

A Natural History of the Development of Talent: Illustrations from the Career of John L. Holland (1919 – 2008)



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This presentation was initially prepared as an invited address at the Maryland Career Development Association, 25 April 2014, Columbia, MD. It was later revised for a colloquium presented in what was, at the time, the Department of Counseling and Personnel Services and which is now named the Department of Counseling, Higher Education, and Special Education at the University of Maryland. In 2020 I added notes pages associated with most of these slides to indicate the nature of comments I might make were I making a presentation with these slides. Please feel free to make use of these slides for classroom or seminar use, provided that you indicate the source of the material. I expect that faculty members in counseling, counseling psychology, student affairs, and similar fields may find this material useful in graduate seminars. If you plan to use the entire presentation, it would be best to plan on having 2 hours or more for presentation and discussion. Enjoy.

Thanks to Jack R. Rayman for suggesting that I add notes pages to these slides and for suggesting improvements in those notes.

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My *post hoc* Reconstruction of the Aims of Today's Talk

- What, in general terms, have been Holland's contributions?
- What were the educational and work environmental influences on the development of these contributions?
- How did Holland's personal style and interactions with others affect his work and his influence on the field?
- How did opportunities and misfortunes or mistakes influence these developments?

Although John L. Holland is very well known, especially in fields related to counseling, career development, and student services, many persons working in these and related fields are familiar only with a part of Holland's contributions. In some cases, familiarity with these wide-ranging contributions may be limited to familiarity with the Self-Directed Search or with the part of "Holland's Theory" involving the personality formulations. This presentation touches superficially on a broader range of contributions. Specifically, it highlights the part of Holland's theory involving the environmental formulations in his theory. It also notes contributions related to student selection and talent in higher education, the assessment of career status, and assessment of work and educational environments.

Holland's sustained scientific and professional contributions are so unusual that it seems useful to discern, if possible, what special influences in Holland's education and work environments seem to have influenced his work.

Furthermore, both science and fields of practice are social systems. Contributions are made when the work, thinking, or practice of others are affected. Accordingly, it seems useful to consider which features of Holland's work style and interactions with others may have contributed to achieving a high degree of influence.

Finally, a review of Holland's career shows that serendipity, bad luck, and mistakes advanced or thwarted his work. Some of these events are briefly explored.

Categories of Contribution

- Intellectual contributions in higher education, vocational psychology, & counseling
- Engineering of useful and transparent assessment & intervention tools
- Unfrocking contributions
- Influence on other productive contributors

This slide provides a preview of four relatively distinct kinds of contributions covered in upcoming slides. Holland's contributions are not limited to straightforward scientific or intellectual work. In addition, Holland contributed by taking seriously the value of figuring out how to engineer or design assessment tools and methods for career assistance. Unfrocking contributions are those analyses or perspectives that show some parts of conventional wisdom to be either wrong or partially misleading. Finally, in addition to his direct contributions to science and practice, Holland's influence was multiplied via his influence on other productive scientists and practitioners.

To read more on this variety of contributions see the following:

Gottfredson, G. D. (1999). John Holland's contributions to vocational psychology: A review and evaluation. *Journal of Vocational Behavior*, 55, 15-40. Reprinted in J. R. Rayman and G. D. Gottfredson (Eds.). (In press). *My life with a theory: John L. Holland's autobiography and theory of careers*. Broken Arrow, OK: National Career Development Association.

Contributions in Higher Education

- College productivity outputs understood as largely a product of student inputs
- Demonstration of moderate correlations between different kinds of student accomplishment--implying that selection focusing on academic ability or achievement results in lost talent of other kinds
- Assessment of college environments using an environmental typology
- Provision of a structure to organize college offerings and career development in college according to a typology

Beginning around 1960 Holland's work, some of it done with Alexander W. (Sandy) Astin showed—to the surprise of some persons that features of outcomes of institutions of higher education, such as the production of PhD scientists, is largely predictable from the characteristics of student inputs (talent of students selected or recruited). Not only does this shake to some extent common beliefs that some institutions are particularly effective, but these scientific insights laid the groundwork for what has come to be called the input-output perspective in higher education research.

Holland and his colleagues showed convincingly that different kinds of student talent are at least to some degree independent of others. This means that when selective institutions emphasize scholastic accomplishment they *ipso facto* de-emphasize other kinds of desirable talent.

Holland and his colleagues at the National Merit Scholarship Corporation and at the American College Testing Program demonstrated that college environments can be characterized in meaningful ways by using a psychological classification of fields of study.

Holland also worked with a number of colleges to organize information about the institutions' fields of study in ways that help students organize their own educational careers.

Contributions in Vocational Psychology & Career Counseling

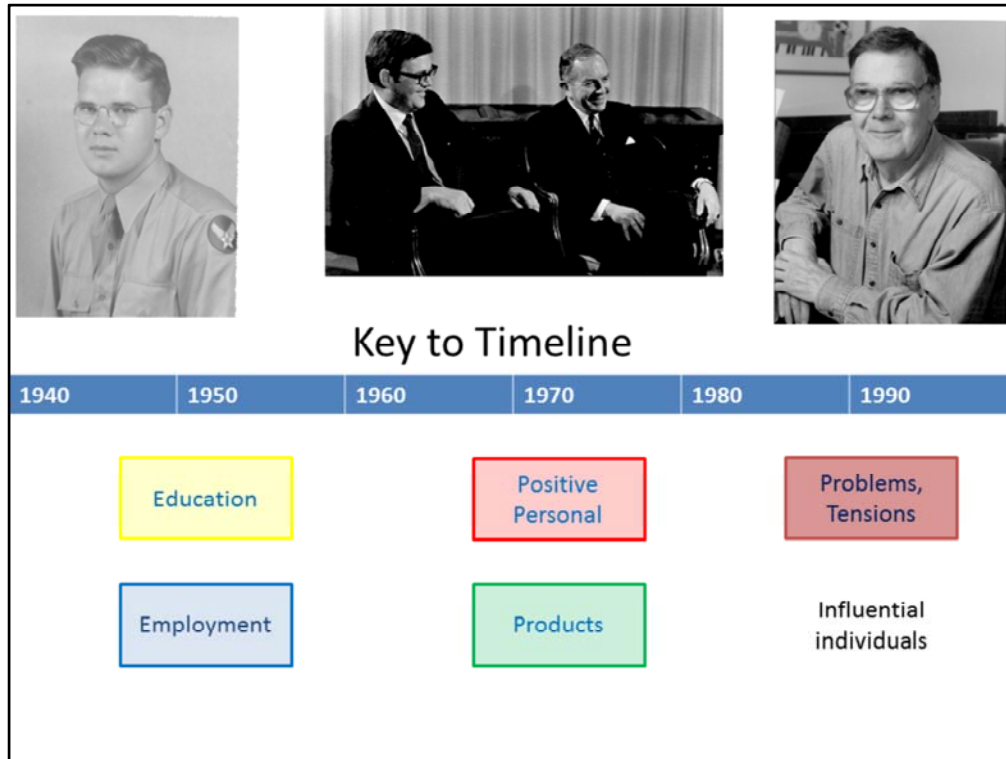
- A theory of vocational personalities, work environments, and person-environment interaction
- A structure for organizing interest assessment that counselors and clients can understand
- Tools for the assessment of the interests/vocational personalities of both men & women using a single scheme
- A psychological classification of occupations/work environments useful in vocational exploration
- Methods for assessing educational or occupational demands and rewards in typological terms
- Evaluations of the effects of assessments on clients (assessment as intervention)

In vocational psychology and career development Holland's theory of vocational personalities and work environments is widely applied in organizing information about the self and about career alternatives for students, adults, and counseling clients.

The theory, or "typology," is important because it provides:

- a structure for organizing information about persons
- a structure for organizing information about occupations or educational majors
- a common personality system for both men and women
- a typology and assessment tools for characterizing work and educational environments

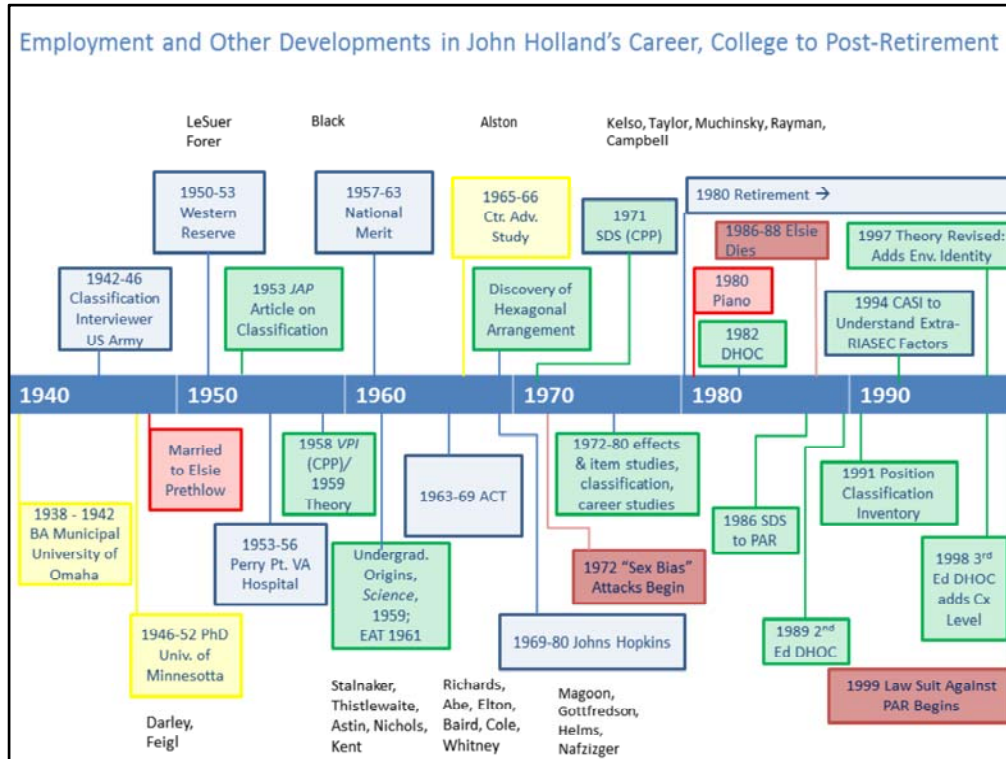
Holland viewed assessment tools (inventories, tests) as interventions which affect clients. His work showed some ways to evaluate these influences



The purpose of this slide is to orient the audience to the next color-coded slide.

The top left photo shows Holland as a private during WW II, where he worked as a personnel clerk and began thinking about vocational personalities. The center photo shows Holland together with Donald Super, who had been a trait-and-factor psychologist and subsequently spent most of his career pursuing notions of vocational development. The photo at the right shows Holland in retirement about the time of the publication of the most recent revision of his theory.

In the chart on the next slide, material shown in yellow pertains to education, in blue to employment, in red to positive personal events, in green to products of Holland's work, and in maroon to mishaps or problems. Plain text is used to indicate when certain influential persons interacted with Holland.



This graphic display contains a large amount of information. In preparing to understand or discuss this slide, it will be useful to review the chapters in Holland's autobiography covering major segments of his education and employment. You can find the autobiography here:

J. R. Rayman & G. D. Gottfredson (Eds.). (In press). *My life with a theory: John L. Holland's autobiography and theory of careers*. Broken Arrow, OK: National Career Development Association.

For help on the names of influential others, in addition to Holland's autobiography see the section of book that provides an annotated list of biographical names.

U.S. Army 1942-46

- Classification interview, psychol. testing, clerk
- Military men appeared to fall into a few common characters or types
- Worked with social workers, psychologists, physicians—reinforced desire to become a psychologist
- “The base rate for bad guys in the military seems about the same as the base rate I experienced later in academia.”



Pvt. John L. Holland

Note: Source for most quotations in these slides is a draft on an unpublished autobiography, *My Life with a Theory* (2004).

The unpublished autobiography referred to here is now available (Rayman & Gottfredson, in press).

Graduate School, U. Minn. (1946-52)

- John G. Darley, advisor
 - Darley & Patterson (1937). *Student personnel work: An outline of clinical procedures.*
 - Darley & Hagenah (1955). *Vocational interest measurement: Theory & practice.*
- Worked as intern in the counseling center.
- “The Strong Vocational Interest Blank could be . . . 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.”



John (“Jack”) Darley

Holland was grateful for Darley’s example, influence, and help in the early years of his career after graduate school. To read more about Holland’s reflections on Jack Darley, see the following sources. In the first item Holland describes his relations with Darley during graduate school and later. In the second, in chapters about his graduate school time and early career Holland recounts help he got from his former advisor.

Holland, J. L. (1992). Some recollections on Jack Darley. *Counseling Psychologist*, 20, 395-397.

Rayman, J. R. & Gottfredson, G. D. (Eds.). *My life with a theory: John L. Holland’s autobiography and theory of careers*. Broken Arrow, OK: National Career Development Association.

"The problem [of slow and cumbersome scoring procedures for interest inventories] was compounded by the lack of a compatible occupational classification for the Strong or Kuder. As always the Dictionary of Occupational Titles (DOT) was a formidable collection of books and files. Using them was a depressing experience."



"At that time, the Strong Vocational Interest Blank could be scored with a Veeder Counter in about an hour or mailed to a scoring service with about a 10-day wait."

An important impetus for Holland's search for useful classifications and simpler scoring methods was the difficulty and time required to use interest measures available before he developed the simply scored Vocational Preference Inventory and the six-category system for classifying persons and environments.

One interesting and enlightening activity I have used with graduate students in counseling is to show them my SVIB profile from around 1964 or 65 and ask them to interpret it. Then, in a second phase, to show them my SDS or VPI profile and ask them to interpret it. The second task is, of course, much easier. I you, either not being my age or not having my packrat tendencies, don't have your Strong profile from the 1960s, use anyone's profile from a Strong of that vintage.

Western Reserve (1950-53)

- Counseling center director, instructor
- Continued to experience test scoring delays, incomplete interest information, incompatible classification of occupations
- Discovered an undated Occupational Interest Blank by Bruce LeSeur scored for level of occupation
- “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?”
- Constructed a 10-scale inventory, no norms, scored as % of items liked. “A psychometric abomination.”

The impetus for Holland’s work to develop a helpful, understandable, and memorable classification lay in the difficulties in using the assessment and occupational information resources available at the time. Scoring available interest tests was onerous and using the best available sources of occupational information was daunting, time consuming, and required knowledge of the Dictionary of Occupational Titles classification and methods.

Holland pursued “unorthodox” solutions to these problems to find methods that seemed to work. Some “experts” pooh-poohed occupational titles as interest items (although they eventually turned out to provide the best kinds of items) and the failure to use score transformations and cast scores against tables of “norms” was not often seen as respectable by measurement aficionados. Holland was able to deflect scoffing that his approach was too simple while he developed simple solutions to the problems faced by vocational counselors.

Western Reserve (1950-52 Cont.)

- Discovered Forer's (1948) *Diagnostic Interest Blank*
- Forer believed items could be interpreted clinically
- "For me, the key element in this journal article was that Forer gave inference lessons."
- Holland set out to try to interpret the keys for Strong scales—forming groups of items, making notes
- "I was surprised that my grouping of the notes for each scale led to plausible sketches of people in different occupations."
- Became first formulations for personality types

Holland came to understand vocational interests as reflections of personality. And he came to see interest items or vocational preferences as expressions of personality.

People seem to have emotional reactions to occupations (via their personal and shared occupational stereotypes). One can see that it is relatively easy for persons to have personal preferences or aversions when presented with items such as "I would enjoy the work of a chicken pucker." "Waiter," "Truck Driver," "Accountant," "Forester," "X-Ray Technician," "Neurosurgeon," and so on.

Ask students to close their eyes and imagine a plumber for a moment. Then ask them to describe the plumber. Ask them to close their eyes and imagine a botany professor, and then describe the image. In the descriptions elicit not only physical descriptions but also social and personality features.

Interest items make use of these stereotypes to inventory personality.

Perry Point VA Hospital (1953-56)

- Vocational counseling service for psychiatric patients, internships for graduate students, experience in assessments & therapy
- Tried out test items (occupational titles) and developed experimental scales
- Went through multiple sets of scale titles, searching for titles that were easily comprehended, connoted meaning, and were inoffensive
- “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.”*

**An article on the Vocational Preference Inventory wasn't published until 1958. John Darley published it after it was rejected by two other editors.*

Working at the VA hospital provided an opportunity to explore and develop without the “publish or perish” pressure that causes so many assistant professors to pursue minor but publishable pieces of work that safely follow an acceptable paradigm.

It was not necessary to seek grants or to satisfy members of inbred promotion and tenure committees, allowing the freedom to pursue necessary work.

National Merit Scholarship Corporation (1957-63)

- Director of research: highly talented students, longitudinal studies
- Vocational interests related to characteristic achievements, competencies, personality traits, and values
- Predictive validity of vocational aspirations
- Studies of the “undecided” student
- Productivity of institutions of higher education related to their highly selected pool of students
- Freedom and resources to develop and test theory

Holland continued to work in a high opportunity environment with ample resources and the freedom to pursue his theory and interests.

National Merit provided access to large samples of talented young people to advance Holland’s measurement research, provided relatively limited “supervision,” and allowed Holland to work with a highly talented protégés – notably Alexander W. (Sandy) Astin.

The next slide illustrates how large samples and straightforward analyses allowed Holland and his colleagues at National Merit to do groundbreaking research in higher education and the development of talent.

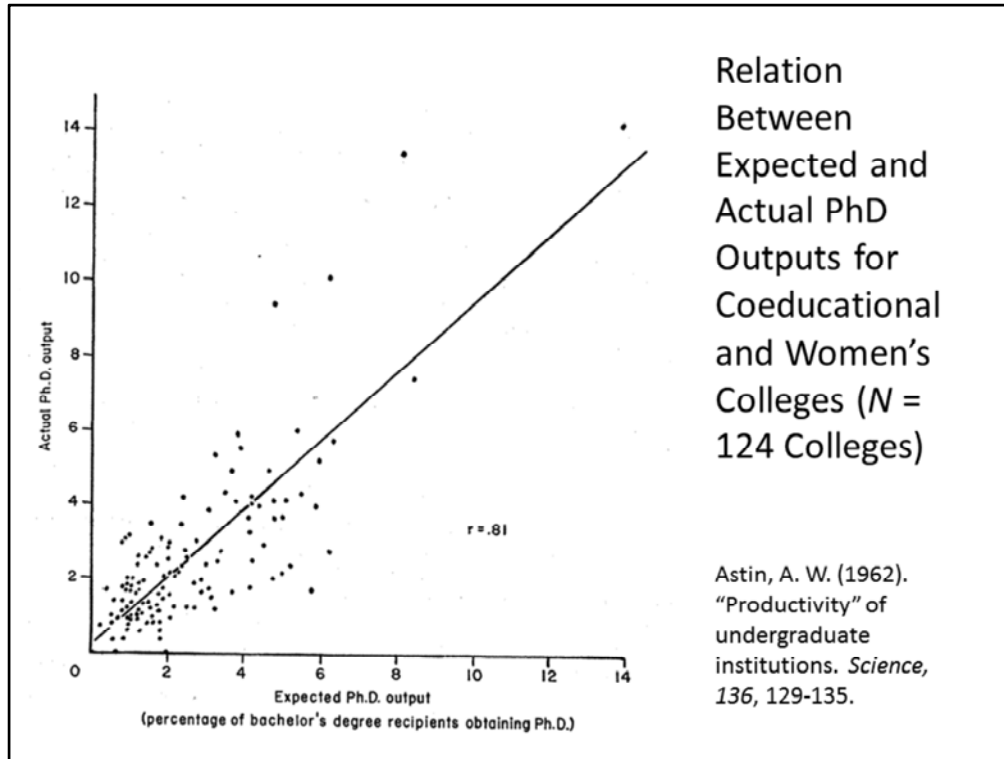
Table 1. Percentage of expected and actual attendance of high-aptitude students at “high” and “low” productive institutions. Each 2 by 2 table is significant beyond the 0.001 level of significance.

Criterion	Males				Females			
	Cert. of Merit college attendance		Merit Scholars college attendance		Cert. of Merit college attendance		Merit Scholars college attendance	
	Ex-pected	Ob-served	Ex-pected	Ob-served	Ex-pected	Ob-served	Ex-pected	Ob-served
Knapp and Greenbaum								
High productivity	7.3	42.8	7.3	43.3	1.6	16.2	1.6	24.7
Low productivity	92.7	57.2	92.7	56.7	98.4	83.8	98.4	75.3
Total	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0
Knapp and Goodrich								
High productivity	3.9	13.4	3.9	16.2	3.9	14.9	3.9	17.5
Low productivity	96.1	86.6	96.1	83.8	96.1	85.1	96.1	82.5
Total	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0

Holland, J. L. (1957). Undergraduate origins of American scientists. *Science*, 126, 433-437.

This simple table is of interest for several reasons:

- It illustrates Holland’s tendency to find simple ways to display and interpret data.
- Here he showed that institutions that were highly productive of scientists had selected/recruited much greater percentages of high aptitude students than would have been expected by chance.
- He analyzed the data separately for men and women and showed a similar pattern of results for both.
- These straightforward results were published in a brief article in *Science*, the most influential American scientific journal.



Here is how one of Holland's colleagues, Sandy Astin, showed the relationship between college selectivity and the production of PhDs. The correlation depicted ($r = .81$) means that the input characteristics of the studentry is strongly linked to the outputs of the colleges in terms of production of scientists—at the institutional level of analysis.

Such results challenge a common perception that certain elite institutions “do something” to produce high achievement outcomes among students by showing that the students recruited, selected, and enrolled by selective institutions may account for a great deal of the differences among institutions in achievement outcomes.

National Merit Scholarship Corporation (1957-63, Cont.)

- Freedom and resources to develop and test theory
 - “We spent no time looking for funds.”
 - “Our research group received only casual oversight.”
- Work habits and goals
 - Daily, weekly, monthly
 - “If you don’t have something you want to do when you arrive at work, someone else will have plans for you.”

This slide and the next show how Holland characterized his own work environment at National Merit.

He pointed out that his job at national Merit provided resources and freedom from constraints.

He also pointed out the importance of a feature of his work style: setting goals and executing work plans.

To read more about the work environment and its influence, see the section of Holland’s autobiography discussing his work at National Merit Scholarship Corporation in the following:

Rayman, J. R., & Gottfredson, G. D. (Eds.). (In press). *My life with a theory: John L. Holland’s autobiography and theory of careers*. Broken Arrow, OK: National Career Development Association.

National Merit Scholarship Corporation (1957-63, Cont.)

- Laura Kent and influences on writing
 - Berkeley graduate student hired on Frank Barron's recommendation
 - Operated counter-sorter and did clerical work
 - Aspiring poet
- Promoted Kent to editor
 - "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."
- Published 1st version of the RISCEA theory (1959) and multiple longitudinal tests (7 years after PhD)

Holland recognized the importance of writing well and learning to write well -- to have an editor and to work to improve his writing. He had the freedom to promote a talented research assistant to editor at National Merit.

The extended period of intellectual freedom at National Merit allowed Holland to develop the initial version of his theory and to complete longitudinal research. Psychologists early in their careers often focus on small scale and quick studies to publish so that they do not academically "perish."

American College Testing Program (1963-1969)

- Vice President, Research and Development
- Large-sample research with more typical college students
- Collection of much data relating interests to other characteristics
- Further research and demonstrations on variety of talent and the downside of selecting solely on the basis of academic talent
 - James M. Richards, Jr. (Mac) revised accomplishment scales from NMSC and devised new ones

Holland continued the program of research required to further test and develop his theory at the American College Testing Program – a large-scale college entrance testing organization.

Critics of his earlier research said that the support for his typology might be due to the use of highly talented samples of research subjects, and might not be found in more typical samples. At ACT – with its tests for college aspirants for 2-year and 4-year institutions – Holland had access to large samples of more typical young people.

Again at ACT, Holland was joined by other talented researchers, including Mac Richards, Leonard Baird, Robert Nichols, Doug Whitney, Nancy Cole, and Chuck Elton all of whom also went on to have productive research careers after leaving ACT.

American College Testing Program (1963-1969, Cont.)

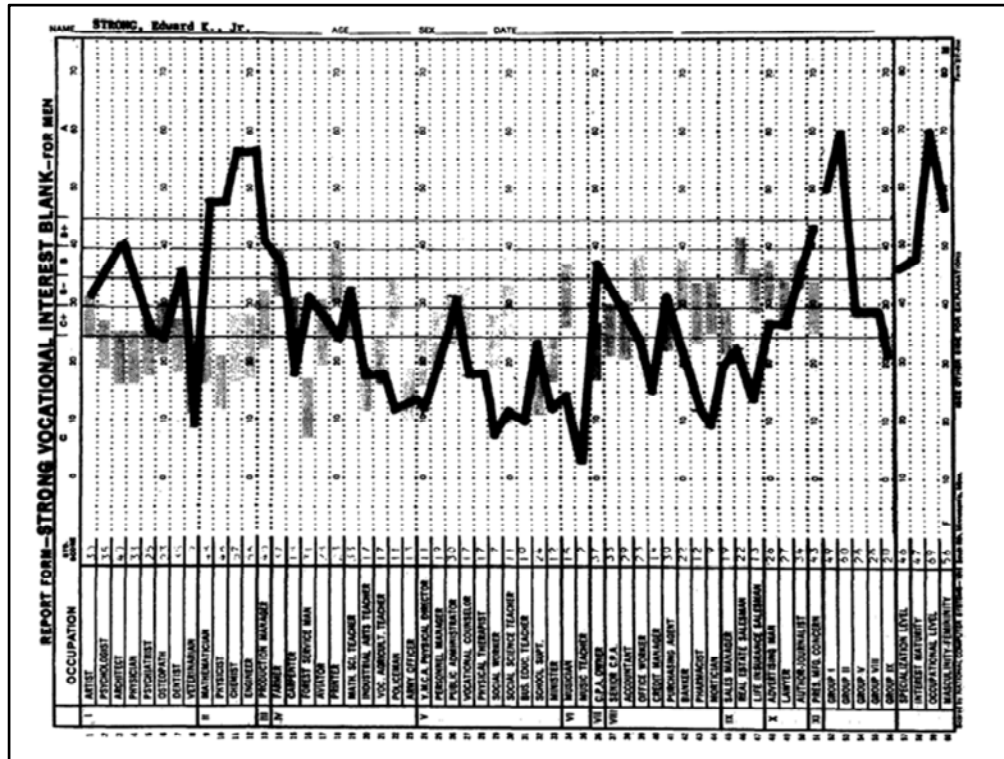
- College selection practices relying heavily on measures of academic potential result in much lost talent.
 - Selecting from top decile on H.S. grades would exclude 86% of H.S. class presidents
 - Selecting only “A” students results in the exclusion of about 95% of national science award winners
- Munday & Davis (1974) continuing this research at ACT later showed that earlier accomplishments predict later accomplishments in the same area
- Subsequent review by Richards (1978)

Holland had begun work on the measurement of students’ accomplishments (as possible indicators of potential for future accomplishments) while at NMSC. He and his colleagues (notably Mac Richards) continued to develop and do research on measures of varieties of students’ accomplishments at ACT.

Holland and associates showed that accomplishments of various kinds (musical, scientific, leadership, etc.) were only moderately correlated. As a consequence, selection focused on one variety may result in a lost opportunity to recruit other forms of talent. That is selection on academic test scores will fail to select many persons who are talented in art or leadership for example. These plain empirical findings generated controversy. To read more about this topic see the following:

Richards, Holland & Lutz (1966) *The Prediction of Student Accomplishment in College* (ACT Research Report), available at <https://files.eric.ed.gov/fulltext/ED014094.pdf>

Gottfredson, G. D. (1999). John Holland’s contributions to vocational psychology: A review and evaluation. *Journal of Vocational Behavior*, 55, 15-40. Reprinted in J. R. Rayman and G. D. Gottfredson (Eds.). (In press). *My life with a theory: John L. Holland’s autobiography and theory of careers*. Broken Arrow, OK: National Career Development Association.



The development of empirically keyed occupational interest scales by E. J. Strong, Jr., was a major accomplishment. The development of an occupational scale was time and labor intensive. Over time occupational scales for dozens of occupations employing men and women were developed. But the result was a way of measuring interests that required a lot of skill, was cumbersome to score, and left much to the imagination of interpreters because empirical keys were available for only a handful of occupations.

This slide shows the SVIB profile of the test's developer, E. K. Strong, Jr. Not only did obtaining such a profile entail scoring delay, but it also results in a complex profile. Strong had sought to organize the scales on the profile into groups, with some success. An expert in the use of this test could see that Strong had interests in science. But the profiles were often confusing for clients and counselors as well.

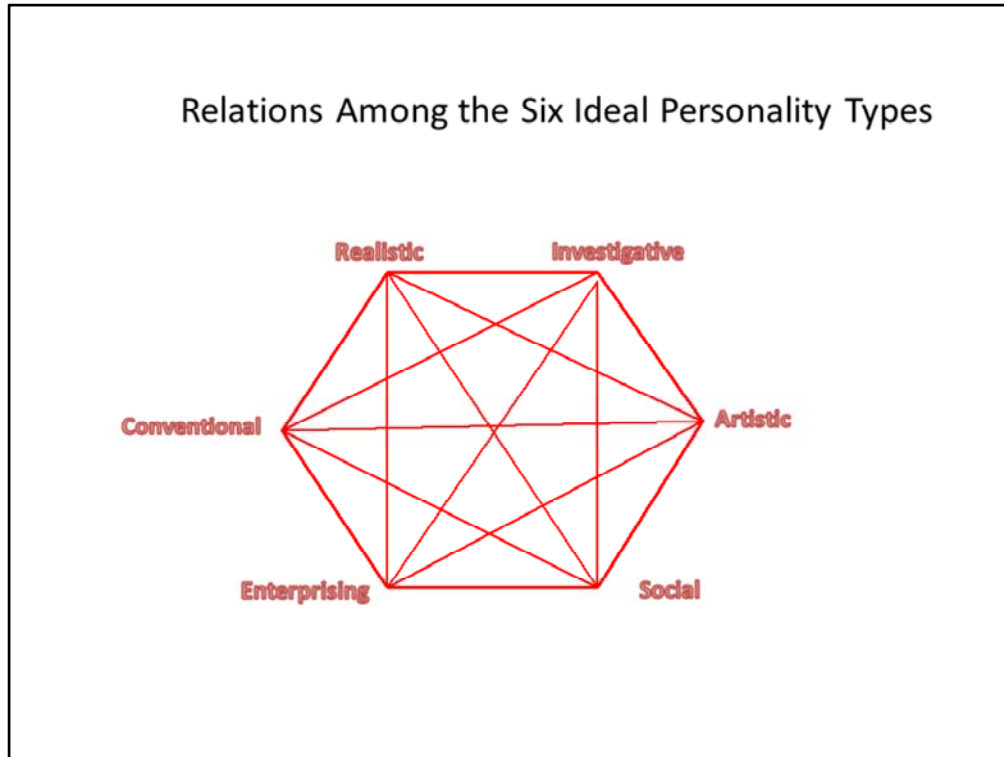
Holland spent much time seeking (a) a parsimonious set of interest scales so that it would not be necessary to develop a scale for each specific occupation, and (b) a useful way of organizing the display of information.

The typology he developed offered one way to address these difficult problems in counseling. A snapshot of the personality typology appears on the next slide.

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, 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	Asocial, 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
Gottfredson, G. D., & Holland, J. L. (1996). <i>Dictionary of Holland occupational codes</i> (3rd ed.). Odessa, FL: Psychological Assessment Resources. (Table 1, p. 3)						

Holland conducted dozens of studies to develop, test, and revise a personality typology useful in organizing information about people's interests, values, preferences, and competencies. Initially, much of this work involved large samples of talented students followed by large samples of more typical students. But tests of the theory and research to provide evidence about the personality typology were conducted by many different researchers over the decades. A hallmark of Holland's work is that he used evidence to support or revise his formulations. Now there is support for the typology for men, women, and people of different cultures and ethnicities. (See especially research by Jim Rounds and his colleagues.)

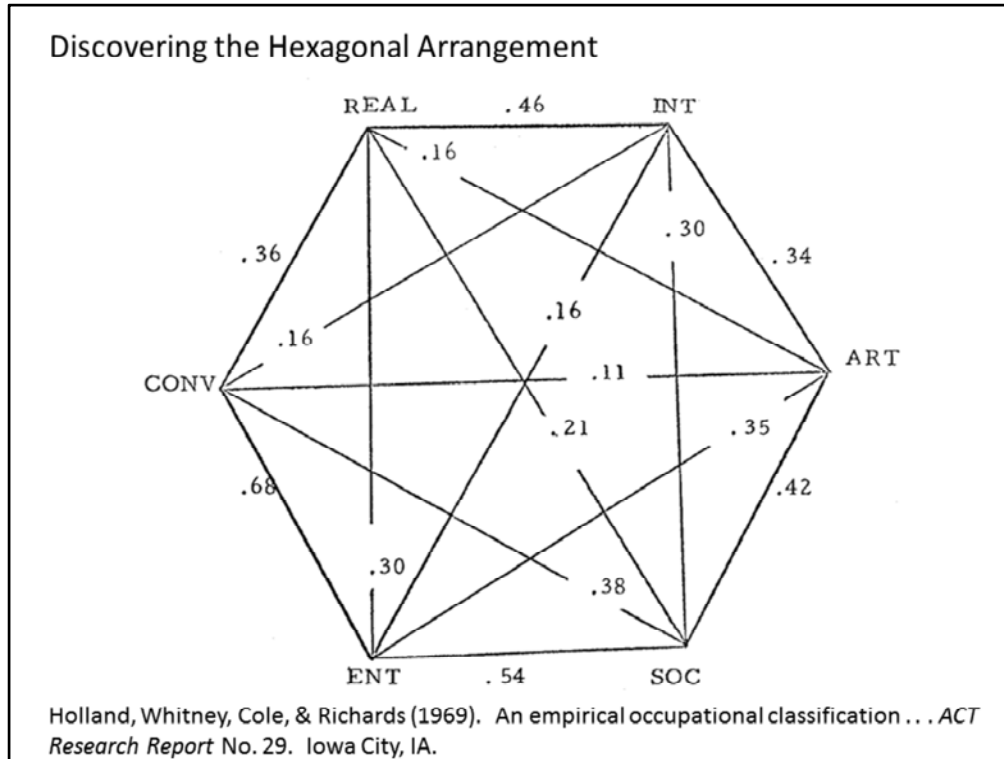
The descriptions of Holland's ideal types presented in this table are easy for counselors and clients to remember, and they are easy to explain. They help to summarize a great deal of information simply by describing the degrees of resemblance to one or more of the ideal types. For example, Gottfredson resembles the Investigative and Artistic types to a great degree and other types much less. We should not say that Gottfredson is an IA type, but that he resembles these ideal characterizations. The types are theoretical abstractions. Knowing, as you now do, that Gottfredson resembles the I and A types, what can you say to describe him?



Holland also devoted effort to finding ways to present information about related interests together in assessment profiles to make understanding an interpretation easier. This concern about organizing interest information had also occupied E. K. Strong. Looking back at slide 21 showing an SVIB profile, notice that Strong placed mathematician, Physicist, Chemist, and Engineer together in Group II; and Sales Manager, Real Estate Salesman, and Life Insurance Salesman together in Group IX.

Holland's solution to this problem proved more successful, in part because it is easier to comprehend, but also because it is accompanied by easy-to recall group descriptors and shows relations among Holland "types" by using a hexagonal figure.

Holland, and his colleague Doug Whitney, were examining the correlations among measures of resemblance to Holland's ideal types when they stumbled on the circular or hexagonal arrangement shown in this figure. Artistic and Conventional types are dissimilar, and they are distant on the hexagon. Enterprising and Social types are similar, and they are adjacent on the hexagon. Read more about this discovery in Doug Whitney's account of the discovery in Rayman and Gottfredson (in press).



The figure shown in our slide was developed by Nancy Cole using a more analytical statistical technique not long after Holland and Whitney discovered the hexagonal arrangement of types.

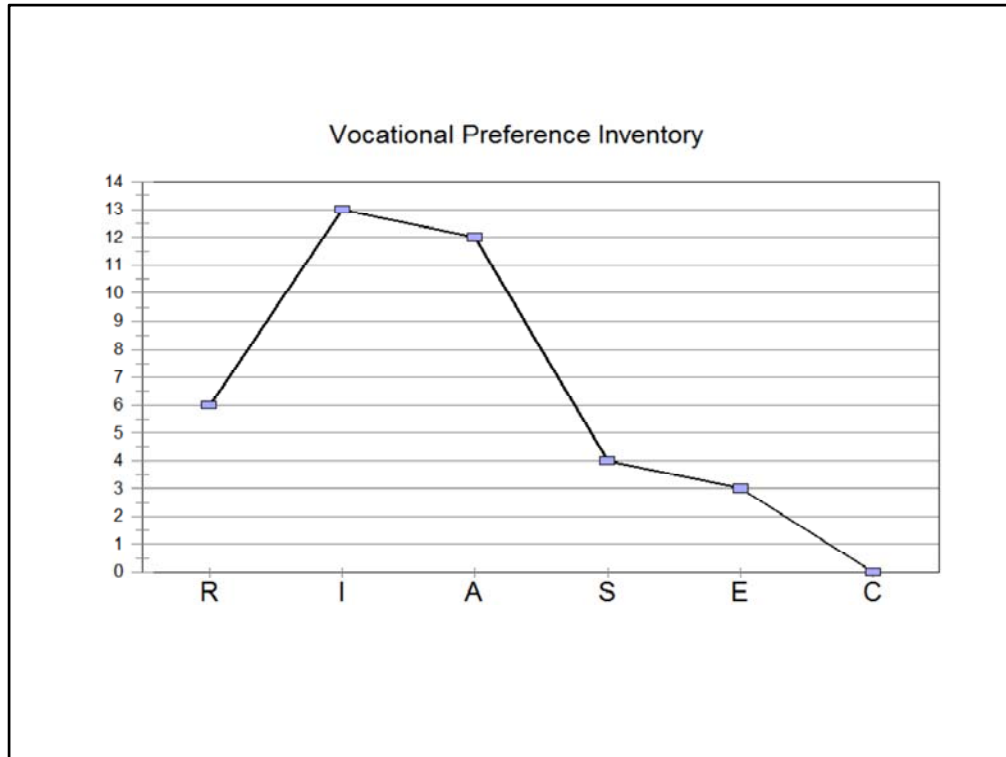
When Holland incorporated the hexagonal arrangement into his typology, the hexagon became—like the personality types—an ideal, an abstraction for explaining relations among interests in simplified terms.

In somewhat technical terms, the kind of hexagonal or circular arrangement in the hexagon takes the form of “circumplex,” that is one way to simplify relations among traits. One approach is factor analysis, which had traditionally sought “simple structure” or representation of traits in multidimensional space in a manner that maximizes the saturation of measures on hypothetical underlying dimensions and minimizes saturation on other dimensions. Both approaches are compromises, and the circumplex model compromises more. It is limited to describing relations of traits in a two-dimensional space (when more dimensions may really be required). So some detailed information is lost. Adopting this simplification temporarily abandons a demand for “simple structure” in exchange of simplified interpretation.

Counselors and clients do not, of course, know or care about these technical issues. Holland’s creative compromises in his theory make interpretation easy without technical expertise.

On the circumplex see: Guttman, L. (1954). A new approach to factor analysis: The radex. In P. F. Lazarsfeld (Ed.) *Mathematical thinking in the social sciences* (pp. 258-348). Glencoe, IL: Free Press.

On simple structure see: Thurstone, L. L. (1947). *Multiple factor analysis*. Chicago: University of Chicago Press.



In this slide you see Gottfredson's profile from the Vocational Preference Inventory, an inventory of Vocational Personality developed by Holland. When interest or personality results are profiled with related scales (those close together on the hexagon) near each other, the profiles become easier to interpret. After the incorporation of the hexagonal arrangement in Holland's typology, examination of a properly arranged profile makes it easy to see that Gottfredson has Investigative and highly related Artistic interests. It is also easy to see that his interests in hexagonally opposite areas of Enterprising and Conventional are very much less pronounced.

Compare the ease of interpretation of this profile using Holland's typology with the interpretation of E. K. Strong's profile (slide 21).

How would you describe Gottfredson's vocational personality now?

“We began . . . With the Realistic scale . . . 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.

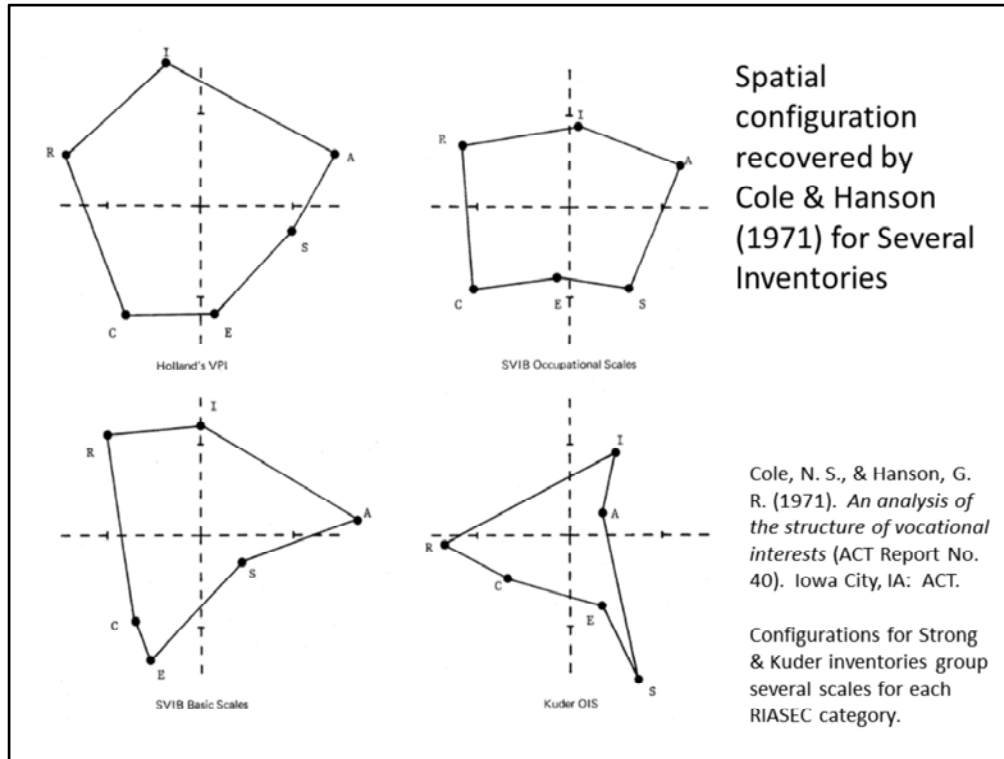
Whitney noticed that we had a circular diagram; Holland said that Roe (1956) had a claim on the circle, but we could have a hexagon.”

Pp. 60-61 in: 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). Erlbaum: Hillsdale, NJ.

This account, reconstructing Holland and Whitney’s discovery of the hexagonal arrangement, shows that the method was empirical, but not highly technical.

One of Holland’s gifts was that he was able to produce highly useful simplifications rather than delving into technical details.

More technical explorations of the hexagonal arrangement ensued, of course, but they were usually made by researchers other than Holland himself.



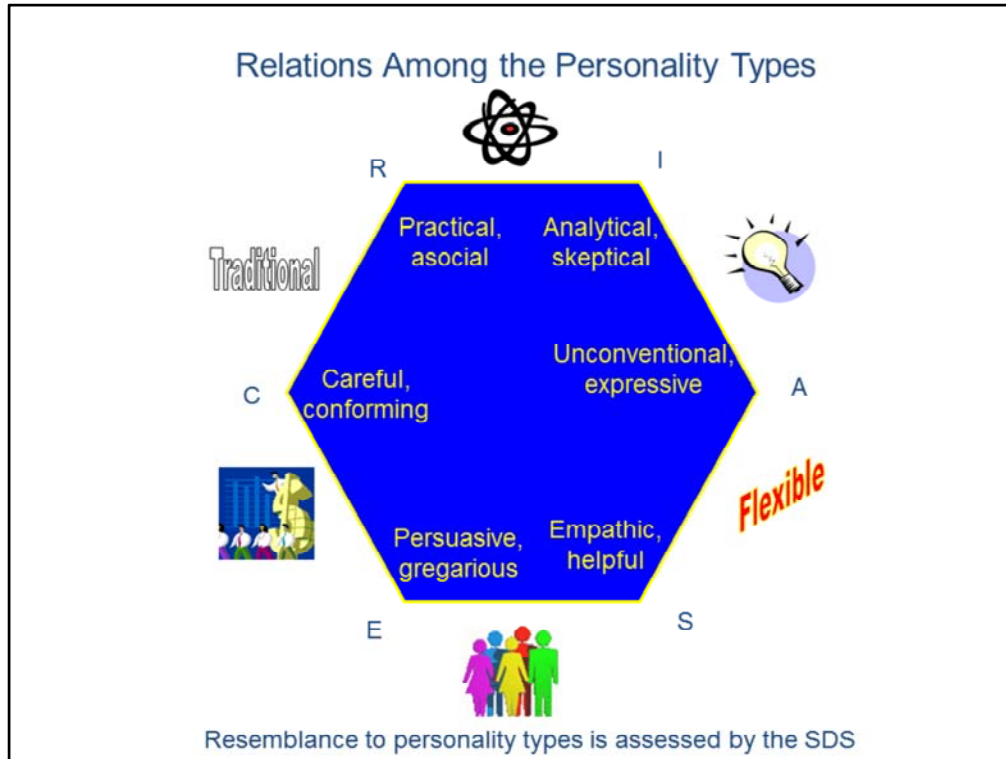
This slide shows that some form of misshapen hexagon can be recovered through spatial configural analyses from several inventories.

This is from very early analytical research conducted by Nancy Cole at ACT. For an example of more recent analytical work see the following article by Tracey and Rounds and other work by Rounds, Tracey, and Day.

Tracey, T. G., & Rounds, J. M. (1995). The arbitrary nature of Holland's RIASEC types: A concentric circles structure. *Journal of Counseling Psychology*, 42, 431-439.

Developments Following Incorporation of the RIASEC Hexagon in Typology

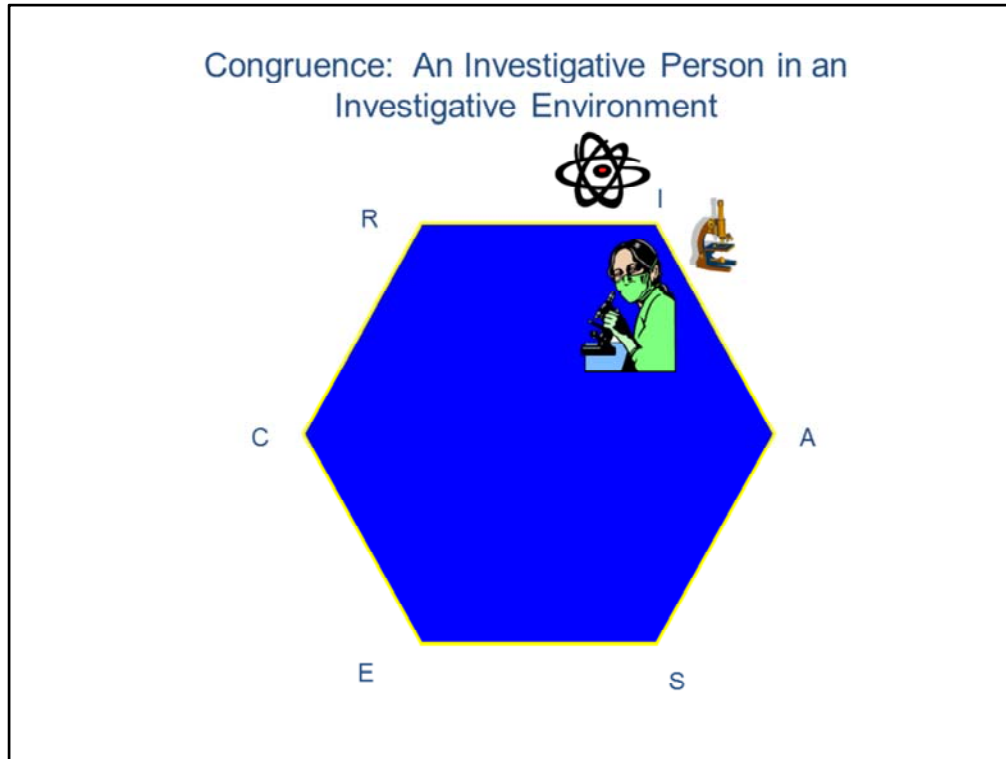
- Use of the hexagonal arrangement as a way to describe degrees of person-environment congruence
- Interpretation of the 2-dimensional space and its application by Prediger
- Extensive study of the generality of the hexagonal structure by Rounds and his students/colleagues
- Incorporation of this structure in most contemporary interest inventories
- Incorporation in career exploration games and instructional materials
- Multiple (13 or more) congruence indexes stimulated by the idea of hexagonal congruence



This and following slides illustrate how the hexagonal arrangement may be used to help people understand the typology.

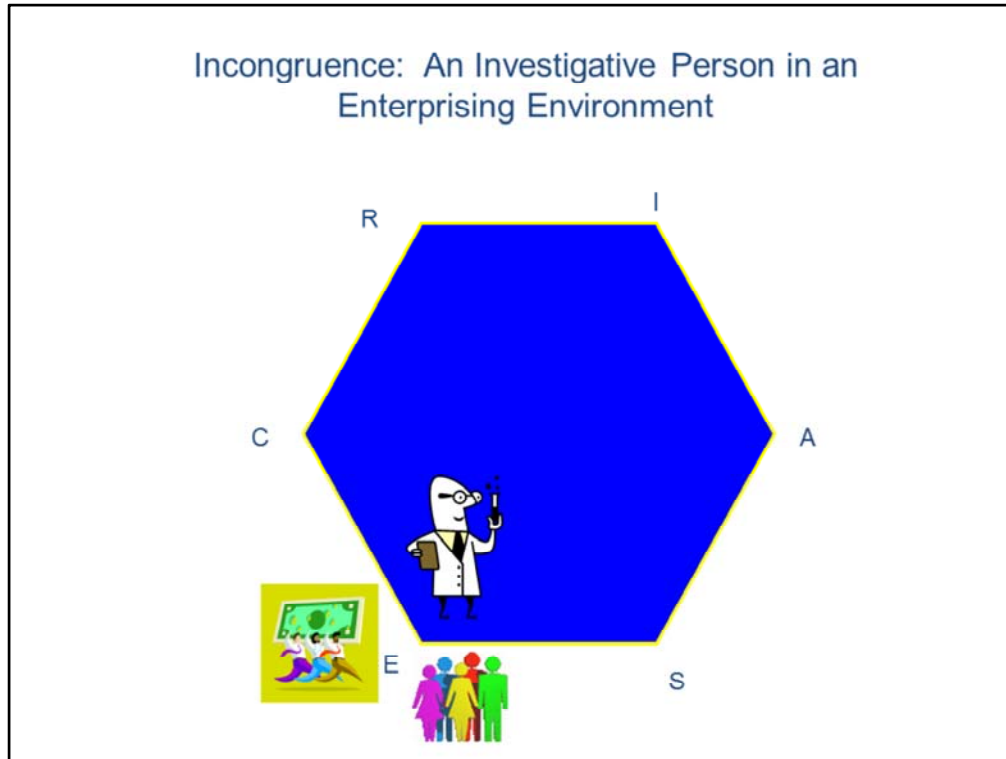
Notice how the descriptions of the types tend to fade into descriptions of adjacent types.

For example, Realistic and Investigative have in common a concern with concrete phenomena, Investigative and Artistic have involvement with ideas in common. Both Artistic and Social personalities tend to be flexible, and so on.



The theoretical hexagon provides a way to define levels of congruence. An Investigative Personality in and Investigative Environment is highly congruent. (As would be a Social person in a Social environment, a Conventional person in a Conventional environment, and so on.

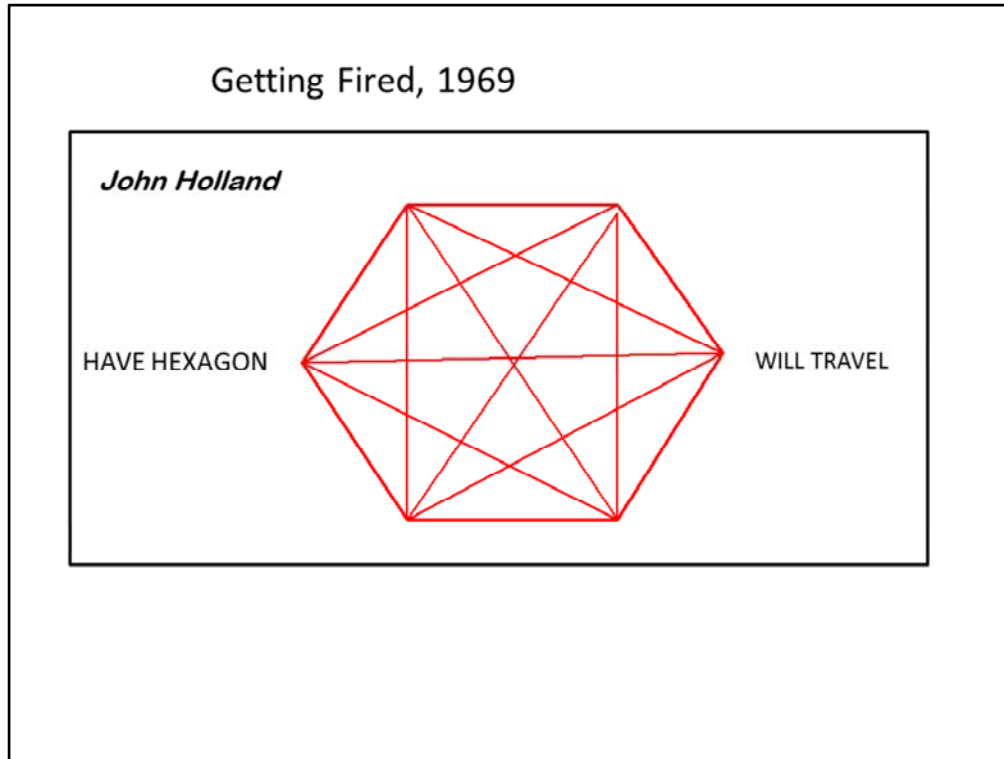
When a person is in a congruent environment, the demands, rewards, and values allowed expression match the skills, dispositions, and values of the person. Similarly, when Person and Environment are congruent, the person supplies the human characteristics needed by the environment.



In contrast, an Investigative Personality in an Enterprising Environment is incongruent. The skills, interests, and values of the person do not match what the environment rewards and encourages expression. The environment is not highly rewarding or encouraging of the incongruent individual. The incongruent person does not supply the behavior the environment encourages.

Because I and E are opposite on the hexagon, this pairing is maximally incongruent. Similarly, A and C, and S and R are maximally incongruent. An Artistic person in a Conventional environment is highly incongruent. A Conventional person in an Artistic environment is also highly incongruent.

As a simplification, the hexagonal calculus in the typology specifies four levels of congruence considering only the most salient feature of the environment and most salient feature of the personality.



Shortly after discovering the value of the hexagonal ordering for organizing the RIASEC typology, a conflict arose within different units at ACT. The research personnel (mainly Investigative) working in Holland's unit became dissatisfied what some of the more business and sales oriented personnel (tending to be Enterprising) wished to do in the company. Holland had promised to represent the views of the research unit in a board meeting, but the President did not allow him to speak. Holland walked out of the meeting. He was fired.

Being fired is a devastating event for any person and his/her family. But Holland approached the problem with his typical puckish aplomb (even if it was the appearance of self-confidence with trepidation in the mix). He printed up some business cards with a red image of the hexagonal arrangement and the legend "Have Hexagon, Will Travel." (This obviously borrowed from the slogan of the gun-toting do-gooder Paladin—the fearless problem-solver-for-hire of a popular television show.)

In short order Holland found a new position of director of an educational research center with a sociological focus at Johns Hopkins University, where he joined the Sociology (then called Social Relations) faculty. The other members of Holland's research team quickly moved to other universities or institutions.

To read more on this see Holland's account of the events in his autobiography in Rayman and Gottfredson (editors), *My Life with a Theory*, in press.

Johns Hopkins (1969-1980)

- Assembled first form of a self-scored inventory to assess
 - vocational preferences
 - preferred activities
 - competencies
 - and self-ratings of abilities
- No scoring keys or norms
- 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
- Published by Consulting Psychologists Press in 1971, the Self-Directed Search (SDS) became a successful, widely imitated test
- "Later, I realized that developing the SDS was an attempt to demonstrate that I was still a valuable person."

Right away after moving to Johns Hopkins, Holland set to work creating a new vocational exploration experience, the Self-Directed Search. The SDS incorporated his vocational personality inventory, the Vocational Preference Inventory, as one section and supplemented it with self-reported aspirations, preferred activities, and self-reported competencies. He combined this with a list of occupations classified according to his environmental taxonomy.

In a break with received practice in psychological assessment, Holland devised a way for the new inventory to be scored by the user in a transparent way. In part to make it practical, he dispensed with casting scores on a table of norms and used raw scores to summarize a person's results. It was shocking!

It was a shocking breakthrough that quickly showed itself to be popular with users and others. And it quickly generated a great deal of research and supportive results. And an inexpensive version was quickly published by Consulting Psychologists Press.

Pink and Blue Interest Inventories

- Campbell & Holland (1972) collaborated to develop Holland scales for the SVIB.
- These were used to organize the “Merged” form (for both men and women) of the Strong-Campbell Interest Inventory
 - Eventually revised with odd norms to become today’s Strong Interest Inventory
 - Campbell no longer involved
- Earlier, Campbell had committed what he called the biggest psychometric blunder in history: Selecting the wrong colors for a revision of the Strong. This had helped to kindle a controversy that lasted most of the decade of the 1970s.

Like many other developments in the history of psychology, psychological assessment and the measurement of interests is a product of and reaction to the social situation at the time it is developing. Contemporary interest measurement has roots in psychometric developments in the first half of the 20th century. In the U.S. women did not win the right to vote until the 19th Amendment (1920). By 1940 women had become an increased share of participants in the US labor force. In 1870 15% of workers were women, by 1900 18%, 1940 24%, and 1948 33%. But by 1940 women were still largely employed as clerical workers, machine operatives, and domestic service workers. In 1940 93% of domestic service workers, 95% of telephone operators, and 93% of stenographers, typists or secretaries were women. Only 23 occupations together employed 75% of employed women. Not surprisingly, then, in retrospect, the early interest test developers and researchers (Darley & Hagenah (1941/55), Fryer (1931), Strong (1943) had developed tests that provided assessments related to a narrower range of occupations for women than for men. This problem was exacerbated by the fact that interest scales tended to be empirically based focused on distinguishing interests in specific occupations rather than broad occupational types.

On early development in interest tests see:

- Dayhaw, L. T. (1948). The measurement of interest. *Canadian Journal of Psychology*, 2, 71-80.
- Darley, J. G.; & Hagenah, T. (1941/1955). *Vocational Interest Measurement*. Minneapolis: Univ. of Minnesota Press. (First published as *Clinical Aspects and Interpretation of the Strong Vocational Interest Blank*).
- Fryer, Douglas 1931 *The Measurement of Interests in Relation to Human Adjustment*. NY: Holt.
- Strong, Edward K. Jr. 1943 *Vocational Interests of Men and Women*. Stanford Univ. Press.

On historical employment of women see:

- Bureau of Labor Statistics, Current Population Survey, historical labor force participation rates.
- Hooks, J. M. (1947) Women’s occupations through seven decades (Women’s Bureau Bulletin No. 218). Washington, DC: US Government Printing Office.

Johns Hopkins (1969-1980, Cont.)

- The SDS attracted the wrath of the women's movement around 1972. Among the complaints:
 - Men and women obtain different scores, on average
 - Men scored much higher on the Realistic scale (preferences for mechanics and working with things) and women scored much higher on the Social scale (preferences for helping and teaching others)
 - Inclusion of items such as "I can make simple plumbing repairs" but not "I can operate a sewing machine" in the Realistic scale signifies bias
 - Use of sexist wording such as "stock and bond salesman" limits the options of women
 - Sex differences could be erased by using within sex norms
 - This and other tests limited the options of women

When David Campbell revised the SVIB to produce the Strong-Campbell Interest Inventory (later to become the SII), he was attempting to ameliorate some of the historical inadequacies of the Strong. To do this he attempted to include representation of more occupations employing women, and (with Holland's help) integrate Holland's typology into the Strong so that it would measure broad interest bands rather than focusing only on specific occupations. A problem with occupational scales is that they must incorporate the status quo into their content and structure.

Despite these intentions, by around 1970 a powerful movement demanding different treatment of women in general and in interest testing in particular had developed. Interest tests, especially if they were printed on pink and blue paper, became targets. The Strong and other inventories came under attack, often by persons with little knowledge of the technology involved in developing such tests.

The complaints about testing were well intentioned and have ended up being helpful in the long run. But demands for change advanced faster than research or consensus about how best to make change and what goals change should seek.

At Johns Hopkins, Holland spent much effort on research and writing in the polemical areas of gender and interest measurement.

Johns Hopkins (1969-1980, Cont.)

- Research conducted in the 1970s showed . . .
 - Use of words such as “fireman” rather than “firefighter” has little effect on scores
 - “Knitting” and similar popular suggestions are poor items for a Realistic scale. Many suggested improvements don’t work
 - Experimental results imply that the SDS has beneficial effects for both men and women
 - Within sex norming implies that women who say “no” to most Realistic items would get scores suggesting that they consider the occupation of diesel mechanic
- Nevertheless the SDS and VPI were revised to eliminate sexist wording and to suggested changes that were not contraindicated by empirical evidence
- Between about 1972 and 1978 this issue consumed a tremendous amount of research time

See the following:

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. Reprinted in J. R. Rayman and G. D. Gottfredson (Eds.). (In press). *My life with a theory: John L. Holland’s autobiography and theory of careers*. Broken Arrow, OK: National Career Development Association.

Holland, J. L. (In press.). *My life with a theory* (Section 2). In J. R. Rayman and G. D. Gottfredson (Eds.). (In press). *My life with a theory: John L. Holland’s autobiography and theory of careers*. Broken Arrow, OK: National Career Development Association.

Johns Hopkins (1969-1980, Cont.)

- Other research progress related to Holland's theory in the 1970s
 - Revisions and validity tests of the SDS and accessory materials (the occupational classification)
 - Theoretical studies of congruency and career decision-making
 - Extensions and revisions of the occupational classification
 - Studies of adult work histories as tests of the theory
 - Experimental studies of the effects of the SDS on the test taker
 - Research on the Vocational Identity Scale
 - Application of the classification to describe the U.S. occupational structure, changes in the structure over time, and the relation between the work people want and what is available

For example:

- Holland revised the SDS and its manual as well as the VPI. Revisions were published by Psychological Assessment Resources.
- The classification was tested in a large adult work samples: 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)
- Stability and redirection in adult careers was studied in large representative samples of U.S. workers: Gottfredson, G. D. (1977). Career stability and redirection in adulthood. *Journal of Applied Psychology*, 62, 436-445.
- An experimental test of the effects of the SDS on test takers was reported: Zener, T. B., & Schnuelle, L. (1972). An evaluation of the Self-Directed Search: A guide to educational and vocational planning. *Center for Social Organization of Schools Report, Johns Hopkins U.*, 124, 50.
- Work was conducted on development of a vocational identity scale: 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. 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.
- The classification was used to characterize changes in the employment patterns of men and women in the U.S. economy over the decades: Gottfredson, G. D., & Daiger, D. C. (1977). Using a classification of occupations to describe age, sex, and time differences in employment patterns. *Journal of Vocational Behavior*, 10, 121-138.

Early Retirement (1980 on)

- Why?
 - “I was ambivalent about teaching and academic life.”
 - “A major source of stress was the time I had to spend dealing with criticism about the alleged sex bias of the SDS.”
 - “My stress came on top of my full time teaching and SDS maintenance work—revisions and manuals, and working on revisions of the theory.”
 - “I talked my retirement over with Elsie; it worried her, but our accountant reassured us.”
 - “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 retired in 1980 and bought a grand piano—a dream I had for many years. Even mistakes sound OK on a grand piano.”

It seems true that Holland found teaching stressful. Although he seemed highly informal when giving talks at conventions, he generally spent a great deal of time preparing in advance for these talks—generally writing them out in advance and revising them up to the time of delivery. He spent many hours preparing for small undergraduate seminar-type classes, and often did not seem to find the class sessions gratifying.



1980



Above: Holland making speech on the occasion of his retirement (basement of the Hopkins Club). Above left: Holland and Arnie Spokane, same occasion

In retirement he could still pursue the work he wanted to do: Large grants were not necessary to work on revisions and tests of the SDS. One does not need to be employed to write articles.

Retirement gave Holland an opportunity to return to playing the piano. In retirement, he regularly took piano lessons. He even took voice lessons for a time. He did do wood working on a small scale using hand tools. (He bought one of those desirable Scandinavian work benches.) He entertained friends and he collected artwork.



John & Elsie Holland, New Year's Eve, 1979

After retirement, Holland continued to drive to the university to have lunch with colleagues. He and his wife, Elsie, frequently hosted cocktail hours on Friday afternoons for conversation with psychologists, sociologists, political scientists, attorneys, and other friends.

In this photo, Holland had stopped by the university to get his mail and discovered that Gary and Denise Gottfredson were quietly getting married at home on New Year's Eve. He rushed home to pick up Elsie, stopped to get a cheese log and a bottle of Champaign, and made it over to the Gottfredson's house in time to provide refreshments for the unannounced ceremony.



To emphasize that he felt unburdened after his early retirement, Holland had a printer make him new business cards. Mimicking the cards he had printed when he was fired at ACT, this card again bore the hexagon, but announced that he would NOT travel.

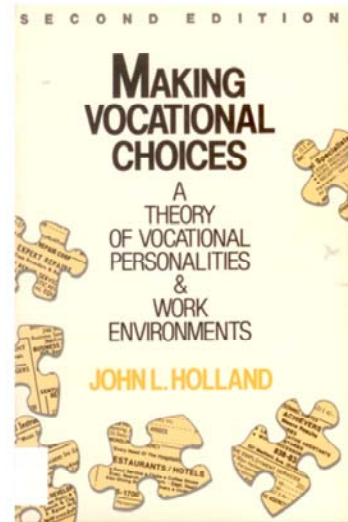
1980s and 1990s

- 1982--Collaborated with Gottfredson on empirical extension of the occupational classification using job analysis data archives for the DOT (over 12,000 occupations)
- 1989—Revised and extended to more occupations
- 1998—Revised and extended again
 - cognitive complexity level added to the classification
 - DOT, Census, OES, CIP, SOC classifications



1980s and 1990s

- 1985—A major revision of the theory
 - More comprehensive and explicit in describing constructs and applications
 - Incorporated Identity
 - De-emphasized earlier ideas that hadn't worked (consistency)
 - Introduced new ideas about learning and development
 - Updated section on evidence



1980s and 1990s



- 1991—Collaborated with Gottfredson in the development of the Position Classification Inventory (PCI)
 - An inventory to assess the resemblance of a work environment to the environmental models
 - Capable of replacing approximation methods (DHOC) for classifying work environments

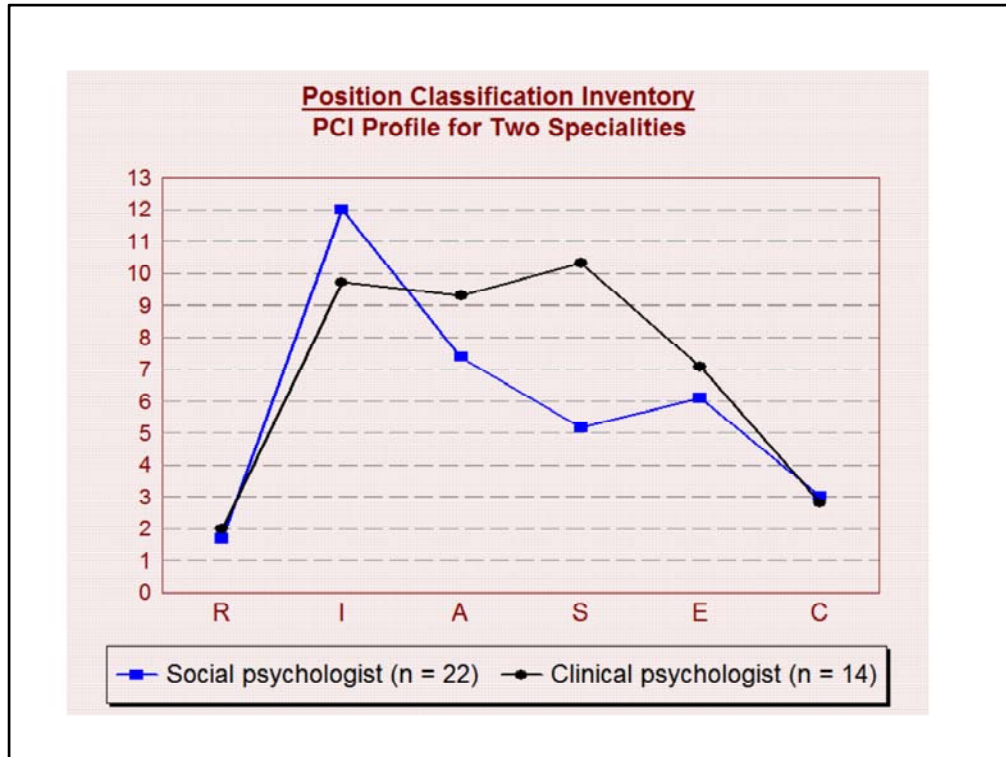
In the 1970s, Gottfredson had begun drafting an inventory to analyze occupational environments. He used the theoretical formulations of the types to compose items that would implement the theoretical descriptions of environmental types in job analysis terms. A typescript of this inventory stayed in the file drawer for a couple of decades.

In retirement, Holland developed the habit of visiting Gottfredson for lunch most days – eating at a favorite Thai restaurant. This gave the two researchers an opportunity to craft items, plan a research project to collect data from incumbents in targeted occupations, and review progress.

Before long, they had gone through a couple of revisions of an inventory, collected data on criterion samples, and garner research partners in large corporations who wished to develop classification systems for internal career development purposes.

The result was the PCI. This is an inventory to assess and classify environments rather than persons.

It directly implements the environmental side of the theory in measurement

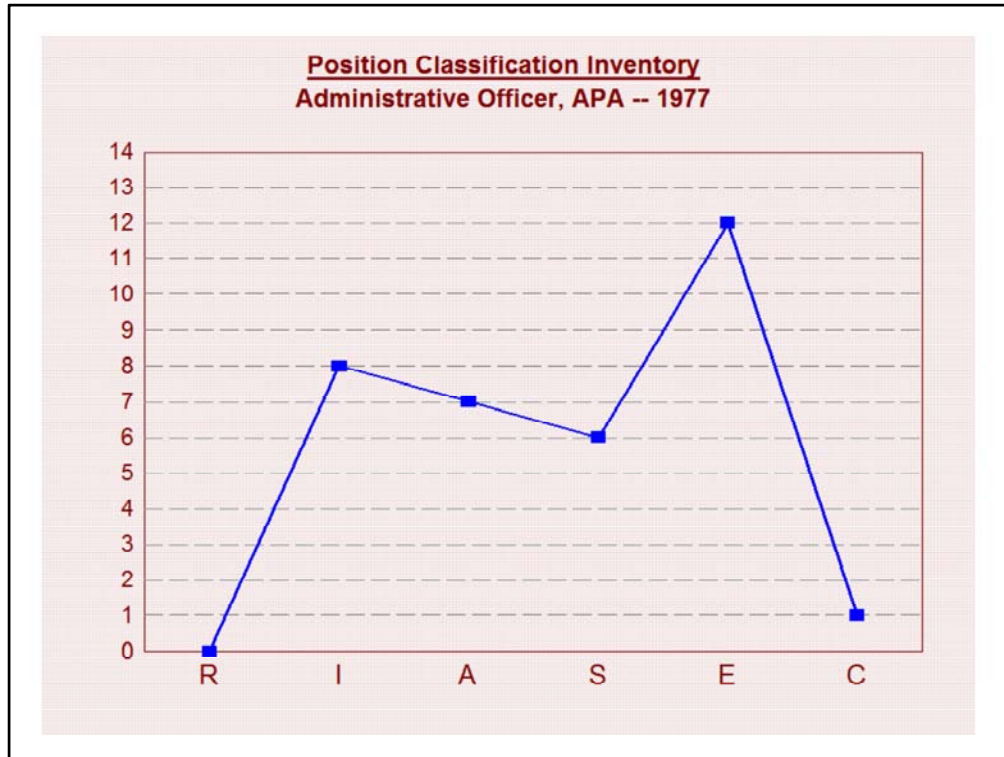


The slide illustrates one application of the PCI—to assess the environments of aggregates of positions in a single occupation to derive an average occupational profile. In this instance, the appropriate identification of both Social Psychologist and Clinical Psychologist were unclear. For instance there was a suggestion in materials for one inventory purporting to implement Holland's typology that the classification of Social Psychologist might be Artistic and Clinical Psychology is sometimes thought to be clearly Social.

In this case a sample of 22 individuals who self-identified as Social Psychologists in the directory of APS were asked to complete the PCI, as were 14 individuals who identified as Clinical Psychologist. Although the samples are relatively small, the profiles imply that social psychology predominantly involves Investigative work, whereas the profile for clinical psychology implies an approximately equal mix of Social, Investigative, and Artistic work.

For some occupations, the profiles for different samples are especially clear. Groups of counselors who complete the PCI to consistently describe their work producing profiles with a strong peak on Social environment.

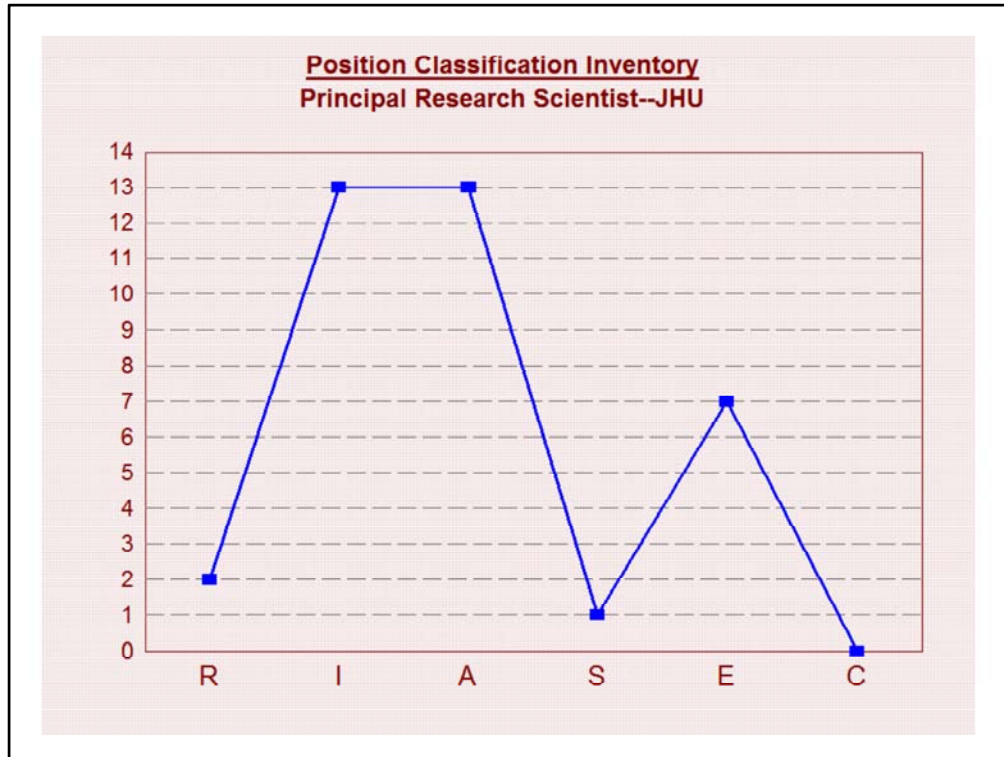
See the manual for the *Position Classification Inventory* for more examples and data.



This slide and the next illustrate the application of environmental assessment using the PCI to different positions (at different times) in the career history of a single psychologist (Gary Gottfredson). On repeated reassessments with the SDS, VPI, or the Strong, this individual's vocational personality has strongly resembled the Investigative and Artistic models. The figure in the slide describes one of his environments, that of an association administrator handling "special projects."

In 1977–78 Gottfredson was employed as an administrative officer at the American Psychological Association. The work entailed consulting with members on issues of concern to psychologists or to the public welfare and quickly planning and preparing communications to be delivered to policy makers in Congress or federal agencies; conducting research, gathering information, and preparing reports on topics such as the distribution of psychological and other health service providers to influence legislation on health insurance issues; staffing committees on program evaluation in health insurance and psychology's human resources and PhD production. The job involved interaction with leading psychologists to develop consensus on issues and increase the influence of psychology in national affairs, research funding, and health care. Often, the work had to be completed quickly and in a highly persuasive manner.

This PCI profile shows that this position strongly resembled the Enterprising environmental model, with Investigative as the main secondary emphasis. How would you characterize the person-environment congruence using Holland's theory?



This slide shows the environmental profile of the next job in the career of the same psychologist. He left the American Psychological Association to develop a program of research on delinquency and schools—taking advantage of a funding opportunity to establish such a program that occurred because of Congressional (and therefor National Institute of Education) in school safety. The new job still required some Enterprising components (managing budgets and personnel, raising money for research), but now it mainly involved research on delinquency, victimization, educational program effectiveness, and school improvement. He was primarily involved in doing and writing and publishing research in technical reports, journal articles, and books or test manuals.

In addition to reports of research, he wrote summaries of advice for educational administrators on school improvement and the prevention of problem behavior, as well as a monograph for juvenile court judges on delinquency prevention. He contributed to National Academy of Sciences reports on rehabilitation of criminal offenders, and on other topics of contemporary public and policy concern. He had become primarily a scientific researcher and a writer.

The PCI profile shows very strong Investigative and Artistic environmental demands, with a secondary emphasis on Enterprising demands.

How do you characterize the person-environment congruence in theoretical terms?

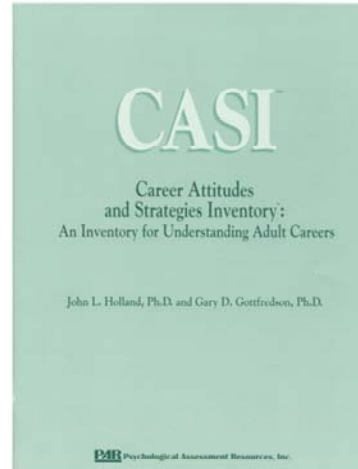
A Brief Description of the Holland Environmental Typology						
Attribute	Environmental Type					
	Realistic	Investigative	Artistic	Social	Enterprising	Conventional
Requires	Manual and mechanical competencies, interaction with machines, tools, and objects	Analytical, technical, scientific, and verbal 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	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; 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
Gottfredson, G. D., & Holland, J. L. (1996). <i>Dictionary of Holland occupational codes</i> (3rd ed.). Odessa, FL: Psychological Assessment Resources. (Table 2, p. 4)						

Research using the massive data base accumulated by the U.S. Employment and Training Administration through its occupational analysis program was used to empirically classify the occupations in the U.S. economy in the first through third editions of the *Dictionary of Holland Occupational Codes*. The job analysis information used formed an important basis for improving the classification and also learning about the construct meaning of the environmental typology.

Research to develop and apply the PCI enhanced this empirical base for the typology. The summary shown in this slide summarizes the environmental typology in very brief terms.

1980s and 1990s

- 1992-94—Collaborated with Gottfredson on sources of career change and stability not explained by congruence
 - Result was the Career Attitudes and Strategies Inventory (CASI)



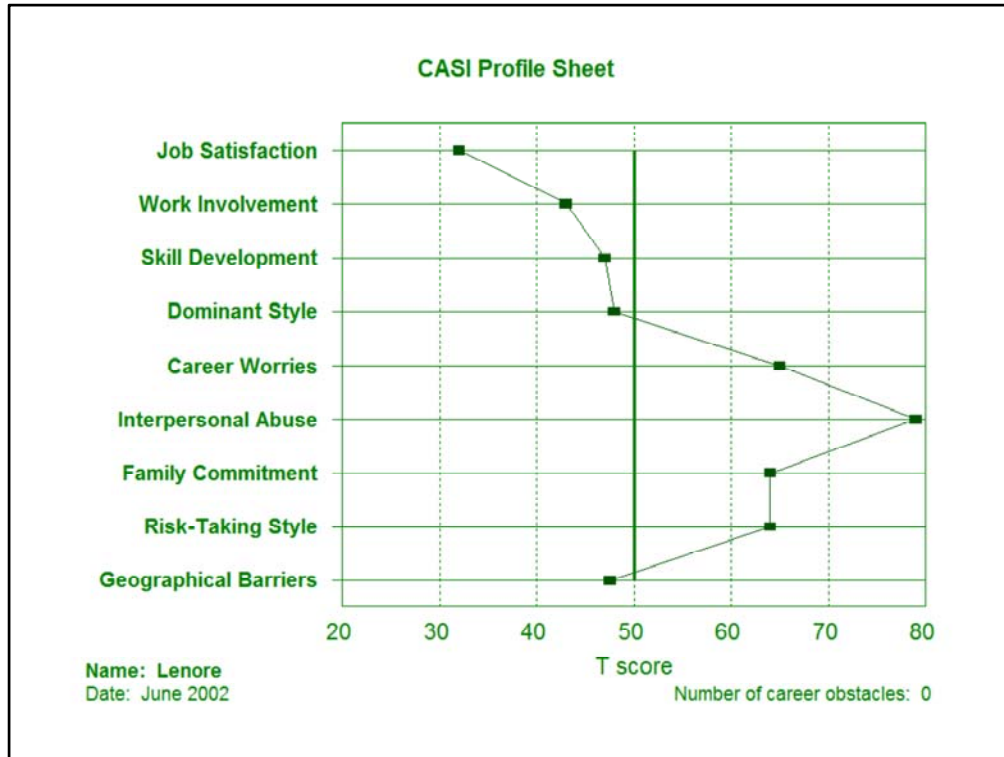
Over the years, Holland became increasingly interested in finding ways to explain those aspects of career stability and career change that were not well explained by his typology.

For example, his theory does not on its face easily explain why Gottfredson took the administrator job at the psychological association. Why would an I take an E job?

This theme occupied lunch time meetings by Holland and Gottfredson for several years, as they speculated about a more comprehensive account of career change. They made notes on thousands of 3 x 5 cards of statements people had made about their stability or change. They wrote other statements to reflect their own conjectures.

Then they began to collect data on the responses of samples of adults when presented with these statements. They went through successive samples with successive sets of items, and they used factor analysis as well as internal consistency item analysis on *a priori* collections of items. After some iterations, they developed a self-administered and self-scored inventory of explanations for stability or change. The inventory seemed to represent a catalog or inventory of adult career status.

It covered such aspects of work environments as interpersonal abuse, work-family conflict, geographical barriers, and other features.



This is the Career Attitudes and Strategies Inventory (CASI) profile for “Lenore.” Lenore was very unhappy with her position. In fact she quit shortly after completing the CASI. The principal problem is clear from the profile. She reports high levels of interpersonal abuse at work. Interpersonal abuse includes such things as other people saying demeaning things, unkind application of power, and lack of appreciation among others. Her Job Satisfaction is also seen to be low.

In view of her extreme scores, it is not surprising that she would quit her job.

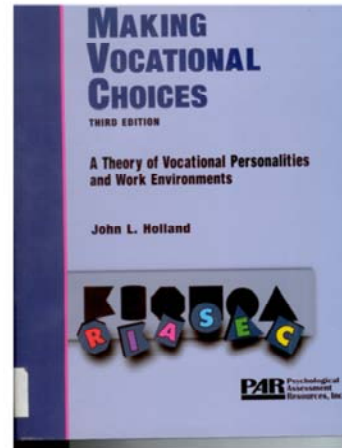
Interestingly, Holland and Gottfredson had expected that a separate scale measuring sexual harassment would be developed from the item set for the CASI. But empirically, it did not prove possible to develop a gender-harassment scale independent of the more general interpersonal abuse scale. Contrary to the developers’ expectations, the relation of interpersonal abuse with respondents’ gender was not strong. Interpersonal abuse is much higher for low status individuals.

In their tryouts of the CASI with clients, it appeared that they sometimes received information about their career status about which they had not been clearly aware. And it appeared that the experience of taking the CASI sometimes stimulated people to take action to bring about change.

Only one study of the effects of the CASI on clients has been performed: A dissertation by Erica Russell (Howard University) which has not been published. More research is needed.

1980s and 1990s

- 1997—Another revision of the theory
 - Summarized evidence about Identity
 - Made formulations about “Environmental Identity” (or Organizational Focus) parallel those for the individual formulations
 - Revised formulations of personality types and environmental models based on empirical research using the SDS and PCI as well as other tools



The final revision of Holland’s theory was published in 1997 by the publisher of the Self-Directed Search, Psychological Assessment Resources, Inc.

PAR sells it directly. It is not distributed via Amazon. An Amazon search may give an “out of print” message. But it is in print. You have to know where to go. (Hint: PAR’s web site.)

It appears that most citations to Holland’s theory in the literature these days are to older versions of the theory. Many persons have not read the most recent version.

This may be a result of Holland’s theory having become part of the background or general scenery in career assistance and career theory, which seems good. But it is not good if career researchers and practitioners are relying only on secondary accounts in textbooks and elsewhere. Secondary accounts sometimes get things wrong, and they are almost always incomplete accounts of the theory.

Read the original stuff.

Publisher Trouble

- In 1999 PAR produced an Internet product it called the SDS
- This product
 - Lacked Holland's approval
 - Was not in any sense self-directed as it was scored and interpreted by computer
 - Omitted the aspiration section of the SDS (the component with the most predictive value)
 - Was produced and published without benefit of research
- PAR's President insisted that he did not need approval to publish this Internet product
- Holland sued, the suit continued for several years, with both sides eventually making some concessions
- The law suit was time and energy consuming and demoralizing; this dispute marked the end of Holland's scientific and professional productivity

As a result of his experience with publishers – journal editors, book publishers, test publishers – Holland provided some advice for potential authors in his autobiography. See: Rayman, J. R., & Gottfredson, G. D. (In press.) *My life with a theory*. Broken Arrow, OK: National Career Development Association.

Holland's Distinctive Style

- Persistence and goal directedness (short- & long-term)
- Attending to data (including what he observed)
- Revising ideas and eliminating those that don't work
- Using the help of others
 - technical skill (Astin, Richards, Cole, Gottfredson)
 - influence & connections (Darley, Rossi & Coleman)
 - the stock broker in the elevator
 - colleagues with knowledge in diverse areas (Alston, Feigl, Kent)
- Treating others with respect (in his own Paleolithic, unreconstructed way)

This slide and the next provide a quick overview of some of the aspects of Holland's personality or research style that contributed to his success and influence.

For more on his style see the following:

- His autobiography: Rayman & Gottfredson (Eds.). (In press). *My life with a theory*. Broken Arrow, OK: National Career Development Association.
- The article by Rayman, "The power of the hexagon," in *My life with a theory*.
- The article by Gottfredson, "A review and evaluation of Holland's contributions," in *My life with a theory*.
- The article by Doug Whitney, "Reminiscences of John L Holland," in *My life with a theory*.

Holland's Distinctive Style (Cont.)

- Striving to write clearly about his ideas to higher education professionals, psychologists, counselors and clients
 - Using and presenting simple, straightforward data rather than complex or difficult-to-understand reports
- Developing devices that are self-administered and self-interpreted
- Engaging his colleagues and subordinates in his and their work
- Use of humor to communicate (“Roll for Life”)
- Calling it as he saw it rather than bowing to pressure

Holland's use of humor to cope with difficult or awkward topics is his demonstration of “Roll for Life” during a talk he gave during the years-long controversy about whether it was “fair” for interest inventories to reveal differences in the interests of men and women. Some critics thought that inventories should produce the same distribution of results for men and women (one notion of “equal”).

Jack Rayman, who is a wood worker as well as counseling psychologist, made and presented to Holland a large pair of cubes with R, I, A, S, E, and C printed on the six faces – large dice. During his presentation Holland announced that he had developed a new interest test. It produced equal distributions of outcomes across the six types for men and women. Then he rolled the dice across the floor, naming the exercise “Roll for Life.” The only problem, no validity.

Some Unfrocking Contributions

- Classified vocational aspirations predict category of eventual occupation better than do interest inventories (any)
- Colleges that appear more productive of scientists to a large extent just recruit better students
- Selection on the basis of test scores and grades results in loss of nonacademic talent
- Accomplishment in college are better predicted by earlier accomplishments of the same type than by some traditional selection methods
- “Roll for Life”

This slide shows a list of some of the areas where Holland's contributions challenged conventional wisdom with evidence or logic.

To Read More

- Holland, J. L. (1997). *Making vocational choices: A theory of vocational personalities and work environments*. Odessa, FL: Psychological Assessment Resources. (www.parinc.com)
- Rayman & Gottfredson (Eds.) (In press.) *My life with a theory: John Holland's autobiography and theory of careers*. Broken Arrow, OK: National Career Development Association.
- Gottfredson, G. D. (2009). John L. Holland (1919-2008) [Obituary]. *American Psychologist*, 64, 561.
- Gottfredson, G. D. (1999). John Holland's contributions to vocational psychology: A review and evaluation. *Journal of Vocational Behavior*, 55, 15-40. Reprinted in Rayman & Gottfredson (Eds.) (In press.) *My life with a theory*
- Gottfredson, G. D., & Johnstun, M. (2009). John Holland's contributions: A theory-ridden approach to career assistance. *Career Development Quarterly*, 58, 99-107.