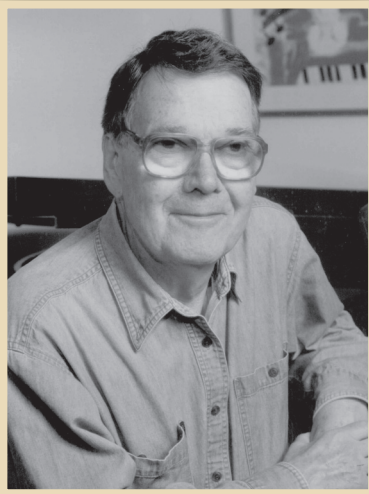


My Life with a Theory



*John L. Holland's
Autobiography
and Theory of
Careers*

Jack R. Rayman
Gary D. Gottfredson
EDITORS

NCDA | National Career
Development
Association

My Life with a Theory

John L. Holland's Autobiography
and Theory of Careers

Jack R. Rayman and Gary D. Gottfredson
Editors

2020

NCDA | National Career
Development
Association

National Career Development Association

Copyright 2020 Jack R. Rayman and Gary D. Gottfredson.

No part of this book may be reproduced, stored in a retrieval system, or transmitted in any form or by any means, electronic, mechanical, photocopying, recording, or otherwise without prior permission of the publisher:

National Career Development Association
305 North Beech Circle
Broken Arrow, OK 74012

Printed in the United States of America

Library of Congress Cataloging-in-Publication Data

Names: Holland, John L., author. | Rayman, Jack R., editor. | Gottfredson, Gary D., editor.

Title: My life with a theory : John L. Holland's autobiography and theory of careers / Jack R. Rayman and Gary D. Gottfredson, editors.

Description: Broken Arrow, OK : National Career Development Association, [2020] | Includes bibliographical references and index. | Summary: "In 1959, John L. Holland introduced a theory of vocational choices involving personality typology (widely known in the career development field as the Holland Code, or RIASEC). Included with the autobiography are book chapters, journal articles and other original source material that will enhance the reader's understanding of both the theory and the scientist" -- Provided by publisher.

Identifiers: LCCN 2020004681 (print) | LCCN 2020004682 (ebook) | ISBN 9781885333612 (paperback) | ISBN 9781885333612 (adobe pdf)

Subjects: LCSH: Holland, John L. | Psychologists--United States--Biography. | Typology (Psychology) | Vocational interests--Testing.

Classification: LCC BF109.H58 A3 2020 (print) | LCC BF109.H58 (ebook) | DDC 150.92 [B]--dc23

LC record available at <https://lcn.loc.gov/2020004681>

LC ebook record available at <https://lcn.loc.gov/2020004682>

NCDA opposes discrimination against any individual based on age, culture, disability, ethnicity, race, religion/spirituality, creed, gender, gender identity and expression, sexual orientation, marital/partnership status, language preference, socioeconomic status, or any other personal characteristic not specifically relevant to job performance.
(Approved by the NCDA Board – October 2012)

TABLE OF CONTENTS

Editors' Introduction	viii
Organization of the Book	viii
A Note on Editorial Approach	xi
Acknowledgements	xii
SECTION 1: Holland's Theory In His Own Words	1
Chapter 1.1. Introduction To The Theory	3
A Summary of the Theory	3
Background Concepts and Origins	8
Loose Ends	14
Summary	16
References	17
Chapter 1.2: Two Parallel Typologies	21
What Is the Classification? Two Parallel Typologies	21
Person-Environment Interactions	28
Using Listings of Holland Codes	28
Using Indexes of Holland Codes	29
Some Interpretations and Cautions	30
Some Frequently Asked Questions	32
References	35
SECTION 2: My Life with a Theory: An Autobiography by John L. Holland	37
Editors' Introduction to the Autobiography	38
Preface	40
Contents of the Autobiography	43
Chapter 2.1: A Theory of Careers: Origins and Outcomes	44
College Education (1938–1942)	44
Military Career (1942–1946)	45

Graduate School (1946–1952)	45
Western Reserve University (1950–1953)	46
VA Hospital at Perry Point (1953–1956)	48
National Merit Scholarship Corporation (1957–1963)	50
American College Testing Program (1963–1969)	52
Johns Hopkins (1969–1980)	58
Theoretical Work	61
Retirement Years (1980–2008)	65
Loose Ends and Omissions	67
Chapter 2.2: Becoming a Researcher	72
Getting Started	72
Finding Funding or Opportunity	73
Learning to Write	74
Training and Developing for Research	75
Finding Your Niche and Style	76
Developing Helpful Habits and Competencies	76
Chapter 2.3: Editorial Encounters	78
Journal Publishing	78
Book and Test Publishing	80
Afterthoughts	85
Chapter 2.4: Living With the Highs and the Lows	87
Getting the Most Out of Your Talents	87
Coping with Negative Events	89
Chapter 2.5: My Research Perspective	95
Research Training	95
Work Experience	97
Controversy	99
The Current Scene	103
Chapter 2.6: Afterthoughts and Omissions	105

SECTION 3: Exhibits	109
Exhibit 3.1: John Holland's Vita	112
Exhibit 3.2: References Not Included in Author's Vita.	130
Exhibit 3.3: Correspondence	135
Letter to President of the State University of Iowa, 1963	136
Letter to the Editor of the College and University Journal, 1965.	137
Letter to W. C. Wolf	139
Letter to John D. Black, 1970.	140
Letter from John D. Black Proposing to Publish the Self-Directed Search, 1970.	142
Form Letter from Imaginary Assistant Replying to Correspondence during Holland's Absence, ca. 1975–1977.	144
Letter to Albert C. Sims of the College Entrance Examination Board, 1971	145
Letter to David P. Campbell, 1972	146
Letter to Ralph F. Berdie, 1973	147
Letter from Lenore W. Harmon Inviting a Submission for a Special Issue, 1973	149
Letter to Lenore W. Harmon Transmitting Farcical Manuscript, 1973. .	150
Enclosure with Letter to Harmon—A Report of a Fictitious Study.	151
Letter from A. R. Pennypacker of Consulting Psychologists Press to John L. Holland Regarding Travel Expense Reimbursement, 1973 ..	153
Letter from Holland to Pennypacker in Protest of Being Nicked-and-Dimed, 1973.	154
Letter from Holland to the President of the University of Minnesota ..	155
Letter from David P. Campbell to Holland	156
Letter from David P. Campbell, 1977.	158
Letter from Holland to L. G. Hodell, 1979	159
Undated Form Letter Turning Down a Request.	160
Letter to Thomas Magoon on the Occasion of Magoon's Retirement, 1981.	161
Letter to Frank B. Womer Agreeing to Do Workshops, 1981.	163
Letter to Robert D. Brown, 1982.	164

Exhibit 3.4: Notes, Papers, Talks	165
Exhibit 4A: The Meaning of “Interests”	166
Exhibit 4B: The Vocational Preference Inventory	171
Exhibit 4C: A Theory-Ridden, Computerless, Impersonal Vocational Guidance System	175
Exhibit 4D: Final Report of the Careers and Curricula Program	178
Exhibit 4E: Vocational Guidance for Everyone	182
Exhibit 4F: Reducing Sexual Inequality.	183
Exhibit 4G: Some Recent Discoveries in Career Research and Development	187
Exhibit 4H: My Life with the SDS	195
Exhibit 4I: Separate But Unequal is Better	201
Exhibit 4J: Some Recollections of Jack Darley	203
Exhibit 4K: My Life with a Theory.	205
Exhibit 4L: New and Old Perspectives.	212
Exhibit 3.5: Gender and Theoretical Controversy	214
Exhibit 5A: The Influence of Vocational Interest Inventories: Some Implications for Psychological Testing	216
Exhibit 5B: Toward Beneficial Resolution of the Interest Inventory Controversy.	226
Exhibit 5C: Letter to Melvin Novick, 1992	240
SECTION 4: Perspectives on Holland’s Contributions to Research and Practice	243
Editors’ Introduction to Section 4.	244
Chapter 4.1: John L. Holland’s Contributions to Vocational Psychology: A Review and Evaluation	246
The Contributions.	247
Common Themes and Working Styles	258
The Unexplored Agenda	262
Conclusion.	266
References	267

Chapter 4.2. The Meaning and Measurement of Environments in Holland's Theory	277
Holland's Environmental Formulations.	278
Assessment of Holland Environmental Models	280
Assessing the Construct Validity of Holland's Occupational Types	286
Relationship to Other Approaches in Assessing Environments.	291
Conclusions about Holland's Contributions.	292
References	292
Chapter 4.3: Holland's Theory and Career Intervention: The Power of the Hexagon	296
Utility of Holland's Theory	297
Career Interventions Spawned by the Holland Theory.	299
Why Do Holland Theory-Based Interventions Work?	303
Final Thoughts	306
References	306
 SECTION 5: Personal Recollections and Tributes	311
Chapter 5.1: A Tribute to John L. Holland: Psychologist, Theoretician, Scholar, Researcher, Counselor and Friend.	313
Chapter 5.2: Reminiscences of John L Holland.	316
Chapter 5.3: John L. Holland (1919–2008)	319
Chapter 5.4: Australian Obituary, John L. Holland 1919–2008	322
 SECTION 6: Resources for Instruction: Photographs, Videos, PowerPoint Presentation	325
 SECTION 7: Appendices	339
Appendix 7.1: Glossary of Holland Theoretical Terms	340
Appendix 7.2. Names Mentioned in Holland's Autobiography	342
Appendix 7.3: Abbreviations or Acronyms Used	349
Appendix 7.4: Index	353

EDITORS' INTRODUCTION

Holland's theory of vocational personalities and work environments has had massive influence on the practice of career counseling, the classification of occupations, and the conduct of career development. Our principal intent in this book is to make public Holland's autobiography entitled, "My Life with a Theory." We have also included book chapters and journal articles that we believe will enhance reader understanding of both the theory and the scientist.

The material assembled in this volume is also intended to serve as a resource for teaching graduate students about Holland's theory, the scientist, and the tools and methods he developed. The book provides in one place original statements of the theory by Holland, articles about the nature of the scientific and professional contributions widely used by counseling professionals today, and evaluations (admittedly with a positive bias) of those contributions. Indeed, we expect that the main audiences for this book will be counselor educators, counseling psychology faculty, career practitioners and graduate students in counseling and psychology.

ORGANIZATION OF THE BOOK

The book is organized into seven sections as follows.

Section 1: Presentation of the Holland Theory in Holland's Own Words

The first chapter of this section consists of an introduction to the Holland Theory in the author's own words. It is reprinted here with permission of the publisher¹. This is a true original source—an opportunity for counselors, educators, students, and researchers to read John Holland's description of the theory in his own words rather than a second- or third-hand interpretation of the theory. Similarly, the second chapter provides another original source. It is excerpted from "Introduction to Using Holland Codes" from the *Dictionary of Holland Occupational Codes*.² Whereas the first chapter gives greater emphasis to the personality typology, the second chapter emphasizes the environmental models in the dual typology.

1 From *Making Vocational Choices: A Theory of Vocational Personalities and Work Environments* (3rd ed.) by J. L. Holland, 1997, Psychological Assessment Resources, Inc. Reprinted with permission.

2 From *Dictionary of Holland Occupational Codes*, (3rd ed., pp. 1-16) by G. D. Gottfredson and J. L. Holland, 1996, Psychological Assessment Resources, Inc. Reprinted with permission.

Section 2: Holland's Life with a Theory

The second section of the book is Holland's previously unpublished autobiography. It consists of six chapters in John's own words with explanatory notes from us. The chapters cover the origins of Holland's theory, influences on his development as a scientist, his encounters with editors, personal and emotional experiences of criticism, setbacks, successes, and his perspectives on the conduct of research. The autobiography ends with a final chapter in which Holland gets a few remaining issues off his chest.

Section 3: Exhibits

The third section is an extension of the autobiography. As he wrote the memoirs in Section 2, Holland assembled documents to which he wished to call readers' attention. It was his intention that these additional documents (which we call "exhibits") be published as appendices along with his autobiography. We have assembled these documents into five numbered exhibits.

The first exhibit is Holland's vita. It serves as a reference list for much of the literature cited in the autobiography. The second exhibit is a supplementary list of references cited in the autobiography but not listed in the vita. To this list, we have added items cited in our editorial notes to the autobiography. The third exhibit contains correspondence related to Holland's memoir that expressed some of his views at multiple points in his career. A number of unpublished papers or talks explaining his views appear in a fourth exhibit. Of special importance are articles and other material concerning controversies about his theory and about issues of sex fairness and sex bias found in Exhibit 5.

Holland had intended to include a larger number of documents to be published together with his autobiography. We have selected the items presented in Section 3 from this larger set of documents. Several of the omitted items have been published elsewhere and so are easily available. Others present material we judged not to be of wide interest to readers or that seemed relatively less important. Serious scholars can find the entire set of materials in a Holland Collection maintained by the University of Missouri Library (Accession No. CA6195).

Section 4: Perspectives on Holland's Contributions to Research and Practice

The fourth section of the book consists of three articles that highlight Holland's contributions to the field of counseling psychology, career counseling, and career development research and theory. These articles are reprinted from a *Festschrift* published in the *Journal of Vocational Behavior* in 1999. In one, Rayman and Atanasoff explain the usefulness and appeal of the *Self-Directed Search*, a self-administered and self-interpreted vocational assessment. In a second, Holland collaborators Linda Gottfredson and James M. Richards, Jr., explain the

importance and uses of the environmental taxonomy. Finally, the third examines the depth and breadth of Holland's scientific and practical contributions that span not only counseling and vocational behavior but extend to research on higher education, the selection of college students, and other topics; and it demonstrates how Holland's research style influenced the productivity of other scientists.

Section 5: Personal Recollections and Tributes

The fifth section includes a tribute to Holland by Jack Rayman, reminiscences of work with Holland by Doug Whitney, Holland's Australian obituary by James Athanasou, and Holland's obituary by Gary Gottfredson, which appeared in *American Psychologist*.

Section 6: Photographs, Videos, and Presentations

In section six we have included photographs and links to several short video clips of Holland interactions in an attempt to convey Holland's personality and humanity as well as to provide materials of use to educators engaged in the preparation of future counseling professionals.

One of these instructional aids is a PowerPoint presentation by Gary Gottfredson entitled, "A Natural History of the Development of Talent: Illustrations from the Career of John L. Holland (1919–2008)."

Section 7: Glossary and Indices

The final section provides a biographical glossary, a glossary of terms used in Holland's theory, and an index to subjects and authors cited. The biographical glossary is included because we assume that many of today's readers will be unfamiliar with the personages mentioned by Holland in his autobiography. The glossary of theoretical terms is included to assemble in one place definitions of terms, some of which are not always understood correctly by educators and students.

A NOTE ON EDITORIAL APPROACH

The topics and material covered in this book span half a century—the mid-1950s through 2008. Over that period, customs of language use, the vocational behavior of men and women, and perspectives on many topics shifted markedly. In editing material written by Holland and others, we have eschewed making changes in wording or views expressed to make these appear more felicitous from a contemporary perspective. We have done this to preserve the fidelity of the historical record and to allow readers to see firsthand the evolution of Holland's views over time. We have sparingly corrected occasional errors in Holland's manuscript, however. We have done this sparingly for two reasons. First, both of us had counseled Holland on drafts of his autobiography. Second, in cases where he apparently did not heed our counsel and where we might have put matters differently, Holland should have the last word.

Today's readers will sometimes find references to assessment technologies, methods, or topics unfamiliar. Where we thought unfamiliarity might pose obstacles to understanding, we have added clearly labeled editorial notes to provide clarification for contemporary readers, while letting Holland's original wording stand.

Finally, we encourage readers to bear in mind the historical context in which Holland worked, lived and wrote. We have included articles, papers, documents and letters written before some of the conventions of socially sensitive discourse in use today were widespread. We know that, taken out of context, some of this writing could be misinterpreted in view of the social and political sensitivities of today. And we know that some readers will react negatively to some of the opinions Holland expressed or the ways he expressed them. There is no way to please everyone and at the same time accurately describe the character, scholarship, leadership and humanity of the subject of this book. We urge readers who react negatively to some parts of the book to remain open to Holland's valuable contributions. As Holland himself wrote, "Read our reports and examine the data."

Readers will note that editorial introductions are set in gray boxes so as to be

distinguished from the selected material.

ACKNOWLEDGEMENTS

We are grateful for the experience of knowing and working with John L. Holland, our friend, colleague, and confidant. For decades, we have benefited from his counsel, support, consolation, goading, encouragement, and admonitions. Both of us read multiple drafts of Holland's autobiographical manuscript while he was preparing it. As was his custom, he heeded some of our advice on the manuscript. Probably the most frequent reason Holland decided not to heed our advice was that we might have toned down the earnestness, directness, humor, or humility too much for his taste. However that may be, his earlier drafts were somewhat more earnest, direct, humorous, and humble than his final manuscript. Others who advised Holland on drafts of his manuscript include George C. Doub, Jo-Ida C. Hansen, Paul Power, and Keith Taylor.

We are grateful to the National Career Development Association (NCDA) for allowing us the opportunity to bring Holland's plan to publish his autobiography to fruition. Putting this book together is a major project, and it reflects the professional dedication of the Association and its staff that it has undertaken this project. Several individuals from NCDA were helpful in the development of this project: Spencer Niles, Deneen Pennington, Melanie Reinersman, and Emily Bullock Yowell helped advance the publication of this book. We know our blunt descriptions at times caused pain to our editors; we are grateful for their forbearance and regret the discomfort we caused.

We thank the publishers of the material reprinted here for their generous permission to reprint it.

- Psychological Assessment Resources, Inc., (PAR) the publisher of the *Self-Directed Search*, kindly allowed us to reproduce chapters from two of its books so that readers of this volume have direct access to Holland's statements of his theory. PAR's president, R. Bob Smith, III, has been a long-time supporter of the theory and associated assessment tools.
- Elsevier, the publisher of the *Journal of Vocational Behavior* and the *Festschrift* in honor of Holland that originally published several of the articles reprinted here allowed us to reprint several articles from that journal. Mark Savickas, who edited the *Journal of Vocational Behavior* for many years made publication of the *Festschrift* possible, and has been a font of sage advice for the editors for years on professional, scientific, and political matters.
- The American Psychological Association and the National Career Development Association permitted us to reprint tributes to Holland

published after his death.

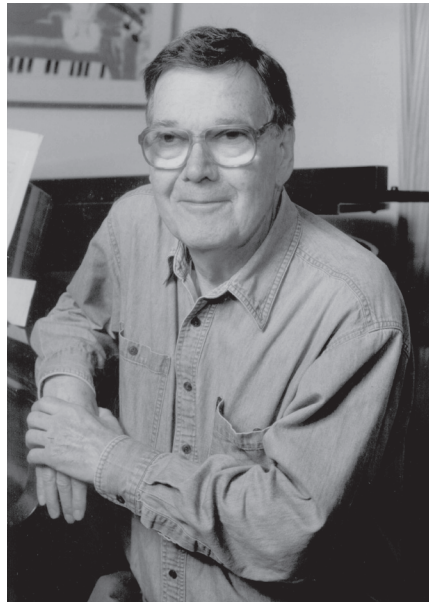
Of course, we are grateful to several authors whose work is reprinted here for their contributions. These authors include Lynne Atanasoff, James Athanasou, Linda S. Gottfredson, James M. Richards, Jr., and Douglas R. Whitney.

W. Bruce Walsh and Jane Walsh made a gift to the American Psychological Foundation (APF) to initiate a program of small grants to support research related to Holland's theory and related matters. We are grateful for their efforts to promote research in this area, and the NCDA has kindly agreed to contribute the royalties from the sales of this book to that APF grant program.

Richard Lamb, Fred Borgen, Mark Savickas and others (friends, colleagues, and acquaintances) added value to the work by providing information about historical details we did not witness. Zi Young Kang read Holland's manuscript to help us identify terms with which the current generation of counseling professionals may not be familiar. Upon her advice we added multiple editor notes to enhance contemporary understanding.

The administrators of John Holland's estate, John Cavagna and Joan Holland (both of whom had been unaware of Holland's work to develop his autobiography), assisted in the publication of this book by giving permission to publish Holland's autobiography posthumously. Finally, the University of Missouri Library which is a repository for Holland's papers, provides a valuable resource for scholars who may wish to pursue further the material covered in this book.

Jack R. Rayman
Gary D. Gottfredson
January 2020



John L. Holland seated by his piano, 1997.

Photo by Bill Rettberg

SECTION 1

HOLLAND'S THEORY IN HIS OWN WORDS

The two chapters in this section present Holland's theory of vocational personalities and work environments as he expounded it. Holland introduced a theory of vocational choices—what later came to be known as *Holland's Theory*—in an article published in 1959. The resemblance of his last exposition of his theory in 1997 to the first statement is clear. Both embrace a personality typology involving six models, and most of the other foundations have persisted to this day. But over time Holland used evidence from his prolific program of research, increasing sophistication about theory construction, and the development of tools for putting the ideas in the theory to work. He revised, extended, or clarified the original ideas in publications in 1966, 1973, 1976, 1985, and 1997.

Over the same period of time, and extending to the present, textbook and other authors have tried to summarize or explain the theory. These secondary accounts usually describe some of the main features and applications of the theory, but not all. Further, perfect scholarship is an elusive ideal, and some secondary accounts present errors or misunderstandings. One antidote for imperfect secondary accounts is to read the theorist's own original accounts of the theory. This section makes taking the antidote easy. Chapter 1.1 is Holland's introduction to the theory. It is reprinted from his 1997 book stating the most recent version of the theory. Chapter 1.2 provides more emphasis on the dual personality and environmental typologies. It is adapted from the 1996 *Dictionary of Holland Occupational Codes*.

CHAPTER 1.1

INTRODUCTION TO THE THEORY³

The purpose of this book is to present a revised theory of careers and its applications to vocational life. I show more completely than before (Holland, 1985a) how a theory of careers can be used to explain common career phenomena, to report some new insights and supportive research, and to spell out the implications of these ideas for career counseling and other forms of vocational assistance. The theory provides explanations for three common and fundamental questions:

1. What personal and environmental characteristics lead to satisfying career decisions, involvement, and achievement; and what characteristics lead to indecision, dissatisfying decisions, or lack of accomplishment?
2. What personal and environmental characteristics lead to stability or change in the kind and level of work a person performs over a lifetime?
3. What are the most effective methods for providing assistance to people with career problems?

The primary concern of the theory is to explain vocational behavior and to suggest some practical ideas to help young, middle-aged, and older people select jobs, change jobs, and attain vocational satisfaction. To a lesser degree, the theory also concerns personal competence, educational behavior, social behavior, and personality. The inclusion of these areas is the natural outcome of the development of the theory as it has acquired greater clarity of statement and more evidence for a wider range of usefulness. The following section summarizes the main ideas. The remainder of the book elaborates these ideas, summarizes the scientific evidence for their validity, and shows how to apply them to selected vocational, personal, educational, and industrial problems.

A Summary of the Theory

The theory consists of several simple ideas and their more complex elaborations. First, we can characterize people by their resemblance to each of six personality types: Realistic, Investigative, Artistic, Social, Enterprising, and Conventional. The more closely a person resembles a particular type, the more likely he or she is to exhibit the personal traits and behaviors associated with that type. Second,

³ Reproduced by special permission of the publisher, Psychological Assessment Resources, Inc., 16204 North Florida Avenue, Lutz, FL 33549, from *Making Vocational Choices*, Third Edition, Copyright 1973, 1985, 1992, 1997 by Psychological Assessment Resources, Inc. All rights reserved.

the environments in which people live and work can be characterized by their resemblance to six model environments: Realistic, Investigative, Artistic, Social, Enterprising, and Conventional. Finally, the pairing of persons and environments leads to outcomes that we can predict and understand from our knowledge of the personality types and the environmental models. These outcomes include vocational choice, vocational stability and achievement, educational choice and achievement, personal competence, social behavior, and susceptibility to influence.

Four working assumptions constitute the heart of the theory. They indicate the nature of the personality types and environmental models, how the types and models are determined, and how they interact to create the phenomena—vocational, educational, and social—that the theory is meant to explain.

1. *In our culture, most Persons can be categorized as one of six Personality types: Realistic, Investigative, Artistic, Social, Enterprising, or Conventional.*

The description of each type (see chapter 2) is both a summary of what we know about people in a given occupational group and a special way of comprehending this information: It is a theoretical or ideal type. A type is a model against which we can measure the real person.

Each type is the product of a characteristic interaction among a variety of cultural and personal forces including peers, biological heredity, parents, social class, culture, and the physical environment. Out of this experience, a person learns first to prefer some activities as opposed to others. Later, these preferred activities become strong interests; such interests lead to a special group of competencies. Finally, these interests and competencies create a particular personal disposition that leads the person to think, perceive, and act in special ways. For example, people who resemble the Social type are more likely to seek out Social occupations such as teaching, social work, or the ministry. They would be expected to see themselves as friendly and social and to have more social competencies (e.g., helping others with personal problems) than realistic competencies (e.g., using tools or understanding machines). They would value socially oriented problems or tasks: helping others, serving a community, upholding religion.

In short, each personality type has a characteristic repertoire of attitudes and skills for coping with environmental problems and tasks. Different types select and process information in different ways, but all types seek fulfillment by exercising characteristic activities, skills, and talents and by striving to achieve special goals. Consequently, types are often active rather than passive recipients of environmental influence because they both seek and avoid environments, problems, and tasks.

By comparing a person's attitudes with those of each model type, we

can determine which type he or she most resembles. That model represents a person's dominant personality type. Then we can also determine what other types a person resembles. For example, a person might resemble a Social type most, then an Enterprising type, and then the other types in descending order. The total resemblance to each of the six types forms a pattern of similarity and dissimilarity—the individual's personality pattern. Thus we obtain a profile of resemblances that allows for the complexity of personality and avoids some of the problems inherent in categorizing a person as a single type. A six-category scheme built on the assumption that there are only six kinds of people in the world is unacceptable on the strength of common sense alone. But a six category scheme that allows a simple rank ordering of a person's resemblance to each of the six models provides the possibility of 720 different personality patterns or repertoires for coping with that person's environment.

To estimate a person's profile or personality pattern, we can use one of several methods: the person's scores on selected scales from interest and personality inventories, choice of vocation or field of training, work history or history of preemployment aspirations, or combinations of these data. For example, certain scales of the Vocational Preference Inventory (VPI; Holland, 1985b), the Self-Directed Search (SDS; Holland, Powell, & Fritzsche, 1994), and the Strong Interest Inventory (SII; Harmon, Hansen, Borgen, & Hammer, 1994) have been designated as estimates of the types. The procedure is to have a person take an inventory, score it, and profile the appropriate scales. The profiles can then be interpreted by applying the descriptions of the types.

2. There are six model environments: Realistic, Investigative, Artistic, Social, Enterprising, and Conventional.

Each environment is dominated by a given type of personality, and each environment is typified by physical settings posing special problems and opportunities. For example, Realistic environments are "dominated" by Realistic types of people—that is, the largest percentage of the population in the Realistic environment resembles the Realistic type. A Conventional environment is dominated by Conventional types.

Because different types have different interests, competencies, and dispositions, they tend to surround themselves with special people and materials and to seek out problems that are congruent with their interests, competencies, and outlook on the world. Thus, where people congregate, they create an environment that reflects the types they most resemble, and it becomes possible to assess that environment in the same terms as we assess people individually. One method of accomplishing this task is to count the number of different types in an environment. The distribution of types is then converted to percentages of the

total number of people in the environment. The environment is represented by six percentages and is interpreted by the environmental formulations presented in chapter 3.

3. People search for environments that will let them exercise their skills and abilities, express their attitudes and values, and take on agreeable problems and roles.

Realistic types seek Realistic environments, Social types seek Social environments, and so forth. Environments also search for people through friendships and recruiting practices. The person's search for environments is carried on in many ways, at different levels of consciousness, and over a long period of time. The personality types epitomize some common ways in which people develop in our culture. They also illustrate how personal development channels a person's goals, vocational choices, and mobility.

4. Behavior is determined by an interaction between personality and environment.

If we know a person's personality pattern (or profile) and the pattern of his or her environment, we can, in principle, use our knowledge of personality types and environmental models to forecast some of the outcomes of such a pairing. Such outcomes include choice of vocation, job changes, vocational achievement, personal competence, and educational and social behavior.

These four key assumptions are supplemented by several secondary assumptions that can be applied to both persons and environments. The purpose of these secondary concepts is to moderate or qualify predictions or explanations that are derived from the main concepts. For example, a well differentiated, consistent, Realistic type with a clear sense of identity, as contrasted with a Realistic type without these attributes, would be expected to exhibit more realistic attitudes, behaviors, and choices.

Consistency

Within a person or an environment, some pairs of types are more closely related than others. For example, Realistic and Investigative types have more in common than Conventional and Artistic types. Consistency is the degree of relatedness between personality types or between environmental models. Degrees of consistency or relatedness are assumed to affect vocational preference. For instance, a person who most resembles the Realistic type and next most resembles the Investigative type (i.e., a Realistic-Investigative person) should be more predictable than a Realistic-Social person.

Differentiation

Some persons or environments are more clearly defined than others. For instance, a person may closely resemble a single type and show little resemblance to other types, or an environment may be dominated largely by a single type. In contrast, a person who resembles many types or an environment that is characterized by about equal numbers of the six types is undifferentiated or poorly defined. The degree to which a person or an environment is well defined is called the degree of differentiation.

Identity

This concept provides an estimate of the clarity and stability of a person's identity or the identity of an environment. Personal identity is defined as the possession of a clear and stable picture of one's goals, interests, and talents. Environmental identity is present when an environment or an organization has clear and integrated goals, tasks, and rewards that are stable over long time intervals.

Identity, consistency, and differentiation are all concerned with the clarity, definition, or focus of the main concepts—personality types and environmental models. They probably represent three techniques for assessing the same concept.

Congruence

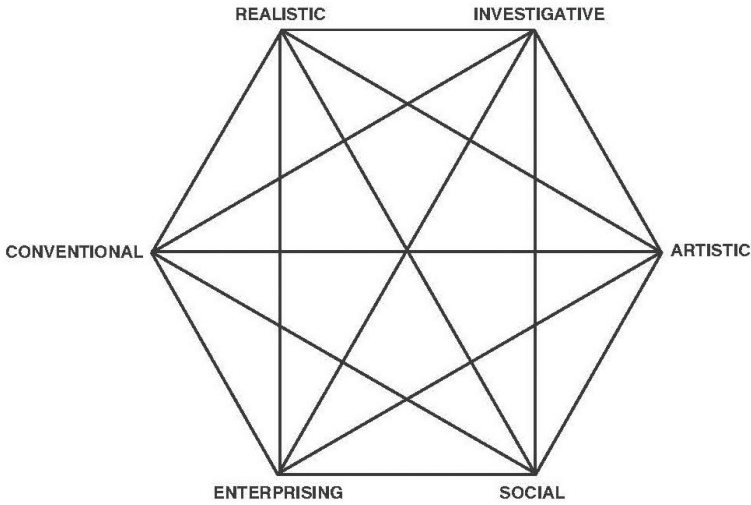
Different types require different environments. For instance, Realistic types flourish in Realistic environments because such an environment provides the opportunities and rewards a Realistic type needs. Incongruence occurs when a personality type lives in an environment that provides opportunities and rewards foreign to that person's preferences and abilities—for instance, a Realistic type in a Social environment.

Calculus

The relationships within and between personality types or environments can be ordered according to a hexagonal model in which the distances among the types or environments are inversely proportional to the theoretical relationships between them. This spatial arrangement provides explicit definitions of both consistency of a person or an environment (three levels) and congruence of person and environment (four levels). In this way, the internal relationships of the theory are defined and organized by a single geometrical model (see Figure 1).

Figure 1

A hexagonal model for defining the psychological resemblances among personality types and environments and their interactions.



Background Concepts and Origins

The theory comes from and rests upon the work of many individuals. This section provides a brief account of the main origins of the theory and some additional background principles that I have either proposed or borrowed from others. These ideas are important to the theory but usually less so than the main ideas summarized earlier in this chapter.

Origins

The formulations for the types grew out of my experience as a vocational counselor in educational, military, and clinical settings. That experience, the vocational literature, and the construction of the Vocational Preference Inventory (VPI; Holland, 1958) gradually led me to the notion that it might be helpful to categorize people in terms of interest or personality types.

The idea for a typology resulted from the frequent observation that several broad classes account for most human interests, traits, and behaviors. In a now obscure article, Darley (1938) suggested the potential value of organizing our knowledge according to occupational stereotypes. As a beginning, I used six scales of the Vocational Preference Inventory that correspond to the present personality

types: Realistic, Investigative, Artistic, Social, Enterprising, and Conventional. Somewhat later, I was impressed and reassured by the comprehensive factor analysis of human interest (Guilford, Christensen, Bond, & Sutton, 1954), which obtained six major factors to account for the diversity of interests and personality traits: mechanical, scientific, social welfare, clerical, business, and esthetic.

The present types are analogous in some ways to the types proposed earlier by Adler (1939), Fromm (1947), Jung (1933), Sheldon (1954), Spranger (1928), and later by Gordon (1975) and Welsh (1975). They differ from the earlier typologies in both their origin (which is largely the vocational literature) and their empirical definitions (see chapter 2⁴). In addition, I have tried to formulate a clear, testable structure for each type and to conform with as many scientific principles of logic and evidence as possible.

The notion of assessing environments by characterizing the people in a particular environment came from Linton (1945), who suggested that a major portion of the force of the environment is transmitted through other people. The typology thus became a method for engineering Linton's idea—that is, by calculating the distribution of types in an environment, you will know the environment. This hypothesis led to the development of the Environmental Assessment Technique (EAT; Astin & Holland, 1961), which was first used to describe college environments.

The assumption that human behavior depends upon both personality and the specific environment in which a person lives has a long history. However, Murray's (1938) formulations of personal "needs" and environmental "presses" were the immediate stimulus for the use of personality types and environmental models in the theory.

Throughout the development and study of the theory, I have been impressed with the need for pragmatism. Any research study requires much time and many resources, so I have tried to limit the use of the theory to simple, inexpensive, practical definitions and measures. Further, I have hoped that the elaboration of these simple approaches would be sufficient to cope with much of the complexity of human behavior and human environments; much of the research now supports the value of these strategies.

I have also been concerned with developing an elegant and symmetrical theory. The development of parallel sets of types and environments and the discovery of the hexagonal model (see Figure 1) came partly from a personal preference for symmetry. I agree with Mohr (1982) that longer lists of variables and more elaborate theories are unlikely to succeed and will be less likely to be tested or used.

4 Editors' note: Holland is referring to Chapter 2 of his 1997 book.

Background Principles

In developing the typology and the environmental models, a number of principles seemed plausible, or at least hard to imagine as false. These six principles are enumerated below, along with some arguments for their acceptance.

1. *The choice of a vocation is an expression of personality.*

For many years it was popular to interpret individuals' scores on vocational interest inventories and their choices of vocation as a function of their "vocational interests," as if these interests were different from or independent of personality. Some early work of Strong (1943) and Super and Crites (1962) epitomizes the view that vocational interests measure only interests, vocational choices, and vocational preferences. A long history of adherence to this concept produced an independent literature known as "interest measurement."

More recent knowledge about the personal and environmental factors associated with vocational choice, job changes, and vocational achievement has revealed the need for a broader conception. We have learned that vocational preferences are sometimes moderately correlated with personality and originality scales (Holland, 1963), self-ratings of ability, personality traits, and life goals (Baird, 1970), parental attitudes (Medvene, 1969), objective perceptual tests (Crutchfield, Woodworth, & Albrecht, 1958), and many other psychological and sociological variables. The most recent evidence (summarized in chapter 6⁵) continues to support the assumption that interests are an expression of personality. For many years, writers have suggested the need for a more comprehensive view of vocational preferences and interests: "Interest inventory scores are measures of self-concept" (Bordin, 1943); "vocational interest measurement is a special case in personality theory" (Darley & Hagenah, 1955); "vocational choice is a developmental process" and is, in large part, "the implementation of a person's self-concept" (Super, 1972). These orientations consistently imply that people's vocational interests flow from their life history and personality.

If vocational interests are construed as an expression of personality, then they represent the expression of personality in work, school subjects, hobbies, recreational activities, and preferences. In short, what we have called "vocational interests" are an important aspect of personality. Just as we have developed theories of personality from our knowledge of sexual and parental relationships, so we can construct theories of personality from our knowledge of vocational life. We can then reinterpret vocational interests as an expression of personality. The theory is mainly an engineering of this key idea.

5 Editors' note: Referring to Holland's 1997 book.

2. Interest inventories are personality inventories.

If vocational interests are an expression of personality, then it follows that interest inventories are personality inventories. Forer (1948) was probably the first to develop an inventory to assess personality from interests and activities and to illustrate how a person's responses to apparently neutral content (i.e., vocational interests and activities) could be interpreted as expressions of various dimensions of personality. Although Forer did not put his ideas to a direct scientific test, he did show that we can distinguish a great variety of medical and psychiatric groups (asthmatics to schizophrenics) by their scores on various scales of one interest inventory, the Kuder Preference Record (Forer, 1951). Forer's theorizing led to the construction of my Vocational Preference Inventory (Holland, 1958, 1977, 1985b), a personality inventory composed entirely of occupational titles. In general, the scales were developed by hypothesizing that preferences for occupations are expressions of personality. The rationale for the development of the inventory contains a more complete statement of this hypothesis:

The choice of an occupation is an expressive act which reflects the person's motivation, knowledge, personality, and ability. Occupations represent a way of life, an environment rather than a set of isolated work functions or skills. To work as a carpenter means not only to use tools but also to have a certain status, community role, and a special pattern of living. In this sense, the choice of an occupational title represents several kinds of information: the S's motivation, his knowledge of the occupation in question, his insight and understanding of himself, and his abilities. In short, item responses may be thought of as limited but useful expressive or projective protocols. (Holland, 1977, p. 5)

The development and validation of the Vocational Preference Inventory (Holland, 1977) made it clear that vocational preferences are indeed signs of personality traits. Work by Baird (1970), Campbell (1971), and others also shows that interest scales are related to a person's values, academic achievement, liberalism, adventurousness, and other personal characteristics. And Staats, Gross, Guay, and Carlson (1973) applied Staats' attitude-reinforcer discriminative theory to selected items of the Strong Vocational Interest Blank (SVIB; Campbell, 1971) and demonstrated in three experiments that interest items have emotion-eliciting properties, that items can serve as rewards or punishments, and that measured interests can indicate the stimuli that have discriminative control over the individual's approach and avoidance behavior. Staats et al. supplied persuasive and explicit data for assuming that a person's interests are useful for understanding personality and that earlier assumptions such as "an interest inventory is a record

of a person's reinforcement history" have merit. Or, in Staats' words, "an interest inventory...samples the events that have learned emotional value."

To summarize, it seems useful to interpret vocational interest inventories as personality inventories. Moreover, the content of vocational interest inventories provides scales whose reliabilities and validities approximate those obtained for other methods for assessing personality.

3. *Vocational stereotypes have reliable and important psychological and sociological meanings.*

Just as we judge people by their friends, dress, and actions, so we judge them by their vocations. Our everyday experience has generated a sometimes inaccurate but apparently useful knowledge of what people in various occupations are like. Thus, we believe that carpenters are handy, lawyers aggressive, actors self-centered, salespeople persuasive, accountants precise, scientists unsociable, and the like. In earlier years, social scientists were skeptical of the accuracy of this amorphous folklore of vocational stereotypes (some still are), but research makes it clear that many have some validity.

O'Dowd and Beardslee (1960, 1967) have demonstrated that occupations are perceived in much the same way by high school students, college students, college faculty, and men versus women. They also found that one's social status makes only small differences in the perception of occupations and that occupational stereotypes change only slightly during 4 years of college. And Marks and Webb (1969) demonstrated that students entering the fields of industrial management or electrical engineering possess "a fairly accurate image—assuming the professionals know what they are talking about—of the typical incumbent of the intended occupation." Their elaborate study of two occupational titles by three levels of experience—freshmen, seniors, and professionals before, during, and after training—practically closes the door on the argument that inexperienced and experienced people do not see an occupation in similar ways. In addition, L. S. Gottfredson (1981) has provided a more recent summary that supports and extends these early studies. In short, people of different ages and backgrounds have characteristic perceptions of an occupation: its appropriateness for men and women, its level of prestige, and the personal traits of the typical incumbent.

These findings have considerable and pervasive importance for vocational behavior. Most interest inventories rest heavily on the assumptions that people perceive common occupations and their associated activities accurately and that these perceptions remain the same over long periods of time. In the same way, a person's vocational preferences and choices rest on the same assumptions. If perceptions of occupations had no validity, interest inventories would have little

or no validity, and the average person would have great difficulty in selecting suitable jobs.

4. The members of a vocation have similar personalities and similar histories of personal development.

If a person enters a given vocation because of a particular personality and history, it follows that each vocation attracts and retains people with similar personalities. Laurent's (1951) study of engineers, physicians, and lawyers documents the similarities in life histories for the members of a vocation. Other studies—for example, Chaney and Owens (1964), Eberhardt and Muchinsky (1984), Kulberg and Owens (1960), Nachmann (1960), and Roe (1956)—support this assumption. And, if we should form classes made up of vocations demanding similar personalities, we would get groups of people who are alike. For example, groups of scientists such as physicists, chemists, and mathematicians should be grossly similar because the evidence indicates that physical scientists have something in common.

5. Because people in a vocational group have similar personalities, they will respond to many situations and problems in similar ways, and they will create characteristic interpersonal environments.

For example, Astin and Holland (1961) were able to predict what college students would say about their college and about their fellow students. The method entails a simple census of the number of students in each of six curricular groups: Realistic, Investigative, Social, Conventional, Enterprising, and Artistic. The percentage of students in each curricular group at a given college becomes the profile of that college. We found, for example, that the percentage of students in the Realistic group was correlated with a student's description of the college and its students as pragmatic rather than humanistic. It is possible then to describe a college by a simple census of its members if one has a way to interpret the meaning of membership in various curricula. Other studies (Astin, 1968; Richards, Seligman, & Jones, 1970) have validated these ideas in largescale analyses of educational environments.

6. Vocational satisfaction, stability, and achievement depend on the congruence between one's personality and the environment in which one works.

Just as we are more comfortable among friends whose tastes, talents, and values are similar to our own, so we are more likely to perform well at a vocation in which we "fit" psychologically. Vocational interest inventories are based in part on this assumption. Moreover, the vocational literature is filled with evidence that supports the assumption, although that evidence is not usually interpreted

as relating to the interaction between a particular personality and a particular environment. In the present theory, the congruence of person and environment is defined in terms of the structure of personality types and environmental models. For example, a congruent or fitting environment is one in which a person's preferred activities and special competencies are required and his or her personal disposition and its associated characteristics—a special outlook on the world, role preferences, values, and personal traits—are reinforced.

Loose Ends

The theory, like most theories, has some ambiguities, limitations, and omissions and is prone to some misunderstandings. This brief section will (a) place the theory in the context of related career and personality theory, (b) emphasize how stability and change in career pathways occur, and (c) indicate the role of influential variables such as intelligence, gender, and social class.

Theoretical Context

The theory is a structural-interactive or typological-interactive theory. It is structural or typological because it attempts to organize the vast sea of information about people and jobs. And it is interactive because it assumes that many career and social behaviors are the outcome of people and environments acting on one another. It is not a one-way street; jobs change people, and people change jobs.

Compared with other theories of personality, the theory is a fulfillment model as it assumes that (a) all people look for enjoyment and seek to reach goals that actualize talents, skills, and interests, (b) some goal-oriented activities are conscious and some are not, and (c) all people are active and that “all psychological agents give direction to behavior. Stimuli, prior learning, genes, physiological conditions, developmental processes, almost any psychological or sociological influence exerts its influence by making some response classes more probable than others” (Robert Bolles, 1978, p. 11).

Here it is assumed that interest inventories provide a potent assessment of both psychological and sociological agents, or the behavioral repertoires that such influences create. And the Environmental Assessment Technique (EAT) or job analyses provide information about the environmental characteristics or demands that press for the expression of different activities, goals, coping behaviors, and values.

A particular disposition develops because different people have different biological capacities and life histories. The developmental outcomes of these interactions are characterized as personality types and tend to become well defined between the ages of 18 and 30.

Stability and Change

The average career is both focused and stabilized by relatively constant dispositions, special talents, expectations, irreversible choices, credentials, and other baggage that workers acquire, and by the benign and biased environments everyone encounters at every age. At the same time, some workers do change (or become different types), although career changes or changes in personality are difficult to accomplish and sustain. People trying to change themselves or their careers receive little environmental support and must overcome the cumulative learning associated with a particular job or self-concept such as “I am a teacher, not an executive,” or “I am an inferior person, not a confident one.”

In short, stability is the norm—because workers soon become active seekers of a limited range of congruent jobs and because employers discourage change through common hiring practices and biases of age, appearance, sex, training, and work history. Family, friends, coworkers, and relatives also press for stability because they usually have a stake in a worker’s income, friendship, and power. These generalizations are elaborated as theoretical explanations in chapter 4.⁶

Although the guts of the theory is the interaction of a particular person (personality pattern) in a particular work environment (environmental pattern) within a “closed” system of six personal and six environmental concepts, the theory is at the same time an “open” system within a particular culture. For instance, as the American culture shifts toward greater equality for women, that influence will be reflected in the interest profiles of women. This appears to be happening already. And, as the interests of incumbents and the demands of a particular occupational environment shift, these changes will alter the data used to characterize that occupational environment. Some informal data and old work by David Campbell (1971) imply that some small cultural changes in vocational interests and, therefore, personality occurred between the 1930s and the 1960s, and more may be occurring now.

“Other Things Being Equal...”

The theory cannot be applied successfully without the observance of a few boundary conditions. These are comparable to the instructions supplied with a new computer or VCR. You can ignore them, but don’t complain to the manufacturer when things go wrong.

In this instance I want to emphasize that “other things being equal...” applies to the entire theory and refers to the following characteristics of the person and environment: age, gender, ethnicity, geography, social class, physical assets or

6 Editors’ note: Chapter 4 of Holland’s 1997 book.

liabilities, educational level attained, intelligence, and influence. Most of these variables are incorporated indirectly in the theory, but direct assessments of these variables are also required to secure more positive applications.

For example, the distribution of influence and status within a person's social environment makes a difference. For this reason, researchers must control their experiments for influence and status, and practitioners must make some estimate of the role of influence and status in evaluating environments for their clients. People also acquire perceptions of job-self compatibility—especially gender, prestige, and required effort associated with a job—that focus and limit a person's job search in adolescence (L. S. Gottfredson, 1981) and probably in adulthood. These influences appear most powerful at the extremes of age, sex-role socialization, social class, intelligence, and physical disability. For example, visually impaired college students frequently want to become teachers, tutors, or therapists because these occupations represent the world they know best.

In short, these variables—age, gender, social class, effort required—circumscribe (L. S. Gottfredson, 1981) or reduce the range of careers a person will consider. At the same time, the number of options remaining after the effects of these variables are considered is still large. It is at this point that interest inventories become especially useful for comprehending and sorting out the remaining pool of possibilities. I hope readers will at least include measures of age, gender, social class, and intelligence as well as gross characteristics of the work environment so that the contributions of these influences and the theoretical constructs can be applied or studied in a more integrated way.

Kind and Level of Work

All earlier versions of the theory (Holland, 1959, 1966, 1973, 1985a) have focused more on the kind of work a person performs (e.g., sales, clerical, scientific, mechanical, artistic, educational) than on the level of work a person performs (i.e., its prestige, income, level of talent required, etc.). The earlier versions included a few testable hypotheses about the level of vocational choice and achievement, but these ideas attracted little research attention and apparently got lost among the numerous hypotheses about kind of work. Undaunted, I have again included some formulations for understanding and researching a person's level of vocational aspiration and work performance.

Summary

A typology that includes six personality types, six corresponding occupational environments, and their interactions is offered as a tool for understanding work histories, vocational satisfaction, achievement, and vocational interventions, as

well as for organizing and interpreting personal and occupational data. Some secondary concepts—congruence, consistency, differentiation, and identity—are included to increase the explanatory value of the two main concepts—personality types and environmental models. The origins, theoretical context, and some ambiguities and misunderstandings of the theory are reviewed. The following chapters⁷ offer a more complete exposition: chapter 2, “The Personality Types,” provides detailed descriptions of the theoretical types and their expected performance; chapter 3 specifies “The Environmental Models”; chapter 4, “People in Environments,” shows what happens when different personalities live in different environments; and chapter 5 summarizes early evidence (1959–1984) for the usefulness of the theory. Chapter 6 summarizes more recent evidence (1985–1996); chapter 7 summarizes “Some Theoretical Clarifications and Revisions”; chapter 8 describes the classification system and summarizes the evidence of its validity; and chapter 9 outlines the practical applications of the theory to personal, educational, and industrial problems.

In this revision, the theory has been extended by providing more explicit formulations for the types, the environments, and their interactions. My aim was to improve the internal structure so that the theory would have more explanatory power. In general, readers will find all parts of the theory to be more comprehensive, including more detail. In short, the main ideas are the same as before, but their exposition is more complete and, I hope, more satisfying.

References

- Adler, A. (1939). *Social interest*. New York, NY: Putnam.
- Astin, A. W. (1968). *The college environment*. Washington, DC: American Council on Education.
- Astin, A. W., & Holland, J. L. (1961). The Environmental Assessment Technique: A way to measure college environments. *Journal of Educational Psychology*, 52, 308-316.
- Baird, L. L. (1970). The relation of vocational interests to life goals, self-ratings of ability, and personality traits, and potential for achievement. *Journal of Educational Measurement*, 7, 233-239.
- Bolles, R. C. (1978). Whatever happened to motivation? *Educational Psychologist*, 13, 1-13.
- Bordin, E. S. (1943). A theory of interests as dynamic phenomena. *Educational and Psychological Measurement*, 3, 49-66.
- Campbell, D. P. (1971). *Handbook for the Strong Vocational Interest Blank*. Stanford, CA: Stanford University Press.

⁷ Editors' note: Chapters of Holland's 1997 book.

- Chaney, F. B., & Owens, W. A. (1964). Life history antecedents of sales, research and general engineering interests. *Journal of Applied Psychology, 48*, 101-105.
- Crutchfield, R. S., Woodworth, D. G., & Albrecht, R. E. (1958). *Perceptual performance and the effective person* (ASTIA Document No. AD 151 039). Lackland Air Force Base, TX: Personnel Laboratory, U. S. Air Force.
- Darley, J. G. (1938). A preliminary study of relations between attitude, adjustment, and vocational interest tests. *Journal of Educational Psychology, 29*, 467-473.
- Darley, J. G., & Hagenah, T. (1955). *Vocational interest measurement*. Minneapolis: University of Minnesota Press.
- Eberhardt, B. J., & Muchinsky, P. M. (1984). Structural validation of Holland's hexagonal model: Vocational classification through the use of biodata. *Journal of Applied Psychology, 69*, 174-181.
- Forer, B. R. (1948). A diagnostic interest blank. *Rorschach Research Exchange and Journal of Projective Techniques, 12*, 1-11.
- Forer, B. R. (1951). *Personality dynamics and occupational choice*. Paper presented at the annual meeting of the American Psychological Association, Chicago, IL.
- Fromm, E. (1947). *Man for himself*. New York, NY: Holt, Rinehart and Winston.
- Gordon, L. V. (1975). *The measurement of interpersonal values*. Chicago, IL: Science Research Associates.
- Gottfredson, L. S. (1981). Circumscription and compromise: A developmental theory of occupational aspirations [Monograph]. *Journal of Counseling Psychology, 28*, 545-579.
- Guilford, J. P., Christensen, P. R., Bond, N. A., Jr., & Sutton, M. A. (1954). A factor analysis study of human interests. *Psychological Monographs, 68* (4, Whole No. 375).
- Harmon, L. W., Hansen, J. C., Borgen, F. H., & Hammer, A. L. (1994). *Strong Interest Inventory applications and technical guide*. Stanford, CA: Stanford University Press.
- Holland, J. L. (1958). A personality inventory employing occupational titles. *Journal of Applied Psychology, 42*, 336-342.
- Holland, J. L. (1959). A theory of vocational choice. *Journal of Counseling Psychology, 42*, 6, 35-45.
- Holland, J. L. (1963). Explorations of a theory of vocational choice and achievement: II. A four-year prediction study. *Psychological Reports, 12*, 537-594.
- Holland, J. L. (1966). *The psychology of vocational choice*. Waltham, MA: Blaisdell.
- Holland, J. L. (1973). *Making vocational choices*. Englewood Cliffs, NJ: Prentice-Hall.
- Holland, J. L. (1977). *Manual for the Vocational Preference Inventory*. Palo Alto, CA: Consulting Psychologists Press.
- Holland, J. L. (1985a). *Making vocational choices* (2nd ed.). Englewood Cliffs, NJ: Prentice-Hall.

- Holland, J. L. (1985b). *Manual for the Vocational Preference Inventory*. Odessa, FL: Psychological Assessment Resources.
- Holland, J. L., Powell, A. B., & Fritzsche, B. A. (1994). *The Self-Directed Search professional user's guide*. Odessa, FL: Psychological Assessment Resources.
- Jung, C. G. (1933). *Psychological types*. New York, NY: Harcourt Brace Jovanovich.
- Kuhlberg, G. E., & Owens, W. A. (1960). Some life history antecedents of engineering interests. *Journal of Educational Psychology*, 51, 26-31.
- Laurent, H., Jr. (1951). *A study of the developmental backgrounds of men to determine by means of the biographical information blank the relationship between factors in their early backgrounds and their choice of professions*. Unpublished doctoral dissertation. Western Reserve University.
- Linton, R. (1945). *The cultural background of personality*. New York, NY: Century.
- Marks, E., & Webb, S. C. (1969). Vocational choice and professional experience as factors in occupational image. *Journal of Applied Psychology*, 53, 292-300.
- Medvene, A. M. (1969). Occupational choice of graduate students in psychology as a function of early parent-child interactions. *Journal of Counseling Psychology*, 16, 385-389.
- Mohr, L. B. (1982). *Explaining organizational behavior*. San Francisco, CA: Jossey-Bass.
- Murray, H. A. (1938). *Explorations in personality*. New York, NY: Oxford.
- Nachmann, B. (1960). Childhood experience and vocational choice in law, dentistry, and social work. *Journal of Counseling Psychology*, 7, 243-250.
- O'Dowd, D. D., & Beardslee, D. C. (1960). *College student images of a selected group of professions and occupation* (U.S. Office of Education Cooperative Research Project No. 562 [8142]). Middletown, CT: Wesleyan University.
- O'Dowd, D. D., & Beardslee, D. C. (1967). *Development and consistency of student images of occupations* (U. S. Office of Education Cooperative Research Project No. 5-0858). Rochester, MI: Oakland University.
- Richards, J. M., Jr., Seligman, R., & Jones, P. K. (1970). Faculty and curriculum as measures of college environments. *Journal of Educational Psychology*, 61, 324-332.
- Roe, A. (1956). *The psychology of occupation*. New York, NY: Wiley.
- Sheldon, W. H. (1954). *Atlas of men: A guide for somatotyping the adult male at all ages*. New York, NY: Harper & Row.
- Spranger, E. (1928). *Types of men*. Halle, Germany: Max Niemeyer Verlag.
- Staats, A. W., Gross, M. C., Guay, P. F. & Carlson, D. D. (1973). Personality and social systems and attitude-reinforcer-discriminative theory: Interest (attitude) formation, function, and measurement. *Journal of Personality and Social Psychology*, 26, 251-261.

- Strong, E. K., Jr. (1943). *Vocational interests of men and women*. Stanford, CA: Stanford University Press.
- Super, D. E. (1972). Vocational development theory: Persons, positions, processes. In J. M. Whiteley & A. Resnikoff (Eds.), *Perspectives on vocational development* (pp. 13-33). Washington, DC: American Personnel and Guidance Association.
- Super, D. E., & Crites, J. O. (1962). *Appraising vocational fitness* (rev. ed.). New York, NY: Harper & Row.
- Welsh, G. S. (1975). *Creativity and intelligence*. Chapel Hill, NC: Institute for Research in Social Science, University of North Carolina.

CHAPTER 1.2

TWO PARALLEL TYPOLOGIES⁸

The theory uses two parallel classifications to organize information and make predictions about persons in environments. This chapter describes the dual classifications which evolved from elaborations of Holland's theory over the years and especially from improving empirical evidence about the nature of the personality types and environmental models.⁹

What Is the Classification? Two Parallel Typologies

The occupational—environmental typology is based on a theory of persons and work environments (Holland, 1985/1992). The theory uses a classification of persons to describe and explain individual differences and similarities, and a classification of work environments to describe and explain differences and similarities among positions and occupations. The theory uses both classifications and a small number of additional concepts to explain career choice and persistence, attraction and retention of workers, and job satisfaction and environmental compatibility.

Persons

People can be described by their degree of resemblance to six theoretical personality types labeled Realistic, Investigative, Artistic, Social, Enterprising, or Conventional. Each type is characterized by distinctive preferences, outlooks, competencies, and self-perceptions. In practical application, information about a

8 Reproduced by special permission of the Publisher, Psychological Assessment Resources, Inc. (PAR), 16204 North Florida Avenue, Lutz, FL 33549, from the *Dictionary of Holland Occupational Codes*, Third Edition, by Gary D. Gottfredson, Ph.D. and John L. Holland, Ph.D., Copyright 1982, 1989, 1996. Further reproduction is prohibited without permission from PAR Inc.

9 Editors' Note. Adaptations were made so that this chapter fits in the present publication. For example, here we refer to the *Dictionary of Holland Occupation Codes* (DHOC) whereas the original said "this volume," and we added a couple of introductory sentences to replace the original introductory paragraphs. The present chapter omits some detail related to the use of the indexes in the DHOC and is adapted to be read with the omissions. It adds editors' notes to refer to the Holland codes in the O*NET system which didn't yet exist when this chapter was written.

person's preferences, outlooks, competencies, and self-estimates is used to assess the degree to which an individual resembles each of the six personality types. The Self-Directed Search (SDS; Holland, Powell, & Fritzsche, 1994) is the most direct implementation of the theory for classifying individuals, although a number of other inventories also aim to implement the theory.

The six personality types are briefly described in Table 1. These ideal personality types are used to describe the similarity of any particular individual to one or more of these stereotypical abstractions.

To apply the classification, individuals are described according to their degree of resemblance to the six ideal personality types. The SDS (Holland, Powell, & Fritzsche, 1994) or the Vocational Preference Inventory (VPI; Holland, 1985) can be used to assess the degree of resemblance of a person to the six personality types. The categories into which a person's expressed occupational aspirations or history of employment fall also can be used to estimate the resemblance of a person to the six ideal types.

Environments

The personality types are paralleled by six model environments that also are used to describe the resemblance of specific work environments to abstract models. The present chapter and the volume from which it is reprinted focuses on the environmental typology. The salient features of the environmental models are summarized in Table 2.

Realistic. The Realistic model environment requires manual and mechanical competencies and interaction with machines, tools, and objects. It rewards the display of practical, mechanical, technical, and physical abilities. The Realistic model environment allows the expression of practical, productive, and concrete values and robust, adventurous, and risky personal styles. This environment demands and rewards conforming behavior and practical accomplishment. Occupations classified as Realistic tend to involve concrete and practical activity and the use of machines, tools, or materials.

Investigative. The Investigative model environment requires analytical, technical, scientific, and verbal competencies. It rewards the display of skepticism and persistence in problem solving, the achievement or documentation of new knowledge, or the understanding or solution of practical and technical problems. Occupations classified as Investigative tend to involve analytical or intellectual activity aimed at problem solving, trouble-shooting, or the creation and use of knowledge.

Artistic. The Artistic model environment requires innovation or creative ability. It rewards the display of imagination in artistic, literary, or musical

Table 1
A Brief Description of the Holland Personality Typology

Attribute	Personality Type					
	Realistic	Investigative	Artistic	Social	Enterprising	Conventional
Preferences for activities and occupations	Manipulation of machines, tools and things	Exploration, understanding, and prediction or control of natural and social phenomena	Literary, musical, or artistic activities	Helping, teaching, treating, counseling, or serving others through personal interaction	Persuading, manipulating, or directing others	Establishing or maintaining orderly routines, application of standards
Values	Material rewards for tangible accomplishments	Development or acquisition of knowledge	Creative expression of ideas, emotions or sentiments	Fostering the welfare of others, and social service	Material accomplishment and social status	Material or financial accomplishment and power in social, business, or political arenas
Sees self as	Practical, conservative, and having manual and mechanical skills—lacking social skills	Analytical, intelligent, skeptical and having academic talent—lacking interpersonal skills	Open to experience, innovative, intellectual—lacking clerical or office skills	Empathic, patient, and having interpersonal skills—lacking mechanical ability	Having sales and persuasive ability—lacking scientific ability	Having technical skills in business or production—lacking artistic competencies
Others see as	Normal, frank	Social, intellectual	Unconventional, disorderly, creative	Nurturing, agreeable, extroverted	Energetic, gregarious	Careful, conforming
Avoids	Interaction with people	Persuasion or sales activities	Routines and conformity to established rules	Mechanical and technical activity	Scientific, intellectual, or abstruse topics	Ambiguous or unstructured undertakings

Table 2
A Brief Description of the Holland Environmental Typology

Attribute	Environmental Type					
	Realistic	Investigative	Artistic	Social	Enterprising	Conventional
Requires	Manual and mechanical competencies, interaction with machines, tools and objects	Analytical, technical, scientific, and verbal competencies	Innovation or creative ability, emotionally expressive interaction with others	Interpersonal competencies; skill in mentoring, treating, healing, or teaching others	Skills in persuasion and manipulation of others	Skills in meeting precise standards for performance
Demands and rewards the display of	Conforming behavior, practical accomplishment	Skepticism and persistence in problem solving, documentation of new knowledge, understanding or solution of problems	Imagination in literary, artistic or musical accomplishment	Empathy, humanitarianism, sociability, friendliness	Initiative in the pursuit of financial or material accomplishment; dominance; self-confidence	Organizational ability, conformity, dependability
Values or personal styles allowed expression	Practical, productive and concrete values; robust, risky, adventurous styles	Acquisition of knowledge through scholarship or investigation	Unconventional ideas or manners, aesthetic values	Concern for the welfare of others	Acquisitive or power-oriented styles, responsibility	Conventional outlook and concern for orderliness and routines
Occupations or other environments involve	Concrete, practical activity; use of machines, tools, materials	Analytical or intellectual activity aimed at trouble-shooting or creation and use of knowledge	Creative work in music, writing, performance, sculpture; or unstructured intellectual endeavors	Working with others in a helpful or facilitating way	Selling, leading, manipulating others to attain personal or organizational goals	Working with things, numbers, or machines to meet predictable organizational demands or specified standards
Sample occupations	Carpenter, truck operator	Psychologist, microbiologist	Musician, interior designer	Counselor, clergy member	Lawyer, retail store manager	Production editor, bookkeeper

accomplishments, and allows the expression of unconventional ideas or manners. Occupations classified as Artistic generally involve creative work in the arts: music, writing, performance, sculpture, or other relatively unstructured and intellectual endeavors.

Social. The Social model environment requires interpersonal competencies and skill in treating, healing, or teaching others. The Social environment allows the expression of empathy and humanitarianism. It rewards the expression of concern for the welfare of others. Occupations classified as Social typically involve working with people in a helpful or facilitative way.

Enterprising. The Enterprising model environment requires skills in the persuasion and manipulation of other people. It allows the expression of acquisitive or power-oriented personal styles. It rewards initiative in the pursuit of financial or material accomplishment. Occupations classified as Enterprising tend to involve working with people in a supervisory or persuasive way to achieve some organizational goal.

Conventional. The Conventional model environment requires clerical skills or skills in meeting precise standards for performance. It allows the expression of a conventional outlook and a concern for orderliness and routines. It rewards organizational ability, conformity, and dependability. Occupations classified as conventional typically involve working with things, numbers, or machines in an orderly way to meet the regular and predictable demands of an organization or to meet specified standards.

Work environments are assessed or described according to their degree of resemblance to the six ideal environmental types. Several methods are used to assess the degree of resemblance of a position or occupation to the model environments. Occupations were originally classified according to the inventoried interests of persons employed in or aspiring to them (Holland, 1973). More recently, occupations were classified by using job analysis data developed by the U.S. Employment Service to produce the second edition of the *Dictionary of Holland Occupational Codes* (Gottfredson & Holland, 1989). The Position Classification Inventory (PCI; Gottfredson & Holland, 1991)—a structured job analysis inventory—is the most recent method for identifying occupations according to the theoretical classification. It is the method that most directly applies the theoretical formulations to implement the classification.

Any particular occupational environment will show a profile of resemblance to the six ideal types. For example, the PCI profile for experimental psychologist shown in Figure 1 implies that this occupation most resembles the Investigative environmental model, followed by Artistic. This profile is based on job descriptions by 10 incumbents. In most applications, a one- to three-letter code describes the

types an environment most resembles. By convention, the first letter denotes the environmental model resembled most, the second letter denotes the type next most closely resembled, and so on. By the use of two- or three-letter codes, the six main categories are divided into a larger number of subcategories.

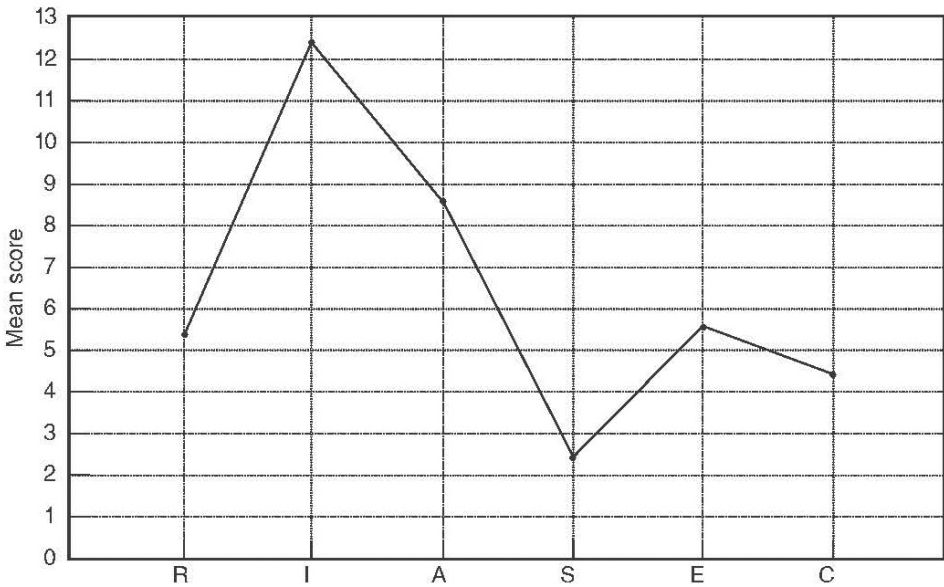


Figure 1. Position Classification Inventory profile, experimental psychologist. Job descriptions were provided by 10 incumbents. Data are from *Position Classification Inventory professional manual* (p. 49), by G. D. Gottfredson and J. L. Holland, 1991, Odessa, FL: Psychological Assessment Resources, Inc. Copyright 1991 by Psychological Assessment Resources, Inc. Adapted with permission.

Some environmental models are more closely related than others; similarly, certain personality types are more closely related than others. These degrees of resemblance are summarized by the hexagonal arrangement in Figure 2. Theoretically, distances on the hexagonal model are inversely proportional to the resemblances among the types. For example, a Realistic occupation is more closely related to a Conventional or an Investigative occupation than it is to a Social occupation. Environments opposite each other on the hexagon are most distinct from one another. The Realistic environment often involves work with machines or tools, whereas the Social environment involves work with people rather than tools or machines. The Investigative environment requires skepticism and analytical skill, whereas the Enterprising environment requires persuasiveness and other social skills. The Artistic environment requires creativity, whereas the Conventional environment rewards orderliness and the application of established rules or standards for performance.

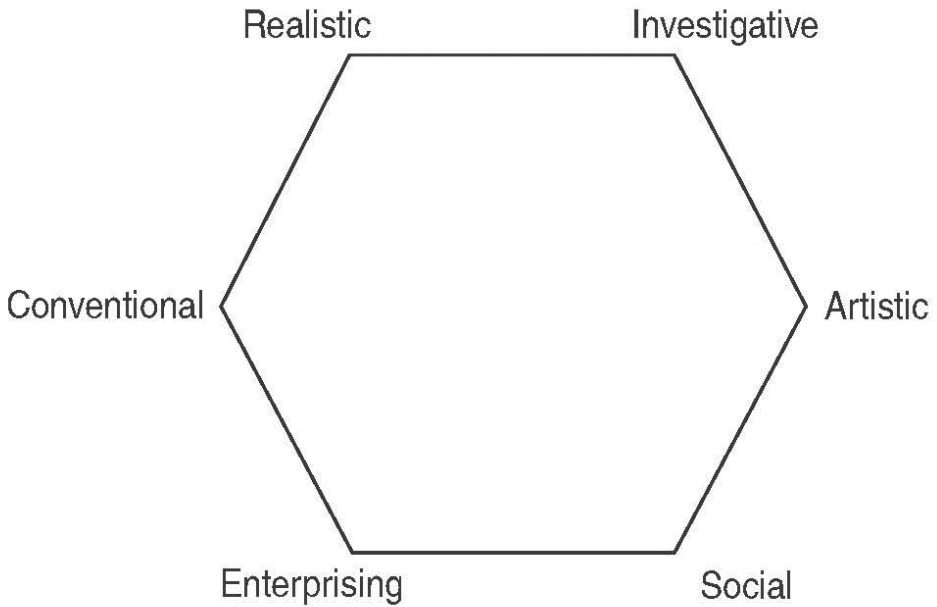


Figure 2. A hexagon summarizing relations among environmental and personality types.

Level of Complexity

A distinguishing feature of occupations is the level of complexity they involve. Some occupations make great and varied cognitive demands on workers, and other jobs are simple to perform and require little special preparation. Similarly, individual differences in ability distinguish those who quickly learn to perform complex jobs well and those who require more time to acquire skilled performance of complex jobs. Accordingly, it is useful to supplement the classification of both people and occupations according to level of complexity.

It has been possible to measure a large number of specific and more general abilities on which individuals differ. Because specific and general abilities are usually substantially correlated with each other, it also is useful to summarize a great deal of information about individual differences using measures of general ability. Similarly, job analysts have traditionally assessed the worker trait requirements of occupations using a large number of specific demands. Because the specific cognitive and skilled performance demands of occupations are usually highly correlated with each other, it is possible to summarize a large amount of information about differences among occupations by using a general measure of complexity.

Person-Environment Interactions

Individuals seek and remain in congruent environments; and environments recruit, retain, and reward congruent people. Congruence is assessed according to the degree of match between the vocational personality of an individual and the environmental type of an occupation or position. A person who most resembles the Realistic type and works in an occupation that most resembles the Realistic environmental model is most congruent, and a Realistic person who works in a Social environment is least congruent. Intermediate distances according to the hexagon imply intermediate degrees of congruence.

Other things being equal, people are expected to seek, to be satisfied in, and to remain in congruent environments. For example, a person who most resembles the Investigative type according to an SDS assessment would be expected to seek and remain in Investigative jobs. In contrast, an Investigative individual is expected to avoid, to be dissatisfied in, and to leave an Enterprising environment. These outcomes are expected because an Investigative environment provides opportunities for the expression of and rewards for analytical competencies and a skeptical outlook, whereas an Enterprising environment fails to reward these personal characteristics and instead requires confidence and persuasive ability.

Other things being equal, people seek, are selected for, and remain in occupations that roughly match their level of general ability to the level of complexity required by the work. For example, a person with a high level of general ability will find it easy to acquire the skills needed to perform complex work. In contrast, individuals who lack high levels of general ability seldom enter or persist in jobs characterized by high levels of complexity.

Using Listings of Holland Codes¹⁰

Classified indexes used to search the Holland occupational classification usually place related or similar occupations together. This is accomplished by using the Holland occupational classification (HOC) as the primary organizing

10 This section of the chapter is modified from the earlier published original. It omits references to the multiple classification systems for which codes are provided in the DHOC. To make the text understandable with this modification, the text here is more loosely adapted than the rest of this chapter.

tool and by using the level of complexity (Cx)¹¹ as a supplementary classification tool.

Realistic (R) occupations are listed first, followed by Investigative (I), Artistic (A), Social (S), Enterprising (E), and Conventional (C) occupations. Within each major category (R, I, A, S, E, and C), Holland subcategories also are organized in RIASEC order. That is, RI precedes RA and RS, and so forth.

Within each three-letter Holland category, occupations are listed in descending order of level of complexity.¹² Occupations involving the most complex work are listed first. Occupations classified in the same three-letter Holland category and at the same complexity level are listed in alphabetical order.

Alphabetical listings of occupations are also of use in career assistance applications. Typically, these are alphabetized lists of occupational titles that give an estimate of one-, two-, or three-letter Holland codes and an indication of occupational level (cognitive complexity of work requirements, level of education usually required, or other indicator of level).

Using Indexes of Holland Codes

Counselors and clients can use the DHOC, Occupations Finder, or other classified indexes to search for occupations or instructional programs suggested by a person's Holland code obtained using the SDS or the VPI. In addition, alphabetical indexes provide ready access to the Holland code for specific occupational titles.

Clients should explore several permutations of their three-letter vocational personality codes. Although most clients will find many occupations whose codes precisely match their SDS or VPI assessment results, they should be urged to expand their career exploration to include closely related codes.

One of the most common misuses of the classification in counseling and

11 Editors' Note: Holland had long included level of work in one way or another in his classification. Early on, his Vocational Preference Inventory, which assessed the six personality types, also included a status scale representing occupational level. Later, his Self-Directed Search incorporated a classification of occupations in an accompanying Occupations Finder that represented occupational level in terms of the general educational development or specific vocational preparation required to do the work. The third edition of the DHOC was the first to use an empirical estimate of occupational level, termed *complexity level*. A factor analysis of occupational analysis data for all 12,000+ DOT occupations implied that the largest common factor could be interpreted as cognitive complexity or substantive complexity of the work demands. The Cx score listed for detailed occupations and for occupational groups in the DHOC is based on standardized scores for eight job-analysis ratings combined with equal weight. See Gottfredson & Holland 1996, p. 723.

12 The DHOC lists level of cognitive complexity for each of the 13,000 DOT occupations as well as for aggregations of occupations to other levels in other classification systems.

guidance applications occurs when clients are led to focus solely on the three-letter code that exactly matches the three-letter code from their personal inventory results. A person whose SDS assessment produces a code of SIA should be directed to search all occupations listed under SIA in this classification, as well as IAS, ISA, SAI, AIS, and ASI occupations.

Occasionally, a client's SDS or VPI assessment produces a three-letter code for which there are no corresponding occupations or instructional programs. Such a client should be directed to broaden his or her search of occupations by examining all occupations in the major category corresponding to the first letter of the Holland code and occupations matching all two-letter permutations of the Holland code.

Some Interpretations and Cautions

Several cautions are important in making interpretations of any occupational information. Experienced counselors have long recognized the following points, but it is important to emphasize them for new users of the classification system.

1. The categories in the classification are not distinct—black or white, all or none. Even a casual review of the classifications will reveal that the six main categories blend together at the edges. For example, CR occupations in the Conventional category resemble RC occupations in the Realistic category. In general, occupations involving less complexity are less clearly identifiable as belonging to any major group than are occupations entailing more complexity. Therefore, the distinctions among low level occupations are somewhat blurred.

2. The average person has well developed ideas about many occupations (O'Dowd & Beardslee, 1967). Although many occupational perceptions have a moderate degree of validity, some perceptions form inaccurate stereotypes. The categories in the Holland classification appear to have undergone similar mistaken stereotyping (e.g., "Realistic jobs never require paper work, Conventional jobs never involve tools, Investigative jobs never require artistic judgment"). It is more accurate to think of the main categories in the Holland classification as bands or rings that blend into each other than to view the categories as six separate bins.

3. A person does not resemble one type and no other. An occupation does not fit into one main category and no other. For these reasons, the number of possible occupations or positions that are congruent with a particular person is large. When the levels of resemblance also are taken into account, this outcome is easily understood. Some people resemble two or three theoretical types to the same degree, and some occupations resemble two or more occupational groups to the same degree. Further, the codes assigned to a few occupations shift from one study to the next. "Police officer" is a good example. S, E, and R are the main

categories suggested by divergent data at different times, so that one study suggests RSE and another suggests SRE. “Engineer” is another occupation for which I and R are the codes usually suggested by interest inventory data, but the positions of I and R change from study to study—even for the same engineering specialty.

4. A variety of people are found successfully working within any single occupation, but people resembling some types are found more frequently than others (see Holland & Holland, 1977; or Holland, Powell, & Fritzsche, 1994, pp. 20-21). For example, most counselors have codes that include S, A, and E, but a few have codes of C or R. In short, all occupations tolerate a range of types, but some types appear to cope more successfully with an occupation's demands than do others. See Holland's theory for a more complete explanation of person-environment fit (Holland, 1985/1992).

5. The specific positions or jobs subsumed by a single occupational title also are sometimes varied. But when an occupational classification has been carefully composed by grouping similar work together, work done by different individuals in different specific positions tends to be similar. Nevertheless, some occupations appear more homogeneous than others. For example, most counselors' jobs are clearly dominated by social activities with artistic and enterprising activities somewhat less salient. Job analysis seldom suggests anything but “Social” for the primary classification for counselor. Other occupations, such as Musical Instrument Repairer, are more difficult to classify because job analysis information implies that this occupation involves activities characterized by several occupational models. See the Position Classification Inventory Manual (Gottfredson & Holland, 1991) for more information about heterogeneity within occupations.

6. Most occupations do not resemble a single environmental type and no other. This is why three letters have been listed for all occupations and instructional programs in the classified indexes. Nevertheless, some occupations have a strong resemblance to one type and much weaker resemblance to other types. Sometimes the ordering of letters beyond the first letter is essentially arbitrary because there is little evidence of strong links to more than one type. This occurs most often with occupations with low complexity levels. For low level occupations, the second and third letters listed may not be particularly meaningful.

Some Frequently Asked Questions

Does this classification supersede all earlier versions of the Holland classification? Yes—when in doubt, use this one.¹³

Will the Occupations Finder be changed? Yes, when the SDS is revised, the most up-to-date information will be used for the Occupations Finder codes.

Is this revision of codes ever going to end? I'm tired of revising my occupational information files. It is unlikely that revisions will cease. Occupations evolve and the nature of information about the work involved changes over time. Information about occupations will always be imperfect due to errors in sampling, limitations in occupational analyses, and changes in job content over time. Therefore, codes will always be approximations or estimates.

Can I use these codes with other interest inventories besides the SDS and VPI? The DHOC is intended for use with the SDS or the VPI, and it will be most compatible with these inventories. The codes are expected to be compatible with other inventories, but no empirical tests of compatibility have been made.

In the past, codes based on the interests of males using either norms or raw

¹³ Editors' note. In the years since the 1996 third edition of the DHOC was produced, the federal government has changed the manner in which it collects occupational information. The U.S. government initiated a Standard Occupational Classification system in 1977 and has periodically revised it employing an interagency governmental group of experts, with the most recent revision in 2018 (<https://www.bls.gov/soc/2018/home.htm>). Occupations the government panel judges to be new or emerging are added from time to time. The federal Office of Management and Budget requires government agencies to use the SOC classification for employment and occupational statistics (Standard Occupational Classification (SOC) System, 2017). A federal government sponsored occupational information system (O*NET) has been developed based on the SOC and the use of Holland codes provided by the O*NET has become common in recent years. Among other changes (including deletions), the O*NET-SOC taxonomy for 2019 added 12 new occupations not included in earlier versions—several of these in cybersecurity (Gregory, Lewis, Frugoli & Nallin, 2019). This is the fifth revision of the taxonomy. When changes are made on the O*NET-SOC classification, the O*NET providers attempt to provide Holland codes for added occupations. Judgment rather than statistical formulae based on job analysis data are used to estimate codes in the O*NET classification, but because it is revised periodically involving interagency panels of experts, it is more up-to-date and comprehensive in terms of occupations covered than is the DHOC. For specific positions or group of related positions, the most definitive approach to classification would be analysis of an adequate sample using the Position Classification Inventory rather than using any lookup source.

scores from various inventories have been very similar. In contrast, codes based on the inventoried interests of women using sex-based norms or “balanced” scales sometimes produce codes that are at variance with the codes produced by raw scores. They also are at variance with the codes based on the occupational analysis data presented in the *Dictionary*. Efforts to erase sex differences (Cronbach, 1984), to the extent that they are successful, restrict the domain of interests measured to those that show limited sex differences or distort scores by inflating interest scores in some areas and deflating scores in others. In short, these codes should be compatible with other inventories for males, but may be compatible for females only with inventories reporting raw score profiles or profiles based on pooled norms. Users of inventories using sex-based norms or balanced scales should conduct new research or regard their applications as experimental when using these codes.

Don't occupational codes and codes for fields of training vary from region to region and from institution to institution? Yes. And sometimes they vary from sample to sample. If you have been collecting PCI, SDS, or VPI data to create a local classification, you should continue to do so. Your data will usually be most valid for your situation. Most institutions do not have carefully developed and comprehensive data. This volume supplements what institutions can do for themselves.¹⁴

What should I do when I find an occupation with a code that seems strange or in error? Locate and read the DOT definition or the definition used in another classification. Look at the job analysis ratings in published volumes (Employment and Training Administration, 1981, 1982, 1986, 1991a) or, if you have the technical resources, review the data archives developed by the Employment and Training Administration.¹⁵

In some cases, the title assigned to an occupational group may not convey an accurate impression of the work's content to most readers or may involve a misclassification of a detailed occupation in a particular system.

Careful review should clarify most apparent misclassifications—the occupational title itself does not always convey an accurate picture of the occupation.

Also, review occupations with the identical code at about the same complexity level. For example, if you are in doubt about an RIE occupation, look at other RIE

¹⁴ Editors' note. The O*NET also provides a convenient cross-walk to the Classification of Instructional Programs with Holland code estimates.

¹⁵ Editors' note. Today, users of the O*NET system can read the O*NET task, knowledge, skills and other ratings. More of the DOT data are now available on-line as well, making such reviews easier to accomplish. Examine these data at the following location: (<http://www.govtusa.com/dot/>).

occupations at a similar level to clarify for yourself the conceptual meaning of the category involved. Review the section of the DHOC on Theoretical and Technical Origins (Part 4) for additional insights into the distinctions among the categories.

If persons knowledgeable about the occupation are available, have them complete PCIs to describe it. This is a direct way to classify any occupation according to the typology. When the job is analyzed directly, you do not need to know how it is classified according to the DOT or other classification system.

Finally, exercise circumspection in taking the codes listed in the DHOC or any other listing at face value. They are based on fallible data and data that may be based on a small number of job analyses.

What should I do when I cannot find a code for a specific occupational title in the alphabetized indexes? Any title may have a number of synonyms.

Try finding a synonymous title or transposing the words in the title. For example, “Newspaper Editor” may be found under “Editor, Newspaper.” Finally, consult the DOT for alternate titles that are listed under defined titles. Be creative and persistent in your search; try to think of more general or more specific alternatives for a given title.¹⁶

What should I tell a client who wants to pursue an artistic career and looks like a CES according to the SDS? Stimulate the client to examine how he or she will use the CES interests, values, and competencies in an occupation dominated by Artistic types and tasks. Explore with the client the origin of the Artistic aspiration—what it means to him or her. Such exploration may reveal that the client can explain such a choice and that the explanation is backed by personal and other evidence, or that the client recognizes the aspiration as a fantasy which may easily be relinquished. As an alternative, have the client describe a desired artistic occupation using the PCI. This may reveal an unusual understanding of what the occupation entails.

Whatever happens, help the client explore both A and CES options.

If the client has an undifferentiated (flat) profile of SDS or VPI scores, explore the possibility that the person may lack well articulated interests in any area. People with flat profiles may require more assistance.

¹⁶ Editors’ note. If using O*NET titles, alternative titles can be searched at https://www.onetcenter.org/dictionary/20.3/text/alternate_titles.html

References

- Cronbach, L. J. (1984). *Essentials of psychological testing* (4th ed.). New York: Harper & Row.
- Employment and Training Administration, U.S. Department of Labor. (1981). *Selected characteristics of occupations defined in the dictionary of occupational titles*. Washington, DC: U.S. Government Printing Office.
- Employment and Training Administration, U.S. Department of Labor. (1982). *Dictionary of occupational titles* (4th ed. Suppl., 1982). Washington, DC: U.S. Government Printing Office.
- Employment and Training Administration, U.S. Department of Labor. (1986). *Dictionary of occupational titles* (4th ed. Suppl., 1986). Washington, DC: U.S. Government Printing Office.
- Employment and Training Administration, U.S. Department of Labor. (1991a). *Dictionary of occupational titles* (4th ed., revised, 2 vols.). Washington, DC: U.S. Government Printing Office.
- Gottfredson, G. D., & Holland, J. L. (1989). *Dictionary of Holland occupational codes* (2nd ed.). Odessa, FL: Psychological Assessment Resources.
- Gottfredson, G. D., & Holland, J. L. (1991). *Position Classification Inventory professional manual*. Odessa, FL: Psychological Assessment Resources.
- Gottfredson, G. D., & Holland, J. L. (1996). *Dictionary of Holland occupational codes* (3rd ed.). Odessa, FL: Psychological Assessment Resources.
- Gregory, C., Lewis, P., Frugoli, P., & Nallin, A. (2019). *Updating the O*NET-SOC taxonomy: Incorporating the 2018 SOC structure: Summary and implementation*. Raleigh, NC: National Center for O*NET Development.
- Holland, J. L. (1973). *Making vocational choices*. Englewood Cliffs, NJ: Prentice-Hall.
- Holland, J. L. (1985). *Manual for the Vocational Preference Inventory*. Odessa, FL: Psychological Assessment Resources.
- Holland, J. L. (1992). *Making vocational choices: A theory of vocational personalities and work environments*. Odessa, FL: Psychological Assessment Resources. (Original work published 1985.)
- Holland, J. L., & Holland, J. E. (1977). Distributions of personalities within occupations and fields of study. *Vocational Guidance Quarterly*, 25, 226-231.
- Holland, J. L., Powell, A. B., & Fritzsche, B. A. (1994). *The Self-Directed Search (SDS) professional user's guide*. Odessa, FL: Psychological Assessment Resources.
- O'Dowd, D. D., & Beardslee, D. C. (1967). *Development and consistency of student images of occupations* (U.S. Office of Education Cooperative Research Project No. 5-0858). Rochester, MI: Oakland University.
- Standard Occupational Classification (SOC) System—Revision for 2018; Office of Management and Budget Notice of Final Decisions, 82 Fed. Reg. 56271 (November 28, 2017).

SECTION 2

MY LIFE WITH A THEORY: AN AUTOBIOGRAPHY

BY JOHN L. HOLLAND

EDITORS' INTRODUCTION TO THE AUTOBIOGRAPHY

John spent decades of his life in what Erikson (1950) termed the generative stage. We each encountered John early in our careers as psychologists. He was generous, straightforward, and unobtrusive in his counsel—which he offered whether we were seeking it or not. (After a time, of course, we had learned to seek it.) He advised us to write clearly and showed by example how to work towards this end by diligence and revision. In research, he counseled the examination of simple statistics in preference to newfangled statistical legerdemain represented by waves of fashion in sociology and psychology. He modeled the abandonment of pet ideas unsupported by evidence.

The autobiography expresses gratitude for mentors and colleagues who contributed to John's development as a scientist and theoretician through their examples, admonitions, collaboration, or encouragement. It also testifies to the advantages afforded by work environments rich in opportunity or unburdened by hindrances, which allowed John to test, develop, and revise his theory over extended periods of time. Holland was able to *stick to the knitting* (Peters & Waterman, 1982) due to these affordances.

Through the autobiography, Holland explicitly revealed irrational facets of the scientific enterprise. Among these are the biases of critics and editors, the roles of self-confidence and self-doubts in the scientific enterprise, serendipity, and the influence of collateral appendages to valid and needed changes in views about gender and society. This is a continuing expression of the unfrocking contributions characteristic of Holland's work in which he revealed that generally revered beliefs or practices are not sacrosanct (Gottfredson, 1999; reprinted in the present volume, Chapter 4.1).

The personal account of his life with the theory shows the author's human sensitivity, and it demonstrates how the actions of others—whether intended or not—affected him emotionally or stimulated or diverted various efforts. Further, the autobiography illustrates Holland's triumphs and setbacks and their effects on his professional and personal life.

Holland prepared the autobiography over a span of several years beginning in the late 1990s and continuing with revisions and additions into 2004. A dispute with the publisher of his *Self-Directed Search* (SDS) occupied much of his time during his final years and caused him much anxiety and grief. The dispute with the publisher was protracted (formal legal activity continued at least until 2004), and took priority over publishing the autobiography. This issue is discussed further in our editors' note on page 83. Although Holland's attorney indicated no reason not to publish this autobiography, Holland wished to avoid (further) aggravating the publisher. He was dispirited by the unpleasant dispute, and let the biography lie fallow. After a period of illness, Holland died in 2008 without publishing the work. It had been his intention to publish it.

This section contains the text of the autobiography. The following section (Section 3) contains the exhibits Holland had selected to append to the autobiography.

References

- Erikson, E. (1950). *Childhood and society*. Norton, New York.
- Gottfredson, G. D. (1999). John Holland's contributions to vocational psychology: A review and evaluation. *Journal of Vocational Behavior*, 55, 15-40.
- Peters, T. J., & Waterman, R. H. (1982). *In search of excellence: Lessons from America's best-run companies*. Harper & Row, New York.

PREFACE¹⁷

I have been daydreaming for a long time about writing a personal account of my research experience that would be helpful for students and new researchers. The ideas and topics were stimulated by the unexpected problems and tasks I encountered as an author of a theory of careers and as a developer of several related psychological devices.

For instance, every time I worked on a revision of my theory I wanted to include a special chapter or Exhibit such as “Ambiguities, Biases, Controversies, Doubts, Misunderstandings, Sex, and Values” in which I would devastate critics. I sketched outlines for these chapters (they made me feel good), but even I realized that such responses would be seen as defensive and unpersuasive.

I have been reassured by other researchers who report they have encountered many of the same problems and tasks: coping with controversy, living through the inevitable ups and downs, securing funding or at least research opportunity, finding a fruitful research or theoretical idea, learning to write, and so on. There are useful sources for dealing with some problems, but they usually omit any discussion of the personal coping these tasks typically require. I was also stimulated by a few graduate students wanting to know about the origins of my theory or the Self-Directed Search, and by occasional writers who assumed that they were present at the birth of this work.

To summarize, this account is an attempt to document the subjective side of the discovery and developmental processes in research that psychological training neglects with its emphasis on research design and statistical analysis or on clinical practice. Graduate training can't do everything.

To reduce my distortions, I reviewed my correspondence (incomplete) from 1959 to 2002, and other files of reprints, reports, and notes. This review was enlightening and occasionally an emotional experience. Despite my complaints about critics, editors, and publishers, it is clear that I also received a lot of encouragement and support from colleagues, consumers, and others. I learned more about myself. Some letters to administrators and editors document that I was an angry young man but one who wrote well. Now, of course, I am a lovable old man.

17 Editors' note. Following Holland's death, we had two final or nearly final versions of his manuscript to work with. They were not identical. One version was a WordPerfect file that had been typed by an assistant, one was a paper copy with “final copy” marked in pencil and dated August 2004. That version contains a substantially revised preface clearly more current than that in the electronic file. Those revisions are included here as appropriate. At the same time, the version marked final copy did not incorporate many of the edits or corrections that were included in the word processor version, and vice versa. The word processor version was read against the final paper version to identify differences, and merged into the best version in the present document.

I have had many difficulties in organizing what I want to write. I settled on organizing my experience into six chapters. Chapter 1 is a narrative that is organized around my academic and work histories and is focused on two themes: the story of my career theory and the story of the work that the theory stimulated. These outcomes include the development of the classification system for persons and occupations, the Self-Directed Search, the Position Classification Inventory, the Career Attitudes and Strategies Inventory, and the Vocational Identity and Environmental Identity Scales.

Chapters 2 through 6 provide a summary of what I learned in the process of a research career (or failed to learn) that I hope will be useful for graduate students and researchers. It is not a set of studied principles but some cautions, ideas, and strategies for coping with some common but neglected research problems. These include getting started or identifying a research problem, finding your research niche or role, dealing with editors and publishers, coping with critical reviews and failed research, and so on.

I have included some appendices to exemplify and support the text. Exhibit 1¹⁸ is my vita. This item provides some factual support for this book. I confess that I have omitted a few published articles that were obligatory institutional pieces that had no research or other value. You won't miss them. Exhibit 2 includes publications not in the vita. Exhibits 3-6 exemplify the author's personality, writing, and sense of humor and occasionally a lack of same.

The reader is cautioned that this account is one researcher's story. Other researchers, editors, and publishers would have both convergent and divergent opinions about the same topics. Consensus about the validity of my interpretations would be hard to achieve because authors, editors, and others are reluctant to express their views publicly. A few authors have reported their personal experiences but usually in less detail than here. One academic (Aronson, 1998) publishes a regular column which invites authors to write about complaints with journal editors. Many others have published brief accounts of their research experience. These articles are informative and often humorous (Cohen, 1990). Parenthetically, I have usually provided only my views about the topics in this report. My defense is that editors, publishers, and funding institutions have enjoyed more influence and less critical appraisal than authors or researchers have.

This personal story raises the question, "Aren't you just trying to get even with some of your critics?" True, there is some of that, but most of all, criticism has stimulated me to improve my work and to persist. For many years, I kept a file of complaints, but eventually, I didn't hear any criticism that I had not responded to with desirable revisions or research, or I had rejected.

18 Editors' note. Holland used the word "appendix" which we have changed to the word "exhibit" because this book contains other appendices.

I am indebted to a special group of friends, practitioners, students, and tutors who helped me at crucial times with their ideas for research, theoretical revisions, and practical applications. Some provided almost lifetime support; others only briefly but with something vital to my work. They include the following persons and some whose names I cannot recall: Gary D. Gottfredson, Thomas H. Magoon, Denise C. Gottfredson, Linda Gottfredson, William Alston, Charles F. Elton, W. Bruce Walsh, James M. Richards, Jr., Alexander W. Astin, Joseph A. Johnston, Robert C. Reardon, John D. Black, John C. Smart, Jack Rayman, Dean H. Nafziger, Keith F. Taylor, Geoffrey I. Kelso, Paul G. Power, Paul M. Muchinsky, David P. Campbell, Benjamin Schneider, Arnold Spokane, and Dennis L. Nord.

CONTENTS OF THE AUTOBIOGRAPHY

Preface

Chapters	44
A Theory of Careers: Origin and Outcomes	44
Becoming a Researcher	72
Editorial Encounters	78
Living with the Highs and Lows	87
My Research Perspective	95
Afterthoughts and Omissions	105
Exhibits	109
Author's Vita	112
The vita is in chronological order so readers can interpret the development of the author's research and thought.	
References	130
This includes publications cited that are <i>not</i> in the author's vita.	
Author's Correspondence	135
Some examples of author's anger, frustration, defenses, and humor.	
Published and Unpublished Notes, Papers, and Talks	
Gender and Theoretical Controversy	
Samples of author's response to criticism of the Self-Directed Search (SDS) and the theory of careers.	

CHAPTER 2.1

A THEORY OF CAREERS: ORIGINS AND OUTCOMES

This chapter is the story of why and how I developed a theory of careers, how it became a lifelong obsession, how it led to some useful psychological devices, and in the end, how it affected my life. I have used a tour of my education, military experience, and work history to organize this account.

Fortunately, I could rely on a large but disorderly collection of correspondence and records to stimulate my memories and on a few old friends to temper my distortions of the past. They didn't catch everything, but this manuscript could have been worse. I will start with my college education from 1938 to 1942 and end with my retirement from 1980 to the present. Along the way, I focus on the origins and revisions of the theory as well as the major outcomes of that work.

College Education (1938–1942)

As a college student, I worried about what to major in and what occupation made sense for me. This search led to giving up the hard sciences because I was only a so-so student, and because I lost interest in the subject matter usually after only four or five weeks. I got through differential calculus with a C, but I never really understood what was going on.

I enjoyed analytical geometry and did well, for geometry was my favorite high school course. I could solve the difficult problems in the back of the text and get extra credit. My older brother, Bill, was a star in science and math. His academic talent cast a shadow of teacher expectations that I could not satisfy. Years later, my younger brother, Dick, told me he too couldn't satisfy Bill's teachers. Dick considered science but eventually majored in art and worked as an advertising executive. Eventually he took over our father's advertising agency and turned it into a larger agency.

I took piano lessons from age 12 to 22 and toyed with becoming a musician, until I noticed in the typical stair step recitals that there was always some little kid who made everyone else look bad. A year of harmony in college made clear that I wasn't a potential composer, but my involvement in music never went away. More later.

I majored in psychology because it opened up a world for understanding my adolescent worries. More important, I was still interested in the course content at the end of the semester. An independent research project in my senior year was a scientific failure, but I loved the process and the feeling it gave me. I thought I should become a psychologist.

Military Career (1942–1946)

After graduating in 1942, I served three and a half years in the army and worked as a classification interviewer, test proctor, paralegal clerk, laborer, squadron clerk, psychological assistant, and Wechsler administrator. I complained at the time, but the military experience provided a rough and ready practicum in human behavior that I needed, for I was a sheltered middle class young man.

In retrospect, this extended practicum led to some life-long beliefs such as the common man does not seem as infinitely complex as my undergraduate training suggested. Instead, military men appeared to fall into a few common characters or types, but I thought I was just imagining this. I also discovered that the average male was a decent, competent, and sensitive person. I rarely met a truly nasty or evil person. The base rate for bad guys in the military seems about the same as the base rate I experienced later in academia.

I also was able to work with and get informal training from social workers, psychologists, and physicians—an experience that reinforced my desire to become a psychologist.

Graduate School (1946–1952)

I entered graduate school at Minnesota in the fall of 1946 and began work as an intern in the student counseling center. Among other things, I began to worry about a thesis topic. My advisor, John Darley, just happened to have a pile of reprints for “A Preliminary Study of Relations Between Attitude, Adjustment, and Vocational Interest Tests” (1938). This old research implied that college males with different interests have different personalities. The analyses leading to this interpretation were weak but often plausible. Most of all, they stimulated my thinking that a person’s interests, attitudes, and personality may go together in meaningful ways.

Somewhat later I met an artist in the General College at Minnesota who claimed that he could tell what was going on in a student’s life by looking at her paintings. Fully indoctrinated by the Minnesota push for evidence, I replied, “I find that hard to believe” while I said to myself, “Bull stuff.” I visited his painting class to observe student painters and to hear his interpretations. I remained skeptical. I did join his Sunday painting group for recreation as an escape from graduate school. This experience led to a quasi-experimental thesis (Holland, 1952) in which the ratings of a person’s free paintings were compared with his Minnesota Multiphasic Personality Inventory (MMPI) scores. Surprise, some personality inventory (MMPI) scores were correlated with ratings. For instance, the rating of “Painting is depressing” was related to high Depression scores. The results were generally negative for most ratings, but the positive results left me believing

that one's personality can be expressed in content or materials that personality inventories do not use. In addition, I began to doubt the conventional assumption that personality inventories provide the fundamental characterizations of a person and that interest inventories and other assessments provide only superficial assessments.

In the 1940s, psychology at Minnesota was pro "show me the evidence" and anti-Freud, Rogers, typologies, and speculation. A four-year practicum in counseling centers, devoted largely to vocational counseling, also had several long-term effects. At that time, the Strong Vocational Interest Blank (SVIB) could be scored with a Veeder Counter¹⁹ in about an hour or mailed to a scoring service with about a 10-day wait. If a client was interested in an unkeyed occupation, one had to use one's imagination and incomplete knowledge of occupations. This problem was compounded by the lack of a compatible occupational classification for the Strong or Kuder. As always the Dictionary of Occupational Titles (DOT)²⁰ was a formidable collection of books and files. Using them was a depressing experience.

Herbert Feigl's philosophy of science course stimulated my interest in theory and served as a kind of antidote to the Minnesota Zeitgeist. Although he was a logical positivist, Feigl seemed more open and evenhanded than the caricature applied then and now to people with such views. His influence got me started in a foreign literature and relieved me of many doubts about the value of theoretical endeavors. Much later, Bill Alston, a Michigan philosopher, continued my basic training with a critique of my 1966 typology in which he pointed the way to a more defensible theory.

Western Reserve University (1950–1953)

After graduate school, I began my career at Western Reserve (now Case Western Reserve in Ohio) where I worked as an instructor, vocational counselor, and gave talks that senior faculty thought would be good for my personal development. I also married Elsie Prethlow in my second year at Minnesota. Her love and talent made my life and career go well. The Minnesota experiences were reinforced at Western Reserve. Once again, scoring delays and incomplete information about a student's interests and a compatible classification were hard to cope with. As it turned out, my experience at Reserve (1950–1953) was a helpful

¹⁹ Editors' note. Veeder counters were handheld mechanical counting devices.

²⁰ Editors' note: The DOT was a product of a large ongoing government occupational analysis project stimulated during a period of especially extensive unemployment in large part by the belief that occupational information would be helpful in matching workers to jobs. This index was revised four times over the decades to include ever larger numbers of occupations (over 12,000 by the 4th edition), and the detailed job analysis information it contained spanned several volumes.

source of research ideas that persist to the present time. A key event was the death of a senior faculty member who had a large collection of reprints, vocational tests, and books. His widow donated these materials to our vocational center. Probably something she may have dreamed about for many years. This intellectual rubbish was available to anyone with the energy to wade through it.

I discovered an Occupational Interest Blank (consisting only of occupational titles) by Bruce LeSuer (undated) that was scored for the level of occupation rather than the kind of occupation. My reaction was that nearly everyone knows the level they desire, but most people are interested in the kind of occupations that match their interests. Why not build an interest inventory that uses only occupational titles as test items and create scales for the main *kinds* of occupations rather than for single occupations? The first a priori inventory form yielded results that usually paralleled those obtained from the Strong and Kuder inventories. Initially there were no norms, all items were scored “like;” the ten scales were of different lengths, so a person’s scale score became the percentage of like responses—a psychometric abomination.

Although it was an interest inventory, it was easily scored and interpreted. My friends and I were excited, because we had created a makeshift inventory to use while we waited for the Strong electronic scoring service to respond. At the same time it was apparent that the validation of the new inventory would require considerable resources and a long term effort.

I also discovered Forer’s (1948) Diagnostic Interest Blank. Forer believed that his interest blank items could not be scaled but instead the individual items should be interpreted clinically. For me, the key element in this journal article was that Forer gave inference lessons. For instance, if a person prefers “going to movies,” then it implies X. His lessons appeared useful, because I also discovered a set of the old Strong hand-scoring stencils for about 25 occupations as well as some group keys. These keys were developed to assess a person’s interest in an occupational area such as science, social welfare, sales, and so on. In retrospect, these keys are forerunners of my typology and the Strong Theme scales.

Following Forer’s training, I decided to interpret the Strong keys (1943) including the Vocational Maturity, Occupational Level, and Masculinity-Femininity keys. This task went on forever, or at least it seemed that way. I made notes about each scale, grouped items that seemed to imply the same thing, and so on. I was surprised that my grouping of the notes for each scale led to plausible sketches of people in different occupations. These interpretive summaries eventually became the first formulations for the personality types (Holland, 1959).

In retrospect, two other events at Reserve contributed to the initiation of a theory of vocational choice that became a theory of careers. I discovered a manual for the Kuder Preference Record that contained average profiles for men

and women employed in 85 occupations. Because the development of new scales for the Strong, or additional profiles for the Kuder, was a very slow process, it appeared more helpful to create a classification system with the Kuder profiles that would give counselors an occupational plan for interpreting interest profiles and understanding occupational similarities and differences.

My staff and I (Holland, Krause, Nixon, & Trembath, 1953) performed simple cluster analyses of the Kuder profiles that yielded 7-category and 5-category interest classifications for men and women. We were pleased when we discovered that these preliminary classifications looked plausible for the most part and consistent with other research at the time. Like many people on their first academic job, I was driven by the need to publish something soon. I managed to convince my staff that this project was worthwhile. This was difficult because we had to calculate several thousand rho coefficients on manually operated calculators. We celebrated when the editor of the *Journal of Applied Psychology* took our article without revision and with some kind words. My interest in classification never stopped.

Another piece of the theory was stimulated by Harry Laurent's PhD thesis (1951). He showed that a person's life history was associated with the choice of a profession. At the time, this idea seemed very clinical to many people. I found it very plausible. The items in his life history blank were typically obvious rather than subtle.

I left Reserve for several reasons—some more important than others. I taught in the undergraduate program during the day, the evening college at night, and worked as a vocational counselor five days a week including a half day on Saturdays. My pay was \$3800 a year, average at the time. When I heard about the new Veterans Administration (VA) jobs for counseling psychologists at \$5440, I thought my wife and I would be rich. On the other hand, the Reserve years were valuable. I began to learn to teach. I know I was bad. The senior faculty were outstanding teachers and invited me in to see how they worked and were glad to help me with my questions about teaching. An old man said near the end of a course in the evening college, "You're getting better."

VA Hospital at Perry Point (1953–1956)

My next move was to the Perry Point VA Hospital in Maryland (1953–1956). There I initiated a small vocational counseling service. We provided service to psychiatric patients and internships for graduate students. In retrospect, Perry Point was one of my most gratifying jobs. I finally had some research assistants to do my dirty work, and my clinical colleagues became good friends and provided three years of informal training in projectives and therapy. This experience led to questioning patients about their responses (a clinical inquiry) to Vocational

Preference Inventory (VPI) items. After only four or five patients, I discovered that they paid little or no attention to the directions to respond according to their interests. Years later, I discovered that college students and adults also ignore similar directions in the Self-Directed Search (SDS; Holland, Fritzsche, & Powell, 1994). Instead, a person's abilities, values, concern with status, sex role, and almost any quality may affect item responses.

This was the heyday of blind analyses of projectives and tests. I got caught up in the spirit of the time and tried my hand. I remember being on an American Psychological Association (APA) symposium where three or four of us did blind analyses of a Strong profile. I can't remember much about this experience, but I was the only panelist to predict the client's age—he was 28. He had put 28 on his answer sheet.

My most dramatic interpretation came later. Two trainees brought me a VPI profile for a patient being considered for discharge; he had been hospitalized for more than 20 years for a sexual offense among other things. One of the major questions at the case conference was, "is he still a threat to others?" The trainees thought they had me stumped because the patient had said "Yes" to almost everything in an experimental VPI form that had 457 titles. I said, "Let's look at what he said "No" to." He said "No" to "chicken sexer" and "morals squad patrolman." I won.

About this time, I discovered that Garman and Uhr (1958) had developed a Manifest Anxiety scale for the Strong that had impressive evidence for its validity as assessed by the MMPI and Sixteen Personality Factor Questionnaire (16PF). This anxiety scale of 33 Strong items was most consistently correlated with artistic scales in the Strong—artist, architect, musician, author-journalist. At that time, the Garman and Uhr study provided the most persuasive evidence that vocational interests and one facet of personality (anxiety) have a moderate, positive correlation with selected interest items.

The Perry Point experience, I realize now, had many beneficial opportunities. I was able to try out a wide range of test items (occupational titles) and to develop several experimental scales including Reality Orientation, Aggressiveness, Infrequency, and other scales. Early on, it became apparent that women needed a somewhat different set of scales. At that time what we now call Realistic or skilled trade items evoked almost no response from women. I also went through several sets of scale titles with the aid of patients, psychologists, and others in a search for titles that were easily comprehended, connotated the gist of the scale interpretation, and were not offensive. That search went on until 1965 when an editor suggested that "Investigative" be substituted for "Intellectual" scale.

None of this early work was published. I was lucky that I had no pressure to publish these early attempts for they were tangential to my job, and I received

no direct financial support for what became my hobby. I should add much of this work failed. Even the first article about the inventory (Holland, 1958) was not a striking success and was only published after the third journal editor, John Darley, took pity on me. This is a long way of saying that the freedom to explore what might work for many years without worrying about promotion was a major benefit. I feel sorry for the frenetic way young scientists now have to look creative, rational, and productive at a time when they have little experience, confidence, or time before being evaluated up or down.

National Merit Scholarship Corporation (1957–1963)

My move from the Perry Point VA Hospital to the National Merit Scholarship Corporation (NMSC) was both accidental and rational. The president, John Stalnaker, was looking for someone to set up a research department to study bright students. The first man he recruited was better qualified than I, but he screwed up the opportunity by misleading the president. Stalnaker started another search via Minnesota, and Darley recommended me. I hit it off with Stalnaker, and I saw his offer as a great opportunity to work full time as a researcher, hire a small staff, and continue my work on the VPI.

I spent the next six years at the National Merit Scholarship Corporation whose research mission was to study bright high school students. Most research was concerned with academic and nonacademic achievement, education and college effects. We did discover that different vocational interests (VPI) were related to characteristic achievements, self-ratings, competencies, coping behaviors, personality traits, originality scales, parental attitudes and values (Holland, 1960, 1962, 1963, 1964, 1968).

Among other things, artistic and scientific interests were most closely related to a wide range of originality measures, while realistic and conventional interests were most weakly related. This pattern of relations is very similar to the relation of the six interests in the SDS and the Openness scale of the NEO Personality Inventory (NEO PI; Costa & McCrae, 1992) discovered much later. The Openness scale is also positively correlated with many measures of originality (McCrae, 1993).

National Merit provided a grand research opportunity. I was able to hire Don Thistlewaite, Sandy Astin, and Bob Nichols, whose talents were instrumental in initiating and sustaining a very successful research program. They also made up for my deficient technical skills and became lifelong friends.

That environment now seems to have been unusual. The president, John Stalnaker, secured most of the funding (private and federal) and National Merit provided a generous budget, so we spent no time looking for funds. Our research

group also received only casual oversight. As our work attracted attention, Stalnaker established a helpful research advisory group that met only once a year. Among other things, we started a longitudinal study of bright students every year for many years in which we imbedded assessment materials for multiple projects. I was able to insert the VPI, or some proxy for it, most years. In general, we were able to take all kinds of risks in assessments and to try out a wide array of ideas, scales, and inventories.

For instance, I began an exploration of the predictive validity of a person's vocational aspirations, a study of student explanations for being "undecided" about a major field or career, and why they decided to stay or change to another field of study. All the pieces in the SDS (1970-1994) have their origins in these old studies. Much of this work is summarized in Holland (1968, 1997). Another way of characterizing this work is to say I used the VPI scales like personality researchers use personality inventories, and looked at all the correlates, antecedents, and outcomes that are associated with the VPI scales or items, in ways that appeared plausible in a simple-minded, rational, theoretical way.

These explorations—often successful—gave me the confidence to write the article "A Theory of Vocational Choice" in 1959. The deficiencies of other theory at the time seemed so great that I believed any graduate student could do just as well. So why not try; I couldn't do worse.

This article sketched a potential theory and a long-term research agenda that I didn't anticipate. Successive revisions of the 1959 statement in 1966, 1973, 1985, and 1997 are reminiscent of an elaborate painting created from a painting by the numbers kit. The basic structure has remained the same; the revisions usually consist of minor alterations or re-conceptions of the basic ideas—of types, environments, and their interactions.

The interpretation of the 1959 article becomes more concrete if you review that article: There are six types and six corresponding environments, but note the old labels for these constructs that were revised three or four times before I arrived at the present set of realistic, investigative, social, conventional, enterprising, and artistic. Likewise the order of these constructs was revised when the hexagonal model was discovered. Note that I started with "modal personal orientations" rather than types. Types were in deep trouble at that time. The notion of a developmental hierarchy led to the coded interest profile.

My work at National Merit was also influenced by two fortuitous events. I hired a Berkeley graduate student, Laura Kent, on Frank Barron's recommendation, and put her to work running our high speed sorter and a lot of endless clerical tasks. At one point, because I learned that she was an aspiring poet, I asked her to edit a brief article. It came back with revisions on almost every other line; I found I couldn't contest the suggested changes. After a few more tests, I made her our

editor. Several researchers complained that she made their research articles look too simple. I also gave her a raise. Eventually she provided me with a long-term writing internship whose influence I still feel. My zeal for better writing was fed by the realization that I had no graduate students who might carry on my work but also that I would have more influence on other professionals if I learned to write well. At any rate, my reports would be clear even if my research was flawed.

My work habits and goals were influenced by my casual acquaintance with an insurance manager I met at the elevator in our building. His beliefs about daily, weekly, and monthly goals for salesmen rubbed off. The basic ideas are still with me but modified by my pursuit of hobbies and an enjoyable life. My translation of this goal-driven structure is: "If you don't have something you want to do when you arrive at work, someone else will have plans for you."

American College Testing Program (1963–1969)

In 1963, I moved to the American College Testing Program (ACT) in Iowa City where I could have access to large samples of relatively normal college students. I had become sick of studying gifted high school students. In contemporary jargon, this was a positive and smooth transition. The president gave me a humidor for my cigars that I cherish although I gave up cigars a few years later. In retrospect, he was the most talented executive I ever worked for. I learned a lot about money and supervision. I continued a series of monographs (Holland, 1968) on my theory of vocational choice in which I learned that interests—as assessed by the VPI, major field, or expressed vocational choice—were related to a great range of personal characteristics. I also learned that editors were not keen on publishing monographs on the same topic by the same author. So I gave monographs Roman numerals and disguised many as journal articles.

My colleagues and I also engaged in a lot of scale building usually oriented to achievement and competency. For example, Baird and I (Holland & Baird, 1968) developed an Interpersonal Competency scale, modeled after Foote and Cottrell's (1955) rationale for that concept. We discovered that our scale was most closely related to Social and Enterprising interests as opposed to the four other kinds of interests. We also developed an originality scale (Holland & Baird, 1968), modeled after Kubie's theory (1958) of the creative process. This scale was most closely related to Artistic interests in the VPI in 1968 and in the SDS in 1991 (Holland, Johnston, Hughey & Asama, 1991).

The ACT experience resembled the National Merit experience in several ways. In both places I got an opportunity to start a research program from scratch. In this instance, I was recruited to ACT by Don Hoyt, a friend I met as a fellow graduate student at Minnesota. In turn, I recruited James M. (Mac) Richards, Jr., from Educational Testing Service (ETS). I assumed that he couldn't

be happy there. I was right, and he recruited Rod Skager and Clifford Abe from ETS. Later we recruited Charles Elton from Kentucky, and Leonard Baird from Los Angeles, and Nancy Cole from Iowa City. Laura Kent's work at National Merit had demonstrated the value of good writing so I found Renee Huntley at Iowa to edit our research reports. The staff was not thrilled by the need to renovate their reports, but they tolerated this intrusion and became better writers. In short, we were able to secure a productive and talented staff, and to establish programs to study college students, educational institutions, and their effects on students.

I was again able to insert my own research interests in a few programs. I was anxious to try out the assessment materials we had developed at National Merit with the ACT populations of normal or average college students. Critics believed that the findings for bright students (National Merit finalists) would not hold up with the average college student. What we discovered was that the findings for the ACT samples were usually both clearer and stronger.

Once again, I benefited from the technical and research insights and talents of my staff. Mac Richards became a long-term friend and collaborator. He polished and revised many of the National Merit scales and inventories and invented some new ones. Among other things, we revised the "records of student accomplishment" scales developed at National Merit so they had more range and created several new scales. These became the Student Profile section in the ACT national assessment program. Ten years later, the College Entrance Examination Board added similar scales. Leonard Baird continued this work at ETS with considerable success, but ETS ignored the scientific and practical promise of his research.

These were productive years because I was able to do my job as the Vice-President for Research and Development, and at the same time I was able with the help of others to engage in much needed background work to extend the theory and to develop the tools to implement it. For instance, I published my first attempt to extend the classification from the six scales of the VPI to more occupations and fields of study (Holland, 1966) and to obtain more information about the six orientations (not types yet) in other work (Abe & Holland, 1965a, 1965b, Holland, 1963a, 1963b, 1963c).

A comprehensive account of the early development of the classification for occupations was reported by Holland and Rayman (1986). The discovery of the hexagonal model and its assimilation into the theory was described as follows:

The Hexagonal Model. The arrangement of the classification according to a hexagonal model was stimulated by a desire to have occupational categories in an order that was consistent with occupational data. To this end, Strong (1943) struggled with the classification of occupations in the old SVIB profile and performed

some factor analyses to map occupations. That map (Strong, 1943, Figs. 5 and 6, p. 146) anticipated the hexagonal model. Holland also believed that the correlation matrices for the VPI (1953-1969) implied an ordering of vocational interests. In search of this implied order, Whitney and Holland were daydreaming one day that the VPI correlation matrices for college men and women (Holland, Whitney, Cole, & Richards, 1969) might contain the data for arranging the classification in a rational way.

The following explains how Whitney and Holland discovered the hexagonal model:

We began by starting with the Realistic scale, because it was the first VPI scale and because we had to start somewhere. Then we scanned the matrix for the scale with the highest correlation with R, it was I. Then we looked for the highest correlation with I, it was A. Then A was followed by S; S by E, and last C by R. We both saw that these simple correlations created a circle of RIASEC. At this point, we were surprised and pleased but unaware of the value of these relationships, so we made a diagram with the correlations around the perimeter and filled in all the intermediate values. Then we noticed that the values around the perimeter were, on average, the largest correlations, that the intermediate distances were associated with smaller correlations and the greatest distances (opposed scales on the circle) had the smallest correlations. Whitney noticed that we had a circular diagram; Holland said that Roe (1956) had a claim on the circle, but we could have a hexagon. (Geometry was the only mathematical subject in which Holland excelled). (pp. 60-61)

Several simple but important events then flowed from the discovery of the hexagonal model. Occupations were first organized into six main categories (*R-I-A-S-E-C*); then it was assumed that subcategories could be created by following the hexagonal model in clockwise order: *RI, RA, RS, RE, RC*; then *RIA, RIS, RIE, RIC*; then *RAS, RAE, RAC, RAI*; and so on. Next, it was assumed, and later noticed, that this procedure organized occupations according to their psychological relatedness; closely related occupations were adjacent to one another. Subsequent studies of work histories and aspirational recollections support this assumption (Holland, 1985a). Somewhat later Viernstein (1972), my research assistant, performed a vector analysis, using the hexagon, to map occupations. Other analyses by Cole, Whitney, and Holland (1971) and by Prediger (1982) provide similar maps.

When the hexagon was discovered (1969), I was working on a revision of the theory and saw that the hexagonal model might be a vehicle for defining and

integrating the main concepts in the theory. For example, the a priori notions of consistency (Holland, 1966b) could be redefined according to three, rather than two, levels and the definitions created by the hexagonal model were very similar to those stimulated earlier by clinical observation and rational analysis. Likewise, the hexagonal model implied some graduated levels of congruence rather than the a priori all or none definitions proposed earlier. Still later, Zener and Schnuelle (1976) developed a 7-step index for assessing congruence in a more precise way. Later, Iachan (1984) developed a 28-step agreement index that provides a more precise technique for the assessment of person-environment congruence or the degree of agreement between any two three-letter codes. Fortunately, the Iachan and Zener-Schnuelle indices are highly correlated.

These early indices of congruency were followed by more than 13 indices of congruency. Among these, I prefer the Brown and Gore (1994) index that follows the theory, is easy to calculate, and appears to have a normal distribution.

Parenthetically, I learned much later how fortuitous it was to have had in hand a large, diverse sample of 2-year college students from 65 colleges (Holland et al., 1969). More recent samples have rarely fitted the model so well. I assume this is so because most researchers use small samples that have a very uneven distribution of types and that tend to be homogeneous on many demographic and psychological variables.

The hexagonal model stimulated a long series of analytical studies to test the expected symmetry of this model. See Holland (1997) for a summary of this early literature. The recent literature is dominated by Rounds and his colleagues and students.

Their most recent studies (Day & Rounds, 1998; Day, Rounds & Swaney, 1998) provide compelling evidence that the RIASEC structure is markedly similar across African Americans, Asian Americans, Native Americans, and Caucasians ($N = 49,450$). Read the Day and Rounds (1998) article for the most readable account I found in this technical literature. The Day, Round, and Swaney (1998) article also suggests that the RIASEC model adequately represents the interest structures of both sexes.

Several other fortuitous events affected the development of the theory. I received a fellowship from the Center for Advanced Study in the Behavioral Sciences at Stanford (1965-66). There I met Bill Alston, a philosopher from Michigan, who became my tutor on philosophy of science and whose special interest was personality theory. We were a good fit. He was looking for someone who needed his kind of help, and I needed help. I read his journal articles. He read the proof for my first book (Holland, 1966) about the theory which was an elaboration of the 1959 article and a summary of whatever evidence I could scrounge from the literature.

His chief criticism was the theory was often too complex or vague to test. In short, I should simplify. I told him that critics said the whole scheme was too simple. His response was, "It's too complex in some spots." For example, the formulations for the types were filled with clinical ideas and constructs that don't lend themselves to empirical test. He also got me to see that "interests" were dispositions and not simple, automatic traits that are expressed without regard to the environment or to other competing traits. His writing implied that a person's profile of "interests" can be viewed as a "tendency field" composed of competing interests—an idea that I made explicit only recently (Holland, 1997). Above all, Alston's tutoring increased my confidence and focused my attempts to revise the 1966 book. I remain in his debt.

Before I left ACT in 1969, there were three key developments that strengthened the classification and led to related research and development. Cole and Cole (1970) demonstrated that the classification could be mapped in two dimensions that implied some helpful applications made much later. Prediger (1982), using DOT data, added to this work with his mapping of vocational interests. Whitney and I (1968) demonstrated in great detail and in a large sample that the 3-letter code of students' aspirations as a first-year college student was predictive of their vocational aspirations 8 or 12 months later. This technical report was never published, but it led to several similar work history studies at ACT and Johns Hopkins (Holland et al., 1972, 1974; Nafziger et al., 1972, 1974).

In 1967, my staff and I (Holland, 1968) created the ACT Guidance Profile for two-year colleges. The goal was to develop an inventory composed of a student's educational and vocational aspirations, self-estimates of abilities and personal traits, occupational interests (the entire VPI of 160 items), potential scales that may forecast interests and achievement in nine areas (technical, scientific, community service, business, sports, etc.). This inventory was a mixed bag of scales and items obtained from earlier research and organized in the six category classification. ACT published a revision in 1968 that was printed on a long sheet of paper (41 inches) using both sides and scored by E. F. Lindquist's optical scan machine. ACT printed 100,000 copies and sold very few. We finally gave them away.

Although this inventory was a commercial failure, it was a gold mine for new work. Among other things, it anticipated the Self-Directed Search in 1970. Chuck Elton who had joined our group said, "If you could make this inventory self-scoring, you would really have something." My response was a "Yeah, yeah." I had no idea how this miscellaneous collection of materials might be self-scored. At that time a self-scored inventory was viewed as unethical, perhaps harmful to a test taker. When I moved to Johns Hopkins I remembered Elton's advice and eventually found a way to make the SDS a self-scored inventory.

The environment at ACT (1964-69) was well organized on paper, but we

lived through three presidents in six years. These were exciting times for there were no institutional traditions like “we have never done that before.” There were three divisions: administration, field services, and research and development, but everyone participated to some degree in all divisional planning. The oversight for R & D was primarily budgetary, not technical so it was easy to mix company needs with personal projects.

The third president was hired by the board to bring order to this burgeoning organization as the informal relations among divisions had occasionally become fractious.

The new president did bring order. I got caught up in the new order. Proposals for R & D projects or products were expected to go through appropriate channels, not directly to the president. Someone in field services went to the president with an R & D project rather than through R & D. I asked the president via a memo (we were into memos by then) to send the request through R & D first. He said, “No” so I walked out of the president’s staff meeting. He followed me down the hall saying, “This was insubordination.” I thought it was a small protest, but he had the board relieve me as VP and reassign me as a special assistant to the president, and gave me 90 days to find another job.

I had miscalculated. The board had formally commended me two or three weeks earlier, our division had a good reputation, and my relations with board members had always been cordial and helpful.

As a special assistant I was free to finish my research projects, but I was stripped of the signs of status—the company keys, credit card, and my posh office. I had a beautiful two-window office with Danish furniture, couch, etc. I did miss the office; I had some decent art on the walls. The hardest thing about this event was its impact on my wife, Elsie. She was an innocent victim, but she recovered and helped me get on with the next job. Our children had different reactions. Kay, the oldest, in full adolescent rebellion, said, “You see, Dad, that’s what the establishment is all about,” or something to that effect. Joan, number two child, cried but recovered. Son, Bob, seemed unaffected. Who knows what he felt?

It was a good time to get fired. Jobs were plentiful. I located three good possibilities in short order. My casual acquaintance with Peter Rossi and Jim Coleman, who I had met at conferences, led to my next job at Johns Hopkins University. My staff also found desirable jobs. Elton returned to Kentucky, Baird went to ETS, and Richards went to American Institutes for Research.

Before I left Iowa, I decided to sue ACT for breach of contract. That action was settled out of court five years later to my satisfaction. I tried to give Elsie half the award but she wanted a lesser amount that she put in our checking account where it eventually disappeared. I too was affected by our experience in the great depression.

A friend said I should buy a new hi-fi. I bought a new needle. I did buy a Swedish workbench made of beech. When I assembled it on the living room floor, Elsie said, "It's more attractive than our furniture!" It was; I hated to put it in the basement. I still have it; it makes me feel good just to see it. Son Bob tried to saw it in half once but failed. Between the two of us it has suffered many scars. Recently, I lost the key to the cabinet in the bench. This could become a problem if I can ever remember what is inside.

I realized later that the shift from ACT to Hopkins was advantageous for the theory and my research. For my family it's hard to say, but it is clear that I had little to gain if I had stayed. If I had managed to turn the ACT Guidance Profile into an SDS-like simulation, it would be foreign to the machine-scoring and norming traditions. The first tests of that product would have taken too long to bring the income that the large, bureaucratic institution it was becoming needed. In contrast, the Hopkins environment with an open-ended research tradition encouraged my interests in theory and research.

Johns Hopkins (1969-1980)

In 1969 I left ACT for Johns Hopkins. This involuntary career move was advantageous in the long run. I put together the first form of the SDS in 1970. Later, I realized that developing the SDS was an attempt to demonstrate that I was still a valuable person. Most of my R & D effort at Hopkins was spent resolving the problems the SDS had created—writing manuals and dealing with critics—and with the engineering, testing and revising of my theory of careers. Fortunately, I met Gary Gottfredson in 1973 who became my research partner, whose creative and technical talents have extended or salvaged much of my work.

I have organized the extensive developments at Hopkins around the birth of the Self-Directed Search and its revisions, and the career theory and its revisions. Both topics spawned new research and had unanticipated effects on my life and that of a few others.

The Self-Directed Search (SDS)

In the winter of 1969 Tom Magoon at the University of Maryland called and said that the counselors at the Student Counseling Center wanted to do something vocational with the entering freshmen in 1970. Preferably something that was new.

I had been daydreaming about how to develop a self-scored version of the ACT Guidance Profile. I also wanted to create a new inventory that was explicitly integrated by the theory. The ACT inventory was a diverse collection of materials composed of the entire VPI (160 items), nine competency scales, eight activity

scales, and 26 self-ratings of abilities. To use the ACT inventory, a counselor had to interpret the scoring outcomes of this assessment by integrating this collection of loosely related information. I should have realized that the interpretive difficulties of this inventory would lead to its financial demise.

When Magoon called, I had already roughed out a preliminary inventory composed of six activity scales, six competency scales, six occupational interest scales (the first six scales of the VPI), and 12 self-ratings (two for each type). All scales were the same length within each section: 11 items per scale in the activities and competency sections, and 14 items in each VPI scale. This strategy would make scoring easier and would eliminate the need for norms. At ACT, Mac Richards had also applied a statistical formula to some of these scales that suggested where you could shorten a scale without destroying its reliability and validity.

I decided to make the SDS self-scoring because I had found a way at National Merit to score the VPI with a single cardboard key. This time I wanted to avoid both a cardboard key or keys, as well as electronic scoring. The organized and symmetrical arrangement of scales with all items scored as “yes” or “like” made self-scoring of the subscales easy. No keys were necessary.

Unfortunately, the scale scores in the 1970 SDS were weighted according to their rank within each section in the calculation of summary scores. This procedure was burdensome for people who could not follow directions or multiply easily by 1, 2, or 3. A few years later statistical analyses suggested that weighting added little if anything to the validity of the SDS profile or code. The unweighted simplification was proposed by a nurse in my neighborhood, whose children took the SDS. She said, “Why not transfer all the section scores to a single page and add them up to get the six summary scores?” I did and this is still the current format.

In writing this chapter, I rediscovered the forerunner of the ACT Guidance Profile: The Personal Survey in 1963. It was published in the first book about the theory (Holland, 1966, Appendix B, pp 125-130). I was surprised, when I reviewed this old inventory, how many items and ideas in the SDS in 1994 can be traced to the Personal Survey (PS) in 1963. In earlier research with the VPI and the theory, I had tried out pools of adjectives, life goals, admired people, school subjects, activities, self-rated abilities and competencies, and sources of satisfaction and frustration. Self-reports of achievements and vocational daydreams were also included. Most research was geared to the identification of talented adolescents in the National Merit program, but because the VPI was imbedded in these data collections, it was easy to find items that characterized the types or to test other aspects of the theory.

I had worked out keys for scoring the PS and tried it on myself and two or three friends. I concluded it wasn't worth the effort to continue. It was tiresome to

score, and it didn't appear to work any better than the VPI. At the time I believed that short assessments are more useful than longer ones. I was scarred by my hand-scoring experience with the Kuder, Strong, and other inventories and scales. I relented some with the SDS.

The publication of the SDS in 1971 by Consulting Psychologists Press set off a long series of rewards and problems. I was pleased when sales doubled from year to year for several years. My dream of having a grand piano looked possible. Elsie and I weren't poor but with three children going to college or technical schools, buying an expensive piano couldn't be justified.

Some counselors and academics were skeptical about an inventory that was self-scored and self-interpreted. On the other hand, I was surprised by the positive reception the SDS received from students and adults. A few of my own faculty came by to get copies for their daughter or son. One college administrator called me up late at night to tell me that the SDS said he should be an administrator. I was pleased, but I didn't tell him that this outcome was a somewhat lucky event. A graduate student at the University of Maryland gave 20 or 30 students the SDS to take home. He called to say that only a few came back to see him. I told him to phone students and see what happened. He reported that they found the SDS helpful and saw no need to return for counseling.

The first article about the SDS, "A Theory-Ridden, Computerless, Impersonal Guidance System" (Holland, 1971), was published in the *Journal of Vocational Behavior*. It was my Division 17 talk at the APA convention. I asked an editor who had heard my talk if his journal would like to publish it. "No," he said, "It's just another gimmick." He helped to formulate my paranoia about journal editors or at least selected editors.

In the early years, I gave workshops at meetings or by invitation to introduce the SDS. It didn't take long to realize that I lacked the energy and time to keep this sales effort going and still do my job. Among other things, my correspondence and phone calls became an unexpected burden. I decided that a more effective strategy would be to develop a better manual (Holland, 1972) to answer questions and to provide training. This helped, but I soon learned that professionals don't read manuals. I also began to decline talks about the SDS and referred requests to knowledgeable friends. This didn't work well either, but eventually the flood of questions slowed down as the SDS became better known.

I kept a file of complaints and testimonials from counselors, psychologists and critics for about ten years that I used to shape the SDS and to initiate new research. I inserted a "Common Questions" section in most manuals. I also included a self-test. Most questions were "common," but I invented other questions to take on critics and to cope with misunderstandings. I loved writing these sections.

Gary Gottfredson and I continued this activity when we gave talks at

professional meetings. We would ask an audience to write questions on 3 x 5 cards because most people seemed reluctant to ask hard questions. We usually slipped in a few questions that we wanted to answer. Some were written before a meeting; others were stimulated by the audience's questions. I liked this strategy because we could provide articulate "spontaneous" responses to criticism in the literature or from advocates concerned with racial, gender-related, or psychometric topics.

About 1972, the SDS attracted the wrath of the women's movement. The SDS and my theory were imbedded in a grant proposal to the National Institute of Education. A monitor visited our Education Center at Hopkins (the Center for Social Organization of Schools, CSOS), and without warning, one of his staff waved an SDS in the air and said that a committee of women at the Office of Education had found both the SDS and my theory to be sex-biased and had recommended that the commissioner of education reject my proposal. Up to this point, our meeting had been routine. I got so angry that I declared a break to pull myself together. I had already forgiven the monitor for putting his car in my parking space—one of the few perks that came with my job.

My grant survived largely, I believe, because what little evidence I had about the fairness of the SDS exceeded the rhetoric of these critics. At the same time, some of their beliefs were plausible. These attacks—they weren't neutral criticism—coupled with the escalating wave of the women's movement—stimulated the need for relevant research about the measured effects of the SDS and other career interventions. In the early 1970's, such evidence was absent.

Fortunately, Thelma Baldwin Zener came to my rescue with a large-scale proposal to perform an experimental evaluation of the effects of the SDS on high school students (Zener & Schnuelle, 1976). Her work led to more than 22 studies of the effects of the SDS on test-takers. I was relieved to learn that taking the SDS had positive effects for men and women. Still, beliefs that the SDS had negative effects persisted into the 1990's.

We did make a few minor test item revisions in the SDS and some other inventory revisions are reported in the Technical Manual (Holland, Fritzsche, & Powell, 1994) and elsewhere. Perhaps the most important outcome of this controversy has been the realization that inventories and tests are now viewed as both interventions and as psychometric devices.

Theoretical Work

After the SDS was developed, I began a program of research to elaborate and test my theory of vocational choice. I was blessed by finding three outstanding graduate students and interns: Gary Gottfredson, Sam Helms, and Dean Nafziger, and some other students. I also got counsel and research assistance from Keith

Taylor, a visitor from the University of Melbourne in Australia who sent me two of his students: Geoffrey Kelso and Paul Power. The insights, technical skills, and energy of this cadre led to perhaps the most prolific period in the testing and elaboration of the theory.

This program was funded for only two years, but we produced 24 articles and papers in which the classification was revised, extended, and tested; the theory was revised and tested; and some products and practical applications were developed or suggested. I located the Final Report (Holland, Nafziger, & Gottfredson, 1973) for this program to jog my memory. I was again surprised by how much I had forgotten and how thoroughly the theory and the SDS were integrated in our research and thinking. For instance, all the classification research can be seen as validating or extending the Occupations Finder. The studies of person-environment interactions (Helms & Williams, 1973; Helms 1996; Hogan, Hall, & Blank, 1972) examined some of the congruency hypotheses. The studies of the inter-correlations among the types (Cole, Whitney, & Holland, 1971; Edwards & Whitney, 1972; Edwards, Nafziger, & Holland, 1974) foreshadowed the recent studies of the hexagonal model by Rounds and his colleagues (Day & Rounds, 1998; Day, Rounds Swaney, 1998; Rounds & Tracey, 1996).

So much was going on in those early years, I don't think it is possible to provide an accurate and comprehensive account of the many interactions among the theory, its instrumentation, the research data, my colleagues' work and thinking, and my own. The only interpretation I feel confident about is that the main elements of the theory provided a rough framework for organizing our research that in turn led to the revised theory (Holland, 1973). Parenthetically, the work by researchers in other institutions also contributed to the revision of the theory (see Holland, 1997). And, of course, critics reminded me of the need for revision.

After my grant ran out in 1973, I continued working at the Education Center at Hopkins and collaborating with psychologists and sociologists who were interested in my research or who I persuaded that they should be. In the period 1973 to 1980, we authored 45 publications that continued the main outlines of the funded program on the following topics:

- SDS revisions, validity, and accessory materials
- Theoretical studies of the hexagon and congruency
- Classification extensions and revisions
- Work history studies on national samples
- Experimental studies of the effects of the SDS on the test taker
- Development of the Vocational Identity Scale.

In general, this work helped to support the theory, and some research led to revisions in the 1985 version of the theory and to revisions in the SDS and its accessory materials.

In the 1969-1980 period I had also attracted the support of authors and researchers in other settings, whose work served to elaborate or strengthen what we were doing at Hopkins. They included David Campbell, Nancy Cole, Geoffrey Kelso, Paul Muchinski, Keith Taylor, Bruce Walsh, Douglas Whitney, Jack Rayman, and Thomas Magoon and his students.

In 1971, Keith Taylor, a professor of psychology at the University of Melbourne came to work with me at Hopkins. His contributions here and in Australia were substantial. On his return to Australia he established an extensive research program. Taylor and his colleagues summarized their work in an edited book (Taylor & Lokan, 1986). This work stimulated an Australian form of the SDS (Lokan, 1988).

Taylor also sponsored a consulting trip to Australia—arranged so I could work one day and rest the next. Elsie and I found our visit one of the highlights of our life: eating, visiting with students and faculty, and experiencing Australia's animals and geography. Taylor and his students (Geoffrey Kelso and Paul Power) became lifelong friends.

The reader can get an appreciation of the contributions of these researchers and many others by a review of the bibliographies in the successive versions of the theory in 1966, 1973, 1985, and 1997. In 1959 I was unaware of how much work would be required to explore and substantiate my first bare bones proposal.

I didn't daydream why some people liked my work; I was grateful for any help I could get. Recently, Rayman and Atanasoff (1999) attributed the acceptance and popularity of the theory and its tools to its simplicity, usefulness, face validity, organizational framework, vocabulary, and its easy translation into practice. I didn't plan these virtues—many just happened.

In 1975, I decided to leave the Education Center and teach full time in the Social Relations department. I felt that I had accomplished most of what I wanted to do at the Center, and I had found the role of center director increasingly onerous. Coping with Federal funding was difficult and frustrating, and the university provided only minimal support. I daydreamed that I could perform some small projects and fund them myself.

My teaching experience was satisfying in some ways. I developed an undergraduate course called Vocational Behavior that was an attempt to summarize what we know about vocational life from birth to death. It forced me to read about topics I had no knowledge of and helped me speculate about making the theory more applicable to the entire life span. Students liked it because it was for many a

means of getting career counseling without admitting that they needed it. Career services at Hopkins were primitive compared to those of a state university.

When the dean urged senior faculty to teach freshmen, I started a Career Seminar for freshmen or anyone else who wanted to participate. I used the seminar to try out SDS materials and other interest inventories as well as a wide range of new and old assessment and treatment ideas. Among other things, I discovered that no matter what the scientific quality of an assessment device, some students found it helpful.

The seminar requirements for students were to use the assessment devices and treatment exercises to create a personal case study to support three vocational options. The other requirement was to visit me for 20-30 minutes at midterm to talk about their vocational situation so I could get a clearer understanding of their evaluations of the seminar and the individual treatments.

Two graduate students and I (Johnston, Smither, & Holland, 1981) did a simple evaluation of two of the five seminars by asking students to rate the value of 12 different treatments. We found strong main effects for both seminars, but the ratings of individual treatments were usually unreliable. Nevertheless, I was cheered by learning that the SDS received high ratings in both seminars. But I was surprised to learn that “Talking to employed people about jobs and careers” received the highest rating in both seminars. This is an example of how a rather ordinary experience can have a powerful influence. At that time, it was fashionable in career counseling to “model your own career” for students. My use of this idea received a low rating in both seminars. I’m sure I could do a better job now—I have a longer career.

The outcomes of these fragile evaluations (very small N 's) still appear consistent with subsequent large scale evaluations. Main effects are achieved for many diverse treatments, but the search for interactions (specific treatments for people with specific problems) rarely succeeded.

I decided to take early retirement in 1980. This decision was the outcome of many personal and environmental influences. I was ambivalent about teaching and academic life. Each year, I had reworked my course materials, but I lost interest in these tasks as I got involved in a new research project. Gary Gottfredson, who had been my research and teaching assistant, told me I was better working one-to-one. I agreed. The best you could say about my teaching was that I was ambivalent. I disliked getting organized for class sessions, but I felt satisfied when things went well and unhappy when they didn't. A major source of stress was the time I had to spend dealing with criticism about the alleged sex bias of the SDS. I was scared that critics would do it in. Critics earlier had attacked the Strong and added to Dave Campbell's troubles. I wondered later if that experience led to his giving up on the SCII after a productive 10 years. My stress came on top of my full

time teaching and SDS maintenance work—revisions and manuals, and working on revisions of the theory.

There also was the money question. At that time, I was the first full-time professor to ask for early retirement, and it took the Dean a little time to work out a mutually satisfying deal. For instance, they didn't have a special procedure or form. Fortunately, they had been hoping that some senior faculty would retire early so I received a package that was equivalent to about half-time pay. Another force was my increasing income that resulted in higher income taxes so my Hopkins salary was eventually cut in half.

I talked my retirement over with Elsie; it worried her, but our accountant reassured us. As it worked out, my income never dropped. I told Elsie that she should retire too and give up typing my manuscripts. She agreed but countered with, "I will still do your emergency typing." There is something wonderful about a satisfying traditional marriage. I was a lucky man.

On the positive side, I saw early retirement as a chance to spend more time with my hobbies—playing the piano, woodworking, and planning a revision of the theory. I believed Elsie and I could live a more leisurely life. Among other things, we considered a part-time job with Jack Rayman at Iowa State in Ames, another trip to Australia, and visiting our children and relatives.

Retirement Years (1980 – 2008)

I retired in 1980 and bought a grand piano—a dream I had for many years. Even mistakes sound OK on a grand piano. My joy about this instrument was brief. Our hopes for retirement were quickly revised when Elsie was diagnosed with lymphoma in 1980. She spent six months in outpatient chemotherapy at Hopkins Hospital. We gave up our move to Ames and learned to live with medical check-ups. We had a good life for about six years. We traveled some and I published the 1985 revision of the theory. The cancer returned in 1986, and Elsie died at home in 1988. It was a tough time for everyone.

I returned to a few part time research activities in the fall of 1988 and assisted Gary Gottfredson in several publications. He figured out in 1982 how to extend the classification to the *Dictionary of Occupational Titles* (DOT) and was the principal author for the revisions in 1989 and 1996. He also took the lead in the creation of the Position Classification Inventory (PCI, Gottfredson & Holland, 1991). This inventory provides a simple technique for classifying new occupations or positions not in the *Dictionary of Holland Occupational Codes* (DHOC; Gottfredson & Holland, 1996). The PCI was stimulated by graduate students and researchers who occasionally sent us long lists of occupational titles to classify—as if we were a public service. Like many assessment devices, we found the PCI

useful for some unanticipated purposes such as comparing a person's perception of their occupation with the perception of supervisors or characterizations in the DHOC.

During my retirement I spent a lot of time daydreaming about how to make the theory more useful. A counselor at a cocktail hour asked me, "What do you do most of the time?" I said, "I worry about how to fix things." Not knowing what to do, I collected reprints, reread Alston articles, skimmed books, organized materials for book revisions, and talked to friends for advice.

With each successive revision, it had become harder and harder to make satisfying revisions. In the 1997 revision, I focused on two chief worries and some potential solutions: How to clarify or revise the secondary constructs of consistency, differentiation, and identity. And how to cope more successfully with the problem of job changes, shifts, or transitions. The secondary constructs were revised by clarifying and elaborating the definition and roles of consistency, differentiation, and identity in the theory.

The search for a better explanation of job shifts led Gary and me down a two-year rambling path. We initially decided to develop a vocational change scale. We assembled a group of items—invented largely by us—and gave it to some adults. The assumption was that a person's potential for change was a dispositional variable. Several sources that I can't cite, had reported that a large proportion of job shifts are made by a small proportion of a population. We also gave participants, who took our scale, a chance to suggest items.

Without any coherent planning we accumulated clusters of items that belonged in the change scale and eight different clusters. These item clusters led to the nine scales in the Career Attitudes and Strategies Inventory (CASI; Holland & Gottfredson, 1994) measuring Job Satisfaction, Work Involvement, Skill Development, Dominant Style, Career Worries, Interpersonal Abuse, Family Commitment, Risk-Taking Style, and Geographical Barriers.

The Change scale became the Job Satisfaction scale for several reasons. Unpublished factor analyses of successive scale revisions suggested the Change scale was a single factor, and the best items were all about positive and negative attitudes about a person's job including preparation to change jobs. The CASI Job Satisfaction scale also correlated .84 with Hoppock's Job Satisfaction scale, -.38 with a list of career search activities, and -.70 with the Vocational Identity scale.

I was attached to the idea of a change scale but was consoled by the development of the CASI and by the support for the Vocational Identity (VI) scale. This work led to some speculations about the role of the VI scale in the 1997 revision of the theory. See Holland (1997, pp. 172-174). The 1997 revision also includes multiple revisions in the formulations of the types and environments but so far no reviewer has noticed these changes. See the first (and only) review (Betsworth, 1998). A

summary of the revisions is provided in a separate chapter in my 1997 book (pp. 171-176).

I am anxious to learn if these and other revisions will survive empirical investigations. I am especially hopeful that counselors and clinicians will find my outline of a Personal Career Theory congenial and that a few researchers will explore its merit.

Loose Ends and Omissions

My attempt to write a coherent account of the origins and development of the theory led to the omission of many events and topics. Some experience seemed tangential to the main topic; other experience I had forgotten as I was writing; and some experience I didn't know how to report. For these reasons, I thought it would be helpful to supplement my chronological account with a few neglected topics. These include the effect of the theory on myself and my personal relationships, the effect of others on me, and my attempts to cope with my life, to maintain my mental health via hobbies, recreation, and a social life.

Initially, the theory played a minor role in my life. I was preoccupied with learning to teach, counsel, and survive in academia. At Western Reserve I taught in the Evening College, the undergraduate college, and gave a class for a few graduate students. I supervised a small vocational service and saw clients. My boss volunteered my services, one day a week, for an American Heart Society clinic. I enjoyed this experience and learned from some congenial cardiologists and a social worker. I was busy.

At the same time, the birth of the VPI (1952-53) grabbed my interest in a way that none of my work duties did. The move to Perry Point VA hospital and every subsequent move was usually oriented by my desire to polish the theory or to gain access to desirable data. Without any long range planning, the pursuit of a defensible theory took over. Critics helped by activating my competitiveness, and by implying a new research agenda, or by suggesting revisions that worried me.

Recently a graduate student asked why did I keep at it so long. Until this book I had not speculated about my persistence, but the review of my correspondence and writing about my work experience made clear that I had received long-term, substantial emotional and intellectual help from Elsie, Gary Gottfredson, and from many other colleagues, friends, and students, here and abroad.

Two other influences kept me going. The theoretical research became more comprehensive and positive from one decade to the next, and the theory attracted researchers in other psychological specialties and other countries. These developments increased my focus on the theory so I became more ambitious and intense as I worked on successive revisions. A clinician might say that my

obsessive-compulsive qualities created their own environment that rolled along successfully—most of the time. He or she might also say that this book is just an elaborate justification. Ed Bordin, after hearing my talk at a conference in 1994, said, “You have integrated work and play.” I was pleased to hear this because a few colleagues have not enjoyed my humor.

I hit low points when research projects produced the wrong outcomes. The early findings for the validity of the VPI versus a person’s vocational aspiration indicated that the VPI was about equal to a single vocational aspiration. I worried about these findings for several years before I found some useful solutions. One was to capitalize on the predictive validity on a person’s successive aspirations. Another was to explore the value of using the VPI and aspirations together. Later, VPI profiles (Holland, 1966a) were used as a technique for building a preliminary occupational and personal classification. This simple idea led to the comprehensive classification and its revisions from 1966 to 1996.

Finally, I included a vocational daydreams section in the SDS in 1970 so the inventory would provide a more comprehensive assessment of a test-taker’s aspirations and interests. The most recent step was to integrate vocational aspirations in the theory in more explicit fashion (Holland, 1997).

This early work on the validity of vocational aspirations lessened my evaluation of interest inventories (including my own) and increased my desire to exploit the value of a person’s vocational aspirations. I wondered why aspirations had been neglected and traced this disinterest to negative reports of the early research (Strong, 1943; Fryer, 1931) and the failure to appreciate the difficulty of the predictive task—the prediction from one occupational title to the same title among a large number of titles as opposed to the prediction from one occupational *category* to the same *category* among a small number of categories.

My colleagues and I (Holland, 1962, 1963; Holland & Lutz, 1968) found that the *category* of a person’s vocational aspiration was an efficient predictor of the category of an aspiration at a later time and that the categorization of a person’s first three aspirations yielded very efficient predictions for intervals of one to seven years. The most exciting fact about the use of multiple aspirations is that this research has never failed. See Holland (1997) for a summary of the research. Unfortunately, this research topic has been unpopular because it is a threat to the usefulness of interest inventories. The research also doesn’t look very psychological to some, and the research entails simple analyses that anyone can perform and comprehend.

The effects of the theory on me and others are many and extensive. It didn’t take long before I saw myself and my family, colleagues, and relatives as types. It started with Elsie and spread to our children who filled out the early forms of the VPI and SDS. They grasped the main ideas and eventually referred to me as the

“big A,” Elsie was the “big C.” I saw her as the “CSE.” Kay, who became a translator, was an “A.” Joan, who has taken every revision of Form R, has always been an SI or IS with trivial scale differences, and became a nurse. Bob, the youngest, who also took most revisions, was the “big R” on all forms and has spent most of his life driving trucks and liking it. My closest relatives—father, mother, and siblings received less scrutiny but were eventually characterized by the typology—several are in the manuals. My mother had been an elementary school teacher in a one-room country school. She taught all grades. Clearly an “S” by virtue of her social skills, interests, and values. My father, an English immigrant, became a successful advertising executive. His work and hobbies personified an AER. He was a competent commercial artist, writer, and a good carpenter—he built two houses in his spare time, designed the family home and tended to work seven days a week. His example probably had something to do with my persistence and that of my two brothers and sister who had successful careers in business and science. I also have come to see many of my colleagues and friends as types. In the interest of privacy and survival, these characterizations have been omitted.

Seeing groups or organizations as collections of types was the next step. The counseling psychologists in Division 17 of the American Psychological Association (that I have lived in for 40 years) exemplify a collection of full-blown Social types with traces of Enterprising and Investigative attitudes, competencies, and behavior. They prefer to work as professional counselors, clinicians, and teachers. Their journals are now dominated more by good causes than research. The division has created special sections for women and multi-culturalism. Recently, the section for women was relabeled as the section for the Advancement of Women. (There is no section for men). They created a special ethical code for the psychotherapy of women. They welcomed qualitative research. The latest cause is the inclusion of all peoples. The division is currently dominated by a majority of women who display the chief attributes of the Social type.

Thirty years ago, the division was dominated by men who in retrospect were Social-Investigative and Enterprising types. Their causes were traditional science (especially evaluation), ethical codes for counseling practice, and spreading the counseling gospel in the United States. The shifts in topics and advocacy from the past to the present are, of course, imbedded in the present major cultural changes. At the same time, the population shift in this division is dramatic—from male domination in positions of power, elected offices, journal editors, and consultants to female domination in numbers, positions of power, etc. The typology provides a partial explanation of the behavior of these contrasting groups at different times.

A less charged example, are the observations of counseling workshop trainers who report that participants tend to be largely Social types along with a few other types, but they are rarely attended by Realistic or Conventional types. Workshop training activities usually provide congenial social experiences. Reports of

relevant research receive little interest.

Although the theory dominated my life, I enjoyed and needed time out when I was working full time. My colleagues and I occasionally played golf. At ACT in Iowa City, Mac Richards, Don Hoyt, and I occasionally played on one of the 9-hole golf courses with sand greens. We would wait for the ACT president to take a trip and then start playing in the early afternoon. We didn't play well, but some clubhouses had beer on tap at the 9th hole so poor scores became less important. I dreamed of becoming a decent golfer and took weekly lessons from a pro for a large part of the year when I was on a fellowship in California. When I returned to Iowa City, I played well on the first 9 holes but reverted to my bad habits thereafter. I still have a set of clubs, but I no longer try to play or practice.

My main long term recreation has been playing the piano. I took lessons from 12 to 22. I don't play as if that is true, but I always get an emotional lift from playing. Unlike baseball, football, or tennis, your physical skills for performance do not deteriorate until about 75 and very little then if you are a professional musician. I have slipped, of course, but I have adapted by playing short pieces of limited difficulty. When I was at National Merit I took jazz lessons at noon. I had a good teacher, and I enjoyed learning more harmony and what jazz was all about, but I had little aptitude and gave up after a year of trying.

At Western Reserve, a graduate student gave me an old player piano that I restored by painting it black and by creating a phony gold label (Trouville) so it had some status among pianos. I enjoyed it for several years but had to give it to Good Will when the movers couldn't get it into the family room in our new home in Skokie, Illinois.

I resumed lessons when I retired; I added voice lessons when I was 74. Now my problem is I don't have the energy and time to keep these activities going well, and to cope with the remnants of my career: SDS and VPI maintenance, working with Gary Gottfredson, and doing some writing. Despite this complaint, these hobbies are still a major source of satisfaction.

Earlier I said negative research outcomes were discouraging from time to time, but the most discouraging times occurred when I was trying to find plausible revisions to make the theory more useful or to cope with criticism in the literature. Once I wrote to ten authors for their ideas about revision. I didn't get much that I could use, and I received contradictory advice ranging from "Don't mess with a good thing" to "Consider turning the typology into a thorough-going theory of personality."

I realize now that I acquired a few criteria for evaluating proposed revisions such as: Is the revision within the scope of the theory? What's the evidence for its potential usefulness? Will the revision make the theory more complex with

little gain for consumers, counselors, and researchers? Is the revision unnecessary because the present theory is useful for solving the problem the revision is assumed to fix? Could the revision be an integral part of the theory—does it have a logical fit or is it an ugly ad hoc addition? Can you apply the revision to the formulations for the types as well as the environments? (I have a symmetry bias.) Evaluation has its ambiguities but it is relatively easy compared to imagining, deriving or finding suitable revisions.

This chapter has no ending. Every time I worked on it I could dredge up more topics to write about. I decided to stop here so I could finish the rest of this manuscript. The next chapters report my attempts to cope with editors, journals, lawyers, copyrights, publishers, colleagues, and summarize what I have learned that might be helpful to other researchers.

CHAPTER 2.2

BECOMING A RESEARCHER

My credentials for writing this chapter consist of my watching others struggle with becoming a researcher and my own early attempts. I wanted to write about this topic because I have found fault with my graduate training, and especially with the recent training of graduate students—not everything but some things.

Learning to research entails coping with some common hurdles and tasks. These include getting started or finding a problem or task, learning to write, finding funding or opportunity, and developing interpersonal skills and relationships.

Getting Started

There is no formal training for selecting a research problem—a task that stimulates anxiety and frustration for most students. Many take the easy way out and let their advisor propose a problem, but there are other strategies for finding a satisfying problem. These take more effort and time, but they may make you a better researcher in the long run. These include:

Reading scientific literature, few do.

Examining your own life through your friends, partners, relatives, children, neighbors. Get out of your own ghetto. Because your special ghetto of income, education, race, etc. has limited your attitudes and beliefs, it is helpful to learn from people who don't belong to your ghetto.

Listen to outstanding clinicians and counselors.

Let anyone teach. You don't know everything; let your colleagues and friends teach.

Work like a detective. Use any kind of evidence or idea to solve the problem. Don't confuse looking like a scientist with acting like one.

These strategies have benefits and pitfalls. For instance, listening to kibitzers of all kinds (from clinicians to statisticians) may shift you away from the question you hope to deal with, but they may also stimulate more defensible research. Kibitzers may also direct you to productive literature or provide you insights about the phenomenon you plan to investigate. Ordinary people are occasionally a useful source of reality that is not available to academics. At any rate, the average person can provide a reality check or be a source of overlooked information.

Listening to others requires a skeptical attitude and careful evaluation. Good

ideas have only a modest correlation with the talents of the source. Untutored people can have creative ideas, and PhDs can have sterile advice. In short, look around and keep trying. Persistence may be more important than originality. And extended research usually provides a more complete knowledge of older work—failed, original and promising. If the proceeding strategies are not productive, you might find *What to Study: Generating and Developing Research Questions* (Campbell, Daft, & Hulin, 1982) to be valuable. This text is the best work I have found for its careful and comprehensive account of the research planning process. Although it focuses on organizational research, the ideas are easily applied to all social science research. Students should read the entire book. Those in a hurry should at least read Chapter 4, “Antecedents and Characteristics of Significant and Not-So-Significant Organizational Research,” and Chapter 5, “Toward More Satisfying Research Questions.” The text also has some sly humor.

Another book, *The Science Game* (Pyke & Agnew, 1991) provides a comprehensive account of research in social science. This is an engaging text for students interested in research but lacking an understanding of the basics of science.

Finding Funding or Opportunity

The securing of research grants is a mixed bag. Without a grant or a rich relative, some kinds of research are simply not possible; and unfortunately grant activities have great status among peers and administrators so that students come to believe they cannot do good work unless they have a grant.

It is possible to do research without a grant. Data processing is not a substantial expense except for an atypical project, but data collection can be an expensive hurdle. One solution is to find a school, a company, a religious institution, or a group that will trade consulting or other services for access to research participants. Data entry work for small samples ($N < 250$) can be performed by faculty children who are preteens. They are cheaper than graduate students; and they worry more about making errors than about a project’s scientific merit. The only problem I encountered is when I raised a student’s hourly rate because of good work. Her mother complained that her daughter’s allowance had lost influence. At another time I used psychiatric patients to do item analysis—also more efficient than graduate students.

I have been doing small scale research for the last 20 years. The out-of-pocket costs to me have been small. I barter to secure data, consultation, data processing, and typing. Until recently, reprints were my largest single expense, but these can now be obtained from the Internet.

I am not saying my way is the best or the only way to get research done. I am

saying that more researchers should consider using their social skills, ingenuity, and professional capital to do research. At first, this strategy may seem like a lot of work and wasted time, but compare a few sales visits to likely sources with the time spent in preparing grant proposals that often fail. In the do-it-yourself strategy, you can take great risks (empirical or theoretical fishing); in a grant proposal, you have to work hard to create the impression that your proposal is important and infallible.

Another funding strategy is to knuckle under and get grants but at the same time engage in cheap, empirical or theoretical fishing expeditions to learn what you can. This is of course what most grant-addicted researchers do, but it is a stressful life for many and tends to focus one's work on safe designs and popular topics.

Learning to Write

Learning to write well is a lifelong process or at least it was for me. I had taken the typical composition courses in high school and assumed I was through. My experience with the editors I have hired indicated that I had much to learn. My first editor, Laura Kent, was the most influential. Like many PhDs I was skeptical about improving my writing, but her tutoring got me started and enthused me about becoming a better writer. She rehabilitated my manuscripts and stimulated my reading of a heterogenous collection of writing materials from Strunk and White (1959) to the writing of established authors.

For students who are skeptical about the renovation of their writing, I have found it helpful to ask them to compare the first article (Holland, 1959) about the theory with my recent writing. That comparison usually brings rain. And for writers whose first draft is too bad to edit, it is helpful to have them read it aloud in the privacy of their office. That also brings insight.

Writing is for many one more unpleasant hurdle in the research process. My desire to improve was driven by the satisfying tutorials I had received and by the realization that I needed to attract students and researchers to explore the value of my work. I did some research, but I needed others to examine the many possibilities in the theory.

Now I also realize that Kent's emphasis on clarity has been valuable in attracting researchers and students. It is hard to sustain interest in books and articles with vague writing and confusing organization. Clear writing is influential. For many years, I struggled to understand everything I read and blamed myself if I found a journal article hard to understand. Now, if I find something hard to read, I blame the author. Occasionally, I have asked a friend to read something I saw as confusing. It is reassuring when someone else finds the same writing confusing.

Training and Developing for Research

It is helpful to think of research training as the acquisition of the fundamentals or the tools of the trade: data collection, research design, and statistical analyses. Like the study of technical exercises for a musical instrument, they are a vital beginning but not a guarantee of beautiful music or useful research.

I am in uncharted territory here. I have found it helpful to think of my work and non-work environments as a vast practicum or human zoo. The watchword here is to get out of your special ghetto and observe the larger world. Only in recent years have I come to appreciate the benefits of my military and work experience. Living in these diverse environments helped me see the special biases and narrow perspectives encouraged in most work environments. It took a long time to see that my academic jobs exposed me to a variety of research environments with favorite research topics, strategies, and tools. At Minnesota it was “show me the evidence” along with a marked skepticism about speculation and theory. At Western Reserve (now Case-Western) it was a concern with practical applications of validated psychological devices and ideas. At Johns Hopkins, the emphasis was on science and theory with practical applications as a secondary interest.

At the Perry Point VA Hospital, I received a 3-year practicum in clinical and counseling psychology. I was there during the heyday of psychological diagnostic testing. That experience led me to transfer some clinical diagnostic ideas to the interpretation of interest inventories and items. Although the common bias was clinical judgment, there was a counter-influence concerned with empirical validation of clinical ideas and theory.

These diverse work environments gave me a more balanced outlook and training for performing my own work. At the same time, they usually favored critical thinking and empirical evidence as the road to better science and practice. These experiences also fostered my openness. In short, you can learn from many sources but some appear more valuable than others.

I realize now that my work experience not only affected my thinking about my research and theory but also my understanding of myself and my perceptions of others. I got in the habit of taking inventories and scales that we used in our research, and my clinical friends occasionally delivered uninvited interpretations of my behavior. I began to see my family and co-workers as types. I continue to take new inventories and still record spontaneous interpretations from friends. A few years ago, Gary Gottfredson said I was “eccentric.” I agreed—a few days later.

Finding Your Niche and Style

As I began working, I felt responsible for every facet of my research, but it didn't take long to realize that I needed help with writing for publication, statistical analyses, data collection, relevant literature, and so on. In the early 1950s, most of the relevant literature could be mastered by a fresh PhD. I could understand most journal articles and common statistical methods. The computer revolution and the proliferation of statistical analyses were just beginning. As I continued working, I also discovered that I didn't have the talent, time, or interest to do everything well. I reluctantly began to specialize and to rely on talented friends for advice.

This experience led to working in a team with other researchers. Eventually, I focused on research planning, data collection and assessment development, and relied on research partners for research design and the resolution of technical problems. I also spent a lot of time foraging for useful ideas in the literature. For a few years I even subscribed to the *Psychological Abstracts* where I would occasionally find something helpful.

Gough and Woodworth (1960) derived eight characteristic working styles among engineers and physical scientists. Although this work was based on elaborate analyses of Q-sort and California Personality Inventory (CPI; Gough, 1957) data for a small sample ($N=45$), the empirical descriptions of the research types appear applicable to many psychological researchers.

For instance, it is easy to identify researchers you can label as Methodologists, Initiators, Independents, Scholars or Zealots. These and other types are not independent of one another, and I would add some others I have encountered: The Professional Commentator and Critic; they write about research but do little. The Loyalist who polishes and supports the work of the Zealot. The Historian or Pathologist who resurrects old ideas or theories for reconsideration or integration into the current literature. Other researchers could add other types.

The gist of my comment is that researchers, like the members of other occupations, change and specialize in response to the work environment and their own talents and personality.

Developing Helpful Habits and Competencies

Doing research leads to new opportunities and tasks: giving talks and writing articles about your work, attracting critics and supporters, planning or worrying about the research required to fill gaps or to clarify controversy, revising the written or unwritten theory that guides your work, and responding to colleagues, students and others. These and other demands—consulting, teaching, professional activities—can become a burden that make your research goals difficult to pursue.

Perhaps the most difficult task is arranging your life so you can devote much of your time to research. This is a personal decision. Like success in athletics, business, and the arts, achievement requires a focused effort for a long time. Such effort isn't a guarantee, but it is a minimum requirement for most people. Focusing your effort early in life is difficult because a fresh PhD is pulled in many directions—learning to teach, what roles to play and developing old or new competencies to cope with the first few jobs. As your career moves along these tasks are easier to cope with because you have acquired a reputation as a researcher or as an administrator, practitioner, politician, teacher, or as a jack-of-all-trades that insulates you from many demands.

I don't know how to characterize and summarize the process of becoming a researcher other than to say that one way or another most researchers seem to go through an exploration of themselves and their work environments. This experience entails discovering research activities that bring satisfaction, feelings of competency, and occasionally joy. Other experience as a clinician, supervisor, teacher, and so on may stimulate feelings of incompetency, frustration, dissatisfaction or discomfort. This specialization process can also be explained in many other ways via Freud, the DSM, standard and unstandard personality variables. At times I have found these systems helpful, but I find my own theory more satisfying. Surprise!

CHAPTER 2.3

EDITORIAL ENCOUNTERS

If your research is to make a difference, it should be reported in an established journal or at least in a creditable publication. Unpublished research or work reported in technical reports or other obscure sources usually goes unnoticed and becomes difficult to retrieve for even the most ardent fan of the topic. Technical reports and private publications are also ignored by many or most abstract services so they cannot easily be retrieved. This situation makes journal publication a first step for establishing yourself as a researcher.

In the following sections I have summarized some of the rewards and hazards of journal and book publishing. Again, my views of publishing are colored by my experiences and those of my friends and fellow authors. For the views of editors and publishers you have to look elsewhere.

Journal Publishing

Like many graduate students, I believed that if you did a good piece of work, you would have no difficulty in getting it published. The first article that I wrote with my counseling staff (Holland, Krause, Nixon, & Trembath, 1953) was accepted by the *Journal of Applied Psychology*; the editor, Donald Paterson, accepted the article without revision and praised our writing. This was a misleading experience. With or without coauthors, I have rarely enjoyed the same untroubled experience. At the same time, I have acquired a practical knowledge for smoothing the path from rough draft to publication.

Manuscript Preparation. Your report should be written so it is easy to comprehend and, in a format following the rules the journal advocates. Journal editors are under pressure to reject articles because they can publish only a small portion of submitted manuscripts. Don't help them; it is easy to reject an article that is poorly written and difficult to comprehend.

It is important to resist the rush to submit and to put your report through a few quality control tests.

First, read the report aloud. This is a useful way to detect meaningless sentences, unnecessary words and phrases, poor organization, missing references, needed explanations, and so on. Second, get others to read the report for its readability and its compliance with the journal rules, missing or more suitable references, or needed clarifications. Last, religiously incorporate revisions you can agree with and reread the manuscript.

Editorial Response. The editor might accept your article without revision—an unlikely response. A more common response is “acceptance with revisions.” These often appear formidable, but usually can be dealt with. Perhaps, the most common responses are, “rejection for a wide variety of reasons,” “your study is flawed in the following ways,” “another journal is a more appropriate place for publication,” “the scientific significance of the research is too small to warrant publication,” “this looks like multiple publication of the same article—I saw it in another journal.” Other unwritten reasons for rejection include, “I don’t believe the outcomes,” “I don’t like this kind of research,” and “publication of this kind of research will be harmful for the members of a particular group.”

Whatever response you receive, the task is to cope. If it is only making recommended revisions for publication, this is usually an easy task. Unfortunately, editors and consulting editors are not perfect and may ask for unnecessary revisions and occasionally misguided or stupid changes. Do what you can accept and see what happens. Editors usually do not feel strongly about every proposed revision.

This brings me to the myth of the perfect editor. Like authors, editors are not impartial judges. They have all the good and bad attitudes, biases, and talents common to authors so it is irrational to believe your research will always receive an objective appraisal or to assume that the editor will share your positive beliefs about your report. Among other things editors have a special perspective (often ambiguous and occasionally flexible) about the kinds of research they want to encourage. To an unknown degree, editors also have their judgment strengthened by their consulting editors who are chosen or certified by the editor. This practice probably reduces the range of opinion you can expect from a single journal.

One alternative after reworking a manuscript and adding desirable data or analyses is to try another journal.

A second alternative is to persuade the editor that the rejected manuscript has been inaccurately characterized. Resubmissions are rarely successful and damage your good will with the editor and may establish your reputation as “difficult” or “paranoid.” Gary Gottfredson and I did convince a journal editor to reconsider. It worked once but we never tried it again. It didn’t harm our reputations; for other reasons we were already characterized as “difficult” people and in my case, “paranoid.”

A third option is to try a different journal and keep trying until you succeed. Garvey and Griffith (1965) have demonstrated that almost anything can be published. Journal shopping has its problems. Authors usually start with the more prestigious journals in their field, and end with journals that carry less status. The less valued journals are contaminated by editors and consulting authors who serve two or more journals including the better journals. The net effect

of these incestuous relationships is that authors cannot count on receiving an independent appraisal. This network of overlapping editorships is striking in the career counseling and assessment areas. Early in my career a friend in another area of psychology expressed similar beliefs. We planned an empirical analysis of overlapping editors for publication, but we gave up this venture when we envisioned its potential for self-destruction. I still think that project was a good idea.

I eventually settled on a strategy of trying to publish in a good journal first, and if rejected, trying to publish in a less desirable journal. Publication anywhere builds a public record that you and others can cite in new work.

Readers and Rebuttals. If you are lucky, someone will read your published article and write, fax, or e-mail a message. You need all the support you can get, for you cannot perform the necessary work to move your research agenda alone. Critical responses are important because they identify misunderstandings, poor explanations (yours) or serious weaknesses in research design and sampling. For many years I kept a file of critical comments about the SDS and the theory; both topics attracted much skeptical comment. This information has been helpful in performing new work and in revising the theory. Eventually critical comments faded away, and now I rarely receive any new criticism.

Recently, I rediscovered an editorial by John Campbell (1982) that is an extensive account of his experience as a journal editor. It is a balanced and comprehensive account of journal publication as well as the personal and scientific habits of authors. In many ways, Campbell's article extends the present chapter. Read his editorial if you never read anything else about the topic.

Book and Test Publishing

At one time in your career, you may want to have a book or psychological test published. Searching for a desirable publisher is a lot like buying a house or car. The range and variety of individual differences is great and presents an ambiguous diagnostic problem. For instance, small publishers usually have less merchandising muscle than large companies, but large companies may lose your book in their vast collection. For example, I had a book in a large company, but when I talked to their sales representatives at conventions, my book was not on their radar. The best they could say was they had heard about it.

Like a good car dealer, publishers should provide prompt and intelligent service to customers and authors. At one point, my large book publisher wanted a potential customer to provide a five- or six-digit number to order a book. I left that publisher when I got the chance. On the other hand, a small publisher may not have the staff to provide good service because they are caught in an economic

struggle to survive or they may be comfortable with their profit level. Like car dealers, publishers also come with a reputation and status ranging from low and unknown to high status and with a well-defined mission.

Perhaps the most important quality of a good publisher is a reputation for treating authors as partners. Authors are included in planning new editions and business plans—not after the fact. They are offered symmetrical not sweetheart contracts—more later. Poor publishers treat authors like unappreciated subordinates, provide asymmetrical contracts with many obligations for the author but few for the publisher. For instance, the publisher has the right to print rival products, but the author cannot create rival or related products. There is no Consumers Union for picking a desirable publisher. You cannot rely on a publisher's courting behavior of expensive dinners, ambiguous promises, and admiration for your work. For a more realistic but still an ambiguous appraisal, visit a publisher's premises and get some sense of the resources—especially the staff. They are on their best behavior so it is hard to evaluate but superior to only phone calls, letters, and more dinners. A more realistic estimate of a publisher's sense of partnership is to talk to a publisher's authors: Has the publisher provided the sales or financial support outlined earlier, does the publisher neglect authors, do authors have clauses in their contract that they regret? Are they pleased with the publisher? Are they willing to tell you about their royalty?

Unfortunately, an author's first contract occurs when he or she is pleased—if not overjoyed—that any publisher would print his or her work. The author usually signs a standard contract without the counsel of a lawyer. The first contract may be brief, but it typically includes the lowest royalty the publisher thinks an author will accept, and an “in-perpetuity” clause that locks you and your book to the publisher until its sales are too small to continue publishing. This leaves the author with little or no influence on any future deficiencies in the publisher's performance.

Legal Counsel. All authors should seek legal counsel before they negotiate or sign an agreement. Unfortunately, most authors see the cost of a lawyer as too forbidding and expensive. In the long run a bad contract can be a costly mistake that can't be fixed. Like psychologists, all lawyers are not equal. Ideally, you need an intellectual property lawyer, but any lawyer is better than none. The lawyer will be more knowledgeable about copyrights, desirable and undesirable clauses in publishing contracts than you are.

An educational alternative to no legal counsel has recently been provided by the Authors Guild (2000) in a succinct 64 page book, *Model Trade Book, Contract and Guide including Electronic Rights Clauses*. This publication is free to members of the Authors Guild but ninety dollars to nonmembers. Although the Guild urges authors to use a lawyer, this publication is an educational tool that summarizes

the Guild's experience in shepherding authors through the publisher-author legal mine-fields.

I am excited about this publication because it summarizes my mistakes in dealing with publishers and a few of my desirable actions. My desirable actions consisted of a term contract with a one-year phase-out when Consulting Psychologists Press agreed to publish the first form of the Self-Directed Search. In a second agreement I also secured a royalty that increased from 15% to 25% as the number of inventories sold increased. I didn't negotiate this agreement; I hired my brother Bill, a business consultant and former executive, who had developed an accounting method to estimate an organization's profit for individual products. Many firms have no accurate assessment of what a product costs to produce and sell. Instead, they apply a single overhead for all products to estimate their profit and in turn what royalty they can offer an author.

These agreements allowed me to transfer the SDS from Consulting Psychologists Press (CPP) to Psychological Assessment Resources (PAR) when CPP took on the publishing of the Strong-Campbell Interest Inventory. CPP had done a good job in making the SDS a very successful inventory, but I believed no company could sell both inventories with equal enthusiasm and effort; the inventories were too different.

My search for a new publisher had a few surprises. I talked to a large publisher who was interested but concerned that my larger royalty might stimulate a royalty war among publishers or the raiding of authors. Another large publisher didn't respond to my letter for a conversation. I didn't like the looks of many other publishers in the test industry—they didn't sell career products, or they seemed too small or too large to devote much effort to the SDS.

I discovered PAR because it was a distributor of some CPP products. I was impressed by the president, Bob Smith, and by his small youthful and well-organized firm. I visited his organization to get a concrete picture of their physical resources and staff. The physical plant was cramped and rented, but everyone had a computer at that time (c. 1984). I predicted that they would give the SDS an enthusiastic treatment, for it would be their main product. I was right; the SDS sales have multiplied four times since 1985.

In the first contract (1985) PAR agreed to a [relatively high] royalty. In a second contract (1989) I agreed to an in perpetuity clause [that split licensing royalties in a way somewhat more favorable to me].²¹ The typical licensing

21 Editors' note. The bracketed material in these two sentences replaces Holland's explicit statements of royalty rates as a courtesy to PAR, which wishes to keep this information confidential. Licensing of a test or other intellectual property occurs when the owner of the copyright (the author or, if the rights have been assigned, the publisher) allows another party to use the material for a fee. For example, if the copyright has been assigned to a publisher, the publisher may license a publisher in another country to sell a translated version of the material.

agreement is for a 50/50 split. In the second contract, my royalty could also be reduced in several situations, and I agreed to several amendments that reduced royalties on some products. This agreement did not include an Internet electronics rights clause. This omission and the ambiguities in the contract resulted in a smaller royalty for the Internet form of the SDS. I didn't believe this reduction was justified by the agreement, but PAR did. I tried to resolve our disagreement with letters but we were unable to reach a satisfying resolution. I sued PAR in 1997 and that legal action has dragged on to the present (2003).²²

The outcome of this dispute is important to PAR and to me. The publication of the SDS and similar products on the Internet reduces the costs of printing and warehousing as well as royalties in my case. Eventually, Internet publishing may (will) reduce the sale of the paper SDS and my income. Now it is clear that an explicit Internet clause could have avoided this extended legal experience with its financial expenses and damage to personal relationships. I hope all authors will examine their contracts for this controversial but vital topic.

I joined the Authors Guild several years ago. They publish a bulletin several times a year that reports the news about copyright legislation, legal disputes with publishers, and news about authors and writers. I find the bulletins interesting and fun to read. If you are a member, and if you have an unsigned agreement for your book or test, they will review it free and give you a valuable evaluation in about two or three weeks.

Royalties. Authors have occasionally asked me about the adequacy of a proposed royalty. The royalties offered authors present them with ambiguity because authors usually have little or no knowledge of what constitutes a reasonable royalty. Like one's income, fellow authors don't talk about their royalties. To remedy this situation, I conducted an informal poll of authors—not about their own royalty, but what were the highest and lowest royalties they knew

22 Editors' note. The dispute involved, among other things, the publisher taking the liberty to devise, with intent to sell, a product derived from the SDS. Holland objected to the publication of an Internet product the publisher had devised in 1997-1998. This development was objectionable for several reasons, among them (a) Holland was not involved in devising the derivative product. (b) Whereas a major innovation represented by the SDS is its self-administered, self-scored, and self-interpreted nature (Rayman & Atanasoff, 1999; reprinted in the present volume, Section 4.3), investing users with the self-direction of their own assessment and exploration of career possibilities, the computerized derivative made administration, scoring, and interpretation the work of a computer program that did not involve the user in learning from these tasks. (c) An important part of the SDS was to be omitted. The SDS asks users to list and classify occupations they have considered, providing an opportunity for them to learn about the occupational classification and producing data more predictive of subsequent choices than any other part of the instrument (Gottfredson & Holland, 1975; Holland & Gottfredson, 1975). And (d) Although the SDS was viewed by Holland not simply as an assessment device but also as an intervention intended to have beneficial effects on users, there was no plan to examine the effects of the derived computer product.

about and what they believed the average royalty was. My poll indicated the range was 1-20% and the mean and mode were in the range of 10-15%.

My experience has been that publishers don't want authors talking about royalties, for they will discover differences and make requests for a higher royalty or a rate an author believes is more equitable.

Royalties depend on a publisher's evaluation of your book or test and on your own evaluation. A publisher's evaluation includes: Is there a market for this product? Has the author provided any persuasive information about potential users? Has the author offered a finished product or does it need more developmental work? Is the market for this publication crowded with similar products? Does this publication possess some innovative ideas or special characteristics that would make it competitive? Will the author's reputation help to sell the book? These and other questions make the publisher's evaluation an ambiguous process.

The author also needs to estimate what he or she believes the work is worth. For instance, will my work fill a special need or is it similar to many other publications? Will my reputation add value to my manuscript? In short, your evaluation depends on many of the same questions the publisher will have. If this is your first publication, you will be in a weak position because your reputation will usually add little value in the eyes of the publisher. If your career goes well, you will be in a stronger position to cope with a publisher. Unfortunately, publishers seem to have an understanding about average royalty levels so they can avoid competition. This may only be my paranoia, for at times publishers don't appear to care for one another.

Self-Publication. It is tempting to publish your own work. I tried it once; it looked like an easy task to sell an early form of the Vocational Preference Inventory (VPI) and make a substantial profit instead of a small royalty. I got a printer to print the necessary forms for a small fee. The VPI materials filled a large part of our garage. Packaging and filling orders turned out to be a labor-intensive process that was slow, expensive, and hard on our marriage. The printer had bundled everything in 500 packages of 500, but most orders were requests for about 25 VPI forms. I bought packaging materials in small quantities so I paid a large price. Our company almost collapsed when we received an order for 3000 VPIs. Elsie, my wife and bookkeeper, eventually summarized our experience by reporting that we were losing not making money. I was lucky to be able to return the VPI to Consulting Psychologists Press. Elsie used the old envelopes and stationery for many years. I hated the sight of it.

That was in the 1960s; now personal computers and the Internet have made self-publishing an easier task, but self-publishing is still burdened with multiple problems. Materials published by the author lack status in the eyes of potential customers. Copyright protection is not backed up with substantial resources.

A one-item company lacks the support that the same item would receive in a company with a broad range of related items. As always, the service and training needed by customers can be too expensive for a single author.

Self-publishing may be necessary to help a test or inventory through a developmental stage and get it to the point where a publisher would be interested in taking it over. A scale or inventory with no present or future marketability can also serve as a useful research tool. Snyder et al. (1991) have a Hope scale that they give away to anyone who cares to use it. Whatever your strategy, register your copyright so you will receive some initial protection.

Afterthoughts

I found it difficult to provide a balanced view of an author's interactions with publishers. So I thought it would balance my account if I reported the support I occasionally received from editors and publishers.

I reported earlier how Jack Black, the editor and president of Consulting Psychologists Press took on the Vocational Preference Inventory when no one else was interested. John Darley, the editor of the *Journal of Applied Psychology*, accepted a weak article about the VPI, and Norman Munn, the editor of *Psychological Monographs*, published the first monograph about the theory which was rejected by another journal.

I forgot to mention that Jack Black promptly published the first form of the SDS. At that time (ca. 1971) some professionals believed that the SDS bordered on the unethical. On the other hand, I wrote an arrogant letter to Black about the opportunity I was offering CPP. My letter²³ and his response epitomized our relationship. We were good friends.

Norman Gysbers, the editor of the *Vocational Guidance Quarterly* now the *Career Development Quarterly*, proposed that he would like to publish an early monograph as three separate articles. I was surprised and pleased. In 1962, editors were reluctant to publish a monograph. I prepared six monographs, but I learned to shorten some manuscripts and get them published as journal articles.

Raymond Kuhlen, the editor of the *Journal of Educational Psychology*, and a consulting editor for Ginn and Company, wanted me to write a textbook about vocational choice. I told him I was too absorbed by my own theory to write a balanced overview of the field, but I would like to write a text about my theory. He said, "Yes," and the *Psychology of Vocational Choice* (Holland, 1966) was the result. This paperback book was almost too brief to be called a book—only 132 pages. Kuhlen's chief complaint about my manuscript was I should not say I sat down

23 Editors' note. The letters are found in Exhibit 3 in Section 3 (Exhibit 3.3) of the present book.

one day and decided that six types were needed to explain vocational choices. He asked me to cite some empirical forerunner of the types. I cited the Guilford et al. (1954) factor analysis of interests that I had read after my initial formulations were written and saw six of his seven factors as support for my six types. Actually, I was most influenced by John French's (1953) book that reviewed multiple factor analyses of interests and personality.

My discussion of publishing contracts implies that I may see publishers as entrepreneurial monsters and that authors are angels. I advocate a more balanced assessment. Authors should see the author-publisher relationship like a modern marriage. You hope it will be a long and mutually beneficial relationship. But just in case things go wrong, you work out a prenuptial agreement that will negate misunderstandings and inequitable royalties and license fees. You cannot expect publishers to look out for your interests with the same zeal they have for their own. Local legal assistance and the publications and legal service of the Author's Guild can provide the education you need to create a more equitable contract. The alternative is to sign a contract that you later find is unfair, stingy, or with other undesirable outcomes.

CHAPTER 2.4

LIVING WITH THE HIGHS AND THE LOWS

Having a productive and satisfying research career entails coping with three general problems: (1) getting the most out of your talents and resources, (2) securing talented consultation and support, and (3) coping with negative events—failed research, critical reviews, rebuttals, and controversy. I have had my share of these experiences and eventually learned how to deal with them although it sometimes took years to get insight and a balanced perspective.

Getting the Most Out of Your Talents

Like achievement in business, politics, sports, music, or art, achievement in research requires a focused effort. When my academic career began in 1950 this axiom was not obvious to me. I knew I was expected to do research, and I wanted to do something useful. What I didn't know were the distractions and hurdles that make it difficult to maintain a focused and long-term effort.

As a junior faculty member, searching for what to do is complicated by training duties, departmental business and politics. Your low status reduces your ability to get cooperation and funding. Graduate students get sucked up by senior faculty with well-established reputations. I should add I was preoccupied by learning to teach; making a substantial research effort was not on my mind. I didn't realize that my use of existing data in the Kuder Preference Record manual (Holland et al., 1953) was the forerunner of many similar efforts to circumvent data collection and funding hurdles. In the remainder of my career, I obtained only two grants to pursue my work. Instead, I worked for organizations: Western Reserve University, the Veterans Administration, the National Merit Scholarship Corporation, the American College Testing Program, and the Johns Hopkins Education Center provided either comprehensive grants or support in which I could insert my own interests. Fortunately, my research was usually valued by my sponsors. I was careful to spend limited funds for my special interests. As I reported earlier, I financed the first SDS materials and some small research projects while at Hopkins. In recent years I have made small grants to researchers whose work was usually related to my interests.

I realize now how helpful it was to do research from 1950 to 1980 with little oversight and with few of the environmental distractions that recent PhDs encounter. I occasionally am asked to review someone's vita for promotion. I am astonished by the heavy load of teaching, community good works, professional activity, consulting—even some research participation. It's hard to imagine how

anyone could perform well in all these roles. The other thing I have noticed is how comprehensive and specific these evaluations can be.

I too had to play multiple roles in my first few jobs but the loose evaluation by others was rarely intimidating and allowed me to live with little worry about the quality or quantity of my performance. I had considerable time to daydream about solutions for the common problems encountered by practitioners especially when they used interest inventories. Earlier I described my own frustrations with hand scoring the Strong. That experience led to the development of the VPI, which led to "A Theory of Vocational Choice" (Holland, 1959), which led to the classification system and later the SDS (Holland, 1970). In short, my early work experience focused my interest on career counseling and related theory, and this focus increased with further experience.

Now it is apparent that there also were reciprocal processes going on that probably narrowed my focus. Aside from my own insights about my research and theory, the response to my writing and inventories by users, friends, and critics also worked to keep me on task. One of my friends described this process as becoming a prisoner of your early good work. I have felt these expectations and have daydreamed about research in a different area, but these feelings never lasted long.

I assume that people who become outstanding practitioners go through a similar process and are caught up by their positive feelings and competencies in that role along with "ho hum" reactions to research tasks.

Your focused research effort can be strengthened in several ways: by taking advantage of environmental or institutional demands, by assessment of how you spend your time, and by avoiding intellectual swamps. No matter where you work, your work environment is a mixture of desirable and undesirable forces and resources. Your job is to use your competencies and interests to satisfy both your goals and those of the organization. This is easy to do, if you are hired to do full-time research in an area you find congenial, and the employer provides ample resources. This situation is rare. Most people have to perform a mixture of teaching, consulting, clinical services, and administration. Research activity is often an expectation but with little or no financial support.

People who want to do research have several options. One is to seek grants or funding from state, national, or private sources. If you are a successful researcher, this can be a satisfying alternative. If you are a new PhD this can be a hard row to hoe. Early in my career I sought grants from the Carnegie Foundation and the Office of Education with no luck. I wanted to collect national data to build my classification system. I lucked out and got the data I needed from the McCormick, Jeanneret, and Mecham (1969) files for the cost of the punched cards. It was not precisely what I needed, but it was very valuable. (See Holland, 1997, p. 180-182.)

My use of the McCormick data illustrates a second way to support research—look for existing data in the work of others or in libraries or government agencies. Mac Richards (1973, 1974) used existing data to study the environments of Japanese and British commonwealth universities. See Holland (1997) for more of Richards' use of institutional data and the typology. He is retired now; using his computer he continues his low-cost research without leaving home.

Another option is to work with organizations or institutions by trading services, materials, or consultation for research data. I developed mutually satisfying relationships with four Catholic schools. The same strategy has been used by institutional researchers in colleges and universities to study graduates. Astin (1993) has made a magnificent career out of studying national samples of college students—first at National Merit Scholarship Corporation and then the American Council on Education and the Higher Education Research Institute at the University of California, Los Angeles. In turn, John Smart (Smart, Feldman & Ethington, 2000) has made a career out of Astin's data for his university and a few others. Gottfredson and I (1982, 1989, 1996) developed the *Dictionary of Holland Occupational Codes* from the occupational analysis data underlying the *Dictionary of Occupational Titles* (1977).

The gist of this strategy is to explore the potential opportunity for research in your local setting or in accessible public data. Don't assume that a grant is your only hope for research salvation.

Coping with Negative Events

Sooner or later, you will encounter failed research, rejected articles, critical reviews, rebuttals, or cultural controversy. This experience is sometimes hard to deal with because the interpretation of these events is often ambiguous so your response or remedial action, if any, is difficult to formulate.

Failed Research

In some ways failed research is easy to cope with because you experience the negative outcomes before publication and can avoid the emotion generated by others after publication. A more typical problem occurs when you get weak outcomes and nobody cares except you and a few friends. I had this experience many times.

I expected the VPI to have strong relations with the Kuder Preference Record and the Strong (the old forms in the '60s). Large positive correlations never occurred until Campbell (1974b) produced the six theme scales in the Strong-Campbell form of the Strong Interest Inventory. It took some time to realize that the heterogeneous items and factors in the old Strong scales made it difficult to

obtain strong correlations with related scales in the VPI which were relatively homogeneous and short.

I had the same experience in trying to validate the VPI with the MMPI and a variety of other scales and inventories. Again, I usually obtained some plausible but weak findings with these old inventories (Holland, 1978, 1985). Later more positive findings for the VPI and SDS occurred when they were correlated with the NEO Personality Inventory scales (Costa, McCrae, & Holland, 1984). Again, the NEO scales were more homogeneous than those in the MMPI or at least they seemed to be.

Because the first NEO-SDS comparison (Costa, McCrae, & Holland, 1984) provided correlational matrices for both the VPI and SDS versus the NEO it became clear to me that the more positive correlations for the NEO vs the SDS and the lower correlations for the NEO vs the VPI were probably due to the longer scales in the SDS. This outcome seems to explain why the VPI has usually produced lower expected correlations with other inventories; it wasn't just their homogeneity—the scales were short (14 items per scale).

I was also encouraged by the positive results I obtained (Holland, 1958) by comparisons of psychiatric patients, psychopaths, TB patients, controls and college freshmen enrolled in different fields. This use of defined groups was helpful, but the interpretation of group VPI differences is occasionally (often?) ambiguous. That article (1958) also outlined the rationale for the interpretation of the VPI scales. These early speculations became the formulations for the personality types and the background principles for the theory (Holland, 1959, 1966, 1973, 1985, 1997).

In those early days (1953-1969) I was encouraged by friends and clinicians who believed my speculations about interest inventories made sense and were worth exploring. I needed support; I felt like giving up several times. I kept working and eventually the theory began to attract researchers and more positive research. This experience increased my confidence in my speculations. At the same time I had learned to think critically at Minnesota and to listen to the evidence. This is occasionally hard to do, but after a while I developed more and more confidence in my speculations and my ability to make useful revisions in the theory. I think this is a common experience that happens to people who develop scales, inventories, or theories. I was fortunate to have talented advisors (Gary Gottfredson, Mac Richards, and many others) who were not carried away by my enthusiasm and occasional misinterpretations of the data.

Reviews and Rebuttals

This is a loaded topic for me. Rejected articles, unexpected rebuttals, and critical book reviews usually stimulate emotion and defensiveness. I have had my share of this experience—so much that I have more ability to deal with critiques than with positive regard. I have found it helpful to talk to friends and to do nothing until the emotional dust settles. The next step is to examine the validity of the criticism and to revise a rejected manuscript if the critical comment is correct or to ignore the criticism if not.

Your decision to respond to a critique or to a journal editor is often a fuzzy one. I would rarely advocate responding to a journal editor other than by making some but not all of the recommended manuscript changes. Among other things, the editor is usually committed to the consulting editors.

There is also the public-relations aspect of responding in print. If you never respond, careless readers may believe the critique is valid. On the other hand, if you respond to every critique you won't be doing much research. Critiques and responses are often unintelligible to the average reader. Only specialists in the field understand, and they often disagree.

I adopted a strategy of responding only occasionally and then only to flawed critiques. I responded to an article (Brown, 1987) that was a large vulnerable target. I (Holland, 1987) responded because I saw that it would be easy to deal with several controversial issues about theory and mine in particular. I relished the chance to rebut many of the author's beliefs and those of other critics he cited. Upon rereading this article it is clear that I enjoyed writing this paper.

Somewhat later Borgen (1991) in his 20-year retrospective of career research and theory provided an extensive and positive appraisal of the typology and the related research. His article was a welcome sign of support.

Book reviews come in many flavors: positive, negative, neutral, informative, and insightful. Negative reviews are hard to take because authors invest long term energy and effort in their book only to see their work devaluated. I have had the full range of reviews. My 1966 book was my first attempt to marshal the evidence for the 1959 journal article. The publisher sent out post cards with free books and forwarded 80 cards to me. These early readers wrote more positive than negative comments. A few were skeptical about my "speculations" and "typology," and a few were friends. (The publisher didn't know that.) The most important outcome was it encouraged me to keep going. C. Gilbert Wrenn (1966, p. 504) wrote a brief, positive account of my research and book. This book was also reviewed briefly in England but it was reviewed with considerable skepticism.

The 1966 book received positive reviews by K. F. Taylor (*Australian Journal of Psychology*, 1967)²⁴ and in a Polish journal in 1969 according to M. Choynowski²⁵, and according to a Polish-American I got to translate the review. In contrast to other reviews, Super's (1967) review was largely critical.²⁶ Super questioned the assumptions in the theory, the adequacy of evidence, my earlier critique of the developmental view, my interpretation of research data, and my interpretation of the Strong and Kuder.²⁷ In general, most reviews of the 1966 book were critical and skeptical about its practical or theoretical value (Harris, 1967; Isaacson, 1967; Nicholas, 1967; Thoresen, 1967; and many others that I can no longer identify).

The 1973 book received a stellar review by David Campbell (1974a): the kind of review authors dream about. I couldn't write a better review myself. Campbell summarized the book's content and virtues but said nothing about its weaknesses. He provided a lengthy account of the barriers to the acceptance of Holland's theory including a humorous but accurate assessment of Holland's personal style. He concluded his review by announcing that the new edition of the Strong (Campbell, 1974b) will use Holland's work to organize interest data and urged readers to take advantage of the theory. Lenore Harmon (1974) also wrote an enthusiastic and appreciative review. In another review, Warnath (1975) worried about the potential negative effects of the theory on Blacks and women. He anticipated the controversy about assessment biases for women and other groups. There were other reviews, but I couldn't find them.

The 1985 reviews were more critical than the 1974 reviews. Super's review (1985) was mixed. He saw the author's interpretations of the research as occasionally biased and neglectful of developmental data. At the same time, he believed the typology and the SDS were major contributions. There were other reviews but my recollection is they were never as positive as the 1974 reviews.

The 1997 book received only a single review (Betsworth, 1998). The author provided an extended account of the content and changes in the theory from 1985 to 1997 and noted that Holland often provided no explanation for many revisions. I assumed that many revisions didn't need explanation. I also believe that some revisions will have major heuristic value—namely the sub-theory of career intervention and change in the practical application chapter. I characterize

24 Editors' note. The citation for the 1967 review by Taylor is as complete as possible at the time of this writing.

25 Editors' note. Holland did not give the name of the journal or the author. We believe this may be a reference to a personal transmittal of the review to Holland by M. Choynowski.

26 Editors' note. Holland did not provide bibliographic information about this review, and we could not locate the review, so this does not appear in the reference list.

27 Editors' note. We have made changes in this sentence to make it clear that Holland was describing what Super had written in his review about Holland's work.

this review as a non-review—an uncommon occurrence in a good journal. The only explicit critical comment involved my choice of two references. One I should not have cited, and one I should have cited.

My experience with reviews has led to several strategies: (a) to seek consultation with talented friends for solace and clarification, (b) to begin work on revisions or research to resolve deficiencies and (c) to get another life through relationships and special interests. My special interests have been music, art, and woodworking. Now I focus on voice and piano lessons. Like any activity that brings emotional expression, playing or singing have several positive effects. I forget my current aggravations and worries and find joy in hearing the sounds I make and the signs of occasional improvement with practice. My relationships with my music teachers give me a break from research activities and widen my horizon.

Anger, Frustration, and Humor

I didn't plan it, but humor has often been my way to cope with anger and frustration. Gottfredson has often collaborated with me or on his own. For instance, as my research assistant in the early seventies, he didn't want to be cited as the author of a bibliography of research about the theory. He invented "Adam Lackey" as the author. The bibliography went into the APA archives that way. It seemed harmless until Lackey began to attract people wanting information. So we killed Lackey, but he still attracted an occasional graduate student wanting help. We decided to make a public announcement at a convention symposium after I met a woman in Texas whose last name was Lackey. We confessed, but no one seemed to believe us or care.²⁸

In the early days of the sex bias controversy about 1973-1975, I complained to my staff at our daily lunch about the biases being exerted by journal editors. Several said I was just paranoid about editors. So I countered with "I will show you editorial bias," by writing a critical and somewhat absurd letter to the editor of a popular journal.²⁹

28 Editors' note. Adam Lackey (aka A Lackey, aka A "Damn" Lackey) was one of Gottfredson's imaginary assistants. Holland was a bit squeamish about putting Lackey's name on things from the beginning, but it was never a secret that Lackey was a mere figment. It happened, however, that some people didn't believe he was imaginary. So after a while Holland began trying to kill Lackey off—writing or saying things like "as the late Adam Lackey put it . . ." Gottfredson objected to this attempted fantasy-cide and continues to have Lackey do his library work today.

29 Editors' note. Holland's hoax worked all too well, involving additional correspondence between the editor (who had been receptive to the silly criticisms), the publisher of the SDS, and the fabricated critics. Holland called his demonstration to a halt, informing the hoodwinked editor of the deception.

In Section 3 Exhibit 3, I include a sample of letters to consumers, journal editors, critics and others that illustrate my attempts to cope with frustration and critical correspondence and some unrelated matters. Among other things, my responses round out my private personal qualities.

CHAPTER 2.5

MY RESEARCH PERSPECTIVE

Like many researchers, my experience has led to special beliefs and strategies about doing research. Bits and pieces of my biases and style are reported in earlier chapters. Here I try to provide a comprehensive account of my orientation: how my research perspective came about, and how my training and work experience shaped my beliefs about methodology, philosophy of science, qualitative research, constructivism, and related topics. My views are not unique or indisputable. Other psychologists, sociologists, and statisticians have also written about the lessons or strategies they acquired in their research and teaching (Cohen, 1990; Rothkopf, 1973; Popham, 1991; Campbell, Daft & Hulin, 1982; Gage, 1989; and others).³⁰ This chapter summarizes mine.

Research Training

My graduate training has had some long-term effects that I had not appreciated, until I worked on this little book and especially on this chapter. I have tried to summarize these effects as four main influences.

First, the emphasis on empiricism was the paramount strategy at Minnesota for understanding human activity, evaluating research outcomes and resolving controversy. In short, what are the data or facts about a question was the mantra. The assumption here is that if you look at the data or secure the missing data, you can gain a reliable and valid interpretation. I should add—if you keep gathering relevant data. Consequently, there was a marked skepticism about most theories or data-free theorizing.

Of course, I learned later from Herbert Feigl's course that theorizing permeates how data are defined and collected. You don't escape theory by acting as if it were absent or unimportant. Among other things, most data or information is rarely self-organizing—you need a theory, a classification, or some other organizer to provide a useful interpretation. Your city phone directory is not a theory although it contains a massive amount of data.

A second influence was the treating of applied research and basic research as partners in understanding human behavior. These perspectives were viewed as partners of equal status that use similar methods to cope with different data to understand human problems. At Minnesota, faculty and students did not live and

30 Editors' note. Holland did not provide bibliographic information for the Popham citation, and we are unable to provide it. This does not appear in the list of references.

work in separate fiefdoms of basic and applied psychology. Perhaps this climate was a major influence in fostering productive students and faculty.

A third influence was a concern for the value of critical thinking about everything—research design, theory, counseling practice, scientific literature. As students, we had to review assigned research reports for an audience of faculty and students. This basic seminar sharpened your critical skills in a way that reading alone does not. The Minnesota orientation to science also infiltrated my counseling training. Senior supervisors were critical of loose trainee responses in taped interviews.

Finally, when my formal course work was over I took three electives out of curiosity and for recreation—an art appreciation course, a cultural anthropology course, and Fiegl's philosophy of science. I had no formal art training but everyone in my family had displayed some artistic talent so I thought it would be fun to learn something.

I took the anthropology course because that topic was a mystery to me. Much later, the idea that the cultural environment is transmitted through the inhabitants of a society provided the key idea for assessing work environments in my typology. This principle implied that a census of the personality types could be used to estimate the characteristic influences of a work environment. It turned out to be a valuable tool for studying environments, building the classification system, and understanding the impact of different environments on different types.

Fiegl's course had both short and long term effects. His advocacy of logical positivism made me a believer. My recollection is that he emphasized the need for good (operational) definitions of terms in a theory and that the main role of philosophy is one of clarification of theories, language, and disputes. Most of all he took the mystery out of theory and made its construction a respectable enterprise. I began developing a theory of vocational choice when I revisited my course notes and texts he suggested. He stimulated my interest in theory so I did more reading years later.

My friend, Bill Alston, a philosopher from the University of Michigan, whom I met on a fellowship in California, also had a strong effect. After reading the proof for my 1966 book, he gave me a critical review and outlined how I might renovate the theory. Much later at Hopkins (1974-75) he provided more advice about the 1973 version of the theory. He didn't tell me what to do, but he suggested the need for clarification or simplification. When I told him some critics already thought the typology was too "simplistic" he replied, "Not so, you have too many complexities now" or words to that effect. So, I simplified or clarified it the best I could in the next revision. Along the way I also learned that a strict operationalism can be destructive so a little looseness in definitions can be a more fruitful strategy.

Work Experience

My beliefs and competencies for doing research were also shaped by my work environments from 1950 to the present. On my first job at Western Reserve nearly all data collection had to be done by hand. This included hand scoring tests using cardboard keys. Most data analyses had to be done on slow and noisy mechanical calculators. If you were lucky, you might have access to an IBM scoring machine. If you also had an answer sheet that was compatible with the machine, you were indeed fortunate. The old Strong inventory could be scored by a machine in Minneapolis if you could wait seven to ten days. You could hand score it in about an hour. Depending on your time and ambition, you could rescore it for errors.

For a beginning faculty member, doing research was a formidable task. These barriers persisted into the sixties. Then if you had the money, you could use an IBM service bureau to process some of your data. A cheaper alternative was to rent an IBM high speed sorter if you could fit your data on punched cards.³¹ You could punch the cards yourself or hire a service to do the work.

These working conditions made me spend considerable time thinking and daydreaming about the value of any particular hypothesis or project: Could it be done inexpensively? How long would the data collection and processing take? What would the project cost? Most important, would a positive outcome have practical or theoretical value? These concerns had beneficial effects. I felt the need to carefully think through the merits of a possible project and the strength of the theory and design I was relying on. Some data processing tasks appeared to encourage categorical thinking. The IBM sorter became my favorite tool for about six years. My typology lent itself to this tool. You could sort data according to the six types almost endlessly. In a few minutes you could teach a research assistant how to do most of the needed analyses.

Life again improved with access to a mainframe computer.³² This advance also

31 Editors' note. An IBM counter-sorter was a machine that read and sorted physical cards made of index stock in which rectangular holes had been punched. A stack of cards would be fed into a hopper and would be mechanically sorted on the basis of the punched holes. To make a cross-tabulation of two variables, the individually sorted piles would be fed again through the machine to obtain a different sort. This must seem kludgy to today's readers, but it was a great research tool that replaced sorting by manual methods.

32 In the 1960s, "mainframe" computers (referring to computers housed in large steel boxes often as large as a small room) became available in large organizations and universities. Over that decade, "canned" programs for performing statistical analyses became available. This included "canned" statistical packages such as BMDP (the Biomedical data package developed by Wilfrid Dixon of UCLA around 1965; Ylvisaker, undated) and BC TRY (a factor-analysis and cluster-analysis package that ran on an IBM 7094 computer like the one at Berkeley; Tryon & Bailey, 1966). These statistical packages produced a revolution in statistical computing that put multivariate analyses in the hands of researchers who know little about statistics—but one had to learn how to encode the control information or rely on those who knew how.

had its special advantages and disadvantages. I was slow to learn how to punch the desired program cards. By the time I learned how to cope with one mainframe, my institution would install a new one with a new language. Fortunately, I found friends and students who liked to perform the necessary data processing and who did it well. I gave up trying to master the computer and focused on planning research, searching the literature, and daydreaming about fixing the theory. Over the years Alexander Astin, Mac Richards, and Gary Gottfredson became research partners so we accomplished much more than I could have done on my own.

These early data collection and analysis chores along with my attempts to develop a powerful but relatively simple theory reinforced the biases of my training. In addition, my statistical shortcomings also contributed to some biases. These include using a small number of variables, simple analyses for main effects, a preference for large *N*s, mean differences, and efficient predictions. In test construction, I relied more on following my theory in item selection rather than on item theory—old or new.

When the occasion appeared ambiguous or unknown, I have often performed large fishing expeditions using anything that looked promising or something that someone else saw as promising. For instance, when I was studying creative talent as part of a National Merit Scholarship Corporation project, I used a large number of scales (published and unpublished) developed to assess creative thinking or performance. I discovered that Barron's (1953) Complexity-Simplicity scale was as useful as any other scale and more useful than most. It was most closely correlated with Artistic interests, artistic performance, and other measures of originality among high school and college students.

I developed several empirical scales untouched by my typology. In the VPI, the Acquiescence, Infrequency, Masculinity, and Status scales have a simple direct empirical rational development. See the 1985 manual for details.

The Vocational Identity scale had a somewhat tortuous empirical development. At the time (1970s), there was a lot of speculation about vocational indecision and its interpretation. I had no interest in this research because I had no special insight. I had learned from my earlier failures not to jump into areas where others had failed and where I had no persuasive insight. I thought it would be useful to ask students in two surveys devoted to a related topic, to explain their indecision with a free response item: "I'm undecided about a career because . . ." The most frequent "explanations" slightly edited became the heart of the Identity scale. Another scale, the Vocational Decision Making Difficulty scale was found to be negatively correlated with the Identity scale. Some of these items were added to the Identity scale to form the present 18-item scale (see Holland, Gottfredson, & Power, 1980) for the details of this empirical adventure. Later I incorporated the Identity scale into the theory (Holland, 1985, 1997).

Controversy

The publication of the theory and its associated tools (VPI, SDS, classification system) attracted a wide range of skepticism about their scientific merit and everyday usefulness. Looking back, it is clear that many of these early doubts were justified when you recall the research and practice climate of the time (1950-1975).

Diagnostic testing was a major activity; and students, clients, and patients were excluded from the process. Clinical and counseling practice usually placed clients in a passive role. Among other things, test results always had to be interpreted by a professional to prevent harm. Test items were always presented in random order so the test-taker could not sense what was being measured. In the same period (1950-1970) the interest and personality literature clearly supported the belief that interests and personality were separate domains.

The VPI, SDS, and theory questioned these beliefs by assuming that interests can be interpreted as estimates of a person's personality and values, that it is okay to have test-takers score their inventories (it can help them learn about themselves), and learning can be increased by making the scoring of an interest inventory transparent. This last outcome was an unanticipated outcome of arranging the SDS so it could be scored without a computer or a set of cardboard keys.

Technical Controversy

The doubts about the theory and its implementation in the VPI, and SDS stimulated a long trail of research to respond to specific criticism and to more general questions about most assessment devices. These include: the effect of response bias or acquiescence on the validity of an inventory's scales, the validity of raw scores versus normed scores, the validity of scales whose items are presented in random order versus scales whose items are arranged according to a single scale or in a transparent order. And, what are the effects of an interest inventory on the test-taker?

The effects studies and experiments suggest that interest inventories have relatively small positive effects on the test-taker. The particular format, scoring, and reporting procedures have no special effect; the effects of such diverse inventories as the Strong, SDS, ACT IV, or Kuder are about the same.

An elaborate experiment to understand *how* the SDS achieves its effects (Holland, Takai, Gottfredson, & Hanau, 1978) implied that the SDS achieves its effects largely because of its numerous occupational options; whereas its structure may be less influential. Experimental evaluations of inventories as interventions were rarely performed after 1980. I assume the decline in interest occurred because evaluations were hard to perform, hard to publish, and most of all failed to produce large, predictable outcomes.

There was another set of technical controversies that generated more research and less heat than the effects studies. These investigations included disputes about response bias or acquiescence set, the use of raw scores instead of norms, and differences about theoretical preferences. I have summarized my views about these controversies in the following pages.

A response bias is always present in the SDS and VPI, for the items are scored in the same positive direction. Fortunately, an unpublished analysis of this bias shows that it varies only slightly from scale to scale. This means that the codes derived from an SDS profile will usually be unaffected. Siebel and Walsh (1977) also changed the directions in the SDS to increase the woman's acquiescence and found only minor changes in the shape of the SDS profile. The interest scales of the VPI are always scored positively, so I assume that the interest scales (R, I, A, S, E, C) have a response bias that resembles that of the SDS.

The debate about response bias was settled for me with Rorer and Goldberg's (1965) work on the MMPI; it is the content of an item that counts not whether or not it is stated positively or negatively. Interest inventories have an advantage in this controversy. Test takers typically perceive interest items as innocuous, but items in personality inventories occasionally appear threatening and stimulate distorted responses.

The use of raw scores in the SDS instead of normed scores was initiated by my goal to make hand-scoring easy so I made all scales the same length. This created SDS profiles that were easy to interpret. Test-takers and counselors could see that a person had more interest (higher raw scores) in some areas than others.

The use of norms would make interpretation more difficult, misleading, and occasionally humorous. An old ACT inventory used norms so that a woman who was "indifferent" to all items on the Realistic scale was at the 84th percentile according to the female norms. Put another way, normative scores frequently fail to provide a concrete or realistic interpretation. This problem led some authors to balanced scales in which sex differences are minimized. This solution results in loss of validity when it is pushed too far (Hanson & Rayman, 1976; Rayman, 1974). I developed two short forms of the VPI interest scales for use in research. The balanced form had less concurrent validity than the unbalanced form. There are other problems with norms; one normative group is rarely appropriate for everyone so multiple norms are required.

Theoretical Differences and Disputes

The typology has attracted a wide range of criticism for being simplistic, for ignoring developmental theory, for having questionable origins: based largely on male data, being authored by a privileged European male who relied on old

fashioned logical positivism. This criticism in book reviews and elsewhere fueled my desire to develop a revised theory with more power. Much of this criticism takes the form of my philosophy of science is better than yours or my favorite theory is better. For my money, the best answer lies in the empirical research that a theory accounts for and generates.

I took most of these critical evaluations seriously and responded by thinking it over with friends, designing research to test a critical idea, making revisions in the theory or just worrying about potential remedies. Occasionally, I got a chance to zap a critic in a talk or a related publication. Eventually, I learned it was more productive to focus on new research and promising theoretical revisions than to debate critics. I occasionally forget this belief and respond with humor. It's a good feeling (Holland, 1987).

Cultural Controversy

Doubts about the usefulness of the theory and its instrumentation have been extensive and long term. Initially, these doubts were confined to the technical issues reviewed earlier, but most controversy has been about the usefulness of the SDS for women and minorities in the U.S. Later, the adaptation of the SDS in 23 foreign countries has met with little controversy, but has been questioned by a few researchers in the U.S. In general, there have been only one or two experimental evaluations in other countries, and these were in Australia. The critical research in the United States has focused on examining the quality of the hexagonal model in foreign data rather than assessing the validity of the adapted SDS in a particular country.

Recently (1990 to the present) multicultural advocates have pushed for revising interest inventories or developing special inventories for different groups. My stance on these goals is twofold. If a developer revised an inventory to fit the demands of many groups, the inventory's validity would probably be reduced. A more practical alternative would be to perform standard experimental evaluations for the SDS or any other interest inventory when they are used by one or more special groups. A separate investigation could test the validity of the SDS or another inventory in a particular group. What we have now are inappropriate investigations and critical opinions of a small group of multi-culturalists in the U.S. about the use of SDS adaptations in other countries.

I have responded to some multi-culturalist beliefs (Holland, 1997; Holland, Fritzsche, & Powell, 1994) in my last book revision and the SDS Technical Manual and as a discussant in a symposium (Holland, 2000). It is unlikely that my beliefs will have any influence. Like the sex bias controversy, we probably have to go through a decade of controversy before the slow pace of research clarifies the validity of the arguments pro and con. I'm not optimistic about a resolution that

will satisfy the participants. This pessimism has been strengthened by Cole and Zieky's recent article (2001), "The New Faces of Fairness." They concluded "that there is no generally accepted definition of fairness with respect to testing and no measure that can prove or disprove the fairness of a test" (p. 369). Their review of the 30-year history of research about fairness is more concerned with tests of ability, but the problems and potential solutions are similar for other tests and interest inventories.

Cole and Zieky urged test authors to reduce group differences within the bounds of validity at the design stage of test development. That strategy has been followed in the revisions of the SDS and VPI. The authors of the ACT inventory have also followed the same strategy to cope with sex differences. In both cases, sex differences remain relatively small for five scales, but the differences for the Realistic scale are still large.

The difference for men versus women on the SDS Realistic scale is about the same as it was on earlier forms of the SDS. The main effect of the attempt to reduce the difference has been to increase the scores of men *and* women without reducing the difference between them.

A recent investigation (Swan, 2005)³³ of 423 female carpenters from a national population of 3322 who took the SDS form R, raises doubt about the revision of inventories to reduce group differences. In this instance, the mean R score for female carpenters was more than 2 standard deviations higher than the norm mean for female adults or for high school females. In addition, the carpenters average R score was one standard deviation above the male norm for adult males and high school males. Other information provides plausible data that links becoming a carpenter to one's life history. The majority of female carpenters had participated in team sports (79%), had used hand tools (72%), had taken high school shop courses (47%), and had fathers in Realistic occupations (63%). These and other data (the SDS code in the SDS classification is RCE; the code in the carpenter sample was RSC) and three of four sections of the SDS assessment are dominated by high R scores.

In a nutshell, the complaints about women's low R scores in earlier investigations may be due to sampling (women who work at R jobs are rarely sampled) rather than to bias in the SDS. If anything, the revisions to soften sex differences may have gone too far.

33 Editors' note. Holland here cited Swan's 2002 doctoral dissertation which was later published in 2005. We have updated the citation and reference list to refer to the published version.

The Current Scene

My recent experience with graduate students and a few faculty trainers has made me pessimistic about the future. My misgivings may be only the common experience of old people who regret a changing world and their frustration with the process. I offer here my perceptions of the recent research scene for counseling psychologists and counselor educators. Other social scientists will have different views.

In psychological training there is a wide range of emphases ranging from standard science with a heavy emphasis on method and statistics to clinical practice and qualitative research and assessment. I find the emphasis in some institutions on qualitative research and practice along with a devaluation of conventional science to be destructive.

Qualitative work has a reliability, validity, and generalization problem. For instance, when is a qualitative report reliable, valid, and applicable to new persons or situations? Perhaps most important, qualitative research lacks a plausible long term strategy for strengthening or amending earlier work. The watch word of qualitative reports appears to be “trust me” or “look how carefully I gathered and organized my information about people.”

A more productive strategy is to use qualitative work as a source of ideas for trying in standard science. Critics of standard science fail to realize that researchers in social science have always used their life experiences and those of others in planning research. Unlike qualitative researchers, most researchers don't publish their speculations about how people interact with their environments. A large part of this little book illustrates how one person was influenced in unpublishable ways—including what he has left out. In the interest of fair play, standard science also has its weaknesses, but it has a built in strategy and tradition for amending research outcomes.

My negative impression of some current training and practice includes the failure to inculcate critical thinking about research reports, practical interventions as well as unsupported theory and speculation. At the core of this uncritical acceptance of ideas or flawed reports, is the failure to appreciate the difference between fantasy and evidence. The decline in critical thinking has been accompanied by a decline in the quality of diagnostic skills in the use of interest inventories. I am most familiar with counselors use of the SDS. In general, many use the SDS like a cookie cutter. They note the 3-letter code and assume there is nothing else of value. At the other extreme, some practitioners use the SDS like a projective device and find “support” for many creative interpretations instead of relying on more obvious and empirically supportable interpretations.

Other experienced colleagues (Joseph Johnston, Robert Reardon, Kathleen

Boggs, and others) have observed the same phenomenon with the SDS and other interest inventories.

A recent book (Niles, Goodman, & Pope, 2000) of case studies, in which counselors and psychologists outline how they would work with clients also documents a wide range of clinical practices from the clumsy use of standard inventories and insensitive strategies to the skillful use of inventories and sensitive strategies. This book is especially discouraging as it signifies the probable behavior of many “certified” and experienced practitioners and trainers.

A large portion of counseling research is also burdened with mindless and superfluous analyses and clumsy use of theoretical ideas.

Cohen (1990) has provided a valuable and engaging summary of the misuse and misunderstanding of common statistics. His principles include less is more, simple is better, and some things you learn aren't so, as well as the importance of power analysis and effect size. His article should be required reading for all students and many researchers. It is an effective antidote for the mindless use of statistics.

My enthusiasm for Cohen's work is easy to comprehend. I have preferred a small number of variables—except for some early fishing expeditions; the theory has a limited number of constructs: the research has often entailed large *N*s (sometimes by luck rather than by design). I looked for large main effects rather than interactions, and for replication of main effects.

My views were formed more by my research experience than by my statistical knowledge. As I reported earlier, my perspective was also an outcome of the *Zeitgeist* of empiricism and critical thinking at Minnesota. These influences were moderated by Fiegl's introduction to the philosophy of science. The residual effects were several: I learned the difference between established fact and theory and unsupported speculation and fantasy, and I became a more critical thinker about my work and that of others.

CHAPTER 2.6

AFTERTHOUGHTS AND OMISSIONS

I continue to have difficulty in providing a complete account of my experience. When I read the first draft, I realized I had left out some ideas and topics I should have included. Rather than rewriting, I chose to report these omissions here. I did this because it's easier to report them here, and perhaps some ideas may have more influence if they are singled out.

I remember a well-known novelist writing about the growth of his confidence as he went from aspiring author to experienced and established author. He reported that with each successive novel he became more and more confident that he knew what he was doing. I went through a similar experience, and I believe many researchers probably go through the same experience. My confidence about my judgment about research projects and theoretical matters increased when they yielded positive results, and when I received support from students and from younger psychologists.

Early on, I got my family and friends to take the VPI or SDS. I was in a full clinical stance in those early days. I got my brothers to take the SDS. My children took the SDS. I got one of their husbands to participate. And I speculated about my father and mother's profiles. I took the SDS, Strong, Kuder, and any personality inventory I could find. Later I took the MMPI and Five-Factor Inventories. Recently, I took the CPI with its elaborate computerized report. I forgot, I also took the 16PF and many of Super's scales and inventories for a published report of the personalities of Super and Holland (Weinrach, 1996).

I found these assessments of my family, friends, and myself helpful in understanding the strengths and weaknesses of these devices. Among other things, I found the Vocational Aspirations especially helpful. This experience had a strong influence because I have known some people for 70-80 years, or I am a rater with more data about a single person's life than any experiment or case study might yield. Biases or not, this experience has increased my belief about the validity of the theory and its instruments. Or, I have conducted one of the longest, successful (?) qualitative experiments in history. Perhaps I have been too harsh in my criticism of that new movement.

My earlier account of the development of the theory and its first publication (1959) may fail to convey the crooked paths that led to its formal statements. I did not set out to develop a useful theory; I first had to cope with the practical problems in my everyday jobs (1950-59). These problems included how to interpret the heterogeneous occupational classification systems for use with clients, how to interpret the information from diverse interest inventories, and

how can I cope with the shortcomings of these early assessments? These problems were compounded by the more difficult problem of how can you relate a person's interests to appropriate or defensible occupations.

The development of the VPI (1953) implied a potential solution for dealing with the organization of interest data and occupational information. The six VPI interest scales had no direct empirical origin. Initially, I thought the building of scales for single occupations was too impractical to warrant trying. Instead, the creation of a limited number of group or special content scales seemed worth a try. The old Kuder used ten content scales, but I thought a smaller number would be more useful; I also thought some scales should be combined: for instance, Outdoor and Mechanical, and the three arts scales (Artistic, Literacy, Musical). For similar reasons I did not like Roe's (1957) occupational classification either. At the same time, I saw that some occupational categories appeared in all classifications – science, esthetic, social welfare, business, skilled trades or technological occupations.

The *Dictionary of Occupational Titles* (DOT) classification with its endless specificity of titles and categories provided some support for the categories in these early classifications, but its organizational size and complexity implied that it would be difficult to revise or translate into psychological terms (interests and personality). Much later, other researchers found ways to reorganize DOT data into the typological classification. See Holland (1997) for the tortuous evolution of the classification system form 1959-1997.

An early simpleminded unpublished empirical excursion implied that an early classification (the six categories in the VPI, ca. 1957-60) had validity. I had a research assistant (Laura Kent who also worked as our editor) reorganize an old DOT publication that provided extensive tables with ratings of aptitudes (11), temperaments (12), interests (10), physical capacities (6), and working conditions (6) for a sample of 100 occupations. She reorganized this occupational data according to an early form of the six category classification.

A review of this reorganization indicated that occupations in each category shared many of the same characteristics, and these characteristics were easy to interpret and appeared consistent with the data about occupations at the time. This work also implied that further use of the DOT would be valuable, and this is what we eventually did (Gottfredson, Holland, & Ogawa, 1982; Gottfredson & Holland, 1989, 1996).

This incomplete account of the history of the typology is an example of what Kaplan (1964) has termed "logic-in-use" (p. 8) in science or how scientists go about doing their work with a "cognitive style which is more or less logical" (p. 8). The published report of a theory is reconstructed logic or "an idealization of scientific practice" (p. 10). I like to think of it as a model or tool that organizes

what we have learned and expect to learn.

Theoretical reconstructivism comes in many forms. I started with a typology of persons and added a typology of occupations. I tried to integrate these typologies by looking at what data I had, but it wasn't satisfying. When Whitney and I (reported in Holland & Rayman, 1986) discovered the hexagon, it implied how one could estimate a person's congruence with different occupational classes. Now I see my theory as a useful typology with a sloppy hypothetetical deductive logic for dealing with the data about careers. The incorporation of the secondary constructs (consistency, differentiation, and vocational identity) were attempts to make predictions from the theory more accurate.

SECTION 3

EXHIBITS

This section contains material Holland appended to his manuscript to support the autobiography. The section contains five exhibits that:

1. Present his vita with each part organized in chronological order to document his education, professional and scientific experience and awards received, publications and presentations.
2. Provide references to literature cited in the autobiography that is not already provided in his vita.
3. Reproduce selected correspondence to reflect some of his interactions with others.
4. Make available some notes, papers, or talks that would otherwise not be available to readers.
5. Call attention to some documents related to controversies—particularly controversy related to gender differences in interest measurement.

The vita (first exhibit) contains most of Holland's publications. We know that Holland omitted some items he regarded as trivial, but this vita provides a largely complete listing of formal publications. For reasons of economy, Holland chose not to provide a separate listing of literature cited in his autobiography as the vast majority of literature cited is already listed in his vita, so the vita serves as a reference list for the autobiography.

At the time Holland prepared this vita, he had been retired for about 23 years, so he evidently felt free to introduce some whimsical elements. Among the listing of honors received (e.g., honorary doctorates, distinguished scientific contributions) Holland listed two that were awarded by his friends at a dinner on his 80th birthday. One was The Old Guard Award (TOGA). Having observed the way Holland was sometimes treated as if he were a prophet delivering wisdom from the mountain at a recent psychological convention, it occurred to Gottfredson's wife Denise Gottfredson that Holland should perhaps wear a toga. Being a talented seamstress in addition to eminent professor of criminology and criminal justice she made him a toga. (It didn't really require much sewing.) The TOGA citation read "presented by the Society for the Advancement of the Old Guard in recognition of persistence in resisting the temptations of political correctness." The other award listed on the same day is the Gary D. Gottfredson Award presented occasionally to a colleague for contributions made to psychology between the ages of 70 and 80 "in

recognition, *inter alia*, of the 4rd edition of *Making Vocational Choices: A Theory of Vocational Personalities and Work Environments*, the *Career Attitudes and Strategies Inventory*, the *Position Classification Inventory*, the 3rd edition of the *Dictionary of Holland Occupational Codes*, the 1995 manuals for the *Self-Directed Search*, and 10 years of advice—some of it requested.”

The second exhibit provides a listing of material cited in the autobiography that is not included in Holland’s vita, i.e., material authored by others. The listing of additional references Holland left with his manuscript was incomplete, so we have provided the missing references where we were confident we know what sources Holland intended to cite. We have also added to this second exhibit a few references to citations in the editorial notes which are placed in introductions or footnotes to the text of the autobiography.

The third exhibit reproduces correspondence Holland selected to illustrate the nature of his interactions with editors, publishers, and others. This exhibit contains a selection from a larger set of correspondence.

Similarly, the fourth exhibit contains material Holland wanted readers to be able to see. Here we have omitted items that are readily available in the literature—usually because they were published in professional or scientific journals—in order to keep the book of a reasonable size.

The fifth exhibit does contain a few items that are published elsewhere, but they are items to which Holland wished to call particular attention. Some are unpublished elsewhere, however. All pertain to one or another controversy of the kind Holland described in his autobiography.

We have excluded one of the exhibits, which Holland characterized as a “qualitative test of editorial bias.” The omitted exhibit was long and difficult to follow. It documented a prank Holland carried out in 1972 to illustrate his view that editors were displaying bias towards the SDS, which was increasingly popular at the time.

EXHIBIT 3.1

VITA

JOHN L. HOLLAND

Education

- 1942 B.A. University of Nebraska at Omaha (Psychology, French, Mathematics)
- 1947 M.A. University of Minnesota (Psychology, Educational Psychology)
- 1952 Ph.D. University of Minnesota (Psychology, Educational Psychology)

Experience and Awards

- 1950-53 Instructor and Director of Counseling Center, Western Reserve University
- 1953-56 Chief, Vocational Counseling Service, V.A. Hospital, Perry Point, Maryland
- 1957-63 Director of Research, National Merit Scholarship Corporation, Evanston, Illinois
- 1960 Research Award, American Personnel and Guidance Association
- 1961-69 Consulting Editor, *Journal of Applied Psychology*
- 1966 Fellow, American Psychological Association, Divisions 15 and 17
- 1963-69 Vice President, Research and Development, American College Testing Program
- 1965-66 Fellow, Center for Advanced Study in the Behavioral Sciences, Stanford, California
- 1969 President, Division 17, American Psychological Association
- 1969-75 Director, Center for Social Organization of Schools, Johns Hopkins University
- 1969-77 Professor of Social Relations, Johns Hopkins University
- 1970-77 Consulting Editor, *Journal of Vocational Behavior*

Exhibits

- 1974 Awarded E. K. Strong Gold Medal for Contributions to Interest Measurement
- 1977-80 Professor of Social Relations and Psychology, Johns Hopkins University
- 1980 Received Eminent Career Award, National Vocational Guidance Association
- 1980 “Citation of the Week” *Current Contents* (May 19, 1980) for *Making Vocational Choices*, Prentice-Hall, 1973
- 1980 Professor Emeritus, Johns Hopkins University
- 1980 Visiting Professor, Iowa State University
- 1981 Doctor of Science (Honoris Causa), Doane University
- 1985 Doctor of Letters (Honoris Causa), University of Nebraska
- 1987 John Holland Award for outstanding achievement in career or personality research established by Division of Counseling Psychology of the American Psychological Association and Psychological Assessment Resources, Inc.
- 1988 Fellow and Charter member, American Psychological Society
- 1990 Walter Storey Career Development Professional Award, American Society for Training and Development
- 1991 Research Professor, University of Missouri
- 1994-98 Senior Consultant, Gottfredson Associates, Inc.
- 1994- President RIASEC International, Ltd.
- 1994 Distinguished Contributions to Knowledge, American Psychological Association
- 1995 Extended Research Award, American Counseling Association
- 1997 Distinguished Lifetime Contribution to Evaluation, Measurement, and Statistics, Division 5 of the American Psychological Association
- 1999 The Old Guard Award, Society for the Advancement of the Old Guard, in recognition of persistence in resisting the temptations of political correctness
- 1999 The Gary D. Gottfredson Award for impressive contributions made to psychology between the ages of 70 and 80 years, Gottfredson Associates, Inc.
- 2001 Doctor of Science (Honoris Causa), University of Minnesota

Publications

- Holland, J. L. (1952). *A study of measured personality variables and their behavioral correlates as seen in oil paintings*. (Unpublished doctoral dissertation). University of Minnesota, Minneapolis.
- Holland, J. L., Krause, A. H., Nixon, M. E., & Trembath, M. F. (1953). The classification of occupations by means of Kuder interest profiles: I. The development of interest groups. *Journal of Applied Psychology*, 37, 263-269.
- Holland, J. L. Rowe, F. B., Roath, F. L., & Stone, G. B. (1957). Hospital attendant selection. Part I. *Hospital Management*, 83, 107-110.
- Holland, J. L. (1957). Undergraduate origins of American scientists. *Science*, 126, 433-437.
- Holland, J. L., & Stalnaker, J. M. (1957). An honorary scholastic award. *Journal of Higher Education*, 28, 361-368.
- Holland, J. L. (1958). A note on the reliability and validity of the Minnesota Scale for Parental Occupations as an estimate of family economic status. *Journal of Applied Psychology*, 42, 195-196.
- Holland, J. L. (1958). A personality inventory employing occupational titles. *Journal of Applied Psychology*, 42, 336-342.
- Holland, J. L. (1958). The prediction of scholastic success from a high aptitude sample. *School and Society*, 86, 290-293.
- Holland, J. L. (1958). Student explanations of college choice and their relation to college popularity, college productivity, and sex differences. *College and University*, 33, 313-320.
- Holland, J. L. (1958). *Manual for the HVPI*. Palo Alto, CA: Consulting Psychologists Press.
- Holland, J. L., & Stalnaker, R. C. (1958). A descriptive study of talented high school seniors: National Merit Scholars. *Bulletin National Association of Secondary School Principals*, 42, 9-21.
- Holland, J. L. (1959). A classification of occupations in terms of personality and intelligence. *American Psychologist*, 14, 376.
- Holland, J. L. (1959). Determinants of college choice. *College and University*, 35, 11-28.
- Holland, J. L. (1959). Parental expectations and attitudes about colleges. *College and University*, 34, 164-170.
- Holland, J. L. (1959). The prediction of college grades from the California Psychological Inventory and Scholastic Aptitude Test. *Journal of Educational Psychology*, 50, 135-142.

- Holland, J. L. (1959). Some limitations of teacher ratings as predictors of creativity. *Journal of Educational Psychology, 50*, 219-223.
- Holland, J. L. (1959). A theory of vocational choice. *Journal of Counseling Psychology, 6*, 35-45.
- Holland, J. L. (1959). The undergraduate achievement of National Merit Scholars and Certificate of Merit winners. *Bulletin of the National Association of Secondary School Principals, 43*, 190-192.
- Holland, J. L. (1960). The achievement, aptitudes, and personalities of National Merit Scholars and Certificate of Merit winners. *Bulletin of the National Association of Secondary School Principals, 44*, 100-104.
- Holland, J. L. (1960). A comparison of National Merit Scholars and Certificate of Merit Winners. *Bulletin of the National Association of Secondary School Principals, 44*, 140-142.
- Holland, J. L. (1960). The prediction of college grades from personality and aptitude variables. *Journal of Educational Psychology, 51*, 245-254.
- Holland, J. L. (1960). The relation of the Vocational Preference Inventory to the Sixteen Personality Factor Questionnaire. *Journal of Applied Psychology, 44*, 291-296.
- Holland, J. L. (1960). Research on honors: A response to the MacLeod-Heist proposals. *The Superior Student, 3*, 7-8.
- Holland, J. L., & Kent, L. (1960). The concentration of scholarship funds and its implications for education. *College and University, 35*, 471-483.
- Fairweather, G. W., Simon, R., Gebhard, M. E., Weingarten, E., Holland, J. L., Sanders, R., Stone, G. B., & Reahl, J. E. (1960). Relative effectiveness of psychotherapeutic programs: A multicriteria comparison of four programs for three different patient groups. *Psychological Monographs: General and Applied, 74*(5), 1-26.
- Holland, J. L., (1961). Achievement syndromes among high aptitude students. *Psychological Reports, 8*, 384.
- Holland, J. L. (1961). Creative and academic performance among talented adolescents. *Journal of Educational Psychology, 52*, 136-147.
- Holland, J. L. (1961). Dangers in our scholarship policies. *Teachers College Record, 62*, 326-328.
- Holland, J. L. (1961). Some explorations with occupational titles. *Journal of Counseling Psychology, 8*, 82-87.

- Astin, A. W., & Holland, J. L. (1961). The Environmental Assessment Technique: A way to measure college environments. *Journal of Educational Psychology*, 52, 308-316.
- Holland, J. L. (1962). *The meaning of interests*. Paper presented at the American Personnel and Guidance Association Convention, Chicago.
- Holland, J. L. (1962). The National Merit Research Program. *School and Society*, 90, 199-202.
- Holland, J. L. (1962). The nature of student achievement: A summary and model for research and practice. In C. W. Taylor (Ed.), *Creativity: Its assessment and measurement*. Los Angeles, CA: Educational Testing Service.
- Holland, J. L. (1962). Some explorations of a theory of vocational choice: I. One- and two-year longitudinal studies. *Psychological Monographs*, 76(26), 1-49.
- Holland, J. L., & Astin, A. W. (1962). The need for redefining "talent" and "talent loss:" A plan for practical action and research. *Journal of Higher Education*, 33, 77-82.
- Holland, J. L., & Astin, A. W. (1962). The prediction of academic, artistic, scientific, and social achievement of undergraduates of superior scholastic aptitude. *Journal of Educational Psychology*, 53, 132-143.
- Astin, A. W., & Holland, J. L. (1962). The distribution of "wealth" in higher education. *College and University*, 37, 113-125.
- Taylor, C. W., & Holland, J. L. (1962). Development and application of tests of creativity. *Review of Educational Research*, 32, 91-102.
- Holland, J. L. (1963). "Comment" on article by Gonyea. *Journal of Counseling Psychology*, 10, 26-27.
- Holland, J. L. (1963). Explorations of a theory of vocational choice and achievement: II. A four-year prediction study [Monograph]. *Psychological Reports*, 12(2), 547-594.
- Holland, J. L. (1963). Explorations of a theory of vocational choice, Part I: Vocational images and choice. *Vocational Guidance Quarterly*, 11, 232-239.
- Holland, J. L. (1963). Explorations of a theory of vocational choice, Part II: Self-descriptions and vocational preferences. *Vocational Guidance Quarterly*, 12, 17-21.
- Holland, J. L. (1963). Explorations of a theory of vocational choice, Part III: Coping behavior, competencies, and vocational preferences. *Vocational Guidance Quarterly*, 12, 21-24.
- Holland, J. L. (1963). Explorations of a theory of vocational choice, Part IV: Vocational daydreams. *Vocational Guidance Quarterly*, 12, 93-97.

- Holland, J. L. (1963). *The prediction of achievement in different college environments*. Paper presented at the annual meeting of the American Psychological Association, Philadelphia, PA.
- Holland, J. L. (1963). *The psychology of vocational preference and choice*. Psi Chi Invited Address, meeting of the Midwest Psychological Association, Chicago, IL.
- Holland, J. L., Astin, A. W., & Nichols, R. C. (1963). A research program on talented students. *Journal of College Student Personnel*, 4, 144-150.
- Nichols, R. C., & Holland, J. L. (1963). Prediction of the first year college performance of high aptitude students. *Psychological Monographs*, 77(7), 1-29.
- Holland, J. L. (1964). A little learning is . . . [Review of the books *The brain watchers* by M. L. Gross and *The tyrants of testing* by B. Hoffman]. *Teachers College Record*, 64, 510-514.
- Holland, J. L. (1964). Evaluation of general and liberal education. *University College Quarterly*.
- Holland, J. L. (1964). *Explorations of a theory of vocational choice: V. A one-year prediction study*. Moravia, NY: Chronicle Guidance Press.
- Holland, J. L. (1964). Major programs of research on vocational behavior. In H. Borrow (Ed.), *Man in a world of work* (pp. 259-284). Boston: Houghton Mifflin.
- Holland, J. L. (1964). The assessment and prediction of the creative performance of high aptitude youth. In C. W. Taylor (Ed.), *Widening horizons in creativity* (pp. 298-315). NY: Wiley.
- Holland, J. L. (1964). Some new directions for vocational counseling. Paper presented at the annual meeting of the American Educational Research Association, Chicago.
- Holland, J. L. (1964). *What do colleges do to students?* Presentation at the Admissions Symposium, State University of New York, Oswego. (Published in Proceedings).
- Holland, J. L., & Nichols, R. C. (1964). The development and validation of an Indecision Scale: The natural history of a problem in basic research. *Journal of Counseling Psychology*, 11, 27-34.
- Holland, J. L. (1964). Explorations of a theory of vocational choice: III. A longitudinal study of change in major field of study. *Personnel and Guidance Journal*, 43, 235-242.

- Holland, J. L., & Nichols, R. C. (1964). Prediction of academic extracurricular achievement in college. *Journal of Educational Psychology*, 55, 55-65.
- Nichols, R. C., & Holland, J. L. (1964). The selection of high aptitude high school graduates for maximum achievement in college. *Personnel and Guidance Journal*, 43, 33-40.
- Holland, J. L., (1965). The selection of honor students. *The Superior Student*, 7, 16-19.
- Holland, J. L. (1965). Some new dimensions of service and research in college admissions. *Phi Delta Kappan*, 46, 322-324.
- Holland, J. L. (1965). Letter to the editor of *College and University*, 4(1), 2. Rejoinder to attack on Astin by Barr.
- Holland, J. L., & Richards, J. M., Jr. (1965). Academic and nonacademic accomplishment: Correlated or uncorrelated? *Journal of Educational Psychology*, 56, 165-174.
- Holland, J. L. (1965). Invited letter to the editor commenting on article titled, "A computer-measurement system for guidance," in *Harvard Educational Review*, 35, 77-78.
- Abe, C., & Holland, J. L. (1965). *A description of college freshmen: I. Students with different choices of major fields* (ACT Research Report No. 3). Iowa City, IA: American College Testing Program.
- Abe, C., & Holland, J. L. (1965). *A description of college freshmen: II. Students with different vocational choices* (ACT Research Report No. 4). Iowa City, IA: American College Testing Program.
- Abe, C., Holland, J. L., Lutz, S. W., & Richards, J. M. Jr. (1965). *A description of American college freshmen* (ACT Research Report No. 1). Iowa City, IA: American College Testing Program.
- Holland, J. L. (1966). A psychological classification scheme for vocations and major fields. *Journal of Counseling Psychology*, 13, 278-288.
- Holland, J. L. (1966). *The psychology of vocational choice: A theory of personality types and model environments*. Waltham, MA: Blaisdell.
- Holland, J. L. (1966). The research and development division in the American College Testing Program. *Journal of Counseling Psychology*, 13, 117-119.
- Holland, J. L. (1966). On vocational interests. Review of the book: *The origin of interests*, by A. Roe & M. Siegelman, *Contemporary Psychology*, 11, 89-90.
- Richards, J. M., Jr., & Holland, J. L. (1966). A factor analysis of student "explanations" of their choice of college. *International Journal of Educational Scientists*, 1, 103-112.

- Richards, J. M., Jr., Holland, J. L., & Lutz, S. W. (1966). *The assessment of student accomplishment in college* (ACT Research Report No. 11). Iowa City, IA: American College Testing Program.
- Richards, J. M., Jr., & Holland, J. L. (1966). *Academic and nonacademic accomplishment in a representative sample taken from a population of 612,000* (ACT Research Report No. 12). Iowa City, IA: American College Testing Program.
- Skager, R. W., Holland, J. L., & Braskamp, L. A. (1966). *Changes in self-ratings and life goals among students at colleges with different characteristics* (ACT Research Report No. 14). Iowa City, IA: American College Testing Program.
- Holland, J. L. (1967). *Manual for the Vocational Preference Inventory* (6th Revision). Palo Alto, CA: Consulting Psychologists Press.
- Holland, J. L. (1967). The prediction of academic and nonacademic accomplishment. In *Proceedings, 1966 Invitational Conference on Testing Problems* (pp. 44-51). Princeton, NJ: Educational Testing Service.
- Holland, J. L. (1967). *The assessment of the effects of higher education*. Paper read at conference on Purposes and Assessment Methods in Higher Education, University of Lancaster, Lancaster, England.
- Holland, J. L. (1967). Current psychological theories of occupational choice and their implications for national planning. *Journal of Human Resources*, 2, 176-190.
- Holland, J. L. (1967). What every college president should know about admission practices. In E. J. McGath (Ed.), *Selected issues in college administration* (pp. 17-23). NY: Teachers College Press.
- Holland, J. L., & Richards, J. M., (1967). The many faces of talent: A reply to Werts. *Journal of Educational Psychology*, 58, 205-209.
- Richards, J. M., Jr., Holland, J. L., & Lutz, S. W. (1967). The prediction of student accomplishment in college. *Journal of Educational Psychology*, 58, 343-355.
- Holland, J. L., & Lutz, S. W. (1967). *Predicting student's vocational choice* (ACT Research Report No. 18). Iowa City, IA: American College Testing Program.
- Holland, J. L., & Lutz, S. W. (1968). The predictive value of a student's choice of vocation. *Personnel and Guidance Journal*, 46, 429-434.
- Holland, J. L. (1968). Explorations of a theory of vocational choice: VI. A longitudinal study using a sample of typical college students. *Journal of Applied Psychology Monograph*, 52, No. 1, Part 2.
- Holland, J. L., & Whitney, D. R. (1968). *Changes in the vocational plans of college students: Orderly or random?* (ACT Research Report No. 25). Iowa City, IA: American College Testing Program.

- Holland, J. L. (1968). *Manual for the ACT Guidance Profile – Two-Year College Edition*. Iowa City, IA: American College Testing Program.
- Holland, J. L. (1968). Test reviews: Torrance Test of Creative Thinking. *Journal of Counseling Psychology*, 15, 297-298.
- Holland, J. L. (1968). The psychology of vocational choice. *Yearbook for Trade and Industrial Education*. American Vocational Association.
- Holland, J. L., & Baird, L. L. (1968). An Interpersonal Competency Scale. *Educational and Psychological Measurement*, 28, 503-510.
- Holland, J. L., & Baird, L. L. (1968). The Preconscious Activity Scale: The development and validation of an originality measure. *Journal of Creative Behavior*, 2, 217-225.
- Baird, L. L., & Holland, J. L. (1968). *The flow of high school students to schools, colleges, and jobs* (ACT Research Reports No. 26). Iowa City, IA: American College Testing Program.
- Holland, J. L. (1969). A critical analysis. *The Counseling Psychologist*, 1, 15-16.
- Holland, J. L., & Whitney, D. R. (1969). Career development. *Review of Educational Research*, 39, 227-237.
- Baird, L. L., & Holland, J. L. (1969). The flow of high school students to schools, colleges, and jobs: A reexamination of some old questions by the use of multiple indices of talent. *Journal of Human Resources*, 4, 22-37.
- Holland, J. L., Whitney, D. R., Cole, N. S., & Richards, J. M., Jr. (1969). *An empirical occupational classification derived from a theory of personality and intended for practice and research* (ACT Research Report No. 29). Iowa City, IA: American College Testing Program.
- Holland, J. L. (1970). *The Self-Directed Search for Career Planning*. Palo Alto, CA: Consulting Psychologists Press.
- Holland, J. L. (1970). [Review of the book, *The prediction of achievement and creativity*, by R. B. Cattell & H. J. Butcher]. *Measurement and Evaluation in Guidance*, 3, 125-126.
- Holland, J. L. (1970). [Review of the book: *The research process in education* by D. J. Fox]. *Measurement and Evaluation in Guidance*, 3, 183-184.
- Holland, J. L. (1970). [Review of the book: *The discovery of talent*, by D. Wolfle (Ed.)], *Personnel and Guidance Journal*, 48, 785-786.
- Holland, J. L. (1971). A synthesis for vocational psychology [Review of the book *Vocational Psychology* by J. O. Crites]. *Contemporary Psychology*, 16, 148-150.
- Holland, J. L. (1971). A theory-ridden, computerless, impersonal vocational guidance system. *Journal of Vocational Behavior*, 1, 167-175.

- Cole, N. S., Whitney, D. R., & Holland, J. L. (1971). A spatial configuration of occupations. *Journal of Vocational Behavior*, 1, 1-9.
- Campbell, D. P., & Holland, J. L. (1972). A merger in vocational interest research: Applying Holland's theory to Strong's data. *Journal of Vocational Behavior*, 2, 353-376.
- Holland, J. L., Viernstein, M. C., Kuo, H., Karweit, N. L., & Blum, Z. D. (1972). A psychological classification of occupations. *Journal Supplement Abstract Service*, 2, 84-85.
- Nafziger, D. H., Holland, J. L., Helms, S. T., & McPartland, J. M. (1972). *Applying an occupational classification to a national representative sample of work histories of young men and women* (Research Report No. 121). Center for Social Organization of Schools, Johns Hopkins University, Baltimore, MD. (ERIC No. ED 065 675)
- Holland, J. L., Hollifield, J. H., Nafziger, D. H., & Helms, S. T. (1972) *A guide to the Self-Directed Career Program: A practical and inexpensive vocational guidance system* (Research Report No. 126). Center for Social Organization of Schools, Johns Hopkins University, Baltimore, MD.
- Holland, J. L. (1972). The present status of a theory of vocational choice. In J. M. Whitely & A Resnikoff (Eds.), *Perspectives on vocational development* (Chapter 3). Washington, DC: American Personnel and Guidance Association.
- Holland, J. L., Whitney, D. R., Cole, N. S., & Richards, J. M., Jr. (1972). An empirical occupational classification derived from a theory of personality. In J. M. Whiteley & A Resnikoff (Eds.), *Perspectives on vocational development* (Chapter 11). Washington, DC: American Personnel and Guidance Association.
- Holland, J. L. (1972). *Professional manual for the Self-Directed Search*. Palo Alto, CA: Consulting Psychologists Press, 1972.
- Holland, J. L., Nafziger, D. H., & Gottfredson, G. D. (1973). *Final report of the Careers and Curricula Program*. Baltimore, MD: Center for Social Organization of Schools, Johns Hopkins University. (ERIC No. ED 087 884)
- Holland, J. L., Sørensen, A. B., Clark, J. P., Nafziger, D. H., & Blum, Z. D. (1973). Applying an occupational classification to a representative sample of work histories. *Journal of Applied Psychology*, 58, 34-41.
- Holland, J. L., Gottfredson, G. D., & Nafziger, D. H. (1973). *A diagnostic scheme for specifying vocational assistance* (Research Report No. 164). Center for Social Organization of Schools, Johns Hopkins University, Baltimore, MD. (ERIC No. ED 087 883)

- Holland, J. L. (1973). *Making vocational choices: A theory of careers*. Englewood Cliffs, NJ: Prentice-Hall.
- Holland, J. L. (1973). Form E of the Self-Directed Search. Palo Alto, CA: Consulting Psychologists Press.
- Holland, J. L. (1973). Unfrocking college admissions [Review of the book *College admissions and the psychology of talent* by C. W. Wing, Jr., & M. A. Wallach]. *Contemporary Psychology*, 18, 327-328.
- Holland, J. L. (1974). *The use and evaluation of interest inventories* (Research Report No. 167). Center for Social Organization of Schools, Johns Hopkins University, Baltimore, MD. (ERIC No. ED 092 568)
- Holland, J. L. (1974). Vocational guidance for everyone. *Educational Researcher*, 3, 9-15.
- Holland, J. L. (1974). Some guidelines for reducing systematic biases in the delivery of vocational services. *Measurement and Evaluation in Guidance*, 6, 210-218.
- Edwards, K. J., Nafziger, D. H., & Holland, J. L. (1974). Differentiation of occupational perceptions among different age groups. *Journal of Vocational Behavior*, 4, 311-318.
- Nafziger, D. H., Holland, J. L., Helms, S. T., & McPartland, J. M. (1974). Applying an occupational classification to the work histories of young men and women. *Journal of Vocational Behavior*, 5, 331-345.
- Holland, J. L. (1974). Research suggestions for students. *Measurement and Evaluation in Guidance*, 7, 69-73.
- Holland, J. L. (1974). [Review of the book *Vocational guidance and human development* by E. L. Herr], *Personnel and Guidance Journal*, 53, 76-77.
- Holland, J. L. (1974). Career counseling: Then, now, and what's next? *Counseling Psychologist*, 4(3), 24-26.
- Gottfredson, G. D., & Holland, J. L. (1975). Vocational choices of men and women: A comparison of predictors from the Self-Directed Search. *Journal of Counseling Psychology*, 22, 28-34.
- Gottfredson, G. D., & Holland, J. L. (1975). Some normative self-report data on activities, competencies, occupational preferences, and ability ratings for high school and college students, and employed men and women. *JSAS Catalog of Selected Documents in Psychology*, 5, 192. (Ms. No. 859)
- Holland, J. L. (1975). Invited comment: Dilemmas and remedies. *Personnel and Guidance Journal*, 53, 517-519.

- Holland, J. L., & Nafziger, D. H. (1975). A note on the validity of the Self-Directed Search. *Measurement and Evaluation in Guidance*, 7, 259-262.
- Nafziger, D. H., Holland, J. L., & Gottfredson, G. D. (1975). Student-college congruence as a predictor of satisfaction. *Journal of Counseling Psychology*, 22, 132-139.
- Holland, J. L. (1975). *Manual for the Vocational Preference Inventory (VPI)*. Palo Alto, CA: Consulting Psychologists Press.
- Holland, J. L., & Gottfredson, G. D. (1975). Predictive value and psychological meaning of vocational aspirations. *Journal of Vocational Behavior*, 6, 349-363.
- Holland, J. L., Gottfredson, G. D., & Gottfredson, L. S. (1975). Read our reports and examine the data. *Journal of Vocational Behavior*, 7, 253-259.
- Holland, J. L., Gottfredson, G. D., & Nafziger, D. H. (1975). Testing the validity of some theoretical signs of decision-making ability. *Journal of Counseling Psychology*, 22, 411-422.
- Gottfredson, G. D., Holland, J. L., & Gottfredson, L. S. (1975). The relation of vocational aspirations and assessments to employment reality. *Journal of Vocational Behavior*, 7, 135-148.
- Holland, J. L. (1976). Vocational preferences. In M. Dunnette (Ed.), *Handbook of industrial and organizational psychology* (pp. 521-570). Chicago, IL: Rand McNally.
- Holland, J. L. (1976). Consistency and raw scores survive another test: A last response to Prediger and his colleagues. *Measurement and Evaluation in Guidance*, 9, 132-135.
- Holland, J. L. (1976, May). SDS—accessible vocational assessment and counseling by 1986? *Civil Engineering—ASCE*, pp. 92-94.
- Holland, J. L. (1976). The virtues of the SDS and its associated typology: A second response to Prediger and Hanson. *Journal of Vocational Behavior*, 8, 349-358.
- Holland, J. L., & Gottfredson, G. D. (1976). Sex differences, item revisions, validity, and the Self-Directed Search. *Measurement and Evaluation in Guidance*, 8, 224-228.
- Holland, J. L., & Gottfredson, G. D. (1976). Using a typology of persons and environments to explain careers: Some extensions and clarifications. *Counseling Psychologist*, 6, 20-29.
- Reprinted in J. M. Whiteley & A. Resnikoff (Eds.), *Career counseling* (pp. 146-170). Monterey, CA: Brooks Cole, 1978.
- Also reprinted in D. H. Montross & C. J. Shinkman (Eds.), *Career development in the 1980's: Theory and practice* (pp. 5-27). Springfield, IL: Charles C. Thomas, 1981.

- Holland, J. L. (1976). A new synthesis for an old method and a new analysis of some old phenomena. *Counseling Psychologist*, 6, 12-15.
- Holland, J. L. (1977). Author's comment on test reviews. *Measurement and Evaluation in Guidance*, 10, 123-128.
- Holland, J. L., & Holland, J. E. (1977). Vocational indecision: More evidence and speculation. *Journal of Counseling Psychology*, 24, 404-414.
- Holland, J. L., & Holland, J. E. (1977). Distributions of personalities within occupations and fields of study. *Vocational Guidance Quarterly*, 25, 226-231.
- Holland, J. L. (1977). *Understanding yourself and your career*. Palo Alto, CA: Consulting Psychologists Press.
- Kelso, G. I., Holland, J. L., & Gottfredson, G. D. (1977). The relation of self-reported competencies to aptitude test scores. *Journal of Vocational Behavior*, 10, 99-103.
- Gottfredson, G. D., & Holland, J. L. (1978). Toward beneficial resolution of the interest inventory controversy. In C. K. Tittle, & D. Zytowski (Eds.), *Sex-fair interest measurement: Research and implications* (pp. 43-51). Washington, DC: National Institute of Education.
- Holland, J. L., Gottfredson, G. D., & Holland, J. E. (1978). New edition of the Self-Directed Search. *JSAS Catalog of Selected Documents in Psychology*, 8, 73. (Ms. No. 1740)
- Gottfredson, G. D., Holland, J. L., & Holland, J. E. (1978). The seventh revision of the Vocational Preference Inventory. *JSAS Catalog of Selected Documents in Psychology*, 8, 98. (Ms. No. 1783)
- Holland, J. L., Takai, R., Gottfredson, G. D., & Hanau, C. (1978). A multivariate analysis of the effects of the Self-Directed Search on high school girls. *Journal of Counseling Psychology*, 25, 384-389.
- Holland, J. L. (1978). Promoting vocational exploration and decision-making among high school and college students. *The School Guidance Worker*, 33, 21-30.
- Richards, J. M., Jr., Williams, G. D., & Holland, J. L. (1978). *An evaluation of the 1997 minority introduction to engineering summer program* (Research Report No. 270). Center for Social Organization of Schools, Johns Hopkins University, Baltimore, MD. (ERIC No. ED 171 870)
- Holland, J. L. (1979). Career anchors and organizational ports [Review of the book *Career dynamics: Matching individual and organizational needs* by E. H. Schein. *Contemporary Psychology*, 24, 302-303.

- Holland, J. L. (1979). *Professional manual for the Self-Directed Search*. Palo Alto, CA: Consulting Psychologists Press.
- Takai, R., & Holland, J. L. (1979). Comparison of the Vocational Card Sort, the SDS and the Vocational Exploration and Insight Kit. *Vocational Guidance Quarterly*, 27, 312-318.
- Power, P. G., Holland, J. L., Daiger, D. C., & Takai, R. (1979). The relation of student characteristics to the influence of the Self-Directed Search. *Measurement and Evaluation in Guidance*, 12, 98-107.
- Holland, J. L. (1979). *Form E of the Self-Directed Search*. Palo Alto, CA: Consulting Psychologists Press.
- Holland, J. L., Birk, J. M., Cooper, J. F., Dewey, C. R., Dolliver, R. H., Takai, R. T., & Tyler L. (1980). *The Vocational Exploration and Insight Kit*. Palo Alto, CA: Consulting Psychologists Press.
- Holland, J. L., Gottfredson, D. C. & Power, P. G. (1980). Some diagnostic scales for research in decision-making and personality: identity, information, and barriers. *Journal of Personality and Social Psychology*, 39, 1191-1200.
- Holland, J. L. (1980). *My Vocational Situation—An experimental diagnostic form*. Palo Alto, CA: Consulting Psychologists Press.
- Holland, J. L. (1980). The influence of vocational interest inventories: Some implications for psychological testing. *Counseling Psychologist*, 9, 83-86.
- Johnston, J. A., Smither, R., & Holland, J. L. (1981). Evaluating vocational interventions: A tale of two career seminars. *Journal of Counseling Psychology*, 28, 180-183.
- Holland, J. L., Magoon, T. M., & Spokane, A. R. (1981). Counseling psychology: Career interventions, research, and theory. *Annual Review of Psychology*, 32, 279-305.
- Holland, J. L. (1982, August). *Some implications of career theory for adult development and aging*. Invited address, Division of Adult Development and Aging, presented at the annual meeting of the American Psychological Association, Washington, DC. (ERIC No. ED 230-838)
- Holland, J. L. (1982). Planning for alternative futures. *Counseling Psychologist*, 10, 7-13.
- Holland, J. L. (1982). The SDS helps both females and males: A comment. *Vocational Guidance Quarterly*, 30, 195-197.
- Gottfredson, G. D., Holland, J. L., & Ogawa, D. K. (1982). *Dictionary of Holland occupational codes*. Palo Alto, CA: Consulting Psychologists Press.

- Pallas, A. M., Dahmann, J. S., Gucer, P. W., & Holland, J. L. (1983). Test-taker evaluations of the Self-Directed Search and other psychological tests. *Psychological Documents*, 13, 11. (Ms. 2550)
- Rayman, J. R., Bernard, C. B., Holland, J. L., & Barnett, D. C. (1983). The effects of a career course on undecided college students. *Journal of Vocational Behavior*, 23, 346-355.
- Costa, P. T., Jr., McCrae, R. R., & Holland, J. L. (1984). Personality and vocational interests in an adult sample. *Journal of Applied Psychology*, 69, 390-400.
- Holland, J. L. (1984). A celebration of the career development view [Review of the book *Handbook of vocational psychology* by W. B. Walsh & S. H. Osipow (Eds.)]. *Contemporary Psychology*, 29, 862-864.
- Holland, J. L. (1985). *Making vocational choices: A theory of vocational personalities and work environments* (2nd ed.). Englewood Cliffs, NJ: Prentice-Hall.
- Holland, J. L. (1985). *The Self-Directed Search* (1985 revision). Odessa, FL: Psychological Assessment Resources.
- Holland, J. L. (1985). *Professional manual for the Self-Directed Search* (1985 revision). Odessa, FL: Psychological Assessment Resources.
- Holland, J. L. (1985). *Manual for the Vocational Preference Inventory* (1985 revision). Odessa, FL: Psychological Assessment Resources.
- Holland, J. L. (1985). Author biases, errors, and omissions in an evaluation of the SDS Investigative summary scale: A response to Aronowitz, Bridge, and Jones (1985). *Journal of Vocational Behavior*, 27, 374-376.
- Taylor, C. W., Albo, D., Holland, J., & Brandt, G. (1985). Attributes of excellence in various professions—their relevance to the selection of gifted and talented persons. *Gifted Child Quarterly*, 29, 29-34.
- Holland, J. L. (1986). New directions in interest testing. In B. W. Plake & J. C. Witt (Eds.), *The future of testing* (pp. 245-265). Hillsdale, NJ: Erlbaum.
- Holland, J. L., & Rayman, J. R. (1986). The Self-Directed Search. In W. B. Walsh & S. H. Osipow (Eds.), *Advances in vocational psychology, Vol. 1. The assessment of interests* (pp. 55-82). Hillsdale, NJ: Erlbaum.
- Holland, J. L. (1986). Student selection, training, and research performance. *Counseling Psychologist*, 14, 121-125.
- Holland, J. L. & Baker, H. G. (1987). *Preliminary classification of Army and Navy entry-level occupations by the Holland coding system* (NPRDC-TN-87-5). San Diego: Navy Personnel Research and Development Center.

- Holland, J. L. (1987). Current status of Holland's theory of careers: Another perspective. *Career Development Quarterly*, 36, 24-30. (A response to Brown in the same journal, 1987, 36, 13-23.)
- Holland, J. L. (1987). Some speculations about the investigation of person-environment transactions. *Journal of Vocational Behavior*, 31, 337-340.
- Holland, J. L. & Baker, H. G. (1987). *Using expressions of vocational aspirations in military vocational guidance; I: Preliminary investigation and research planning* (NPRDC-TN-87-14). San Diego: Navy Personnel Research and Development Center.
- Gottfredson, G. D., & Holland, J. L. (1989). *Dictionary of Holland occupational codes* (2nd edition). Odessa, FL: Psychological Assessment Resources.
- Gottfredson, G. D., Holland, J. L., & PAR Staff. (1989). *Dictionary of Holland occupational codes computer search program*. Odessa, FL: Psychological Assessment Resources.
- Holland, J. L., Gottfredson, G. D., & Baker, H. G. (1990). The validity of vocational aspirations and interest inventories: Extended, replicated, and reinterpreted. *Journal of Counseling Psychology*, 37, 337-342.
- Gottfredson, G. D., & Holland, J. L. (1990). A longitudinal test of the influence of congruence: Job satisfaction, competency utilization, and counterproductive behavior. *Journal of Counseling Psychology*, 37, 389-398.
- Gottfredson, G. D., & Holland, J. L. (1991). *Position Classification Inventory: Professional manual*. Odessa, FL: Psychological Assessment Resources.
- Also published in translation as: *Explojob--Das werkzeug zur beschreibung von berufsanforderungen und tätigkeiten* (Deutschsprachige adaption des Position Classification Inventory nach Gary D. Gottfredson und John L. Holland), 2007.
- Also published in translation as: *Het Functie- en Omgevingstyperingsonderzoek - Nederlands/Vlaamse editie* (The Dutch/Flemish adaptation of the Position Classification Inventory). Lisse: Swets & Zeitlinger.
- Holland, J. L., Johnston, J. A., Hughey, K. F., & Asama, N. F. (1991). Some explorations of a theory of careers: VII. A replication and some possible extensions. *Journal of Career Development*, 18, 91-100.
- Holland, J. L. (1991). The difference between a journal article and a complete intellectual and psychological report: A frank account of how one small project was born and executed. *Journal of Career Development*, 18, 101-109.
- Holland, J. L., & Gottfredson, G. D. (1992). Studies of the hexagonal model: An evaluation (Or, the perils of stalking the perfect hexagon). *Journal of Vocational Behavior*, 40, 158-170.

- Holland, J. L. (1992). Some recollections of Jack Darley. *Counseling Psychologist*, 20, 395-397.
- Holland, J. L., Johnston, J. A., & Asama, N. F. (1993). The Identity Scale: A diagnostic and treatment tool. *Journal of Career Assessment*, 4, 233-244.
- Gottfredson, G. D., Jones, E. M., & Holland, J. L. (1993). Personality and vocational interests: The relation of Holland's six interest dimensions to five robust dimensions of personality. *Journal of Counseling Psychology*, 40, 518-524.
- Holland, J. L. (1994). Separate but unequal is better. In M. L. Savickas & R. W. Lent (Eds.), *Convergence in Career Development Theories* (pp. 45-52). Palo Alto, CA: CPP Books.
- Holland, J. L., Fritzsche, B. A., & Powell, A. B. (1994). *The SDS professional technical manual*. Odessa, FL: Psychological Assessment Resources.
- Holland, J. L., & Gottfredson, G. D. (1994). *Career Attitudes and Strategies Inventory: An inventory for understanding adult careers*. Odessa, FL: Psychological Assessment Resources.
- Also published in translation as: Holland, J. L., & Gottfredson, G. D. (2010). *Inventário de Atitudes e Estratégias de Carreira: Manual Técnico*. Lisboa, Portugal: CEG-TEA, Lda.
- Also published in translation as: Holland, J. L., & Gottfredson, G. D. (2012). *업무태도 및 전략검사*. South Korea: Korea-Personality Assessment and Consulting.
- Holland, J. L., Johnston, J. H., & Asama, N. F. (1994). More evidence for the relationship between Holland's personality types and personality variables. *Journal of Career Assessment*, 2, 331-340.
- Holland, J. L., Powell, A. B., & Fritzsche, B. A. (1994). *The Self-Directed Search (SDS) professional user's guide*. Odessa, FL: Psychological Assessment Resources.
- Spokane, A. R., & Holland, J. L. (1995). The Self-Directed Search: A family of self-guided career interventions. *Journal of Career Assessment*, 3, 373-390.
- Gottfredson, G. D., & Holland, J. L. (1996). *Dictionary of Holland occupational codes* (3rd ed.). Odessa, FL: Psychological Assessment Resources.
- Holland, J. L. (1996). Exploring careers with a typology: What we have learned and some new directions. *American Psychologist*, 51, 397-406.
- Holland, J. L. (1997). *Making vocational choices: A theory of vocational personalities and work environments* (3rd ed.). Odessa, FL: Psychological Assessment Resources.
- Holland, J. L. (1998). New and old perspectives: A response to a symposium on the "new career." *British Journal of Guidance and Counseling*, 26, 555-558.

- Holland, J. L. (1999). Why interest inventories are also personality inventories. In M. Savickas & A. Spokane, Eds., *Vocational interests: Meaning, measurement, and counseling use* (pp. 87-101). Palo Alto, CA: Davis Black.
- Fuller, B. E., Holland, J. L., & Johnston, J. A. (1999). The relation of profile elevation in the Self-Directed Search to personality variables. *Journal of Career Assessment*, 7, 111-123.
- Holland, J. L. (2000, August). Discussant. Symposium on career assessment for the new millennium. Presented at the annual meeting of the American Psychological Association, Washington, DC.

EXHIBIT 3.2

REFERENCES NOT INCLUDED IN AUTHOR'S VITA

- American College Testing Program. (1968). *The ACT community college guidance profile*. Iowa City, IA: Author.
- Aronson, H. (1998). Questions asked and unasked about Aunt Academe. *Psychology of Women, 25*, 9-12.
- Astin, A. W. (1993). An empirical typology of college students. *Journal of College Student Development, 34*, 36-46.
- Authors Guild. (2000). *Model trade book, contract and guide including electronic rights clauses*. New York, NY: Author.
- Barron, F. (1953). Complexity-simplicity as a personality dimension. *Journal of Abnormal and Social Psychology, 48*, 163-172.
- Becker, H. S. (1986). *Writing for social scientists*. Chicago, IL: University of Chicago Press.
- Betsworth, D. (1998). Same theory in a new book. *Contemporary Psychology, 43*, 447-448.
- Borgen, F. H. (1991). Megatrends and milestones in vocational behavior: A 20-year counseling psychology retrospective. *Journal of Vocational Behavior, 39*, 263-290.
- Brown, D. (1987). The status of Holland's theory of vocational choice. *Career Development Quarterly, 36*, 13-23.
- Brown, S. D., & Gore, P. A., Jr. (1994). An evaluation of interest congruence indices: Distribution characteristics and measurement properties. *Journal of Vocational Behavior, 45*, 310-329.
- Campbell, D. P. (1974a). Have hexagon, will travel. *Contemporary Psychology, 19*, 585-587.
- Campbell, D. P. (1974b). *Manual for the Strong-Campbell Interest Inventory T325* (Merged form). Stanford, CA: Stanford University Press.
- Campbell, J. P. (1982). Editorial: Some remarks from the outgoing editor. *Journal of Applied Psychology, 67*, 691-700.
- Campbell, J. P., Daft, R. L., & Hulin, C. L. (1982). *What to study*. Beverly Hills, CA: Sage.
- Cohen, J. (1990). Things I have learned (so far). *American Psychologist, 45*, 1304-1312.

- Cole, N. S., & Cole, J. W. (1970). *An analysis of spatial configuration and its application to research in higher education* (ACT Research Report No. 35). Iowa City, IA: American College Testing Program.
- Cole, N. S. & Zieky, M. J. (2001). The new faces of fairness. *Journal of Educational Measurement*, 38, 369-382.
- Costa, P. T., Jr., & McCrae, R. R. (1992). *NEO PI-R professional manual*. Odessa, FL: Psychological Assessment Resources.
- Cronbach, L. J. (1984). *Essentials of psychological testing* (4th ed.). New York, NY: Harper & Row.
- Darley, J. G. (1938). A preliminary study of the relations between attitude, adjustment, and vocational interest tests. *Journal of Educational Psychology*, 29, 467-473.
- Day, S. X, & Rounds, J. (1998). Universality of vocational interest structure among racial and ethnic minorities. *American Psychologist*, 53, 728-736.
- Day, S. X, Rounds, J., & Swaney, K. (1998). The structure of vocational interests for diverse racial-ethnic groups. *Psychological Science*, 9, 40-44.
- Edwards, K. J., & Whitney, D. R. (1972). A structural analysis of Holland's personality types using factor and configural analysis. *Journal of Counseling Psychology*, 19, 136-145.
- Foote, N. N., & Cottrel, L. S. (1955). *Identity and interpersonal competence*. Chicago, IL: University of Chicago Press.
- Forer, B. R. (1948). A diagnostic interest blank. *Rorschach Research Exchange and Journal of Projective Techniques*, 12, 1-11.
- French, J. W. (1953). *The description of personality measurements in terms of rotated factors*. Princeton, NJ: Educational Testing Service.
- Fryer, D. (1931). *The measurement of interests*. New York: Holt.
- Gage, N. L. (1989). The paradigm wars and their aftermath: A "historical" sketch of research on teaching since 1989. *Teacher College Record*, 91, 135-150.
- Garman, G. D., & Uhr, L. (1958). An anxiety scale for the Strong Vocational Interest Inventory: Development, cross validation, and subsequent tests of validity. *Journal of Applied Psychology*, 42, 241-246.
- Garvey, W.D., & Griffith, B.C. (1965). Scientific communication: The dissemination system in psychology and a theoretical framework for planning innovations. *American Psychologist*, 20, 157-164.
- Gough, H. G. (1957). *Manual for the California Psychological Inventory*. Palo Alto, CA: Consulting Psychologists Press.

- Gough, H. G., & Woodworth, D. G. (1960). Stylistic variations among professional research scientists. *Journal of Psychology*, 49, 87-98.
- Guilford, J. P., Christensen, P. R., Bond, N. A., Jr., & Sutton, M. A. (1954). A factor analysis study of human interests. *Psychological Monographs*, 68, 4. (Whole No. 375).
- Harmon, L. W. (1974). [Review of the book, *Making vocational choices*]. *Measurement and Evaluation in Guidance*, 7, 198-199.
- Hanson, G. R. & Rayman, J. R. (1976). Validity of sex-balanced interest inventory scales. *Journal of Vocational Behavior*, 9, 279-291.
- Harris, E. E. (1967). [Review of the book, *The psychology of vocational choice: A theory of personality types and model environments*]. *Sociological Quarterly*, 8, 543-544.
- Helms, S. T., & Williams, G. D. (1973). *An experimental study of the reactions of high school students to simulated jobs* (Report No. 161). Baltimore, MD: Center for Social Organization of Schools, Johns Hopkins University. (ERIC No. ED 087 882)
- Helms, S. T. (1996). Some experimental tests of Holland's congruency hypotheses: The reactions of high school students to occupational simulation. *Journal of Career Assessment*, 4, 253-268.
- Hogan, R., Hall, R., & Blank, E. (1972). An extension of the similarity-attraction hypothesis to the study of vocational behavior. *Journal of Counseling Psychology*, 19, 238-246.
- Iachan, R. (1984). A measure of agreement for use with the Holland classification system. *Journal of Vocational Behavior*, 24, 133-141.
- Isaacson, L. E. (1967). [Review of the book, *The psychology of vocational choice*], *Personnel and Guidance Journal*, 46, 303-304.
- Kaplan, A. (1964). *The conduct of inquiry*. San Francisco: Chandler.
- Kubie, L. S. (1958). *Neurotic distortion and the creative process*. Lawrence, KS: University of Kansas Press.
- Kuder, G. F. (1951). *Examiner manual for the Kuder Preference Record, vocational, form C*, second revision. Chicago: Science Research Associates.
- Laurent, H., Jr. (1951). *A study of the developmental backgrounds of men to determine by means of a biographical information blank the relationship between factors 1 and their early backgrounds and their choice of profession*. (Unpublished doctoral dissertation). Western Reserve University, Ohio.
- LeSuer, B. V. (n.d.). *Occupational Interest Blank*. New York: Psychological Corporation.

- Lokan, J. (1988). *The Self-Directed Search manual for the Australian supplement*. Hawthorn, Victoria: Australian Council for Educational Research.
- McCormick, E. J., Jeanneret, P. R., & Mecham, R. C. (1969). *The development and background of the Position Analysis Questionnaire* (Office of Naval Research Contract NONR-1100[28], Report No. 5). Lafayette, IN: Occupational Research Center, Purdue University.
- McCrae, R. R. (1993). Openness to experience as a basic dimension of personality. *Imagination, Cognition and Personality, 13*, 39-55.
- Nicholas, P. W. (1967). Categories in search of data [Review of the book, *The psychology of vocational choice*]. *Contemporary Psychology, 12*, 578-579.
- Niles, S., Goodman, J., & Pope, M. (Eds.) (2000). *The career counseling casebook: A resource for students, practitioners, and counselor educators* (2nd ed.). Tulsa, OK: National Career Development Association.
- Prediger, D. J. (1982). Dimensions underlying Holland's hexagon: Missing links between interests and occupations? *Journal of Vocational Behavior, 15*, 259-287.
- Pyke, S. W., & Agnew, N. M. (1991). *The science game: An introduction to research in the social sciences* (5th ed.). Englewood Cliffs, NJ: Prentice-Hall.
- Rayman, J. R. (1976). Sex and the single interest inventory: The empirical validation of sex-balanced interest inventory items. *Journal of Counseling Psychology, 23*, 239-246.
- Rayman, J. R. & Atanasoff, L. M. (1999). Holland's theory and career intervention: the power of the hexagon. *Journal of Vocational Behavior, 55*, 114-126.
- Richards, J. M., Jr. (1973). A study of the "environments" of Japanese universities. *Research in Higher Education, 1*, 87-89.
- Richards, J. M., Jr. (1974). "Environments" of British Commonwealth universities. *Journal of Educational Psychology, 66*, 572-579.
- Roe, A. (1957). Early determinants of vocational choice. *Journal of Counseling Psychology, 4*, 212-217.
- Rorer, L. G., & Goldberg, L. R. (1965). Acquiescence and the vanishing variance component. *Journal of Applied Psychology, 49*, 422-430.
- Rothkopf, E. Z. (1973). What are we trying to understand and improve: Educational research as leerlaufreaktion. *Educational Psychologist, 10*, 58-66.
- Rounds, J., & Tracey, T. J. (1996) Cross-cultural structural equivalence of RIASEC models and measures. *Journal of Counseling Psychology, 43*, 310-329.
- Siebel, C. E., & Walsh, W. B. (1977). A modification of the instructions of Holland's Self-Directed Search. *Journal of Vocational Behavior, 11*, 282-290.

- Smart, J. C., Feldman, K. A., & Ethington, C. A. (2000). *Academic disciplines: Holland's theory and the study of college students and faculty*. Nashville, TN: Vanderbilt University Press.
- Snyder, C. R., Harris, C., Anderson, J. R., Holleran, S. A., Irving, L. M., Sigmon, S. T., Yoshinobu, L. R., Gibb, J., Langelle, C., & Harney, P. (1991). The will and the ways: Development of an individual-differences measure of hope. *Journal of Personality and Social Psychology*, 60, 570–585.
- Staats, A. W., Gross, M. C., Guay, P. F., & Carlson, C. C. (1973). Personality and social systems and attitude-reinforcer-discriminative theory: Interest (attitude) formation, function, and measurement. *Journal of Personality and Social Psychology*, 26, 251-261.
- Strunk, W. & White, E. B. (1959). *The elements of style*. New York, NY: MacMillan.
- Super, D. E. (1985). Validating a model and a method. *Contemporary Psychology*, 30, 771.
- Swan, K. C. (2005). Vocational Interests (The Self-Directed Search) of Female Carpenters. *Journal of Counseling Psychology*, 52, 655–657.
- Taylor, K. F., & Lokan, J. J. (Eds.). (1986). *Holland in Australia: A vocational choice theory in research and practice*. Victoria, Australia: Australian Council for Educational Research.
- Thoresen, C. E. (1976). [Review of the book, *The psychology of vocational choice*], *American Educational Research Journal*, 4, 162-163.
- Tryon, R. C. & Bailey, D. E. (1966). The BC Try computer system of cluster and factor analysis, *Multivariate Behavioral Research*, 1, 95-111.
- Viernstein, M. C. (1972). The extension of Holland's occupational classification to all occupations in the Dictionary of Occupational Titles. *Journal of Vocational Behavior*, 2, 107-121.
- Warnath, C. F. (1975). Vocational theories: Direction to nowhere. *Personnel and Guidance Journal*, 53, 422-429.
- Weinrach, S. (1996). The psychological and vocational interest patterns of Donald Super and John Holland. *Journal of Counseling and Development*, 75, 5-16.
- Wrenn, C. G. (1966). Capsule reviews. *Journal of Counseling Psychology*, 13, 503-506.
- Ylvisaker, D. (n.d.). *Statistics at UCLA—1939 to 1998*. Retrieved from: <http://statistics.ucla.edu/about/our-history/statistics-at-ucla/>
- Zener, T. B., & Schnuelle, L. (1976). Effects of the Self-Directed Search on high school students. *Journal of Counseling Psychology*, 23, 353-359.

EXHIBIT 3.3

CORRESPONDENCE

This exhibit contains correspondence selected by John Holland for inclusion in his autobiography. We have not added any correspondence, but we did omit one letter bragging about a bowling score. We have corrected minor errors of spelling, punctuation, or usage when the change did not alter the sense of the original document. The original, unmodified selection of correspondence is located in an archive in the University of Missouri library.

Because this correspondence occasionally refers to other documents or to events or people (real or imagined) with whom readers may not be familiar, we have added editors' notes in many places to explain the context of the correspondence or to offer an interpretation of it. These notes which appear at the bottom of the pages to which they apply are marked as editors' notes.

The correspondence ranges widely. It includes complaints by Holland about some chuckleheaded opinions of critics, editors, and reviewers; praise for colleagues or defenses of them; jocular exchanges with friends; and other topics. Taken together, the correspondence reveals Holland's puckish and sometimes wry wit; it shows how offended he was to be accused of unfairness to women in the measurement tools he developed; it demonstrates his generosity to colleagues; and it reveals that he was able to say "no" to unreasonable requests.

Letter to President of the State University of Iowa, 1963

April 19, 1963

President Virgil Hancher
State University of Iowa
Iowa City, Iowa

Dear President Hancher:

Last summer I was invited to participate in an NDEA Institute at your institution for five days. I was contacted for this job by Professor Donald Hoyt acting for Dean Cooper. When I arrived, I was informed that I was to work for three instead of five days. This change of plans didn't particularly upset me, since the heat of the summer made working an unpleasant idea.

Next I was informed that I would be paid \$50 rather than \$75 a day. This last minute change didn't seem cricket, but there was little I could do other than go home, but I did not want to appear more interested in money than teaching, so I taught.

After a reasonable delay, I was paid \$150 for my three days. Somewhat later I received two expense checks for \$95.99. Thinking this was an error, I called but was told these were to even the financial score, a total of \$241.98 as contrasted with an original commitment of \$375.

Recently, I was told that I must refund one check for \$95.99 paid me in error. This task I have now performed.

I am not writing you to negotiate a more equitable settlement—the fact is I am now afraid to even correspond with your institution. Instead I am writing only to call your attention to the fact that my experience does not build good will and that you have a dean who leaves something to be desired.

I wish to consider the matter closed—my income tax is now in error, and my wife, who does my bookkeeping, is irritated with your institution and me for not straightening things out earlier.

Sincerely,

John L. Holland
Director of Research

JLH:vc

cc: Dean Howard Jones
Professor Donald Hoyt

Letter to the Editor of the College and University Journal, 1965³⁴

Dear Sir,

I came across Donald Barr's *Age of the Wise Guy* somewhat by accident about a month ago. His naïve assertions about some educational research of a colleague of mine stimulated me to write this brief rejoinder. Let me begin by trying to impress you with my real life signs of humanistic virtues. Briefly, I have been an amateur classical pianist for more than 20 years. My father was an accomplished artist, carpenter, and socialist. In my own field, educational research, I have a reputation for being a deviant thinker and professional trouble maker. I have never been elected to anything I know of. That's not quite true, I was elected president of our high school Latin club, but I do not recall how this sudden and brief popularity occurred. For a few weeks as a graduate student I could translate French and German with considerable facility. My major thesis was on the relation of painting to the personality of the artist. Although I received a degree, some felt that my choice of topic forecast a deviant career—a good prediction, still wish Norman Thomas would run this year. This incomplete sketch of myself, I think, gives me some claim to what many people call humanism. I thought it necessary to present, since Headmaster Barr trades in on his humanism in slicker fashion by appealing to some of the popular authorities in humanism, and by his ploy of "I cannot prove anything I say."

Before I go to work on Barr's shortcoming in the interpretation of educational research, I must first applaud his thoughts on high school students and researchmanship. I found many of his interpretations of what is going on in these areas sensible as would many people. For another account of current researchmanship, the late C. W. Mills' book, *The Sociological Imagination*, is more entertaining and complete. For balance, and in the interest of fair play, I repeat—I found most of Barr's piece congenial.

Barr's account of a research study on the effects of colleges upon students is another matter. His interpretation of my former colleague's work violates many principles of literary or any other kind of criticism. First, he obviously did not understand the bare bones of the study itself. Second, he has tried to smear the researcher by appealing to the literary man's common abhorrence of numbers and computers with sentences such as "He shoved a matrix into a 7094" or "he had a very elaborate, absolutely ludicrous way of classifying the different factors." And finally, Barr assumes like his intellectual godfathers Barzun and Hoffman,

34 Editors' note: This letter, a rejoinder to an attack on Alexander W. Astin's research by Donald Barr, was published with the heading *Wise Guy*, in volume 4, number 1, of *College and University*, p. 2.

that any bright, perceptive person without appropriate technical training has an infallible facility for the interpretation of educational research reports.

Barr was apparently offended by the finding that selected Northeastern men's colleges had negative effects upon students, effects which are contrary to our educational folklore. To negate Astin's findings, Barr conjures up Hoffmann's "creative" student in research clothing—"the simpleton with ideals and with a great love of the world perishes." For the record, I think it is important to point out once again that students get right or wrong answers on multiple choice tests for many reasons, not for only two reasons: being shallow and superficial, or deep and critical. Students get the wrong answers in multiple choice because they don't know anything, because they are stupid, because they lack sufficient social sensitivity to interpret the question, because they are careless in marking their answer sheet, and because they are trying to look creative. Equally important, the available evidence is clear: if scholastic aptitude tests discriminate at all between more creative and less creative people, it is to give the more creative person a slight break, since measures of originality and creative performance usually are positively correlated at a low level with aptitude measures. Only if the relationship was negative, could the terrible injustices Barr postulates occur.

Finally, I find Barr's criticism distressing because it seems irresponsible; that is, he does not appear to have made any effort to understand the work he criticizes. His criticism reflects a kind of anti-humanism, since he is not sensitive to what he doesn't know, and he burlesques mathematics—a discipline usually associated with humanism.

John Holland
Iowa City, Iowa

Letter to W. C. Wolf, ca. 1969³⁵

210 Windsor Drive
Iowa City, Iowa 50613

W. C. Wolf, Jr.
Educational Researcher
22 Mt. Pleasant
Amherst, Massachusetts 01002

Dear Dr. Wolf:

If you have space, my staff and I, who are AERA members, would like to have the following notes, or our revisions of them, run in "Professional Activities of Members."

James M. Richards, Jr., formerly director of Developmental Research for the American College Testing Program, has been appointed Principal Research Scientist at AIR, Palo Alto.

Leonard L. Baird, formerly Research Psychologist for the American College Testing Program, has been appointed Research Psychologist at ETS.

Charles F. Elton, formerly Director of Applied Research for the American College Testing Program, has been appointed Professor of Higher Education, University of Kentucky.

John L. Holland, formerly Vice-President for Research and Development at the American College Testing Program, has been appointed Professor of Education and Social Relations, and Director of the Center for the Study of Social Organization of Schools, Johns Hopkins University.

And, if you like, you could add, "And we are delighted to leave ACT!"

Sincerely yours,

John L. Holland

³⁵ Editors' note. Holland presumably wrote this undated letter in 1969. It announces the exodus of senior research personnel from the American College Testing Program following the firing of John Holland.

Letter to John D. Black, 1970³⁶

May 25, 1970

Dr. John D. Black
Consulting Psychologists Press, Inc.
577 College Avenue
Palo Alto, California

Dear Jack:

I am enclosing a draft of the theory-ridden, impersonal, computerless, guidance system for your information. This booklet provides a guidance experience for persons aged 14 to 40. The booklet makes it possible for a person to assess and profile his self-ratings, activities, competencies, and vocational interests. Then the person can translate his responses into a theoretical code which enables him to see, in turn, how his assessment is related to various occupational opportunities. This booklet is possible because the theoretical assessment and the occupational classification use the same major concepts and theory.

The booklets or booklet should not cost more than a dime apiece and should sell for about 50¢, a price which would be more than competitive.

The market for this booklet is the high school, the two-year and four-year college, and the second-career adult. The booklet would enable schools and other agencies to serve the large population that professional counselors cannot reach. The booklet could be an almost self-contained technique within a system of guidance services.

Actually, I am hoping that you and your cautious board will say “no,” because I think the booklet will be easier to market than a conventional test—no keys, self-guidance, simplicity, etc.

Currently, I am working with York University in Canada and with the University of Maryland.

³⁶ Editors' note: This letter transmitted a draft of the self-assessment booklet, not yet named the *Self-Directed Search*, to his friend, the president of Consulting Psychologists Press. It evidently was preceded by informal telephone or in-person communication about the publication of the booklet and getting help from the Press in covering some of the costs of further development. By this time, Holland had become Director of the Center for Social Organization of Schools at Johns Hopkins University. In addition to chiding Black about being cautious about the business venture, Holland misrepresents his experience publishing the Vocational Preference Inventory from his basement—which he had seen as a real burden. Evidently, a proposed budget for development may have been included with this letter.

In short, I think there is a large market for this booklet, the booklet itself has many desirable features—excessive empirical background, a promising and known theoretical base, a revised occupational classification which has now some unique properties.

Whatever your board decides, I plan to move ahead, make anyone who buys the booklet pay for all the development costs, or return to the basement press business, which I enjoyed.

Parenthetically, I am amused that you, a president, must take a niggling operational decision like six or seven thousand dollars to a board of trustees. I would have thought that you, a leader, would have confined their activity to matters of policy long ago.

Cordially,
John L. Holland
Director

:pkw
enclosures

**Letter from John D. Black Proposing to
Publish the Self-Directed Search, 1970**

June 16, 1970

Dr. John L. Holland
Center for Study of Social Organization of Schools
Johns Hopkins University
Baltimore, Maryland 21218

Dear John:

I have looked over your new material carefully and I guess I have to agree that it might possibly have some utility. At least I am willing to take a chance that it won't be a complete bust.

Accordingly, I have had Bunny copy essentially your contract on the VPI—the only author's contract we have ever signed that was written by the author (and the most generous one we've ever approved).

Upon approval of the contract, we will be glad to pay for the printing of the materials for the Maryland tryout. I would like you to send me a dozen or so copies, however, so I can try them out on some clients. We will also help out as much as we possibly can on subsequent expenses. I cannot meet the full budget in your recent letter for two reasons:

1. We have just completed a \$200,000 building project which has been a drain on our cash reserves.
2. We would have to sell more than \$50,000 of the new materials before we would cover the subsidy, i.e., break even and that would take a minimum of three years, if your judgment were accurate, five years by my optimistic estimate, and 8 to 10 years by more conservative judges.

Nevertheless, we will try to help with as many of your out-of-pocket costs as we can. I do have some uncertainty about whether, under the terms of any of your prior employment contracts, anyone else has a claim against any of this material. Even if someone had a weak claim it might be better to buy them off now rather than wait until we have a best-seller. Please treat this question seriously.

I really think the material has lots of possibilities, John; in fact, I am more optimistic about it than anything else in the works. Students are increasingly resistant to tests but, in my judgment, will really dig this approach. There is no reason for over-worked counselors not to accept it as an initial approach which

might screen out lots of clients. I hesitate to say these things since your enthusiasm obviously shows no need for stimulation, but I do think it is an exciting approach and I would be willing to do a special mailing piece on it to every high school and college in the country—something we haven't done except for the CPI and the Strong.

Someday I'll tell you all my troubles with Stanford; except for them life isn't too bad. Nancy's daughter had a lovely wedding, as the Wilkins' probably told you, and our two sons were graduated from high school last week. Today is Kathy's twelfth birthday—and she's a little miffed that all I've given her so far is twelve pennies.

Love to Elsie.

Sincerely,

John D. Black

President

JDB:bb

Enc.

**Form Letter from Imaginary Assistant Replying to
Correspondence during Holland's Absence, ca. 1975–1977³⁷**

Dear Correspondent:

Dr. Holland is on sabbatical and will not be back in his office until January 1, 1978. He will attend the APA, visit the Universities of Melbourne, Iowa, Iowa State, and Kansas. He plans to write a new SDS manual, begin a book of readings, and most of all pursue some hobbies.

Dr. Holland instructed me to say that he will answer his correspondence only after he returns in January. If you have an urgent message, I will forward it, but I would not count on a reply. The old fellow is really out of gas.

I suggest that you write Consulting Psychologists Press if you have a question about the SDS or VPI. If you want him to give a talk or workshop, assume he will not do it. His schedule for 1978 is full.

If he were here, I am sure he would send his best wishes.

Sincerely,

Adam Lackey
Research Assistant

AL;jh

³⁷ Editors' note. Adam Lackey (a lackey or a damned lackey) was an imaginary assistant conjured up by Gary Gottfredson who, as a graduate student, sorely desired an assistant. Adam performed a variety of undesirable jobs for both Holland and Gottfredson for a number of years. Eventually, when it was discovered that some persons could not seem to understand that Adam was a figment, Holland repeatedly tried to kill him off by writing things such as, "As the late Adam Lackey put it . . ." This form letter, apparently from sometime around 1975-1977, informs correspondents that they should not expect an early reply while Holland was traveling.

**Letter to Albert C. Sims of the College Entrance
Examination Board, 1971³⁸**

June 19, 1971

Mr. Albert G. Sims
Vice President for Programs
College Board Review
College Entrance Examination Board
888 Seventh Avenue
New York, New York 10019

Dear Mr. Sims:

I read your account of the development of the SDQ with interest and amusement. I thought you might like some more facts for your story.

Joshua Fishman gave me the idea for the ACT SPS in the late 1950s when he said: "Do you think it would be helpful to add a few questionnaire items to the SAT?" I said "yes," but CEEB said "no."

When I went to ACT in 1963, my staff and I (both of us) composed the first ACT SPS in the first 30 days. Those were the same days when the boards were issuing anti-nonintellective policy statements.

At any rate, I cannot tell you how proud I am that your organization has copied the idea about 7 years later. At the same time, I would think your research staff could have at least avoided developing an imitation that did not have the same number of items (108).

I can imagine very well what your regional meetings were like. There is much virtue in small organizations without advisors and committees. The man who pushed the SDQ through should get a medal.

Again, congratulations!

Sincerely,
John L. Holland
Director

JLH:dfw

38 Editors' note. The SDQ or Student Descriptive Questionnaire is a self-report inventory of academic and nonacademic activities, plans, interests and abilities. Used as an optional part of the College Board's admissions testing program, results were to provide colleges with additional information for selection decisions. It was introduced in 1971. In this letter, Holland makes fun of the College Board's delay in introducing measures of non-intellective characteristics using the expedient of self-reports. (Ironically, the College Board later revised the SDQ to focus more on academic features in the 1980s.) The ACT Student Profile Section was included with ACT assessments in 1965 to capture information about nonacademic accomplishments.

Letter to David P. Campbell, 1972³⁹

January 25, 1972

Dr. David P. Campbell
Student Counseling Bureau
Center for Interest Measurement Research
University of Minnesota
Minneapolis, Minnesota 55455

Dear Dave:

I found my copy of the article for J of VB.

Needless to say I enjoyed the story of the neuter form of the Strong-Campbell. I think your revision looks great. You should write the women' rights groups a thank-you note, for they gave you more real help than your advisory group ever did.

I am considering resigning from your advisory committee for several reasons. I find myself hesitating to give you my best advice as the SDS sales accelerate. And, I have some minor sexist problems of my own, which you have just helped to solve.

At any rate, I suggest that you obtain expensive, representative samples of men and women for the norming of the basic scales rather than a convenience sample. You might find it helpful to consider two other strategies. Label the neuter book "Experimental" so you can change your mind. Or, go slow in developing its final format so that you won't have to reverse fields again. I gave up the women's form of the VPI in 1956, norms in 1966, and profiles in 1971. One other matter, "childrens clothing designer" is a copyrighted item from you know where. This time a free manual will not do the trick.

Cordially,
John L. Holland
Director

JLH:bjm
Enclosures

39 Editors' note. Campbell and Holland had been working together to develop a set of RIASEC scales within the Strong item pool and reported on the development in an article in the *Journal of Vocational Behavior* (oddly referred to here as J of VB here rather than the more common JVB). Adding Holland-type scales to the Strong would benefit the Strong by adding an influential theoretical base, and doing so would also benefit Holland's tests because the prestige of the more established inventory would be expected to rub off on the SDS. At this time Campbell was also developing a merged form of the Strong that would contain scales for both men and women (earlier versions had been for men *or* women as E. K. Strong had developed separate inventories for the two genders). This revision opened up many issue regarding appropriate norms for the scales (issues that are not fully resolved today). Holland is poking fun at this psychometric three-ring circus by pointing out that he had much earlier adopted simpler approaches by avoiding the use of norms and complicated profiles. He is also chiding Campbell about pilfering an occupational item—something that is difficult to avoid in tests composed of occupation names.

Letter to Ralph F. Berdie, 1973⁴⁰

March 28, 1973

Mr. Ralph F. Berdie

Editor

Journal of Counseling Psychology

University of Minnesota

408 Morrill Hall

Minneapolis, Minnesota 55455

Dear Ralph:

My note is to make a mild protest.

I think your rejection of the report by Edwards, Nafziger, and Holland (Do Occupational Perceptions Become More differentiated With Age?) was ill-advised.

The reviewers' comments are occasionally stupid:

1. "The five large . . . groups differ on age." J.C.! they should; that is the main experimental variable.
2. "Differ in education." How could 4th graders have the same educational level as college students?
3. "Differ in work experience." Next time we will get migrant children.
4. "Differ on sex." We did separate analyses.
5. "Differ on geographical origin." Geography has little to do with vocational interests.
6. "Differ in intelligence." Usually shows only small *rs* with interests as you well know.
7. "Differ on a host of other variables." What other variables?
8. "Differ on SES." In this instance, there is finally something that I can agree with. However, it is unlikely that we have selected extreme SES groups. Consequently, the *rs* between this variable and the scales of the VPI should be low.

40 Editors' note. Holland counseled in the body of his autobiography that it is usually unfruitful to argue with editors. This letter is an understandable example of Holland deviating from his usual practice. Editors and their minions (reviewers) can sometimes powerfully tempt rebuttal. One of us (Gottfredson) submitted a very brief experimental study of the effect of wording changes in interest items. The study found no evidence that changing "policeman" to "police officer" had much effect on the endorsement rates of men and women. Gottfredson received a terse rejection letter from Berdie—evidently dictated but not signed shortly before his death—indicating that the field is attempting to eliminate gender bias regardless of our inability to demonstrate its existence. While this was correct in terms of the political climate of the day, had Berdie not been deceased he might have received another letter of protest because item analyses are useful regardless.

More important, this article truly breaks new ground. In contrast, you recently accepted an article about the hexagonal model (Wakefield & Doughtie) which is about the 6th replication of that finding. I assumed your editors were suckered by the statistical folderol.

Several other oversights. One is mine. The reviewer is correct about the sentence on page 4. Ideally we should have had a group of nationally representative samples to make statements about trends. On the other hand, the reviewer in his haste to reject the article failed to note that Cureton's analyses of representative national samples strongly supports our main hypothesis. Tell your reviewer the technical term for this is integrating or reading the literature.

I have enclosed several copies to distribute to your over-confident editors. I have enclosed a copy of the original paper to remind you about the risks of being an editor.

Sincerely,

John L. Holland
Director

JLH/kh

Enclosures

P.S. Who said people mellow with age?

**Letter from Lenore W. Harmon Inviting a Submission
for a Special Issue, 1973⁴¹**

September 21, 1973

Dr. John L. Holland
Center for the Study of Social Organization of Schools
The Johns Hopkins University
Baltimore, Maryland

Dear John:

Dave Campbell and I have been asked to guest-edit a special issue on interest measurement of MEG, the journal of the Association for Measurement and Evaluation in Guidance, a division of APGA. We are now soliciting manuscripts for that issue.

We thought you, or your students, might have some interest in submitting an article for this issue. If so, please let us know as soon as possible.

We need to receive the manuscripts by November 1st. They should be addressed to a population of counselors who are especially interested in the practical applications of psychological measurement and whose level of sophistication is relatively high. Because of space limitations, we prefer concise manuscripts with a maximum of about 10 pages.

We will have to make some choices, of course, and not all submitted manuscripts will be chosen, but we hope you and/or your students have some work to submit.

Sincerely,

Lenore W. Harmon
Associate Professor

LWH:bnp
cc: David P. Campbell

41 Editors' note: In our cynical view, journals tend to develop special issues as a way of filling pages when they are not getting enough high-quality manuscripts to publish. In this letter, special issue editor Lenore Harmon is seeking pages for a special issue with a ridiculously close deadline for submission. The following pages show Holland's response, a hastily fabricated hilarious account of a too-perfect experimental longitudinal study supposed to have been initiated well over 2 years earlier. The account was probably written as a passtime during a lunch hour at Holland's research center. Scientists and research assistants usually gathered in the center's conference room for brown-bag lunch and playful conversation. John Hollifield was a professional writer who served as the center's editor. Hollifield authored several short comedic articles about Holland's theory. Lenore Harmon became convinced, more or less reasonably, that Hollifield was an imaginary figure. When Hollifield died years later, one of us (Gottfredson) sent a clipping from the *Baltimore Sun*, expecting to convince her of Hollifield's actual existence. Her reaction was to indicate how clever she thought it was that Gottfredson and Holland were able to simulate a newspaper death notice.

**Letter to Lenore W. Harmon Transmitting
Farcical Manuscript, 1973⁴²**

September 27, 1973

Dr. Lenore W. Harmon
The University of Wisconsin-Milwaukee
Department of Educational Psychology
Milwaukee, Wisconsin 53201

Dear Lenore:

I am submitting a short piece for your special issue in interest measurement. My collaborator is worried that you may accept it. I, myself, am pleased at the contribution that this elegant study makes.

Sincerely,

John L. Holland
Director

JLH/kms
Enclosure

⁴² Editors' note: A few days after receiving the request for manuscripts (or perhaps the same day, who knows how long it took for the request to arrive in 1973), Holland sent this letter and accompanying farcical manuscript to Harmon.

**Enclosure with Letter to Harmon—
A Report of a Fictitious Study⁴³**

The Effects of Personal and Impersonal Vocational Interventions and their
Implications for Practitioners⁴⁴

John L. Holland and John H. Hollifield

This study was performed to settle once and for all whether or not personal, sensitive, caring vocational interventions are more useful and desirable than impersonal, insensitive, and cold vocational interventions.

The study was accomplished in the following way:

A population of 10,000 high school juniors in a large city school system were randomly assigned (computer generated random numbers) to one of 3 groups (333 in two groups, 334 in the third). Group 1 received the traditional neglect typical of large counseling staffs in bureaucratized school systems. And Group 2 received the services of the warmest, most concerned, empathic counselors in the school system. To accomplish this task, Hogan's empathy scales and the CPI were used to select the most sound, and empathic counselors. In addition, counselors with reputations for short interviews were not assigned to Group 2. Group 3 received the Self-Directed Search as a vocational treatment.

All students were polled in 1971 for their current vocational aspirations (treatments or neglect began in January of 1971) and were polled again for their vocational aspirations in January of 1973. Students were also polled for their satisfaction with their current choice or job in 1973.

The data were analyzed as follows: Pre- and post-vocational choices were categorized according to Holland's classification to form 6 by 6 tables. A comparison of the percentages of students who maintained the same kind of choice (stayed in one of the six main categories) was greatest for the controls, or Group 1, who received the usual neglect. That percentage was 80%. The percentage for group 2 (served by outstanding, caring counselors) was 60%. The percentage for group 3 (served by the Self-Directed Search in 22 pieces of unfeeling paper) was only 40%.

In short, an impersonal guidance simulation was most effective in getting students to explore and change their minds about the occupational world. These

43 Editors' note. In the early 1970s interest inventories were being attacked because they were presumed to reinforce an undesirable *status quo*, especially Social interests among women and Realistic interests among men. These were the most common interest categories for women and men, respectively. Under this interpretation, an inventory that promoted change from these common choices to other types of choice could be considered to be fostering exploration of non-stereotypic kinds of work—thought to be a good outcome. This paragraph implies an implausibly large change stimulated for the group served by the Self-Directed Search (60% versus 20% for the Group 1 control group). This is a preposterous outcome.

44 Prepared and printed at private expense—our allowances to be precise.

faultless, experimental results held equally for boys and girls with a few exceptions.

A comparison of the satisfaction levels of these three student groups also displayed gross differences paralleling the results for vocational aspiration. The SDS users were most satisfied, and controls were next, followed at a considerable gap by the students with involved counselors. Contrary to popular opinion, students appear to want skilled help instead of maudlin love. Some student responses appear to illustrate their concerns: Cary A. reports: "All my counselor ever did was read me poems or quote practical passages from his professional journal."⁴⁵ Charley R: "She kept repeating, "If you will only begin to communicate with yourself, you will see that being a plumber is beneath you." Or, Maybell Z: "Elementary teaching is for sexist kids, you're an electrician, if I ever saw one."

Practical Implications

Although this clear experiment is almost without flaws (just as poems, wise sayings, and professional advice or sermons have some subjectivity), several practical implications seem clear.

Use the SDS as the method of choice.

Reduce counseling personnel as soon as SDSs arrive from the publisher. One counselor, however, should be retained and given a desk in a corner of a small office, where he may serve as a scapegoat for teachers and parent who need *someone* to blame when they have a behavior problem with a child. The Really-True-Masochistic Test (RTMT) should be administered in order to identify the counselor who could best perform this function. All counselors will want this position; the decision to fill it with only one must be firmly adhered to.

Explore the use of other impersonal systems for performing counselor functions—writing poems, listening to weeping clients, etc. For example, writing bad poetry can be accomplished by any badly-programmed computer, or by a chimpanzee on an electric typewriter (given enough time). Listening to weeping clients could also be impersonalized by having the Disney people make a wax figure that looks like God, sits cross-legged on the floor, nods, and says, "I understand, I understand," every two minutes. If this is too costly, the chimpanzee on the typewriter could be trained to appear attentive (even as it bangs out a poem). Another inexpensive ploy would be to train a parrot to cock its head and keep saying, "Go ahead and cry, person, it's good for you." Students with really terrible problems would be allowed to take the parrot home at night

Perform comparative studies of the effects of reading books, journals, or the *Personnel and Guidance Journal*.

⁴⁵ Editors' note. In the 1970s the *Personnel and Guidance Journal* published poems, as subsequently did the renamed *Journal of Counseling and Development*. This passage mocks the journal's laughable practice. This burlesque of the confusion of poetry and compassionate interaction with clients with the provision of useful structure continues as this parody unfolds further.

**Letter from A. R. Pennypacker of Consulting
Psychologists Press to John L. Holland Regarding Travel
Expense Reimbursement, 1973⁴⁶**

February 22, 1973

Dr. John L. Holland
7013 Copeleigh Road
Baltimore, MD 21212

Dear Dr. Holland:

Enclosed are your expenses for the visit to SRA. Since Company regulations require its representatives—even including the president—to use the cheapest practical means of transportation, I have taken the liberty of reimbursing you for limousine fare in Chicago. No doubt the comfort, convenience, and sense of importance you obtained from being privately chauffeured were worth your additional cost.

Very truly yours,

A. R. Pennypacker
Comptroller

ARP:bb

⁴⁶ Editors' note. This letter transmitting a travel expense reimbursement made by Consulting Psychologists Press is purportedly authored by an A. R. Pennypacker, comptroller. Most likely, however, this letter was hatched up by Jack Black, CPP president and long-time Holland friend. The two men enjoyed engaging in persiflage. Based on a reading of the letter of reply from Holland to Pennypacker presented next, the refund evidently reduced the amount claimed for cab fare to the amount an airport shuttle would have charged. Note that in Holland's letter to Pennypacker, he refers in the inside address to CPP as Small Psychologists Press.

**Letter from Holland to Pennypacker in Protest of Being
Nicked-and-Dimed, 1973**

March 8, 1973

Mr. A. R. Pennypacker, Comptroller
c/o President John D. Black
Small Psychologists Press, Inc.
577 College Avenue
Palo Alto, California 94306

Dear Mr. Pennypacker:

I appreciate the expense check for my SRA visit. Since you have taken the liberty of reducing my cab fare, I have taken the liberty of charging you for my time—\$300 a day. However, since I was also working for myself, a check for \$150 will be sufficient.

Give my best regards to your president who incidentally persists in taking trains as a way to save money.

Sincerely,

John L. Holland
Director

JLH/ns

**Letter from Holland to the President of the University of
Minnesota Jocularly Complaining About David P. Campbell
(Drafted But Not Sent), 1973**

April 24, 1973

President Malcolm Moos
University of Minnesota
Minneapolis, Minnesota 55455

Dear President Moos:

I hate to burden you with one more problem, but as a former Hopkins man,⁴⁷ I hope you can help.

Recently I filled out an experimental inventory developed by one of your most prominent faculty, David P. Campbell. You probably know him as that “pink and blue” form sexist who gave you public relations problems only a year ago.⁴⁸

Well, he has done it again! He returned my profile in an unsealed envelope marked “Personal.” That phony cover did not prevent him from making snide comments about my vocational interest scores such as “chortle, chortle” for my high score in Investment Manager. My high score on President of University evoked, “You are just like ours, this test must have more validity than I ever dreamed.”⁴⁹

Surely the University of Minnesota must have a Committee on Human Subjects that you could refer this matter to. Whatever you do, I will continue to donate to the alumni fund, but such activities make me wonder what is happening to your faculty.

Sincerely,
John L. Holland
Director

JLH/ns

47 Editors’ note. Malcolm C. Moos had taught political science at Johns Hopkins.

48 Editors’ note. When a test is revised, it is a common practice to make the materials distinct visually from earlier forms. When Campbell revised the Strong, he whimsically selected pink and blue paper for the women’s and men’s forms, respectively, as most of the colors of paper he was shown by the printer had been used earlier or were unattractive. Campbell later referred to his paper selection as “the biggest psychometric blunder in history” (personal communication with Gottfredson, date not known). A burgeoning feminist movement was on the warpath about perceived sexism in interest tests, and the pink and blue forms were all that was required as a symbol of their ire.

49 Campbell was gibing Holland by remarking on high scores on scales reflecting Holland’s Enterprising personality type, and its interest in pecuniary pursuits. Other associates of Holland, noting his success with his theory and the new Self-Directed Search, also sometimes cracked wise in a similar manner, suggesting, for example that his personality code must be EEE). In actuality, Artistic, Social, and Investigative were more like it. So in this letter Holland is ridiculing Campbell in return.

Letter from David P. Campbell to Holland

March 17, 1977

Dr. John L. Holland
Department of Social Relations
Johns Hopkins University
Baltimore, MD 21218

Dear John:

Your blue and pink forms⁵⁰ have just arrived and I am writing to present my condolences for the trampling that you are about to receive.

I admire your whimsy; you have more endurance at this than I do.

Sincerely,

David P. Campbell⁵¹

DPC:vag

50 Editors' note. Gottfredson presented a paper at the American Personnel and Guidance Association meeting in March of 1977, reporting on the development of the seventh edition of the Vocational Preference Inventory. The research to develop the revision was largely stimulated by an effort to eliminate wording perceived to be sexist (e.g., substituting police officer for policeman) while preserving the validity of the inventory. There was only a single form of the VPI. But to provide a sight gag for the presentation, Gottfredson photocopied the VPI onto pink and blue paper. This was, of course, a reference to the pink and blue forms of the Strong which had drawn fire a few years earlier; the gag got a big laugh from the audience. Holland evidently sent copies to Campbell.

51 See the original letter on page 157.

Exhibits

DAVID P. CAMPBELL, Ph.D.
Vice-President, Research and Programs

March 17, 1977

Dr. John L. Holland
Department of Social Relations
Johns Hopkins University
Baltimore, MD 21218

Dear John:

Your blue and pink forms have just arrived and I am writing to present my condolences for the trampling that you are about to receive.

I admire your whimsy; you have more endurance at this than I do.



Sincerely,
David

David P. Campbell

DPC:vag

Letter from David P. Campbell, 1977⁵²

July 7, 1977

Dr. Gary D. Gottfredson
American Psychological Association
and
Dr. John L. Holland
Johns Hopkins University

Dear Gary and John:

Regarding your paper (with the Running head: Controversy), I think it is one of the clearest discussions yet of the problems. I have found it very helpful, and thank you for taking the trouble to do it and to send me a copy.

Some day we will look back upon all this and laugh, I think.

Sincerely,

David Campbell

52 Editors' note. The paper to which Campbell refers was subsequently published (Gottfredson & Holland, 1978; reprinted as Exhibit 5B in this section). Despite representing the authors' culminating proposal for resolving the interest-measurement gender-fairness controversy, the paper has been cited only 27 times as of 21 November 2019 according to Google Scholar, and only 17 of these citations are in English. This indicates remarkably low influence on a topic that consumed so much time and effort in the 1970s.

Letter from Holland to L. G. Hodell, 1979⁵³

May 25, 1979

Miss L. G. Hodell, Lecturer
Western Australian Institute of Technology
Hayman Road
South Bentley 6102
Australia

Dear Miss Hodell:

I found your letter about my theory, career education, sex role socialization and the law in the United States to be uninformed, insensitive, and offensive.

First, there is no evidence that my book or related devices reinforce “outmoded conceptual thinking.” To the contrary, the experimental evidence is that my ideas and devices have been liberating for females and males.

Second, the law (Title IX) omits any discussion of what words an author uses, because it “raises grave constitutional issues”—freedom of speech, etc.

Third, the theory (1973) has little to say about sex role socialization for the same reason that social status, race, geography, and many other socializing influences are also largely ignored. These influences, if internalized, lead to a person resembling some types more than others. My theory is not a social or religious tract, it is only an attempt to organize much (but not all) of what we know about careers.

Fourth, “modern career education” is a movement with more definitions than we have states. Depending on the definition, my theory is in, out, or maybe.

I enclose some reports that outline my views and some of the evidence. I don’t expect you to believe, but I do expect you to browse through these materials before you continue to assume that your views are correct and unassailable.

I have asked my publisher not to harass Western Australia with free books.

Sincerely yours,

John L. Holland
Professor

JLH:ags

53 Editors’ note. We do not know what letter from Hodell stimulated this letter or what had stimulated her to write it, and we do not recognize the name. Nor do we know what honorific Hodell preferred. But this testy letter reveals that Holland was weary of being attacked by self-appointed pundits who were ignorant about research that had been done, arguments made, and other matters related to the interest-inventory sex-fairness controversy. It is difficult to have a rational exchange of views with true believers who do not attend to one’s evidence and arguments.

Undated Form Letter Turning Down a Request⁵⁴

Dear Friend:

Some time ago, I made the reluctant decision to stop responding to requests to give advice or fill out forms or questionnaires. The need to do so became apparent when I found myself spending a lot of time helping others while watching my own work and research go down the drain. Although I am a slow learner, I finally saw what I had to do, and have decided to take care of my own interests now and pay less attention to the needs of others.

I hope you do not consider this letter to be arrogant, insensitive or irresponsible. However, if this is your impression, I have included a form, below, which will help you relieve yourself of your anxieties. You may also be interested in obtaining a copy of my luncheon talk, which I gave only once, entitled “The Prostitution of Talent.” This talk outlines my position in greater detail—so much so, you may adopt some of my strategies for simplifying your life.

Sincerely,

Check one:

- I think you are an arrogant, insensitive, irresponsible SOB.
- What makes you think your work is more important than mine?
- My time is one helluva lot more valuable than yours.
- I plan to adopt your strategy. Thank you!
- I plan to write your immediate supervisor and point out your negative public relations value. Please send me his name and address.

⁵⁴ Editors' note. The form is undated, probably circa 1980, and according to Holland's hand-written note on the copy it was used only once. In fact, Holland was generous with advice when it was requested by others. He regarded collegial support as a professional responsibility. That does not mean he always found it a pleasant task.

Letter to Thomas Magoon on the Occasion of Magoon's Retirement, 1981

March 4, 1981

Dear Tom:

I don't know where to begin my tribute to your friendship, scientific and administrative achievement, critical and creative thought, and occasional uninvited advice and insight. My task is more difficult than that of most of your colleagues. They have worked with you from 1 to 25 years; I have tried to work with you for more than 30!

Perhaps the best way to illustrate what your friends and I think of and feel about you is to sample some of our interactions over the years.

I will skip our graduate years together. They were short and uneventful—except for your critical comments about the nature of the instruction and how the counseling center was organized and operated at Minnesota.

My next recollection is from the year 1955. I was working at the Perry Point VA hospital and was developing the VPI. I was 37 and you were 39. Then, as now, I was desperate for a tryout of a revised VPI with a large *N*. Many promised assistance, but they rarely came through; others just moved away as I approached them at conventions or meetings. In contrast, you listened, said the VPI was a promising idea, and proceeded to try it out in a large sample of ever present Maryland freshmen. Perhaps they should be represented here tonight.

This early assistance is a vivid illustration of your concern for the work of others, your willingness to take risks, and your skillful help in shaping the intellectual products of friends and students. Critics are never in short supply (I should know), but assertive, problem-solving, and supportive people are.

Your generosity in other ways is not well known. Somewhere in the period 1956 to 1960, you arranged for me to work in an NDEA summer institute at College Park. This institute was organized so that the three out-of-town supervisors lived only to get back to their summer quarters (where nothing mechanical or electrical worked) where they could rest from your flaccid supervision. I remember one ageist thing we did (now illegal although it seemed like a good idea at the time). We had a counselor-teacher-trainee who was 64, or 1 year from retirement. Without hesitation, you said "Why not teach him to just listen and nod. It's a little late for any other kind of training." We followed your blunt but caring advice with considerable success. If we had had more time, we might have taught him to alternate nodding and listening.

I have a collection of other memories whose focus is your shepherding of

students toward my work. I occasionally resisted this help. If I wouldn't come to College Park, you dragged some to Baltimore. Your stimulation of those students and myself has led to, and continues to lead to, some first-rate research. The students got MA and PhDs. I received badly needed research news that I was unable to obtain and much encouragement to keep going.

Another vivid group of memories can be arranged around the development of the SDS. You were the chief personal stimulus for its initial form and for much of the shaping of subsequent forms. You badgered me in 1970 to prepare something vocational for the freshman orientation program. You arranged the tryout of the first form and the revisions thereof.

Your gentle words led to the title, "Self-Directed Search." You said my proposed title was "potty." I remember cringing. Bill Sedlacek has reminded me several times that he too was present in the naming session, but I don't remember his contribution. Nevertheless he should get credit for being present and for helping with the data collection and processing.

There is much more, but I was told to keep my letter short. My small sample of recollections is intended to represent your population of good works in my interests, in the interests of your students and of your contributions to your profession and university.

I thank you for them and myself.

Affectionately,

John L. Holland
Professor Emeritus

Letter to Frank B. Womer Agreeing to Do Workshops, 1981

September 29, 1981

Dr. Frank B. Womer
Bureau of School Services
School of Education
The University of Michigan
401 S. Fourth Street
Ann Arbor, Michigan 48109

Dear Frank,

I agree to do three one-hour workshops, and I will introduce myself if necessary.

I also agree to participate in the Meet the Authors sessions when I am not in a workshop.

On the other hand, I do not agree to attend Super's talk, the conference luncheon, nor will I communicate with participants in the restroom.

This will be a long day. I plan to go into training in the Spring. Might be useful to cut Super's talk to 30 minutes and use the time to give authors a break or two.

I can see that planning this event has been a chore. Good luck to all of us.

Cordially,
John L. Holland

P.S. Will you find me a room for the night before, please? March 16?

Letter to Robert D. Brown, 1982⁵⁵

29 March 1982

Dr. Robert D. Brown
Editor Elect
University of Nebraska-Lincoln
Educational Psychology & Social Foundations
31 Teachers College
Lincoln, Nebraska 68588-0440

Dear Mr. Brown:

My note is a comment on your letter of rejection to Aaron Pallas on March 8th regarding the article, "Test-Taker Evaluations of the SDS"

You are in good company. This article has also been rejected by JCP, MEG, and JVB. In no instance, did any journal find any technical flaws that we could agree with. Their letters of rejection were characterized by a long list of minor editorial complaints. However, your journal wins the prize; your list of excuses for failure to publish is the longest and silliest of all.

We would have appreciated a frank reply such as "my consulting editors didn't like this article."

Sincerely yours,

John L. Holland

JLH/sls

P.S. We are not entirely ungrateful. The earlier editorial suggestions have given the article a clarity and impact that the earlier draft lacked. Thank you.

55 This letter to the incoming editor of the *Journal of College Student Personnel* illustrates, among other things, Holland's irritation that it is difficult to get independent reviews of manuscripts and with editors accepting silly criticisms by reviewers. In the letter, he lists three more prestigious journals that had also rejected the manuscript.

EXHIBIT 3.4

NOTES, PAPERS, TALKS

This exhibit contains several documents Holland appended to his manuscript to illustrate his views about his theory and associated instruments. They span the interval 1962 to 1998. The earlier documents show Holland's thinking about his theory and theory in general when it was still a new development and had not yet become highly influential. Later documents were written when Holland had begun to use his theory to integrate a variety of assessments into a package organized by the theory. The documents near the end of this exhibit reflect Holland's reaction to come criticisms of his theory and reflections on how the theory and instruments evolved over time. Included are reminiscences about his early career and training at Minnesota, including remarks he made after his advisor, Jack Darley, died.

We had to use some judgment in sorting the material included in Exhibits 4 and 5. Holland had indicated in his notes that some items might appear in both places. We selected the location that seemed to be most logical. Also, some of the material that Holland had indicated should be included among the exhibits are published elsewhere and are easily available. We have omitted these published items, usually providing an abstract and citation to the sources. Finally, a few minor or cryptic items have been omitted.

Exhibit 4A. The Meaning of “Interests”⁵⁶

John L. Holland

National Merit Scholarship Corporation

Evanston, Illinois

The words “interests” and “vocational interests” are old and familiar terms in the working language of counselors, personnel workers, and psychologists. Generally speaking we have been able to communicate easily what we mean when we talk about vocational interests or interests. Over a long time, we have also acquired several popular methods for differentiating among kinds of interest. And, although we can communicate with one another, all is not well, or at least, it is my contention that all is not well. My talk is an attempt to examine our current definitions of interest, to indicate some of their effects upon research, training and practice, and to suggest an orientatin for redefining “interests” in a more productive way.

Traditional definitions. Historically, Fryer, Strong, Carter and others tried to conceptualize and define interests as habits, drives and motivation. Unfortunately, these early trials at definition failed to produce any general agreement. At the same time, these pioneers described certain *methods* for obtaining information about “interests.” For the most part, we have ignored their early conceptual definition of interests. So today, we have three popular definitions of interest: (1) Expressed interests, or what the person says he would like to do, or is interested in. (2) Manifest Interest, or what we observe the person doing: listening to music, collecting stamps, acting as a leader. And (3) Inventoried Interests—for example, the scale scores for the Strong and Kuder.

Effects of Traditional Definitions. Our traditional definitions have led to a series of both positive and negative outcomes. At this point, I will try to outline some of these effects which, I believe, show in our research, training, and practice. Let me turn first to the positive values of our traditional definitions of interest.

Historically, our definitions of “interest” and the closely related terms “vocational interest” and “interest inventory” have served to focus research and study on vocational satisfaction, vocational adjustment, and especially interest measurement. And, although a generally satisfying definition of “vocational interest” has not been obtained, we have developed a large body of eminently constructive and practical research about some important human behavior. This achievement is summarized largely in the volumes by Fryer, Strong, Super, and most recently by Darley and Hagenah, and by Clark. Traditional definitions have also served to keep us clear about the way we have obtained the information we call “interests.”

⁵⁶ Paper presented at the American Personnel and Guidance Association Convention, April 18, 1962, Chicago, IL.

The circular quality of traditional definitions—“interests” are what interest tests measure—has served to restrict the information we give to clients or students largely to that information which has substantial empirical support. Similarly, we have trained students to practice vocational counseling in the same way.

In short, a substantial body of knowledge has been developed and a large corps of personnel workers has been trained to transmit some of this information in a fairly direct way. This empirically dominated orientation has not, however, occurred without a price.

I would like now to outline some of the costs of those empirical definitions of interest; that is, the acceptance of methods of assessment as definitions, and later the tacit assumption that interests equal the Strong and Kuder scales. First, the lack of an adequate conceptual definition has led to a vocational interest literature which has only tentative and ambiguous relationships with the mainstreams of social psychology and the psychology of personality. Since we have relied heavily on interest inventories with their narrowly empirical scale interpretations to study vocational choice and vocational satisfaction, our research findings suggest that interests are related to interests or to other interest inventories. Such studies usually fail to suggest that “interests” are an expression of personality, personal development, etc., because interest scales have lacked “surplus” meaning or conceptual definition. The accumulation of many such studies has led to a relatively *independent* literature known as “interest measurement,” more specifically a summary of what we know about the Strong and the Kuder. And, although it is fashionable in recent years to say that interests are an expression of personality, just saying it doesn’t solve the problem, for we spent more than twenty years acting as if interests and personality were unrelated phenomena.

Second, the character of our research with interest inventories has tended to be repetitive, stereotyped, and frequently trivial. For the most part, we have emulated Strong and filled in the details of his pioneering contribution by studying the interests of new occupations, major fields, specialties within a given occupation, inventory reliabilities, etc. Unfortunately, at the same time we have performed little research that we can call “breaking new ground.” This development occurred too, I think, because we substituted the methods of interest assessment for conceptual definitions of interest. Darley and Hagenah (1955) expressed a similar belief when they wrote “We may have attempted to isolate the individual’s occupational life from his total life and life style. We may have given inadequate operational definitions to our terms and concepts. . . . We have been too much concerned with the empiric aspects of our problems” (p. 134).

Finally, traditional definitions have led to the training of students in operational, but circular interpretations of the Strong and Kuder. “Tell the student that he has answered the blank like a chemist or that he has scientific interests.” This

orientation is useful in conveying accurate information to the client, but it also provides a set of intellectual blinders for the counselor when he attempts to integrate interest data with all other available information. With this kind of training, the inexperienced counselor frequently sees interest inventory results as unrelated to his interview impressions, personality inventory results, since "interests" are thought of in vocational, almost non-psychological terms. In contrast, he sees most other data in more psychological terms. Our training in literal interpretations and a long research history of treating "interests" as "interests" have left our interpretative skills weak and atrophied. It is ironical that we become skilled at interpreting vague pictures with poor lighting or spilled ink, but we cannot easily interpret the explicit, concrete goals and preferences given us in interest inventories.

Interests as Personality. I would like to suggest now a redefinition of "interests" which for me at least, has been helpful: "*interests*" represent the expression of personality in work situations, roles, hobbies, activities, and preferences. Similarly, interest inventories are personality inventories; personality reveals itself in all facets of life and what we have called "vocational interests" is only one kind of information about the person. This notion has, of course, been proposed earlier by others, but what we have failed to do is to indicate explicitly *how* interests are an expression of personality.

Before I attempt this task, I would like to remind you of some of the many significant relationships which have been found to exist between interest inventories or expressed interests, and a variety of attitudinal, personality and background factors.

Expressed and measured interests are significantly related to vocational achievement, vocational choice, aptitudes, choice of major field, preferred role within an occupation, creative performance, identifications with parents and famous people, self-conceptions, ratings by teachers and others, personality inventories, socioeconomic status, father's occupation, mother's and father's vocational preferences, the TAT and Rorschach, sentence completion blanks, life history variables and experiences, educational aspirations, self-evaluations, daydreams, parental attitudes and values. Recently, Dr. Astin and I have been able to predict how college students will describe their faculty, fellow students, and their college "environment" by performing a census of students in the various major fields at a college. In short, we were able to do this by conceptualizing membership in a major field as an expression of personality. More recently, we have used this simple census technique to make more accurate predictions of student change and achievement in major fields over a four-year period. There is, then, considerable evidence that what we call "interests" and personality are only two ways of talking about personality.

I think interests can be construed as expressions of personality so that we can interpret our research, train others, and practice vocational counseling in more productive ways. You can perform this task in *many* ways. Let me suggest one way, as an example.

Over a period of several years, I have made a hobby of collecting evidence and ideas about the meaning of vocational interests. This summary you have in your hands represents what I think Welfare or Social Service interests mean in terms of personality, personal development, and achievement.⁵⁷ The empirical evidence was collected by using a homogeneous list of occupations assumed to be typical of what we call welfare occupations and by searching the literature for evidence about people with preferences for these occupations, full-time employment in them, or who are in training for these occupations.

These empirical data were used as a foundation for speculation about the possible meanings of what we call welfare interests. The theoretical formulations are the outcomes of this speculation. I have also prepared five other summaries to represent what I think are the remaining kinds of “interest.” These formulations are the outcome of a long series of data collections—speculations—new data—more speculation and so on. At this point, I am reasonably certain that these formulations possess validity.

The usefulness of such summaries seems multiple. They bring together much of what we know about interests in a relatively succinct way so we can use both this empirical and speculative information for interpreting interest inventories, integrating case data, for interpreting research results and for suggesting new research. Although these summaries need both empirical replication and logical clarification, they serve as a starting place. Whether we attempt to define and understand “interests” via statistical pyrotechnics, creeping empiricism, or some other method, sooner or later we have to come out from behind the data and attempt to give it meaning by saying what we believe or hypothesize. “Without speculation there is no good and original observation.”⁵⁸

Unfortunately, in our training of counselors and in our journals, we still tend to deprecate both speculation and theory so that our hunches and speculations about the possible meanings of interest are rarely communicated. Our academi-

57 Editors’ note. Evidently, Holland distributed a handout to the audience for this paper that summarized personality characteristics of persons with welfare or social service interests. We do not have a copy of this handout. This would have been a forerunner of the characteristics of the Social personality in his typology.

58 Editors’ note. Holland did not cite the source for this quotation in his paper, but it is recognizable. In a 22 December 1857 letter from Charles Darwin to Alfred Russell Wallace, Darwin wrote, “I am a firm believer that without speculation there is no good and original observation.” Page 465 in Francis Darwin (Editor). *The Life and Letters of Charles Darwin*, Volume 1, NY: Appleton, 1896.

cians and journal editors frequently foster a climate of correlate now, think later. As a result, we report publicly time worn, hackneyed hypotheses while privately we harbor many more insightful hypotheses that we communicate only to our immediate colleagues. The experienced counselor with a wealth of research ideas has no one to write to, or for.

To summarize, our troubles in interpreting interest began when we tried to define interests as largely what interest tests measure. As a result, we acquired an interest measurement literature which had no theoretical form and which became a kind of intellectual cyst in our psychological and sociological knowledge. As a remedy, I suggest that we regard “interests” as expressions of personality. Further, that we begin to speculate in wholehearted fashion *how* interests are a function of personality and begin to examine such speculations in experimental ways. Although we are beginning to do this, we need a more explicit acknowledgement of the value of speculation. Some of our current research efforts seem to be attempts to frighten meaning out of empirical data rather than to use our imagination. Finally, we ought to abandon “interests” as a term and substitute words with more productive connotations. “Interests” have in many ways failed to arouse much scientific interest.

Exhibit 4B: The Vocational Preference Inventory⁵⁹ A Tool for Personal Assessment, Theory Construction and Occupational Classification

In my brief talk, I plan to tell you what the Vocational Preference Inventory is, how it came about, and how I moved on to more important problems.

I feel compelled to tell you what the VPI is, because the users of the VPI rarely come to APGA conventions. The fact is, the other user couldn't afford Las Vegas.

First, what is the VPI? The present form of the VPI is a list of 160 occupational titles. These titles form nine relatively homogeneous and independent scales as well as a validity scale. It is usually scored by a single stencil rather than by an expensive machine or long needle.⁶⁰ The psychometric properties of the VPI are not spectacular: The 14-item scales have a median Kuder-Richardson 20 of about .80.⁶¹ There are no overlapping items and the highest correlation between any two scales is about .60. A series of studies to establish the validity of the VPI reveal that the scales usually measure what they are supposed to measure, but only to a limited degree, and that they have some predictive validity.

At the same time, there is no evidence that the VPI has more validity than any other interest inventory. But, it is a simple, brief, inexpensive inventory, which provides, I believe, some of the same information provided by more extensive and expensive inventories.

Although the VPI was developed more out of irritation with scoring delay

59 Editors' note. Holland's hand-written note on this manuscript indicated that it is a "Convention talk about 1975 in Las Vegas." A little detective work implies, however, that it was probably a talk given in 1969 at the American Personnel and Guidance annual meeting in Las Vegas. This is implied by clear references to APGA conventions and Las Vegas in the second paragraph, and by the references only to work completed before 1969 in the manuscript.

60 Editors' note. This is probably a reference to scoring using notch-edged cards, such as McBee cards. Such cards could be sorted on the basis of information contained along the edges of the cards by means of notches. Cards without a notch were left behind when a needle passed through holes retained cards without the edge cut. Holland's point is that the VPI is much easier to score than tests requiring complicated keys. At one time many psychological tests were scored by overlaying a "stencil" which might be index stock with holes punched to allow the counting of marks keyed in a scale or by transparent plastic "stencils" with the same purpose. Holland referred to the use of a single stencil because the items on the VPI answer sheet were arranged so that only one such stencil was required to score all of the scales. As a matter of fact, many users could score the test without the use of any stencil at all.

61 KR-20 is a relatively easy to compute special case of what has come to be called coefficient alpha for tests composed of dichotomous items. The calculation of KR-20 requires only information about the variance of the total score, the number of test items, and the sums of variances of the items. This coefficient is not often reported today because of the ease of calculating other coefficients.

than any formal plan to develop a better Strong or Kuder, I tried for many years to find ways to increase the reliability and validity of the inventory. After six revisions and listening to many psychometric soothsayers, I concluded that there is little to be gained by more revisions.⁶²

My discontent with the VPI and interest inventories began when I discovered in a study of Natinal Merit Finalists that a student's self-expressed vocational choice was more than twice as predictive as selected Strong scales. Later, using ACT data, I discovered a student's self-expressed occupational choice was twice as efficient as the VPI. This experience led eventually to the following resolution: Why not study student self-expressions more carefully and give up trying to prop up the VPI. Or, if simple studies of student self-expression are so useful, what might they become, if we actively studied such self-expressions? Somewhat later, I also concluded that it might be profitable to define personality types in my theory by self-expressions of occupational choice rather than by VPI scores. And still later, I assumed that the VPI might be useful for determining where particular vocational preferences or occupations belong in my classification.

This is where I am now. The VPI is simply a tool for assessing occupational membership or where a particular occupation or occupational preference belongs in a special classification system. And the theory of vocational choice is a way to interpret the meaning of occupational membership. These revisions in my thinking about the VPI, the classification and its closely associated theory, have led to recent attempts to build a better occupational classification.

My current goal is to revise my classification so it more closely resembles an ideal or scientific classification scheme. Without always knowing what I have been doing, I have developed a classification with several desirable characteristics.

1. The classification has a relatively explicit theory for interpreting what it means for a person or occupation to belong to a particular occupational category or subcategory (Holland, 1966).
2. The classification with its main classes and sub-classes organizes in expected ways a great range of information about persons interested in various kinds of work (Holland, 1962, 1963-64, 1964, 1968).
3. The main categories and their subcategories provide efficient predictions (Holland & Whitney, 1968).
4. The relationships among major categories can be interpreted by arranging the main categories in the form of a hexagon—relationships which are supported by much empirical evidence (Holland, 1968; Holland & Whitney, 1968).

62 Editors' note. Despite expressing this view in 1969, Holland did revise the VPI within only a few years, largely in response to emerging concerns about the use of non-gender-neutral occupational titles such as "policeman" as items (Gottfredson, Holland, & Holland, 1978).

5. The classification satisfies two of the three logical principles of classification: each occupation is classified in a *single* class. The principle for classification is always the *same* empirical procedure. (The average VPI scores for the Realistic, Intellectual, Social, Conventional, Enterprising, and Artistic scales are profiled and occupations are assigned to classes and subclasses according to their three highest scale scores.)⁶³ Currently, the classification lacks comprehensiveness because it deals with only a limited number of common occupations and major fields and it has no provision for levels of occupations.⁶⁴
6. Revisions or extensions of the classification require only the application of a single explicit principle—the testing of an occupational or educational group to ascertain their interest profile.

Most recently, Whitney and I have extended the classification based originally on four-year students by assessing a large sample of two-year college students with the ACT Guidance Profile, an educational and vocational guidance inventory containing the VPI and other inventories and scales. By sorting students according to their vocational choice and calculating the average VPI profiles for students with different vocational choices, we have extended the earlier scheme to the occupations aspired to most frequently by both two- and four-year college students. The keepsake which has been passed out is the outcome of this recent effort.⁶⁵

We have also been reanalyzing other people's longitudinal data to see if the classification produces better predictions (it usually does), and we have been looking to see if a person's movement from one occupational group to another is predictable (it usually is).

By this time, you may still wonder, why all this enthusiasm for a classification scheme. I am excited about my own classification because it appears to have unusual, practical, and theoretical potential. For example, the revised classification can be used:

63 Editors' note. Here Holland listed the scale names in RISCEA order, which was the order in which scales appeared in profiles before the incorporation of the hexagonal arrangement following discoveries by Holland and Whitney and analytical work by Cole—events which occurred around 1970. This RISCEA listing also places the date of this paper before 1970, not in 1975.

64 Editors' note. This statement, true in 1969, is no longer true today.

65 Editors' note. Evidently, Holland distributed a handout (the keepsake) at the session detailing the occupational-educational classification.

1. To provide a single classification for the scientific-educational study of student aspirations, field of study, occupational materials, first and subsequent jobs. In short, a person can be studied within a single, explicit theory of classification from the time he can express a vocational aspiration to the end of his career.
2. To provide a beginning for a theory of vocational education. Because the classification is based on a comprehensive theory, it seems useful to extend the theory to vocational education by exploring the implications of the theory for education.
3. To organize occupational materials in guidance centers and schools.
4. To form curricular clusters or to reorganize old clusters.
5. To suggest ways to motivate students in different curricula.
6. To plan extracurricular and work experience for students in particular classifications.
7. To show the relationships between curricula and occupations.
8. To provide a classification needed for computerized and computerless guidance systems. All guidance systems require some classification scheme.
9. To organize census data for clearer interpretation.
10. To organize educational and sociological research data for clearer interpretation.

To summarize, if vocational choices at various points in time are conceived of as a finite Markov process, the transition matrices will be diagonal-dominated. Or, people keep choosing the same occupations!

Exhibit 4C: A Theory-Ridden, Computerless, Impersonal Vocational Guidance System^{66 67}

John L. Holland

Center for Social Organization of Schools

The Johns Hopkins University

I would like to tell you about a vocational guidance system I developed this year. I will give you the device itself so you can try it out on yourself or a friend. I only ask that you keep any insights about yourself to yourself. I am not prepared to render help or to cope with any invasion of privacy ruckus.

Let me begin by a brief summary of the need for practical vocational guidance systems and services.

As always, there are not enough counselors to provide vocational guidance for all. And, well trained or not, the effectiveness of traditional vocational guidance is only fair. In addition, the traditional one-to-one relationship is expensive for the client and often wasteful of counselor time and talent. Finally, the computerized systems for coping with the great need for vocational guidance are usually expensive, frequently impractical, and often atheoretical.

The main goal in developing the Self-Directed Search for Educational and Vocational Planning (alias the SDS) was to develop a cheap, practical vocational guidance system having a high degree of scientific validity and client effectiveness. Among other things, my hidden agenda was to demonstrate that you can do something valuable without a computer and almost without funds.

Although I put the SDS together this year, I have been thinking about a device like the SDS for some time. Like some of you, I have been intimidated by my professional training so that I believed that helping others must be through personal relationships, that the good solutions lay in better tests, more information and its processing by computers, that the misinterpretation of tests by clients is more harmful than the misinterpretations by counselors, or the failure to give any help at all. And finally, that if you tell the client all we know about vocational

66 Presidential Address, Division 17, American Psychological Association Meeting, September 1970.

67 Editors' note. This is the first, or one of the first, public presentations about the Self-Directed Search when it was a new device. Here, we reproduce a drastically pruned version of Holland's paper. We have tried to preserve Holland's presentation of his intent, his playful approach, and his observations about his new "baby." Omitted are his citations to the research that led to the development of the SDS and all of the technical information about the SDS Holland presented. Those accounts can be found elsewhere, and the technical manual provides more up-to-date information about psychometric properties. Ellipses indicate where we have omitted material.

guidance, he will make poor decisions and commit self-destructive acts. At any rate, I found some ways to negate these beliefs and to find a solution by following some other paths and models. But first, let me describe the SDS.

Description

The Self-Directed Search (SDS) is a self-administered, self-scored, and self-interpreted vocational counseling tool. The SDS includes two booklets. To use the SDS, a person merely fills out the assessment booklet and obtains a three-letter occupational code. He⁶⁸ then uses the three-letter code to search for suitable occupations in the occupational classification booklet. Most people complete the SDS in 30 to 50 minutes. In short, the SDS provides a vocational counseling experience by simulating what a person and his counselor do in several interviews.

The typical person's experience in taking a psychological test is characterized by ambiguity (the person doesn't clearly know what is going on), dependency (the person is a passive participant), and delay (he just waits for results). The taking of the SDS is a different experience. When a person takes the SDS, he knows what is being assessed, he participates in his own scoring, profiling, and interpretation, and he gets the results of his self-assessment experience immediately.

The SDS has two main purposes: to provide a vocational counseling experience for people who do not have access to professional counselors, or who cannot afford their services, and to multiply the people a counselor can serve. For example, a counselor can concentrate on those people that this inexpensive service fails to help and act as the manager of the SDS system—its distribution, its coordination with other kinds of vocational service, and its evaluation. . . .⁶⁹

68 Editors' note. The present address was given in 1970, and the widespread adoption of gender-neutral language had not yet occurred. The text reflects usage at the time in which "he" was used in contexts such as this to refer to persons in general. The *Publication Manual* of the American Psychological Association in 1974 urged authors to be aware of a move to avoid the use of "he" when a more generic expression would be appropriate. In 1975 an APA Task Force on Issues of Sexual Bias in Graduate Education published "Guidelines on the Nonsexist Use of Language" in the *American Psychologist*, and APA issued a change sheet to the *Publication Manual* suggesting ways to avoid sexist language. In the present paper, Holland used non-generic forms that would not be used today. For historical accuracy, we made no attempt to bring the usage up to date.

69 Editors' note. Several pages including two tables describing the SDS in more detail and detailing results of research on psychometric properties are omitted here. More recent technical information has since been reported elsewhere, including in manuals for the SDS.

Evaluation

Although I am not capable of an objective evaluation of the SDS, I will give you my evaluation anyway, and you can provide your own corrections for my enthusiasm. . . .

Lacking a formal empirical evaluation, I will substitute an informal evaluation based on the use of the SDS with 5,000 University of Maryland freshmen, my neighbors, my friends, some inner city Black children, and the members of my own family.

1. About 50 percent of the people who take the SDS like it and are often enthused. The other 50 percent sometimes appear troubled when they don't receive the right answers. A clinical investigation is planned to learn what this outcome means. I see the dissatisfied 50 percent as the population that counselors should work with and the SDS as a simple way to identify that population.

2. The SDS appears applicable to a wide age range. Children don't find it too difficult and adults don't find it childish. One nine year old even wrote me a note about her experience.

3. The SDS has by its design several other desirable characteristics. They include:

Immediacy. Anyone can use the SDS whenever he wants to, and he does so with privacy.

Self-direction. Because the SDS is always controlled by its user, people enjoy the experience, and the learning experience cannot be marred by occasional and unavoidable conflicts with the test administrators, teachers, or counselors. In a sense, using the SDS is like a successful programmed learning experience.

Completeness. The SDS may be the first device to provide a relatively complete vocational counseling experience. In the SDS, the personal assessment, the occupational search, and the translation of the assessment, the occupational terms are contained in a single pair of booklets along with some ideas for some "Next Steps" for confirming or extending a person's occupational search.

Independence. Users are not dependent upon the vagaries of scoring services, computers, and appointment restrictions.

Personal development. Because of its desirable characteristics, the SDS lends itself to repeated use by students. Such a periodic stock-taking is consistent with a developmental conception of vocational counseling.

. . .

Exhibit 4D: Final Report of the Careers and Curricula Program

Contract No. NIE-C-00-3-0115

John L. Holland, Dean H. Nafziger, & Gary D. Gottfredson

Report No. 165

December, 1973

Center for Social Organization of Schools

The Johns Hopkins University

Baltimore, Maryland

Synopsis⁷⁰

This report summarizes the outcomes of a program of research carried out during the period 1970 to 1973. The general goal of this program was to organize and explain knowledge of vocational behavior from birth to death by exploring the usefulness of Holland's theory of careers, and to create vocational devices, plans, and systems to help people adapt more successfully to vocational problems. At the time of this report, the theory had been the subject of more than 120 empirical tests and had led to some practical outcomes: (1) a well-established theoretical typology for understanding and organizing occupational data, (2) a self-directed vocational guidance simulation (the Self-Directed Search), (3) a comprehensive occupational classification scheme, (4) a self-directed vocational guidance system (The Self-Directed Career Program), and (5) the stimulation of related devices, career materials, and research.

The following sections summarize these outcomes, the main research findings, and the practical applications. Other sections summarize the funds expended for this program and list its published scientific or vocational products.

70 Editors' note. This final report on a \$337,320 contract for the period May 1970 to November 1973 from the National Institute of Education, U. S. Department of Health, Education, and Welfare, summarizes the work performed, products produced, and personnel involved in work on Holland's program of research in the first three years following his arrival at Johns Hopkins. The full report is available in the Holland archive at the University of Missouri Library, and a copy may be found in the Milton S. Eisenhower Library at Johns Hopkins University. Here the editors synopsise the lengthy document. The full report lists complete citations, and it provides abstracts for all reports published by the program. Those details are omitted here. Research reports mentioned in this synopsis that were published in journals *after* the final report of the careers program was prepared in 1973 are cited by showing both the original date of the technical report and the date of journal publication.

The Theory

The theory used to orient the work of the program was proposed by the Principal investigator [John Holland] in 1959 in a journal article. This beginning was followed by more systematic presentations in book form (Holland, 1966; 1973). A summary of the theory at the present time is presented in the book *Making Vocational Choices: A Theory of Careers* (Holland, 1973, pp. 2-5).

As of 1973, the theory and its classification have undergone 122 empirical investigations, of which only 8 have yielded only negative data. Seventeen of the total 122 studies were produced by the present program.

Research Summary

The work and influence of this research program is summarized in four categories: (1) theoretical studies, (2) classification studies, (3) applied studies, and (4) related studies and influence.

Theoretical Studies

Six studies were performed, all with generally positive outcomes. Of these, one (Nafziger, Holland, & Gottfredson, 1973/1975) demonstrated that the hypotheses about the interaction of students and their college environments (major field) were sustained; that is, a student is most satisfied when his typological code resembles the code for his field of study.⁷¹ Another study (Helms & Williams, 1973/Helms, 1996) shows that the interaction of high school students and six simulated vocational environments (Krumboltz Work Kits) conforms largely to theoretical expectations.⁷² This elaborate, carefully structured experimental study was a large-scale test of nearly all hypotheses about person-environment interactions in the theory. In short, these studies lend strong support to the main person-environment congruency hypothesis and do so for large diverse samples of both sexes.

Classification Studies

Six classification studies have provided positive and useful information. Studies by Holland, Viernstein, Kuo, Karweit, and Blum (1972) and Viernstein (1972) indicate that the original occupational classification could be extended to every occupation in the Dictionary of Occupational Titles and that the psychological

71 Editors' note: Language usage has shifted since this report was prepared. Despite the now archaic use of the generic "he," both men and women were studied and the results apply to both.

72 In this experiment, high school students were assigned to experience simulated work environments by completing "kits" that had been developed to provide such simulations.

information upon which the classification was based also incorporated much objective job-environment data. Studies by Holland, Sørensen, Clark, Nafziger, and Blum (1973) and Nafziger, Holland, Helms, & McPartland (1972/1974) indicate that the classification can be used to organize and interpret the work histories of the average person as well as the work histories of more privileged groups (college students and professionals). A study by Nafziger (1973) shows that Markov chain analysis fails to improve upon the regular application of the classification. And the study by Nafziger and Helms (1973) reveals that when the interrelations among the scales of the Strong, Kuder, and Minnesota Vocational Interest Inventory are subjected to a standard clustering procedure, they produce a clustering of occupational scales that closely resemble the present classification. In short, the classification is supported by a wide array of subjective and objective data from high school, college, and employed adult samples of unrepresentative and representative populations.

Applied Studies and Products

The theoretical work has led to seven practical products and reports showing vocational counselors and practitioners how to use the outcomes of this program. These include three reports showing vocational counselors and others how to use the occupational classification to help students and to organize occupational materials or whole vocational systems. A report by Zener and Schnuelle (1972/1975) details a large-scale experimental evaluation of a vocational simulation device (the Self-Directed Search) developed by the principal investigator. The results of this and of a similar but smaller scale evaluation by Redmond (1972) are positive and generally unequivocal. The SDS works (has desirable effects upon high school students) as planned and has positive relationships with the Kuder Preference Record, Thurstone Temperament Schedule, and other tests which were assumed earlier (Holland, 1966). A report by Holland, Gottfredson, and Nafziger (1973/1975) summarizes the development and partial validation of a diagnostic system for tailoring vocational assistance to a person's particular vocational needs, and shows counselors how to use the diagnostic system in vocational counseling or to amend computer-assisted vocational guidance systems so that such systems are more sensitive to a person's vocational needs.

Aside from the theory itself and its classification scheme, the Self-Directed Career Program is perhaps the most important practical guidance device. The program was installed in a Baltimore City high school and achieved good results. *A Guide to the Self-Directed Career Program* (Holland, Hollifield, Nafziger, & Helms, 1972) is a manual that describes the system and how to implement it, evaluate it, and integrate additional common guidance materials. A maximum number was reproduced for distribution under the grant; then Science Research Associates

produced 3,000 copies without charge, because the SDC program advocates the use of SRA products as well as those of other publishers. At this time, users must secure the SDC manual through the ERIC system.

Related Studies, Reports, and Outcomes

The principal investigator has undertaken independently of this program, before this program, or concurrently with it, a number of other projects, tasks, or developments. In addition, other investigators have been engaged in trying out the same or closely related ideas growing out of the same theory.

The *Self-Directed Search*, published by Consulting Psychologists Press (Holland, 1970) simulates the vocational counseling process with a pair of booklets. The assessment booklet provides a structured self-assessment. The occupations booklet, executed in the same terms, helps a person see what occupational groups require people like him or herself. The first published account of the SDS was Holland (1971). An article by Cole, Whitney, and Holland (1971) provides information about the hexagonal model used to organize the classification, and an article by Campbell and Holland (1972) uses the constructs in the SDS to classify occupations in the Strong Vocational Interest Blank archives.

Making Vocational Choices: A Theory of Careers (Holland, 1973) is a major revision of the *Psychology of Vocational Choice* (Holland, 1966), and "Vocational Preferences" (Holland, in press/1976) is a handbook chapter on the same topic. In addition, talks disseminating results from the research program were given. And the research program and theory stimulated dissertation research at the University of Maryland, Teachers College Columbia University, as well as the development and evaluation of an Australian form of the SDS at the University of Melbourne, Australia.

Program Staff

Many individuals contributed to the research program over this period of time. They include, in addition to John L. Holland, the following people: Thelma L. Baldwin, Gary D. Gottfredson, Samuel T. Helms, Dean H. Nafziger, Leslie B. Schnuelle, B. Skellie, Keith F. Taylor, Mary C. Viernstein, and Gerald D. Williams.

Exhibit 4E: Vocational Guidance for Everyone

We offer this summary of an article that is published and readily available.

Holland published a scathing statement of dissatisfaction with the vocational assistance practices of schools, colleges, employment agencies and others in 1974. His statement was contained in the following article:

Holland, J. L. (1974). Vocational guidance for everyone. *Educational Researcher*, 3(1), 9-15.

Holland claimed, "Current vocational guidance services are generally expensive, impractical, atheoretical and ineffective, failing to reach most people who want and need guidance and often failing to help those who are reached" (p. 9). He enumerated the following deficiencies of services: (a) they reach a small fraction of those who could benefit, (b) the costs are high, (c) the cost/benefit ratio is low, (d) agencies providing services rarely respond to evidence, and (e) those who train counselors emphasize expensive traditional practices.

After explaining what he sees as limitations of existing information or guidance systems, programs for special populations, curricula, career education, and miscellaneous assessment devices, he goes on to fix blame for the then current state of confusion on (a) mistaken notions that counseling must be a personal process, (b) misguided claims that trait-and-factor approaches to counseling are static and outmoded, (c) a misplaced emphasis on vocational maturity approaches that have not proven helpful, and (d) other questionable ideas about the labor market and special groups.

Holland proposed that vocational interventions should (a) provide appropriate career materials or experiences prior to decisions and (b) organize or structure occupational and personal information into a scheme that is "coherent, comprehensible, communicable, effective, and researchable" (p. 13).

Exhibit 4F: Reducing Sexual Inequality⁷³

John Holland

Johns Hopkins University

I am a reformed male chauvinist. I am entering my seventh year of consciousness-raising treatments. I am not perfect, but I am still learning and recovering. I don't care much for some of my therapists, but I know that they are usually right, and that I must continue in treatment.

I regret that Blue Cross has declined to cover these treatments and some of my pain. I would like to take you through some of these experiences but they would take too long and would create a ruckus, because I still have an occasional evil thought. Like any ex-alcoholic, I have to avoid groups of males and pool halls where my old habits might be set in motion.

In 20 to 25 minutes, I will review some ideas about reducing sexual inequality in our society that grow out of the research on this topic. This is not the talk I wanted to give. I wanted to give my old tried and true talk, "My Life with the SDS" but your coordinator said everyone had probably heard it. As a result, I have had to put together a new talk as a part of my continuing enlightenment.

What is the Problem?

1. Segregation at work according to sex
2. Two kinds of segregation
 - a. Different levels of prestige and salary
 - b. Different kinds of work

What Are the Costs?

1. The denial of those satisfactions that money can buy? Food, shelter, clothing, status, self-esteem and indirectly mental health. (Level bias)
2. The denial of self-fulfillment, job satisfaction, and well-being when

⁷³ Editors' note. Speech presented at the Administrators Conference on Sex Equity in Vocational Counseling, May 18, 1979. The manuscript for this speech is in outline form. This is unusual, as Holland more typically prepared presentations in completely written-out form. The manuscript appears to have been hastily prepared, because there are some locations where the typist left an illegible handwritten word blank. There are also places where Holland simply indicated the ideas he intended to elaborate in the speech. We lack sufficient information to describe the organization or location of this speech more fully. Where we could, we supplied what is most likely a missing word in brackets, or clarified a cryptic expression.

a person must work at a job that is incompatible with one's talents, values and interests. (Kind of work bias)

3. Large proportions of stunted males and females who never were able to use their most valued talents or interests.

4. Some findings from a national survey on the Quality of Life for people aged 30, 50, and 70 suggest how the stereotyping of men's and women's lives results in some unfortunate outcomes. Men report that relations with other people (parents, brothers, sisters, etc.) are less important to the quality of their lives than the same relations are for women. Think of the costs to men and their relatives.

Another finding: Men report that expressing themselves in a creative way in music, writing, art photography, practical activities or in leisure-time activities is less important to the quality of life than these activities are for women. This need actually decreases from young to old age. Such a decrease does not occur for women.

These findings illustrate how our society distorts men's relations with others and discourages them from engaging in expressive and creative activities that might enrich their lives. Our society does other things to women, but I want to emphasize that sexual inequality affects us all.

How Does Sexual Inequality Come About?

There are more than 1000 research articles that document how our society shapes men and women so they march into different kinds of jobs and at different levels of pay and status—and typically with very little insight or protest. I have some good news. I will not attempt to review this extensive research. But, I will point out a few of the more vivid findings and trends.

1. The distribution of vocational aspirations (male & female) for
 - a. Preschoolers
 - b. Elementary school children
 - c. High school students

Resemble the distributions of [employment for the] male and female work force.

2. Schools are no better or worse than the society in which they are embedded. Male and female preschoolers arrive with very divergent vocational daydreams.

3. Many educational courses and training programs have provided (or still encourage) divergent goals for males and females. That is changing, but only slowly. In 1972, males and females were in [approximately] equal numbers in only 1 of 8 program areas in vocational education.

4. Unfortunately, there is also some evidence that we treat males and females differently *within* the same classroom. For example, Wirtenberg⁷⁴ points out that even female teachers discriminate by giving boys more attention and instruction than they do girls. Incidentally, observational studies of mothers and their babies indicate that they talk to male and female babies in different ways. I will not give you any illustrations of this divergent cooing. I have not reached that level of self-expression and freedom.

5. A Lou Harris poll in 1976 illustrates some of the more gross and vivid ways in which our society values males and females.

Question: "If you had a son and a daughter who were both good students, but you had enough money to send only one of them to college, whom would you send?"⁷⁵

	<u>Men</u>	<u>Women</u>
Son:	43%	36%
Daughter:	4%	5%
Oldest:	27%	27%

Other question: Hitting back if your son or daughter is bullied on the school bus?

Hitting endorsed at high rates for both boys and girls (61–72%) but higher for parents of boys rather than girls. (This may explain some of your school bus problems.)

6. Again and again, we are finding that sex differences, assumed to be innate by some, are turning out to be products of our culture or due to the differential treatment of males and females.

For example, the ability to solve problems involving spatial visualization is occasionally related to sex. Recently, researchers at Purdue University found this to be true for samples of college men and women. Men got higher scores. However, when the researchers divided males and females according to spatial ability and looked at the activities or experiences associated with high and low scores, they found that high scores were related to having more experience in activities that would be expected to develop spatial abilities: sketching house plans, using hand

74 Editors' note. Holland is most likely referring to the 1979 UCLA dissertation by J. T. Wirtenberg on sex-desegregated vocational arts classes.

75 Editors' note. These are presumably column percentages. It is unclear why the columns do not add to 100%; perhaps the remainder gave no valid response.

tools, making furniture, reading a map, using machine tools, weaving, etc. Spatial ability was related much more to experience in these activities than it was to being male or female.

This study is especially important, because it makes clear how differential experience can affect the development of a person's potentials. If you have not had a chance to try, you will never know what talents you may possess.

7. Finally, if you look at the norms for many ability and interest tests, you can see some of the outcomes of differential treatment. A simple example: When college women rate themselves on "mechanical ability" in comparison with "people of their own age," 89% rate themselves as average or below average. In contrast, only 30% of college men rate themselves as average or below average. The self-ratings of artistic ability favor females rather than males. Again, the force of the culture appears to show. These differential or preferential treatments and experiences lead to divergent enrollments in non-college and college training. Thereafter, the processes of discrimination are taken up by fellow workers, supervisors, employers, husbands, and wives. There is also substantial literature on the nature of these shaping experiences.

You can debate the correct interpretation of some of these studies, but taken together, the trends in more than 1,000 analyses provide a convincing picture of how sexual inequality begins in the home and is aided and abetted by the rest of society.

What Can We Do?

Introduction—learning from influence studies.

1. Encourage self and vocational exploration in students and in yourself.
Cognitive rehearsal.

Read some of the materials intended for students and adults. For example, *The School Guidance Worker*, Sept/Oct 1975 (Vol. 31). Number 1 has a whole issue "The Woman of the 1980s." It is also about men. Only 55 pages of brief articles and book reviews. I recommend it because . . . [Ellipsis in original]

2. Provide accessible, personal and vocational information.

3. Conduct some regular informal assessments of how your institution fosters or fails to foster sexual equality.

4. Remember that the achievement of equality is going to take a long time—don't give up after a few failures.

5. Finally, try to remain tolerant of the extremists on both sides; those people who don't believe that inequality exists and those people who want equality tonight. Somehow, we need to find our way to a more just society with a minimum of destructive, polarizing divisiveness.

Exhibit 4G: Some Recent Discoveries in Career Research and Development⁷⁶

John Holland

I have had many difficulties preparing this talk. I didn't like the conference director's suggestions; he didn't like mine. I wanted to give my standard talk: "My Life with the SDS." I have given that talk several times. It gets better every time. Your conference director recommended instead a scholarly lecture that could be recorded and perhaps published, such as "Theoretical Models of Vocational Decision-Making and Their Remote Applications." I told him that I would not enjoy preparing such a talk, and I wouldn't even enjoy listening to such a talk.

In the meantime, I had several occasions to give talks. I found that I was tired of my favorite talk. So I began thinking about a second talk. This one was called, "Vocational Explorations"—a report of some ongoing research. This talk confused and irritated a small group I tried it out on.

Finally, I decided to create a new talk by using only the presentable portions of the old and new talks. I call this *collage* of career research and speculation, "Some Recent Discoveries in Career Research and Development." This is a selective review of some striking research findings in the study of careers and in the evaluation of the many forms of career assistance. In short, or more accurately, in a long sentence, I will attempt to summarize what we have learned from the application of occupational classification systems to career data, vocational aspirations, and test data, *and* from the experimental assessment of the influence of tests, seminars, and counselors on students. Finally, I will spell out some of the implications of this new knowledge.

Now you are wondering if my talk will keep you awake. I'm worried too, but for a different reason. I rarely go to work before 10, and I sometimes quit early, when I become discouraged.

If things go badly, I have brought along a rejected research article, which I can give a humorous reading. Three journal editors thought it was humorous. I can also demonstrate a new assessment device that is age-fair, race-fair, sex-fair, and

⁷⁶ Editors' note. Holland's handwritten notation on this manuscript is, "An old talk about 1985?" The available manuscript is a photocopy with many handwritten corrections. Not all of these are legible. It appears that the typescript was a typist's attempt to interpret Holland's barely legible handwritten manuscript, because he manually corrected in pencil incorrect guesses about what he had written. The present version incorporates as many of the corrections to the draft made by Holland as possible. In a few places, we have indicated that material is omitted because it is not legible.

social-class fair. It has only two *minor* defects. It has no validity or reliability, but everyone enjoys taking it once.⁷⁷

Occupational Classification Systems and Typologies

I will begin with a summary of what we are learning by applying an occupational classification system and typologies to personal and occupational data. I will summarize the main ideas of this new knowledge in five, easily comprehended, generalizations.

First, there are probably only five to eight kinds of work in the world. True, there are thousands of different job titles, but multiple analyses by researchers with divergent techniques, biases, and data result in a limited number of similar categories.

These outcomes mean that we can organize occupational information in a relatively small number of categories. Consequently, occupational data can be stored, retrieved, and understood more easily than in the past. Students, counselors, faculty and researchers no longer have to have special training to use this information.

Second, it is possible to organize vocational aspirations and interest inventory scores into groups of five to eight categories. For some purposes, people are not indefinitely complex. These primitive schemes for characterizing people make a person's exploration of the occupational world a more manageable and satisfying activity. "A person like you might want to look into occupations like the following." The identification of potentially compatible alternatives has become a brief and relatively simple process—at least for many people, but not all.

Third, the application of classification systems to work histories usually yields patterns of stability or lawfulness. In plain English, there is a strong tendency for people to keep doing the same kind of work from one year to the next. Job titles may change, but the trail of jobs in a person's life usually spells out a theme of mechanical work, supervisory and sales work, artistic work or some other kind of work. Classification systems function to make the identification of themes or common denominators an easy task.

The pattern of stability or instability in a person's history of aspirations or jobs has some practical value. Chaotic patterns such as "I am considering becoming

⁷⁷ Editors' note. Here Holland is referring to what he sometimes called "Roll for Life." Jack Rayman, who is a woodworker in his secret life, had made a set of cubes with R, I, A, S, E, and C printed on the six faces. A roll produces a random Holland code with no reliability and no greater-than-chance validity. Holland may have used these dice to impress the audience (who may not have had sufficient statistical sophistication to get the joke). It is not possible to be sure from the manuscript that Holland rolled the dice before the audience—but it most likely did occur.

a business executive, musician, educator or chemist” are often associated with an unstable career history and accompanied by less satisfaction and achievement. In other work, we are finding that people with divergent career goals are more apt to lack a clear sense of identity and to profit more from the more elaborate forms of career assistance.

Fourth, different classifications yield *similar* results when they are applied to the same data. The *American Dictionary of Occupational Titles*, the *Canadian Dictionary of Occupations*, the McCormick Position Analysis [outcomes], the Minnesota Occupational Classification and other systems have much in common. All is not lost in social science! It is also reassuring to know that one or more of these schemes has been applied to the aspirations *or* work histories of representative and non-representative samples ranging in age from 7 to 70 and that similar results are obtained.

Finally, the organizing properties of classification systems can be used to devise assessment devices, to estimate change in employment patterns in the United States, to devise personnel classifications and to interpret group data. For instance, I tried to estimate the distributions of occupational types who would be here today. From these estimates, I tried to cast my talk in terms that would appeal to the dominant types: Social and Enterprising types. If I were to give this same talk to a group dominated by Investigative types, there would be little humor, more numbers, and more doubts and worries.

Vocational Aspirations and Intentions

The recent classification work has also led to a reexamination of the meanings and value of a person’s vocational goals. Less than 10 years ago, most professionals regarded a person’s intentions such as “I want to be a social worker” as interesting but unreliable talk that must always be reexamined with a more reliable psychological device—preferably one that must be scored by a machine. Many studies now make it clear that a person’s self-expressions of vocational intention (when categorized by almost any classification scheme) are a relatively efficient index of what a person may do. In addition, a person’s vocational aspirations can serve as a useful vehicle for self-assessment and self-understanding.

I would like to summarize three main findings about the *virtues* of vocational aspirations.

First, the *category* of a person’s vocational aspiration is an efficient forecast of the *category* of future job or future aspiration. For example, if a student aspires to chemistry, it is likely that he/she will still be in some field of science 4 years later. Or, if a person is currently employed in sales, the odds are high that he/she will be in the same, or a closely related field, such as administration, five years later.

Second, vocational aspirations are usually as *predictive of future job* as any interest inventory is. Studies of high school and college students for periods of 4 to 11 years reveal that a student's aspiration is as predictive of field of work as a student's interest scores. These results now hold for five popular inventories with divergent characteristics and origins.

Third, *very efficient* predictions can be obtained by using a student's aspirations *along with* an interest inventory. For example, if a student aspires to education *and* the inventory also indicates education, then predictions in the 70 to 85 percent range have been obtained. About as effective as the Salk vaccine.⁷⁸ In contrast, when aspiration and inventory imply divergent alternatives, the efficiency of both aspirations and inventory drop to only 20 to 35%!

These and related findings have several clear implications: Treat a person's intentions with respect and become more skeptical about test results. Learn to code and interpret vocational aspirations as well as you are able to interpret inventory profiles, letters of recommendation, student papers, or your favorite diagnostic technique. And, learn how to integrate aspirations, test scores and personal histories.

...⁷⁹

Influence of Personal and Impersonal Forms of Vocational Assistance

Now I want to talk about another kind of research—the influence of counselors, career programs, tests, workshops and other interventions.

Ideally, we need a clear knowledge of what kind of vocational service will be most helpful for what kind of student so we could tailor services to student needs and could reduce some of the anything-and-everything goes activity. A better knowledge should also lead to more cost-effective services.

At this time, more than 100 studies are concerned with the effects of vocational treatments. I won't review these experiments in any detail (that's the good news), but I will summarize the main findings and spell out some of the implications.

78 Editors' note. This sentence is a penciled in addition to the typescript. It is not what we regard as a well-considered statement. Holland is probably referring to the results of an early effectiveness trial of the Salk vaccine (Francis, T., Jr., Korn, R., Voight, R., Boisen, M., Hemphill, F., Napier, J. et al. (1955). An evaluation of the 1954 poliomyelitis vaccine trials: Summary report. *American Journal of Public Health*; 45(supplement), 1-50), which reported 80% to 90% effectiveness in preventing paralytic polio. This is, to say the least, an apples-and-oranges comparison with a prediction of subsequent vocational category.

79 Editors' note. Holland had added a penciled note that is completely illegible in the available poor photocopy. It appears to be about a sentence in length.

These experiments usually entail the following general plan. Students are assessed for their current vocational aspirations, satisfaction with their choice, degree of decidedness, degree of self-understanding, or related ideas. Then students are assigned randomly to different experimental treatments (take an interest inventory, see a professional counselor, use a vocational card sort, or receive some other treatment). Finally, after the treatment—either immediately or at intervals up to three months later—students are again polled for their vocational aspirations, ratings of the treatment, information-seeking or job-seeking activity and related criteria.

The *first group* of experiments has been concerned with evaluating the effects of career-programs, tests, and counselors in a wide range of high school and college populations. In general, these studies have revealed that it is possible to find some evidence for the beneficial influence of almost any vocational intervention: counselors, interest inventories, career courses, career education programs, vocational card sorts.

Next, a *second group* of experiments has been performed to estimate the *relative* value of some of the more promising treatments discovered in the first group of evaluations. These new experiments involved the comparison of the effects of different interest inventories (3 times), the comparison of unstructured treatments (like the Vocational Card Sort) and structure treatments (interest inventories). And, much to everyone's surprise and dismay, none of these comparisons result in a clear victor for anyone's favorite ideas or treatment.

Undaunted, researchers moved on to a third group of experiments I call these "piling it on" or "additive" treatments. You take two or more treatments and apply both to students. These experiments have included adding two interest inventories together, adding a card sort to an interest inventory, or adding an interest inventory, a group session, and a counselor together. Generally, these combinations have no more effect than a single treatment, or one vocational aspirin is usually as good as two are.

In another group of studies, researchers have turned to more *analytical* experiments. In six different experiments, they discovered that revising the directions for an interest inventory, using machine or self-scoring, providing more or fewer vocational options did not result in more or less beneficial outcomes.

These analytical investigations have led to three experiments that advance our understanding. In one experiment, high school students were polled for their *expectations* for the interest inventory that they were about to take. Both females and males indicated that they wanted most of all "reassurance" about an aspiration they already had. "Wanting more alternatives" ranked well below this desire. High school girls wanted more or fewer options to about the same degree. Boys wanted fewer options rather than more. In this same investigation, we found that students

with a clear sense of identity rated the helpfulness of the interest inventory higher than did students with a diffuse sense of identity.

In two related experiments, researchers found that college students who appeared most confused in their vocational decision-making *gained* the most from elaborate career workshops. In contrast, college students with a relatively clear sense of identity and few decision-making difficulties reported more benefited from informational activities (using the DOT, OOH, talking to faculty and employers).

Finally, several recent studies are very encouraging. Studies by Rayman et al. (1983) and by Ware (in press) indicate that career courses can have *substantial* impact on a college student's vocational identity. These investigators report gains in vocational identity that range from one to three standard deviations! Such courses use interest inventories, values clarification, lectures on career theory, case studies, employer contacts, and so on.

Of special importance, a comprehensive review of individual and group interventions by Spokane and Oliver (1983) suggests that *group* vocational interventions have more influence than *individual* or one-to-one forms of career assistance. And, because group interventions are more cost effective, they appear to be the treatment of choice for most people.

Now I want to suggest some interpretations of this work. Taken together, these experiments imply that the beneficial effect of vocational interventions are due to the *common* elements present in divergent inventories, workshops, courses, and related treatments. These *common* elements include (a) exposure to occupational information in career materials and tests, (b) cognitive rehearsal of vocational aspirations in the process of filling out inventories and talking to counselors or advisors, (c) the combination of occupational information and rehearsal probably stimulates conceptions of occupational structure and self-understanding. These events seem likely because the average student knows very little about the occupational world so that a small amount of new information makes a big difference. And (d) counselors, groups, inventories and other interventions are a source of emotional support as well as information.

Of special importance, our general failure to find different effects for different treatments may occur because the success of a treatment depends on a student's expectations for that assistance and sense of identity. Also, some counseling experience suggests that students wish to invest different amounts of effort and money in their vocational planning. Our ideas about student needs, and student ideas about their needs, often *diverge*.

Practical Implications

The practical implications of this new knowledge and my speculations about this new information are controversial, but I offer these ideas to stimulate a discussion and evaluation of your advising and career services. I have organized these ideas around some key questions.

Are you exploiting classification systems? Any one of several occupational classifications can be used to make student exploration easier, cheaper, and more understandable. Classifications can be used to organize field of study, part-time job exploration experience, and the relation of field of study to subsequent occupations. Students find brochures that show the relation of field of study to occupations reassuring and helpful.

Are you exploiting vocational aspirations? Do your counselors listen for clarity or confusion? Do they stimulate the rehearsal of student plans? Do they show interest in these plans? Or, are tests and inventories considered more important?

How are your advising and career services distributed in your school or on your campus? Is there a wide range of divergent services or programs, or are students forced to use one or two standard programs? What is the fit between the distribution of student vocational needs and the distribution of services? Are they convergent? Are student information and counseling services accessible or must students pass through multiple professional barriers such as appointments, unnecessary supervision, etc.? Is a concerted effort made to match student expectations with vocational services, or has it been assumed that the present services do not require reevaluation? Is it possible for students to self-select the vocational service they would like to try? . . .⁸⁰

Finally, I would like to emphasize the need for more evaluation and critical thinking. At the present time, we have an abundance of programs and ideas for helping students. At the same time, we have very little evidence about the actual effects of these treatments. As a result, practitioners and administrators must select materials and develop programs with very little concrete evidence to guide them.

Although it is unreasonable to expect every institution to conduct complex and comprehensive evaluations of every program or service, there are many useful alternatives to these evaluative Hollywood productions. For instance, students can be asked to rate the usefulness of materials and programs. Practitioners can conduct simple inventories to assess the popularity and usage of materials and programs. Likewise, practitioners and advisors can encourage better evaluations by asking authors, publishers, and other entrepreneurs more pointed questions.

80 An illegible penciled insertion (probably another short question) is omitted here.

“Show me the evidence that our product helps students!”

Unless we do more counting, evaluating, and thinking, our collective ability to help students will not improve much. The job of evaluation and critical thinking is too big and too important to be left to a small group of researchers, authors, and publishers. In addition, these preliminary evaluative studies will help us take the next big step—why do some programs work better than others do? Satisfactory answers to this question will make it possible to create services that are more useful.

Exhibit 4H: My Life with the SDS⁸¹

I had many difficulties preparing this talk. I didn't like the program chairman's suggestions; he didn't like mine. For instance, he wanted a scholarly talk that could be recorded and published such as "The Role of the Career Counselor in the Resolution of Contemporary Problems." I told him that I could not prepare such a talk, and I wouldn't care to listen to a talk like that. It's bad enough giving talks; it is worse listening to them.

We worked out a compromise. I proposed that a revision of an old talk—"My life with the SDS"—would cover both his interests and mine. In it, I summarize the side effects or unexpected outcomes of living with the development of the SDS. Put another way I will run through a medley of problems, experiences, developments, and ideas that were stimulated by the development of the Self-Directed Search.

This review of my experience with data, counselors, critics, academics, and others will expose my paranoia in full bloom. But I feel comfortable doing so because someone else at this convention is talking about "inner voices." I may hear voices, but I have enough sense not to talk about them.

Goals and Origins

The main goal in building the SDS in 1970 was to provide a useful career counseling experience that was both helpful and inexpensive. At the same time, I had a lengthy hidden agenda: the elimination of scoring keys, answer sheets, psychometrists, and even some other inventories. I am indebted to the Office of Education, the National Science Foundation and the Carnegie Corporation for *not* sponsoring the development of the SDS. No one except my publisher expressed any enthusiasm for this idea. Last but not least, I wanted to acquire a high quality piano. On a good piano, both mistakes and technical exercises have a satisfying sound.

81 Editors' note. Talk presented at a National Career Development Association Luncheon, Cincinnati, March 17, 1990. Holland presented a number of talks on this general theme and with some variation of the self-deprecating introduction (which readers may recognize from other items reproduced in this volume). The talk evolved over time—improving somewhat with practice. This is a relatively late version. Holland explained to one of us (Gottfredson) that Stalnaker (who had been president of the National Merit Scholarship Corporation where Holland was in charge of research early in his career) had advised him that if he gave the same talk repeatedly, he would acquire a reputation for giving that talk. That reputation may have been part of why Holland was invited to give this luncheon address.

Early Editions

The publication of the SDS in 1970 resulted in a long string of interesting problems and solutions. Some problems began before publication. It took 15 revisions of the self-scoring instructions before scoring went smoothly. We also re-discovered what everyone else knows: many high school and college students and working adults cannot follow directions, nor can they accurately multiply by 2 or 3.

Consequently, we created another simplified edition in 1977, which eliminates all multiplication and graphs, but unfortunately, a user must occasionally be able to add to 30 or 40. The publisher then established a scoring service in 1986 for people with that deficiency.

As always, I got other complaints. A few counselors reported, "The SDS is not really self-directed." So we developed the Self-Directed Career Program. The SDC is a systematic collection of directions, paper booklets, and occupational materials, which can be placed on a table in a library, office, or hallway so that people can use the SDS with more resources and fewer difficulties. This program was a magnificent failure. Don't try to order one. The last two copies are now in a psychological museum.

Another person complained, "My brother who is 17 but reads at the 6th grade level cannot take the SDS." So, we developed form Easy, or Form E, in fourth grade language. After six revisions, average 4th and 5th graders could usually get through the SDS without supervision.

Over the years, I also learned about the reading habits of professionals. For example, a counselor in Minnesota asked, "Do a person's vocational daydreams have any validity?" I said, "Yes, they do. It's all in the manual." He said, "There's a manual?"

A prominent counseling psychologist wrote me a flattering note about a manual that I had given him 3 years earlier. I thanked him and said, "Why are you reading the manual now?" "I have to prepare a book chapter about interest inventories; I avoid reading manuals otherwise."

I have proposed two solutions to get professionals to read. Both were rejected. One was to have my publisher offer a substantial reward for finding a planned error in a manual. The other was a test standards proposal that would require the reading, or browsing through, the test manuals one used in daily practice at least once every *ten* years. This idea was rejected without discussion.

I forgot to mention that the first article about the SDS was rejected by an editor of the *Personnel and Guidance Journal* who, after hearing my talk at the APA, said, "It's just another gimmick." I was hurt until I remembered that another editor had said much earlier that the Vocational Preference Inventory was just "a

collection of expressed choices.” These encounters led to a new saying. “Beware of mature people bearing professional wisdom.”

Influence Research

Along with these niggling problems has come some exciting news. Twenty studies from 1973 to 1983 of the influence or effect of the SDS on the test taker indicate that the SDS usually affects people in positive ways. The string of experiments, initiated by Thelma Zener and accelerated by the sex bias controversy, beginning about 1973, was helpful in several ways.

These studies give a clean bill of health not only to the SDS, but also to a few other inventories that were studied in similar experiments. These studies also implied that different inventories, constructed in different ways and interpreted with different materials, had similar positive effects. Equally important, two investigations show that the SDS is as effective as a vocational counselor is—at least for some purposes. (Even I didn’t expect to achieve a tie.) And, a cost/benefit analysis by Krivatsy shows that counselors cost nine times as much as the SDS in achieving the same goals among college students.

I interpret these results to mean two things: (1) We still need counselors, but counselors should reconsider and perhaps reallocate their time in dealing with different client problems. And (2) if this first pair of booklets, designed only to imitate the simplest kind of vocational help, works—what might happen if we put our minds to the solution of more complex vocational problems?

The next step was the preparation of a booklet called, “The Paper Guidance System” (PGS) developed to help people whose vocational decision-making difficulty fails to yield to a cheap intervention. The PGS appeared to be helpful for the three people who managed to get through all the exercises. I suppose I should have listened to my wife, who, as she typed the first draft said, “*Nobody* is going to do all of these things.” Not to be outdone, I amended the directions to read, “Do as much as you can.” I also abandoned my plan to finish the “Paper Placement System.”

These paper experiences, my experience as a career counselor and as a supervisor of computers and scoring machines have led me to a somewhat deviant perspective about vocational problems and their solutions. In the remainder of my talk, I would like to outline why we have been unable to provide career assistance to everyone who needs it, and to suggest some ideas for improving the quality, and reducing the cost of career assistance for students and adults.

Common Misconceptions and Straw Persons

Career counseling practice and research are weakened by numerous misunderstandings, meaningless questions, and misguided forms of humanism. I would like to clarify or dispense with two of these barriers to better knowledge and higher quality service.

“Counseling Must Be Personal.” The counseling and teaching professions attract a large proportion of friendly people who must love and be loved in order to get through the day. Consequently, they believe that other people also must have the same needs with the same intensity. As a natural corollary, these groups also believe that any form of vocational intervention must provide for a person-to-person situation. These beliefs have prevented any major revision of the delivery system for career services. Some experience and some recent experiments strongly imply that most people want help, not love. In no case has an impersonal information or guidance system received a lower average rating than have local counselors. Most evaluations reveal that impersonal schemes are highly rated by clients, are cheap, reach many people, and can be made available seven days a week.

“Trait and Factor Approaches are Static and Outmoded.” In their rush to illustrate that vocational decisions depend, in part, upon a person’s life history, the career development crowd had to belittle the “matching model” or what personal traits or factors go with what jobs. Because many people are uncritical thinkers, they continue to mouth this meaningless battle cry. The facts seem clear—nearly all of our most useful vocational assessment devices, classifications, and simulations rely upon well-established matching models. The developmental strategy has been slow to produce useful tools. The more prominent tools include occupational knowledge tests (although a person’s intelligence or social status are good estimates of occupational knowledge) and vocational or career development measures, whose practical value remains in doubt. Until the developmental strategy produces more explicit validated plans for the introduction of vocational interventions, a heavy reliance upon the matching model is still warranted. And when the developmental strategy does imply a specific group of interventions, it should be carefully integrated with the matching model so that the virtues of this older and more established model will not be lost in the name of progress.

The “Getting Down to Cases” section in the *Career Development Quarterly* provides some vivid illustrations of what I have been trying to say. These vignettes emphasize the clinical skills of the practitioner and neglect sources of studied information (inventories and tests). Likewise, the chief treatment option appears to be talking with the counselor, but little interest is expressed in group treatments, bibliotherapy, or tests and inventories as informational treatments and as sources of diagnostic information for both the counselor and the client.

For instance, one career counselor writes, “I would not administer any paper and pencil assessment instruments. . . . I would ask the client about those Holland environments he is interested in.”

Why not rely on the SDS or one of its clones and some interpretive materials—even portions of relevant books? In short, the selective use of printed materials can provide valid information and relieve counselors of unnecessary and time-consuming activities.

This shift to great confidence in one’s clinical skills and away from confidence in other treatments or assessment tools is typical of the vignettes in the “Getting Down to Cases” section. Some shifting makes sense because inventories and tests have had at times an undesirable influence, but to start over with only one’s unstudied clinical skills appears equally undesirable.

More Desirable Professionalism

Now I want to outline some ideas for a more responsible, sensitive, and productive agenda for career counseling practice and research.

First, we should work harder to establish cafeterias of services rather than relying on one-to-one counseling for all career problems. If we hope to reach all segments of the population rather than a privileged few, we need to exploit group treatment, paper treatments, and any technique that helps. As it is, we are on our way to serving the same populations served by clinical psychologists, psychiatrists, veterinarians, lawyers, and so on. In short, rich folks.

Second, we need to revive and redirect our research agenda, if we hope to serve everyone, and if we hope to survive the competition. Other professionals and nonprofessionals have walked into the career field, because counseling psychologists, academic psychologists, educators, and other academics have ignored or deprecated the need for outstanding research and practice in this field.

Although treatment evaluations are hard to summarize and publish, there is a great need to sort out the value of different treatments and to explore more persistently the question of different treatments for people with different vocational problems. We should be able to develop more treatments that are effective. Career counselors in and out of private practice are often in ideal situations for such studies. Someone should explore the possibilities of cooperative research among solo practitioners.

We should focus on our strengths and central problems not on our weaknesses and peripheral problems. Case in point, I don’t think we need to counsel people about “pet loss” as a recent journal article suggests. I have lost four dogs and three cats over my lifetime. Upon their death, my grief was usually brief and uneventful despite the fact that I like animals more than I do some people. Researchers might

acquire more valuable and helpful information if they would explore some of our embarrassing findings. In one evaluative study of a career course, Evans found that filling out a simple form about a student's vocational aspirations was rated more helpful than taking an interest inventory. In one of my own career seminars, talking to me was rated lower than most of the variegated treatments offered in the seminar. I call that an unexpected finding; you might call it an expected finding.

Perhaps the most promising new inventory is the Career Beliefs Inventory by John Krumboltz. The inventory takes stock of a wide range of beliefs that interfere with career decision making. It can be used as a diagnostic tool for individuals or as a pioneering research tool.

Finally, we need a more involved, critical, and intelligent consumerism. Weinrach's (1987)⁸² extensive and gentle evaluation of the workings of the AACD and its journals is a helpful and humorous beginning. I don't know how it happened, but the counseling field appears to have moved from a hard headed and critical view of new ideas to a gullible acceptance of untested ideas. Despite the new philosophy of science, evidence is still considered helpful.

Now What?

I hope my talk has stirred you up. Like you, I am also appalled by the work I have outlined. At the same time, I plan to engage in "little wins"—picking out some little piece of a big problem.⁸³ For me, it consists of renovating the SDS one more time, revising my theory a little, and perhaps doing some more evaluative studies.

The side effects of the SDS are continuing in other ways. I did get a high-quality grand piano in 1980, and my piano teacher is now on a yearly retainer to lessen check writing. I sometimes believe music is more important than research. I have also lost interest in being a consultant, *but* if you know of anyone who would like a luncheon speaker to talk about "Editorial Encounters"—one of my talks your program chairman turned down, I would like to hear from you. In that talk, I document through my correspondence with editors that editors exhibit the same human weaknesses that authors exhibit from time to time—bias, pettiness, and self-interest among other qualities.

82 Editors' note. Weinrach, S. G. (1987). Some serious and some not so serious reactions to AACD and its journals. *Journal of Counseling & Development*, 65, 395–399.

83 Editors' note. Here Holland appears to be referring to an important article by Karl Weick titled, "Small Wins: Redefining the Scale of Human Problems," that appeared in the *American Psychologist* in 1984, 4, 40–49.

Exhibit 4I: Separate But Unequal is Better

Holland included among the materials to be appended to his autobiography a paper titled “Separate but Unequal is Better,” in which he argued against trying to merge disparate theories of career development.

He presented the paper at the Conference on Career Theory Convergence held at Michigan State in 1991. It advises against cluttering up theories with incompatible or contrary assumptions and aims. Holland wrote it in the context of a conference that had been organized to find ways to merge, concatenate, or converge several different theories of career development.

A reviewer noted that some persons in the reviewer’s graduate counseling seminars, upon encountering the title of this paper, initially emotionally equated the title’s words with the discredited “separate but equal treatment” doctrine for racial groups. It is easy to see how this could occur, because the separate but equal doctrine represented by the 1896 *Plessy v. Ferguson* decision of the U.S. Supreme Court was used to justify Jim Crow practices, and the term itself continues to have currency in that context. The 1954 *Brown v. Board of Education* decision of the Court overturned *Plessy v. Ferguson*, but its vestiges linger.

Holland did not intend to connote that different groups require different theories. On the contrary, the title is a reference to an article written by a criminological theorist (Travis Hirschi) who had recently written an article objecting to other criminologists’ (Elliot, Ageton, & Canter, 1979) efforts to combine Hirschi’s *social control* theory of delinquency with other theories of delinquency. Like Holland, Hirschi wished to argue against what he regarded as flawed theorizing. His article had nothing to do with racial groups. On reading a draft of Holland’s talk, one of us (Gottfredson), who is a criminologist and had been impressed by Hirschi’s article, gave a copy of it to Holland. Holland then adopted the title of Hirschi’s criminological article for his career theory talk. Holland explicitly noted this origin of his title in his article.

The paper was subsequently published along with other proceedings of the conference:

Holland, J. L. (1994). Separate but unequal is better. In M. L. Savickas & R. W. Lent (Eds.), *Convergence in Career Development Theories* (pp. 45-52). Palo Alto, CA: CPP Books.

Because the published version is easily available, we just include a brief summary here. A link to a video of this conference presentation by Holland is included in Section 6 of this book.

Summary of “Separate But Unequal is Better”

Although the conference was purportedly to find ways to move the career discipline towards a comprehensive theory, Holland argued it would be better to advance existing theories. He noted that it appears possible to “patch in” just about any learning theory into other theories that involve learning or that Super’s notions about self-concept might be related in some sense to Holland’s personality type, Holland argued that cobbling theories together is a poor idea for at least six reasons.

1. Different theories have different goals, different audiences, and address different human problems.
2. Different theories involve divergent beliefs about development, learning and vocational problems.
3. Advocates of different theories seem to have differing beliefs about philosophy of science, research, and criteria or theories.
4. Political agendas that differ make discussion and integration difficult.
5. The cost of developing and researching a comprehensive catalog of career outcomes is too great. Some outcomes *are* more important and should be prioritized.
6. Different background fields differ in their constructs and may provide support for contradictory ideas.

In contrast to efforts to assemble parts of various theories as if they were tinker toys, Holland recommended improving existing theories that are much in need of improvement. He then discussed what is needed to bolster several separate theoretical perspectives: (a) Bordin’s ideas about the origins of interests, (b) The Lofquist and Dawis theory of work adjustment, (c) Krumboltz’s social learning theory, (d) Super’s segmental theory, and (e) Holland’s typology. Noting that each of these multiple perspectives has not yet been sufficiently reviewed, tested and developed, Holland suggested the alternate strategy of trying to improve each rather than undertaking the awkward task of stitching them together.

References Cited in Editors’ Note

- Brown v. Board of Education of Topeka, 347 U.S. 483 (1954).
- Elliot, D. S., Ageton, E. W., & Canter, R. J. (1979). An integrated theoretical perspective on delinquent behavior. *Journal of Research in Crime and Delinquency*, 16, 3-27.
- Hirschi, T. (1979). Separate and unequal is better. *Journal of Research in Crime and Delinquency*, 16, 34-38.
- Plessy v. Ferguson, 163 U.S. 537 (1896).

Exhibit 4J: Some Recollections of Jack Darley

After spending time in the Army, Holland headed to the University of Minnesota for graduate school. One of the items Holland selected for inclusion with his autobiography is a brief account of some recollections about Jack Darley presented at a meeting of the American Psychological Association shortly after his advisor's death. That talk was subsequently published (Holland, J. L., 1992, Some recollections of Jack Darley. *Counseling Psychologist*, 20, 395-397), and readers can easily find the article. Here in this précis, we try to convey an impression of Holland's experiences with sentiments towards Darley.

Holland's undergraduate education had been at the University of Nebraska, Omaha. At that time, the university was still known as the Municipal University of Omaha—or somewhat derisively as “Puny Muni.” Going to Minnesota, which meant joining a larger and more distinguished university, might be expected to be intimidating. In the halls of Minnesota were the likes of fellow graduate students Paul Meehl and Harrison Gough and Professors John G. (Jack) Darley, Kenneth E. Clark, and others.

Evidently, Minnesota did not seem like a warm and welcoming place—and not just because of the cold weather. In his recollections, Holland wrote, “The practice [in 1946] was to have students interview faculty to find a congenial advisor. I found [Darley] to be both congenial and interesting on our first meeting. This rating was based on local norms of compatibility—he did not have much competition. . . . Although [Darley] had a reputation then and later as a tough and sometimes cynical person, I usually found him to be supportive and warm, but he did have his direct, therapeutic moments” (p. 395).

It is clear from Holland's reminiscences that Darley was direct and blunt, as well as helpful.

Darley was in a position to help with Holland's career. He was eminent and had contributed impressively to the kind of dustbowl empiricism for which Minnesota psychology is known. He had connections by virtue of his status, and so he helped Holland get a job at a university counseling center after graduation, and subsequently recommended him for other plum jobs, as Holland explains in the autobiography. Darley, editor of the *Journal of Applied Psychology*, also boosted Holland's career by accepting one of his early articles for publication, but he wrote, “I hope this article is not a good sample of what you are going to do with this grand research opportunity” (p. 396). As Holland observed, Darley “liked to put on the necessary heat” (p. 396).

Holland wrote of Darley, “He did demonstrate that a man could be direct and tough yet considerate and sensitive. His concern for good writing, high quality applied research, and his demand for evidence has influenced me as well as some of my colleagues and students” (p. 397). Darley did indeed shape subsequent psychologists, including both of us. He did this directly and through his broader influence on the empirical science of applied psychology.

Holland’s gratitude for the contributions of his tough yet sensitive advisor was clear in the emotion that showed as he delivered his recollections at the convention meeting memorializing Darley.

Exhibit 4K: My Life with a Theory⁸⁴

I had many difficulties in preparing this little talk. I did not like the program chairman's suggestions; he did not like mine. For example, he wanted a nostalgic account of counseling psychology in the 1940s versus the 1980s. That topic had formidable problems.

On the one hand, I was ambivalent about my graduate experience. I felt like quitting at the end of the second year, but I had no desirable alternative, nor could I face my father (my banker) who had already told the neighbors about his son, who was about to become a PhD. My wife was supportive, but she expressed no enthusiasm for quitting, so I stayed. On the other hand, I retired in 1980, so I know very little about graduate life in the 1980's. So much for that topic.

The program chair's advice on style I can easily follow: "Be broad brush, and don't get too technical." If you are as statistically challenged as I have been for my entire career, this was welcome advice. My other handicaps include an inability to even add or subtract in a reliable fashion, and a complete computer deficiency despite numerous computer consciousness-raising efforts by well-meaning friends.

I toyed with giving an old but polished talk—"My Life with the SDS"—but I found that I am sick of talking about the SDS. I also tried to create several new talks.

For instance, "My Philosophy of Science is Better than Yours." If you have been following the recent philosophical wars, you know that logical positivism has been out for some time and almost anything else is in. These philosophical shifts have concerned me, because my theory continues to be a fruitful enterprise, but it has some old-fashioned philosophical ideas. My personality types are arbitrary constructions without substance. My deductive logic is interesting, but it provides a misleading account of how theories are actually constructed or should be constructed. In addition, critics have repeatedly pointed out that my theory is deficient, because I was a White, middle class male when I proposed the theory in 1959. They overlooked the fact that I was also legally blind.

In short, it is important to distinguish a theory's origins (the discovery process) from its public testing process. I have toyed with a retraction in which I attribute my theory to my mother's ideas. She was a bright, caring, insightful woman who told me what to write. Another idea was to have her write nasty letters to critics from her nursing home.

⁸⁴ Editors' note. This is a talk Holland presented at the Minneapolis Celebration of Counseling Psychology, 1993. Holland was one of several Minnesota alumni of the early post-war years participating.

At any rate, Howard Kendler has written a book chapter clarifying the role of behaviorism, positivism, and psychology in everyday science. He rebuts some common misconceptions about these topics. If you are afflicted with a neobehavioristic, evidence—oriented view of science, you will enjoy this chapter. If you are afflicted with one of the new philosophies of science in which social action, imagination, or promissory notes are sometimes more important than evidence, you will find this chapter disconcerting.

I also considered abstracting a little book about research for graduate students that I have been daydreaming about. Some chapter headings will give you the flavor. They include Getting Started; Finding Your Style; Coping with Critics and Controversy; Copyrights, Lawyers, and Psychometric Burglary; Living with the Highs and Lows (my mental health chapter); Learning to Write; and Publishers, Publishing, and Editorial Encounters. The problem with telling you about this book is that it has no text.

This search for a suitable topic led finally to a unifying idea: My Experience in Developing and Revising a Typology. (I also considered lengthening these introductory comments to the point where there would be no time for a talk.)

I have received a 40-year internship that has shaped my beliefs and biases about counseling, training, practice, and research. It has also shaped my competencies—so much so, I can now cope more skillfully with controversy than with support.

At any rate, I wish to comment on a few of my experiences and impressions of some controversial and destructive research trends in counseling psychology.

What Are These Trends?

1. We have moved from simple data analyses that communicate to most psychologists to hyper-analytical treatments that communicate only to a sophisticated few. Research reports often fail to report simple orienting information such as means, standard deviations, simple correlations, or proportions.

2. There is a decline in the publication of simple empirical studies to search for initial information about neglected or unexplored problems.

3. This decline in empirical fishing expeditions has been accompanied by an increasing worship of theory. Theories are two sided tools. They can focus our vision in useful ways, but they can also blind us to new data and other more useful explanations.

4. There is an increasing disparity between our favorite interventions and societal needs. Years ago, clinicians used to say, “If all the psychiatrists trained in the next 50 years were available today, they couldn’t take care of the people who need help.” If you substitute “counseling psychologists” for “psychiatrists,”

you come to the same conclusion today. To make matters worse, CP's are acting like psychiatrists, rushing into private practice and relegating career assistance to the bottom of the practice barrel. In contrast, there is little interest in preventive education or group interventions.

5. The shift to private practice has been accompanied by a shift to a wide range of counseling topics as well as a host of new topics, sports, old people (not elderly), recreation, people of color, women. These shifts have also been accompanied by a neglect and denigration of career interventions. This is especially unfortunate, because our career interventions have a long history of positive evaluations; and the need for such services by people of all ages is extensively documented. Equally important, we have a wide range of individual and group treatments that are cost effective.

This indiscriminate investment in old and new research topics is spread so thin over our man- and womanpower that little progress can be expected. For instance, there are only 2300 CPs. About 2000 are not engaged in research except as spectators or commentators, another 100-200 do an occasional piece of research, and less than 100 have fulltime research careers. If there are only ten major research problems or about ten people per topic, these groups are hardly a threat to scientific ignorance.

Now I want to speculate about the environmental forces that drive these research and service trends. These influences are both benign and destructive. I will focus on destructive influences, because they need exposure and because most people focus on the benign influences.

1. Grant wrangling. The securing of research grants is a mixed bag. Without a grant or a rich relative, some kinds of research are simply not possible. Unfortunately, grant activities have great status among peers and administrators so that students come to believe they cannot do good work unless they have a grant. At Minnesota, according to my mail, students cannot even get to a convention without a grant. Apparently, they have not heard of carpooling or writing for papers.

2. Focused Editorial Power. In CP, our journals are dominated by conservative beliefs about research so there is little risk-taking. Conservative evaluations are desirable biases—otherwise journals would contain more worthless material than they do now. These conservative biases, however, are accentuated, because authors see the same club of old boys and girls no matter where they turn. Defensive editors occasionally publish analyses that show how well their consulting editors agree. They should agree—the editor selected them or had them certified by right thinkers. In short, the focusing of editorial power limits the range of acceptable research within a single journal, and because editors and consulting editors serve on multiple journals, authors have trouble finding a fresh, second opinion.

Because authors have no union, they do nothing. To cry too much about rejections is a sign of low status. I have converted low status to high status by claiming that I have more rejections than most people have acceptances. Not only that, poor journals reject my work as frequently as good journals do.

3. Destructive Training. Most graduate training in research is devoted to how to collect and process ideal data (representative of something and preferably with a large N) through statistical sieves so that a defensible report emerges. Or, research training focuses on the evaluation of information so good ideas prevail and bad ones are suppressed. This kind of training is of major importance, for it distinguishes a scientific discipline from a cult, among other groups.

The problem with this aspect of training is that the processes of problem finding, speculation, and theorizing are neglected. Students usually leave graduate work with a few well-developed technical muscles, but with many underdeveloped problem-finding skills, along with little experience or confidence in their speculations or theorizing.

Graduate schools cannot be finishing schools with endless curricula, but they do neglect the subjective side of science. At the same time it is easy to see how students come to believe that useful inventories, scales, theories come only from careful, explicit research activities rather than from multiple sources. Careful research is one source. For instance, the Strong came from considerable empirical thrashing around by Strong and others. The Kuder emerged from a factor analysis. The SDS came from looking at multiple factor analyses, a primitive theory, reading Strong's book, looking at correlation matrices, and so on. Incidentally, the use of six rather than some other number of types was cemented in the theory when a psychiatrist, whose hobby was numerology, told me "six was a good number." That did it.

4. Journals and funding agencies reinforce many of our training biases, because they are usually populated by people with conservative views of science. Put another way, journals and funding agencies covet scientific respectability, which translates as "don't fund or publish deviant or fragile projects." Making decisions about such projects is difficult, because it is often hard to see the difference between a creative idea and a psychotic one, yet it is important to keep these gates open to some innovative work.

Finally, over the last 40 years, my impression is that there has been a marked decline in open discussion and writing about controversial topics. Research and writing about ethnic minorities, women, old people, people with physical problems, and so on has become Balkanized. Women talk to women; white males talk to white males, so there is little constructive feedback. Different groups have acquired some inaccurate, in- and out-group beliefs about one another, but because there is little open discussion, some crazy ideas receive no corrective feedback

or simply no response. A kind of political correctness cloud seems to hang over some topics so that despite the public appearance of concern and sensitivity, many (how many?) simply no longer voice an opinion.

A similar division or void exists between the developmentalists and the structurally oriented career researchers. They have avoided any constructive interaction for more than 40 years. The only interaction occurs in journals in which one side implies that the other's view of careers is simplistic, evidence deficient, or some other scientific slur.

Possible Remedies

I have some ideas for softening these destructive trends and influences. These remedies are arranged in order of their increasing difficulty to achieve, and for some problems, I have no useful ideas.

First, our focused editorial power could easily be decentralized or dispersed by asking people to serve a single journal. As it stands, many serve two or more journals. We have editors for a single journal who also serve as consulting editors for other journals. We cannot do anything about book publishers and funding agencies.

Limiting people to a single journal would also create more opportunity for minorities, women, young and old people. I also forgot; it may also be wise to limit being an editor to one journal per lifetime. This idea may represent overkill.

How to get things started. We need someone who does not intend to publish research, run for office in the APA, or need tenure, and has some engrossing hobbies and a supportive social group. A report is required that documents the overlap among the relevant journals. A computer is not required; 3 x 5 cards will do. Publication could be achieved by submitting a minority report at a Division 17 business meeting. The rejection of the report could then be used to attract attention to a convention program in which its purpose is disguised with a deceptive title such as "Improving the Research Climate."

How to cope with grant wrangling, model gazing or theory worship, and the decline in empirical fishing expeditions poses a very complex array of problems as they require an understanding of the developing self in interaction with a cultural environment that is undergoing dramatic shifts. At any rate, that is what some of our colleagues might say. I see these problems differently.

It might be helpful to encourage more people to perform research without grants. Data processing is no longer a substantial expense except for a very atypical project, but data collection can be an expensive barrier. One solution is to find a school, a company, a religious institution, or a group that will trade consulting services for access to research participants. Another strategy is to

provide psychological or educational materials in exchange for access. Faculty children who are preteens can perform data entry work for small samples ($N < 250$). They are much cheaper than graduate students are; and they worry more about making errors than about a project's scientific merit. The only problem I have encountered is when I raised a student's hourly rate because of good work. Her mother complained that her daughter's allowance had lost influence. At another time, I used psychiatric patients to do item analyses—also more efficient than graduate students.

I have been doing small-scale research for the last 18 years. The out-of-pocket costs to me have always been small. I barter to secure data, consultation, data processing, and typing. Currently, reprints are my largest single expense.

I am not saying my way is the best or only way to get research done. I am saying that more people should consider using their social skills, ingenuity, and professional capital to do research. At first, this strategy may seem like a lot of work and wasted time, but compare a few research and sales visits to likely sources with the time spent in preparing grant proposals that often fail. In the do-it-yourself strategy, you can take great risks (empirical or theoretical fishing); in a grant proposal, you have to work hard to create the impression that your proposal is important and infallible.

Another funding strategy is to knuckle under and get grants but at the same time engage in cheap, empirical or theoretical fishing expeditions to learn what you can. This is of course what most grant-addicted researchers do, but it is a stressful life for many and tends to focus one's work on safe designs of popular topics.

I have no promising ideas for improving research training. When I read some of the imaginative articles written by psychologists who believe evidence is a dirty word, I think we need more of the same old traditional training that I have been knocking.

I also have no promising ideas for more open and constructive discussions about research and social problems. If psychologists cannot organize their professional concerns in a single institution, it is unlikely that they can have more constructive and open discussions. Psychologists cannot escape the American culture; we issue credit cards; we now have a stylish corporate logo; and we have a flourishing cadre of professional politicians—even one in the House of Representatives. Being cool has become more important than being frank.

So What?

I do not have a big windup for my ideas, but I do have a few cautions in thinking about my remarks.

1. They represent my impressions of what is going on. At no time did any data appear.

2. As one of my friends said: Beware of mature (old) people bearing intellectual gifts.

3. I ignored the positive qualities of journal editors, traditional research training, and other benevolent influences.

Finally, if you feel the urge to respond, let me rest at the cocktail hour, and wait until you can pay your own way to the next celebration. There will always be opportunities for speakers who can give rather than receive.

Reference

Kendler, H. H. (1992). Ethics in science: A psychological perspective. In W. M. Kurtines, M. Azmitia, & J. L. Gewirtz (Eds.), *The role of values in psychology* (pp. 131-160). New York, NY: Wiley.

Exhibit 4L: New and Old Perspectives

A final exhibit Holland selected to illustrate his views on contentious matters is the following article:

Holland, J. L. (1998). Debate: New and old perspectives. *British Journal of Guidance & Counselling*, 26, 555-558.

The published version is easily available, so we merely characterize this article.

The article is a reaction to a collection of papers in a *British Journal of Guidance and Counselling* (BJGC) symposium on the “new career.” The so-called “new career” refers to a large body of writing and speculation based on the notion that in contemporary work life, changes in jobs or in the firms for which people work appear much more common than in the past. Careers are said to be “Protean” and to require “construction.”

Proponents of these new perspectives sometimes implied that older perspectives or older theories are inapplicable or less applicable to contemporary careers. Furthermore, the need for new theory may be necessary, according to some new perspectives because of changes in the nature of work, special counseling approaches for special or more diverse populations, or the desirability of giving workers the power to construct their own careers.

Holland seems to have found the assumptions in some of the writing from these “new” perspectives a bit irritating. Do workers whose careers undergo transitions because they must find new work (are fired, downsized, become “gig” workers, etc.) really change their careers much more often than in the past? Do workers who were plumbers in a U. S. factory, the functions of which have moved to some distant land, commonly find new work in early childhood education or in teaching English as a second language? Such Protean shifts appear relatively unlikely from Holland’s structural perspective. In contrast to willy-nilly shape shifting, Holland’s theory predicts that displaced workers are likely to continue engaging in work that is similar in kind and level according to the RIASEC-Complexity classification. An assistant professor of sociology who is denied tenure will be more likely to continue engaging in some social scientific work—not to become a welder.

In the BJGC article, Holland let his disapproval of some of the “new” speculation show: “I was trained in the heyday of logical positivism so I am skeptical about speculations and strategies that have a tenuous relation to evidence” (p. 555). He wrote of one contribution,

Collin . . . advocates contextualism as the road to a more satisfying career theory and practice, but the case for this perspective is in the 'my philosophy of science is better than yours' tradition. Like most early attempts, this one is a complex promissory note that sympathetic researchers and practitioners must translate into more persuasive research and practice. (p. 555)

Holland noted,

Several roads may lead to the development of more useful career theory. These include a shift from advocating a favorite theory to collecting evidence . . . to demonstrate its value. . . . And the constructivists might gain more disciples if they stopped writing and started researching in the real world, even if it is hard to agree what 'real' is. (p. 557)

EXHIBIT 3.5

GENDER AND THEORETICAL CONTROVERSY

Holland's discussion of his Research Perspective in Chapter 5 of this autobiography indicates that a range of cultural and methodological controversies concerned him deeply, powerfully affected his later life, and led to frustration and anxiety. These effects were clear in our interactions with him. Foremost among these controversies were accusations that his theory and instruments (especially the SDS) were culturally biased against women and a variety of minorities, had had origins in research of highly talented sample groups rather than appropriately representative samples, and were invalid and unreliable because of simplified measurement techniques. These criticisms naturally concerned and offended Holland, and he sought to defend his life's work with the scientific tools with which he was most adept—research, persuasive scholarship, and persistence—all anchored in Midwestern dustbowl empiricism.

Holland selected Exhibit 5 items to illustrate his views about these controversies. First among these items is a paper delivered at the 1979 APA Convention entitled, "The influence of vocational interest inventories." Holland's chief goal in this paper was to illuminate the effects of psychological testing on the public. He reviewed the basic elements of the interest inventory controversy that took place throughout the 1970s and concluded that little evidence implies that interest inventories are harmful. Finally, Holland provided recommendations that he felt would lead to a more comprehensive assessment of the effect of testing on the public. An edited version of that paper is included here with ellipsis showing where material was omitted.

Holland's second and perhaps most persuasive offering in Exhibit 5 is included in its entirety. It is entitled, "Toward Beneficial Resolution of the Interest Inventory Controversy," authored jointly with Gary Gottfredson. This is a carefully researched and thoughtfully written explanation of the interest inventory controversy. It includes eight suggestions to foster a consensus on sex fairness in interest measurement and stimulate the fair use of vocational interventions.

Two additional items illustrating Holland's concern about and preoccupation with gender and theoretical issues at this stage of his life

are not included in Exhibit 5, but here we provide complete references and brief annotations:

Holland, J. L. (1987). Current status of Holland's theory of careers: Another perspective. *Career Development Quarterly*, 36, 24-30.

This article was a response to Brown's article in the same journal issue (pp. 13-23) entitled, "The Status of Holland's Theory of Vocational Choice" in which Brown is critical of Holland's theory. Holland's response displays his understanding of the philosophical criteria by which theories are evaluated, his commitment to evidence-based research, his biting wit, and his enduring personal resolve.

Feinberg, L. (1982). Study rejects bias charges in job tests. *The Washington Post*, February 3, 1982.

This is a newspaper article that Holland cited to demonstrate that aptitude and ability tests are often subject to some of the same unproven discrimination charges as are interest inventories.

Finally, Holland selected a letter written to eminent statistician and psychometrician Melvin R. Novick at the Lindquist Center for Measurement at the University of Iowa. This letter, reproduced here, is an example of the way Holland reached out to other professionals as he strove to understand and resolve the controversies that he saw as threats to the integrity of career research and assistance—and as demeaning of his own contributions. While we are uncertain about some of the specific references in the letter, the general tone conveys the depth of John's concern about the controversy and his commitment to evidence-based resolution.

Exhibit 5A: The Influence of Vocational Interest Inventories: Some Implications for Psychological Testing⁸⁵

I had a lot of difficulty in preparing this talk. Frankly, I have always had a lot of difficulty in preparing talks. In this instance, the difficulties have been especially frustrating. The topics for these centennial symposia call for macro-thinking and wisdom. I am not even a good micro-thinker, despite many years of 14-page, 3-table efforts.

...

The chief goal of my talk is to illuminate the impact of psychological testing on the public. I hope to achieve this goal by a review of the interest inventory controversy that began in 1972, peaked in 1975, and died in 1978. That controversy involves all the basic elements contained in the I.Q., admissions testing, and employment testing controversies. In short, I will begin with the interest inventory controversy. Then, I will summarize what we have learned from the research and political activity that was part and parcel of this social-psychometric brouhaha. And last, I will conclude with some ideas and recommendations for increasing our ability to cope more expeditiously with the current controversies about tests and inventories. . . .

The Interest Inventory Controversy

The interest inventory controversy began in the period 1971 to 1973, when individuals, groups, committees, and commissions charged that interest inventories served to keep women and men in traditional occupations. The belief was that interest inventories by virtue of their items, instructions, interpretive materials, scoring and normative procedures helped to maintain the sex-segregated⁸⁶ character of the work force. This belief was reinforced by numerous plausible hypotheses and some plausible data. For example, when males and females of any age take interest inventories, the distributions of suggested occupations for males and females are usually somewhat divergent. According to interest inventories,

85 Editors' note. This exhibit, edited to shorten the length, is based on the paper presented at the Symposium on Psychology and the Public Good at the American Psychological Association Convention, New York City, September 4, 1979. Ellipses show where material has been omitted.

86 Editors' note. Throughout this 1979 paper Holland used the term "sex" where today's writers would more commonly use the word "gender." Before the remarkably successful efforts to change word usage, now generally ensconced in publication guides and manuals, the word "gender" was mostly used in the context of grammar (masculine, feminine, and neuter nouns) and building trades (e.g., male or female electrical connectors). We have not edited the text so that it presents Holland's language usage at the time of writing.

a small proportion of females have skilled trades and factory-oriented interests, whereas men have those interests in larger proportions.

The first stage of this controversy was characterized by rational analyses by critics that inventories must exert a restrictive force on women and men, and by rational defenses by authors that these evil events were unlikely.

The second stage was characterized by recommendations and guidelines for reducing the alleged sex bias of inventories. This collection of ideas and recommendations of the National Institute of Education and the Association for Measurement and Evaluation in Guidance and later by Title IX and by the Office of Civil Rights appeared to chart some activities and test revisions that would change the alleged undesirable influences of interest inventories. Authors and publishers made multiple revisions that ranged from minor changes in items to major reconstructions of an entire inventory.

The third stage involved the empirical examination of the multiple recommendations and solutions that were proposed to reduce sex differences, to foster non-traditional goals, and to increase self-understanding of sex-role socialization. The need for empirical investigation became clear in 1972 when no one was able to locate a single experimental study of the influence of any interest inventory on the test-taker. The few existing evaluations were compounded by the effects of counselors and interest inventories as well as other tests or treatments. I will not review all of these more recent investigations (there are now about 50) but I will outline the main ideas and findings in the experimental evaluations.

These experiments usually entail the following general plan. Males and females are assessed for their current vocational aspirations, satisfaction with their choice, degree of decidedness, degree of self-understanding, or related ideas, then people are assigned randomly to different experimental treatments (take an interest inventory, see a professional counselor, use a vocational card sort, or receive no treatment), and finally after the treatment—either immediately or at intervals up to three months later—females and males are again polled for their vocational aspirations, ratings of treatment, information-seeking activity and related criteria.

The initial group of experiments compared the effect of an interest inventory either with controls, or with some special treatment plus an interest inventory. These early experiments indicated that people who took interest inventories listed more vocational choices, increased their satisfaction with a current choice, and reported increased self-understanding. No sex differences were observed in any of these beneficial outcomes.

A second group of experiments has involved the *comparison* of different interest inventories (the Strong-Campbell Interest Inventory versus the Self-Directed Search), vocational card sorts (you do your own categorizing and

scoring), and group counseling treatments. Although these comparisons involve different inventories and treatments developed by divergent methods, and have different interpretative materials and scaling procedures, the results suggest that different vocational treatments have similar or identical effects on the test-taker or treatment taker. Again, no sex differences have been observed in the beneficial outcomes.

A third group of experiments has involved piling several treatments on the client. For example, adding a vocational card sort to the SDS is no more effective than either device alone.

A fourth group of experiments, which I characterize as “analytical,” illuminates how the beneficial effects observed in the earlier shotgun investigations may occur and what changes may increase a person’s options and satisfaction. A group of five simple experiments produced no significant mean differences in outcomes for males and females when the directions for an interest inventory were radically revised, and when all items were rendered gender neutral. Likewise, a sixth experiment indicated that the structure, self-scoring or sheer number of vocational options contained in an inventory may have no special merit.

These analytical investigations led to a recent experiment in which high school students were polled for their expectations for the interest inventory that they were about to take. Both females and males indicated that they wanted most of all, “reassurance” about an aspiration they already had. “Wanting more alternatives” ranked well below this desire. High school girls wanted more or fewer options to about the same degree. Boys wanted fewer options rather than more. In this same investigation we found that students with a clear sense of identity and few vocational decision-making problems rated the helpfulness of the interest inventory higher than did students with a diffuse sense of identity and multiple decision-making difficulties.

Taken together, these more analytical experiments imply that the beneficial effects of inventories are due to the common elements present in divergent inventories, card sorts, and related treatments. These common elements include: (a) exposure to occupational information in items and interpretative materials, (b) cognitive rehearsal of vocational aspirations in the process of filling out inventories and talking to counselors or others, and (c) the combination of occupational information and rehearsal, which probably stimulates conceptions of occupational structure and self understanding. These implications seem likely, because the average student knows very little about the occupational world so that a small amount of new information makes a big difference.

This ends my hurried review of the evidence about the experimental evaluations of interest inventories. (See Holland, 1979, for a more detailed review of these investigations.) Parenthetically, if you are an aficionado of this

controversy, you have noticed that I omitted any discussion of the raw score, normed score, and balanced scale proposals and disagreements. I have done so because the experimental comparisons of inventories that use divergent scale construction techniques have identical or similar effects. There has been no experimental test of the effect of any balanced scale inventory on the test taker, but I expect the effects to be similar to those observed for normed inventories, because a balanced-scale inventory, like a normed-scale inventory, by virtue of its construction, presents similar distributions of options to males and females. And, the experimental comparisons of inventories that present similar or divergent distributions of vocational alternatives to females and males do not influence females or males in different ways. No significant interactions.

Now I want to emphasize three major findings in these experimental evaluations.

First, interest inventories have small but apparently beneficial effects on a wide range of populations (high school and college students, males and females, Blacks and Whites, Hispanics). There is no *experimental* evidence that documents a single negative effect. In addition, there is more experimental evidence to support the beneficial values of interest inventories than there is for counselors, vocational card sorts, or group counseling treatments.

Second, *some* of the ideas advocated in the NIE guidelines, AMEG, or Title IX regulations have resulted in inventory revisions that have a demonstrable effect on the user. In short, beliefs about the sex-fair or sex-bias characteristics of a particular inventory are not related to its impact on the test taker. To the contrary, inventories with divergent origins and construction have similar, if not identical effects.

Third, the distributions of vocational aspirations for females before and after taking an inventory are very similar. The same trend holds for males. In addition, these distributions for males and females are divergent both before and after taking an inventory. In short, inventories make only a slight dent, if any at all, in the life long shaping forces that society exerts on females and males.

Some Implications

The political, regulatory, and research activity generated by this controversy appears to have some cogent implications for psychological testing generally. I have organized my interpretations of this experience according to the impact of testing on the public, related APA organizational and technical problems, and some common insights about testing practices.

Impact of Testing

The controversy about interest inventories is a useful illustration of what we know and don't know about a particular kind of inventory. Despite the recent experimental evaluations, more is known about the reliability and construct validity of these inventories than their influence on the public. To estimate the probable impact of interest inventories, it is necessary to string together the experimental studies of self-reported impact and several ambiguous criteria such as increasing popularity of these inventories from year to year and the absence of any legal action.

What is missing, is one or more national surveys that would permit generalizations like "70% of the people who take an interest inventory found it helpful, 20% didn't know, and 10% found the experience distressing or harmful." Surveys of this kind could be used to identify negative outcomes for review in more elaborate, clinical investigations. These investigations would provide reliable estimates of the parameters of satisfaction, benefit, and harmful effect for representative populations.

Our knowledge of the impact of intelligence, admissions, and employment tests—which are now involved in intense controversy—has a similar pattern of strengths and weaknesses. More is known about these tests according to multiple investigations of reliability, validity, and content than is known about their impact on the public.

The impact of intelligence, admissions, and employment tests must be estimated by piecing together statistical studies of probable impact of a test (if a test is used with rigid adherence to the statistical formulas), by a small number of legal rulings, and by anecdotal accounts of positive and negative outcomes.

This collection of evidence appears impossible to collate and evaluate. Again, some national surveys of test takers would provide a beginning for estimating the parameters of client satisfaction, strengths and weaknesses of tests and testing practices and for guiding a succession of more focused inquiries.

A more comprehensive and explicit knowledge of testing influences would stimulate the development of better tests and would provide information for an effective defense of sound tests and testing practices. In 1966, David Goslin outlined a comprehensive program of research for estimating and comprehending the impact of testing. And in the last year, the National Academy of Sciences has established a Committee on Ability Testing that is investigating the use of aptitude tests in diverse settings.⁸⁷ Things are moving, but often long after the controversy erupted.

⁸⁷ Editors' note. Holland is referring to the committee that produced the report edited by Alexandra Wigdor and Tex Garner (1982). We have added the citation to the reference list.

Some APA and Organizational and Technical Problems

The interest inventory controversy also revealed a number of organizational, political, and technical problems that require better solutions. And fortunately, the APA has begun to move on one of these difficulties—the APA Test Standards.⁸⁸

1. The current test standards have little to say about the need to assess the actual impact of tests on the test taker. Instead, they stress the importance of reliability and validity. Fortunately, the Committee on Tests has held hearings and is moving toward a new set of test standards.

2. The APA has budgeted \$6,500 this year for the Committee on Psychological Tests and Assessments. The Committee has six talented members who meet three times a year. This organizational commitment appears too small to provide intellectual leadership for an industry that administers perhaps 300,000,000 tests a year and may have annual budgets totaling \$50 million.

3. During this 7-year controversy on interest measurement, the only public action that the APA took was to imply support for the NIE Guidelines⁸⁹ by mailing them to members as guidelines to consider. This action gave the NIE Guidelines a scientific status they do not deserve. And, while the APGA, the NIE, and the AMEG commissions developed recommendations and regulations, our APA Committee appeared to be concerned with other matters and was presumably overwhelmed by the multiple public test controversies.

Test publishers appeared to cope with this controversy by silence and revising inventories, but they soon discovered that revisions did not usually bring praise. Critics, authors, and publishers did not agree. Likewise, the brief paragraphs about testing materials in Title IX turned out to be a new projective device—different people read different meanings into those terse paragraphs.

Common Insights

This controversy also made us more aware of the basic ingredients of beneficial test development and practice. It is still clear that a test's reliability and validity are vital characteristics, but it is also clear that the tested impact of a psychological

88 Editors' note. Holland is referring to the Standards for Educational and Psychological Tests, which are promulgated jointly by the American Educational Research Association, National Council on Measurement in Education, and the American Psychological Association. The 1974 revision of these standards was next revised in 1984 (and subsequently—the most recent being the 2014 version). The development and approval of these standards is a drawn-out process.

89 Editors' note. Holland is referring to unofficial National Institute of Education Guidelines for Assessment of Sex Bias and Sex Fairness in Career Interest Inventories (1978). The guidelines were developed by NIE staff, a consultant, and a committee appointed by NIE. We have added a citation to the guidelines in the reference list.

device is equally important. In addition, the ethical and skilled use of tests requires an integration of values, assessment goals, instructional technology, and knowledge of the field in which the testing takes place. Testing has been dominated by psychometricians and statisticians. It seems more apparent now that psychologists need to be more concerned with the context of testing and take steps to think about tests and their role in the educational and social systems of information and use in which tests are imbedded. And, we need to integrate the experiences of test developers, psychometricians, practitioners, researchers and consumers.

There is a remarkable group of common denominators in the controversies about the effects of admissions, employment, intelligence, and interest tests. In each controversy, participants discovered the ambiguities inherent in defining a particular kind of bias, the strengths and weaknesses of internal versus external criteria for estimating a test's impact, the role that values play in test construction and testing practices. Finally, these controversies have served to sensitize psychologists to "cultural, and racial differences and how apparently innocent and benign practices may perpetuate discrimination."⁹⁰

For instance, in 1973 many participants [in the controversy] believed that the definition of sex-bias was a relatively simple explicit matter. Many thought that you can identify sex bias by simply looking at words and items, by seeing if the endorsement rates for items were about the same for females and males, by seeing if the distributions of interest inventory outcomes for females and males were similar, or by conducting experiments to learn what happens to people when they experience inventories with different characteristics.

As these ideas diffused among the participants, other criteria for determining the presence or absence of bias were proposed: does the inventory in question increase vocational information seeking? Selection of non-traditional options? Number and variety of occupations being considered? Satisfaction with a current vocational choice? Now, it is apparent that none of these and other outcomes are applicable to everyone or to people of all ages. Some people want more options; some want fewer options, and others want reassurance about an option they have in mind. Some people are unhappy with the outcomes of taking an interest inventory when it fails to support their choice. Sometimes, they should be—they want to do something that is foreign to their interests; other times the inventory is in error. A clinical review of the case data is needed and that review may end

90 Editors' note. Holland did not provide a citation for this quotation, so the precise source is unclear. It is very similar to a statement in the Office of Technology Assessment's 1992 report on *Testing in America's Schools*. Because the present paper predates the OTA report by more than a decade, that report cannot be the source. Possibly the source is to some earlier paper written by one of the members of the OTA advisory panel, which was chaired by Sheldon White.

in ambiguity.

I could continue to elaborate the problems of defining bias, but I wanted only to illustrate some of the difficulties in defining bias, a problem that most participants came to appreciate but a problem that the Title IX and NIE Guidelines failed to cope with. These guidelines form vague nets to raise questions of bias, and they were written long before we had any explicit knowledge of the internal structure or effects of inventories.

One of the amusing incidents in this controversy (there were several) was that two advocates of precipitous and uninformed regulation fell into a second controversy about what Title IX really meant.

Some Recommendations

This seven-year controversy has stimulated some ideas for how we might cope with controversies about testing, and how we might gain a more accurate and comprehensive assessment of the impact of testing on the public. I have already indicated some of these recommendations, but I would like to summarize them.

First, although we have some evidence about the actual impact of a few inventories, we need a comprehensive summary of the direct and indirect effects of taking tests of all kinds. Such an effort might entail a review of Goslin's earlier thinking and the planning of an extensive program of research. That kind of research should interest many federal and non-federal sponsors. The APA Test Committee might be charged with leading such an effort. Test publishers might be interested in contributing funds. Such research should be useful in estimating the strengths and weaknesses in tests and test practices that deserve praise and continuation, and those tests and testing practices that require revision.

Second, the APA Committee on Psychological Tests and Assessments should be enlarged and restructured to provide greater national leadership. The present committee of six is simply too small to deal with the multiple and increasing problems of testing. A committee with a reasonable chance of dealing with our current problems might include 30 members. The committee might be organized as six subcommittees: Legal Questions, Public Information, Aptitude and Achievement Tests, Personality and Interest Inventories, Controversy Task Force, and an Ex-Officio Committee consisting of one large and one small test publisher, two disgruntled test authors, two bonafide practitioners who use tests but are not in awe of psychometricians, and two activists from the general public who do not own and operate a newspaper.

I do not believe such a committee is too large or too expensive, for as a recent APA resolution states, "Psychological testing represents one of our most valuable and practical contributions to society." Again, why not ask test publishers, testing

agencies, authors, and federal agencies to contribute funds? The cost of a large committee could be reduced by rotating some subcommittees around the United States.

I have also daydreamed about some immediate tasks for these subcommittees. For example, the public information committee might get out the *good* news. There is considerable good news to report, but it fails to get attention.

Here are two illustrative developments that have gone unreported by the press and that the public information committee could call attention to.

First, the Student Profile section and the Student Characteristics section used in conjunction with the ACT and SAT admissions tests contain simple scales designed to assess a student's non-academic potentials and originality and were developed to supplement the traditional criteria of academic test scores and grades. Also, Baird and Knapp (1979) at ETS have created a more elaborate form for the selection of graduate students. This form calls attention to a student's record of accomplishment outside the classroom. Taylor (1978) and his colleagues have developed materials for identifying six kinds of talents in classrooms; they have trained teachers how to stimulate the development of these talents (academic, creativity, planning, communicating, forecasting, and decision making). And, they have performed multiple evaluations that demonstrate that these new dimensions, and the associated teaching training program have a positive effect on students. Put another way, some of the cogent criticisms of admissions and educational achievement tests—they fail to assess many important human potentials—have been dealt with for more than ten years, but these valuable developments have gone unnoticed.

Four, there are now at least four self-administered and self-scored interest inventories. That development has been going on for about eight years. The research implies that their reliability, validity and effects on the users are not better or worse than more conventional inventories that are scored by electronic machines. They represent a major attempt to make vocational assistance available to a larger proportion of the public.

The tasks for the remaining subcommittees are generally obvious, but perhaps some elaboration of the role of the Task Force on Test Controversy is needed. This group of psychological firefighters could move to the site of intense controversies and act as fact finders, teachers, referees, and conciliators. In principle, they would resemble the aircraft accident teams of the FAA. They might include a lawyer-psychologist, a clinician, a test expert, a social psychologist and a generalist. They might engage in fire prevention. For example, they might ask publishers to refrain from exploiting controversy. Currently, three publishers claim that their devices are sex-fair, because their inventories were developed in a special way, but they have no experimental evidence that these inventories affect females and males in

the same way.

Third, the APA should take over the *Buros Mental Measurement Yearbook*. That Oscar Buros' contribution was magnificent cannot be denied. At the same time, although these yearbooks provide much useful information they also could benefit from a standard format for reviews and the elimination of some conflict of interest between reviewers and reviewees. Opinions and speeches should be clearly delineated, and publishers and authors should have the right to correct errors of fact. Many reviews and counter reviews simply confuse the potential user.

Other *less* satisfying Buros type yearbooks are in production. If the first initiation is a reliable sign of the future (sponsored by the Office of Education) we are in more trouble than ever. Their first effort relied largely on reliability and content validity.

I have only a one-sentence summary for my talk. I was told 13 pages or else. In a sentence, we must move from the era of reliability and construct validity to the era of reliability, validity, *and* public impact.

References

- Baird, L. L., & Knapp, J. E. (1979). *The inventory of documented accomplishments for graduate admissions: Results of a field-trial study of its reliability, short-term correlates, and evaluation*. (Graduate Board Research Report GREB 78-3R; ETS Research Report 81-18). Princeton, NJ: Educational Testing Service.
- Educational Testing Service. (1978). *Inventory of activities and accomplishments*. Princeton, NJ: Author.
- Goslin, D. A. (1966). *The search for ability*. NY: Wiley.
- Holland, J. L. (1979). *Professional manual for the Self-Directed Search* (Rev. Ed.). Palo Alto, CA: Consulting Psychologists Press.
- National Institute of Education. (1978). Guidelines for assessment of sex bias and sex fairness in career interest inventories. In C. K. Tittle & D. Zytowski (Eds.), *Sex fair interest measurement: Research and implications* (pp. 151–154). Washington, DC: Author.
- Taylor, C. W. (1978). *Teaching for talents and gifts*. Salt Lake City, UT: Utah State Board of Education.
- Wigdor, A. K., & Garner, W. R. (Eds.). (1982). *Ability testing: Uses, consequences, and controversies* [Report of the Committee on Ability Testing of the Assembly of Behavioral and Social Sciences, National Research Council]. Washington, DC: National Academies Press.

Exhibit 5B: Toward Beneficial Resolution of the Interest Inventory Controversy

Gary D. Gottfredson and John L. Holland⁹¹

Johns Hopkins University

Abstract. Several reasons are discussed for the current dissention about sex-fairness in interest measurement—lack of clarity or agreement on (a) the diverse purposes of vocational assessment, differences in inventories and their effects, (c) the meaning of sex differences in inventory scores, (d) the way specific inventories have been developed, (e) how different methods for assessing validity can lead to different conclusions, and (f) definitions of fairness and bias. In addition, a number of suggestions are offered to foster consensus on sex-fairness in interest measurement and inventory uses. These include recognition that several seemingly divergent definitions of bias may each have value, attention to the evaluation of the variety of potential effects of inventories on users, and attention to informing clients about the vocational treatments they receive.

Interest measurement specialists have spent considerable effort since the late 1960s examining vocational interest measurement in relation to problems of sex fairness and vocational assistance for women. These specialists have been concerned about the use of separate and unequal forms of interest inventories for women; they have been concerned with the equivalence of the structures of vocational interests for men and women; and some writers have suggested that separate (but presumably equal) vocational theories are needed for women. Several attempts have been made to produce inventories or score reports that minimize score differences between the average woman and the average man. Other research has assessed the effects of counseling or interest inventories on vocational exploration. Finally, measurement specialists have been concerned about the content or wording of assessment devices: Does the wording or the selection of items bias the assessment of men and women?

This effort has resulted in progress. Men's and women's forms of a widely used interest inventory have been merged as a result of some major compromises (Campbell, 1974). Although discussion continues about how to interpret scores

⁹¹ This paper is based on two earlier papers (Gottfredson, 1976b; Holland, 1977) that discuss the same topic. We are grateful to the following people for their helpful comments on this or the earlier papers: Linda S. Gottfredson, Ruth Leggin, Jack Rayman, Willo P. White, Jan B. Woodring. The paper appeared earlier in Tittle and Zytowski (1978).

that are reported on cross-sex norms on that inventory (Creaser and Carsello, 1976; Lunneborg, 1975), much has been learned from the experience. Research on the comparability of the structures of interests for men and women is less ambiguous—they are largely the same (Hanson and Cole, 1973). Likewise, some authors (Holland and Gottfredson, 1976b; Krumboltz, 1976) have elaborated the ways in which a single theory can be used to explain the vocational behavior of both men and women, while others have provided evidence of when (Vondracek and Kirchner, 1974) and how (Kelso, 1976; Maccoby and Jacklin, 1974) sex differences and other differences in vocational behavior come about. It has become clearer that different vocational outcomes do not necessarily imply different processes of vocational development but instead may imply different social experiences that can be interpreted using a single theoretical perspective. Substantial research progress has also been made in the examination of the content of interest inventories (Boyd, 1975; Gottfredson, 1976a; Hansen, 1974; Holland and Gottfredson, 1976a; Rayman, 1974). The examination of alternative reporting procedures (Creaser and Carsello, 1976; Gottfredson and Holland, 1975; Hanson, Noeth and Prediger, in press; Lunneborg, 1975) remains more controversial.

Despite the insight gained from recent research, almost every aspect of interest inventory content and scoring remains an area of concern and dispute. In this paper, we focus on what we judge to be six reasons for dissension about sex-fairness in interest measurement.

1. Failure to consider the diverse purposes of vocational assessment.
2. Failure to consider the differences among interest inventories and their potential effects.
3. Lack of clarity about the meaning of sex differences in scores.
4. Lack of understanding of the way some inventories have been developed.
5. Use of diverse procedures for assessing test validity.
6. Lack of agreement on the definition of fairness and bias.

Purposes of Assessment

The first reason we lack a consensus on sex-fairness in the composition and scoring of interest inventories is that these inventories have multiple purposes (Gottfredson, Holland & Gottfredson, 1975; Holland, 1975b; Holland & Gottfredson, 1976b). Inventories can reassure people who are unsure about their career goals. They can provide a structure that people can use thinking about themselves and their careers. They can serve as career development diagnostic tools. They can promote exploration of a wide range of career alternatives. And they can focus exploration by suggesting a group of occupations that appear

related to a person's interests.

The multiple purposes of interest assessment sometimes lead to divergent requirements for scoring and reporting procedures. For example, pooled-sex norms or ipsative scoring may be most useful for focusing exploration, while same-sex norms may lead to less focused exploration. At the extreme, random reports or no assessment provide no focus for exploration.

There is a variety of legitimate purposes for assessment. To make productive use of vocational assessment, users must be clear about their purposes in any particular instance. Different people may need or desire different treatments. Exploration, reassurance or diagnostic precision may be appropriate for different people—or at different times for the same person. In any event, the fair use of vocational assessment implies that counselors must be open and clear with clients about the nature of the treatment they are getting—for any assessment experience is also a treatment.

Inventory Differences

Interest inventories are constructed in diverse ways, and they probably achieve their effects on people in diverse ways. Some devices employ narrow band measurement and others attempt to assess broad dimensions of interest. Some are limited only to interest items, and others include interest and competency items. Some rely heavily on skilled counselors or computer scoring to assist in interpretation, and others minimize the need for costly, time-consuming or training-intensive procedures. Some inventories make the structure of the interests readily apparent to clients, and others show the structure only after the inventory is scored and interpreted. Despite considerable speculation about the best way to measure or report vocational interests, there is no compelling evidence that any one method is better than another is or that a particular effect can be achieved by only one method. Evaluations of three inventories developed with divergent rationales and techniques suggest that their effects are similar (Cooper, 1976; Prediger, McLure & Noeth, 1976; Zener & Schnuelle, 1976). At present, the relation between an inventory's special characteristics and its effects are unclear. More research into how inventories achieve their effects should promote the design of better devices and clarify the relation of inventory design to inventory effects.

Sex Differences

A third reason for lack of consensus is the belief that sex differences in interest inventory scores are artefactual. Disagreement about the meaning of sex differences is fostered by divergent perspectives on the extent to which a person's

learning experiences should be allowed to influence scores.

Careful attention to the purposes of assessment may resolve this disagreement. If the goal is to indicate a person's current vocational status, scores will often show the consequences of sex-related socialization. In this case, any procedure that removes sex differences in scores can be expected to decrease construct validity because the personality constructs measured are, in theory, dependent upon a person's experience, and at the present time this experience is usually different for men and women. The removal of sex-related variance in the scores appears akin to the efforts in an earlier decade to remove social desirability from measures of personal adjustment. Social desirability seems to be a component of adjustment, and devices that eliminate it appear less valid than those that do not.

On the other hand, when exploration is the goal, valid assessment of current status becomes less important, and scores need not reflect sex differences in personal histories. Likewise, when explicit attempts are made to influence a person to abandon traditionally held sex-role preferences, vocational interventions might not need to include an assessment of a person's current status at all.

Test Development

Another reason for the lack of consensus about interest inventory composition is that detailed reports of inventory development have sometimes not been made widely available and the existing reports have not generated reader interest. Consequently, the recent revision of the Vocational Preference Inventory (Holland, 1975a; Gottfredson, Holland & Holland, 1978) will be used to provide a specific illustration of inventory evolution. An appreciation of this process may reduce some misunderstanding.

The VPI is composed entirely of occupational titles and provides scores on six homogeneous scales intended to assess the major dimensions of vocational interests. This device has undergone seven published revisions and several unpublished item analyses since the 1950s. The reasons for another revision were to improve the sex-fairness and psychometric properties of the inventory and to modernize its content.

The concern about the sex-fairness of the VPI and other devices employing homogeneous scales has resulted primarily from the mean differences obtained between men's and women's scores, from the inclusion of words like policeman or salesman that were not gender-neutral, and from doubts about the selection of items for inclusion—the belief being that equally useful items that do not result in sex differences in scores could be found.

We examined the effect of word endings (Gottfredson, 1976a) and discovered that changing salesman to salesperson, for example, did not change women's

scores. In addition, Boyd (1975) obtained similar results in a more comprehensive study. At the same time we learned that making this kind of word ending change did not harm item validity. Consequently, the Seventh Revision of the VPI includes only items with gender neutral endings, and publishers who adopted this revision without doing the research can breathe a sigh of relief. Although these changes probably have not reduced sex differences in total scores, they have not ruined the devices.

We also considered many occupational titles that might be both valid and result in decreased sex differences in total scores. Some items were discarded before collecting any new data because trials in earlier item analyses in the VPI's history indicated that these items would not scale properly. The items that remained were tested in a series of item analyses. In contrast to some textbook descriptions of item analyses that characterize scale construction as a one-shot

TABLE 1
Typical VPI Items

Item	Correlations						Sample	
	Real.	Inv.	Art.	Soc.	Ent.	Conv.		
Credit Investigator (C)	.08	-.03	-.10	.20	.44	.53	Men ^a	
	.07	-.03	-.12	.10	.45	.72	Women ^a	
	.17	.03	.01	.25	.42	.57	Men ^b	
	.16	-.17	-.23	.00	.46	.78	Women ^b	
	.24	-.10	-.18	.14	.28	.32	Boys ^c	
	.05	-.12	-.02	.08	.07	.22	Girls ^c	
	.30	.15	-.08	.06	.42	.48	Men ^d	
	.10	-.11	-.04	.20	.57	.56	Women ^d	
	Poet (A)	.02	.17	.64	.28	.00	-.05	Men ^a
		.07	.17	.63	.20	.12	-.24	Women ^a
-.28		.18	.65	.39	.06	-.02	Men ^b	
-.03		.22	.76	.32	.04	-.41	Women ^a	
-.17		.21	.49	.17	-.17	-.06	Boys ^c	
.22		-.06	.53	.08	.08	.07	Girls ^c	
-.08		-.12	.67	.14	-.03	-.15	Men ^d	
Speech Therapist (S)	.13	.14	.60	.25	.16	.06	Women ^d	
	.16	.18	.29	.60	.24	.14	Men ^a	
	.07	.26	.17	.58	.14	-.01	Women ^a	
	-.01	.06	.25	.60	.43	.29	Men ^b	
	.16	.21	.24	.66	-.16	-.07	Women ^b	
	-.15	.26	.18	.61	.10	.26	Boys ^c	
	.19	.11	.31	.57	.24	.15	Girls ^c	
	.08	-.04	-.03	.52	-.06	.04	Men ^d	
.22	.16	.08	.32	.00	.14	Women ^d		

We thank Geoffrey Kelso for drawing these three item cards at random from a deck containing all items included in the seventh revision occupational scales.

^aAccidental samples of men (n = 157-161) and women (n = 144-146) from a variety of college and employment settings.

^bMen (n = 45-46) and women (n = 37) tested at a fair in an industrial area outside Baltimore.

^cUrban high school boys (n = 71) and girls (n = 90) enrolled in a private suburban girls' high school.

^dMen (n = 93-94) and women (n = 92-96) attending a Canadian college.

TABLE 2
Selected Poor Items
Correlations

Item	Real.	Inv.	Art.	Soc.	Ent.	Conv.	Sample
Different patterns of correlations for men and women							
Dressmaker/tailor	.23	.25	.28	.09	.02	.04	Men ^a
	<i>.44</i>	.09	.23	.19	.12	.14	Women ^a
Hair stylist	-.04	-.13	.26	.27	.13	-.03	Boys ^b
	<i>.33</i>	-.06	.35	.07	<i>.37</i>	.29	Girls ^b
Military Officer	.03	.03	.27	.08	.14	.00	Men ^c
	.11	-.08	.10	.13	.29	.24	Women ^c
Police Officer	.20	-.14	.00	.12	<i>.43</i>	.27	Men ^c
	<i>.39</i>	.23	.16	.22	.24	.26	Women ^c
Police Officer	.16	.10	-.02	.14	.17	.15	Men ^c
	<i>.26</i>	.10	.09	.28	<i>.37</i>	.30	Women ^c
	<i>.45</i>	.04	-.30	.29	.18	.10	Boys ^b
	<i>.29</i>	.03	.18	.23	<i>.36</i>	.16	Girls ^b
	<i>.40</i>	.16	.09	.29	.06	.03	Men ^a
	<i>.26</i>	.28	-.02	.18	.08	.15	Women ^a
Not clearly related to any one scale							
Cook/Chef	.16	.18	.25	.10	<i>.32</i>	.20	Boys ^b
	<i>.27</i>	.10	.27	.04	<i>.30</i>	.24	Girls ^b
	.18	.16	<i>.34</i>	.23	.17	.01	Men ^a
	<i>.45</i>	.07	.19	.09	.20	.15	Women ^a
Homemaker	<i>.30</i>	-.02	-.08	-.04	.11	.19	Men ^a
	.14	.03	-.01	<i>.31</i>	-.01	.14	Women ^a
	-.03	.16	.25	.12	.29	<i>.43</i>	Boys ^b
	-.03	-.16	-.11	.05	.01	.03	Girls ^b
Industrial relations consultant	.06	.18	-.06	.27	<i>.35</i>	<i>.31</i>	Boys ^b
	<i>.24</i>	<i>.49</i>	.18	.11	<i>.44</i>	<i>.34</i>	Girls ^b
Sewing machine operator	.19	.07	.02	-.01	.07	.19	Men ^a
	<i>.31</i>	.14	.17	.20	-.01	.16	Women ^a
	.17	.16	<i>.32</i>	.04	.10	.17	Boys ^b
Veterinarian	.21	.18	.29	.18	.28	.14	Girls ^b
	<i>.32</i>	<i>.67</i>	<i>.41</i>	<i>.32</i>	.11	.04	Men ^c
	<i>.41</i>	<i>.57</i>	<i>.32</i>	.25	.23	.02	Women ^c
	.06	.20	-.03	.27	.07	.04	Boys ^b
	.17	.28	.12	<i>.42</i>	.13	.11	Girls ^b
Veterinarian	<i>.35</i>	<i>.39</i>	.00	.04	-.01	.01	Men ^a
	<i>.44</i>	<i>.48</i>	.00	-.06	-.14	.06	Women ^a

Note. All correlations over .3 or the highest correlations in a row are italicized.

^aCanadian college men (n = 89-95) and women (n = 91-95).

^bUrban high school boys (n = 70-71) and girls (n = 90).

^cAccidental sample composed of college men and employed men (n = 158-162) and college women and employed women (n = 145-146).

affair, item selection for the VPI proceeded in a sequence of analyses in several samples. To be included in a scale, an item must scale properly in all samples. Table 1 shows the results of this kind of analysis for a random sample of items in the Seventh Revision. Each item scales properly for both sexes in a variety of samples. Table 2 shows the results for some rejected items. The rejected items, e.g. sewing machine operator, correlate with different scales in different samples, do not correlate with the intended scale, or do not work in the same way for both sexes.

This method of scale construction selects robust items—items that work in about the same way in a variety of samples and for both sexes. Note that conducting the item analyses in this way ensures the inclusion of sex-fair items by one criterion: items correlate with the total score to about the same degree for both sexes.

Following a suggestion by Tittle (undated), an additional check on sex-fairness was conducted for every item in the revised VPI. Items were examined by the procedure described by Echternacht (1974) to detect item-group interaction. No item failed this test for item-sex interaction. As a way of assessing the efficiency of this test, some items that were rejected during the earlier item analyses were also examined. These items also passed the test.

We learned two things through this set of analyses: (a) the VPI items survived a specific statistical challenge, and (b) the Echternacht procedure is not much of a challenge. The item analysis procedures seem to be a more powerful safeguard against bias than the procedure recommended by Tittle.

Any item that did not work well for both sexes was discarded in the item analyses. Because an item must have passed not one, but a series of these tests, this process weeded out even marginal items. And because most items in the VPI have survived not only the present item analyses, but also a succession of item analyses in the past 25 years using samples from a variety of sources, we can expect the items to work well in a broad range of samples and for both sexes.

Although the contents of Table 1 are encouraging, a second outcome of these item analyses is disappointing. We were able to find only a few good substitute items that reduced male-female score differences. The use of these new items reduces sex differences slightly, but the changes are very small. Gottfredson, Holland & Holland (1978) give a more complete description of the results.

Parenthetically, we do not believe that the way the VPI has evolved is the only way to develop an inventory. In addition, no development procedure can guarantee that a test will have beneficial effects in practical applications. Nevertheless, the foregoing description of VPI development may reduce some misunderstanding.

Assessing Validity

A fifth reason for lack of agreement about sex fairness is that different authors define and assess validity in different ways. Partly because of the complexities in validating interest measures against job satisfaction, test developers have often assessed the efficiency with which interest inventories can forecast a person's career choice or actual occupation. The assumption underlying this procedure is that, other things being equal, people will enter and remain working at occupations they find satisfying.

The evaluation of an inventory against the seemingly straightforward criteria of occupation or vocational choice has resulted in some confusion. A common procedure is to group actual occupations according to a classification scheme, assign people to a predicted category based on their interest scores, and tally agreement between the interest results and the occupational groups to which people actually belong on follow-up. Interest scores can be used in a variety of ways to assign people to predicted categories. People have been categorized according to high-point raw score codes, high-point same-sex normed scores or discriminant scores. In addition, agreement between interest scores and occupational groupings have been assessed in different ways: percentage agreement that reflects category size, percentage agreement that ignores category size, and an agreement index (*kappa*) that excludes agreement due to chance from the tally (Cohen, 1960; Tinsley & Weiss, 1975).

Because the different statistical procedures used to establish validity can suggest different interpretations, disagreement may result. Discriminant function analyses show that inventories composed of scales which minimize sex differences, called balanced scales, have some concurrent validity (Hanson & Rayman, 1976). It has been argued then that use of the balanced scales is preferable to the use of traditional scales because the discriminant scores derived from these scales can be used to predict occupational group membership almost as efficiently within sex as can discriminant scores derived from scales showing larger sex differences. What the results show, however, is that the weighted linear composites derived from sex-balanced scales have some usefulness. Such within sex discriminant analyses have no clear relevancy to discussions of sex differences in central tendency (i.e., means) of the original scores. Instead, the predictive results apply to the linear composites from the discriminant analysis. This distinction has not been made clear in the literature on sex-fairness.

The meanings of percentage of agreement are also sometimes unclear. A high overall percentage agreement may result because of a high degree of correct identification of large criterion groups combined with lower efficiency in identifying members of relatively small groups. In contrast, procedures that

TABLE 3
An Illustration of Two Ways of Assessing Hit Rates (Percents)

Criterion group	Raw scores		Same-sex standard scores		n
	Number ^a correctly identified	Percent correctly identified	Number ^a correctly identified	Percent correctly identified	
Realistic	0	0	13	45	(29)
Investigative	--	--	--	--	-- ^b
Artistic	8	44	8	44	(18)
Social	218	84	140	54	(260)
Enterprising	9	24	14	38	(37)
Conventional	24	30	31	39	(80)
Total number correctly identified		259		206	
Unweighted avg. hit rate		36		44	
Overall hit rate		61		48	

^aCalculated from Hanson, Noeth and Prediger (in press, Table 1).

^bResults for women in this category were not shown in the Hanson et al. report.

ignore category size by averaging the percentage agreement across criterion categories without taking category size into account may not reveal large absolute numbers of misidentified people in the larger criterion categories.

An example illustrates the percentage agreement problem. Table 3 is adapted from a report by Hanson, Noeth & Prediger (in press⁹²) which compares different scoring procedures for predictive efficiency. The table is simplified by showing only the results for raw score high-point codes and same-sex standard scores for women. To illustrate the difference between overall hit rates and unweighted average hit rates, columns showing the numbers correctly predicted were calculated from information in the Hanson et al. report. These numbers were then used to calculate the overall hit rate, which was not reported by Hanson et al. Unfortunately, insufficient data were reported to calculate kappa.

The overall hit rates and the unweighted average hit rates in Table 3 can suggest divergent interpretations. Because the unweighted average hit rate method ignores criterion group size, it gives the same weight to the low hit rate for the enterprising category ($n = 37$) as to the high hit rate in the social

92 Editors' note. Published in 1977.

category ($n = 260$). As a result, a scoring procedure which correctly identifies many common events, but which fails to identify large numbers of rare events can obtain a relatively low unweighted average hit rate: raw scores 36 percent, same-sex standard scores 44 percent. In contrast, the overall hit rates were 61 percent for raw scores and 48 percent for same-sex standard scores.

In some cases, large hit rates can be obtained simply by chance. For this reason, we have adopted the practice of reporting kappa, an index of agreement that eliminates agreement due to chance. Readers interested in comparing *kappas* to hit rates can examine the results in Gottfredson & Holland (1975), where some of the paradoxes in assessing hit rates are discussed in a different way and for different data. Prediger (1977) discusses these paradoxes from a different perspective.

One way of promoting consensus about the predictive efficiency of different scoring procedures would be to report both types of hit rates or to provide enough detail for readers to calculate them and to report or provide data for computing kappa as well.

Definitions of Fairness and Bias

A sixth reason for the lack of consensus about sex fairness in interest measurement is that agreement on definitions of bias is lacking. Instead of agreement, there are multiple definitions (Department of Health, Education and Welfare, 1975, section 86.36; Diamond, 1975; Holland, 1975b; Prediger & Hanson, 1974; Separate Sex Norms Must Meet OCR Regulations, 1976). Without agreement on a single definition, there can be no conclusive test of an inventory for bias. Put another way, different criteria or definitions will lead to different conclusions about the absence or presence of sex bias. Recent discussions by Herman (1977) and Schaffer (1977) illustrate some of the issues and dilemmas created by the *Title IX Guidelines* (U.S. Department of Health, Education and Welfare, 1975).

Because interest inventories have multiple uses, the divergence of opinion about definitions is not surprising. We may be able to promote progress in sex-fairness by keeping the many uses of inventories in mind when assessing an inventory, scoring procedure, or counseling application for possible bias.

Toward Fairer Use of Interest Inventories

We suggest that everyone can agree on three points: (a) Both the counselor and the client should be clear about the purpose of the intervention at hand. (b) Any intervention that is characterized to the client as an assessment should have good construct validity and the nature of the constructs and scoring procedures

involved should be clear to both the counselor and the client. This implies that assessment be made an open learning experience for the person assessed (cf. Dailey, 1971, on the qualities of good assessment). (c) Research and evaluation will make more useful contributions to the development of helpful interventions than untested speculations about the fairness of particular procedures.

Finally, the following suggestions may foster a consensus on sex-fairness in interest measurement and stimulate the fair use of vocational interventions:

1. Recognize that assessment has multiple purposes, and that these purposes may sometimes be in conflict.

2. Recognize that for some purposes interest scores should, at the present time, reflect the sex-related differences in people's learning histories.

3. Assume that any definition of sex bias has some value or usefulness. Test a proposed definition in experiments devised to learn what actually happens when a treatment or inventory is used with men and women. If undesirable outcomes occur, find a way to overcome that undesirable effect. Explore what a particular solution does and does not accomplish.

4. Learn more about the consequences of using different kinds of inventories through research to evaluate these interventions. This research should consider as outcome variables a wide range of purposes of vocational interventions—exploration, personal insight, self-confidence, predictive validity, occupational knowledge, diagnostic usefulness—and not be limited to a single purpose.

5. Continue to study the antecedents of mature vocational interests. By learning how interests develop, we may learn how to influence their development in beneficial ways.

6. Use the knowledge gained through research and evaluation to create new interventions with stronger and more beneficial effects. Disseminate this knowledge with trainers and resource materials.

7. Explain routinely and in an explicit way to consumers what a proposed vocational treatment may do to them so that they have the option of accepting or rejecting a treatment. Everyone should have the explicit right to accept or reject treatment. Testing, scoring, norming and special reporting procedures should be explained in plain English.

Develop a healthy skepticism about untested intuition. Too often, participants in this controversy have acted as if untested intuitions were equivalent to the results of a program of research.

References

- Boyd, V. S. (1975). *The linguistic structure of the Self-Directed Search: A study of sex-role stereotyping*. Unpublished doctoral dissertation, University of Maryland, College Park, 1975.
- Campbell, D. P. (1974). *Manual for the Strong-Campbell Interest Inventory T-325 (Merged Form)*. Stanford, CA: Stanford University Press.
- Cohen, J. A. (1960). A coefficient of agreement for nominal scales. *Educational and Psychological Measurement* 20, 37-46.
- Cooper, J. F. (1976). Comparative impact of the SCII and the Vocational Card Sort on career exploration of women. *Journal of Counseling Psychology*, 23, 348-352.
- Creaser, J. & Carsello, C. (1976). Comparability of cross-sex scores on the Strong-Campbell Interest Inventory. *Journal of Counseling Psychology* 23, 360-364.
- Dailey, C. A. (1971). *Assessment of lives*. San Francisco, CA: Jossey-Bass.
- Department of Health, Education and Welfare. (1975). Nondiscrimination on the basis of sex in educational programs and activities receiving or benefitting from Federal financial assistance. *Federal Register*, 40, 24128-24145.
- Diamond, E. (Ed.). (1975). *Issues of sex bias and sex-fairness in career interest measurement*. Washington, DC: National Institute of Education.
- Echternacht, G. (1974). A quick method for determining test bias. *Educational and Psychological Measurement*, 34, 271-280.
- Gottfredson, G. D. (1976). A note on sexist wording in interest measurement. *Measurement and Evaluation in Guidance*, 8, 221-223.
- Gottfredson, G. D. (1976, September). Good items, bad items, sex and the Vocational Preference Inventory. Paper presented at the American Psychological Association Convention, Washington D.C.
- Gottfredson, G. D., & Holland, J. L. (1975). Vocational choices of men and women: A comparison of predictors from the Self-Directed Search. *Journal of Counseling Psychology*, 22, 28-34.
- Gottfredson, G. D., Holland, J. L., & Gottfredson, L. S. (1975). The relation of vocational aspirations and assessments to employment reality. *Journal of Vocational Behavior* 7, 135-148.
- Gottfredson, G. D., Holland, J. L., & Holland, J. E. (1978). The seventh revision of the Vocational Preference Inventory. *JSAS Catalog of Selected Documents in Psychology*, 8, 98. (Ms. No. 1783)
- Hansen, J. C. (1974). *Coding strong vocational interest blank items according to Holland's theory of personality types*. (Unpublished doctoral dissertation). University of Minnesota.
- Hanson, G. R., & Cole, N. S. (Eds.). (1973). *The vocational interests of young adults (Monograph 11)*. Iowa City, IA: ACT Publications.

- Hanson, G. R., Noeth, R. J., & Prediger, D. J. (In press). The validity of diverse procedures for reporting interest scores: An analysis of longitudinal data. *Journal of Counseling Psychology*.
- Hanson, G. R., & Rayman, J. (1976). Validity of sex-balanced interest inventory scales. *Journal of Vocational Behavior* 9, 279-291.
- Herman, D. O. (1977, March). Separate-sex norms and Title IV: Measurement issues. Paper presented at the American Personnel and Guidance Association Convention, Dallas.
- Holland, J. L. (1975). *Manual for the Vocational Preference Inventory*. Palo Alto: Consulting Psychologists Press.
- Holland, J. L. (1975). The use and evaluation of interest inventories and simulations. In E. Diamond (Ed.). *Issues of sex bias and sex-fairness in career interest measurement*. Washington, DC: National Institute of Education.
- Holland, J. L. (1977). *Toward definable and beneficial resolutions of the interest inventory controversy*. Unpublished paper, Department of Social Relations, Johns Hopkins University.
- Holland, J. L., & Gottfredson, G. D. (1976). Sex differences, item revisions, validity and the Self-Directed Search. *Measurement and Evaluation in Guidance*, 8, 224-228.
- Holland, J. L., & Gottfredson, G. D. (1976). Using a typology of persons and environments to explain careers: Some extensions and clarifications. *Counseling Psychologist*, 6, 20-29.
- Kelso, G. I. (1976). *Explorations of the developmental antecedents of Holland's occupational types*. (Unpublished doctoral dissertation) Johns Hopkins University.
- Krumboltz, J. (1976). A social learning theory of career selection. *Counseling Psychologist*, 6, 71-81.
- Lunneborg, P. W. (1975). Interpreting other sex scores on the Strong Campbell Interest Inventory. *Journal of Counseling Psychology* 22, 494-499.
- Maccoby, E. E., & Jacklin, C. N. (1974). *The psychology of sex differences*. Stanford: Stanford University Press, 1974.
- Prediger, D. J. (1977). Alternatives for validating interest inventories against group membership criteria. *Applied Psychological Measurement* 1, 275-280.
- Prediger, D. J., & Hanson, G. R. (1974). The distinction between sex restrictiveness and sex bias in interest inventories. *Measurement and Evaluation in Guidance*, 7, 96-104.
- Prediger, D. J., McLure, G. T., & Noeth, R. J. (1976). Promoting the exploration of personally relevant career options in science and technology (Final report to National Science Foundation). Iowa City: American College Testing Program.
- Rayman, J. (1974). *Sex and the single interest inventory: An empirical validation of sex-balanced vocational interest inventory items*. (Unpublished doctoral dissertation). University of Iowa.

- Schaffer, W. M. (1977, March). *Separate-sex norms for tests: Status under Title IX*. Paper presented at the Annual Convention of the American Personnel and Guidance Association, Dallas, TX.
- Separate Sex Norms Usage Must Meet OCR Regulations*. (1976). *APGA Guidepost*, July 22, p. 12.
- Tinsley, H. E. A., & Weiss, D. J. (1975). Interrater reliability and agreement of subjective judgments. *Journal of Counseling Psychology*, 22, 358-376.
- Tittle, C. K. (Undated). *Fairness in educational achievement testing*. Unpublished manuscript, Queens College, City University of New York.
- Tittle, C. K., & Zytowski, D. G. (Eds.). (1978). *Sex-fair interest measurement: Research and implications*, pp. 43-51. Washington, DC: National Institute of Education.
- Van de Geer, J. P. (1971). *Introduction to multivariate analysis for social sciences*. San Francisco: Freeman.
- Vondracek, S. I. & Kirchner, E. P. (1974). Vocational development in early childhood: An examination of young children's expressions of vocational aspirations. *Journal of Vocational Behavior*, 5, 251-260.
- Zener, T. B., & Schnuelle, L. (1976). Effects of the Self-Directed Search on high school students. *Journal of Counseling Psychology*, 23, 353-359.

Exhibit 5C: Letter to Melvin Novick, 1992

March 1992

Dr. Melvin R. Novick
Lindquist Center for Measurement
The University of Iowa
Iowa City, Iowa 42242

Dear Mel:

I appreciate your gracious letter. Perhaps I should try one more Dale Carnegie course.

I assume that your committee does not want to wade through all the evidence and opinion, so I have prepared a little short course at three levels of effort.

Exhibit A is a clipping from the Washington Post about standardized tests. If the reader substitutes “sex” for “race” in this story, they will have a summary of what many psychologists now believe about the alleged sex biases of interest inventories.

Exhibits B and C are two recent rebuttals to the hypothesis that normed scores help women more than raw scores—one of many facets of the controversy.

Exhibit D was an attempt to provide a summary of the controversy about the alleged sex bias of interest inventories. It lays out “the ambiguities, dilemmas and evidence dredged up” as of 1977. Exhibit D also indicates “the multiple goals of career counseling.” Exhibits B and C as well as the manuals for the Strong-Campbell, Self-Directed Search, and ACT inventories bring us up to 1981.

In rereading Exhibit D, I would change very little except to emphasize that the controversy is not resolvable with data, but I would still support the recommendations to explore the side effects of interest inventories, but not forever.

As Exhibit D indicates, we (authors) have tried a great range of ideas for making inventories more helpful for both sexes (gender-neutral words, revised directions, balanced scales, norms, special orientations and interpretative materials). All of these revisions either make no empirical difference to either sex, or they reduce the predictive or content validity. In short, no one has demonstrated that any inventory is fairer or more useful than another despite gross differences in content, scoring, developmental processes, etc. In this regard, the NIE Guidelines generally have no empirical support. Their chief use has been to harass publishers and authors about things that don’t make a difference. Publishers have caved in to political pressure not to any evidence.

I hope the committee finds these materials helpful, and I hope they will poll other authors for their view on these issues. I will be happy to respond to any further inquiries, the references in these articles contain most but not all of the relevant evidence.

Cordially,

John Holland
Professor Emeritus

JH/sls

SECTION 4

PERSPECTIVES ON HOLLAND'S CONTRIBUTIONS TO RESEARCH AND PRACTICE

The three articles in this section review, evaluate, and discuss the contributions Holland made to vocational psychology, counseling, and research in higher education. All three of these articles originally appeared in a *Festschrift* for Holland published in a special issue of the *Journal of Vocational Behavior* that was invited by Mark Savickas, editor of the journal. All three are written by colleagues and collaborators of John Holland and of each other.

The first item, "A Review and Evaluation of John Holland's Contributions," was initially drafted shortly after Holland formally retired from Johns Hopkins University. It was presented at a symposium at an American Psychological Association convention that had been organized by Arnold Spokane and Gary Gottfredson. Years later Gottfredson updated the manuscript to produce the version presented here. Gottfredson benefited from decades of collaboration and friendship with Holland, so this review is in no sense an unbiased account.

The review in the first chapter of this section is not limited to an account of Holland's contributions to vocational psychology and career counseling. Although many readers may be most familiar with Holland's theory of vocational personalities and work environments, if Holland had never developed this theory his contributions, to the psychology of talent and to understanding student selection and sorting in higher education, would have by themselves distinguished him as a creative and influential contributor to these fields. Furthermore, much of Holland's contribution to science and practice was his influence on coworkers, students, and others. Gottfredson's account describes all of these contributions and speculates with evidence on how Holland's research style led to these contributions.

The second item, “The Meaning and Measurement of Environments,” was written for the *Festschrift*. The authors are Linda Gottfredson, sociologist and professor emeritus at the University of Delaware, and James M. Richards, Jr., applied psychometrician, population, and environmental psychologist. Linda Gottfredson worked with Holland when she was a graduate student in social relations at Johns Hopkins University, and Mac Richards had worked with Holland at the American College Testing Program before joining him again at Hopkins. Their article focuses on the environmental classification and illustrates its applications. Because most professionals who use Holland’s theory in counseling or research overlook the power of the environmental formulations and assessment tools, this chapter is especially important for those who seek to understand fully the theory and its applications.

The third item, “Holland’s Theory and Career Intervention,” highlights the power and practical contributions of the theory and derived applications—especially the Self-Directed Search—in career counseling. Jack Rayman and his co-author Lynne Atanasoff analyze the nature of the assessment and counseling tools engineered by Holland to identify the components that led to their influence. Rayman was a colleague and friend of Holland for many years. He was the long-time Director of Career Services at The Pennsylvania State University where, like Thomas Magoon at the University of Maryland, he was able to offer Holland access to clients and a practical testing ground for career interventions. The Rayman and Atanasoff analysis makes it clear that the quality of the science and psychometrics that go into these practical devices is not the only determinant of their power, but the way that insight is communicated to counselors and clients, how material is arranged, and how information is disclosed to clients also matter immensely. Their analysis will be important not only to understand what Holland has done, but also how others might emulate these accomplishments.

The three articles reprinted here were published in 1999. As a reviewer of the manuscript for this book noted, Holland’s work has continued to influence theory, research, and practice long after these articles were written.

CHAPTER 4.1

JOHN L. HOLLAND'S CONTRIBUTIONS TO VOCATIONAL PSYCHOLOGY: A REVIEW AND EVALUATION⁹³

Gary D. Gottfredson

Gottfredson Associates, Inc.

John L. Holland pioneered in assessing the environments of colleges and universities and their influence on students. His research has been central in the development of knowledge about nonacademic accomplishments. His theory of vocational personalities and work environments revolutionized the delivery of vocational assistance worldwide. He made contributions to research on originality and interpersonal competence. And he influenced our field through his influence on other psychologists. Persistence, focus, horizon-scanning, the interpretation of evidence in novel ways, revision of ideas based on evidence, an emphasis on the practical, generosity with colleagues, and intellectual tension are themes that characterize Holland's working style and explain his enormous influence. Much remains to be done to fully explore and extend Holland's theoretical contributions in the areas of development and socialization, personal and environmental change, assessment and influences of environments, and effects of vocational interventions.⁹⁴

John L. Holland's monumental research, theoretical, and practical contributions have irrevocably altered the manner in which career assistance is delivered around the world. In his energetic and creative career he has pioneered in assessing the environments of institutions of higher education and their influence on students. He developed a marvelously useful theory of vocational personalities and work environments. He has been central in the development of knowledge about nonacademic accomplishments. He has made contributions to research on originality and interpersonal competence. He has worked to develop career assistance tools to help counselors and clients understand and cope with

93 Editors' note. Originally published as: Gottfredson, G. D. (1999). John Holland's contributions to vocational psychology: A review and evaluation. *Journal of Vocational Behavior*, 55, 15-40. Reprinted by permission of the publisher.

94 I am grateful for the bibliometric work of Richard D. Joffe, summarizing the period before 1980, and for the editorial counsel of Ellen R. Czeh and Mark L. Savickas.

vocational problems. Finally, Holland has influenced our field through his generative effect on others. Former colleagues, students, and those stimulated by his work are some of today's most active and innovative researchers in education, counseling, and vocational behavior.

The following sections describe Holland's contributions and several themes or styles that pervade his activities. A final section describes an agenda for future research suggested by Holland's products, theorizing, and speculations.

The Contributions

I will describe four categories of John Holland's contributions: (a) the intellectual contributions, (b) the engineering of practical devices, (c) the unfrocking contributions, and (d) his influence on the work of scientists and practitioners.

Intellectual Contributions

College effects. At one time, it was widely assumed that some colleges had vastly more positive influence than others. In a 1957 article published in *Science*, "The Undergraduate Origins of American Scientists," Holland demonstrated that different universities obtain divergent pools of talented students. This study implied that if one considers the characteristics of students recruited to an institution of higher education, little evidence of an institutional contribution to the production of scientists can be found. Subsequently, Astin (1962) and others developed input-output models to test this idea, and these landmark investigations helped to set the paradigm for what has since become the subfield of the psychology and sociology of college effects. After 40 years of active research, the conclusion of that 1957 paper has become the received view among knowledgeable social scientists. To a remarkable degree, input determines output in academic accomplishment (Astin, 1977, Appendix tables).

This is not to say that students do not change in a number of ways over their college years. Newcomb's (1943) early research on accentuation of political and social attitudes, the Astin and Panos (1969) research on the vocational development of college students, and Astin's (1977, 1993) more recent work imply that many changes occur. But the input-output paradigm has provided a major approach to the study of institutional influences.

Also important for research on the influence of institutions on students has been the Environmental Assessment Technique, suggested by Astin and Holland in 1961. The idea of characterizing an environment by using a census of its inhabitants provided researchers with a tool for studying colleges and other environments. This strategy has become a regular part of the tool kit of

psychological researchers (Moos, 1973; Richards, Seligman, & Jones, 1970).

Holland's theory of vocational personalities and work environments. The intellectual contribution for which John Holland is best known is his evolving (1959b, 1966, 1973, 1985a, 1997) theory of careers. This theory has multiple origins. The first, which derives from Murray's (1938) work, is the assumption that behavior depends on both personality and environments. The second is the literature in vocational psychology on the structure of interests and personality (Darley & Hagenah, 1955; Guilford, Christensen, Bond, & Sutton, 1954), and job dimensions (McCormick, Jeanneret, & Mecham, 1972). The third is the Vocational Preference Inventory (Holland, 1958), a personality inventory based on occupational titles. The evolution of the theory into its present form has been shaped by the guidance obtained from research examining successive versions of the theory.

A remarkable feature of Holland's work has been the sustained way in which he has used evidence and criticism to revise his theory, which was first published in the *Journal of Counseling Psychology* in 1959. This account antedated a series of theory-based research projects conducted by Holland and his colleagues in the 1960s (esp. Holland, 1962; Holland & Nichols, 1964). About 14 major studies related to the first formulation were published between 1959 and 1966. The theory underwent a revision with publication of *The Psychology of Vocational Choice: A Theory of Personality Types and Model Environments* in 1966. The role of the environment and specifications of ways to measure environment were spelled out more clearly in this second version of the theory.

Up to this time, most of Holland's research on the theory had involved youths of high scholastic ability. Reviews of the theory and associated evidence (Osipow, 1973; Walsh, 1973) often cited this limitation of the early research (talented student populations) as a potential limitation of the theory. In the 1960s, Holland (1962, 1966) was also circumspect about the applicability of his measures to both men and women. This scholarly circumspection was appropriate at the time, but subsequent research has rendered the earlier reviews out of date.

Following publication of the 1966 revision of the theory, Holland and his colleagues performed another ten major theory-based studies. The theory was again revised in 1973. The most notable revision was the explicit incorporation of the hexagonal arrangement of types for assessing degrees of congruence. In addition, the theoretical statement in *Making Vocational Choices: A Theory of Careers* (Holland, 1973) is clearer and more systematic. It contained typologies of persons and of environments that had been developed and revised in response to evidence, used a hexagonal model to coordinate and specify the degrees of resemblance among personality types and environments, offered speculations about development, and provided specific methods for measuring the theoretical

constructs. The evidence on which this 1973 revision was based was no longer limited to the work of Holland and his co-workers; many researchers and practitioners had tested his ideas. The 1973 book reviewed this evidence.

By the time the 1973 version of the theory was published, many reviewers' worries about its applicability to women, to adults, and to a wide range of youths were already being put to rest by evidence. Vocational Preference Inventory data from 43,391 two- and four-year college students—both men and women—had been used to test the hexagonal representation and to classify occupations. Cole's (1973) study of men's and women's interests supported the hexagonal arrangement for both. Holland's (1968) monograph had reported impressive support for most of the theoretical formulations in a longitudinal study of typical college students. Job analysis data (based on PAQ dimension scores, McCormick et al., 1969), and vocational interest data (Campbell & Holland, 1972) had provided evidence from working adult samples that was used to bolster the occupational classification (Holland, Viernstein, Kuo, Karweit, & Blum, 1972). And, the predictive efficiency of the occupational classification had been tested using work histories from a national sample of about 1000 adult men (Holland, Sørensen, Clark, Nafziger, & Blum, 1973), and similar positive results had been obtained with large samples of young men and women (Nafziger, Holland, Helms, & McPartland, 1974) and older men (Parsons, 1971).

In the 1970s, the journals published numerous articles by independent scholars examining the theory or its uses, and Holland continued to contribute to this literature at a rapid rate. Holland and Gottfredson (1976) extended and clarified the theory, and Holland (1977b) revised the occupational classification to accord with accumulating data. Measurement research was intense during the 1970s, because interest inventories and many other tests were presumed to be contaminated by sex bias. One journal editor who rejected an article (later published, G. Gottfredson, 1976) showing that changing items such as “policeman” to “police officer” made no difference in the proportion of women indicating a preference for the occupation wrote, “We are assuming the existence of sex bias and attempting to eliminate it, despite our inability to demonstrate its existence.”

Unlike the authors of other inventories who made changes to items before doing needed research, Holland insisted that data support decisions about revisions. Following almost feverish effort, both the Self-Directed Search and the Vocational Preference Inventory were revised in 1978 (G. Gottfredson, Holland, & Holland, 1978; Holland, Gottfredson, & Holland, 1978), incorporating psychometrically defensible replacements for offensive items such as “policeman” and other changes to reduce sex differences to the extent possible. Fortunately, the evidence implied that most wording changes did not harm the measurement properties of scales, although some revisions were rejected because they did not produce the expected results.

Holland's research during the 1970s actively tested his core hypothesis that vocational choices express personality, explored the diagnostic value of vocational identity, and tested the validity of secondary concepts of consistency and differentiation. He conducted an ambitious study designed to test the validity of many of the ideas in his 1973 book. That study (Holland, Gottfredson, & Nafziger, 1975) suggested the usefulness of a new identity scale as a diagnostic sign of decision-making difficulty. Other research by Holland and collaborators showed that a Vocational Identity scale had useful properties (Holland, D. Gottfredson, & Power, 1980).

Also in the 1970s, Holland and his colleagues vigorously pursued a series of investigations testing and confirming the applicability of his taxonomy to working adult men and women. If, as Holland's theory implied, vocational choices were expressions of personality, then successive choices or occupational destinations should tend to be in the same or related occupational category. Holland et al. (1973), Nafziger et al. (1974), and G. Gottfredson (1977), using large national samples, showed that successive jobs or occupations in adult careers were predictable from the category and subcategory of previous jobs, and that predictability increased with age.

The 1985 revision of Holland's theory built on the research of the 1970s by being more comprehensive and explicit in describing constructs and applications, and incorporated the identity construct. Because some critics of earlier versions did not seem to understand the "other things being equal" nature of any theory of limited scope, Holland wrote clearly about boundary conditions in the 1985 book. He also introduced subsidiary notions about (a) the role of learning in the development of interests and the usefulness of Staats' (1975, 1981) perspective on the learning of behavioral repertoires and affect-laden preferences and (b) how homogeneity of behavior settings may be related to environmental identity.

Of the changes introduced in the 1985 statement, the construct of vocational identity attracted the most attention. Perhaps partly because a simple, easy-to-use measure of vocational identity was available, a great deal of research on the correlates and practical meaning of a person's vocational identity ensued. In the 20 years before the appearance of Holland's first report on vocational identity (Holland et al., 1975), only two articles on vocational identity appeared in journals abstracted in PsychLIT. A spate of research, much of it conducted by Holland and his colleagues or stimulated by Holland's ideas, produced 13 articles in these journals between 1975 and 1984. Then, 61 articles appeared in the decade 1985 to 1995. A series of studies have shown that the Vocational Identity scale is a useful outcome measure in evaluations of career interventions (Kivlighan & Shapiro, 1987; Johnston, Smither, & Holland, 1981; Rayman, Bernard, Holland, & Barnett, 1983) and that it has desirable psychometric properties (Holland, Johnston, & Asama, 1993). In contrast, Holland's introduction of untested ideas

about behavior settings, environmental identity, and the learning of behavioral repertoires and affect-laden preferences and aversions attracted no attention.

Holland incorporated further revisions in the 1997 statement of his theory. This most recent statement adopted a change in vocabulary to characterize the psychological types in terms of “beliefs,” incorporating some long available evidence about beliefs and vocational personality. Each personality type has distinctive beliefs about the self and about the consequences of actions, and each model environment promotes different belief systems. The 1997 version also gave greater emphasis to vocational identity, reflecting the research that has shown the usefulness of this construct and the scale that implements it. A tool for assessing work environments in typological terms, the Position Classification Inventory (G. Gottfredson & Holland, 1991), was used as an additional explicit method for implementing the environmental classification. Another change was the more explicit cross-classification of type of work with level of work that is reflected in the substantive complexity dimension. Finally, undaunted by the lack of research testing his idea that an environment’s “identity” equals the inverse of the number of distinct behavior settings defined in typological terms, Holland reiterated this proposed operationalization of environmental identity in the 1997 statement. An alternative (also untested) way to operationalize environmental identity was also included—the Organizational Focus Questionnaire.

Academic and nonacademic accomplishments. A third area in which Holland has made major intellectual contributions is the study of academic and nonacademic accomplishments. He and his colleagues produced evidence that more than a single dimension of talent is important in life. Studies by Thorndike and Hagen (1959); Getzels and Jackson (1962); MacKinnon (1962); Torrance (1962); Gough, Hall, and Harris (1963); and Taylor (1958) implied that correlations between academic aptitude as measured by typical tests and nonacademic achievement and originality are modest. But those studies generated controversy: They were contrary to popular belief (at least among psychologists), and they were criticized as being the result of statistical artifacts or for using faulty criteria (McNemar, 1964; Werts, 1967). In a series of reports (Baird & Richards, 1968; Holland & Richards, 1967; Hoyt, 1966), Holland and his colleagues provided compelling evidence that college selection practices relying heavily on measures of academic potential result in much lost talent. Selecting students from about the top decile of high school grades, for example, would exclude about 86% of high school class presidents. Selecting only A students results in the exclusion of about 95% of national science award winners.

This area of research has been a sleeper that has shown only sporadic signs of waking up. Although Holland’s attempts to engineer methods to assess potential for creativity (Holland & Baird, 1968b) and interpersonal competency (Holland & Baird, 1968a) received little attention, the notion that talent is multidimensional

and the idea that common selection practices can be counterproductive have been suggested from time to time. Tyler's (1973) APA presidential address contrasted sharply with McNemar's (1964) presidential address 9 years earlier. Whereas McNemar had flagellated researchers (including Holland, 1961) who suggested that nonacademic accomplishments may be largely independent of measures of academic potential, Tyler called for a more hopeful psychology with multidimensional thinking about testing.

Reviews of the empirical literature on varieties of accomplishment and admissions practices were published by Richards (1970) and by Wing and Wallach (1972). Hirschberg and Itkin (1978) reported a negative correlation between GRE verbal scores and publication among psychology graduate students, and a positive correlation for undergraduate research experience with this same criterion. A longitudinal study by Munday and Davis (1974) convincingly showed that measures of nonacademic performance in college are useful predictors of certain adult accomplishment, whereas typical measures of academic potential are not. Finally, the convincing demonstrations that most of the predictive value of cognitive ability tests can be had from tests of general cognitive ability (Schmidt, Ones, & Hunter, 1992) seems to have stimulated further interest in non-cognitive aspects of personality that predict important performance outcomes.

Schmidt and Hunter (1998) have summarized evidence that non-cognitive aspects of personality are useful for predicting work performance. Evidence implies that conscientiousness and initiative are important dimensions of performance in graduate departments of chemistry, English, and psychology (Reilly, 1976) and that conscientiousness and need for achievement predict success as psychology graduate students (Hirschberg & Itkin, 1978). Biographical data related to interests or achievements of a creative nature predict creativity among scientists (McDermid, 1965; Whiting, 1972) and artistic performance among artists (James, Ellison, Fox, & Taylor, 1974); personality or interests related to leadership, energy, sociability, ascendance or dominance predict earnings among MBA graduates (Harrell, Harrell, McIntyre, & Weinberg, 1977). Very recently, Enright, Rock, & Bennett (1998) again found trivial correlations between cognitive measures (Graduate Record Examination scales) and accomplishments in aesthetic expression, practical language, and leadership. In short, although the research that Holland and his colleagues began to report in the early 1960s did not attract a focused or programmatic research effort in the same way his theory of personality and environments did, it remains a potentially high payoff area for further research and development. The potential to develop useful non-cognitive predictors of nonacademic accomplishments appears great.

Engineering Practical Devices

The contributions that may be most directly responsible for Holland's appeal to practitioners are the instruments he has engineered. The devices Holland has developed are not typical examples of psychological tests. All are marked by a common cachet—they are practical devices. The easily scored Vocational Preference Inventory (Holland, 1985b), the self-scored and self-interpreted Self-Directed Search (SDS; Holland, Fritzsche, & Powell, 1994; Holland, Powell & Fritzsche, 1994), and My Vocational Situation (Holland et al., 1980)—are all designed to provide vocational assistance cheaply and with minimal counselor intervention.

Holland's practical self-help devices are distinctive in part because he developed them during years when psychology was throwing up barriers against clients making their own use of tests by insisting that psychologists interpret tests for them (American Psychological Association, 1975, Principal 14). This narrowmindedness on the part of the profession contributed to nonpsychologists filling the gap in the provision of vocational assistance. Fortunately, this narrowmindedness is gone from the current version of the Ethical Principles.

These popular practical devices attest to the utility of Holland's theoretical work. The Self-Directed Search could not have been developed without useful typologies, because it requires classifications of persons and occupations in parallel terms: the six personality types and the six categories of occupations. The initial use of these typologies in restructuring the Strong-Campbell Interest Inventory (Campbell, 1974), and its current use in the Strong Interest Inventory as well as a number of imitations also attest to the theory's value.

The practical nature of these devices is the result of explicit and continuing effort to use appropriately simple technology and to put assessment in the hands of the user. It is easier for test-taker and counselor to use a paper version of the SDS than to send a bubble sheet off to a scoring service, and it is probably easier, faster, and less expensive to use a paper version than to use a computerized adaptation of the SDS. The structure of the SDS also makes the scoring and nature of assessment transparent to the user—an additional benefit. Holland has continued to seek appropriately simple technology in more recent assessment tools. For example, the Career Attitudes and Strategies Inventory (Holland & Gottfredson, 1994) is intended to be scored and interpreted by the user, who may or may not decide to share the results with a psychologist or other helping professional.

Unfrocking Contributions

I have labeled one category of Holland's contributions "unfrocking" contributions. These are not distinct from his other intellectual contributions,

but discussing this aspect of his work separately calls attention to his intellectual independence and ability to see what others overlook. He has repeatedly challenged the prevailing views of psychologists by bringing counter evidence into the discussion or by presenting a divergent, usually practical, point of view.

Holland's hypothesis that the relatively large number of PhDs and scientists produced by elite institutions may be due more to recruitment and selection of students than to the effects of these institutions is a good illustration of his unfrocking activity. The studies of academic and nonacademic accomplishment, which implied that excessive focus on academic aptitude tests and grades to select students may be unfortunate, is another. That these contributions were met by the howls of those unfrocked is not surprising. Critics complained that ranges were restricted and that the criteria of accomplishment were trivial. Well, they turned out to be wrong when the dust settled. Creating the confrontation required (a) a nose for news, (b) a straightforward and clear statement of the news, and (c) the persistence, talent, and resources to cope with critics. On occasion the critics have been excoriating, arrogant, and acrimonious, as well as mistaken.

Holland's insistence on pointing out (although test publishers reach for the Maalox every time he mentions this fact) that classified vocational aspirations generally have more predictive validity than do inventoried interests (Holland & Gottfredson, 1975; Holland, Gottfredson, & Baker, 1990) illustrates an unfrocking contribution.

Other unfrocking contributions have been more literary and based on hardheaded common sense. Examples can be found in Holland's reviews of developmental theorists (Holland, 1974a, 1975a, 1994), reviews of the vocational literature (Holland, 1984; Holland & Whitney, 1969; Holland, Magoon, & Spokane, 1981), responses to his critics (Holland, 1975b, 1977a; Holland & Gottfredson, 1992), attempts to provide an honest account of the reality of research (Holland, 1991), and punditry (Holland, 1982, 1986). A distinguishing feature of this unfrocking is the straightforward but graciously humorous way in which it is done. In short, when others have offered what Holland saw as a flawed overview of a topic, he has felt free to offer what one of his colleagues at Johns Hopkins called an "underview"—an alternative construal of reality unclad by pretentious garb.

And, on the topic of construction, far from being infected by the virus of social constructionism, Holland's construction has been that positivism is the way to go. Apparently, he has thought that most of the mumbo jumbo characterizing constructionist views was already humorous enough, so there was no need to poke fun at it.

Finally, by exemplifying ways in which vocational assistance can be offered with minimal psychologist intervention (Holland, Hollifield, Nafziger, & Helms,

1972; Holland, 1974b, 1976), Holland has helped to demystify psychological assessment and stimulate the development of a number of less traditional devices and techniques for providing vocational services. His practical devices have provided researched and evaluated interventions (Zener & Schnuelle, 1976; Holland, Fritzsche, & Powell, 1994, pp. 53–58) that require minimal counselor intervention, and he has suggested practical ways for practitioners to improve their efficiency (Holland, 1974b).

Influence on Others

Scientists. Just as Holland was himself influenced by John Darley, Donald G. Paterson, Paul Meehl, Ralph Berdie, and less directly by Henry Murray, he has directly or indirectly influenced some of the most productive of contemporary psychologists. Influence on others is an essential ingredient in the advancement of science (Merton, 1968). Consequently, any assessment of the contributions of a scientist must include an attempt to assess the extent to which others incorporate a scientist's work into their own and use the products of that scientist's efforts to advance their own work.

The scientists who have built on, incorporated, or been influenced by Holland's ideas constitute a sizable proportion of the active researchers in higher education, counseling, and vocational behavior. Among today's eminent higher education researchers, the list includes Alexander W. Astin (worked with Holland at the National Merit Scholarship Corporation), Leonard L. Baird (worked with Holland at the American College Testing Program, ACT), Charles F. Elton (ACT), James M. Richards, Jr. (ACT and later at Johns Hopkins University), John Smart (a student of Charles Elton), and Douglas R. Whitney (ACT). Among the productive researchers in counseling and vocational behavior the list includes Fred H. Borgen (Borgen was a student of David Campbell), Linda S. Gottfredson (her dissertation was supervised by Holland at Johns Hopkins), Thomas M. Magoon (Magoon and Holland both pursued their graduate studies at the University of Minnesota, overlapping for 2 years, 1948 to 1950), James O'Neil (a student of Thomas Magoon), Paul R. Salamone (Salamone took a graduate course from Holland when Holland took over John O. Crites' course at the University of Iowa for a semester), Arnold Spokane (a student of Bruce Walsh), Keith Taylor (visiting scholar at Johns Hopkins), W. Bruce Walsh (Walsh did his dissertation on the validity of self-report measures at the University of Iowa under Holland's supervision). Among test developers, psychometricians, and researchers the list would include David P. Campbell (Campbell and Holland collaborated in developing the theme scales for the Strong–Campbell Interest Inventory), Nancy Cole (ACT), Jo-Ida Hansen (a student of David Campbell, Hansen did her dissertation on the relation of Strong items to Holland's typology), Charles B.

Johansson (a student of David Campbell), Dean H. Nafziger (Hopkins), and Dale Prediger (Prediger inherited parts of the research program left behind by Holland and several of his colleagues when Holland was fired at ACT).

Practice. Holland's contributions have revolutionized the provision of vocational assistance worldwide. It is an understatement to say that he has had a major influence on counseling practice. The popularity of counseling tools using his typologies (including the Self-Directed Search and the Strong Interest Inventory), the size of the groups attending his presentations at national meetings of counselors and psychologists, the incorporation of his typology in the O*NET system (the replacement for the *Dictionary of Occupational Titles*; Peterson et al., 1996; U.S. Department of Labor, 1999), the translation of his tests into many languages, the incorporation of his typology into assessments used in military recruiting, and the use of his ideas in career education in the schools all attest that the influence on practice has been overwhelming. A practical account of how to use Holland's inventories and scales has been assembled by Reardon and Lenz (1998).

Scientific literature. Holland's influence on the scientific literature has been enormous. His theoretical perspective is an important part of reviews (Helson & Mitchell, 1978; Osipow, 1987; Walsh, 1973) and textbooks or collections (Brown & Brooks, 1996; Brown & Lent, 1992; Hall, 1976; Osipow & Fitzgerald, 1995; Borgen & Harmon, 1996). To a great extent, the usefulness of Holland's theory and typology are so well accepted that they are now assumed as background—the context within which much career practice and career research is conducted rather than as a topic for inquiry.

A quantitative way to evaluate Holland's contribution to the literature is to count his contributions and to count the number of times his ideas are used by others. As a producer, Holland has been prolific. Since 1953 he has published six books, at least 136 articles (including 5 monographs and 2 review articles), 11 chapters, 13 test manuals, 12 major technical reports not published elsewhere, 9 book or test reviews, and other published contributions. A sustained average over the 28-year period between his first publication in 1953 and his formal retirement in 1980 of between five and six contributions per year put Holland in the top one-tenth of one percent of publishing psychologists according to the norms provided by Garvey and Griffith (1971).

Science may be viewed as a social system (Garvey & Griffith, 1971). A contribution to science has been made only when a scientist influences others. In the social system of science, a contribution is validated by others, and the operation of the system proceeds in stages. The first formal stage occurs when a manuscript is reviewed for journal publication. Later, evidence that the work has influenced others turns up in the form of citations to that work in journal articles

published by others. Eventually, the work may become codified or assimilated in a field of knowledge, and citations in review articles and texts begin to appear. Thus, an examination of citations provides insight into the extent of a scientist's influence and who is being influenced.

Holland's (1973) book, *Making Vocational Choices: A Theory of Careers*, was cited more than 260 times between 1973 and 1980 ("Citation Classics," 1980). For comparison, the typical article published in a journal in 1973 received 5.7 citations between 1973 and 1976. The influence of this single book is only part of the story. A 1980 computer-assisted search of the *Social Science Citation Index* (SSCI) files implied that by the year of his formal retirement, works of which Holland was the primary author had been cited at least 699 times in English language journals and an additional 26 times in foreign language journals included in the SSCI system, which extended back only as far as 1971 (ambiguous citations and multiple citations from the same source not counted).

Endler, Rushton, and Roediger (1978) performed bibliometric analyses for faculty members in 180 psychology departments in the United States, Canada, and the United Kingdom. These departments were the top-ranked departments in the Roose and Anderson (1970) ratings, the "most productive" departments in the Cox and Catt (1977) study, and other departments they thought might be blooming. They also supplemented the list of psychologists they studied by adding S. Freud, J. Piaget, and others who occurred to them. Therefore, their sample grossly overrepresented eminent psychologists and psychologists in psychology departments in elite institutions. The average psychologist in their 180 select departments was cited 13.6 times (and published 0.9 articles, $N = 5597$) in 1975, according to the SSCI. Holland was not affiliated with a psychology department in 1975 and so was not included in the Endler et al. study. But using their methods, Holland turns out to have been cited 192 times in 1975. This ties him for 66th place in their list of the 100 most cited psychologists. For comparison, F. E. Fiedler, S. E. Asch, and M. Argyle were cited 134 or 135 times in 1975; A. Bandura was cited 650 times, D. T. Campbell was cited 515 times, and B. F. Skinner was cited 501 times.

The Institute for Scientific Information data on citations reveal that 23 journal articles by Holland published between 1980 and 1998 (i.e., published the year of his retirement or after) were cited 345 times. This *excludes* citations to Holland's (1985, 1997) books, to manuals for the Self-Directed Search (1985, 1994), to book chapters, or to any publications prior to 1980!

Additional insight into the groups of scientists most influenced by Holland's work comes from an examination of the patterns of citations across journals covered by the SSCI. Tallies of the journals in which citing articles were published both before and after 1980 converge on a similar pattern, with citing articles

most often appearing in the *Journal of Vocational Behavior*, *Journal of Counseling Psychology*, *Career Development/Vocational Guidance Quarterly*, *Measurement and Evaluation in Guidance/Counseling and Development*, and *Personnel and Guidance Journal/Journal of Counseling and Development*. The range of citing journals is broad, ranging from A to Z (*Academy of Management Review* and *Adult Education Quarterly* to *Zeitschrift für Arbeits und Organisationspsychologie* and *Zeitschrift für Pädagogik*). Most of the citations are from articles published in vocational research, counseling, or measurement journals. One interpretation of this pattern is that Holland's greatest current influence is among researchers working in career counseling, and that his earlier work on nonacademic accomplishments and higher education is now receiving less attention.

Common Themes and Working Styles

Holland's extraordinary influence results in part from the ways he has pursued research. Several common themes or styles pervade his work: persistence, focus, horizon-scanning, the interpretation of evidence in novel ways, attention to evidence and the revision of ideas based on evidence, an emphasis on practical problems, generosity with colleagues, and intellectual tension.

Persistence and Focus on Practical Problems

One distinguishing style is a persistence in focusing on a small number of practical research problems. Holland has persisted in a few core programs of research: finding structures to explain person-environment interactions and careers, unraveling vocational indecision, charting nonacademic competencies, and creating appropriate technologies for vocational assistance.

Holland's first publication in 1953 reported a classification of occupations based on Kuder profiles (Holland, Krause, Nixon, & Trembath, 1953), and a few years later he reported on an occupational classification in terms of personality and intelligence level (Holland, 1959a). Before the first publication of the *Occupations Finder* (Holland, 1977b), he produced at least six papers on this topic and then periodically revised the *Occupations Finder*. Holland and his colleagues conducted a series of investigations of the validity of the classification and approaches to improving occupational classification over the years (G. Gottfredson, 1982; L. Gottfredson, 1980; G. Gottfredson & Holland, 1991, 1996; Holland et al., 1972; Holland, Whitney, Cole, & Richards, 1969; Viernstein, 1972) with the result that researchers and practitioners today have tools to classify any occupational environment in terms of Holland's typology. Holland's efforts over a period of more than 40 years to organize occupational information provides one example of his focus and persistence.

A second example is Holland's pursuit of the problem of vocational indecision. In the early 1960's Holland began research on undecided students (Holland & Nichols, 1964). Counselors and theorists regarded undecided students as a major problem, and as an appropriate target for counselor concern. But the research evidence seemed to imply that decided and undecided students were similar in most measurable ways (Baird, 1969). Nevertheless, there were some differences (Elton & Rose, 1971; Kimes & Troth, 1974). Authors began to distinguish the merely undecided from the "indecisive" person, and proposed treatment schemes (Crites, 1976).

In a series of investigations in the 1970's, Holland persisted in pursuing the meaning and counseling implications of indecision (Holland et al., 1975; Holland & Holland, 1977), and so did other researchers (Osipow, Carney, & Barak, 1976). This persistence payed off. Some individuals are not only undecided, but they are also dissatisfied and express doubts about their capacity to make decisions, their ability, and their self-knowledge. Perhaps this is the group that most needs assistance. Holland developed and tested a Vocational Identity scale for diagnosing people who show this pattern (Holland et al., 1975; Holland & Holland, 1977; Holland et al., 1980). The Identity scale was originally conceived of as a theory-relevant criterion measure for use in assessing the validity of some theoretical signs of decision-making ability (Holland et al., 1975). If vocational personality involves one's conceptions of competencies, preferred activities, interests, and vocational goals as implied by Holland's (1973) theory and the content of the Self-Directed Search, then it made sense to use a direct assessment of the clarity and confidence of one's identity in these same terms.

Because of the accumulating evidence of the usefulness of this direct assessment of identity in understanding vocational personality, Holland incorporated identity as a secondary concept in the 1985 revision of his theory. The first full account of the Identity scale (Holland, D. Gottfredson, & Power, 1980) has since been cited 55 times in journal articles, and evidence subsequently developed (Holland & Gottfredson, 1994; Holland, Johnston, & Asama, 1993) has shown that the scale has substantial validity as a sign of career decision-making difficulty, vocational well-being, and the likely need for assistance. Its use has been incorporated in training materials to make it more useful in vocational diagnosis and in planning vocational assistance (Reardon & Lenz, 1998).

Horizon Scanning—Divergent and Convergent Thinking

A second style pervading Holland's work is an attention to evidence. He regularly scans the horizon for interpretable evidence that may help organize knowledge or bolster or undermine his notions in an area in which he works, and like a pack rat he stores these bits of evidence for later retrieval. For years, he has

scanned abstracts and read *Contemporary Psychology*, which he says “provides a cheap education.” This scanning of divergent information is coupled with a kind of convergent thinking that finds connections with his own theory and research that would elude others. His abiding focus on a few core problems is supplemented by information and ideas gleaned from other areas. Then he uses this evidence, together with the evidence he develops or helps to generate (and the evidence and argument contributed by critics) to revise his ideas and theory. Consequently, his modern differentialist theory has undergone four major revisions, each more empirically defensible, more explicit, and more elegant than the last—outcomes that imply that his style works.

Generosity with Colleagues

A third style may loosely be termed “altruism.” Holland consistently recognizes and fosters the contributions of others. This theme is important because it provides part of the explanation for his influence on others, and may characterize eminent scientists generally (Merton, 1968).

Holland is dutiful in answering correspondence from professionals or students seeking assistance. He has regarded the provision of useful replies as a professional obligation. In recent years, Holland has sought to stimulate scholarly contributions of others by attempting to identify people with the potential to do useful work and providing modest financial support for their research.

Holland directed research programs at National Merit Scholarship Corporation, American College Testing Program, and Johns Hopkins University. During the periods of his leadership, those research groups were remarkably productive. This may be due to an understated but forceful ability to give colleagues the direction they need to be productive.

Examples may help to describe how these subtle influences operate. When Holland was at Hopkins, his office was next to the research unit’s front door. I never heard him criticize anyone for coming late to work, but everyone noticed that he glanced at his wristwatch when they walked in.

I met John Holland in 1973 when I was a graduate student in psychology at Hopkins. I asked him for a job, and worked for him that summer. Between the fall of 1973 and spring of 1976 Holland allowed me to have an office, a typewriter, and the use of his research center’s IBM 1401 computer at night. Most days, at a time not predictable, he would come to my office and ask, “What’s new?” This generated a desire to have something new to report. The combination of the research space and computer, freedom from duties that a National Science Foundation fellowship allowed, the privilege of working on projects together with John Holland, and the daily “what’s new?” led to a productive period for me. Holland’s management of

the research center during this period was so subtle, that I cannot recall many instances of supervision more directive than, “You might consider” Holland *always* read draft manuscripts produced by the research staff promptly, and one of the few directives I can recall was that when a researcher asked another to read a manuscript, the review was to be completed in 2 days. Momentum has value.

Hull (1978) argued that scientists often behave selflessly because it is in their best interest to do so, and that this happens to coincide nicely with the goals of science. Hull noted that the best thing scientists can do for their own careers is to get others to accept and use their ideas. Success in science is determined by the transmission of ideas, just as biological success is determined by the transmission of genes. Scientists pass on their ideas by getting them incorporated in the work of others. Altruism—in the form of recognizing and fostering the contributions of colleagues or students, helping others who seek advice on a research problem or in attempts to engineer a practical program, or assisting those who wish to extend research or theory in new ways—may be a royal road to scientific fertility.

Tension

A final theme that pervades Holland’s work is tension. This tension no doubt stems in part from his “unfrocking” contributions, and his predilection for stating in direct terms the shortcomings he sees in the theories or strategies of others (e.g., Holland, 1975a, 1982, 1994). This tension may result partly from Holland’s feeling that authors representing the “vocational development” perspective sought to marginalize his contributions, combined with his determination to overcome disparagement. When the vocational development perspective (Jordaan, 1974) was popular in vocational psychology, Holland’s modern differentialism—his person-environment perspective—was represented by central figures in vocational psychology as a clone of a defunct trait-and-factor approach (Super, 1975), or was not mentioned (Crites, 1974). Disparaging references by developmentalists continued for some time (Super, 1980). At times, it has seemed that critics have assumed there has been no progress in person–job vocational psychology since Parsons (1909).

As Holland’s theory and devices became more popular, they became a natural and appropriate target for criticism (Diamond, 1975; Harmon, 1973; Prediger & Hanson, 1974). Journal editors sometimes found articles criticizing the theory or devices more attractive than research articles reporting work to revise them. The articles reporting the development of the new edition of the SDS (Holland, Gottfredson, & Holland, 1978) and the seventh revision of the Vocational Preference Inventory (G. Gottfredson, Holland, & Holland, 1978) were rejected by the *Journal of Vocational Behavior* and *Measurement and Evaluation in Guidance*,

which had published at least 10 critiques that had prompted the research leading to the revisions.

This tension is to be expected when a theoretical perspective becomes widely influential. Not everyone copes with tension in productive ways, however. It is characteristic of Holland's style to cope effectively in writing with the tension resulting first from his marginality (psychologists used to laugh at the idea of a personality inventory composed of occupational titles) and later from his success. His responses to critics have been not only effective, but they are often humorous as well (e.g., Holland, 1974b, 1975a; Holland & Gottfredson, 1992; Holland & Richards, 1967). In short, Holland has used tension to fuel his research vehicle.

The Unexplored Agenda

A review should suggest areas for future work. Although my review has been unconventional in many respects—it is biased, selective, and personal—I shall end it by suggesting areas where exploration or further research on Holland's theory may be especially productive. Four areas provide fertile ground for another generation of researchers: (a) development and socialization, (b) personal and environmental change, (c) assessment of environments and environmental influences, and (d) effects of vocational interventions delivered by alternate means and media.

Development, Socialization, and Attainment

Research is needed to provide a more fine-grained account of development and socialization. Although evidently overlooked by many who use other parts of Holland's theory in research and practice, the theory (1973, 1997) has long provided an explicit and provocative account of the development of stable adult interests. A child's biological dispositions in interaction with early experiences (opportunities and reinforcement) produce learned preferences for some activities and aversions for others. Over time, a child's hereditary and other biological potentials, combined with patterns of opportunities and the shaping provided by environmental reinforcers, begin to develop increasingly stable affective responses to different situations or opportunities. These preferences and aversions together with developed competencies or skills are eventually associated with patterns of values, beliefs, and styles. The personality typology provides a way of summarizing the progress and result of this developmental process. Interests (or other measures of personality) become increasingly stable with age, so that adult personality tends to show great stability (Costa & McCrae, 1986; Costa, Metter, & McCrae, 1994; McCrae & Costa, 1994).

To say that personality traits stabilize with age (becoming quite stable around

age 30 years) does not imply, as some have suggested, a *static* view of personality or development. On the contrary, it implies that the *interactions* individuals have with environments as they make choices, display competencies, seek pleasure and avoid punishing experiences are due in part to underlying dispositions. These dispositions make these interactions predictable in the aggregate. (I say in the aggregate, because it is not necessary to accurately predict the result of each interaction to be generally accurate across a sufficient number of interactions.) Stability in vocational dispositions has clear benefit. If I couldn't predict what kinds of work tasks or people I would enjoy, I would be unable to control my future experiences.

More knowledge about the specific manipulable experiences through which these dispositions develop and the circumstances under which they may be influenced—as well as about obstacles to such changes—would be helpful. Research on the heritability of interests and personality (Grotevant, Scarr, & Weinberg, 1977; Loehlin, McCrae, Costa, & John, 1998; Lykken, Bouchard, McGue, & Tellegen, 1993), family background and attitudinal antecedents of classified adolescent vocational aspirations (Kelso, 1976; Mumford & Owens, 1982), changes in aspirations or interests in the face of natural or intentional influences (L. Gottfredson, 1979; Wirtenberg, 1979) provides examples of productive strategies, but additional research and theoretical integration has much to offer in the exploration of the potentials and limits of influence on vocational personality.

Years ago Blau, Gustad, Jessor, Parnes, and Wilcock (1956) provided a crude navigational chart that may help structure this exploration. This chart, research, and theory imply that occupational level (G. Gottfredson, 1977, 1982; L. Gottfredson, 1980, 1981; Tracey & Rounds, 1996) and the distribution of available work (G. Gottfredson, Holland, & Gottfredson, 1975; L. Gottfredson, 1979) are important adjuncts to the typology. Recently, level of substantive complexity was integrated with the Holland occupational classification (G. Gottfredson & Holland, 1996) to facilitate research on level of aspiration and attainment. This summary index of the level and variety of cognitive demands occupations make on workers is available to those who use and conduct research with the classification. Further consideration of explanations of the development of personality dispositions, occupational entry, and of occupational achievement or attainment may be fruitful.

Personal and Environmental Change

Change is a problem closely related to socialization and development, but some specific problems of change merit special emphasis. What are the major modes of coping with incongruent environments? Under what circumstances do

people leave incongruent environments? Seek to change the environment? Are vocational identity or environmental identity related to the degree of personal or environmental change?

Recently, Holland and Gottfredson (1994) developed an inventory of career attitudes and strategies to supplement the typological formulations in understanding change and stability in career behavior. Whatever the degree of congruence between a person and a work environment, a person's experience of interpersonal abuse, job dissatisfaction, conflict between work and family, or a propensity to take risks should all be predictive of career change. And whatever the degree of incongruence between a person and a work environment, geographical barriers, a submissive style, or a tendency to avoid risk should all be predictive of stability. A related hypothesis is that incongruent persons who are high in vocational identity, risk-taking style, or dominant style may be expected to attempt to leave or change the environment (whereas congruent persons and persons low in vocational identity, risk-taking style, or dominant style are not expected to leave or try to change the environment). Research that combines measures of person– job congruence, vocational identity, and these career attitudes and strategies may help provide a fuller understanding of change and stability.

We now face an epidemic of opinion that changes in the nature of work are rendering “careers” a thing of the past. Pundits forecast that people will move from one job or occupation to another with increasing frequency—requiring great flexibility and demanding change on the part of workers. Yet it is not clear that moving from one employer to another or from one assignment to another entails moving from one type of work to another. It seems likely that people who change jobs will continue to change disproportionately from one Investigative job to another Investigative job, from one Enterprising job to another Enterprising job. In other words, stability in typological terms will continue to characterize careers. This expectation should be studied by organizing job analysis data for successive jobs or assignments in contemporary careers.

Assessment of Environments and Environmental Influences

Although the classification of occupations and environments has survived some impressive tests (G. Gottfredson, 1977; G. Gottfredson & Holland, 1991, 1996; L. Gottfredson, 1980; Helms, 1996; Holland et al., 1973; Maurer & Tarulli, 1997; Mount & Muchinsky, 1978; Rounds, Shubsachs, Dawis, & Lofquist, 1978), it remains an understudied aspect of the theory. The classification of occupations was initially grounded in the plausible assumption that persons gravitate to congruent environments and that the character of an environment is determined largely by

the characteristics of its incumbents. It is difficult to imagine these assumptions being false, but more direct measures of environmental characteristics are desirable. One reason for favoring direct assessments of work environments is that it is unlikely that congruence is the only determinant of who inhabits an environment. The old but instructive account of employer biases provided by Noland and Bakke (1949); segregation of sexes across occupations and fields of study; segregation by socioeconomic origins and ethnicity across educational and occupational levels; and evidence that mobility among occupations is strongly linked to sex, educational level, and to some degree race (G. Gottfredson, 1982) all converge in implying that a more direct approach to the measurement of environments is important.

The use of empirical job analysis data developed by the U.S. Department of Labor to classify all occupations in the *Dictionary of Occupational Titles*, *Standard Occupational Classification*, census, and Occupational Employment Statistics classifications (i.e., the development of the *Dictionary of Holland Occupational Codes*; G. Gottfredson & Holland, 1996) was one step toward direct assessment of occupational environments. The theoretical classification was more directly implemented by the development of the *Position Classification Inventory* (G. Gottfredson & Holland, 1991). This direct approach to the classification of occupations in studying worker–job congruence has rarely been implemented in research. An important study by DeFruyt and Mervielde (1999) is an exception. It is ironic that interest in the measurement of congruence has been expressed in research comparing alternative congruence indices in samples in which the occupational environment is classified approximately (by looking up the code in a reference list) rather than through direct measurement (Camp & Chartrand, 1992; Oleski & Subich, 1996; Young, Tokar, & Subich, 1998). Congruence research will be advanced if researchers measure the occupational environment in diverse samples of occupations rather than relying on approximate methods.

In addition, finding ways to cope in theoretical terms with the potency of an environment would be useful. Holland (1973) suggested the need to find ways to characterize the distribution of power in environments. More recently (1985, 1997), he introduced the notion of environmental identity: “An environment with a high (clear) identity would have a focused set of consistent and explicit goals; and an environment with a low (diffuse) identity would have a large set of conflicting and poorly defined goals” (1997, p. 50). Finally, for some people, some environments or parts of environments may be more salient than others. A more complete understanding of person–environment interactions will require an exploration of these matters.

Effects of Vocational Interventions

A last item on the unexplored agenda is work to develop technologies for constructing, understanding, and selecting appropriate career interventions. Existing research (Spokane, 1991) implies that a variety of career interventions have modest positive effects. At the same time, research on career interventions directed at learning what leads to effectiveness is surprisingly rare in view of the importance of the problem. We need more research on how to create more powerful treatments that are targeted to the specific needs of individuals and that are inexpensive.

Holland has shown a special concern for the effects of the Self-Directed Search and other interventions on clients, and this concern is reflected in reports of research on these effects in the Self-Directed Search manual (Holland, Fritzsche, & Powell, 1996, Chap. 5). As interventions as seemingly simple as interest inventories continue to change, questions for research on effects on users will continue to evolve. Does it help to provide users with more extensive lists of occupational alternatives to explore, or do users benefit from more focused lists? Are computerized reports that spoon feed clients with information rather than having them locate and synthesize their own information more or less beneficial? How does transparency in scoring of inventories versus opaque computerized scoring effect users' experiences? What about the ability to change answers and re-score an inventory? Do clients get the kind of help they need when they locate and take interest inventories or other tests in *U.S. News and World Report*, on the World Wide Web, in *Cosmopolitan* or *Seventeen*? Do clients get the kind of help they need when they locate and take interest inventories assisted by the growing troupe of counselors who are "qualified" to administer the test they offer because they took a workshop?

There will never be enough fully trained and skillful psychologists or counselors to provide one-on-one assistance to everyone who can benefit. Accessible, valid, and helpful career assistance for everyone will depend on progress in the development and evaluation of inexpensive, valid, and helpful interventions.

Conclusion

To echo Lewin's (1951) dictum, nothing is so practical as Holland's theory. By focusing in a persistent way on a few important problems, seeking elegant and parsimonious ways to summarize knowledge, and using evidence in an open and creative way, Holland has transformed the way vocational assistance is rendered.

Future developments in vocational psychology will often rest on theoretical and practical foundations laid by John Holland.

References

- American Psychological Association. (1975). Ethical standards of psychologists. In American Psychological Association, *Biographical directory*. Washington, DC: Author.
- Astin, A. W. (1962). "Productivity" of undergraduate institutions. *Science*, 136, 129–135.
- Astin, A. W. (1964). Socio-economic factors in the achievements and aspirations of the merit scholars. *Personnel and Guidance Journal*, 42, 581–586.
- Astin, A. W. (1977). *Four critical years*. San Francisco: Jossey-Bass.
- Astin, A. W. (1993). *What matters in college? Four critical years revisited*. San Francisco: Jossey-Bass.
- Astin, A. W., & Holland, J. L. (1961). The environmental assessment technique: A way to measure college environments. *Journal of Educational Psychology*, 52, 308–316.
- Astin, A. W., & Panos, R. J. (1969). *The educational and vocational development of American college students*. Washington, DC: American Council on Education.
- Baird, L. L. (1969). The undecided student—How different is he? *Personnel and Guidance Journal*, 47, 429–434.
- Baird, L. L., & Richards, J. M., Jr. (1968). *The effects of selecting college students by various kinds of high school achievements* (Report No. 23). Iowa City: American College Testing Program.
- Blau, P. M., Gustad, J. W., Jessor, R., Parnes, H. S., & Wilcock, R. S. (1956). Occupational choice: A conceptual framework. *Industrial and Labor Relations Review*, 9, 531–543.
- Borgen, F. H., & Harmon, L. W. (1996). Linking interest assessment and personality theory. In M. L. Savickas & W. B. Walsh (Eds.), *Handbook of career counseling theory and practice* (pp. 251–266). Palo Alto, CA: Davies-Black Publishing.
- Brown, D., & Brooks, L. (Eds.). (1996). *Career choice and development* (3rd ed.). San Francisco: Jossey-Bass.
- Brown, S. D., & Lent, R. W. (1992). *Handbook of counseling psychology* (2nd ed.). New York: Wiley.
- Camp, C. C., & Chartrand, J. M. (1992). A comparison and evaluation of interest congruence indices. *Journal of Vocational Behavior*, 41, 162–182.
- Campbell, D. P., & Holland, J. L. (1972). Applying Holland's theory to Strong's data. *Journal of Vocational Behavior*, 2, 353–376.
- Campbell, D. P. (1974). *Manual for the Strong–Campbell Interest Inventory*. Stanford, CA: Stanford Univ. Press.
- Citation classics. (1980). *Current Contents*, 20(12), 9–10.
- Cole, N. S. (1973). On measuring the vocational interests of women. *Journal of Counseling Psychology*, 20, 105–112.
- Costa, P. T., & McCrae, R. R. (1986). Personality stability and its implications for clinical psychology. *Clinical Psychology Review*, 6, 407–423.

- Costa, P. T., Metter, E. J., & McCrae, R. R. (1994). Personality stability and its contribution to successful aging. *Journal of Geriatric Psychiatry, 27*, 41–59.
- Cox, W. M., & Catt, V. (1977). Productivity ratings of graduate programs in psychology based on publication in the journals of the American Psychological Association. *American Psychologist, 32*, 793–813.
- Crites, J. O. (1974). Career counseling: A review of major approaches. *Counseling Psychologist, 4*(3), 3–23.
- Crites, J. O. (1976). Career counseling: A comprehensive approach. *Counseling Psychologist, 6*(3), 2–12.
- Darley, J. G., & Hagenah, T. (1955). *Vocational interest measurement*. Minneapolis: University of Minnesota Press.
- De Fruyt, F., & Mervielde, I. (1999). *RIASEC and Big Five traits as predictors of employability and the nature of employment*. Unpublished manuscript, Department of Psychology, University of Ghent.
- Diamond, E. E. (Ed.). (1975). *Issues of sex bias and sex fairness in career interest measurement*. Washington, DC: National Institute of Education.
- Elton, C. F., & Rose, H. A. (1971). A longitudinal study of the vocationally undecided male student. *Journal of Vocational Behavior, 1*, 85–92.
- Endler, N. S., Rushton, J. P., & Roediger, H. L., III. (1978). Productivity and scholarly impact (citations) of British, Canadian, and U. S. departments of psychology (1975). *American Psychologist, 33*, 1064–1082.
- Enright, M. K., Rock, D. A., & Bennett, R. E. (1998). Improving measurement for graduate admissions. *Journal of Educational Measurement, 35*, 250–267.
- Garvey, W. D., & Griffith, B. C. (1971). Scientific communication: Its role in the conduct of research and creation of knowledge. *American Psychologist, 26*, 349–362.
- Getzels, J. W., & Jackson, P. W. (1962). *Creativity and intelligence: Explorations with gifted students*. New York: Wiley.
- Gottfredson, G. D. (1976). A note on sexist wording in interest measurement. *Measurement and Evaluation in Guidance, 8*, 221–223.
- Gottfredson, G. D. (1977). Career stability and redirection in adulthood. *Journal of Applied Psychology, 62*, 436–445.
- Gottfredson, G. D. (1982). An assessment of a mobility-based occupational classification for placement and counseling. *Journal of Vocational Behavior, 21*, 71–98.
- Gottfredson, G. D., & Holland, J. L. (1991). *Position Classification Inventory: Professional manual*. Odessa, FL: Psychological Assessment Resources.
- Gottfredson, G. D., & Holland, J. L. (1996). *The dictionary of Holland occupational codes* (3rd ed.). Odessa, FL: Psychological Assessment Resources.

- Gottfredson, G. D., Holland, J. L., & Holland, J. E. (1978). The seventh revision of the Vocational Preference Inventory. *JSAS Catalog of Selected Documents in Psychology* (Vol. 8, p. 98, Ms. no. 1783).
- Gottfredson, G. D., Jones, E. M., & Holland, J. L. (1993). Personality and vocational interests: The relation of Holland's six interest dimensions to five robust dimensions of personality. *Journal of Counseling Psychology, 40*, 518–524.
- Gottfredson, G. D., Holland, J. L., & Gottfredson, L. S. (1975). The relation of vocational aspirations and assessments to employment reality. *Journal of Vocational Behavior, 7*, 135–148.
- Gottfredson, L. S. (1979). Aspiration-job match: Age trends in a large, nationally representative sample of young white men. *Journal of Counseling Psychology, 26*, 319–328.
- Gottfredson, L. S. (1980). The construct validity of Holland's occupational classification in terms of prestige, census, Department of Labor, and other classification systems. *Journal of Applied Psychology, 65*, 697–714.
- Gottfredson, L. S. (1981). Circumscription and compromise: A developmental theory of occupational aspirations [Monograph]. *Journal of Counseling Psychology, 28*, 545–579.
- Gough, H. G., Hall, R. E., & Harris, W. B. (1963). Admissions procedures as forecasters of performance in medical education. *Journal of Medical Education, 38*, 983–998.
- Grotevant, H. D., Scarr, S., & Weinberg, R. A. (1977). Patterns of interest similarity in adoptive and biological families. *Journal of Personality and Social Psychology, 35*, 667–676.
- Guilford, J. P., Christensen, P. R., Bond, N. A., Jr., & Sutton, M. A. (1954). A factor analysis study of human interests. *Psychological Monographs, 68*, (4, Whole No. 375).
- Hall, D. T. (1976). *Careers in organizations*. Pacific Palisades, CA: Goodyear.
- Harmon, L. W. (1973). Sexual bias in interest measurement. *Measurement and Evaluation in Guidance, 5*, 496–501.
- Harrell, M. S., Harrell, T. W., McIntyre, S. H., & Weinberg, C. B. (1977). Predicting compensation among MBA graduates five and ten years after graduation. *Journal of Applied Psychology, 62*, 636–640.
- Helms, S. T. (1996). Some experimental tests of Holland's congruency hypotheses: The reactions of high school students to occupational simulations. *Journal of Career Assessment, 4*, 253–268.
- Helson, R., & Mitchell, V. (1978). Personality. *Annual Review of Psychology, 29*, 555–585.
- Hirschberg, N., & Itkin, S. (1978). Graduate student success in psychology. *American Psychologist, 33*, 1083–1093.
- Holland, J. L. (1957). Undergraduate origins of American Scientists. *Science, 126*, 433–437.
- Holland, J. L. (1958). A personality inventory employing occupational titles. *Journal of Applied Psychology, 42*, 336–342.

- Holland, J. L. (1959a). A classification for occupations in terms of personality and intelligence [abstract]. *American Psychologist*, 14, 376.
- Holland, J. L. (1959b). A theory of vocational choice. *Journal of Counseling Psychology*, 6, 35–45.
- Holland, J. L. (1961). Creative and academic performance among talented adolescents. *Journal of Educational Psychology*, 52, 136–147.
- Holland, J. L. (1962). Some explorations of a theory of vocational choice: I. One- and two-year longitudinal studies. *Psychological Monographs*, 76 (26, Whole No. 545).
- Holland, J. L. (1966). *The psychology of vocational choice: A theory of personality types and model environments*. Waltham, MA: Blaisdell.
- Holland, J. L. (1968). Explorations of a theory of vocational choice: VI. A longitudinal study using a sample of typical college students. *Journal of Applied Psychology*, 52, 1–37.
- Holland, J. L. (1973). *Making vocational choices: A theory of careers*. Englewood Cliffs, NJ: Prentice-Hall.
- Holland, J. L. (1974a). Review of Vocational Guidance and Human Development. *Personnel and Guidance Journal*, 53, 76–77.
- Holland, J. L. (1974b). Vocational guidance for everyone. *Educational Researcher*, 3, 9–15.
- Holland, J. L. (1975a). A new synthesis for an old method and new analysis of some old phenomena. *Counseling Psychologist*, 6, 12–15.
- Holland, J. L. (1975b). Dilemmas and remedies. *Personnel and Guidance Journal*, 53, 517–519.
- Holland, J. L. (1976, May). SDS—Accessible vocational assessment and counseling by 1986? *Civil Engineering—ASCE*, pp. 92–94.
- Holland, J. L. (1977a). Author's comment on test reviews. *Measurement and Evaluation in Guidance*, 10, 123–128.
- Holland, J. L. (1977b). *Occupations finder*. Palo Alto: Consulting Psychologists Press.
- Holland, J. L. (1979). *Self-Directed Search professional manual*. Palo Alto, CA: Consulting Psychologists Press.
- Holland, J. L. (1982). Planning for alternative futures. *Counseling Psychologist*, 10, 7–13.
- Holland, J. L. (1984). A Celebration of the career development view [Review of the book *Handbook of Vocational Psychology*]. *Contemporary Psychology*, 29, 862–864.
- Holland, J. L. (1985a). *Making vocational choices: A theory of vocational personalities and work environments* (2nd ed.). Englewood Cliffs, NJ: Prentice-Hall.
- Holland, J. L. (1985b). *Professional manual for the Vocational Preference Inventory*. Odessa, FL: Psychological Assessment Resources.
- Holland, J. L. (1986). Student selection, training and research performance. *Counseling Psychologist*, 14, 121–125.

- Holland, J. L. (1991). The difference between a journal article and a complete intellectual and psychological report: A frank account of how one small project was born and executed. *Journal of Career Development, 18*, 101–109.
- Holland, J. L. (1994). Separate but unequal is better. In M. L. Savickas & R. W. Lent (Eds.), *Convergence in career development theories* (pp. 45–52). Palo Alto, CA: CPP Books.
- Holland, J. L. (1997). *Making vocational choices: A theory of vocational personalities and work environments* (3rd ed.). Odessa, FL: Psychological Assessment Resources.
- Holland, J. L., & Baird, L. L. (1968a). An interpersonal competency scale. *Educational and Psychological Measurement, 28*, 503–510.
- Holland, J. L., & Baird, L. L. (1968b). The Preconscious activity scale: The development and validation of an originality measure. *Journal of Creative Behavior, 2*, 217–225.
- Holland, J. L., Fritzsche, B. A., & Powell, A. B. (1994). *The Self-Directed Search technical manual*. Odessa, FL: Psychological Assessment Resources.
- Holland, J. L., Gottfredson, D. C., & Power, P. G. (1980). Some diagnostic scales and signs for the selection of vocational treatments. *Journal of Personality and Social Psychology, 39*, 1191–1200.
- Holland, J. L., & Gottfredson, G. D. (1975). Predictive value and psychological meaning of vocational aspirations. *Journal of Vocational Behavior, 6*, 349–363.
- Holland, J. L., & Gottfredson, G. D. (1976). Using a typology of persons and environments to explain careers: Some extensions and clarifications. *Counseling Psychologist, 6*, 20–29.
- Holland, J. L., & Gottfredson, G. D. (1990). *An annotated bibliography for Holland's theory of vocational personalities and work environments*. Baltimore: Johns Hopkins University.
- Holland, J. L., & Gottfredson, G. D. (1992). An evaluation of the hexagonal model (or the perils of stalking the perfect hexagon). *Journal of Vocational Behavior, 40*, 158–170.
- Holland, J. L., & Gottfredson, G. D. (1994). *Career Attitudes and Strategies Inventory: An inventory for understanding adult careers*. Odessa, FL: Psychological Assessment Resources.
- Holland, J. L., Gottfredson, G. D., & Baker, H. G. (1990). The validity of vocational aspirations and interest inventories: Extended, replicated, and reinterpreted. *Journal of Counseling Psychology, 37*, 337–342.
- Holland, J. L., Gottfredson, G. D., & Holland, J. E. (1978). New edition of the Self-Directed Search. *JSAS Catalog of Selected Documents in Psychology* (Vol. 8, p. 73, Ms. no. 1740).
- Holland, J. L., Gottfredson, G. D., & Nafziger, D. H. (1975). Testing the validity of some theoretical signs of vocational decision-making ability. *Journal of Counseling Psychology, 22*, 411–422.

- Holland, J. L., Hollifield, J. H., Nafziger, D. H., & Helms, S. T. (1972). *A guide to the Self-Directed Career Program: A practical and inexpensive vocational guidance system* (Report No. 126). Baltimore: Johns Hopkins University, Center for Social Organization of Schools.
- Holland, J. L., Johnston, J. A., & Asama, N. F. (1993). The Vocational Identity scale: A diagnostic and treatment tool. *Journal of Career Assessment, 1*, 1–12.
- Holland, J. L., & Holland, J. E. (1977). Vocational indecision: More evidence and speculation. *Journal of Counseling Psychology, 24*, 404–414.
- Holland, J. L., Krause, A. H., Nixon, M. E., & Trembath, M. F. (1953). The classification of occupations by means of Kuder interest profiles: I. The development of interest groups. *Journal of Applied Psychology, 37*, 263–269.
- Holland, J. L., Magoon, T. M., & Spokane, A. R. (1981). Counseling psychology: Career interventions, research, and theory. *Annual Review of Psychology, 32*, 279–305.
- Holland, J. L., & Nichols, R. C. (1964). Explorations of a theory of vocational choice: III. A longitudinal study of change in a major field of study. *Personnel and Guidance Journal, 11*, 235–242.
- Holland, J. L., Powell, A. B., & Fritzsche, B. A. (1994). *The Self-Directed Search professional user's guide*. Odessa, FL: Psychological Assessment Resources.
- Holland, J. L., & Richards, J. M., Jr. (1967). The many faces of talent: A reply to Werts. *Journal of Educational Psychology, 58*, 205–209.
- Holland, J. L., Sørensen, A. B., Clark, J. P., Nafziger, D. H., & Blum, Z. D. (1973). Applying an occupational classification to a representative sample of work histories. *Journal of Applied Psychology, 58*, 34–41.
- Holland, J. L., Viernstein, M. C., Kuo, H., Karweit, N. L., & Blum, Z. D. (1972). A psychological classification of occupations. *JSAS Catalog of Selected Documents in Psychology, 2*, 84.
- Holland, J. L., & Whitney, D. R. (1969). Career development. *Review of Educational Research, 39*, 227–237.
- Holland, J. L., Whitney, D. R., Cole, N. S., & Richards, J. M., Jr. (1969). *An empirical occupational classification derived from a theory of personality and intended for practice and research* (Research Report No. 29). Iowa City, IA: American College Testing Program.
- Hoyt, D. P. (1966, Winter). College grades and adult accomplishments: A review of research. *Educational Record*, pp. 70–75.
- Hull, D. L. (1978). Altruism in science: A sociobiological model of co-operative behavior among scientists. *Animal Behavior, 26*, 685–697.
- James, L. R., Ellison, R. L., Fox, D. G., & Taylor, C. W. (1974). Prediction of artistic performance from biographical data. *Journal of Applied Psychology, 59*, 84–86.

- Johnston, J. A., Smither, R., & Holland, J. L. (1981). Evaluating vocational interventions: A tale of two career development seminars. *Journal of Counseling Psychology, 28*, 210–213.
- Jordaan, J. P. (1974). Life stages as organizing modes of career development. In E. L. Herr (Ed.), *Vocational guidance and human development*. Boston: Houghton Mifflin.
- Kelso, G. I. (1976). *Explorations of the developmental antecedents of Holland's occupational types*. Unpublished doctoral dissertation, Johns Hopkins University.
- Kimes, H. G., & Troth, W. A. (1974). Relationships of trait anxiety to career decisiveness. *Journal of Counseling Psychology, 21*, 277–280.
- Kivlighan, D. M., & Shapiro, R. M. (1987). Holland type as a predictor of benefit from self-help career counseling. *Journal of Counseling Psychology, 34*, 326–329.
- Lewin, K. (1951). Problems of research in social psychology. In D. Cartwright (Ed.), *Field theory in social science: Selected theoretical papers* (pp. 155–169). New York: Harper & Brothers Publishers.
- Loehlin, J. C., McCrae, R. R., Costa, P. T., Jr., & John, O. P. (1998). Heritabilities of common and measure-specific components of the Big Five personality factors. *Journal of Research in Personality, 32*, 431–453.
- Lykken, D. T., Bouchard, T. J., McGue, M., & Tellegen, A. (1993). Heritability of interests: A twin study. *Journal of Applied Psychology, 78*, 649–661.
- MacKinnon, D. W. (1962). The nature and nurture of creative talent. *American Psychologist, 17*, 484–495.
- McCormick, E. J., Jeanneret, P. R., & Mecham, R. C. (1969). *The development and background of the Position Analysis Questionnaire* (Contract NONR-1100(28), Report No. 5). West Lafayette, IN: Purdue University, Occupational Research Center.
- McCrae, R. R., & Costa, P. T. (1994). The stability of personality: Observation and evaluations. *Current Directions in Psychological Science, 3*, 173–175.
- McDermid, C. D. (1965). Some correlates of creativity in engineering personnel. *Journal of Applied Psychology, 49*, 14–19.
- McNemar, Q. (1964). Lost: Our intelligence? Why? *American Psychologist, 19*, 871–882.
- Maurer, T. J., & Tarulli, B. A. (1997). Managerial work, job analysis, and Holland's RIASEC vocational environment dimensions. *Journal of Vocational Behavior, 50*, 365–381.
- Merton, R. K. (1968). The Matthew effect in science. *Science, 159*, 56–63.
- Moos, R. H. (1973). Conceptualizations of human environments. *American Psychologist, 28*, 652–665.
- Mount, M. K., & Muchinsky, P. M. (1978). Person–environment congruence and employee job satisfaction: A test of Holland's theory. *Journal of Vocational Behavior, 13*, 84–100.
- Mumford, M. D., & Owens, W. A. (1982). Life history and vocational interests. *Journal of Vocational Behavior, 21*, 330–348.

- Munday, L. A., & Davis, J. C. (1974). *Varieties of achievement after college* (Report No. 62). Iowa City: American College Testing Program.
- Murray, H. A. (1938). *Explorations in personality*. New York: Oxford University Press.
- Nafziger, D. H., Holland, J. L., Helms, S. T., & McPartland, J. M. (1974). Applying an occupational classification to the work histories of young men and women. *Journal of Vocational Behavior*, 5, 331–345.
- Newcomb, T. M. (1943). *Personality and social change: Attitude formation in a student community*. New York: Holt, Rinehart, & Winston.
- Noland, E. W., & Bakke, E. W. (1949). *Workers wanted: A study of employers' hiring policies, preferences, and practices in New Haven and Charlotte*. New York: Harper.
- Oleski, D., & Subich, L. M. (1996). Congruence and career change in employed adults. *Journal of Vocational Behavior*, 49, 221–229.
- Osipow, S. H. (1973). *Theories of career development* (2nd ed.). New York: Appleton-Century-Crofts.
- Osipow, S. H. (1983). Counseling psychology: Theory, research, and practice in career counseling. *Annual Review of Psychology*, 38, 257–278.
- Osipow, S. H., Carney, C. G., & Barak, A. (1976). A scale of educational-vocational undecidedness: A typological approach. *Journal of Vocational Behavior*, 9, 233–243.
- Osipow, S. H., & Fitzgerald, L. F. (1995). *Theories of career development* (4th ed.). Needham Heights, MA: Allyn & Bacon.
- Parsons, F. (1909). *Choosing a vocation*. Boston: Houghton Mifflin.
- Parsons, G. E. (1971). *An application of Holland's vocational theory to an empirical study of occupational mobility of men age 45 to 59*. Unpublished doctoral dissertation, Ohio State University, 1971.
- Peterson, N. G., Mumford, M. D., Borman, W. C., Jeanneret, P. R., Fleishman, E. A., & Levin, K. Y. (1996). *O*NET final technical report* (Vol. II). Washington, DC: American Institutes for Research.
- Prediger, D. J., & Hanson, G. R. (1974). The distinction between sex restrictiveness and sex bias in interest inventories. *Measurement and Evaluation in Guidance*, 7, 96–104.
- Rayman, J. R., Bernard, C. B., Holland, J. L., & Barnett, D. C. (1983). The effects of a career course on undecided college students. *Journal of Vocational Behavior*, 23, 346–355.
- Reardon, R. C., & Lenz, J. G. (1998). *The Self-Directed Search and related Holland career materials: A practitioner's guide*. Odessa, FL: Psychological Assessment Resources.
- Reilly, R. R. (1976). Factors in graduate student performance. *American Educational Research Journal*, 13, 125–138.
- Richards, J. M., Jr. (1970). *Assessing student performance in college*. Washington, DC: ERIC Clearinghouse on Higher Education, George Washington University.
- Richards, J. M., Jr., Seligman, R., & Jones, P. K. (1970). Faculty and curriculum as measures of college environment. *Journal of Educational Psychology*, 61, 324–332.

- Roose, K. D., & Anderson, C. J. (1970). *A rating of graduate programs*. Washington, DC: American Council on Education.
- Rounds, J. B., Jr., Shubsachs, A. P. W., Dawis, R. V., & Lofquist, L. H. (1979). A test of Holland's environmental formulations. *Journal of Applied Psychology*, 63, 609–616.
- Schmidt, F. L., & Hunter, J. E. (1998). The validity and utility of selection methods in personnel psychology. *Psychological Bulletin*, 124, 262–274.
- Schmidt, F. L., Ones, D. S., & Hunter, J. E. (1992). Personnel selection. *Annual Review of Psychology*, 43, 627–670.
- Spokane, A. R. (1991). *Career intervention*. Englewood Cliffs, NJ: Prentice Hall.
- Staats, A. W. (1975). *Social behaviorism*. Homewood, IL: Dorsey.
- Staats, A. W. (1981). Paradigmatic behaviorism, unified theory, unified theory construction methods, and the zeitgeist of separatism. *American Psychologist*, 36, 239–256.
- Super, D. E. (1975, July). *How people make and might be helped to make career choices*. Paper presented at the CRAC/NICEC Seminar, King's College, Cambridge, England.
- Super, D. E. (1980). A life-span, life-space approach to career development. *Journal of Vocational Behavior*, 16, 282–298.
- Taylor, C. W. (1958). Some variables functioning in productivity and creativity. In C. W. Taylor (Ed.), *The second (1957) University of Utah research conference on the identification of creative scientific talent*. Salt Lake City: University of Utah Press.
- Thorndike, R. L., & Hagen, E. (1959). *10,000 careers*. New York: Wiley.
- Torrance, E. P. (1962). *Guiding creative talent*. Englewood Cliffs, NJ: Prentice Hall.
- Tracey, T. J. G., & Rounds, J. (1996). The spherical representation of vocational interests. *Journal of Vocational Behavior*, 48, 3–41.
- Tyler, L. E. (1973). Design for a hopeful psychology. *American Psychologist*, 28, 1021–1029.
- U.S. Department of Labor. (1999). *O*NET 98 viewer, O*NET 98 database, and O*NET 98 viewer user's guide*. Washington, DC: Government Printing Office.
- Viernstein, M. C. (1972). The extension of Holland's occupational classification to all occupations in the Dictionary of Occupational Titles. *Journal of Vocational Behavior*, 2, 107–121.
- Walsh, W. B. (1973). *Theories of person–environment interaction: Implications for the college student*. Iowa City: American College Testing Program.
- Werts, C. E. (1967). The many faces of intelligence. *Journal of Educational Psychology*, 58, 198–204.
- Whiting, B. G. (1972, Winter). A basis for using biographical data to predict scientific creativity. *JSAS Catalog of Selected Documents in Psychology*, Vol. 2, p. 35, Ms. no. 105.
- Wing, C. W., & Wallach, M. A. (1972). *College admissions and the psychology of talent*. New York: Holt, Rinehart, & Winston.

- Wirtenberg, J. T. (1979). *The impact of a sex-desegregated practical arts course on maximization of occupational potential in seventh grade girls*. Unpublished doctoral dissertation, University of California at Los Angeles.
- Young, G., Tokar, D. M., & Subich, L. M. (1998). Congruence revisited: Do 11 indices differentially predict job satisfaction and is the relation moderated by person and situation variables? *Journal of Vocational Behavior*, 52, 208–223.
- Zener, T. B., & Schnuelle, L. (1976). Effects of the Self-Directed Search on high school students. *Journal of Counseling Psychology*, 23, 353–359.

CHAPTER 4.2

THE MEANING AND MEASUREMENT OF ENVIRONMENTS IN HOLLAND'S THEORY⁹⁵

Linda S. Gottfredson
School of Education, University of Delaware
and
James M. Richards, Jr.
Psychocroistics, L.C.

A major advantage of Holland's (1997) theory is that it provides a parallel way of describing people and environments. Vocational psychology has provided many ways of assessing people but not environments. One of Holland's major contributions during the past four decades has been to develop techniques for assessing and classifying different vocational environments, principally educational settings and occupations. These techniques have allowed Holland and his associates to plumb the validity of his environmental formulations. His newest environmental measure, the Position Classification Inventory (G. Gottfredson & Holland, 1991) promises to stimulate intensive research, both inside and outside vocational psychology, on vocational environments.

Holland's theory (1997) is unique among career theories in providing a parallel way to describe people and environments. It classifies both according to six model types—Realistic (R), Investigative (I), Artistic (A), Social (S), Enterprising (E), and Conventional (C). The theory thus also provides a ready way to assess person–environment fit and test key predictions about vocational development. Despite the importance of validly measuring both people and their environments in testing the theory, researchers have focused on the former. For nearly four decades, however, Holland and his associates have themselves developed various techniques for assessing vocational environments and illuminated much about their structure and influence on incumbents.

95 Reprinted by permission from *Journal of Vocational Behavior*, 55, 57–73 (1999).

Holland's Environmental Formulations

Holland's six personality types represent personal dispositions, that is, characteristic patterns of interests, competencies, and behavior. Realistic personalities, for example, enjoy working with their hands, tools, and machines; perceive themselves as having mechanical, technical, and athletic abilities but lacking social skills; exhibit traditional values; and are practical (Holland, 1997, pp. 21–22). The six parallel environmental models (see Table 1) are settings that elicit, develop, and reward the six patterns of interests, competencies, and behaviors. Thus, Realistic environments are those that reward people for traditional values and require or encourage people to use machines or tools, develop technical competencies, and see themselves as having those skills but lacking ability in human relations (Holland, 1997, p. 43).

In Holland's theory, environmental profiles are characterized in ways analogous to personality profiles. The psychological distance between any two environmental (or personality) types is calculated according to their distance on the RIASEC hexagon, where adjacent types are most similar and those opposite on the hexagon are most different. Accordingly, Realistic types are most similar to Conventional and Investigative types and least similar to Social types.

Neither people nor environments resemble only one model type, but rather all types to some degree. The resulting profile of resemblance to the six types can be described in terms of differentiation, consistency, and identity, all these concepts being important in Holland's theory for predicting how people will behave in different settings. For example, people who strongly resemble some types but not others (have differentiated interests) or who most resemble two adjacent (R-I) rather than two nonadjacent types (R-S) on the hexagon (have consistent interests) are presumed to be more predictable. Similarly, work environments that make highly differentiated or consistent demands on workers are expected to have stronger effects on them, whether that be to stabilize choices among people with congruent interests or repel those with incongruent interests (see Holland, 1997, pp. 52–54, for other predictions).

The parallelism in Holland's theory for describing people and environments greatly simplifies the study of how the two affect each other during development. For instance, it is a relatively simple matter to assess person–job congruence in Holland's theory. Testing the theory's predictions about this and other crucial matters rests, however, on the validity with which both people and environments are assessed. The results of those tests can mislead if either is not measured accurately. Holland's inventories of personality types—the Vocational Preference Inventory (VPI) and Self-Directed Search (SDS)—have been extensively researched and debated for decades. Not so his measures of environments. A short history of their development and use, however, reveals their progress and promise.

TABLE 1
A Brief Description of the Holland Environmental Typology

		Environmental Type					
Attribute	Realistic	Investigative	Artistic	Social	Enterprising	Conventional	
Requires	Manual and mechanical competencies, interaction with machines, tools and objects	Analytical, technical, scientific, and verbal competencies	Innovation or creative ability, emotionally expressive interaction with others	Interpersonal competencies; skill in mentoring, treating, healing, or teaching others	Skills in persuasion and manipulation of others	Clerical skills, skills in meeting precise standards for performance	
Demands and rewards the display of	Conforming behavior, practical accomplishment	Skepticism and persistence in problem solving, documentation of new knowledge, understanding or solution of problems	Imagination in literary, artistic or musical accomplishment	Empathy, humanitarianism, sociability, friendliness	Initiative in the pursuit of financial or material accomplishment; self-dominance; self-confidence	Organizational ability, conformity, dependability	
Values or personal styles allowed expression	Practical, productive and concrete values; robust, risky, adventurous styles	Acquisition of knowledge through scholarship or investigation	Unconventional ideas or manners, aesthetic values	Concern for the welfare of others	Acquisitive or power-oriented styles, responsibility	Conventional outlook and concern for orderliness and routines	
Occupations or other environments involve	Concrete, practical activity; use of machines, tools, materials	Analytical or intellectual activity aimed at troubleshooting or creation and use of knowledge	Creative work in music, writing, performance, sculpture; or unstructured intellectual endeavors	Working with others in a helpful or facilitating way	Selling, leading, manipulating others to attain personal or organizational goals	Working with things, numbers, or machines to meet predictable organizational demands or specified standards	
Sample occupations	Carpenter, truck operator	Psychologist, microbiologist	Musician, interior designer	Counselor, clergy member	Lawyer, retail store manager	Production editor, bookkeeper	
<p><i>Note.</i> Adapted and reproduced by special permission of the publisher, Psychological Assessment Resources, Inc., from Dictionary of Holland Occupational Codes, Third Edition, by Gary D. Gottfredson, Ph.D., and John L. Holland, Ph.D., Copyright 1982, 1989, 1997 by Psychological Assessment Resources, Inc.</p>							

Assessment of Holland Environmental Models

Much research on Holland's theory, particularly its claims about person-job match, involves the characterization of occupational environments. Holland's theory has also been used to assess broader institutional climates, principally college environments, and their effects on incumbent populations. We focus here only on the smaller body of research that assesses and validates the environmental models themselves.

Incumbent-Based Measures of Occupations and Environments

Holland's initial efforts to measure environments were based on the assumption that a major portion of environmental influences is transmitted through other people (Linton, 1945). This assumption was first formulated by Holland as "people make the environment." This formulation allowed him to classify occupational environments by knowing only the personality types of their incumbents or aspirants; a Realistic occupation is one dominated by Realistic people, and so on. This classification principle was then generalized to larger environmental units such as colleges and universities. The environment of a college could be assessed by the number of students (relative to institutional size) of each type. Similarly, the environment of a business enterprise could be measured in terms of the relative number of employees of each type.

Knowledge about vocational environments thus depended on information about the types of people in them. Accordingly, classifying occupations in terms of the typology began with the gradual process of collecting VPI data, SVIB simulated VPI profiles, and SDS results for different occupational groups and educational programs (Campbell & Holland, 1972; Holland, 1966, 1975). The profile for a given field became the mean profile of individuals in that field. Profiles for fields, like the profiles for individuals, could be summarized by three-letter codes (RIA, IAS, SEC, etc.). Such codes became the critical core around which all later Holland occupational coding systems would be built.

Holland and his colleagues (e.g., G. Gottfredson & Holland, 1991, 1996; L. Gottfredson, 1980; Holland, 1997; Richards, Seligman, & Jones, 1970) gradually came to realize that not only people but also work activities and institutional structures in a setting could be classified as Realistic, Investigative, and the like. This realization made it possible to measure the characteristics of environments independently of the characteristics of the people in them, a highly desirable characteristic for research on the impact of environments on incumbents. Moreover, such activities and structures may be logically prior to the people in various environments. For example, the curriculum of a college may be logically prior to the characteristics of the student body, and a curriculum can be assessed

in terms of the relative number of courses of each type (Richards, Seligman, & Jones, 1970; Richards, Bulkeley, & Richards, 1972).

Transition from Incumbent-Based to Public Record-Based Measures of Environments

A first step in describing environments independently of their incumbents was to classify common occupations and educational programs on the basis of the personalities typically populating them, and then to use public records (for example, government publications, college catalogs, and professional directories) to estimate the mix of jobs and programs in different settings. Most studies of public record-based environmental measures have involved college environments, but such measures also have been used to develop three-letter Holland codes for all occupations listed in the *Dictionary of Occupational Titles* (G. Gottfredson & Holland, 1996).

Using public records to classify institutional environments: The Environmental Assessment Technique. Once Holland codes had been determined for major occupations and educational programs, the distribution of environmental types within different colleges could be determined from public records. The earliest example of such use of public record-based environmental assessment came as part of the overall research program of the National Merit Scholarship Corporation when Holland was director of the program. Astin and Holland (1961; Astin, 1963) developed the Environmental Assessment Technique, or EAT (an early example of Holland's life-long liking for giving names to procedures that produce joking acronyms), for measuring college environments. This technique assessed colleges in terms of institutional size, average test scores of students, and relative emphasis on the six Holland types. Assessment of college environmental profiles was based on the number of students at various institutions who obtained baccalaureate degrees in major fields falling into the six types. These data were obtained from the government publication *Earned Degrees Conferred in Higher Educational Institutions: 1957–1958* (United States Office of Education, 1959). The EAT measures were shown to have moderate to high reliability over periods of 1 to 5 years and to be related to other measures, such as the College Characteristics Index of Pace and Stern (1958) in ways that supported the construct validity of the EAT profiles. The EAT sample of colleges was restricted to the 355 institutions that actually enrolled 15 or more students who had taken the National Merit Scholarship Qualifying Test, but Astin (1965) subsequently extended the procedures or outgrowths of them to all accredited 4-year institutions.

The EAT was explicitly developed for research on the impact of college environments on students. For this purpose it was strongly criticized (McConnell

1968; Yonge, 1965) on the grounds that (a) the EAT confounds student characteristics with environmental characteristics and (b) last year's graduates cannot be the environment for this year's entering freshmen. Although these criticisms were technically correct, in retrospect they seem to have involved more academic competition and one-upmanship than a serious effort to produce a cumulative science of environmental assessment. Certainly the criticisms failed to recognize the distinction between the environment and a measure of it.

During this time Holland had moved to the American College Testing Program (ACT) and had developed a research program and research team there. The ACT researchers wanted to build on the strengths of the EAT (thus seeking a cumulative science) while addressing the above criticisms. Since the faculty and the curriculum traditionally have been important aspects of the college environment, it seemed logical to classify them too in terms of the six types. Moreover, comprehensive information about faculties and curricula is readily available in college catalogs. Accordingly, catalog-based studies were conducted of environmental measures based on faculties and curricula for both undergraduate and graduate school environments at 4-year institutions (Richards, Seligman, & Jones, 1970) and for 2-year colleges (Richards, Bulkeley, & Richards, 1972).

These studies found that faculty and curriculum measures were reliable over periods up to 20 years, and that they were highly correlated with each other as well as with baccalaureate degree measures. In other words, measures based on faculty, curriculum, and degrees all tap stable characteristics of the college environment that are common to all three domains. These measures also were correlated with other measures of the college environment, such as the College and University Environment Scales developed by Pace (1963), the various Astin environmental measures, and alternative measures of 2-year college environments developed at ACT (Richards, Rand, & Rand, 1966). The correlations generally supported the construct validity of both the type scales and Holland's environmental theory in that they were usually moderate to high where the theory suggested they should be, but low where the theory suggested no correlation should be present. In these catalog and compendium based studies, institutional size was measured by the total number of faculty members or courses, but no measure of the average academic aptitude of entering students was available. Other research (Astin, 1965) has suggested that institutional "affluence" (such as budget, library books, and faculty members per student) or "selectivity" (percentage of applicants admitted) might be reasonable alternatives to measuring the average academic potential of a student body, but none has suggested alternatives to Holland's six types.

The success of environmental measures based on faculty and curriculum raised the possibility of new kinds of environmental research. For example, many college and university libraries contain college catalogs over the years that such catalogs have been issued. These catalogs could be used to study the

history of college environments. Similarly, compendia are available that list faculties for institutions of higher learning in various nations (e.g., Association of Commonwealth Universities, 1969; International Association of Universities, 1962). These data make it possible to study international differences in college environments.

The latter possibility has been explored in studies of Japanese universities (Richards, 1973) and of universities in British Commonwealth nations (Richards, 1974). Results generally support the usefulness of these theory-based environmental measures for studying international differences. Japanese universities placed more emphasis on Realistic and less emphasis on Artistic education than did universities in the United States. In both the United States and Japan, institutional size was associated with a relative emphasis on Realistic fields, but in the British Commonwealth institutional size was associated with an Investigative emphasis. In the United States, Japan, and British Commonwealth, technological universities emphasized Realistic fields. Finally, a multivariate analysis of the colleges composing the Oxford and Cambridge Universities indicated that Cambridge colleges tended to be more Realistic than Oxford colleges while Oxford colleges tended to be more Artistic than Cambridge colleges.

Faculty and curriculum measures also facilitate the examination of particular kinds of colleges. For example, one study (Richards, 1987a) used such measures to compare the environments of predominantly and traditionally Black colleges and universities (both 2-year and 4-year) with the environments of a representative sample of American colleges and universities. Faculty data indicated that Black colleges were significantly lower on Realistic, Artistic, and Enterprising and significantly higher on Social and Conventional. In other words, Black colleges provided less training in fields that prepare students for technical and managerial careers and more training in fields that prepare students for social service careers.

The results for the representative sample of institutions are especially interesting because they provide the best available evidence about relative emphasis on the six types in U.S. higher education (Richards, 1987a). Table 2 shows means and standard deviations for the percentages of faculty falling in the six types. The six types in order were Social, Artistic, Investigative, Enterprising, Realistic, and Conventional. These results seem consistent with the conventional wisdom about the content of college education in the United States and confirm a fairly strong emphasis on the fields associated with traditional liberal arts education.

TABLE 2
Relative Emphasis on the Six Types in a Representative
Sample of U.S. Colleges and Universities

% of faculty who are	Mean	SD
Realistic	5.3	7.8
Investigative	21.3	16.6
Artistic	29.3	16.9
Social	30.7	14.2
Enterprising	8.7	12.7
Conventional	4.5	6.5

Source. Richards (1987a).

Public records also have been used to apply Holland's theory to the careers of population scientists (Richards, 1993). The basic source of data was the *1980 Directory of the Population Association of America* (PAA). The undergraduate and graduate major fields and current occupations of all scientists listed in this Directory were classified in terms of the theory and averaged to yield profiles for the occupational environment of population science. All three profiles had the same three-letter code, IES. The congruence (Holland, 1997) of codes for individual scientists with IES was positively related to persistence in PAA and to a variety of measures of scientific productivity, findings that confirm the predictions of the theory. Many other scientific and professional associations publish directories that provide similar comprehensive information about their members, and the methods of this study could be applied to such information to provide further tests of the theory.

Using job analysis data to classify all occupations: From the "Occupations Finder" to the "Dictionary of Holland Occupational Codes." To be maximally useful, occupational classifications such as Holland's must be comprehensive. However, administering the VPI or SDS to occupational incumbents or aspirants is clearly an impractical way to code the many thousands of occupations in the United States economy. Holland and his colleagues therefore turned to several large bodies of job analysis data documenting the duties, skill requirements, work contexts, and other characteristics of specific occupational titles.

Holland's theory predicts that occupations will reflect particular patterns of job requirements and rewards depending on which of the Holland environmental

models they most resemble. For example, job analysis data should reveal that Realistic occupations involve extensive use of hands, tools, and machines but not much involvement with people, whereas the reverse should be found true of Social occupations. If such predictions were confirmed, this would not only support the validity of the environmental models but also provide a way to estimate Holland codes without having to administer the VPI or SDS to incumbents. It would also help answer the early objection that Holland's method of classifying occupations was circular (a Realistic job is the one that Realistic people tend to hold), that is, not independent in either concept or method of how he classified their members.

In the first such research (Holland et al., 1972), Holland categorized by type the 832 occupations for which there were detailed data from the Position Analysis Questionnaire (PAQ), basing his judgmental classification on his knowledge of accumulated incumbent-based data for specific occupations. The PAQ rates jobs on almost 200 attributes, including work activities, tools and machines used, working conditions, and emotional as well as physical stressors. Holland et al. (1972) found that the PAQ's 32 dimensional scores (e.g., communicating judgments, businesslike situations) distinguished reasonably well among the six environmental types and did so in a generally sensible and expected manner, thus supporting the validity of his judgmentally assigned, incumbent-based occupational codes. The PAQ data were also used to simulate VPI profiles, a procedure which produced results moderately close to the codes that Holland had assigned judgmentally. Holland then collated these PAQ results together with prior data for specific occupations from the VPI and SVIB to hone a now much expanded list of occupational codes for counseling and research.

A subsequent series of similar studies with job analysis data from the *Dictionary of Occupational Titles* (DOT) resulted in the development and successive revisions of the Occupations Finder (Holland, 1978) and the *Dictionary of Holland Occupational Codes* (DHOC; G. Gottfredson & Holland, 1996; see also the account in Holland, 1997, chap. 8). The nearly 13,000 job titles in the Fourth Edition DOT have now been assigned a three-letter Holland code based on their DOT ratings. The codes are better substantiated for some titles than others, depending on the amount and quality of job analysis, VPI, and other data on which they are based.

The foregoing series of studies also provided three-letter Holland codes for occupational categories in the five other major current federal job classification systems, including the Standard Occupational Classification (SOC) and the Guide for Occupational Exploration (GOE; G. Gottfredson & Holland, 1996). Rounds et al. (1998) have also estimated Holland codes for the occupations in the new federal O*NET database, which will eventually replace the DOT and various other

current federal occupational classifications.⁹⁶ Needless to say, adding Holland's codes to the various federal classifications provides tremendous opportunities for researching Holland's theory and implementing it in counseling.

A Direct, Theory-Based Measure of Occupational Environments: The Position Classification Inventory

The Position Classification Inventory (PCI), developed by G. Gottfredson and Holland in 1991, is an important advance in assessing vocational environments, partly because it provides a direct measure of environments independent of the individuals who populate them. The PCI is a 10-min, 78-item, self-scoring job analysis inventory which has incumbents or supervisors rate how often a job requires certain activities, abilities, values, and perspectives. These items follow directly from Holland's theory. In other words, the PCI does for environments what the SDS does for people: it directly and individually assesses them according to the theory's constructs. The instrument yields a 6-point profile from which an environment's differentiation and consistency can also be assessed. Validity evidence in the PCI manual is supplemented by more recent large-sample, longitudinal research (DeFruyt & Mervielde, 1998; Maurer & Tarulli, 1997).

The PCI opens new vistas in the classification and study of environments. It can be used to classify new (and hypothetical) occupations as well as nonoccupational environments. It is also valuable for assessing the heterogeneity of specific occupations, similarity of jobs across locations, differences in perceptions of job supervisors and incumbents, the ways in which jobs are (or could be) transformed by incumbents, and much more that concerns individuals and their organizations. This new tool provides many new opportunities for studying the course of vocational development through the lifespan. It will also greatly encourage the use of Holland's theory in industrial-organizational psychology, which has long been concerned with understanding and shaping work environments.

Assessing the Construct Validity of Holland's Occupational Types

Holland has provided the tools for implementing his theory of environments, but how valid are his environmental formulations? Most importantly, just what presses and rewards do the six occupational types represent, the environments

⁹⁶ Editors' note. Developers of the O*NET tried and later adopted various strategies to assign Holland codes to its occupational units, including employer ratings and ratings by "subject-matter experts" (Rivkin, Lewis, Cox, & Koritko, 2001; Rounds, Su, Lewis & Rivkin 2013). The citations to Rivkin et al. (2001) and Rounds et al. (2013) have been added to the reference list. They did not appear in the original.

with which the theory is most concerned?

The meaning of Holland's personality types—their construct validity—has been explored by correlating people's VPI or SDS scores with their performance on various personality and aptitude tests to see to what extent Holland's personality types overlap other psychological traits. One question, for instance, has been whether his "personality types" really do reflect personality traits as conventionally defined. The same construct validation process has been pursued, although less vigorously, for the occupational models. The first question has been whether, in fact, the psychological meaning of jobs resides substantially in jobs themselves, not just in the social climates created by their incumbents. That is, is there anything psychologically meaningful in work environments besides the other people in them? If yes, the second question concerns which job attributes are psychologically relevant to incumbents and aspirants and whether they are organized in the manner Holland's theory suggests. The availability of detailed job analysis data for a wide range of occupations is especially useful for answering these questions.

Holland et al. (1972) carried out the first job analysis study of the environmental models in their effort to extend coverage of the occupational classification. As noted, they found that the incumbent-based occupational codes were sufficiently related to PAQ job elements to use the PAQ ratings to estimate codes for many other occupations. Perhaps the most compelling demonstration that incumbent-derived environmental codes reflect objective and theoretically meaningful differences among jobs themselves was provided by a quite different kind of study involving the Occupational Analysis Inventory (OAI; Cunningham, Slonaker, & Riegel, 1987). Cunningham et al. developed an experimental work activity preference inventory based on items parallel to OAI descriptors of hundreds of specific work activities in over 1000 occupations. Upon factor analyzing the activity preferences, Cunningham et al. discovered that the resulting activity-interest factors paralleled the Holland personality types. The same link between people-based and job-based dimensions of work had now been confirmed from opposite directions.

Subsequent analyses with PAQ and Occupational Reinforcer Patterns (ORP) data went further by testing the hexagonal ordering of the environmental models. ORPs, developed by the Minnesota Work Adjustment Project, are ratings of the relative importance of 21 behavioral requirements and reinforcers such as try out own ideas, bosses back up their men, and opportunities for advancement. Hyland and Muchinsky (1991) found that the six Holland categories of occupation differed on 11 of the 13 general PAQ factors and that the six types were arrayed in similarity according to the predicted hexagonal relations. Using essentially the same ORP data but different analytical procedures, Toenjes and Borgen (1974) and Rounds et al. (1978) found that the Holland types tended to differ significantly

in ORP attributes, but only the former study confirmed the hexagonal ordering.

Hyland and Muchinsky (1991) noted that the PAQ factors differ considerably in their ability to discriminate across the hexagon and that, on the whole, the PAQ is more relevant to some Holland types (Realistic and Conventional) than others (Investigative, Artistic, and Enterprising). The same is true of the ORP data. Although half of the 21 ORP factors differ significantly across Holland type, only two (do things for other people and paid well relative to other workers) are useful in distinguishing the types (mostly Social vs Enterprising) after controlling for the types' large differences in job level (L. Gottfredson, 1980). Half the ORP dimensions (e.g., busy all the time, work not morally wrong) seem frankly irrelevant to Holland's theory, although the research on its validity has treated them all as equally relevant.

Holland's environmental models are meant to represent the full range of work activities, meaning that job analysis data that do not sample well across the full range of activity are limited in their ability to test the merits of the theory. In contrast to the PAQ and ORP, the DOT provides ratings more comparable in breadth and generality to the concepts in the Holland models. They thus have been more useful in clarifying the meaning of the types. Especially interesting, for example, is the DHOC's accounting, with DOT activity, interest, aptitude, and work conditions ratings, of the distinctions between adjacent types around the hexagon (G. Gottfredson & Holland, 1996, pp. 715–716).

A key but understudied issue in validating the occupational types involves cataloging which domains of job attributes (work activities, aptitude requirements, working conditions, and so on) are most critical in structuring the types, that is, in creating their overlapping gradients of similarity and difference. Worker activities are clearly central, as suggested by Cunningham et al.'s (1987) analyses, among others. In his effort to understand "why interest inventories work," Prediger (1982) asked whether job activities themselves can be distilled into a few more fundamental dimensions. He demonstrated, in fact, that the hexagon of environmental models can be reproduced by characterizing jobs along two-bipolar dimensions of general human activity: data vs ideas and people vs things. (Be aware that his measures of these activities differ from the same-named attributes in the DOT.)

Ascertaining the role of different aptitudes in defining the models has been more difficult, partly because there are no assessments of general interpersonal skills comparable to those for cognitive and psychomotor skills. The former are at least as important in Holland's theory as are the latter. Nonetheless, there are indications that the latter two aptitude domains are systematically related to the Holland environmental models. When L. Gottfredson (1986) organized GOE occupational groups according to their rated cognitive and psychomotor

demands, she found that they formed four broad categories reflecting different functional foci of work (dealing with physical relations, bureaucratic order, social/economic relations, and performing). These four foci in turn mirrored Holland's environmental models in reverse hexagonal order (I/R, C, E/S, A). Together with earlier research (L. Gottfredson, 1980), this work indicated that the aptitude demands of work track the patterns of activities occupations require (dealings with data, people, and things), those activity patterns in turn being consistent with Holland's predictions.

Thus, aptitude demands are related to the Holland models, but perhaps only indirectly by virtue of the activity demands that different occupations make. The same is probably true of working conditions. By their very nature, many activities necessarily impose different working conditions and aptitude requirements. For instance, serving people (Social) and creating original works of art (Artistic) necessarily preclude the precise procedures that accounting (Conventional) and DNA testing (Investigative) require if the work is to be done well. Conversely, we might expect distinctions in working conditions, rewards, and so on that do not arise from distinctions in work activities to be weakly related, if at all, to the Holland environmental models.

A less expected finding in the foregoing research was that the typical characteristics of the Holland models differ according to the level of work involved. The major distinction among jobs in the American economy is, in fact, their general intellectual complexity level (L. Gottfredson, 1986, 1997). Overall complexity level appears to arise from jobs' complexity of dealings with data, which imposes successively higher requirements for intelligence and results in higher prestige ratings for occupations. These three job attributes constitute a single dimension of work. The point here is that this dimension constrains which activities and specific aptitudes are likely to be characteristic of job families within a type. For instance, Social and Enterprising have more involvement with people and Realistic and Investigative with things, on the average. However, none shows complex involvement with either unless the job families in question are at least moderate in job level.

Accordingly, patterns of aptitude requirements, net of intelligence, vary by job level within Holland type. Several specific findings make that point: net of intelligence, (1) numerical ability is rated important in the I/R, E/S, and C foci of work only when job families are of average level (data complexity) or above; (2) various psychomotor skills are rated important in I/R and C, but only in the lower-level job families; (3) verbal aptitude is important in E/S and the verbal arts only when job families require moderately complex dealings with people; and (4) spatial ability is rated important in I/R and the spatial arts, but only where work with things is moderately complex. Thus, for example, as the job families in the I/R focus of work range from low to high in overall complexity and prestige,

psychomotor aptitudes such as motor coordination and manual dexterity are replaced in rated importance by cognitive ones such as spatial and numerical.

The DHOC (G. Gottfredson & Holland, 1996, Tables 10–14) reveals similar patterns of within-type variability for DOT ratings: some attributes vary primarily by job level, others by job type, and some by both type and level. The implications for Holland's theory of this level-associated shift in the meaning of the Holland types remains an intriguing question. The 1996 edition of the DHOC (G. Gottfredson & Holland, 1996, p. 723) has made it easy to examine this shift by providing an improved measure of job complexity (Cx) for all occupational titles.

A final general conclusion about validating the Holland models is that research on Holland-classified occupations that fails to sample jobs from comparable complexity levels is likely to mislead. This conclusion rests on the confluence of two facts. Many job attributes correlate very highly with this general level factor, among them the DOT ratings of complexity of involvement with data, General Educational Development (GED) level, and repetitive work (negative) and the PAQ ratings for importance of advising, decision making, negotiating, analyzing, and persuading. Second, the different Holland work environments tend to be distributed quite differently by job complexity/prestige level (L. Gottfredson, 1980). For instance, most Realistic work is low-level work and, conversely, most low-level work is Realistic. By contrast, Investigative jobs are found primarily in the higher strata of work and Enterprising work is spread more evenly across different job levels.

Examining mean differences by Holland type in DOT ratings of data, people, and things (ignoring job level) would correctly reveal, for example, that Realistic work has more complex involvement with things than does Social or Enterprising and that the reverse is true for involvement with people. Nevertheless, mean differences would incorrectly suggest that Realistic work has much less complex involvement with data and better perceptions of bosses and company policies (ORP ratings) than do workers in Investigative work (respectively, Tables 6 and 10 in L. Gottfredson, 1980).

In short, Holland and his associates have documented level-associated differences both within and between job families in his six environmental types. Although job level has been outside the scope of Holland's theory, its consideration is critical in understanding his environmental types as they exist in the real world. It is clear, however, that the six environmental types capture crucial differences in the patterning of occupational activity and aptitude requirements and consequent rewards.

Relationship to Other Approaches in Assessing Environments

The need for psychology as a science to assess the characteristics of environments has long been recognized (Lewin, 1936). Two approaches have dominated efforts by psychologists to assess environments. The first is usually traced to Henry Murray's (1938) theory of individual "need" and environmental "press." This theory implies that environments should be assessed in the same ways that individual personalities are assessed. Therefore, researchers using this approach typically develop items and scales that resemble items and scales in objective personality tests. These environmental scales then are administered to the inhabitants of a given environment and combined in some way to yield scores for that environment. Several researchers have used this approach to develop environmental measures, both for colleges and universities (Pace, 1963; Pace & Stern, 1958) and a wide variety of other settings (Moos, 1974, 1975; Stern, 1970). A persistent weakness of this approach has been a lack of clarity about procedures for combining individual inhabitant scores into overall environment scores. Indeed, researchers frequently have failed to recognize that such procedures are necessary, and have incorrectly analyzed the reliability and validity of the environmental scales only at the level of individual inhabitants (Richards, 1990). Pace (1963) addressed this issue by scoring an environmental item only if a majority of inhabitants answered in a given direction and summing such consensus items to yield scale scores for the environment. Other researchers using these scales (Astin & Holland, 1961; Richards, Seligman, & Jones, 1970) have used the simpler procedures of averaging inhabitant scores to yield scores for a given environment.

The second approach is explicitly based on an ecological perspective (Barker, 1968; Brunswick, 1956; Hawley, 1950). This perspective views the world in terms of populations of specific environments (representative sampling from such populations becomes an issue for environmental research), with each environment being an organized whole characterized by its pattern of activities. Consequently, a typical procedure is to collect a variety of measures from public records about a sample of environments and to use factor analysis to search for the dimensions underlying these measures (Astin, 1965; Richards, 1973, 1987b; Richards, Rand, & Rand, 1966, 1968). In general, these studies have yielded meaningful factors and these factors have been related to incumbent-based measures in ways that support the interpretations given to these factors.

Holland's approach began explicitly with a personality test approach, but over the years has more and more moved toward an ecological perspective. This is especially clear in the classification of all occupations in the Dictionary of Occupational Titles in terms of the typology (G. Gottfredson & Holland, 1996). This classification clearly views the world of work as a population of occupational

environments, with each occupation being an organized whole characterized by its pattern of activities. Holland's movement toward an ecological perspective and his sensitivity to the proper statistical analysis of ecological-level data seem highly desirable for building a science of environments (Schoggen, 1989).

Conclusions about Holland's Contributions

Two important criteria for evaluating scientific theories are the range of phenomena they organize and the extent to which they stimulate research. By the first of these criteria, Holland's has been successful. The theory organizes environments for all occupations in the United States and for all types of colleges and universities throughout the world. It also organizes the fit between individuals and their environments and the effects of particular types of environments on particular types of individuals. This organization is parsimonious, involving only six dimensions for both individuals and environments. Finally, no alternative formulation is currently available for organizing these phenomena. Holland's is still the "only game in town."

Holland's theory has also stimulated extensive research, but more on vocational behavior than on vocational environments, with Holland and his colleagues conducting most of the latter. But that will soon change. The reason is that the four decades of sustained research by Holland and his associates has produced much evidence on the construct validity of his environmental formulations, led to new insights into the nature and effects of educational and occupational environments, classified all occupations in the United States, and yielded a simple, theory-driven inventory (the PCI) for assessing any vocational setting. The PCI, in particular, opens up entirely new avenues in studying people in environments. In short, Holland has transformed vocational psychology by providing the theoretical and measurement tools—indeed, the impetus—for understanding vocational environments.

References

- Association of Commonwealth Universities. (1969). *Commonwealth universities year 1969*. London, England: Author.
- Astin, A. W. (1963). Further validation of the Environmental Assessment Technique. *Journal of Educational Psychology, 54*, 217–226.
- Astin, A. W. (1965). *Who goes where to college*. Chicago, IL: Science Research Associates.
- Astin, A. W., & Holland, J. L. (1961). The Environmental Assessment Technique: A way to measure college environments. *Journal of Educational Psychology, 52*, 308–316.

- Barker, R. G. (1968). *Ecological psychology: Concepts and methods for studying the environment of human behavior*. Stanford, CA: Stanford Univ. Press.
- Brunswick, E. (1956). *Perception and the representative design of psychological experiments*. Berkeley, CA: University of California Press.
- Campbell, D. P., & Holland, J. L. (1972). A merger in vocational interest research: Applying Holland's theory to Strong's data. *Journal of Vocational Behavior*, 2, 353–376.
- Cunningham, J. W., Slonaker, D. F., & Riegel, N. B. (1987). Interest factors derived from job analytically based activity preference scales. *Journal of Vocational Behavior*, 30, 270–279.
- DeFruyt, F., & Mervielde, I. (1998). RIASEC and Big Five traits as predictors of employability and nature of employment. Unpublished manuscript. Department of Psychology, University of Ghent, Belgium.
- Gottfredson, G. D., & Holland, J. L. (1991). *The Position Classification Inventory: Professional manual*. Odessa, FL: Psychological Assessment Resources.
- Gottfredson, G. D., & Holland, J. L. (1996). *Dictionary of Holland occupational codes* (3rd ed.). Odessa, FL: Psychological Assessment Resources.
- Gottfredson, L. S. (1980). Construct validity of Holland's occupational typology in terms of prestige, census, Department of Labor, and other classification systems. *Journal of Applied Psychology*, 65, 697–714.
- Gottfredson, L. S. (1986). Occupational Aptitude Patterns Map: Development and implications for a theory of job aptitude requirements. *Journal of Vocational Behavior*, 29, 254–291 (Monograph).
- Gottfredson, L. S. (1997). Why g matters: The complexity of everyday life. *Intelligence*, 24, 79–132.
- Hawley, A. W. (1950). *Human ecology: A theory of community structure*. New York: Ronald Press.
- Holland, J. L. (1966). A psychological classification scheme for vocations and major fields. *Journal of Counseling Psychology*, 13, 278–288.
- Holland, J. L. (1975). *Manual for the Vocational Preference Inventory*. Palo Alto, CA: Consulting Psychologists Press.
- Holland, J. L. (1978). *The occupations finder*. Odessa, FL: Psychological Assessment Resources.
- Holland, J. L. (1997). *Making vocational choices: A theory of vocational personalities and work environments* (3rd ed.). Odessa, FL: Psychological Assessment Resources.
- Holland, J. L., Viernstein, M. C., Kuo, H., Karweit, N. L., & Blum, Z. D. (1972). A psychological classification of occupations. *Journal Supplement Abstract Service*, 2, 84.
- Hyland, A. M., & Muchinsky, P. M. (1991). Assessment of the structural validity of Holland's model with job analysis (PAQ) information. *Journal of Applied Psychology*, 76, 75–80.

- International Association of Universities. (1962). *International handbook of universities 1962*. Paris, France: Author.
- Lewin, K. (1936). *Principles of topological psychology*. New York: McGraw-Hill.
- Linton, R. (1945). *The cultural background of personality*. New York: Century.
- Maurer, T. J., & Tarulli, B. A. (1997). Managerial work, job analysis, and Holland's RIASEC vocational environment dimensions. *Journal of Vocational Behavior, 50*, 365–381.
- McConnell, T. R. (1968). What college for whom? *Contemporary Psychology, 13*, 99–101.
- Moos, R. H. (1974). *The social climate scales: A user's guide*. Palo Alto, CA: Consulting Psychologists Press.
- Moos, R. H. (1975). *Evaluating correctional and community settings*. New York: Wiley.
- Murray, H. (1938). *Explorations in personality*. New York: Oxford University Press.
- Pace, C. R. (1963). *College and university environment scales*. Princeton, NJ: Educational Testing Service.
- Pace, C. R., & Stern, G. G. (1958). An approach to the measurement of psychological characteristics of college environments. *Journal of Educational Psychology, 49*, 269–277.
- Prediger, D. J. (1982). Dimensions underlying Holland's hexagon: Missing link between interests and occupations? *Journal of Vocational Behavior, 21*, 259–287.
- Richards, J. M., Jr. (1973). A study of the "environments" of Japanese universities. *Research in Higher Education, 1*, 87–99.
- Richards, J. M., Jr. (1974). "Environments" of British Commonwealth universities. *Journal of Educational Psychology, 66*, 572–579.
- Richards, J. M., Jr. (1987a). Psychosocial environments of Black colleges: A theory based assessment. *Population and Environment, 9*, 41–53.
- Richards, J. M., Jr. (1987b). The social ecology of U.S. law schools. *Research in Higher Education, 26*, 389–400.
- Richards, J. M., Jr. (1990). Units of analysis and the individual differences fallacy in environmental assessment. *Environment and Behavior, 22*, 307–319.
- Richards, J. M., Jr. (1993). Career development: A ten-year longitudinal study of population scientists. *Journal of Career Assessment, 1*, 181–192.
- Richards, J. M., Jr., Bulkeley, E. M., & Richards, B. M. (1972). Faculty and curriculum as measures of two-year college environments. *Journal of College Student Personnel, 13*, 433–440.
- Richards, J. M., Jr., Rand, L. M., & Rand, L. P. (1966). A description of junior colleges. *Journal of Educational Psychology, 57*, 207–214.
- Richards, J. M., Jr., Rand, L. M., & Rand, L. P. (1968). A description of medical college environments. *American Educational Research Journal, 5*, 647–658.

- Richards, J. M., Jr., Seligman, R., & Jones, P. K. (1970). Faculty and curriculum as measures of college environment. *Journal of Educational Psychology, 61*, 324–332.
- Rivkin, D., Lewis, P., Cox, S., & Koritko, L. (2001). *Pilot test results: Testing subject-matter expert methodology for collecting occupational information for O*NET*. Raleigh, NC: National Center for O*NET Development, Employment Security Commission.
- Rounds, J. B., Jr., Shubsachs, A. P. W., Dawis, R. V., & Lofquist, L. H. (1978). A test of Holland's environment formulations. *Journal of Applied Psychology, 63*, 609–613.
- Rounds, J., Smith, T., Hubert, L., Lewis, P., & Rivkin, D. (1998, February). *Development of Occupational Interest Profiles (OIPs) for the O*Net: Parts I (Report) and II (Appendices)*. (Contract No. SARDC 97–2). Southern Assessment Research and Development Center, Employment Security Commission of North Carolina.
- Rounds, J., Su, R., Lewis, P., & Rivkin, D. (2013). *Occupational interest profiles for new and emerging occupations in the O*NET system: Summary*. Washington, DC: U.S. Department of Labor, Employment and Training Administration, Office of Workforce Investment, Division of Workforce System Support.
- Schoggen, P. (1989). *Behavior settings: A revision and extension of Roger G. Barker's ecological psychology*. Stanford, CA: Stanford University Press.
- Stern, G. G. (1970). *People in context: Measuring person-environment congruence in education and industry*. New York: Wiley.
- Toenjes, C. M., & Borgen, F. H. (1974). Validity generalization of Holland's hexagonal model. *Measurement and Evaluation in Guidance, 7*, 79–95.
- United States Office of Education. (1959). *Earned degrees conferred by higher educational institutions: 1957–58*. (Circular No. 570). Washington, DC: DHEW.
- Yonge, G. D. (1965). Students. *Review of Educational Research, 34*, 253–263.

CHAPTER 4.3

HOLLAND'S THEORY AND CAREER INTERVENTION: THE POWER OF THE HEXAGON⁹⁷

Jack Rayman and Lynne Atanasoff⁹⁸

Pennsylvania State University

Arguably no theory of career development has had a greater influence on the practice of career counseling and education than Holland's. In this paper we identify several of the characteristics of the theory that contributed to its great utility for practitioners, describe several of the most commonly used interventions based on the theory, and discuss research findings and practitioner speculations that support the efficacy, utility, and popularity of those interventions.

John Holland's theory of vocational choice is exceptional among career development theories for its utility in both research and practice. By definition, a theory explains natural events in terms of a system of concepts and laws that relate those diverse concepts to each other (Gall, Borg, & Gall, 1996). From a scientific perspective this is important because if a theory can explain a phenomenon, it serves to describe events, predict consequences, and identify interventions to modify results. For researchers a good theory provides an ability to predict events, lends itself to the scientific method of inquiry, and facilitates further predictions about events (Gall, Borg, & Gall, 1996; Osipow, 1983).

For practitioners, concepts of a good theory translate easily into intervention. While this is the ideal, in the social sciences, theorists sometimes match the complexity of human nature with the complexity of theories, making direct translation of theory into practice unrealistic. In vocational psychology theories are often minimally applicable to practical problems, which leaves counselors to work without a systematic framework (Osipow, 1983). In rare instances, a good theory evolves that minimizes the theoretical interpretation required of practitioners by virtue of it being appropriately valid, complex, and comprehensive (Holland, 1997). The true mark of a good career theory is whether it assists career counselors in promoting the outcome that people seek when entering counseling

⁹⁷ Editors' note. Reprinted with permission from *Journal of Vocational Behavior* 55, 114–126 (1999).

⁹⁸ We are indebted to Ellen Houser, Barbara Blakeslee Rayman, and Elizabeth Toepfer-Hendey for their critical review of the manuscript.

rather than impeding the career decision-making process (Holland, 1997).

John Holland's theory of vocational choice is one of the rare theories that is good both from the perspective of research and practice because it is useful and easily applied in practice while being testable empirically. The typology itself is easy to grasp and has been applied to practical problems such as the development of assessment tools and the interpretation of person and environment fit (Holland & Rayman, 1986). The typology creates a vocabulary to describe individual characteristics and work environments that has utility when assisting people to understand some personal and environmental characteristics that lead to satisfying careers. Furthermore, Holland's theory is clearly defined, internally consistent, and broad in scope, yet it is meaningful when dealing with individual development and change for both women and men across the lifespan (Holland, 1997).

Utility of Holland's Theory

While Holland's theory enjoys the classic technical characteristics of "good theory" described in the introduction above, there are five key qualities that distinguish it from other career development theories. Its unprecedented utility for career counselors and clients is rooted in these five qualities.

Simplicity. First and foremost, Holland's theory is elegant in its simplicity. From the most sophisticated theoretician to the unemployed day worker, the basic ideas in Holland's theory are easily understood. There are six pure personality types. There are six pure work environments. Through genetic predisposition and environmental influence individuals develop characteristic personalities that resemble these pure types to some degree. Similarly, because "birds of a feather flock together," characteristic work environments develop. Where there is a good fit between personality characteristics and work environment, the individual is more likely to be successful, feel satisfied, and lead a productive work life. The rest is details. It makes sense. You don't have to understand developmental psychology or rocket science, which leads to the next key quality.

Face validity. By definition, face validity refers to the extent to which, upon inspection, a theory adequately describes and predicts real life events (Gall, Borg & Gall, 1996) or in this case, human vocational behavior. In our experience, the most common first-time client response, when introduced to the theory is, "Yes, that makes sense." While face validity is no substitute for construct validity, it does have immediate value in gaining rapport and building credibility with the public (Helmstadter, 1964). The almost universal face validity enjoyed by Holland's theory coupled with its well-documented empirical validity has led to its acceptance throughout the nation and around the world (Holland, 1997).

Organizational framework. The Holland hexagonal model (with its now famous types—Realistic, Investigative, Artistic, Social, Enterprising, and Conventional—RIASEC for short) provides counselor, client, researcher, librarian, and webmaster with an organizational framework that is simple, logical, and utilitarian. Instead of thinking of the world of work as a random agglomeration of more than 20,000 occupations, Holland's theory identifies six "pure" work environment types (Realistic, Investigative, Artistic, Social, Enterprising, and Conventional) and conveys spatially how occupations in one sector relate to occupations in the others. Similarly, one can readily see how the six different personality types (of the same names) relate to one another. Like all human enterprises, "getting organized" is fundamental to understanding and problem solution in the difficult business of career development and choice. Holland's theory has become the standard organizing framework for the career counseling profession.

Vocabulary. The fact that the Holland framework is so widely used has led theoreticians, researchers, counselors, and other career services professionals to utilize the Holland terminology in both professional and clinical discussion. Thus, it is common to hear a counselor describe an entrepreneurial client as an ESA or an "E" type personality, or to say, "She's unhappy because she's an "I" (Investigative) personality working in an "E" (Enterprising) environment;" or "her personality type is incongruent with her work environment leading to a poor person/environment fit." This widespread familiarity with the Holland themes and the associated technical terminology such as "consistency," "differentiation," "identity," and "congruence" has created a vocabulary that allows people to discuss the world of work more accurately and within a conceptual framework (Shivy, Phillips, & Koehly, 1996).

Translatable to practice. Perhaps the most powerful key quality of the theory is the ease with which it can be translated into practice. Holland's most direct translation of his theory into practice is the Self-Directed Search (SDS). While there are many different forms of career intervention based on Holland's theory, the SDS has evolved and been continuously refined by Holland over the past 30 years to the point that it has become almost interchangeable with the theory in the minds of clients, career counselors, and other career services professionals.

Although there is an enormous body of evidence that supports the validity and reliability of the theory and its many aspects (Holland, 1997), we believe these five key qualities distinguish it from other theories of career development and lead to its unprecedented utility in the development of career assessments and interventions.

Career Interventions Spawned by the Holland Theory

While Holland's "Investigative" juices had no doubt led to the development of the theory, he found that he was not a pure "Investigative" type. The "Artistic" bent, which had led him to his aspiration of becoming a concert pianist, and the "Realistic" bent that had manifested itself in his frequent tinkering with woodworking, were not satisfied with lofty ideas that could not be translated through creative energy (A) into something of practical value (R) for the clients he had been seeing in his early career as a vocational counselor (S). In a very real sense Holland's development of the SDS was a product of his personal high flat profile, with the personality characteristics of R, I, A, S and even C and E playing significant roles! While we have no firm evidence of it, in his early years Holland was almost certainly an R/I/A/S/E/C personality type. In other words, the theoretician himself was characterized by the high flat profile that is found for many multi-talented college students. This high flat profile seems to have persisted to the present (Weinrach, 1996) though there are those who would say Holland's E personality characteristics began to emerge as the cumulative sales of the SDS approached 20 million!

Holland's first attempt at developing an instrument to assess personality type was the Vocational Preference Inventory (VPI) (Holland, 1975). The VPI is a simple device in which a person indicates which vocations are appealing and which are not from a list of 84 occupational titles that load on the six Holland scales. Emphasized in the VPI and in Holland's theory is the notion that people project their views of themselves and work onto occupational titles (Osipow, 1983). What makes this ingenious is that Holland viewed the occupational stereotyping process as an advantage rather than an impediment (Osipow, 1983). He incorporated into the VPI the fact that occupational stereotyping is based on individuals' experiences with work, making personal perceptions of occupations real and accurate. Where individuals have little knowledge about specific jobs, Holland hypothesized that their stereotype was revealing of a preferred life style. While the VPI remains a simple and effective tool to assess personality type and still receives attention in the vocational research literature (Spokane, 1991), it has long since given way to the SDS which is equally effective at assessing personality type, but has the added benefit of being a powerful intervention as well.

The Self-Directed Search. If Holland's theory provides insight into the theoretical understanding of career development and choice, the Self-Directed Search is the tool Holland invented to deliver that knowledge and understanding directly to the client. As previously mentioned the SDS is Holland's translation of his theory into practice. Indeed, many clients' and counselors' only exposure to the Holland theory is through their interaction with the SDS, or some other

Holland theory-based instrument. The SDS is unique among interest measures for the following characteristics:

1. It is self-administered, self-scored, and self-interpreted.
2. It combines assessments that include occupational daydreams, preferred activities, self-assessed competencies, occupations, and self-estimates.
3. The scales are totally transparent to the user. No attempt has been made to disguise which items load on which scale.
4. It utilizes raw scores instead of standard scores.
5. It produces a three-letter Holland Code that provides a direct linkage to The Occupations Finder, The Dictionary of Holland Occupational Codes (Gottfredson & Holland, 1996), and many other career resources that have been coded to the Holland classification system.
6. It provides a simulation of an interview with a counselor and thus is often perceived by users as more of a treatment or intervention and less as an assessment device.
7. It is kept by the user and can be used over and over as a permanent career planning resource.

The SDS can be used in group and individual career intervention to increase self-understanding, the number of vocational alternatives considered, satisfaction with current vocational aspiration, and knowledge of the typology (Holland, 1997).

The utility and innovativeness of the SDS as a career intervention cannot be overemphasized, and there is remarkable continuity between Holland's theory and the SDS as a career intervention (Holland & Rayman, 1986). The SDS provides an effective vocational counseling experience for people who do not necessarily see group or didactic interaction as attractive interventions (Avallone, 1974; Holland, 1985a). Further, it is self-directed and simple yet comprehensive and effective as a stand-alone intervention (Holland & Rayman, 1986). On a practical level, the SDS multiplies the number of people with whom a counselor can intervene (Holland & Rayman, 1986). In addition, discussion about the SDS in dyadic interviews, in groups, or among friends can generate additional information about someone's strengths thereby making the SDS a flexible intervention tool (Holland, 1997). In brief, the SDS is the premiere assessment tool and intervention based on the Holland Theory, and we will explore why in a later section of this paper.

Other interventions based on the Holland theory. Since Holland's theory was first published (Holland, 1959), an explosion of instruments and interventions based on or linked to the theory have been introduced. To illustrate this trend we have briefly described a few of these developments below.

As an outgrowth of research on the SDS, Holland and several colleagues developed the Vocational Education and Insight Kit, or VEIK (Holland, 1979). The VIEK includes a card sort, the SDS, an interpretive book, and an action plan (Holland & Rayman, 1986). The idea behind the VIEK was to increase the effects of the SDS which is consistent with Holland's life-long goal of enhancing the effects of career interventions (Holland, 1997). Though the VIEK proved to be no more effective than the SDS alone (Talbot & Birk, 1979), Holland's theory influenced the development of other vocational card sorts. Highly praised for their clinical utility, some card sorts aim to ascertain Holland type (Spokane, 1991), making a clinically useful tool more meaningful because it is tied to the hexagonal framework outlined by Holland and by extension to the vast array of Holland theory-based commercially available career resources.

In the same vein as VIEK, and based on the same desire to enhance the impact and effect of the SDS, Holland developed a simple companion piece to the SDS titled "You and Your Career" (Holland, 1985b). This eight-page pamphlet discusses the scientific ideas that support the usefulness of the SDS and makes explicit the theoretical basis for the SDS in language that is easily understandable by users. Many counseling and career centers find "You and Your Career" to be a useful intervention enhancer.

More recently, the SDS themes have also been applied to educational opportunities and leisure activities. In the case of the Educational Opportunities Finder (Rosen, Holmberg, & Holland, 1998) clients can find the educational and/or vocational areas that match their Summary Codes. Similarly, the Leisure Activity Finder (Holmberg, Rosen, & Holland, 1998) can assist a client to plan retirement, discover appropriate recreational activities, and manage stress. The SDS, the many commercially available supportive materials, and clones of the SDS, however, are far from the only interventions that have been influenced by Holland's work.

Career counselors make widespread use of criterion-based inventories in counseling intervention. Perhaps the most frequently used criterion-based interest inventory is the Strong Interest Inventory (SII) (Hansen & Campbell, 1985). A vital part of the SII since 1971 (Campbell, 1971) has been the incorporation of the homogeneous Holland Theme Scales providing a theoretical context in which to interpret the Strong results. Similarly, the Career Assessment Inventory (CAI) and the Exploring Career Options (ECO) scales (Andberg & Johansson, 1987; Johansson, 1982) also use the Holland theme scales. In this arena of career assessment and intervention, the Holland theory has clearly been a significant unifying force.

Another widely used instrument based on the Holland typology is the unisex edition of the American College Testing Interest Inventory (UNIACT)

(American College Testing Program, 1988; Rayman, 1976). The addition of the UNIACT to the ACT battery has enhanced the intervention utility of the battery beyond that of other college entrance batteries. Specifically, there is evidence that using UNIACT facilitates career exploration as well as congruence between measured and expressed interests (Spokane, 1991). Likewise, DISCOVER, The American College Testing Program's computer-assisted guidance system (1987), incorporates the Holland typologies into its learning modules. Yet another practical intervention frequently used in group work is the "Party Exercise" described by Bolles (1999) in his best-selling job-hunting book, *What Color Is Your Parachute?* Indeed, in varying forms, both legitimate and pirated, group exercises, activities and interventions embracing the Holland themes have flooded the vocational workbook market.

The Holland theory has also influenced an inventory used in estimating vocational identity and identifying career barriers—The My Vocational Situation, or MVS (Holland, Daiger, & Power, 1980). The MVS, developed by Holland et al. (1980) to assess vocational identity, is useful in determining intervention outcomes (Slaney, 1988) and shows some promise as a diagnostic tool (Rayman & Bernard, 1982). Likewise, Holland influenced the development of the Career Attitudes and Strategies Inventory, or CASI (Holland & Gottfredson, 1994). The CASI is another self-directed and scored instrument. It measures adults' career attitudes, feelings, experiences, and obstacles that influence an individual's career. CASI represents yet another spin-off of Holland's insight into the process of career development and choice that has had utility for both counselors and clients.

Organizational properties of the theory. Holland's organizing framework and language has been drawn upon extensively to simplify the challenge of organizing career information for use with career interventions. By following Holland's classifications, the client and counselor can easily incorporate career information into career counseling and education (Holland, 1997). As an example, the Dictionary of Holland Occupational Codes (Gottfredson & Holland, 1996) uses the Holland typologies to make the DOT information accessible to clients, making clients more independent (Holland, 1997). Likewise, career centers on college and university campuses have discovered that organizing career information (and career libraries) by Holland codes facilitates student use of career information (Holland, 1997). It has even been proposed that counselors use the typological classification to organize interview records and instrument data to facilitate client understanding of development (Holland, 1997). Moreover, Holland (1997) has suggested that communication between counselor and client is made easier when using the classifications in discussion of client concerns.

Why Do Holland Theory-Based Interventions Work?

Of the interventions based on Holland's theory, the Self-Directed Search is clearly the most popular measure of person/environment congruence. The SDS is so widely embraced as an intervention that it has been used by over 22 million people since its introduction and has been translated into more than 25 languages (Psychological Assessment Resources, 1999). In December 1998, use of the SDS was prominently visible in the psychology literature, appearing referenced by over 300 articles or book chapters indexed in the database PsychInfo. Such frequent reference and widespread use only serve to underscore the impact of the SDS through decades of career intervention research. With such attention to the SDS, its popularity requires an answer to the question, what makes this particular instrument so appealing? What are the characteristics that distinguish it as an intervention?

It is based in theory. The first and most obvious strength of the SDS is that it is linked to and based directly on theory. Most other well-known career assessments are only loosely related to theory, and some were developed with no theoretical base at all. Holland's persistence in polishing, refining, and continuously improving both the theory and the SDS over the past 30 years (to the point where each supports and extends the other in near perfect harmony) is, in our experience one of the best examples of the integration of theory and practice within the social sciences.

It was designed as a treatment as well as an assessment. While other interest inventories were developed almost exclusively as measurement devices, Holland realized that measurement devices have treatment effects on clients and was among the first to capitalize on that treatment effect and attempt to enhance it. He did that in several ways. First, the SDS was deliberately self-administered, self-scored, and self-interpreted (Holland & Rayman, 1986). Beyond the obvious cost saving of such an approach, the "self-aspects" of this approach convey a feeling of complete confidentiality to the client. No one else sees your scores; no one else interprets your scores, or manipulates your scores in any way. This feeling of absolute confidentiality is fundamental to the success of the self-help movement and has surely contributed to the popularity of the SDS among clients.

It is democratic or at least populist. The SDS, like its author, respects the client or user and conveys that respect by engaging the client in the process rather than subjecting the client to a process. It is perceived more as a simulation than as a test. Elements of this include its being self-administered, self-scoring, and having transparent scales. The format and character of the SDS "plays" on the enormous public popularity of self-help surveys and "tests."⁹⁹ Whether they

⁹⁹ Editors' note. For an illustration of client reaction to the SDS, see Rayman, J. R. (1998). Interpreting Elenore's Self-Directed Search. *Career Development Quarterly*, 46, 330-338.

appear in *Time Magazine*, *Redbook*, or *Sports Illustrated*, the public continues to exhibit an eagerness to participate in self-administered, self-scored, and self-interpreted surveys. Holland found a way to use the values of popular culture to the advantage of the career services profession.

It is self-scoring. Because using sophisticated career instruments was customary in vocational assessment, straying from the tradition was daring by most accounts (Borgen, 1986). However, this is exactly what Holland did. Holland was able to branch off successfully from the psychometric tradition by introducing self-scoring, simplified scales and simple occupational classifications (Borgen, 1986). Instead of emphasizing psychometrics, Holland chose to focus on the conceptual, theoretical, and practical (Borgen, 1986). Looking back, his focus on scale simplicity was not only pioneering, but also correct.

It causes measurable effects. Empirical evidence implies that the act of taking the SDS directly affects career decision making (Holland & Rayman, 1986). As stated by Holland (1985a), it is important to consider how interest inventories affect a person's vocational thinking, feeling, and action since interest inventories are administered to stimulate a range of options, increase self-understanding, and teach vocational options.

The SDS expands the number of vocational options that people consider. An early study by Holland, Takai, Gottfredson, and Hanau (1978) found that positive effects of the SDS with women occur in part because of the many vocational options suggested by the SDS instructional booklet. This effect has also been documented with high school students, college students, and adults (Avallone, 1974; Lawler, 1977; Zener & Schnuelle, 1972; Zener & Schnuelle, 1976). Increases in the number of options considered has also been demonstrated in group or independent use, between genders, and with persons who have disabilities (Barker, Reardon, White, & Johnson, 1980; Rhodes, 1973).

Using the SDS is also associated with satisfaction and certainty with vocational plans (Zener & Schnuelle, 1972), confirmation of expressed vocational choices (Atanasoff & Slaney, 1980), and selection of college students' curricular choices (Danca, 1983), thus providing a form of reassurance that is widely recognized as being one of the major benefits of career counseling.

Not only is there evidence that the SDS affects the number of occupations students consider, but it also effects the intent and performance of vocational information seeking (Redmond, 1972). There are studies devoted to examining how the SDS is effective at promoting exploration (O'Neil, Muchow, & Barke, 1980) or information seeking behavior and realism in expressed career choices (e.g., Nolan, 1973).

In addition to the many benefits already identified, it appears that the Holland types may be useful in determining what type of career intervention to use (e.g.,

individual counseling, group counseling, computer-assisted counseling, self-help materials, workshops, or classes, etc.). In several studies Holland's model has served as the basis for choosing which interventions to use with clients who have specific personality types (Clark, 1999; Kivlighan & Shapiro, 1987; Lowman, 1987; Raikes, 1992; Rosenberg & Smith, 1985). There is evidence that there are client/treatment interaction effects with respect to career counseling interventions and personality, especially with social and realistic types (Boyd & Cramer, 1995). Niles (1993) found that participants selected career counseling environments that were congruent with their Holland type and that the relationship was not gender-specific.

There are benefits of using the SDS that were not anticipated even by Holland. Some unexpected benefits of using the self-scored SDS were test taker excitement, comfort, and satisfaction in addition to self-understanding stimulated by the obvious scoring system (Holland & Rayman, 1986). As an illustration, college students who completed the SDS, the Strong Campbell Interest Inventory (SCII), or both instruments perceived more value in the SDS as a stimulus than the SCII alone or the SCII and SDS combined (O'Neil, Price, & Tracey, 1979). Others have also found university students to have favorable opinions of the SDS (Fraser, 1974). Such enthusiasm for the SDS only adds to the instrument's appeal and effectiveness.

Its scales are transparent. Traditionally, vocational interest measures were characterized by being sophisticated and complex psychometric instruments (Borgen, 1986). Such instruments often needed to be scored using computers since hand scoring was complex and could be tedious (Borgen, 1986). It was common for a client to complete a separate answer sheet and later receive computer results. In contrast, in one sitting an individual can take the SDS, identify a three-letter code and a list of associated occupations by using two simple booklets (Holland & Rayman, 1986). Moreover, the way that the three-letter codes are generated is apparent to the individual taking the inventory, making the SDS transparent (Holland & Rayman, 1986). The openness of the scoring procedures and the transparency of the scales of the SDS communicate the tentative nature of the interest measurement enterprise to the client (Holland & Rayman, 1986). We believe this has a positive impact on the client's understanding that interests are not immutable, neither do they come down from the great computer in the sky. Rather they are tentative and always subject to the vagaries of situational events and the standard error of measurement. Similarly, the transparent grouping of scale items in the SDS is so obvious that it causes the client to learn the underlying Holland classifications, thereby adding heuristic value.

It is inexpensive. Over the decades and through multiple revisions, the SDS has remained one of the most cost-effective ways to provide career intervention. In one of the earlier studies, Krivatsy and Magoon (1976) compared the cost of

three treatments: the Self-Directed Search (SDS), a modification of the SDS titled Individual Vocational Planning (IVP), and traditional vocational counseling. Although all treatments were equally effective and satisfying, the traditional counseling treatment was six times more costly per student than was the SDS, making the SDS low cost and comparable in effectiveness to traditional methods (Krivatsy & Magoon, 1976). At current prices the SDS costs about \$2.00 per administration compared to \$6.00 for its closest competitor. From a cost perspective, the SDS remains the clear value leader in the competitive interest inventory market.

Final Thoughts

Taken together the Holland theory, the Holland classification system, and the comprehensive array of Holland theory-based interventions, have been a major force in shaping the face of career development theory, research, and practice over the past three decades. While other theories of career development have received similar acclaim, other classification systems have attained some acceptance, and other interventions have gained a degree of popularity; no other system has achieved the high-level integration of theory, research, and practice that distinguishes the Holland system.

In summary, John Holland's influence on the theory, research, and practice of career counseling and intervention has been unprecedented. Through his life work he has profoundly shaped career development theory, interest measurement design and technology, career intervention, occupational classification, and the entire career counseling enterprise. Through the simplicity of his theory, the practicality of his instruments, and the persistence of his personality, John Holland has himself become one of the most powerful career interventions of our time. And as we would expect from a good intervention, he has significantly changed and enhanced our profession.

References

- Andberg, M. A., & Johansson, C. B. (1987). *ECO: Exploring career options*. Minnetonka, MN: National Computer Systems.
- American College Testing Program. (1988). *Interim psychometric handbook for the 3rd edition ACT Career Planning Program*. Iowa City: Author.
- American College Testing Program. (1987). *DISCOVER*. Iowa City: Author.
- Atanasoff, G. E., & Slaney, R. B. (1980). Three approaches to counselor-free career exploration among college women. *Journal of Counseling Psychology, 27*, 332–339.

- Avallone, V. L. (1974). A comparative study of the effects of two vocational guidance systems: The Self-Directed Search and a traditional vocational guidance model. (Doctoral dissertation, University of Northern Colorado, 1974). *Dissertation Abstracts International*, 35(5A), 2670–2671.
- Barker, S., White, P., Reardon, R., & Johnson, P. (1980). An evaluation of the effectiveness of an adaptation of the Self-Directed Search for use of the blind. *Rehabilitation Counseling Bulletin*, 23, 177-182.
- Bolles, R. N. (1999). *What color is your parachute?* Berkeley, CA: Ten Speed Press.
- Borgen, F. H. (1986). New approaches to the assessment of interests. In W. B. Walsh, & S. H. Osipow (Eds.), *Advances in vocational psychology: The assessment of interests* (pp. 83–125). Hillsdale, NJ: Erlbaum.
- Boyd, C. J., & Cramer, S. H. (1995). Relationship between Holland high-point code and client preferences for selected vocational counseling strategies. *Journal of Career Development*, 21, 213–221.
- Campbell, D. P. (1971). *Handbook for the Strong Vocational Interest Blank*. Stanford, CA: Stanford University Press.
- Clark, D. (1999). *Differences in career treatment preferences resulting from degree of congruence between client personality type and career treatment environment*. Unpublished doctoral dissertation, The Pennsylvania State University, University Park.
- Danca, J. (1983). *The relationship of selected personality measures from John Holland's Self Directed Search and community college student curricular choices*. Unpublished doctoral dissertation, Northern Illinois University, De Kalb.
- Fraser, F. D. (1974). Effect of the Strong Vocational Interest Blank and the Self- Directed Search on career planning of college students. (Doctoral dissertation, University of Missouri, Columbia, 1975). *Dissertation Abstracts International*, 36(3A), 1302–1303.
- Gall, M. D., Borg, W. R., & Gall, J. P. (1996). *Educational research* (6th ed.). White Plains, NY: Longman.
- Gottfredson, G. D., & Holland, J. L. (1996). *Dictionary of Holland occupational codes*. Odessa, FL: Psychological Assessment Resources.
- Hansen, J. C., & Campbell, D. P. (1985). *Manual for the Strong Interest Inventory* (4th ed.). Stanford, CA: Stanford Univ. Press.
- Helmstadter, G. C. (1964). *Principles of Psychological Measurement*. New York: Meredith Company.
- Holland, J. L. (1959). A theory of vocational choice. *Journal of Counseling Psychology*, 6, 35–45.
- Holland, J. L. (1975). *Manual for the Vocational Preference Inventory*. Palo Alto, CA: Consulting Psychologists Press.

- Holland, J. L. (1979). *Manual for the Vocational Exploration and Insight Kit*. Palo Alto, CA: Consulting Psychologists Press.
- Holland, J. L. (1985a). *The self-directed search professional manual*. Odessa, FL: Psychological Assessment Resources, Inc.
- Holland, J. L. (1985b). *You and your career*. Odessa, FL: Psychological Assessment Resources, Inc.
- Holland, J. L. (1997). *Making vocational choices: A theory of vocational personalities and work environments* (3rd ed.). Odessa, FL: Psychological Assessment Resources, Inc.
- Holland, J. L., & Gottfredson, G. D. (1994). *Career attitudes and strategies inventory: An inventory for understanding adult careers*. Odessa, FL: Psychological Assessment Resources, Inc.
- Holland, J. L., Takai, R., Gottfredson, G. D. & Hanau, C. (1978). A multivariate analysis of the effects of the Self-Directed Search on high school girls. *Journal of Counseling Psychology, 25*, 384–389.
- Holland, J. L., & Rayman, J. R. (1986). The Self-Directed Search. In W. B. Walsh, & S. H. Osipow (Eds.), *Advances in vocational psychology: The assessment of interests* (pp. 55–82). Hillsdale, NJ: Erlbaum.
- Holland, J. L., Daiger, D. C., & Power, P. G. (1980). Some diagnostic scales for research in decision-making and personality: Identity, information, and barriers. *Journal of Personality and Social Psychology, 39*, 1191–1200.
- Holmberg, K., Rosen, D., & Holland, J. L. (1998). *The Leisure Activities Finder (LAF)*. Odessa, FL: Psychological Assessment Resources, Inc.
- Johansson, C. B. (1982). *Manual for career assessment inventory* (2nd ed.). Minneapolis, MN: National Computer Systems.
- Kivlighan, D. M., & Shapiro, R. M. (1987). Holland type as a predictor of benefit from self-help career counseling. *Journal of Counseling Psychology, 34*, 326–329.
- Krivatsky, S. E., & Magoon, T. M. (1976). Differential effects of three vocational counseling treatments. *Journal of Counseling Psychology, 23*, 112–118.
- Lawler, A. C. (1977). Career exploration with women using the Non-Sexist Vocational Card Sort. (Doctoral dissertation, University of North Carolina, 1978). *Dissertation Abstracts International, 39*(1A), 130–131.
- Lowman, R. L. (1987). Occupational choice as a moderator of psychotherapeutic approach. *Psychotherapy, 24*, 801–808.
- Nolan, J. J. (1973). The effectiveness of the Self-Directed Search compared with group counseling in promoting information-seeking behavior and realism of vocational choice. (Doctoral dissertation, University of Maryland, College Park, 1974). *Dissertation Abstracts International, 35*(1A), 195.
- Niles, S. G. (1993). The relationship between Holland type preferences for career counseling. *Journal of Career Development, 19*, 209–220.

- Psychological Assessment Resources (1999). What is the SDS? [Announcement posted on the World Wide Web]. Odessa, FL: Author. Retrieved February 11, 1999 from World Wide Web: <http://www.parinc.com>.
- O'Neil, J. M., Price, G. E., & Tracey, T. J. (1979). The stimulus value, treatment effects, and sex differences when completing the Self-Directed Search and Strong-Campbell Interest Inventory. *Journal of Counseling Psychology*, 26, 45–50.
- O'Neil, J. M., Muchow, J. S., & Barke, C. (1980). *Treatment effects of the Strong-Campbell Interest Inventory and the Self-Directed Search on men and women*. Montreal, Canada: American Psychological Association. (ERIC Document Reproduction Service No. ED 192 223)
- Osipow, S. H. (1983). *Theories of career development* (3rd. ed.). Englewood Cliffs, NJ: Prentice Hall.
- Power, P. G. (1979). *The transition from education student to beginning teacher: Personality, self-perceptions, vocational characteristics, commitment, and work satisfaction*. (Unpublished doctoral dissertation). Johns Hopkins University, Baltimore.
- Rayman, J. R. (1976). Sex and the single interest inventory: The empirical validation of sex balanced vocational interest inventory items. *Journal of Counseling Psychology*, 23, 239–246.
- Rayman, J. R., & Bernard, C. B. (1982). *Strong and weak vocational identities: A post-mortem of a career course*. Unpublished manuscript.
- Raikes, T. (1992). *Career intervention by Holland type*. Counseling Center, University of Missouri, Columbia.
- Redmond, R. E. (1972). Increasing vocational information seeking behaviors of high school students. (Doctoral dissertation, University of Maryland, Collage Park, 1973). *Dissertation Abstracts International*, 34(5A), 2311–2312.
- Rhodes, C. I. (1973). An evaluation of the Self-Directed Search and the effect of group or independent use in facilitating career development of secondary school students. (Doctoral dissertation, West Virginia University, Morgantown, 1973). *Dissertation Abstracts International*, 34(4A), 1628.
- Rosen, D., Holmberg, K. & Holland, J. L. (1998). *Educational opportunities finder*. Odessa, FL: Psychological Assessment Resources, Inc.
- Rosenberg, A. G., & Smith, S. S. (1985). Six strategies for career counseling. *Journal of College Placement*, 45, 42–46.
- Shivy, V. A., Phillips, S. D., & Koehly, L. M. (1996). Knowledge organization as a factor in career intervention outcome: A multidimensional scaling analysis. *Journal of Counseling Psychology*, 43, 178–186.
- Slaney, R. B. (1988). The assessment of career decision making. In W. B. Walsh, & S. H. Osipow. (Eds.), *Career decision making* (pp. 33–76). Hillsdale, NJ: Erlbaum.
- Spokane, A. R. (1991). *Career intervention*. Englewood Cliffs, NJ: Prentice-Hall.

- Talbot, D. B., & Birk, J. M. (1979). Does the Vocational Exploration and Insight Kit equal the sum of its parts? A comparison study. *Journal of Counseling Psychology, 26*, 359–362.
- Weinrach, S. G. (1996). The psychological and vocational interest patterns of Donald Super and John Holland. *Journal of Counseling and Development, 75*, 5–16.
- Zener, T. B., & Schnuelle, L. (1972, February). *An evaluation of the Self-Directed Search: A guide to educational and vocational planning* (Center for Social Organization of Schools Report No. 124). Baltimore: Johns Hopkins University.
- Zener, T. B., & Schnuelle, L. (1976). Effects of the Self-Directed search on high school students. *Journal of Counseling Psychology, 23*, 353–359.

SECTION 5

PERSONAL RECOLLECTIONS AND TRIBUTES

The four articles in this section were written by colleagues and admirers of Holland after his death in 2008.

The first chapter, written by Jack Rayman for the Newsletter of the National Career Development Association, is a memorial tribute to his friend and colleague. The second, written by Douglas Whitney at our request and published here for the first time recounts poignant recollections of his work with Holland early in his career—including an account of the “discovery” of the hexagonal arrangement of personality types. The obituary written by James Athanasou and published in the *Australian Journal of Career Development* speaks to Dr. Holland’s international acclaim and demonstrates the esteem in which Holland was held. Finally, Gary Gottfredson describes and assesses Holland’s career contributions in the confines of the single-page obituaries published for a small percentage of psychologists after their death by the American Psychological Association.

Clearly, none of these chapters is unbiased: All were written by authors deeply influenced by and grateful for the personal and professional contributions of John L. Holland.

Additional Reading

Readers can find additional perspectives on the life and work of John L. Holland in the following articles:

Hansen, J. C. (2011). Remembering John L. Holland, PhD. *Counseling Psychologist*, 39, 1212-1217.

Reardon, R. C. (2009). Remembering John Lewis Holland. *NCD A Career Developments*, 25(2), 3.

Weinrach, S. G. (1990). Have hexagon will travel: An interview with John Holland. In P. P. Heppner (Ed.), *Pioneers in counseling and development: Personal and professional perspectives* (pp. 43-49). Alexandria, VA: American Association for Counseling and Development.

CHAPTER 5.1

A TRIBUTE TO JOHN L. HOLLAND: PSYCHOLOGIST, THEORETICIAN, SCHOLAR, RESEARCHER, COUNSELOR AND FRIEND¹⁰⁰

Jack R. Rayman

The Pennsylvania State University

In November 2008, John Holland—whose pioneering work in occupational personalities and environments gave career counselors new tools and perspective to help them guide their clients during career explorations and job searches—died in Baltimore, Maryland. Earlier that month, Holland had been honored by the American Psychological Association (APA) for his “distinguished scientific applications of psychology” and outstanding contributions to vocational psychology and personality.” Following is a tribute to the life and accomplishments of Holland written by Jack Rayman, Senior Director, Career Services, Affiliate Professor of Counseling Psychology and Education at Pennsylvania State University.

John began studying psychology at the Municipal University of Omaha, and, following his graduation in 1942, his interest in the discipline was further stoked during his three-year service in the Army and subsequent matriculation at the University of Minnesota.

For the next 60 years, John worked tirelessly at Western Reserve University, the Veteran’s Administration Psychiatric Hospital (1953-56), the National Merit Scholarship Corporation (1957-63), The American College Testing Program (1963-69), Johns Hopkins University (1969-80) and in retirement to continuously develop and refine his theory and associated assessment devices, instruments, and career development tools.

Products of those years include:

- *The Psychology of Vocational Choice* (1966), his first book
- *The Vocational Preference Inventory* (1953)
- *The Self-Directed Search* (1970, 1977, 1985 & 1994)
- *Making Vocational Choices: A Theory of Careers* (1973, 1985 & 1997) his second book

100 Editors’ note. Reprinted from the Newsletter of the National Career Development Association, November 27, 2008.

- *The Dictionary of Holland Occupational Codes* (1982, 1989 & 1996, with Gary Gottfredson)
- *The Position Classification Inventory* (1991, with Gottfredson)
- *The Career Attitudes and Strategies Inventory* (1994, with Gottfredson)

Throughout his career, John actively engaged in conference presentations, and published journal articles and book chapters totaling several hundred. In addition to the citation from the APA for “distinguished scientific applications of psychology,” he was the recipient of honorary doctorates from the University of Minnesota and the University of Nebraska, of the American Psychological Association’s Award for Distinguished Professional Contributions to Knowledge in 1994, and of the Extended Research Award from the American Counseling Association in 1995.

John may forever be known for establishing a permanent association between a geometric shape (the hexagon) and the field of career psychology having chosen the hexagon to graphically represent his person-environment theory. He, like most Midwesterners, grew up close to the land and probably sported a high-flat Self Directed Search Profile, as follows:

- R** His elevated “R” (Realistic) manifested itself in his long-time interest and skill at woodworking—some of his handiwork will forever grace my home.
- I** His elevated “I” (Investigative) is probably the most obvious in that he was first and foremost intellectually curious about human behavior with a keen interest in philosophy, anthropology, and of course, psychology.
- A** His elevated “A” (Artistic) is apparent in his creative and innovative way of interpreting human behavior, his skill as an accomplished pianist—the proud owner of a baby grand piano—and his long-time interest in art. He was a huge fan of the French Fauvist painter Raoul Dufy. His home was decorated with a number of Dufy paintings, as well as the work of other prominent artists. In a modest way, his home was a sort of small gallery, and he enjoyed providing the occasional close friend with a gallery tour. He had an eye for the aesthetic and one of his fond possessions was a Frank Lloyd Wright designed chair for which he admitted to having paid “far too much.”
- S** His elevated “S” (Social) undoubtedly led to his life of service to the profession and his commitment to issues of social justice.
- E** While publishers and academicians sometimes jokingly referred to Holland’s elevated “E” (Enterprising), he was far too generous and caring, and not financially motivated enough to have been a truly successful entrepreneur.

- C While Holland's lowest score was probably "C" (Conventional), as evidenced by his sometimes impulsive and artistic flair, he was a fiscal conservative who always strove for efficiency and often said, "Carefulness is the secret to my success."

There was much about John of which the public knew little. First among them was that for most of his professional life he was nearly blind. It is an irony of life that a person with such poor vision could be such a visionary. He was also an introverted, caring, and warm individual despite having a biting sarcasm and a sometimes-dark sense of humor.

John had a rebellious nature that was apparent from the twinkle in his eye and which found its way into his professional life in devilish ways. For example, on occasion, he found it amusing deliberately to insert errors in manuscripts he submitted for publication to feed the appetite of manuscript reviewers who revel in identifying and pointing out errors. He tried to be helpful to critics in this way by not being perfect! When his tenure at the American College Testing Program was no longer satisfying, he famously proclaimed, "Have hexagon, will travel."

His Professional Legacy

Taken together, the Holland theory, the Holland classification system, and the comprehensive array of Holland theory-based interventions, have been a major force in shaping the face of career development theory, research, and practice over the past three decades. While other theories of career development have received similar acclaim, other classifications systems have attained some acceptance, and other interventions have gained a degree of popularity, no other system has achieved the high level integration of theory, research, and practice that distinguishes the Holland system.

In summary, John Holland's influence on the theory, research, and practice of career counseling and intervention has been unprecedented. Through his life work, he has profoundly shaped career development theory, interest measurement design and technology, career intervention, occupational classification, and the entire career counseling enterprise. Through the simplicity and elegance of his theory, the practicality of his instruments, and the persistence of his personality, John himself became one of the most powerful career interventions of our time. And as we would expect from a good intervention, he significantly changed and enhanced our profession.

CHAPTER 5.2

REMINISCENCES OF JOHN L HOLLAND

Douglas R. Whitney

Douglas R. Whitney worked with John L. Holland at The American College Testing Program, where they co-authored an influential review of research on career development in the *Review of Educational Research*. He later served as a faculty member in the College of Education at the University of Iowa and as Director of the GED Testing Service of the American Council on Education. Among his reminiscences, he recalls being present when the hexagon was discovered. Here are six of his memories from that time.

An Effective Sales Pitch. I met John Holland in April 1967. I was about to begin my graduate studies at the University of Iowa and had been awarded a “Special Research Assistantship.” These awards were funded by the College of Education, rather than individual departments, so the recipients were free to choose their mentors. Two interviews had been scheduled for me. The first was with John Holland at ACT, the second with the Director of the University Examination and Evaluation Services. I knew that research assistants typically performed low-level tasks—like checking references, running statistical analysis, and the like. At the interview, however, Holland spent most of the time talking about the exciting research that WE would be doing. I recognize now that he was using a standard business sales technique (the presumptive sale—where the seller acts as if the customer has already decided to buy the product). He was so inclusive and persuasive, however, that I could picture myself as a researcher at ACT. I cancelled the second interview. This turned out to be a good thing for my career, but ironic, as I later served as Director of the Exam Services unit.

Congenial Workspace. I worked with Holland above a bar. In 1967, the various units of ACT were located in different parts of Iowa City and Coralville. The ACT Research and Development division was located above a bar in downtown Iowa City. (ACT completed work on its first building later that year.) To enter, one opened a door from the sidewalk at the side of the bar and climbed one flight of stairs. The workplace was something of an open floor plan, with only a few walls and some cubicles. Research assistants sat at desks in the open middle portion of the space. The communal coffee pot required that we all walk around the space regularly. What this encouraged, I believe, was a collaborative sharing of ideas. It certainly was a cozy and friendly workplace! We lost a bit of that, I think, when we moved to the new building.

Spotting Talent. Holland was an adept talent spotter. In my case, I spent the first couple of weeks on the job performing statistical analyses, reviewing manuscripts, and assembling data tables. In 1967, of course, that meant “cutting and pasting” in the original sense of the term. One day, after presenting a pasted-up table and text to Holland, he said “Well, you have shown me you can use scissors; let’s find out if you can use your brain.” From that day on, he treated me as a colleague. I always felt he valued my opinion and ideas—and he regularly sought them out. He treated all of the researchers and assistants in this way, I think. Who wouldn’t want to work with him? (A rhetorical question.) A review of his publications of this time shows that many research assistants and staff were included in his collaborations. I think Larry Braskamp and other graduate assistants would agree. His talent eye was not limited to graduate students. When Sandy Lutz and later Linda Shevel showed their intelligence and skills, they became partners in research even though hired as staff. In 1968, Holland went to lunch one day. The Math Stat department at the University of Iowa had hired a young assistant professor (Jim Cole). Holland met his wife (the Coles were a two-career family—rare for the time), and he hired her. When he returned to the office he said, “I think we hired a really good one (Nancy Cole) today.” Perceptive, if understated.

“...and Associates.” At the time I started at ACT, there were three full-time researchers (Mac Richards, Leonard Baird, and Chuck Elton) as well as other research assistants. Each day, Holland would wander around the offices asking each of us about progress and suggesting alternate interpretations or additional areas that could be studied. He was an effective and eager collaborator! (He reminded me of the performer who can keep multiple plates spinning atop sticks.) Except for his books, all other Holland publications of that period included one or more of us as authors. When others reviewed Holland’s work, they usually summarized it as something that “Holland and associates” had done. So, we referred to ourselves with the collective term in a light-hearted manner. We were proud to be “associates” of John!

The lesson of the colon. When we were working on an article to be submitted to one of the journals, I noted that Holland’s article titles often included a colon (e.g., “Changes in the vocational plans of college students: Orderly or random?”). I asked him about this and he explained that his experience was that the colon seemed to increase the probability that the journal editor would accept the article. This is the type of “homely observation” that he often made—valuable ideas that could be applied immediately. As a list of my subsequent publications confirms, I embraced the colon with enthusiasm. Along that line, he once explained that he would title an article with a Roman numeral to suggest that other related studies were planned. The editors, he said, were pretty much committed to publish following articles if they had accepted the first. They didn’t teach this stuff in my graduate classes!

Discovery of the Hexagon. I was there for the discovery of the Hexagon. Holland, Elton and I were working on a report of the results from administering the Holland VPI to a national sample of community college students. (Holland's early work involved National Merit scholars, and many questioned whether the ideas and instrument would generalize. At ACT, he had an opportunity to expand the samples to college students at all levels.) I was analyzing the correlations among the scores on the six scales of the instrument, and noticed that the highest correlation with the Realistic scale was the Intellectual scale. That scale correlated most strongly with the Artistic scale. Continuing along this line, I reached the end and noted that the Conventional scale correlated most highly with the Realistic scale. Visually, this resulted in a circular way of representing these relationships—a circle reading R-I-A-S-E-C-R. I graphed these correlations, with the distance inversely related to the correlations. I showed this to Holland, calling it a circle. He looked at the diagram and labeled it a Hexagon. (I didn't discover the Hexagon, but was there when Holland's "Eureka" moment occurred.) We then charted the correlations between non-adjacent scales, and noted that these were all lower than those between adjacent scales. Before that time, the scales had always been ordered as R-I-S-C-E-A. Afterwards, and to date, the favored ordering is R-I-A-S-E-C. The Hexagon has proven to be a valuable heuristic device, facilitating the exploration of a host of vocational concepts. A year later, Nancy and Jim Cole applied a robust statistical method to represent these six dimensions in a best-fitting two-dimensional plane. The "geometry" of the Hexagon was complete. Note that the Hexagon was discovered in a workspace above a bar. I think John would have appreciated that!

CHAPTER 5.3

JOHN L. HOLLAND (1919–2008)¹⁰¹

Gary D. Gottfredson

University of Maryland

John L. Holland's theory of vocational personalities and work environments transformed vocational assistance worldwide. Only a few behavioral scientists could combine the capacity for bold speculation, persistent empirical tests, and data-guided revision that Holland showed over the course of his career. His repeated revisions of the theory he first laid out in 1959 resulted in the elegant version in his 1997 book *Making Vocational Choices: A Theory of Vocational Personalities and Work Environments* (Psychological Assessment Resources). Holland also changed the way many of us think about the influences of higher education and the accomplishments of talented people.

After earning a doctorate at the University of Minnesota under John Darley and working in vocational counseling at Case Western Reserve University and Perry Point VA Hospital, Holland began conducting research on the educational development of talented young people as director of research at the National Merit Scholarship Corporation (NMSC). In an article on the undergraduate origins of scientists published in *Science* in 1957 (126, 433-437), he showed that if one considers the characteristics of students *recruited* by universities, there is little evidence that elite institutions contribute to the *production* of scientists. Later, Alexander Astin (who worked with Holland on classifying environments at NMSC) showed that the impressive outputs of elite institutions are largely due to the input characteristics of their students, a demonstration that led to the input–output paradigm that remains a major perspective in higher education research today.

After leaving NMSC to become vice president for research and development at the American College Testing Program (ACT), Holland continued research on his person–environment (P–E) theory with large samples of typical college students. He and his colleagues conducted a series of studies showing that more than a single dimension of talent is important in understanding people's accomplishments. Earlier research by Donald MacKinnon, Harrison Gough, Calvin Taylor, and others had shown that correlations between tests of academic aptitude and nonacademic achievements and creativity were modest. But such findings had been criticized as artifactual or flawed, and they were contrary to popular belief. Reports by Holland and ACT colleagues James Richards and Leonard Baird in the 1960s showed that college admission practices that rely solely on measures of academic potential lose talent of other kinds. For instance, selecting only students earning the highest

101 Editors' note. Obituary reprinted with permission from *American Psychologist*, 64, 561.

10% of grades would exclude about 86% of high school class presidents. Later, ACT researchers extended this research by producing impressive evidence that measures of nonacademic performance in college are useful predictors of adult accomplishments.

Holland was fired from ACT following his thwarted attempt to represent the views of the research unit at a board meeting. In his puckish way, John printed business cards bearing an image of the hexagon that came to symbolize his personality typology along with the pronouncement “Have Hexagon, Will Travel.” He moved to Johns Hopkins University and continued research on his theory and a new vocational intervention, the Self-Directed Search (SDS). He also purchased a grand piano with some of the payoff from a lawsuit against his former employer.

The fruit of years of empirical tests of theory, the SDS provided a transparent, user-directed way for individuals to assess themselves in terms of Holland’s Realistic, Investigative, Artistic, Social, Enterprising, and Conventional (RIASEC) typology. His plan was to provide a theory-ridden, computerless, impersonal, vocational guidance system that would provide vocational guidance for everyone. John’s fellow graduate student from Minnesota, Thomas Magoon (by then director of the counseling center at the University of Maryland), advised him on the name of the device (“call it self-directed something”), tried it with students engaged in educational and career planning, and provided encouragement. The SDS quickly became widely used and imitated.

John used witty satire to disparage some trends in counseling and vocational psychology. For instance, in a chapter of Savickas and Spokane’s 1999 book *Vocational Interests* he wrote, “Thanks to constructivist speculation . . . my personal memories now have publishable merit. It is great to be free of that misguided empirical straightjacket of reliable and valid information” (p. 87). He disapproved of the way these two fields have often wandered away from their empirical roots. During the 1970s, John was offended by charges that differences in the measured interests of men and women reflected sex bias rather than valid variance. Critics had proposed various ways to erase sex differences. He parodied the critics with a large die with RIASEC on the six faces. Rolls of the die produced no sex differences, but no validity.¹⁰² He did not bend willy-nilly in the winds of political correctness.

Jack (as his family called him) was born October 21, 1919, in Omaha, Nebraska, into a family of artistic, intellectual, and enterprising accomplishment. His father, Edward Lewis Holland, was a painter and established an advertising firm in Omaha. His mother, Ellen Walsh Dean, had been a teacher. Jack, his brothers Bill and Dick, and his sister Jean all graduated from the Municipal University of Omaha. Bill (now deceased) became an industrial executive; Dick is an advertising man and

102 Editors’ note. See footnote 77, which also describes this parody.

distinguished philanthropist; and Jean is a retired professor of pathology. Jack, professor emeritus at Johns Hopkins, died in Baltimore on November 27, 2008, pleased that his receipt of the APA Award for Distinguished Scientific Applications of Psychology was announced that month in the *American Psychologist*. He was predeceased by Elsie, his wife of many years. They are survived by three children—Kay Sindoni, Joan Holland, and Robert (Bob) Holland—and by five grandchildren—Bianca and Joey Sindoni and Ted, Eric, and Lisa Samuels.

CHAPTER 5.4

AUSTRALIAN OBITUARY, JOHN L. HOLLAND 1919–2008¹⁰³

James A. Athanasou
James Psychological Consultants

Most readers would have some link with Holland's work. In 1997, I travelled to the Vocational Interest Conference held at Lehigh University to hear the likes of Crites, Rounds, Prediger, Spokane, Gottfredson, Savickas, Zytowski, Harmon and many others, but above all John Holland. I recall clearly when one of the audience members rose and announced to a solid round of applause, "John Holland, you're my hero!" Schmalzty but true. Some two years later when on a short sabbatical visit to the University of Illinois at Urbana-Champaign, I asked Professor Lenore Harmon (a former editor of the *Journal of Vocational Behavior*) which theory she recommended I should teach in my undergraduate classes. She responded unhesitatingly, "Holland." These two events epitomised the esteem in which Holland was held by both researchers and practitioners.

Holland's influence also reached the Antipodes. Australian researchers went to the United States to study with him, and while I understand he was not a great traveler, he did take time to visit Australia. He influenced careers research in this country, as is evident in the text *Holland in Australia*, edited by Dr Jan Lokan from the Australian Council for Educational Research and Professor Keith Taylor from the University of Melbourne. His theoretical framework prompted the Australian edition of his Self-Directed Search by Meredith Shears and Adrian Harvey-Beavis. It was used in the first working draft of the *Australian Standard Classification of Occupations*; it was incorporated in one of the national Longitudinal Surveys of Australian Youth; it finds application in the occupational descriptions and interests in *Job Outlook*; as well as the *Career Quiz* used by the Department of Education, Employment and Workplace Relations. This is a substantial legacy for any careers researcher.

Holland is best known for a theory of six vocational types (Realistic, Investigative, Artistic, Social, Enterprising and Conventional). He used the six types to organise data about people as well as work environments. His theory

103 Editors' note. Originally published in 2009 in the *Australian Journal of Career Development*, 18(1), 56-57. Reprinted by permission. This version preserves the original spelling for words spelled differently in U.S. and Australian English, but the punctuation has been Americanized. A figure contained in the original has been omitted.

was more than the six types, however, and he used it to show how people should make career choices. He suggested that “people can function and develop best and find job satisfaction in work environments which are compatible with their personalities.” This idea is based on the observation that people search for compatible environments that *inter alia* will let them exercise their skills and abilities, express their attitudes and values, and take on agreeable problems and roles.

The origins of Holland’s types have probably been forgotten, but can be traced to an article in the *Journal of Applied Psychology* in 1958 and a subsequent article in 1959 that set out his theory of vocational choices. The original article was linked to the development of the Vocational Preference Inventory or VPI as it was better known. It was originally a projective test of personality using occupational titles. The basic premise was that one’s occupational preferences were in a sense a veiled expression of underlying character. There were many scales in the VPI including masculinity-femininity, extraversion, as well as the six vocational types but it was the latter that really caught on and became popular. They embodied the psychological zeitgeist of the times with a penchant for questionnaires, traits and classification. I may be wrong but the real breakthrough for Holland came when these six types were found to be organised meaningfully as a quasi-hexagonal shape in a two-dimensional space of Data vs. Ideas and Things vs. People. Later research has added a third dimension but that is another story. Holland backed up these inventories with a comprehensive text, *Making Vocational Choices: A Theory of Vocational Personalities and Work Environments*. The remarkable thing about this text was the inclusion of the Self-Directed Search, the occupational classification and the extremely useful section entitled “Research Suggestions for Students.” If nothing else, Holland was a great marketer and pragmatist.

Holland skillfully promoted this hexagonal arrangement to develop a comprehensive theory with secondary constructs such as congruence, consistency, identity and differentiation. It is really quite instructive to look at the propositions in his theory as they are perceptive and comprehensive. In fact, I believe that his greatest contribution is not the typology at all but rather the broader theory with some 27 propositions. I am often saddened by the fact that many modern researchers forget that Holland asked them to insert the phrase *ceteris paribus* when considering these formulations.

Holland’s theory became popular because it was easy to understand, useful and the instrumentation accompanying it was practical. The Self-Directed Search in its various formats led the way in a new approach to self-administered career guidance interventions. It was appropriate for its milieu and social context but has also found wide application throughout the world.

Some indication of the popularity of this theory is that in one of its catalogues,

the publisher, Psychological Assessment Resources, had announced that over 21 million copies of the Self-Directed Search have been sold. More importantly, the Holland classification has been incorporated within major interest inventories such as the prestigious Strong Interest Inventory, the American College Testing Program's UNIACT Inventory, the Career Assessment Inventory and the Career Decision Making Inventory, as well as forming a basis for the O-NET classification of occupations.

At heart, Holland was a psychologist, an empiricist and down-to-earth vocational counsellor. His innovations addressed the need of his time and place. He was widely respected as a researcher as evidenced by the American Psychological Association Award for Distinguished Applications of Psychology. Holland retired from the John Hopkins University in 1980 but continued working and in 1997 produced a revised third edition of his book.

By any standard, he was an international force in career development research that also shaped thinking in Australia. More than 25 years ago, one of my colleagues showed me his business card from a seminar he conducted in Melbourne. If my recollection is correct, it was inscribed with the words, "Have Hexagon Will Travel" (see also Stephen G. Weinrach (1980). Have Hexagon Will Travel: An Interview with John Holland, *Personnel and Guidance Journal*, 58(6), 406-14). John Holland was very much like the highly popular CBS television program *Have Gun Will Travel* that ran from 1957-1963; he was a product of that era and was also popular with audiences. Vale John Lewis Holland.

SECTION 6

RESOURCES FOR INSTRUCTION:

Photographs, Videos, PowerPoint Presentations

In order to create a personal portrait of John Holland in the mind's eye of the reader we have included a number of photographs of him in varied venues. Also, with the permission of Dr. Helen Harkness, we have provided the URL for a YouTube video that portrays him at leisure in his home in Baltimore in the early 1980s. A third "way of getting to know" Holland is by viewing his presentation entitled, "Separate and Unequal is Better" captured on video by Dr. Mark Savickas in 1991. Finally, we have included a link to a PowerPoint presentation about Holland's personal and professional career developed by Gary Gottfredson. These materials provide personal color and perspective that the text cannot capture.

PHOTOGRAPHS

Exhibit 1

A gallery of 12 photographs of Dr. Holland and others chosen for inclusion in his autobiography.



1) Classic photo of John Holland (Circa 1997)

Photo by Bill Rettberg from Holland's Personal File



2) John Holland in his Army Uniform

Photo from Holland's Personal File



- 3) Herb Feigl, philosopher of science at the University of Minnesota, made a lasting impression on Holland as a graduate student at the University of Minnesota

Photo from the University of Minnesota Archives



4) John G. Darley, Holland's mentor in the
Psychology Graduate Program at the University of Minnesota.

Photo from the University of Minnesota Archives



5) John Holland, at the time of his Ph.D. graduation (circa 1952)

Photo obtained from Mark Savickas, unknown photographer



6) John Holland and his wife Elsie Holland

Permission to use photo granted by Dianne Borgen and Fred Borgen.



7) John Holland and Donald Super

Photo from Holland's File, photographer unknown



8) John Holland his siblings: (from left) Dick Holland, John Holland, Jean Holland, and Bill Holland.

Photo from Holland's Personal File, photographer unknown



9) Fred Borgen, John Holland and David Campbell
(All University of Minnesota graduates but at different times!)

Photo obtained from Mark Savickas



10) John Holland at the Hopkins Club (Circa 1980)

Photo by David Campbell



11) John Holland (circa 2006)

*Permission to use photo granted by
Dianne Borgen and Fred Borgen*



12) Holland at his piano in retirement (Circa 1997)

Photo from John Holland's Personal File

VIDEOS

Exhibit 2

YouTubeVideo:

“Discovering Career Options – Self-Directed Search Introduction with Dr. Holland and Dr. Harkness”,
Begin watching at 4 minutes, 23 seconds and ending at 11 minutes, 34 seconds (4’23” to 11’ 34”):

<https://www.youtube.com/watch?v=ZCENvpjHZ30&t=990s>

Exhibit 3

Video of Dr. Holland’s presentation “Separate but Unequal is Better”,
(26 minutes and 23 seconds).

YouTube site: Permission to publish video is granted
by Mark Savickas and Robert Lent.

<https://youtu.be/5OdMjmb2y8I>

POWERPOINT PRESENTATION

Exhibit 4

PowerPoint Presentation:

“A Natural History of the Development of Talent:
Illustrations from the Career of John L. Holland (1919–2008)”,
Gary Gottfredson, April 25, 2014.

<http://hdl.handle.net/1903/25966>

SECTION 7

APPENDICES

APPENDIX 7.1

GLOSSARY OF HOLLAND THEORETICAL TERMS¹⁰⁴

Commonness—Commonness of a personality pattern refers to the relative frequency of the occurrence of personality patterns in the population and the relative frequency of the occurrence of work environmental patterns in the economy. In brief, both personality types and work environments are distributed asymmetrically, e.g., within our society Realistic-Investigative personalities are more *common* than Artistic-Conventional personalities. Similarly, within the US economy Realistic-Investigative work environments are more common than are Artistic-Conventional work environments. Uncommon codes are often inconsistent (see consistency), but commonness and consistency do not rank all patterns in the same way. For instance, the RS personality or environmental patterns are inconsistent, but they are relatively common.

Congruence* — “Different types require different environments. For instance, Realistic types flourish in Realistic environments because such an environment provides the opportunities and rewards a Realistic type needs. Incongruence occurs when a personality type lives in an environment that provides opportunities and rewards foreign to that person’s preferences and abilities—for instance a Realistic type in a Social environment.”

Consistency* — “Within a person or an environment, some pairs of types are more closely related than others. For example, Realistic and Investigative types have more in common than Conventional and Artistic types. Consistency is the degree of relatedness between personality types or between environmental models. Degrees of consistency or relatedness are assumed to affect vocational preference. For instance, a person who most resembles the Realistic type and next most resembles the Investigative type (i.e., A Realistic-Investigative person) should be more predictable than a Realistic-Social person.”

Differentiation* — “Some persons or environments are more clearly defined than others. For instance, a person may closely resemble a single type and show

¹⁰⁴ Asterisked entry definitions are direct quotes from Section 1 Chapter 1 or Section 1 Chapter 2 and therefore are Holland’s own words.

little resemblance to other types, or an environment may be dominated largely by a single type. In contrast, a person who resembles many types or an environment that is characterized by about equal numbers of the six types is undifferentiated or poorly defined. The degree to which a person or an environment is well defined is called the degree of differentiation. The differentiation of a personality pattern is expressed as a numerical value that equals the absolute difference between a person's highest and lowest VPI or SDS scores for the 6 scales."

Hexagon — The geometric shape that has come to spatially represent the relationships among the six Holland types – Realistic, Investigative, Artistic, Social, Enterprising, Conventional.

Identity* — "The concept provides an estimate of the clarity and stability of a person's identity or the identity of an environment. Personal identity is defined as the possession of a clear and stable picture of one's goals, interests, and talents. Environmental identity is present when an environment or an organization has clear and integrated goals, tasks, and rewards that are stable over time."

The Environmental Models — Model is a synonym for type, although Holland usually applied the term "type" when describing persons and "model" when describing environments, Human behavior depends upon both personality and the environment in which a person lives and works. To explain behavior, six model environments have been proposed to characterize the common social and physical environments in our culture. The model environments correspond to the personality types (RIASEC).

Personality Pattern* — "A person's *personality pattern* is the profile of resemblances to the personality types."

Subtype — The name given to a particular personality pattern. Personality patterns and subtypes may consist of from two to six of the types, e.g., RI, SAE, RIAS or SECRIA. Usually subtypes indicate only primary, secondary and tertiary types, e.g., SEC or RAI.

Type — A type is an abstraction stated in ideal terms. No actual individual represents any of these ideals, instead the theory characterizes individuals in terms of their resemblance to six types. The six personality types (RIASEC) are assumed to represent common outcomes of growing up in a particular culture. Persons are described in terms of types created with several goals in mind: (a) Outlining the experiences that lead to a particular kind of person, (b) Demonstrating how a person's experiences lead to a special disposition and how that disposition leads to a wide range of human behavior, and (c) Providing theoretical models that are supported by evidence about the types.

APPENDIX 7.2

NAMES MENTIONED IN HOLLAND'S AUTOBIOGRAPHY

The following entries provide a brief annotation for names mentioned by Holland in his autobiography (Sections 2 and 3). The list includes names mentioned in the text, but omits names included only in formal citations to a work documented in a reference list.

- Abe, Clifford.** Worked in Holland's research group at ACT. Contributed to research on ways college students with different major fields differed.
- Alston, William P. (Bill).** Analytic philosopher with whom Holland spent time at the Center for Advanced Study in the Behavioral Sciences at Stanford. Critiqued Holland's theory and advised on improvements.
- Astin, Alexander W. (Sandy).** Intern at Perry Point VA Hospital with Holland and worked in his research group at NMSC. Together they did research on the academic origins of PhD recipients and other research in higher education that Holland did not review in the present autobiography. Astin went on to be an influential higher-education researcher.
- Baird, Leonard.** Worked with Holland at ACT. Went to ETS when Holland was fired, and later was editor of the *Journal of Higher Education*.
- Barr, Donald.** At the time Holland addressed Barr's criticism of Alexander Astin's research in a letter to the *College and University Journal*, Barr was headmaster of the Dalton School in New York City.
- Barron, Frank X.** Psychologist, writer, and poet, Barron contributed to our understanding of the nature of creativity. Holland used products of Barron's research (the Complexity-Simplicity Scale), and Holland's first editor was a woman recommended by Barron.
- Berdie, Ralph F.** Professor at Minnesota, son-in-law of E. K. Strong, editor of the *Journal of Counseling Psychology* at the time of his death in 1974. Worked on interest measurement, student development, and leadership in counseling.
- Black, John D. (Jack).** Psychologist. Earned his PhD from the University of Minnesota. In 1950, Black established a counseling center at Stanford University, where he later also did institutional research. In 1956 Black founded Consulting Psychologists Press, the initial publisher of both the VPI and the SDS.
- Boggs, Kathleen.** Counseling psychologist at the University of Missouri, specializing in adult career transitions.

- Bordin, Edwin (Ed).** A career and counseling theorist with a psychoanalytic bent, regarding many career problems as neurotic symptoms or irrational thoughts.
- Borgen, Fred.** Professor Emeritus of psychology at Iowa State University. While working on his Ph.D. in Psychology from the University of Minnesota with David Campbell, he helped to develop the Basic Interest (factor-based) Scales for the Strong. He has made many contributions to interest and personality measurement, interest structure, and the measurement of other vocational constructs.
- Campbell, David P.** Psychologist who integrated Holland's theory into the Strong to produce the Strong-Campbell Interest Inventory (later revised and renamed the Strong Interest Inventory). Later still, Campbell went on to develop his own similar inventory (The Campbell Interest and Skill Survey).
- Clark, Kenneth E.** Professor of psychology and department chair at the University of Minnesota. Author of important contributions to vocational psychology and of an influential study of the nation's psychologists. Academic administrator at the University of Colorado and at Rochester, chair of the research advisory board at the National Merit Scholarship Corporation, and president of the Center for Creative Leadership.
- Cole, Nancy S.** A colleague of Holland at ACT. Cole conducted an early "configural analysis" that revealed a multidimensional approximation to the hexagonal arrangement discovered by less technical means by Holland and Douglas Whitney. Cole later became president of ETS and president of AERA.
- Coleman, James S.** Professor of social relations at Johns Hopkins and leader of CSOS. Helped recruit Holland to Hopkins. He led the influential report on equality of educational opportunity that became known as the "Coleman Report" (illustrating one value of having such a long list of co-authors that people usually do not bother to list them). Continued to be an important sociological theorist at Chicago.
- Darley, John (Jack).** Minnesota professor and author (with Theda Hagenah) of *Vocational Interest Measurement*. Holland's graduate school advisor.
- Dawis, R. V.** Along with Lloyd Lofquist, Dawis is developer of the Minnesota Theory of Work Adjustment that explains adjustment in terms of the correspondence between person characteristics and the demands or reinforcers of the work.
- Elton, Charles F. (Chuck).** Worked in Holland's research group at ACT. Continued doing research on higher education as professor at the University of Kentucky. Suggested making Holland's vocational assessment devices self-scoring.
- Feigl, Herbert.** Philosopher, immigrant born in Austria, founder of Minnesota Center for Philosophy of Science, Feigl's course at Minnesota made a big impression on Holland.

- Fryer, Douglas.** His 1931 book, *The Measurement of Interests* was a pioneering work in this area. The influence of his view that feelings (liking or aversion) toward activities lead to engaging or avoidance, is evident in Holland's formulations.
- Goslin, David A.** Sociologist who in the 1960s wrote an influential book (*The Search for Ability*) that called into question the social effect of widespread ability testing in the United States.
- Gottfredson, Gary D.** As a graduate-student Gottfredson worked with Holland at Johns Hopkins. Later he became professor at the University of Maryland and spent most of his career in evaluation of educational and social programs, but he continued to work with Holland until Holland's death in 2008.
- Gottfredson, Linda S.** Sociologist and professor emerita at the University of Delaware. Did research on occupational data and Holland's classification; worked with Holland at Hopkins early in her career.
- Gysbers, Norman.** Known for contributions to school counseling, Gysbers was editor of the *Vocational Guidance Quarterly*.
- Hancher, Virgil.** President, University of Iowa in 1963.
- Harmon, Lenore W.** Was the second editor (following the founder Samuel Osipow) of the *Journal of Vocational Behavior*; later she became editor of the *Journal of Counseling Psychology*. Chair of the Commission on Sex Bias in Interest Measurement which issued a report in 1974. Now professor emerita at the University of Illinois.
- Helms, Samuel T. (Sam).** Worked as a research assistant to John Holland at the Johns Hopkins University Center for Social Organization of Schools (CSOS) while pursuing a doctoral degree at the University of Maryland Baltimore County. Later worked in institutional research at Towson University.
- Hogan, Robert.** Professor in the psychology department at Johns Hopkins when Holland was director of the Education Center. He developed personality assessment devices, one of which was the Empathy Scale to which Holland and Hollifield referred in their description of an imagined study.
- Holland, Elsie.** Formerly Prethlow. Married Holland when he was at Minnesota. Together they had three children. Was supportive of Holland's career in traditional homemaker roles and more. For instance, Elsie sometimes typed John's manuscripts—a boon because he couldn't type.
- Hoyt, Donald P.** Was a contemporary of Holland at the University of Minnesota counseling center. Went on to become a university administrator as well as the president of the American College Personnel Association. During Hoyt's presidency, the ACPA began to hold national conventions apart from the American Personnel and Guidance Association.

- Huntley, Renee M.** Editorial Manager, Test Development, American College Testing Program.
- Johnston, Joseph.** Professor and director of the career center at the University of Missouri.
- Kelso, Geoffrey.** Australian graduate student who completed a dissertation on developmental antecedents of RIASEC types in the Social Relations department at Hopkins.
- Kent, Laura.** Editor of research reports at the National Merit Scholarship Corporation. Influenced Holland and others who worked with him to write clearly.
- Krumboltz, John.** Stanford University psychologist who had pioneered a social-learning perspective on career development and much later developed an inventory of the sometimes wild beliefs that thwart people's careers—the Career Beliefs Inventory.
- Kuhlen, Raymond G.** Editor of the *Journal of Educational Psychology*. Consulting editor for Ginn and Company.
- Lackey, Adam.** An imaginary assistant (lackey) whose early work under Gottfredson and Holland resulted in a published bibliography. When some people apparently did not believe Lackey was imaginary, Holland tried to do Lackey in. He was not successful. Evidently, some people will cling to the notion that Lackey exists despite no first-hand evidence of his corporeality.
- Lindquist, E. F.** Professor of Education at the University of Iowa and resident of Iowa City, Lindquist invented the optical mark reader (OMR) approach to test scoring, which made feasible some large-scale academic assessment programs, among other contributions to psychometrics and statistics. He was the co-founder of The American College Testing Program, and the CEO of Measurement Research Corporation – the company that enabled the mass scoring of the ACT, The Iowa Test of Basic Skills and the Iowa Test of Educational Development.
- Lofquist, Lloyd.** Along with Rene Dawis, Lofquist is a developer of the Minnesota Theory of Work Adjustment that explains adjustment in terms of the correspondence between person characteristics and the demands or reinforcers of the work.
- McCormick, Ernest J.** (Mac or EJ). Industrial psychologist who was a leading proponent of worker-oriented job analysis. He and his students and colleagues developed the Position Analysis Questionnaire, a worker-oriented job analysis inventory. McCormick shared a sizable collection of job analysis data with Holland, who used it for research on the RIASEC occupational classification.

- Magoon, Thomas M. (Tom).** Friend of Holland since graduate school at Minnesota. Professor and director of the counseling center at the University of Maryland. He was a long-time supporter of Holland's emphasis on practical, self-help approaches to career counseling. Through his position as Director of the counseling center, he provided Holland with access to hundreds of research subjects.
- Moos, Malcolm C.** President of the University of Minnesota from 1967-1974. He had been a professor of political science at Johns Hopkins.
- Muchinsky, Paul M.** Industrial-organizational psychologist and textbook author whose research examined the validity of Holland's vocational typology by means of job analysis data and life-history data (biodata).
- Munn, Norman L.** Editor of *Psychological Monographs*. Author of textbooks and research on comparative psychology.
- Nafziger, Dean.** While pursuing a PhD at the University of New Mexico, Nafziger came to Johns Hopkins University Center for Social Organization of Schools (CSOS) as an intern working with John Holland. After finishing his degree, he joined the research staff at CSOS. He later founded WestEd Lab and served as Executive Vice President of ETS, among other accomplishments.
- Nichols, Robert C.** Earned his PhD in psychology from the University of Kentucky. Worked with Holland at the National Merit Scholarship Corporation. Later published large study of genetic influences on personality (1968) with John C. Loehlin and became professor of educational psychology at Buffalo.
- Pallas, Aaron.** A graduate student in sociology at Johns Hopkins. Pallas is now professor of sociology and education at Teachers College, Columbia.
- Paterson, Donald G.** Was professor at the University of Minnesota who pioneered much work in counseling and industrial psychology and individual differences. Edited the *Journal of Applied Psychology* from 1943 to 1954.
- Pennypacker, A. R.** Presumably fictitious comptroller of Consulting Psychologists Press in a letter originated by Jack Black in 1973 that reduced the amount reimbursed to Holland for travel expenses.
- Power, Paul.** Australian psychologist who completed his PhD in the social relations department with Holland at Johns Hopkins.
- Prediger, Dale J.** An ACT researcher who contributed useful research related to the theory and led the vocational research program there after Holland left. He continued to produce large-sample productive research—some of it longitudinal—related to Holland's typology. He became an outspoken critic of using raw scores in interest assessment and proposed reducing sex difference in interest scores by making technical adjustments.

- Rayman, Jack R.** His dissertation titled *Sex and the Single Interest Inventory* at the University of Iowa developed an interest inventory based on Holland's typology to somewhat reduce gender differences in scores. This became the basis for the UNI-ACT—the interest inventory that became a part of the ACT Battery. Jack subsequently moved to Western Maryland College where he was a principal in the development of DISCOVER, a computerized guidance system incorporating the RIASEC types, and finally headed Career Services at Penn State University.
- Reardon, Robert (Bob).** Professor of Educational Psychology at Florida State with long involvement in career services at that university. Author of resources to help practitioners learn to use Holland's theory.
- Richards, James M. Jr. (Mac).** Worked in Holland's research unit at ACT. Later joined Holland at CSOS when Holland was the Director. An iconoclastic psychologist with wide interests ranging from psychometrics to population and environmental psychology.
- Rossi, Peter.** Professor of Social Relations at Johns Hopkins was involved, along with James Coleman in CSOS, which was a sociological research center at the university. Helped recruit Holland to Hopkins.
- Savickas, Mark.** Chair Emeritus and Professor in the department of behavioral and community health sciences department at the Northeastern Ohio University College of Medicine. An expert on the history of vocational psychology, he has helped to promote the internationalization of the field. His book on a narrative approach to career construction—and his demonstrations of this approach in practice—illustrate what he sees as an approach to career assistance for the 21st Century that goes beyond earlier approaches.
- Skager, Rodney.** Worked in Holland's research unit at ACT, coming from ETS. Went on to become Professor of Higher Education and Information Sciences at UCLA where he was involved in surveys of student drug use and drug policy.
- Smart, John C.** Retired Professor of Higher Education at the University of Memphis, Smart conducted research in implications and applications of Holland's theory in higher education.
- Smith, R. Bob, III.** Originally a clinical psychologist who founded Psychological Assessment Resources and became a test publisher. PAR published the SDS when Holland moved it from CPP when CPP took on publication of the SCII.
- Spokane, Arnold R.** Counseling psychologist and professor at Lehigh University, Spokane was at the University of Maryland when he collaborated with Holland on an *Annual Review of Psychology* article on research training for counseling psychologists.

- Stalnaker, John M.** President and founder of the National Merit Scholarship Corporation.
- Super, Donald E.** Worked as an employment counselor in the 1930s and became a counseling psychologist. He had a long and distinguished career as a professor at Teachers College, Columbia University. Late in his career he became an advocate for what he characterized as the “Life Stage/Rainbow theory.” He was an influential figure in what Holland called the vocational development (VD) perspective in counseling.
- Taylor, Calvin W.** Was a University of Utah psychologist and creativity researcher. His work implied that factors other than intelligence (e.g., problem solving, productive thinking) led to creative performance.
- Taylor, Keith.** Australian psychologist who visited Holland at Hopkins. Involved in dissemination of the theory and devices in Australia. Was executive officer of the Australian Psychological Association. Two of his students came to Hopkins to complete their PhDs with Holland.
- Thistlewaite, Don.** While at National Merit Scholarship Corporation, Thistlewaite published an article written with Donald Campbell proposing use of the regression discontinuity design—an important quasi-experimental research approach. Later was professor of psychology at Vanderbilt.
- Viernstein, Mary.** A research assistant for Holland at Johns Hopkins CSOS.
- Walsh, W. Bruce.** Counseling psychologist and professor at Ohio State University. Conducted research on validity of the typology with a variety of different groups. Editor of books and the *Journal of Career Assessment*. Founder of the APA administered Bruce and Jane Walsh Grant in Memory of John Holland which supports scientific, scholarly or applied research investigating how personality, culture and environment influence work behavior and health (mental and physical), or related educational activities. Royalties from the sales of this publication will be donated to the foundation.
- Warnath, Charles F.** Counseling psychologist and critic of vocational theory.
- Wren, C. Gilbert.** Counseling psychologist and president of the APA Division of Counseling and Guidance (later Division of Counseling Psychology and still later Society for Counseling Psychology) in 1950.
- Whitney, Douglas R.** Worked with Holland at ACT, where he co-authored an influential review of research on career development in the *Review of Educational Research*. Self-identified co-discoverer (with Holland) of the Hexagon.
- Zener, Thelma Baldwin.** Conducted an experimental evaluation of the effects of taking the SDS on high-school students.

APPENDIX 7.3

ABBREVIATIONS OR ACRONYMS

16PF	The Sixteen Personality Factor Questionnaire
ACT	American College Testing Program
ACT Guidance Profile	A section of the ACT assessment for 2-year colleges that included self-reports of a variety of activities and competencies
AACD	American Association for Counseling and Development. Earlier named the American Personnel and Guidance Association and subsequently renamed the American Counseling Association
APGA	American Personnel and Guidance Association
APA	American Psychological Association
CASI	Career Attitudes and Strategies Inventory
CEEB	College Entrance Examination Board, now often called the College Board
CPI	California Personality Inventory developed by Harrison Gough. At the time Holland referred to the CPI, it was an empirically criterion-keyed inventory and incorporated most or all of the items in Hogan's Empathy scale.
CPP	Consulting Psychologists Press
CSOS	Center for Social Organization of Schools at Johns Hopkins University. Also commonly referred to as the Education Center at Hopkins (at the time there was no department or school of education)

Division 17	A membership conglomerate of the American Psychological Association. Since renamed the Society for Counseling Psychology
DOT	<i>Dictionary of Occupational Titles</i>
DSM	<i>Diagnostic and Statistical Manual</i> a classification of mental disorders published by the American Psychiatric Association.
EAT	Environmental Assessment Technique
Education Center	Another term used to refer to the Center for Social Organization of Schools at Johns Hopkins University
ETS	Educational Testing Service
FAA	Federal Aviation Administration
GOE	<i>Guide for Occupational Exploration</i>
JCP	<i>Journal of Counseling Psychology</i>
JVB	<i>Journal of Vocational Behavior</i>
Kuder	Kuder Preference Record
MEG	Measurement and Evaluation in Guidance
NDEA	National Defense Education Act
NEO	A 6-factor personality inventory measuring Neuroticism, Extraversion, Openness, and three additional dimensions
NMSC	National Merit Scholarship Corporation
OOH	<i>Occupational Outlook Handbook</i>
PAR	Psychological Assessment Resources

Appendices

PCI	Position Classification Inventory
PGS	Paper Guidance System. An attempt to assemble helpful exercises for persons with decision-making difficulties. People did not use it.
PS	Personal Survey, Appendix B in Holland 1966.
OAI	Occupational Analysis Inventory
ORP	Occupational Reinforcer Patterns
Q-sort	A method used in personality assessment requiring raters to sort descriptors of persons according to the extent to which they characterize the individual being described using a prescribed distribution of ratings. Often analyzed using Q methods in which the usual practice of examining correlations among items across persons is replaced by examining correlations among persons across items.
R & D	Research and development
RTMT	Really-True-Masochistic Test, an apocryphal test invented by Holland and Hollifield in their satirical “report” conjured up in response to a request for an article by Lenore Harmon in 1973.
SCII	Strong-Campbell Interest Inventory. Campbell merged Strong’s men’s and women’s forms of the Strong Vocational Interest Blank (SVIB) into a single form and incorporated Holland’s theory into the inventory. The publisher of the inventory subsequently dropped Campbell’s name and renamed it the Strong Interest Inventory (SII).
SDC	Self-Directed Career program. A failed attempt to assemble helpful career materials that clients could use on their own.

SDS	Self-Directed Search
SDQ	Student Descriptive Questionnaire, a student self-report questionnaire devised by the College Board
SII	Strong Interest Inventory
SPS	Student Profile Section of the ACT assessment package
SRA	Science Research Associates, a publisher of educational materials
Strong	Strong Vocational Interest Blank, also known as the Strong-Campbell Interest Inventory and Strong Interest Inventory depending on the time period in question
VA	Veterans Administration
VD	Vocational Development perspective on careers
VI	Vocational Identity scale
VIEK	Vocational Education and Insight Kit
VPI	Vocational Preference Inventory

APPENDIX 7.4

SUBJECT/AUTHOR INDEX

16PF, 105

A

Abe, C., 53, 342

Academy of Management Review, 258

ACT Guidance Program, 349

ACT Inventory, 100, 102, 282

Adler, A., 9

Administrators Conference on Sex
Equity in Vocational Counseling,
183

Adult Education Quarterly, 258

Ageton, E. W., 201-202

Agnew, N. M., 73

Albrecht, R. E., 10

Alston, W. P., 55, 96

American Association for Counseling
and Development, 349

American College Testing Program,
52, 87, 139, 145, 224, 255, 256,
260, 302, 313, 319, 320, 324

American Council on Education, 89

American Counseling Association,
314

American Journal of Public Health,
190

*American Personnel and Guidance
Association*, 149, 171, 349

American Psychological Association
Award for Distinguished
Professional Contributions to
Knowledge, 314, 324

American Psychological Association
Committee on Psychological Tests
and Assessments, 223

American Psychological Association,
203, 219, 253, 312, 349

American Psychological Association,
Division 17 (Counseling), 69

American Psychologist, 176, 319, 321

Andberg, M. A., 301, 306

Anderson, C. J., 257, 275

Argyle, M., 257

Aronson, H., 41, 130

Asama, N. F., 52, 259

Asch, S. E., 257,

Association for Measurement and
Evaluation in Guidance, 149, 217,
219

Association of Commonwealth
Universities, 283

Assumptions, 4-6

Astin, A. W., 9, 13, 50, 89, 98, 137,
168, 247, 255, 281, 282, 291, 319

Atanasoff, G. E., 304, 306

Atanasoff, L. M., ix, xiii, 63, 83, 133,
245, 296-310

Athanasou, J., x xiii, 312, 322-324

Australia, influence in, 322

*Australian Journal of Career
Development*, 312, 323

Australian Standard Classification of
Occupations, 322

Authors Guild, 81, 83

Avallone, V. L., 300, 304, 307

B

Bailey, D. E., 97, 134

Baird, L. L., 10, 52, 139, 224, 251, 255,
259, 317, 319, 342

Baker, H. G., 126, 127, 254, 271, 307

Baldwin, T. L., 181 (*see Zener*)

Bandura, A., 257

Barak, A., 259, 274

- Barke, C., 304, 309
 Barker, R. G., 291
 Barker, S., 304, 307
 Barnett, D. C., 192, 250
 Barr, D., 137, 138, 342
 Barron, F., 51, 98, 130, 342
 BC TRY(A factor-analysis and cluster-analysis statistical package), 97
 Beardslee, B. C., 12, 19, 30, 35
 Bennett, R. E., 252, 268
 Berdie, R. F., v, 147, 255, 342
 Bernard, C. B., 126, 192, 250, 274, 302, 309
 Betsworth, D., 66, 92, 130
 Birk, J. M., 301, 310
 Black, J. D. (Jack), v, 42, 85, 140–143, 153, 154, 342
 Blank, E., 62, 132
 Blau, P. M., 263, 267
 Blum, Z. D., 179, 180, 249, 250, 264, 285, 287
 BMDP (BioMedical Data Package), 97
 Boggs, K., 103–4, 343
 Boisen M., 190
 Bolles, R. C., 14, 17
 Bolles, R. N., 302, 309
 Bond, N. A., Jr., 9, 18, 86, 132, 248, 269
 Bordin, E. S., 10, 17, 68, 202, 343
 Borg, W. R., 296, 307
 Borgen, D., 332, 335
 Borgen, F. H., xiii, 5, 18, 91, 130, 255, 256, 267, 287, 295, 304, 305, 307, 332, 333 (photo), 335
 Borman, W. C., 256, 274
 Bouchard, T. J., 263, 273
 Boyd, C. J., 305, 307
 Boyd, V. S., 227, 230, 237
British Journal of Guidance and Counselling, 212
 Brooks, L., 256, 267
Brown v. Board of Education of Topeka, 201, 202
 Brown, D., 256, 267
 Brown, S. D., 55, 91, 164, 215, 256
 Brunswick, E., 291, 293
 Bulkeley, E. M., 281, 282, 294
Buros Mental Measurement Yearbook, 225
- C**
 California Personality Inventory, 105, 349
 Camp, C. C., 265, 267
 Campbell, D. P., 11, 15, 64, 89, 92, 95, 146, 155, 156, 157, 158, 181, 226, 249, 253, 255, 257, 280, 301, 333 (photo), 334, 343
 Campbell, J. P., 73, 80, 95
Canadian Dictionary of Occupations, 189
 Canter, R. J., 201, 202
 Career Assessment Inventory, 301
 Career Attitudes and Strategies Inventory, 41, 66, 111, 128, 253, 271, 302, 308, 314, 349
Career Development Quarterly, 198, 215, 258
 Career interventions and assessments based on Holland theory, 299–302
 Carlson, C. C., 11, 134
 Carnegie Corporation, 195
 Carney, C. G., 259, 274
 Carsello, C., 227, 237
 Carter, H. D., 166
 Case Western Reserve University, *see* *Western Reserve University*
 Catt, V., 257, 268
 Cavagna, J., xiii
 Center for Advanced Study in the Behavioral Sciences, 55

- Center for Social Organization of Schools, 61, 139, 140, 175, 344, 346, 349, 350
- Chaney, F. B., 13, 18
- Change and stability, career, 263
- Chartrand, J. M., 265, 267
- Choynowski, M., 92
- Christensen, P. R., 86, 132, 248, 269
- Clark, D. 304, 307
- Clark, J. P., 121, 180, 249, 250, 264, 272, 285, 287
- Clark, K. E., 203, 343
- Cohen, J. A., 41, 95, 104, 130, 233, 237
- Cole, J. W., 56, 131, 317
- Cole, N. S., 53, 54, 56, 62, 102, 173, 181, 227, 249, 255, 258, 317, 343
- Coleman, J. S., 57, 343
- College and University Journal*, 137
- College Entrance Examination Board, 145, 349
- Commonness, 340
- Conference on Career Theory
 Convergence, 201
- Congruence, 7, 340
- Consistency, 6, 340
- Construct Validity of occupational typology, 286
- Consulting Psychologists Press, 60, 82, 84, 144, 153, 154, 181
- Contemporary Psychology*, 260
- Controversy, 61, 89, 92, 99–102
- Cooper, J. F., 228, 237
- Cosmopolitan*, 266
- Costa, P. T., 50, 90, 262, 263, 267, 268, 273
- Cottrel, L. S., 52, 131
- Counseling Psychologist*, 203
- Cox, S., 286
- Cox, W. M., 257, 268
- Cramer, S. H., 305, 307
- Creaser, J., 227, 237
- Crites, J. O., 10, 20, 222, 255, 259, 261, 268, 322
- Criticism of and feedback on publications, 80
- Criticism, response to, 80, 91–93
- Criticism, theoretical differences and disputes, 100
- Cronbach, L. J., 33, 35
- Crutchfield, R. S., 10, 18
- Cunningham, J. W., 287, 288, 293
- Czeh, E. R., 246
- D**
- Daft, R. L., 73, 95, 130
- Daiger, D. C., 302, 308 (*see Gottfredson, D. C.*)
- Dailey, C. A., 236, 237
- Danca, J., 304, 307
- Darley, J. G. 8, 10, 45, 85, 165–167, 203, 204, 248, 255, 319, 330 (photo), 343
- Darwin, C., 169
- Davis, A. C., 252, 274
- Dawis, R. V., 202, 264, 275, 295, 343
- Day, S. X, 55, 62, 131
- DeFruyt, F., 265, 286, 293
- Department of Health, Education and Welfare, 235
- Development, 262–263
- Diagnostic Interest Blank, 47
- Diamond, E., 235, 237, 261, 268
- Dictionary of Holland Occupational Codes* (DHOC), 2, 65, 89, 265, 284, 285, 288, 290, 300, 302, 314
- Dictionary of Occupational Titles* (DOT), 34, 46, 65, 89, 106, 189, 192, 256, 265, 281, 288, 290, 350
- Differentiation, 7, 340
- DISCOVER, 302
- Divergent and convergent thinking, 259

Dixon, W., 97
 Doub, G. C., xii
 Doughtie, E. B., 148

E

Eberhardt, B. J., 13, 18
 Echternacht, G., 232, 237
 Editors, 78, 79
Educational Opportunities Finder, 301
Educational Researcher, 139, 182
 Edwards, K. J., 62, 122, 131, 147
 Effectiveness, features leading to,
 (theory and SDS), 302–306
 Effects (“Impact”) of testing, 220
 Elliot, D. S., 201–202
 Ellison, R. L., 252, 272
 Elton, C. F., 42, 53, 56, 57, 139, 255,
 259, 317, 318, 343
 Employment & Training
 Administration, 33
 Endler, N. S., 257, 268
 Enright, M. K., 252, 268
 Environmental Assessment
 Technique, 9, 14, 281, 282, 350
 Environmental formulations, 278
 Environmental measures, based on
 incumbents, 280–281
 Environmental measures, based on
 job analysis, 25, 26, 286
 Environmental measures, based on
 public records, 281
 Environmental Models, 4, 6–7, 9–10,
 14, 17, 22–25, 278–280, 285, 287–
 289, 340–341
 Erikson, E. H., 38, 39
 Ethington, C. A., 89, 134

F

Face validity, 63, 297
 Federal Aviation Administration, 350
 Feigl, H., 95, 329 (photo), 343
 Feinberg, L., 215
 Feldman, K. A., 89, 134
 Fiedler, F. E., 257
 Fitzgerald, L. F., 256, 274
 Fleishman, E. A., 256, 274
 Foote, N. N., 52, 131
 Forer, B. R., 11, 47, 131
 Fox, D. G., 252, 272
 Francis, T., Jr., 190
 Fraser, F. D., 305, 307
 French, J. W., 86, 131
 Fritzsche, B. A., 5, 22, 31, 61, 101, 253,
 255, 266, 271, 272
 Fromm, E., 9, 18
 Fryer, D., 68, 131, 166, 344

G

Gage, N. L., 95, 131
 Gall, J. P., 296, 307
 Gall, M. D., 296, 307
 Garman, G. D., 49, 131
 Garner, W. R., 220, 225
 Garvey, W. D., 79, 256, 268
 Gender controversy, 61
 Gender (“sexual”) inequality, 183–186
 General Educational Development,
 290
 Generosity, 260
 Getzels, J. W., 251, 268
 Goldberg, L. R., 100, 133
 Goodman, J., 104, 133
 Gordon, L. V., 9, 18
 Gore, P. A. Jr., 55, 130
 Goslin, D. A., 220, 225, 344
 Gottfredson Associates, Inc., 113
 Gottfredson, D. C., 98, 125, 250, 253,
 259, 271 (*see also Daiger, D. C.*)

- Gottfredson, G. D., x, 25, 31, 38, 60, 61, 62, 64, 67, 70, 75, 79, 83, 89, 98, 99, 106, 144, 147, 149, 155, 158, 172, 178, 179, 180, 181, 195, 201, 214, 226, 227, 229, 235, 244, 246, 249, 250, 253, 254, 258, 259, 261, 262, 263, 264, 265, 277, 280, 281, 285, 286, 288, 290, 291, 300, 302, 304, 312, 319, 322, 326, 337, 344
- Gottfredson, L. S., ix, xiii, 12, 16, 226, 227, 245, 255, 258, 263, 264, 277, 280, 288, 289, 290, 344
- Gough, H. G., 76, 131, 132, 203, 251, 269, 319
- Graduate Record Examination, 252
- Griffith, B. C., 79, 256, 268
- Gross, M. C., 11, 19
- Guay, P. F., 11, 19
- Guide for Occupational Exploration*, 285
- Guilford, J. P., 18, 86, 132, 248, 269
- Gustad, J. W., 263, 267
- Gysbers, N. C., 85, 344
- H**
- Hagen, E., 251, 275
- Hagenah, T., 10, 18, 166, 167, 248, 268
- Hall, D. T., 256, 269
- Hall, R. E., 251, 269
- Hall, R., 62, 132
- Hammer, A. L., 5, 18
- Hanau, C., 99, 304, 308
- Hancher, V., 136, 344
- Hansen, J. C., xii, 5, 18, 227, 237, 255, 301, 307, 312
- Hanson, G. R., 132, 227, 235, 237, 238, 261, 274
- Harkness, H., 326, 337
- Harmon, L. W., v, 5, 18, 92, 132, 149–151, 256, 261, 267, 269, 322, 344, 351
- Harrell, M. S., 252, 269
- Harrell, T. W., 252, 269
- Harris, E. E., 92, 132
- Harris, W. B., 251, 269
- Harvey-Beavis, A., 322
- Hawley, A. W., 291, 293
- Helms, S. T., 61, 62, 121, 122, 132, 180, 181, 249, 250, 254, 258, 264, 269, 272, 274, 344
- Helmstadter, G. C., 297, 307
- Helson, R., 256, 269
- Hemphill F., 190
- Herman, D. O., 235, 238
- Hexagon, 7-9, 26-28, 53-55, 249, 287-288, 298, 314, 318, 341
- Higher Education Research Institute, 89
- Hirschberg, N., 252, 269
- Hirschi, T., 201, 202
- Hodell, L. G., 159
- Hogan, R., 62, 132, 151, 344, 349
- Holland, E., 46, 57, 58, 60, 63, 65, 67–69, 84, 143, 321, 332 (photo), 344
- Holland, J. E., 31, 172, 229, 232, 249, 259, 261, 321
- Holland, R. (“Dick”), 44, 320, 333 (photo)
- Holland, W. (“Bill”), 44, 320, 333 (photo)
- Hollifield, J. H., 121, 149, 151, 180, 254, 258, 272, 344
- Holmberg, K., 301, 308
- Hopkins Club, 334
- Hoppock, R., Job Satisfaction, 66
- Hoyt, D., 52, 70, 136, 251, 272, 344
- Hughey, K. F., 52, 127
- Hulin, C. L., 73, 95, 130
- Hull, D. L., 261, 272
- Hunter, J. E., 252, 275
- Huntley, R. 53, 345
- Hyland, A. M., 287, 288, 293

- I**
- Iachan, R., 55, 132
 IBM scoring, 97
 Identity, 6, 7, 264, 265, 278, 298, 302, 323, 341 (*see also My Vocational Situation, Vocational Identity*)
 Individual Vocational Planning, 306
 Influence (on career counseling and intervention), 315
 Information search, 259
 Intellectual contributions, 247–252
 Interests, as personality, 11–12, 16, 166–170
 International Association of Universities, 283
 Intervention, 16, 61, 83, 92, 99, 103, 151, 182, 190–192, 197–198, 206–208, 214, 229, 235–236, 246, 250, 253–255, 262, 266, 296, 298–306, 315, 320, 323, 355
 Intervention, effects of, 266
 Iowa State University, 65
 Isaacson, L. E., 92, 132
 Itkin, S., 252, 269
- J**
- Jack (Holland's nickname), 320
 Jacklin, C. N., 227, 238
 Jackson, P. W., 251, 268
 James, L. R., 252, 272
 Jeanneret, P. R., 88, 248, 249, 256, 273
 Jessor, R., 263, 267
 Joffe, R. D., 246
 Johansson, C. B., 256, 301, 306, 308
 John, O. P., 263
 Johns Hopkins University, 58, 96, 175, 244, 255, 260, 313, 320, 324
 Johnson, P., 304, 307
 Johnston, J. A., 52, 103, 125, 250, 259, 345
 Jones, H., 136
 Jones, P. K., 13, 248, 274, 280, 281, 282, 291, 295
 Jordaan, J. P., 261, 273
Journal of Applied Psychology, 78, 203, 323
Journal of College Student Personnel, 164
Journal of Counseling and Development (*see also Personnel and Guidance Journal*), 152, 200
Journal of Counseling Psychology, 248, 258, 350
Journal of Educational Psychology, 85
Journal of Vocational Behavior, 146, 244, 258, 261, 350
 Jung, C. G., 9, 19
- K**
- Kang, Z. Y., xiii
 Kaplan, A., 106, 132, 196
 Karweit, N. L., 121, 179, 249, 272, 293
 Kelso, G. I., 62, 63, 124, 227, 238, 263, 273, 345
 Kendler, H. H., 206, 211
 Kent, L., 51, 53, 74, 106, 345
 Kimes, H. G., 259, 273
 Kirchner, E. P., 227, 239
 Kivlighan, D. M., 250, 273, 305, 308
 Knapp, J. E., 224, 225
 Koritko, L., 286, 295
 Kornis R., 190
 Krause, A. H., 48, 78, 258, 272
 Krivatsy, S. E., 197, 305, 306, 308
 Krumboltz, J. D., 200, 202, 227, 345
 Kuder Preference Record, 11, 47, 87, 89, 92, 105, 166, 167, 180, 208, 350
 Kuhlen, R., 85, 345
 Kulberg G. E., 13, 19
 Kuo, H., 121, 179, 249, 272, 293

L

Lackey, A. 93, 144, 345
 Lamb, R., xiii
 Laurent, H., Jr., 13, 19, 48, 132
 Lawler, A. C., 304, 308
 Lawsuit, legal dispute, 39, 83, 320
 Leggin, R., 226
 Lent, R. W., 128, 201, 256, 267, 337
 Lenz, J. G., 256, 259, 274
 LeSuer, B., 47, 132
 Level of aspiration and attainment, 263
 Levin, K. Y. 256, 274
 Lewin, K., 266, 291, 294
 Lewis, P., 286, 287, 295
 Lindquist, E. F., 56, 345 (*see also University of Iowa, Lindquist Center*)
 Linton, R., 9, 19, 280, 294
 Loehlin, J. C., 263
 Lofquist, L. H., 202, 264, 275, 295, 343, 345
 Lokan, J., 63, 133, 134, 322
 Lowman, R. L., 305, 308
 Lunneborg, P. W., 227, 238
 Lutz, S. W., 68, 118, 119, 317
 Lykken, D. T., 263, 273

M

Maccoby, E. E., 227, 238
 MacKinnon, D. W., 251, 273, 319
 Magoon, T., 42, 58, 59, 161, 162, 245, 254, 255, 305, 306, 320, 346
 Manuscript, writing and quality of, 78
 Maurer, T. J., 264, 273, 286, 294
 McConnell, T. R., 281, 294
 McCormick, E. J., 88, 133, 189, 248, 249, 273, 345
 McCrae, R. R., 50, 90, 262 263
 McDermid, C. D., 252, 273
 McGue, M., 263, 273
 McIntyre, S. H., 252, 269

McLure, G. T., 228, 238
 McNemar, Q., 251, 252, 273
 McPartland, J. M., 180, 249, 250, 274
Measurement and Evaluation in Guidance/Counseling and Development, 258, 261, 350
 Mecham, R. C., 88, 133, 248, 249, 273
 Medvene, A. M., 10, 19
 Meehl, P. 203, 255
 Merton, R. K., 260, 273
 Mervielde, I., 265, 286, 293
 Metter, E. J., 262, 268
 Michigan State University, 201
 Military experience, 45
 Minnesota Multiphasic Personality Inventory, 45, 90, 100, 105
 Minnesota Occupational Classification, 189
 Minnesota Vocational Interest Inventory, 180
 Minnesota Work Adjustment Project, 287
 Mitchell, V., 256, 269
Model Trade Book Contract and Guide including Electronic Rights Clauses, 81
 Mohr, L. B., 9, 19
 Moos, M. C., 155, , , 346
 Moos, R. H., 248, 273, 291, 294
 Mount, M. K., 264, 273
 Muchinsky, P. M., 13, 264, 273, 287, 288, 293, 346
 Muchow, J. S., 304, 309
 Mumford, M. D., 256, 263, 273, 274,
 Munday, L. A., 252, 274
 Municipal University of Omaha, 313
 Munn, N., 85, 346
 Murray, H. A., 9, 19, 248, 255, 274, 291, 294
 My Life with the SDS, 183, 187, 195–200
 My Vocational Situation, 253, 302

N

Nachmann, B., 13, 19
 Nafziger, D. H., 56, 62, 147, 178–181,
 249, 250, 254, 256, 258, 259, 264,
 285, 287, 346
 Napier J., 190
 National Career Development
 Association, xii, 195, 312
 National Defense Education Act, 350
 National Institute of Education
 Guidelines for Assessment of Sex
 Bias and Sex Fairness in Career
 Interest Inventories, 221
 National Institute of Education, 217,
 219
 National Merit Scholarship
 Corporation, 50, 87, 98, 166, 195,
 255, 260, 281, 313, 319
 National Merit Scholarship
 Qualifying Test, 281
 National Science Foundation, 195,
 260
 NEO Personality Inventory, 50, 90,
 350
 Newcomb, T. M., 247, 274
 Nicholas, P. W., 92, 133
 Nichols, B., 50
 Nichols, R. C., 248, 259, 346 (see also
 Nichols, B.), 50
 Niles, S. G., xii, 104, 133, 305, 308
 Nixon, M. E., 48, 78, 114, 258, 272
 Noeth, R. J., 227, 228, 238
 Nolan, J. J., 304, 308
 Noland, E. W., & Bakke, E. W., 265,
 274
 Non-academic accomplishments, 251,
 252
 Novick, M. R., 215, 240

O

O*NET, 21, 32–34, 256, 285, 286, 324
 O'Dowd, D. D., 12, 19, 30, 35

O'Neil, J. M., 255, 304, 305, 309
 Occupational Analysis Inventory, 287,
 351
Occupational Outlook Handbook, 192
 Occupational Reinforcer Patterns,
 287, 288
Occupations Finder, 258, 300
 Office of Technology Assessment, 222
 Ogawa, D. K., 106, 125
 Oleski, D., 265, 274
 Oliver, L. W., 192
 Ones, D. S., 252, 275
 Organizing framework and properties
 of theory, 298, 302
 Osipow, S. H., 248, 256, 259, 274, 296,
 299, 309
 Owens, W. A., 13, 18, 19, 263, 273

P

Pace, C. R., 282, 291, 294
 Pallas, A., 346
 Panos, R. J., 247, 267
 Paper Guidance System, 197, 351
 Parnes, H. S., 263, 267
 Parsons, F., 261, 274
 Paterson, D. G., 78, 255, 346, 356
 Pennington, D., xii
 Pennsylvania State University, 245,
 313
 Pennypacker, A. R., 153, 154, 346
 Perry Point VA Hospital, 48–50, 67,
 75, 161, 319, 342
 Personality pattern, 5, 6, 15, 340, 341
 Personality typology, viii, 2, 4, 23, 262
 Person-environment interactions, 28,
 179, 258, 265
Personnel and Guidance Journal/
Journal of Counseling and
Development, 152, 196, 258, 324
 Peters, T. J., 38, 39
 Peterson, N. G., 256, 274
Plessy v. Ferguson, 201, 202

- Pope, M., 104, 133
 Popham, W. J., 95
 Population Association of America, 284
 Position Analysis Questionnaire, 284, 288, 290
 Position Classification Inventory (PCI), 25, 26, 251, 265, 277, 286, 292, 314, 351
 Powell, A. B., 5, 22, 31, 61, 101, 253, 255, 266
 Power, P. G., 98, 125, 250, 253, 259, 271, 302, 308, 309, 346
 Prediger, D. J., 54, 56, 123, 133, 227, 228, 234, 235, 238, 256, 261, 274, 288, 294, 322, 346
 Price, G. E., 305, 309
 Psychological Assessment Resources (PAR), xii, 82, 83, 303, 319, 324, 347, 350
Psychological Monographs, 85
Publication Manual of the American Psychological Association, 176
 Publishers, working with, 80–85
 Publishing, legal matters and legal counsel in, 81–83
 Publishing, self-publication, 84–85
 Purdue University, 185
 Pyke, S. W., 73, 133
- Q**
 Q-sort, 351
- R**
 Raikes, T., 305, 309
 Rand, L. M., 282, 291, 294
 Rand, L. P., 282, 291, 294
 Rayman, J. R., ix, x, 42, 53, 63, 65, 83, 100, 107, 126, 132, 133, 188, 192, 226, 227, 233, 238, 245, 250, 274, 296–310, 312–315, 347
 Really-True-Masochistic Test (RTMT), 152, 351
 Reardon, R. C., 42, 103, 256, 259, 274, 304, 307, 312, 347
 Redbook, 304
 Redmond, R. E., 180, 304, 309
 Reilly, R. R., 252, 274
 Reinersman, M., xii
 Research climates, Minnesota, Hopkins, Western Reserve, Perry Point, 75
 Research problems (selecting), 72, 73
 Research training, 95, 208, 347
 RIASEC order of types in hexagon, 318
 Richards, B. M., 281, 282
 Richards, J. M. Jr., ix, xii, 13, 52, 54, 70, 89, 98, 139, 244, 248, 252, 251, 255, 258, 262, 277, 280–284, 291, 317, 319, 347
 Riegel, N. B., 287, 288, 293
 RISCEA order of types in early VPI profiles, 318
 Rivkin, D., 286, 287, 295
 Rock, D. A., 252, 268
 Roe, A., 13, 19, 54, 106, 118, 133
 Roediger, H. L., 257, 268
 Roose, K. D., 257, 275
 Rorer, L. G., 100, 133
 Rorschach test, 168
 Rose, H. A., 259, 268
 Rosen, D., 301, 308
 Rosenberg, A. G., 305, 309
 Rossi, P., 57, 347
 Rothkopf, E. Z., 95, 133
 Rounds, J. (*see Rounds, J. B.*)
 Rounds, J. B., 55, 62, 133, 263, 264, 275, 286, 287, 295, 322
 Rushton, J. P., 257, 268

S

- Salamone, P. R., 255
 Sales pitch (in interview), 316
 Savickas, M. L., xii, xiii, 201, 244, 246, 320, 322, 326, 331, 333, 337
 Schaffer, W. M., 235, 239
 Schmidt, F. L., 252, 275
 Schnuelle, L., 55, 61, 180, 181, 197, 228, 255, 276, 304
 Scholastic Aptitude Test, 224
School Guidance Worker, 186
 Science Research Associates, 153, 180, 352
Science, 247, 319
 Scientific literature, (bibliometric contributions), 256, 257
 Secondary concepts/assumptions, 6–7
 Self-Directed Career Program, 180
 Self-Directed Search (SDS), 5, 22, 32, 51, 68, 83, 88, 99, 100, 101, 102, 103, 105, 144, 151, 162, 164, 175, 176, 177, 181, 195, 196, 197, 199, 200, 205, 214, 217, 218, 245, 249, 253, 256, 257, 259, 266, 278, 284, 285, 287, 298, 299, 301, 303, 305, 306, 313, 320, 323, 324, 352
 Seligman, R., 13, 19, 248, 274, 280, 281, 282, 291, 295
 Setbacks, coping with, 89
 Shapiro, R. M., 250, 273, 305, 308
 Shears, M., 322
 Sheldon, W. H., 9, 19
 Shubsachs, A. P. W., 264, 275
 Siebel, C. E., 100, 133
 Simplicity, as theoretical virtue, 297, 304
 Sims, A. C., 145
 Sindoni, K., 321
 Skager, R. 53, 119, 347
 Skellie, B., 181
 Skinner, B. F., 257
 Slaney, R. B., 304, 306
 Slonaker, D. F., 287, 288, 293
 Smart, J. C., 42, 89, 134, 347
 Smith, R. Bob, III, xii, 82, 347
 Smith, S. S., 305, 309
 Smither, R., 64, 125, 250, 273
 Social Science Citation Index, 257
 Sørensen, A. B., 121, 180, 249, 250, 264, 272, 285, 287
 Spokane, A. R., 45, 125, 128, 192, 244, 254, 255, 266, 272, 275, 299–302, 309, 320, 322, 347
 Spranger, E., 9, 19
 Staats, A. W., 11, 12, 19, 134, 250, 275
 Stalnaker, J., 50, 51, 114, 195, 347
 Standard Occupational Classification, 32, 35, 265, 285
 Stanford University, 55
 Stern, G. G., 291, 294
 Strong Campbell Interest Inventory (SCII), 64, 82, 146, 217, 253, 305, 347, 351
 Strong Interest Inventory (SII), 5, 89, 92, 97, 99, 167, 180, 208, 253, 256, 301, 324, 351, 352
 Strong Vocational Interest Blank (SVIB), 11, 46, 53, 105, 280, 285, 351, 352
 Strong, E. K., Jr., 10, 20, 53, 54, 68, 146, 166, 208
 Strunk, W. 74, 134
 Student Descriptive Questionnaire, 145, 352
 Student Profile Section, 145, 352
 Su, R., 286, 287, 295
 Subich, L. M., 265, 274, 276
 Subtitles (“lesson of the colon”), 317
 Subtype (*see also personality pattern*), 341
 Super, D. E., 10, 20, 92, 105, 134, 163, 166, 202, 261, 275, 332 (photo), 347
 Sutton, M. A., 18, 86, 132, 248, 269

Swan, K. C., 102, 134
Swaney, K., 55, 62, 131

T

Takai, R. T., 99, 124, 304, 308
Talbot, D. B., 301, 310
Talent, identification of, 317
Talent, loss of, 116, 251–252
Tarulli, B. A., 264, 273, 286, 294
TAT (Thematic Apperception Test), 168
Taylor, C. W., 116, 126, 225, 224, 251, 252, 272, 275, 348
Taylor, K. F., xii, 42, 62, 63, 92, 134, 181, 255, 319, 322, 348
Teachers College, Columbia University, 181
Tellegen, A., 263, 273
Tension, intellectual, 261–262
Theory, revisions of, 1959, *Psychology of Vocational Choice*, 85, 90
Theory, revisions of, 1966, *Psychology of Vocational Choice*, 2, 16, 18, 46, 51, 53, 55, 56, 59, 63, 68, 85, 91, 248, 313
Theory, revisions of, 1973, *Making Vocational Choices: A Theory of Careers*, 90, 179, 248, 257, 313
Theory, revisions of, 1985, *Making Vocational Choices: A Theory of Vocational Personalities and Work Environments*, 90, 319, 322
Theory, revisions of, 1997, *Making vocational choices: A theory of vocational personalities and work environments*, 90
Thistlewaite, D., 50, 348
Thoresen, C. E., 92, 134
Thorndike, R. L., 251, 275
Tinsley, H. E. A., 233, 239
Title IX, 219, 221, 223, 235
Tittle, C. K., 226, 232, 239

Toenjes, C. M., 287, 295
Tokar, G. M., 265
Torrance, E. P., 120, 251, 275
Tracey, J., 62
Tracey, T. J. G., 62, 133, 263, 275, 305, 309
Translation to practice, 298
Trembath, M. F., 48, 78, 258, 272
Troth, W. A., 259, 273
Tryon, R. C., 97, 134
Tyler, L. E., 252, 275
Types, relations among, 7 (*see also hexagon*)
Typology, 8, 16, 21, 47, 69, 96, 100, 106–107, 178, 202, 255–256, 262, 291, 297, 301, 323

U

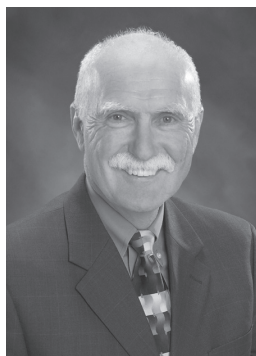
U. S. Office of Education, 195
Uhr, L., 49, 131
Unfrocking contributions, 253
UNIACT, 301, 302, 324, 365
University of California Berkeley, 97
University of California Los Angeles, 89, 97
University of Iowa, 136, 215, 255, 317
University of Iowa, Lindquist Center for Measurement, 215, 240
University of Maryland, 140, 177, 245, 320
University of Melbourne Australia, 181
University of Michigan, 163
University of Minnesota, 155, 255, 313, 314, 319, 329, 330
University of Nebraska, 203, 314

V

VA Hospital at Perry Point (*see Perry Point VA Hospital*)
Veterans Administration, 87, 313, 352

- Viernstein, M. C., 54, 121, 134, 179,
181, 249, 258, 272, 275, 293, 348
- Vocabulary, provided by typology,
297–298
- Vocational Card Sort, 191
- Vocational choice, 10
- Vocational Education and Insight Kit,
301
- Vocational Guidance for Everyone,
182
- Vocational Guidance Quarterly*, 85,
258
- Vocational Identity Scale, 41, 62, 66,
98, 250, 259, 352 (*see also Identity,
My Vocational Situation, MVS*)
- Vocational interests, 10–11, 166–170,
320
- Vocational Preference Inventory, 8, 11,
32, 48, 67, 68, 84, 88, 90, 98, 99,
100, 105, 106, 142, 144, 146, 161,
171, 196, 229, 230, 232, 249, 278,
284, 285, 287, 299, 313, 322, 352
- Voight R., 190
- Vondracek, S. I., 227, 239
- W**
- Wakefield, J. A., 148
- Wallace, A. R., 169
- Walsh, J., xiii, 348
- Walsh, W. B., xiii, 42, 63, 100, 133,
248, 255, 256, 275, 348
- Warnath, C. F., 92, 134, 348
- Waterman, R. H., 38, 39
- Weick, K., 200
- Weinberg, C. B., 252, 269
- Weinrach, S., 105, 134, 200, 299, 310,
312, 324
- Weiss, D. J., 233, 239
- Welsh, G. S., 9, 20
- Werts, C. E., 251, 275
- Western Australia Institute of
Technology, 159
- Western Reserve University, 46, 75,
87, 313, 319
- What Color is Your Parachute?, 302,
307
- White, E. B., 74, 134
- White, P.304, 307
- White, S., 222
- White, W. P., 226
- Whiting, B. G., 252, 275
- Whitney, D. R., x, xiii, 54, 56, 62, 63,
172, 173, 181, 254, 255, 258, 312,
316–318, 348
- Wigdor, A. K., 220, 225
- Wilcock, R., 263, 267
- Williams, G. D., 62, 132, 181
- Wing, C. W., & Wallach, M. A., 252,
275
- Wirtenburg, J. T., 185, 263
- Wolf, W. C., 139
- Womer, F. B., 163
- Woodring, J. B., 226
- Woodworth, D. G., 10, 18, 76, 132
- Working environment, 316
- World Wide Web, 266
- Wrenn, C. G., 91, 134, 348
- Y**
- Ylvisaker, 97
- Yonge, G. D., 282, 295
- York University, 140
- You and Your Career, 301
- Yowell, E. B., xii
- Young, D., 265
- Z**
- Zeitschrift für Arbeits und
Organisationspsychologie*, 258
- Zeitschrift für Padagogik*, 258
- Zener, T. B., 55, 61, 180, 197, 228, 255,
304, 348
- Zieky, M., 102, 131
- Zytowski, D. G., 226, 239, 322

EDITORS



Jack R. Rayman is Senior Director Emeritus of Career Services and Affiliate Professor of Counseling Psychology and Education at Penn State University. He received a B.S. in Industrial Administration and English from Iowa State University in 1967 and a Ph.D. in Counseling Psychology and Student Personnel Administration from the University of Iowa in 1974. He served on the faculty of Rajang Teachers College as a Peace Corps Volunteer in Sarawak, Malaysia from 1967 to 1970 where he taught agricultural science and English and designed and built the first 18-hole golf course at the college. His doctoral dissertation, “Sex and the Single Interest Inventory” was

a groundbreaking effort to eliminate gender bias in interest measurement. It was the prototype for the Unisex Edition of the ACT Interest Inventory (UniACT) which became an integral part of the ACT battery. He was Assistant Professor for Research at Western Maryland College from 1974-1978 and during that time was one of the architects of DISCOVER, the computerized career guidance system that was ultimately marketed nationally by the American College Testing Program. From 1978-1983 he was the Career Development Officer and Affiliate Associate Professor of Counseling Psychology at Iowa State University. He joined the faculty and staff at Penn State University in 1983.

Dr. Rayman is the author of more than 40 journal articles and book chapters and has authored or coauthored three books for career services professionals including, *The Changing Role of Career Services* (1993); *Handbook for the College and University Career Center* (1993), co-authored with Edwin Herr and Jeff Garis; and *The Professional Counselor as Administrator: Perspectives on Leadership and Management of Counseling Services Across Settings* (2006) co-authored with Edwin Herr and Dennis Heitzmann. He is a Fellow of the American Psychological Association (1987, Division of Counseling Psychology), and served on the editorial board of the *Career Development Quarterly* from 1991-1997. He was elected to Fellowship in the National Association for Colleges and Employers (NACE) in 2000 and was a member of the NACE Principles for Professional Conduct Committee from 1995-2002. In the early 2000s he raised \$9.5 million to build a state-of-the-art 44,000 square foot Career Services Building at Penn State University which opened in 2002. He and his wife Barbara live in Naples, Florida and State College, PA, where he is an avid tennis player and disc golf enthusiast. In his spare time, he writes poetry and has built a log cabin on the Allegheny Plateau.

EDITORS



Gary D. Gottfredson is Professor Emeritus at the University of Maryland.

He served as Peace Corps Volunteer in Malaysia from 1969 to 1972, improving health and prevention program statistics in the Penang State Health Office and editing a bi-lingual health newsletter in collaboration with the State Education Office. His research as a graduate student showed the disparate employment of men and women, and he worked to revise career assessment instruments to make them more sex-fair. He earned a PhD in psychology from Johns Hopkins University in 1976.

After briefly serving as an administrative officer at the American Psychological Association, he returned to Johns Hopkins in 1977, establishing a program in delinquency research. He published *Victimization in Schools* (with Denise Gottfredson, Plenum), a statistical examination of school climates, demography, and problem behavior. In 1993 he founded a private behavioral science research and development organization, conducting evaluation, survey, and measurement research on school climates, diversity, and delinquency mostly with federal grant funding. In 2003 he moved to the University of Maryland. There, he conducted large-scale school-randomized trials of prevention programs and taught assessment and research design.

He is a Fellow of the Academy of Experimental Criminology, the Association for Psychological Science, and the American Psychological Association. He received the Holland Award for Career and Personality Research from the Society for Counseling Psychology. He served on the editorial board of the *Journal of Vocational Behavior*. He was a member of the National Research Council/National Academy of Science (NRC/NAS) Committee on Occupational Classification that assessed bias and equity in pay for men and women, and the NRC/NAS Panel on Research on Rehabilitation of Criminal Offenders that assessed the efficacy of rehabilitation efforts.

Dr. Gottfredson's research has involved occupational classification, program evaluation, delinquency prevention, organization climate, and career assessment. He conducted randomized evaluations of group counseling for delinquents and place-based randomized trials of school-wide educational interventions. He is the author of assessment tools used by counselors including the Position Classification Inventory for assessing work environments, and the Career Attitudes and Strategies Inventory (both with John Holland).

His most recent publications are "Environments" and "Using Holland's Theory to Assess Environments" (with ZiYoung Kang) in the *American Psychological Association Handbook of Career Intervention*, and "School Violence" (with Denise Gottfredson) in the *Cambridge Handbook of Violent Behavior and Aggression*.

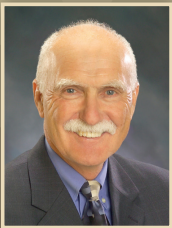
No two individuals knew Holland better than Jack Rayman and Gary Gottfredson so this book is Holland's autobiography and more. It captures the essence of his theory — a theory that continues to influence the way we approach career planning. Holland's RIASEC model gave us a creative way of thinking about the relationship between personalities and environments. Now we have a refreshing look at what Holland left the profession. For anyone who discovered Holland some years ago, and for those about to discover Holland for the first time, this will be a good read — an accurate reflection of Holland's contributions to the field.

*Joe A. Johnston, Ph.D, Emeritus Professor, Counseling Psychology
University of Missouri-Columbia*

John Holland stands as a giant within the career development field. As an early pioneer, his work has impacted both theory and practice for decades. His theory continues to be used widely in schools, universities, and community settings, and has been adapted by a long list of assessment developers. This is unique because typically after theorists pass way, so too does their theory. Holland's theory lives on and it is important that it does. The impact of Holland's theory seems to be as resilient as his own career. This marvelous book, edited by two of Holland's closest associates, contains Holland's own words describing his theory and provides a detailed, and sometime quite personal and humorous, peek into the life of one of the most important figures in career development. "My Life with a Theory" is destined to be a treasured resource.

*Spencer Niles, Dean and Professor
William & Mary*

EDITORS



Jack R. Rayman
Senior Director
Emeritus of Career
Services and
Affiliate Professor
of Counseling
Psychology and
Education, Penn
State University



Gary D. Gottfredson
Professor Emeritus,
University of Maryland

Editors' royalties from the sales of this publication will be donated to the Bruce and Jane Walsh Grant in Memory of John Holland.



NCDA National Career
Development
Association

National Career Development Association
305 North Beech Circle
Broken Arrow, OK 74012
www.ncda.org