Chapter 8. Worldview

Part III concludes with a look at the belief systems that underlie the life and work of any creative person. I begin by examining whether great psychologists exhibit any distinctive religious leanings. From there I treat the relation between a psychologist's long-term impact on the field and his or her philosophy of psychological science. Which theoretical or methodological orientations are most conducive to a psychologist's posthumous reputation?

> "It is a historical curiosity that Fechner's empiricism was ultimately rooted in metaphysical and mystical speculation; that in his microscopically exact experiments, there always lurked the tendency to prove the correctness of these cosmic speculations" (Capretta, 1967, p. 76).

The rest of this chapter is allotted to a more detailed discussion of this principle. That is, we will examine the extent to which a psychologist's ideas emerge from a personal worldview or *Weltanschauung*, to use the German term. I begin by discussing the impact of religious convictions, and then turn to the influence of a psychologist's philosophy of science.

RELIGIOUS CONVICTIONS

Antagonism between religion and science/philosophy?
399 BC Socrates
415 AD, Hypatia
1553, Michael Servetus
Galileo
Descartes
Charles Darwin
In psychology's history

Religious:

Augustine to Thomas Aquinas

Priests or ministers:

Malebranche, Condillac, James Mill, and Brentano.

Individuals who planned to enter ministry:

Charles Darwin, Carl Stumpf, G. S. Hall, Pavlov, George Romanes, J. B. Watson, Clark Hull, Carl Rogers, Rollo May, and Theodore Newcomb.

Those who studied theology:

Kant, Herder, Benecke, and James Ward

Yet "the recent history of psychology includes a few clerics – like Brentano – but these were almost without exception university professors whose connection with the church was merely incidental" (MacLeod, 1975, p. 177).

"In spite of the strongly mystical strain in his outlook, and his flirtations with alchemy, oriental cults and occultism, Jung nevertheless made several valuable contributions to psychology" (Hearnshaw, 1987, p. 166).

So, what is the connection, if any, between religion and the attainment of distinction as a psychologist?
Lehman & Witty (1931): "Scientific Eminence and Church Membership."

- The sample of 1,189 eminent ("starred") scientists came from the 1927 edition of J. M. Cattell's *American Men of Science*.
- Information about their religious affiliation was taken from the 1926-1927 edition of *Who's Who in America*, whose editors has specifically requested that their biographees provide their religious denomination.

Lehman and Witty noted at once that 75% of those sampled provided no information about church membership. From this they "inferred either that the 886 scientists, who neglected to state their church membership, belong to no church or that they did not consider the information of sufficient importance to include when they were preparing their biographical sketches" (p. 546).
Of the 303 outstanding scientists for whom the data were available, the largest numbers were Congregationalist (22%), Presbyterian (20%), Episcopalian (17%), Unitarian (12%), and Methodist (10%). "among 1,189 outstanding scientists, three only report membership in the Catholic Church" (p. 548).
However, Lehman and Witty realized that these raw percentages are misleading, because they do not take into account the distribution of church membership across the diverse denominations. When this adjustment was made using the most recent figures for the United States, the rankings altered considerably.
"The Unitarians provide 81.400 times their expected quota, the Friends, 6.600, the Episcopalians, 5.701, and the Presbyterian, 2.995 times their quotas," whereas "the Roman Catholics provide the smallest number of research workers in proportion to their number" (p. 547).
In fact, after adjustment, Unitarians outnumber the Catholics by 1,696 to 1.
The Lutherans, Baptists, and Disciples were almost as poorly represented among eminent scientists.
Lehman and Witty concluded that great scientists are not inclined to belong to established churches, and when they do, those churches are more likely to be those representing liberal denominations.

The low participation rates of eminent scientists have been replicated in other investigations using different samples and methods.

- Of Roe's (1953a) 64 eminent scientists, only 3 displayed serious involvement in any church or synagogue.
- A more recent and larger sample of natural scientists found that none of the highly eminent attended religious services regularly, and even among their less eminent colleagues the figure was only 12% (Feist, 1993).
- Furthermore, this low attendance can be probably be attributed to lack of religious interests rather than the preoccupations of research (Chambers, 1964).
- For instance, highly creative mathematicians score lower on measures of religious values than do their less creative colleagues (Helson & Crutchfield, 1970).

Nonetheless, it is conceivable that religious feeling lives more comfortably with some disciplines than with others.

- In Terman's (1954) study of 800 men who had been members of his sample of gifted children, some vocational interest toward the ministry was reported in 34% of those who pursued college majors in the social sciences. This percentage falls in the same range as those found for those who majored in engineering (23%), the physical sciences (29%), and medicine or biology (55%), but it is half as high as found for the Termites who majored in the humanities (68%).
- A totally different study, however, which looked at actual researchers, found that psychologists had less proclivity toward religion than did the chemists (Chambers, 1964).

Perhaps the safest conclusion to draw from these statistics is that great psychologists may fall somewhere in the range typical for natural scientists.

Why do most scientists, including psychologists, shy away from religion?

One possible explanation is the totally contrasting attitude toward truth. For most religions, truth is contained in divinely inspired scriptures, with exegeses of those scriptures severely constrained by received traditions and institutional authorities. In contrast …

Michael Faraday once wrote that

> the world little knows how many of the thoughts and theories which have passed through the mind of a scientific investigator have been crushed in silence and secrecy by his own severe criticism and adverse examinations; that in the most successful instances not a tenth of the suggestions, the hopes, the wishes, the preliminary conclusions have been realized. (quoted in Beveridge, 1957, p. 79)

Charles Darwin (1892) likewise observed that

> I have steadily endeavoured to keep my mind free so as to give up any hypothesis, however much believed (and I cannot resist forming one on every subject) as soon as facts are shown to be opposed to it. Indeed, I have had no choice but to act in this manner, for with the exception of the Coral Reefs, I cannot remember a single first-formed hypothesis which had not after a time to be given up or greatly modified. (pp. 55-56)

Even after the scientist feels confident enough that something is worth sharing with the scientific world, the offering is given as something tentative and changeable, as new facts and theories constantly change the criteria by which any scientific idea must be judged.

- Each successive edition of Darwin's *Origin of Species* exhibits revisions that underline continually the fallibility of scientific knowledge.
- Freud's collective works reveal an intellect that could not rest content with the unmodified repetition of the same ideas, even his sacred pleasure principle eventually yielding ground to the death instinct.
- Wilhelm Wundt changed his ideas so much in his various publications as to cause William James considerable exasperation, yet
- James himself would sometimes collate seemingly contradictory ideas into a single publication, the *Principles of Psychology* – that inclusive and elusive compilation of surmises and guesses *par excellence*.

The conjectural nature of the scientific enterprise explains not only why great psychologists may be disinclined toward religion, but also why when psychologists do admit religious beliefs, they tend to be of a liberal or flexible form. Unitarians subscribe to a doctrine so loose and inclusive that many more dogmatic religionists believe it cannot be considered a genuine faith. Indeed, Servetus was executed for heresy because he had advocated what now would be considered unitarian beliefs, beliefs then condemned by the Protestants and Catholics alike. Yet Unitarianism proves much more popular among scientists than those faiths in which all belief is predetermined by established dogma. Hence, great psychologists are not likely to be religious or, if they are, they are proponents of a religion that remains open to novelty and controversy.

In addition, this interpretation fits well with what the empirical research has shown about the personal characteristics of great scientists (see chapter 7).

Their openness to new facts and ideas, their behavioral and cognitive flexibility, their independence, self-sufficiency, and nonconformity – these do not represent of cluster of traits that would sit comfortably with unchanging, closed, and rigid ideologies.

One of the recurrent facts to found in the biographies of many great psychologists is their total unwillingness to conform to the norms and expectations of their society, occupation, or church. Some daring individuals, like Galvani , J. M. Cattell, and Tolman, lost their academic positions by advocating unpopular political views, while others where willing to take on powerful dictators, as when Pavlov attacked Stalin by letter or when Köhler criticized Hitler in the press.

David Hartley, though trained for the Anglican ministry, could not take holy orders owing to his refusal to subscribe to all Thirty-Nine Articles, while Karen Horney found herself ousted from the New York Psychoanalytic Institute for her failure to accept its “party line.”

Spinoza was excommunicated from his synagogue for his “atheist” beliefs, while Fichte was obliged to resign from the University of Jena for the same cause.

The list of thinkers and researchers who have suffered arrest for expressing their unconventional views is very long, and includes figures as diverse as Auguste Comte and Mustafer Sherif.

It seems that the great figures of psychology’s history simply do not have the personal disposition needed to submit to the dictates of any dogmatic faith, whether it be political, professional, or religious. The conflict between science and religion is psychological rather than sociological.

SCIENTIFIC PHILOSOPHIES

In the foregoing argument I lumped psychologists with the scientists. The implicit assumption is that each psychologist aspires to become a scientist first and foremost.

There actually exists some empirical evidence on this score. In this study, past presidents of the American Psychological Association were asked to fill out the Strong Vocational Interest Blank (D. P. Campbell, 1965). Of the 70 APA presidents between 1892 and 1965, 50 had completed the inventory one or more times. The sample began with Joseph Jastrow, APA president in 1900, to Jerome Bruner, president in 1965. Among those assessed were such big names in the field as physiological and comparative psychologists Karl Lashley, Robert M. Yerkes, Harry Harlow, and Donald Hebb, learning psychologists Edward L. Thorndike, John B. Watson, Clark Hull, Edward Tolman, Edwin Guthrie, O. Hobart Mowrer, and Neal Miller, humanistic psychologists Gordon Allport and Carl Rogers, psychometricians L. L. Thurstone, J. P. Guilford, and Paul Meehl, and even the historians of psychology Walter B. Pillsbury, E. G. Boring, Gardner Murphy, and Ernest Hilgard. Curiously, it also included two psychologists, Robert R. Sears and Lee Cronbach, who may have taken the SVIB as part of Terman's (1954) study of the vocational interests of 800 gifted men cited in the previous section – along with Lewis M. Terman himself!

The SVIB scores for the 50 APA presidents were then contrasted with those for a large sample of psychologists at large (N = 1,024) who had no particular claim to distinction (D. P. Campbell, 1965). In some respects, the two groups were very similar.

> For example, the APA presidents "averaged 50 on the Psychologist scale, precisely the same as the total criterion group" (p. 643), and much higher the mean of 17 that a group of average male respondents received. Hence, all psychologists, eminent or not, have a strong vocational interest in Psychology.

Yet in other respects the two groups are rather different.

- On the one hand, the comparison group expressed more vocational interest in Life insurance salesman, Mortician, YMCA physical director, Social science teacher, and Personnel manager – a rather curious mix of occupations, to say the least! All these interests seem to have in common is an interest in dealing with people, albeit not always in a face-to-face manner.
- On the other hand, the APA presidents exhibit appreciably stronger and far more coherent vocational interests in Physicist, Mathematician, Engineer, Chemist, and Physician – all pure or applied sciences.

E. G. Boring's SVIB scores are fairly typical of great psychologists generally.

- He had taken the SVIB in 1927, the year before he became president of APA. His five highest vocational interests were Physicist, Chemist, and Engineer (all 54), and Mathematician (53), followed closely by Psychologist (48).
- Although it may seem odd to have Boring's own chosen profession fall in fifth place, it is not unusual. Edward K. Strong, the instrument's originator (and never an APA president), received the following scores (also in 1927): Engineer 58, Chemist 57, Physicist 48, and Mathematician 48, and Psychologist 35 (D. P. Campbell, 1965).
- Interestingly, Boring took the SVIB two other times, in 1948 and 1965, permitting a check on the stability of vocational interests over nearly 40 years. The profiles are basically the same, except that his interest in Mathematician, Physicist, Chemist, and Engineer actually increased, while his interest in Psychology remained unchanged.

Judging from these findings, great psychologists most strongly align themselves with other scientists in the exact and natural sciences. However, before this conclusion is given unqualified acceptance, it must be acknowledged that these data were collected at a time when the American Psychological Association was primarily a research-oriented organization, more like the American Association for the Advancement of Science than like the American Medical Association. It was after this period that APA acquired increasingly more clinical psychologists and other practitioners whose interests aimed more at practice than research. The latter may have caused a shift.

This possibility was demonstrated in Gregory Kimble's (1984) investigation of "psychology's two cultures."

> Inspired by C. P. Snow's (1960) conception of two divergent academic cultures – the sciences versus the arts and humanities – Kimble devised a scale designed to tap the presence of conflicting values within our discipline.
>
> The scale was administered to 164 APA members who belonged to only one division, namely either
>
> > Division 3 consisting of experimental psychologists or
> > Division 29 consisting of psychotherapists.
>
> The scale assessed the following dimensions:
>
> > (a) scientific versus human values,
> > (b) determinism versus indeterminism,
> > (c) objectivism versus intuitionism,
> > (c) data versus theory,
> > (d) laboratory investigation versus field study,
> > (e) historical versus ahistorical,
> > (f) heredity versus environment,
> > (g) nomothetic versus idiographic,
> > (h) concrete mechanisms versus abstract concepts,
> > (i) elementism versus holism,
> > (j) cognition versus affect, and
> > (k) reactivity versus creativity.
>
> In line with expectation, the experimental psychologists were far more strongly governed by scientific values, with conspicuous sympathy toward determinism, objectivism, laboratory investigation, nomothetic explanation, and elementism.

Moreover, subsequent investigators have found comparable results, suggesting that the division is not only real but also runs deep (e.g., Conway, 1988; Zacher & Leong, 1992).

If psychology consists of two separate cultures, then there might be two types of great psychologists, each with their own distinctive philosophy of psychological science. If so, then two questions come immediately to mind.

- First, is there a psychological foundation for the two types? For instance, do illustrious representatives of the two cultures differ in personality traits or developmental experiences?
- Second, what is the ultimate impact of the two types? Are great scientists among psychologists more influential than the great humanists, or is the reverse true?

Is There More Than One Type of Great Psychologist?

It has become almost cliché for those who write history of psychology texts to suggest that a psychologist's ideas are grounded in their personality.

"Psychologists are human, and therefore, they have emotions, aspirations, sensitivities, and inhibitions. In later chapters, I present evidence that these personal variables have indeed influenced the development of psychological theory" (Stagner, 1988, p. 21).

> For instance, some psychologists might be tough-minded and others tender-minded, their respective philosophical orientations accordingly leaning toward either the natural or human sciences. Hence, when behaviorist B. F. Skinner and humanistic psychologist Carl Rogers once entered into a classic debate about the nature of psychology, neither could yield substantial ground.

But is there any evidence that a psychologist's ideas have antecedents in their personality and development? The evidence is somewhat mixed.

- On the one hand, some empirical studies have shown that a psychologist's scientific orientation may correlate with various personality characteristics.
    - For example, one investigation found that scores on a measure of scientific orientation (the Organicism-Mechanism Paradigm Inventory) exhibited consistent associations with assessments of cognitive and interpersonal style, personality, and occupational interests in a large sample of behavioral scientists (Johnson, Germer, Efran, & Overton, 1988).
    - Most tellingly, behavioral scientists' views of themselves were linked with two important philosophical presuppositions:
        - whether persons are passively reactive or actively purposive and
        - whether reality consists of stable, isolated elements or of changing holistic patterns.
    - In addition, another inquiry showed that how psychologists scored on a different measure (the Theoretical Orientation Survey) was linked with such variables as gender, age, family background, childhood experiences, education, religion, occupation, and other biographical factors (Coan, 1979).
        - For instance, those psychologists whose mothers where extremely religious are more likely to subscribe to scientifically oriented beliefs, such as behaviorism, quantification, and elementarism.
        - This developmental "boomerang effect" puts in nomothetic context the extreme metaphysical behaviorism of J. B. Watson, whose mother was so devoutly religious that she had named her son after the fire-and-brimstone Baptist minister, John Broadus.
- On the other hand, the empirical literature suffers from several drawbacks from the standpoint of our scientifically informed history of psychology.
    - First, the empirical results fail to cover all issues that make up a worldview.
        - For example, among the most critical distinctions in psychology's history is whether a thinker advocates materialist or idealistic beliefs.
        - Yet according to a study of actual philosophers conducted by Hans Eysenck (and Gilmour) in 1944, thinkers who varied along this dimension did not differ on such traits as general drive, emotionality, introversion, shyness, or depression.
    - Second, almost all of the research looked at everyday research participants (graduate students or APA members) rather than eminent psychologists.
        - The only notable exception is Suedfeld's (1985) study of the integrative complexity of APA presidents, as assessed by content analyses of their presidential addresses. He found that integrative complexity was positively correlated with whether the psychologist had a subjectivistic rather than objectivistic orientation.

Despite these reservations, I think it is reasonable to conclude that a prima facie case has been made for the existence of distinct types of great psychologists.

Which Type of Psychologist Has the Greater Impact?

On the basis of the tentative conclusions just offered, let us now suppose that great psychologists do not have to share identical philosophical outlooks.
It might still hold that certain worldviews are more conducive to influence than others are.
In particular, it may be the case that those psychologists who adopt more scientific orientations will make greater contributions to psychology's progress as a science, and thereby will secure more fame.
In contrast, those psychologists who advocate more humanistic positions may be counted among those who retarded psychology's advancement toward scientific respectability.

This question was actually addressed in a study of eponyms in psychology (Roeckelein, 1972).

- The study's main goal was to determine how many times various psychologists' names are mentioned in 8 popular textbooks for introductory psychology courses.
- Despite the overall eminence of the sampled psychologists, considerable variation existed in the prominence. For instance, Sigmund Freud's name appeared dozens of times in every textbook, whereas Edward Titchener's name appeared in only 3 texts, and then only once.
- A secondary part of the investigation examined if this differential presence had anything to do with whether the psychologist's was tender- or tough-minded, with 13 notables in each category.
- The tender-minded psychologists were Adler, Binet, Freud, Galton, Horney, Jung, Maslow, Piaget, Rogers, Sheldon, Sullivan, Terman, and Wolpe, whereas
- the tough-minded psychologists were Ebbinghaus, Helmholtz, Hull, James, Lashley, N. E. Miller, Pavlov, Schachter, Skinner, Thorndike, Tolman, Watson, and Wundt.
- Although the two groups did not significantly differ in eponymic status, subsequent analyses obtained better results: Statistically significant differences were obtained when Freud was contrasted with Skinner and when Freud and Piaget were compared with Hull and Tolman.
- The tests showed that the tender-minded psychologists held an edge over the tough-minded psychologists according to their eponymic status in introductory psychology textbooks.

Those follow-up analyses may raise doubts about the robustness of the results.
Nor is this the only methodological objection.

- The assignment to the two orientations was based on each psychologist's subdiscipline. Personality, clinical, developmental, and testing psychologists were identified as tender-minded, whereas the learning-motivation and psychophysics psychologists were tough-minded.
- In other words, the contrast was really based on whether the psychologists favored correlational or experimental methods – what Cronbach (1957) once styled the "two disciplines of psychology."
- Making these classifications all the more crude is the fact that they were categorical rather than quantitative. Surely, Watson, Hull, and Tolman were not all equally tough-minded, nor were Freud, Galton, and Maslow all equally tender-minded.
- In addition, no attempt was made to control for historical time, even though the relative presence of the two types of psychologists may have shifted over history.
- Finally, it may be preferable to use some other gauge of a psychologist's impact on the field than eponymic prominence in introductory psychology textbooks. Specifically, the magnitude of current influence might be better assessed using citation indices, such as discussed in chapter 3.

I have conducted a more recent study that avoids these and many other possible objections (Simonton, 2000b).

Philosophy of psychological science and long-term influence.

The investigation began with a sample of psychologists whose unquestioned eminence had been previously established through expert ratings (Coan & Zagona, 1962).

- 54 psychologists active from the 1880s to the 1950s "who emerged among the top 50 in overall ratings or among the top 10 in the ratings for any decade" (p. 716).
- The mean year of birth was 1872, with a range from 1801 for Fechner to 1919 for Estes.
- Most came from the United States, the remainder coming from Germany, Britain, Austria, France, Switzerland, Canada, and Russia.
- The 54 represented every major subdiscipline (physiological, comparative, cognitive, personality, developmental, educational, social, clinical, etc.) and major schools (Structuralism, Functionalism, Behaviorism, Gestalt, Psychoanalytic, Humanistic, etc.).
- But there was only one female, namely Karen Horney (Simonton, 2000b).

Given this sample, it was an easy task to assess the long-term impact of these psychologists on current research using the *Social Sciences Citation Index* (1983, 1992).

- To obtain the most reliable measure of current influence, two 5-year accumulation citation indexes were used, one for 1976-1980 and the other 1986-1990.
- These are the two most recent, non-adjacent periods for which indexes were available.
- In each case the total number of citations received was counted (consulting various sources, such as R. I. Watson, 1974, whenever there existed any ambiguities).
- The correlation between these two measures is .84, indicating a conspicuous temporal stability in the long-term influence of the 54 psychologists.
- Because the test-retest reliability was so substantial, the two measures could be summed to produce a composite index of scholarly influence.
- The average psychologist received 1,359 citations in 10 years, or 136 citations per year.
- Range from an annual rate of 6 citations for Külpe to a rate of 1,271 for Freud.
- Because the resulting measure was also skewed right with an unusually extended upper tail, the citation indicator underwent a logarithmic transformation that made it more closely approximate the normal distribution (Simonton, 2000b).

The next step was to see whether this log-transformed measure was contingent upon the philosophy of psychological science represented by each psychologist's research program.

- This obviously requires that each of the 54 be assessed for their theoretical and methodological orientation, a seemingly prodigious task. Happily, that assessment had already been carried out and published by a previous investigator (Coan, 1968, 1979).
- In particular, 232 experts rated the research programs of these 54 psychologists according to 34 characteristics, such as the role of conscious processes, introspective reports, individual uniqueness, naturalistic observation, determinism, nomothetic analyses, statistical analyses, etc.
- Then using factor analysis, these 34 measures were consolidated into 6 nonorthogonal factors and the corresponding factor scores published (Coan, 1979).

The 6 factors may be described as follows:

(a) *Objectivistic versus Subjectivistic* (emphasis on observable behavior versus emphasis on subjective experience; e.g., Watson, Pavlov, Skinner, and Hull versus Jung, Brentano, Adler, Piaget, Fechner, and Janet);

(b) *Elementaristic versus Holistic* (emphasis on molecular or atomistic analysis versus emphasis on molar analysis; e.g., Spence, Titchener, Estes, Hull, Wundt, Pavlov, and Skinner versus Goldstein, Koffka, G. Allport, Lewin, and Rogers);

(c) *Impersonal versus Personal* (emphasis on the nomothetic, deterministic, abstract, and tightly controlled versus emphasis on the idiographic, emotional, and the unconscious; e.g., Hull, Skinner, Titchener, and G. E. Müller versus Rorschach, Adler, Jung, Janet, G. Allport, and Charcot);

(d) *Quantitative versus Qualitative (*emphasis on mathematics, statistics, and precision versus emphasis on qualitative attributes and processes; e.g., Estes, Thurstone, Spearman, Binet, and Ebbinghaus versus Freud, Charcot, Wertheimer, Sullivan, and Köhler);

(e) *Static versus Dynamic* (emphasis on the normative and stable versus emphasis on motivation, emotion, and the self; e.g., Wundt, Mach, Fechner, Spearman, and Külpe versus McDougall, Mowrer, Freud, and James);

(f) *Exogenist versus Endogenist* (emphasis on environmental determinants and social influences versus emphasis on biological determinants and heredity; e.g., Skinner, Angell, Hull, Rogers, and Watson versus Galton, Freud, Hall, McDougall, and Cannon).

The actual standardized factor scores the 54 eminent psychologists are shown in Table 8.1.

Table 8.1

Standardized Factor Scores for 54 Theorists on the 6 Factors Assessing Scientific Orientation

Theorist	Objectivistic	Elementaristic	Impersonal	Quantitative	Static	Exogenist
Fechner	-0.985	0.597	0.972	0.968	1.595	0.587
Helmholtz	-0.269	1.090	0.582	0.445	1.093	-0.493
Galton	-0.179	0.400	-0.781	0.881	0.892	-2.456
Charcot	-0.448	-0.093	-1.268	-1.389	-0.918	-0.787
Wundt	-0.627	1.189	0.582	0.619	1.797	0.783
Brentano	-1.164	-0.586	-0.391	-0.952	1.093	1.078
Mach	-0.716	0.301	0.875	-0.603	1.696	-0.002
James	-0.448	-1.079	-0.391	-0.516	-1.119	-0.591
Hall	-0.985	0.005	-1.073	0.357	-0.616	-1.769
Pavlov	2.060	1.189	0.680	0.968	0.691	-0.493
Ebbinghaus	0.179	1.386	0.485	1.318	1.394	1.372
G. E. Müller	-0.806	0.696	1.069	-0.341	-0.315	-0.493
S. Freud	-0.090	-0.093	-0.976	-1.738	-1.320	-2.259
Binet	-0.090	0.203	-1.852	1.318	1.093	-0.394
Sherrington	1.075	0.400	0.680	-0.603	1.093	-0.591
Dewey	-0.627	-0.882	-0.489	-0.778	-0.918	0.194
Janet	-0.985	-0.586	-1.463	-1.738	-0.315	-0.198
J. Cattell	0.179	0.400	-0.294	0.619	0.490	-0.493
Külpe	-0.358	0.696	0.290	0.183	1.294	0.587
Spearman	0.090	0.696	-0.781	1.754	1.294	0.587
Titchener	-0.806	1.583	1.069	-0.428	1.998	1.372
Woodworth	-0.179	0.104	0.290	0.270	-0.516	-0.296
Angell	-0.896	-0.488	-0.197	-1.040	-0.013	1.372
Adler	-1.075	-0.981	-1.755	-0.778	-1.622	0.391
Cannon	0.448	0.104	0.388	-0.079	0.389	-1.474
McDougall	-1.433	-1.671	-0.878	-0.778	-1.722	-1.572
Thorndike	0.985	0.794	0.096	0.445	-0.415	0.096
Jung	-1.433	-0.586	-1.657	-1.302	-1.622	-1.769
Terman	-0.000	0.203	-1.560	1.667	0.490	-0.591
Watson	2.239	1.090	0.777	0.532	-0.114	1.078
Goldstein	-0.896	-2.164	-0.878	-1.476	0.087	-0.689
Wertheimer	-0.448	-1.573	1.069	-1.214	1.495	-0.296
Rorschach	-0.896	-0.290	-1.949	0.095	-0.516	-0.198
Hull	1.433	1.189	1.362	0.794	-0.717	1.176
Horney	-0.448	-0.488	-0.976	-0.778	-0.717	0.391
Koffka	-0.716	-1.671	1.848	-1.127	0.691	-0.493
Guthrie	1.343	0.992	0.485	-0.079	-0.214	0.194
Tolman	0.448	-0.784	0.777	0.794	-0.717	0.293
Köhler	-0.537	-1.770	1.751	-1.127	0.791	-0.787
Thurstone	0.358	0.893	-0.489	1.929	0.289	-0.198
Lewin	-0.000	-1.474	0.680	-0.079	-0.516	0.783
Lashley	0.985	-0.192	1.069	0.183	0.289	-0.591
Sullivan	-0.448	-0.488	-0.781	-1.214	-1.420	0.783
Piaget	-0.985	-0.784	-0.197	-1.040	-0.315	-0.296
G. Allport	-0.896	-1.671	-1.365	-0.690	-0.918	-0.100
Rogers	-0.627	-1.474	-0.976	-0.603	-0.817	1.176
Brunswik	0.090	-0.586	0.290	0.445	0.188	0.194
Skinner	1.791	1.189	1.069	0.445	0.188	2.648
Hebb	0.806	0.400	0.485	0.794	-0.817	-0.885
Harlow	1.343	0.400	0.485	0.532	-0.616	0.096
Spence	1.881	1.781	0.972	1.492	-0.616	1.176
Mowrer	-0.179	0.301	0.388	-0.516	-1.521	0.882
N. Miller	1.522	0.696	0.485	1.056	-1.018	0.783
Estes	2.418	1.485	1.362	2.104	0.590	1.176

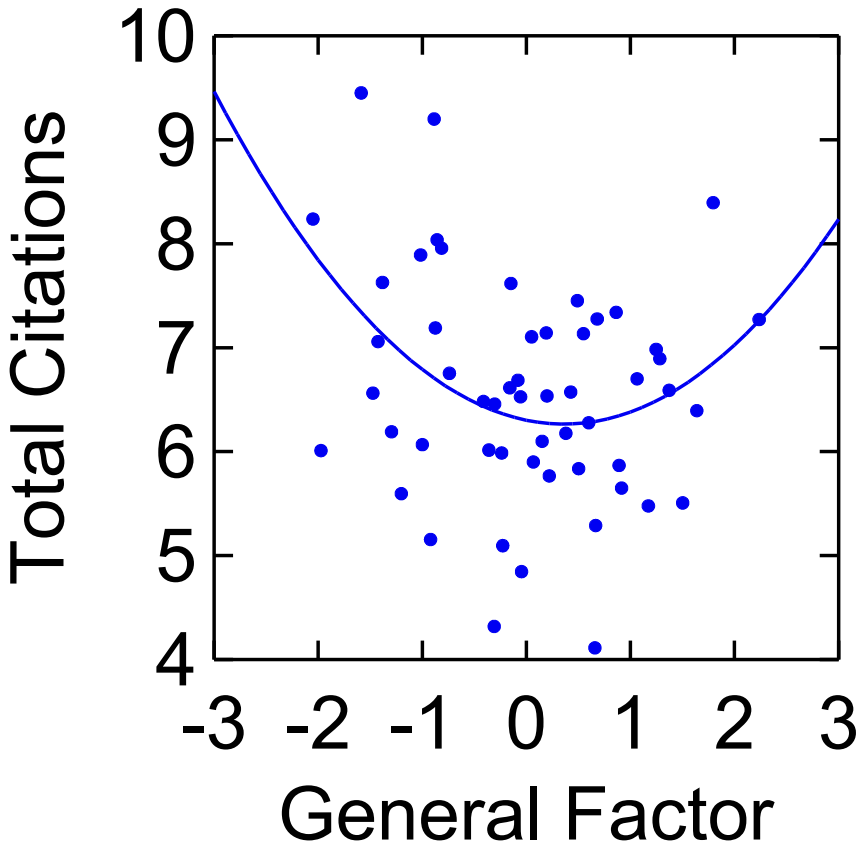
***Note*. All factor scores standardized to a mean of 0 and a standard deviation of 1 (i.e., *z* scores). See text for the labels for the negative pole of each bipolar dimension. The standardized scores were computed from T-scores reported in Coan (1979).**

As the original researcher (Coan, 1968, 1979) pointed out, the correlations among these 6 factors are sufficiently high as to suggest the existence of one or more higher-order factors.

- In fact, the first principal component accounts for nearly half of the total variance, with no loading below .49 (Simonton, 2000b).
- This may be considered a general factor that pits elementaristic, objectivistic, quantitative, exogenist, impersonal, and static psychologists against their holistic, subjectivistic, qualitative, personal, endogenist, and dynamic colleagues (i.e., natural versus human science orientations).
- When the standardized scores on the 6 factors are summed to produce a composite measure, the resulting internal-consistency reliability coefficients (alpha) was .85 (see Simonton, 2000b, for actual scores).

All that is left to do is to see how the citation measure of contemporary influence correlates with the theoretical and methodological orientation represented by the general factor.

- This correlation was calculated after controlling for the psychologist's year of birth, so as to avoid artifacts from historical trends.
- The linear relation was negative ($\beta = -0.23$). That is, those great psychologists who adopt a human-science orientation are more likely to boast long-term impact. This tendency replicates what was found earlier in the study of eponyms (Roeckelein, 1972).
- Nevertheless, the residuals betray substantial departures from linearity, suggesting that the relation is actually curvilinear. When a quadratic function was added to the linear function, the citation measure was found to be a curvilinear, backward-J function of a psychologist's position on the natural- versus human-science dimension ($\beta = 0.26$ for the quadratic term and $\beta = -0.22$ for the linear term).
- Together these terms account for 11% of the total variance in long-term impact, with the curvilinear function accounting for slightly more of the curve than the linear function (6% versus 5%).
- The scatterplot and the best-fit quadratic curve is shown in Figure 8.1.


Total Citations
10
9
8
7
6
5
4
-3
-2
-1
0
1
2
3
General Factor

Three features of this curve deserve emphasis.

- First, the highest total citations tend to be received by those eminent psychologists who score lowest on the general factor.
    - These are psychologists inclined toward the subjectivistic, qualitative, holistic, personal, dynamic, and endogenist side of psychology.
    - Eminent figures in this group include Sigmund Freud, Jung, Adler, James, Gordon Allport, and Carl Rogers.
- Second, the next highest total citations tend to be received by those eminent psychologists who score highest on this same factor.
    - These are those who lean toward the objectivistic, quantitative, elementaristic, impersonal, static, and exogenist. Skinner, Harlow, Thurstone, and Estes are among the illustrious psychologists in this category.
- Third, psychologists situated at the bottom of the J-curve are those who have taken more moderate positions, their long-term influence evidently declining as a consequence.
    - Actually, the low point is off-center, shifted toward those who score higher than average on the general factor.
    - By applying differential calculus to the quadratic function, it can be shown that the trough of the backward-J occurs when a psychologist scores almost exactly half of a standard deviation above the mean on the general factor (i.e., 0.50).
    - In any case, the distinguished psychologists in this group are J. R. Angell, G. E. Müller, and J. M. Cattell.

Disciplinary implications of the backward-J curve.
What does Figure 8.1 tells us about the question at hand? Which type of philosophy of psychological science is most conducive to long-term disciplinary influence.
To answer, it must be first recognized that this question actually consist of two parts.

- First, why are those who score lowest on the general factor more highly cited than those who score highest?
- Second, why is the function complicated by the U-shaped curve?

First question:

- One possible response to the first question is simply that the low-scorers tend to produce more accessible work, not just for the researcher and practitioner but for the general scholarly community besides. Certainly Freud's *Interpretation of Dreams* and James' *Principles of Psychology* are far more accessible works than are Hull's *Principles of Behavior* and Thurstone's *Factorial Studies of Intelligence*. Much of this accessibility may reflect a tendency for the tender-minded or human-science orientation to be a more broadly and enduringly attractive than the tough-minded or natural-science orientation.
- However, it could also be the case that the success of the high scorers is not fully reflected in citation rates. It is in the manner of the scientific enterprise that a scientist's contributions become assimilated to such a degree that citation of their work would only be pedantic. As noted in chapter 3, much of the contemporary work on reaction times makes no explicit reference to Donders because his ideas have now entered the public domain (Goodman, 1971). Of course, the same claim might be made about those eminent psychologists who occupy the low end of this general factor. The term Oedipal complex tends to float around in the social sciences literature without specific references to any particular item in Freud's collected works. Even so, it is possible that the more personal nature of terms like these makes this assimilation toward citation anonymity less likely than happens to an impersonal term like reaction time.

Second question: What about the dip in influence seen in psychologists who fall in the middle ranges of this broad dimension? There are at least two alternative but rather divergent responses.

- On the one hand, the U-shaped portion of the curve may represent something idiosyncratic to psychology as a discipline. I already mentioned Kimble's (1984) work on psychology's "two cultures," and noted that these two cultures may reflect more fundamental contrasts in the personality traits that characterize those psychologists who typify each culture. Consequently, the U-shaped curve may simply reflect this fundamental bifurcation in the discipline. Those eminent psychologists who can boast the most long-term success are those who can be considered as exceptional exemplars of one or the other of these rival disciplinary cultures. In contrast, those who try to accommodate both sides of the division are ultimately obliged to satisfy neither, and thereby undermine their influence in the long run. This interpretation implicitly assumes that the distribution of personal attributes underlying the two cultures is bimodal rather than unimodal. If most psychologists have a basic disposition focused at either one or the other extreme, with relatively few psychologists in the middle of the distribution, then clearly the long-term reputation of the middle-of-the-roaders is going to suffer as a consequence. Admittedly, because so many psychological characteristics are roughly described by a normal distribution, the middle should represent the norm, and the associated pressure push the most influential psychologists toward the golden mean between the extremes. Even so, psychologists could represent a highly biased sampling from the larger population because there actually exists more than one psychological profession – the scientist and the practitioner – each with its own distinctive requirements with respect to the orientation of its adherents.
- On the other hand, it could be the case that this quadratic component is not unique to psychology, but rather it indicates the operation of a far more universal process underlying attributions of greatness. Certainly comparable U-functions have been identified between the historical eminence of world leaders and their personal morality or idealism (Simonton, 1984f, 1987d). Saints and sinners have an advantage over those who dwell in the ambiguous compromise between good and evil. A parallel pattern was found regarding the differential eminence of more than 2,000 thinkers who make up the Western intellectual tradition (Simonton, 1976f). This inquiry will be described in more detail in chapter 15, so may it suffice here just to note that the most influential philosophers tend to be those who took extreme stances on the major debates that have preoccupied thinkers since the times of ancient Greece. Hence, it seems that to attain durable fame (or notoriety) demands that a person stand out from the crowd by avoiding moderate views. Long-term achievement as an eminent psychologist may operate according to the same rule.

Naturally, because the most recently born psychologists in the sample were born 80-90 years ago, one might question whether the same principle operates today.

- Nevertheless, the residual diagnostics indicated that neither of the two most recent psychologists in the sample (Miller and Estes) departed in any significant manner from their earlier-born colleagues.
- In addition, there was also no consistent tendency for the errors of prediction to increase as a function of birth year. As a consequence, there is no empirical reason why we should doubt that the findings remain applicable today (Simonton, 2000b).

Before some young, aspiring psychologist rushes off to espouse extremist positions, an essential caveat must be added.

This foregoing investigation only examined the long-term impact of 54 eminent psychologists. It did not address the issue of how eminent psychologists differ from their more obscure colleagues. These two questions do not necessarily have the same answer.

In fact, many investigations have shown that the predictors need not be the same (see, e.g., R. B. Cattell & Butcher, 1968).

For example, the factors that predict whether or not a politician wins election as President of the United States are not identical to those that predict whether a President will be effective or ineffective (Simonton, 1987, 1993; Winter, 1987). In fact, sometimes what predicts success by one criterion may predict failure by another criterion.

Consequently, it would be most unwise for any ambitious psychologist to conclude that he or she must now adopt an extreme position on these dimensions in order to boast the same long-term impact as the 54 psychologists investigated here. After all, these individuals had to first make a name for themselves in the psychological science of their day (i.e., *before* the question of their long-term impact on contemporary psychology would have any meaning). That prerequisite signifies that they first fulfilled a far more fundamental requirement, namely, the need to make original contributions to the discipline.

Nevertheless, these findings do show that once psychologists have established a solid reputation, their long-term influence may be a partial function of whether they have advocated more extremist positions.

The irony here, of course, is that the truth may sometimes dwell at the mean rather than the extremes. An excellent case in point is the classic nature-nurture issue, a debate that dates at least since Galton (1874) and continues to plague the discipline today (Simonton, 1999d). Yet in the long run it may be better to claim something blatantly wrong (and thus easily attacked) than to propose a position too refined and complex for broad intellectual consumption. Insofar as the nature-nurture controversy forms an aspect of the more inclusive exogenist-versus-endogenist dimension, we can now understand why the most distinguished contributors to the discipline tend to gravitate toward the extremes. The exogenist-endogenist dimension was specifically shown to have a curvilinear, U-shaped relation with the long-term influence of these same 54 psychologists (Simonton, 2000b).

This gravitation toward the antagonistic extremes contrasts dramatically with what has been learned about great discoveries in the natural sciences. In the latter, especially in physics, it is not uncommon for the breakthrough ideas to involve a synthesis of antithetical opposites. This integrative process has been called “janusian” thinking, after the Roman god who had two faces looking in opposite directions (Rothenberg, 1987). According to the son of Nobel laureate Niels Bohr, “one of the favorite maxims of my father was the distinction between the two sorts of truths, profound truths recognized by the fact that the opposite is also a profound truth, in contrast to trivialities where opposites are obviously absurd” (Bohr, 1967, p. 328). By applying this maxim, Bohr could triumphantly claim – in his complementarity principle – that the particulate and wave theories of subatomic phenomena were *both* correct and thereby reject the exclusive either/or position that had generated so much controversy.

We are thus led to a curious paradox. Psychology’s advance as a scientific discipline may partially depend on its capacity to adopt more moderate, integrative positions with respect to certain key issues. Yet from the standpoint of the individual, the criteria for success may be diametrically opposed to this desideratum. To become the greatest of the great psychologists in the eyes of posterity, moderation may be an invariable vice. So, the long-term progress of the field may sometimes prove inconsistent with the long-term prominence of its participants. Great psychologists do not always make psychology a great science.