

Part IV. LIFE-SPAN DEVELOPMENT OF GREAT PSYCHOLOGISTS

The preceding two parts focused on individual differences. Where do these individual differences originate? Can we identify developmental factors that set certain individuals on the path toward distinction in the discipline?

Chapter 9. Family Background

The quest for developmental correlates begins in the home environment, including such aspects as socioeconomic class, religion, ethnicity, and geographical origins. Special attention is given to the possible influence of two distinct factors: birth order and traumatic experiences.

Galton's (1874) *English Men of Science* represents the first empirical study of the home environment that is most strongly associated with scientific accomplishment.

- Galton sent out questionnaires to nearly 180 Fellows of the Royal Society of London (FRS) – the first such application of the survey-questionnaire method in psychology.
- Galton was himself FRS, and knew many great British scientists personally, such as his cousin Charles Darwin.
- Perhaps as a consequence, he was able to attain a respectable response rate, obtaining a bit over 100 usable responses.
- Several of these respondents besides Galton and Darwin can claim some place in the history of psychology, namely, T. H. Huxley, W. S. Jevons, Charles Lyell, James Clerk Maxwell, and Herbert Spencer (Hilts, 1975).

Because the questionnaire asked a large variety questions about family background, it established the springboard for all subsequent research on the familial origins of eminent individuals, scientific or otherwise.

Galton's successors include such researchers as Havelock Ellis (1926), James McKeen Cattell (1910), Louis Terman (1954), Catharine Cox (1926), Edward Thorndike (1950), and Anne Roe (1953a).

Although a huge literature has thus accumulated since Galton's pioneering inquiry, relatively few studies focus on just distinguished psychologists.

Even so, the research findings are probably sufficient to justify a few generalizations about the family experiences that are most strongly linked to the emergence of great psychologists.

In particular, below I shall examine three sets of findings:

- (a) the general home circumstances in which a psychologist grew up,
- (b) the psychologist's specific birth order in the family and
- (c) the occurrence of distinctive traumatic events during the psychologist's childhood or adolescence.

HOME ENVIRONMENT

Galton himself came from an old and distinguished family. The lineage included notable religious, political, and military figures.

His father was a successful banker of sufficient means to leave Galton with a sizable inheritance, while his mother was a Darwin whose mother was the second-wife of Erasmus Darwin.

On his father's side, Galton was descended from one of the founders of the Quaker faith.

Ethnically he hailed from the majority English culture, and his childhood home was in Birmingham, a major industrial and commercial city about in the middle of England, about 110 miles from London.

To put these facts in context, let us examine how

- class,
- religion,
- ethnicity, and
- geography

might be associated with the origins of great psychologists.

Class

The Victorian England of Galton's day was a highly stratified and class-conscious society.

After all, it was during this period that Karl Marx was laboring away in London's British Museum doing his research on the class struggle.

But in the same years that Marx was writing his epochal *Das Kapital*, Galton was investigating another aspect of this socioeconomic stratification – its consequences for achieved eminence.

In fact, the very first table in *English Men of Science* is devoted just to this subject (Galton, 1874, p. 22). Of the FRS he surveyed,

- only 2% came from farmer backgrounds, and just
- 8% had fathers who were noblemen and private gentlemen, while another
- 17% hailed from fathers who were in the military or government service. Almost three fourths came from just two family backgrounds,
- 32% from the professions (law, medicine, clergy, and teachers) and
- 40% from business (bankers, merchants, and manufacturers).

Hence, Galton himself emerged from the largest single group, and 7% of the respondents came from bankers, counting Galton among those respondents. He fits right in.

Research since 1874 has replicated these findings many times.

- In Roe's (1953a) study of 64 eminent scientists, fully 53% were the sons of professional men, and not one was the son of an unskilled worker (also see Chambers, 1964; Eiduson, 1962).
- This is about the same percentage as holds for Nobel laureates in the sciences, with another 28% being the offspring of business men (Berry, 1981; also see Moulin, 1955; Zuckerman, 1977).
- Furthermore, the most highly represented professions among the laureate fathers are professors and physicians (Berry, 1981).

It is critical to recognize that these studies usually defined socioeconomic standing in terms of the father's occupation, pretty much ignoring the mother's status.

The one-sided definition merely reflects the place of women during the periods in which most of the scientists grew up.

- Almost all of these scientific luminaries came from homes where the mother occupied the traditional role of wife, mother, and housekeeper (e.g., Eiduson, 1962),
- a reality that holds for even relatively recent samples (e.g., Feist, 1993).
- Moreover, although the mothers of eminent scientists are most likely to have been employed within the home, their own background and educational level tends to be considerably above average for their gender (e.g., Eiduson, 1962; Wispé, 1965).

Hence, these mothers were obviously making significant contributions to the home environment in which the scientists experienced childhood and adolescence.

To appreciate better the role of class background in the origins of great psychologists, we must examine how class origins relates to

- the domain of achievement and
- the degree of eminence achieved.

How do class origins vary across achievement domains?

Clearly, the specific origins of eminent figures will depend on the domain in which those individuals attained eminence. Samples having a different composition than Galton's (1874) will obtain different distributions across the available classes.

- For instance, Havelock Ellis (1926) had a much broader sample of British genius, and so obtained a slightly different dispersion: 3% artisans or unskilled, 6% farmers, 6% military, 9% crafts, 19% upper class, 19% business, and 35% professional (mostly clergy, law, and medicine).
- For the Cox (1926) sample, the breakdown was as follows: 52% nobility and professional, 29% semi-professional, higher business, and gentry, 13% skilled workers and lower business, 4% semiskilled, and 1% unskilled. The percentages were very similar for the maternal grandfathers, except for a very slight tendency for the mother's father to come from lower socioeconomic strata. The corresponding figures are 42%, 35%, 19%, 2%, and 2%, respectively.

Several investigations looked at how these proportions shifted according to the domain of eminence.

- In one early study of eminent scientists and writers (Raskin, 1936), the former were somewhat more likely to come from the homes of professionals (47% vs. 41%), whereas the latter were somewhat more likely to have fathers who were semi-professionals (14% vs. 29%).
- The tendency for scientists to originate in the higher socioeconomic groups in comparison to other individuals in artistic domains has been found in other samples as well (e.g., Schaefer & Anastasi, 1968).
- But such contrasts can even appear within various types of scientific endeavor.
 - The anthropologists and theoretical physicists in Roe's (1953a) investigation were more prone to come from well-to-do homes.
 - In Terman's (1954) longitudinal study, those who entered the physical sciences and medical-biological research tended to have somewhat better educated fathers than those who became engineers, the social scientists being about average in class origins.

The latter result raises the obvious question of where the psychologists fit in this picture.

If one goes by the figures whose names are most likely to grace the history of psychology, most do indeed appear to come from the homes of professionals.

- Calkins, Fechner, Guthrie, Helvétius, Hobbes, Jung, Pavlov, Thorndike, and Wundt were all the children of ministers, priests, or clergymen;
- the Allports, Aristotle, Erikson, A. Freud, Galvani, Golgi, M. Klein, Paracelsus, Stumpf, and Vesalius were all offspring of physicians or other health professionals;
- G. S. Hall, Helmholtz, Leibniz, Piaget, Romanes, Spencer, E. H. Weber, Wertheimer, and Norbert Wiener had fathers who were professors, teachers, or other educators; and
- Averroës, Galen, Koffka, Locke, Rogers, and Skinner all hailed from homes where the father pursued some other learned profession, such as law, engineering, or architecture.

Somewhat fewer seem to have had fathers who were in business (e.g., Bettelheim, Bruner, Ebbinghaus, Galton, Münsterberg, Schopenhauer, and Spinoza) or who served in government or military positions (e.g., Comte, Malebranche, Sartre, and Alan Turing).

Fewer still emerged from the homes of skilled laborers; Bain, Diderot, Fichte, Kant, James Mill, and Socrates are among the examples.

Even fewer could be said to have come from truly impoverished or disadvantaged backgrounds. This small group includes names like C. L. Morgan, O. Rank, and Titchener.

By the same token, only a small number – such as A. Adler, Albertus Magnus, St. Anselm, Democritus, Galton, Heraclitus, W. James, Lamarck, Montessori, Murray, Plato, and Tolman – could boast status among the aristocratic or at least wealthy elite of their day.

The foregoing class distribution appears to fall in line with what might be expected from Galton's (1874) inquiry. The only important departure is that professional fathers appear somewhat more prominent than the entrepreneurial ones.

In line with this switch, of the 14 eminent psychologists in Roe's (1953a) sample, 7 had fathers who were professionals (physicians, engineers, professors, and lawyers), 4 had fathers in business (2 as

owners), 2 came from farming families, and only 1 had a father who was a skilled laborer. Hence, 50% came from professional families, and another 29% from business backgrounds.

Roe also noticed another curious fact about her 64 eminent scientists: Those who tended to think in words were more likely to come from homes where the fathers pursued highly verbal occupations, such as law, the ministry, or teaching.

Because psychology tends to favor verbalizations over visualizations, this linkage would suggest that great psychologists would also be more likely have fathers with those pursuits.

One of Galton's students and disciples, James McKeen Cattell, once expressed this association in a more autobiographical fashion: "In my statistical studies I found that one who wanted to become a scientific man had the best chance if he chose a professor or a clergyman for his father. ... My father was both a professor and a clergyman" (quoted in Sokal, 1971, p. 633). But was Cattell more famous than his less notable colleagues as a consequence of his having chosen his father so carefully?

How do class origins vary according to achieved eminence?

Even if great psychologists are most likely to originate in the homes of professionals, that is not equivalent to the assertion that they are more likely to enjoy such a background than those psychologists who failed to make an imprint on the discipline's history. The latter issue must be addressed separately.

- For example, it may simply be that persons must acquire a higher education to become a scientist, and the children of professionals are most likely to obtain a college and university degrees (West, 1961).
- In addition, the children from such backgrounds may be more likely to see the value of science as an intellectual endeavor, and display an early interest in pursuing science as a career (Datta, 1968).

Indeed, it is conceivable that certain kinds of professions, despite being "learned," might militate against a scientific mindedness most supportive of doing great science. In chapter 8 we observed the potential antagonism of the scientific and religious worldviews. "It is therefore a fact," claimed Galton (1874), "that in proportion to the pains bestowed on their education generally, the sons of clergymen rarely take the lead in science. The pursuit of science is uncongenial to the priestly character" (p. 24).

Unfortunately, the research on this question is not totally consistent.

- A secondary analysis (Simonton, 1976a) of Cox's (1926) 301 geniuses found no linear or curvilinear relation between their father's socioeconomic status and their ranked eminence according to Cattell (1903c).
- A more recent study of contemporary university scientists obtained the same result, the eminent and the non-eminent exhibiting no difference in class backgrounds (Feist, 1993).
- In contrast, one investigation actually found that the more eminent scientists in the sample were less likely to come from the higher socioeconomic strata (Raskin, 1936).
- Amplifying the confusion all the more, one study of scientists (including psychologists) discovered that the more eminent were more likely to have had professionals as fathers (Chambers, 1964).
- Another study found that eminent male psychologists, relative to matched controls, had a higher likelihood of having mothers with a high school education or better and of coming from families having three or fewer children (Wispé, 1965). Yet the psychologist's eminence had nothing to do with his father's educational level or his family's financial condition.

Until additional research clarifies matters, I believe the safest conclusion is that social class helps determine who becomes a psychologist rather than how great a psychologist a person becomes. Because Galton had a banker father, he had educational opportunities that would more likely be denied to a farmer's or a worker's child. But if the latter somehow manages to overcome those obstacles, and obtains the credentials necessary to secure suitable occupations – such as physician or professor – the socioeconomic advantage may vanish. Accordingly, many great contributors to psychology emerged from rather humble beginnings. J. P. Müller's father was a shoemaker, Hull's a poor farmer, and Maslow's an uneducated immigrant.

Religion

In chapter 8, we discussed the religious affiliations of great psychologists. But the religious practices of the adult may not be the same as the religious beliefs in which he or she grew up. Therefore, we still must treat the religious background most strongly associated with the attainment of success in the discipline.

It should come as no surprise that Galton (1874) was the first to address this question empirically. In his *English Men of Science*, he specifically examined the religious affiliations and origins of his distinguished survey respondents. Although the majority came from families that belonged to the Church of England, Galton was impressed with the large number of scientists with more uncommon religious backgrounds. "In confirmation of the assertion that the scientific men were usually brought up in families characterized by independence of disposition," said Galton (1874), "I would refer to the strange variety of small and unfashionable religious sects to which they or their parents belonged" (p. 123). Citing as examples the Sandemanians, Moravians, Bible Christians, and Unitarians among those who responded to his questionnaire, Galton could not resist noting that he found "in these returns numerous cases of Quaker pedigree" (p. 124). Besides John Dalton and Thomas Young, whom he mentions explicitly, there was the implicit case of Galton himself (albeit his mother belonged to the Church of England).

Despite the self-serving emphasis, the general conclusion remains valid: Great scientists have a higher likelihood of appearing in families that subscribe to less conventional religious faiths.

- In fact, this trend towards religious unconventionality has become accentuated in the 20th century: Eminent scientists are far more likely than other famous personalities to have grown up in agnostic and atheist home environments (Simonton, 1986a).
- Furthermore, illustrious scientists, in comparison to their less distinguished colleagues, are less likely to have regularly attended religious services when they were children (Feist, 1993).

Because the English of Galton's day were strongly aligned with the Protestant denominations, he did not have a whole lot to say about Roman Catholics and Jews (two groups that had suffered much persecution in generations previous to Galton's own). However, subsequent researchers have focused on broader populations of scientists, permitting generalizations about how these two faiths may contribute to the emergence of great psychologists. Two conclusions have been well established.

- First, notable scientists are less likely to come from Roman Catholic homes.
 - None of Roe's (1953a) 64 scientists had such a background, for example.
 - Among eminent mathematicians, 16% claimed such a religious heritage, an increase perhaps reflecting the fact that mathematics has seldom threatened religious dogma as much as have the natural sciences (Helson & Crutchfield, 1970).
 - The Roman Catholic disadvantage even holds at the national level, for predominantly Protestant countries have a higher per-capita output of great science than do those countries where Catholicism prevails (Berry, 1981).
- Second, distinguished scientists are more likely to emerge from Jewish families (Berry, 1981).
 - Of the 64 in Roe's (1953a) study, 5 had Jewish backgrounds, or about 8%, a figure larger than their representation in the general population.
 - A survey of successful university researchers obtained the figure of 27% (Feist, 1993) while
 - a study of eminent mathematicians obtained the figure of 38% (Helson & Crutchfield, 1970).
 - Not only are Jews more conspicuous at the major research universities, but in addition the more elite the university the stronger their representation (Hayes, 1989).
 - Besides publishing more than Protestants and Catholics (Hayes, 1989),
 - Jews receive a disproportionate share of the Nobel Prizes in the sciences (Zuckerman, 1977).
 - Moreover, the advantage of having a Jewish background seems to emerge early, because Jews also exhibit impressive percentages of those future scientists who emerge in talent searches (Datta, 1967).

Of course, the contributions of Jews to psychology's history are highly conspicuous.

Ethnicity

Jews represent a people and not just a religion, Jews might just as well be considered an ethnic group. This raises the broader question of how ethnicity is connected to the attainment of greatness.

This was treated in Galton's (1874) classic survey, albeit somewhat briefly. In particular, on the basis of his FRS sample (leaving out a handful of Germans), he concluded that "out of every 10 scientific men, 5 are pure English; 1 is Anglo-Welsh; 1 is Anglo-Irish; 1 is pure Scotch; 1 includes Anglo-Scotch, Scotch-Irish, pure Irish, Welsh, Manx and Channel Islands; finally, 1 is 'unclassified'" (p. 16).

Galton (1892/1972) observed that "it is very remarkable how large proportion of the eminent men of all countries bear foreign names" (p. 413).

Empirical studies have documented the auspicious fortune of immigrants (Bowerman, 1947).

- For instance, a study of 20th century eminent personalities found that nearly one fifth were either first- or second-generation immigrants (M. Goertzel, V. Goertzel, & T. Goertzel, 1978).
- In a sample of eminent scientists, 25% were second-generation immigrants (Eiduson, 1964).
- Among distinguished mathematicians, 32% were foreign born (Visher, 1947b), and 52% were either foreign born or second-generation Americans (Helson & Crutchfield, 1970).
- One recent investigation scrutinized the origins of the most influential figures in the physical and life sciences of the United States (Levin & Stephan, 1999). Judging from citation impact and membership in the National Academy of Sciences, "individuals making exceptional contributions ... are disproportionately drawn from the foreign born" and "are also disproportionately foreign educated, both at the undergraduate and graduate level" (p. 1213).

According to the illustrious sociologist Robert Park (1928), "one of the consequences of migration is to create a situation in which the same individual ... finds himself striving to live in two diverse cultural groups." Consequently, "the 'cake of custom' is broken and the individual is freed for new enterprises and new associations" (p. 881).

The eminent psychologist Donald Campbell (1960) similarly maintained that

persons who have been uprooted from traditional culture, or who have been thoroughly exposed to two or more cultures, seem to have an advantage in the range of hypotheses they are apt to consider, and through this means, in the frequency of creative innovation. (p. 391)

These explanations would also account for the preeminence of Jews among the Christian nations in which they reside (Veblen, 1919).

Even more interesting, these accounts suggest a way that members of the native-born population can attain some of the same advantages supposedly enjoyed by immigrants and Jews: Immerse yourself in some culture besides your own.

- In line with this, Havelock Ellis (1926) observed that a very high proportion of the British geniuses he studied had spent their early years living abroad for a considerable time.
- If one does not reside in another country early in life, at least there remains the option of studying abroad. Nobel laureates, for instance, illustrate this alternative, a very high percentage having gone to foreign universities to complete their education (Moulin, 1955; also see Poffenberger, 1930).

Although Galton completed his formal education at Cambridge University, a securely English institution, perhaps his education was not really complete until he launched his significant explorations in the heart of Africa. Besides establishing his reputation as a scientist – his self-financed expedition earned him a Gold Medal from the Royal Geographical Society – Galton may have acquired a conceptual openness that he might have otherwise lacked.

Geography

The very first data Galton (1874) presented in *English Men of Science* concerned the birthplaces.

- Galton began by noting that “the birthplaces of scientific men and of their parents are usually in towns, away from the sea coast” (p. 19). Specifically, “out of every 5 birthplaces I find that 1 lies in London or its suburbs; 1 in an important town, such as Edinburgh, Glasgow, Dublin, Birmingham [including Galton], Liverpool, or Manchester; 1 is in a small town; and 2 either in a village or actually in the country” (p. 19).
 - The conclusion that great scientists are more likely to come from urban rather than rural environments has been replicated by subsequent researchers as well (e.g., Eiduson, 1962).
 - Galton also observed that “the branch of science pursued is often curious disaccord with the surrounding influence of the birthplace. Mechanics are usually hardy lads born in the country, biologists are frequently pure townfolk” (p. 19).
 - Surprisingly, Galton made no attempt to adjust his figures for population size, even though he had introduced this very correction in the analysis of the “Comparative Worth of Different Races” offered in his *Hereditary Genius* (Galton, 1869).
 - Accordingly, it is impossible to judge from these figures whether metropolitan areas are more productive of great scientists on a per capita basis.
 - Sometimes, when this adjustment is implemented, the primacy of the cities still emerges (Berry, 1981). At least this is true for those scientists who become Nobel laureates.
 - Yet other inquiries suggest that, notwithstanding the disadvantages apparently faced by those born in rural areas, birth in small towns may be more advantageous than birth in large metropolitan areas (Poffenberger, 1930).
 - “It seems that the cities are failing to produce scientific men,” noted Cattell (1910, p. 640).
- Galton’s (1874) also observed that his eminent scientists originated in certain regions of UK.
 - In particular, “an irregular plot may be marked on the map of England which includes much less than one-half of its area, but more than 92 per cent. of the birthplaces of the English men of science or of their parents” (p. 19).
 - Galton had no explanation for this geographical concentration, except to note that the area roughly corresponded to the distribution of cities.
 - Nonetheless, more than a century later it was observed that the areas that were least productive of scientific eminence correspond very closely to the areas that sent the most Puritan immigrants to New England in the first part of the 17th century (P. H. Gray, 1983). In other words, these deficient regions may represent the aftermath of a massive brain drain from the mother country to the American colonies (also see Lynn, 1979).
 - What makes this conjecture especially intriguing is the preeminence of New England among the colonies in the production of great Americans.
 - For example, Massachusetts has been far more productive of greatness than has Virginia on a per capita basis (Woods, 1911).
 - Furthermore, the university presidents who did the most for the establishment of scientific research in the United States were predominantly descendants of English families that had immigrated to New England in the 17th century (Gray, 1983).
 - Even more to the point, a detailed study of the ancestry of illustrious US scientists found that those with Puritan origins were by far the most conspicuous (Visher, 1947b).
 - Of course, as the US expanded toward the west, and with the advent of new waves of immigration, the hegemony enjoyed by Puritan New England dissipated over time (Cattell, 1933; Poffenberger, 1930). Hence, although “Massachusetts still retains its leadership in the production of scientific men,” J. M. Cattell (1910) would say in the early part of the 20th century, “it has lost ground in the course of the past seven years, while the north central states have gained” (p. 639).

- Yet some remnants may have remained even decades later. Roe (1953a) observed that relatively few of her 64 eminent scientists came from the US South.

ORDINAL POSITION

The preceding review focused on those home background factors that have received a respectable amount of empirical attention since Galton's (1874) survey.

Naturally, not every variable that attracted Galton's fancy managed to inspire the curiosity of later researchers. Among other preoccupations, Galton examined whether the parents were in harmony with respect to the four temperaments, hair color, and body type, and from a statistical analysis concluded that "there is more purity of breed in scientific men than would have resulted from haphazard marriages" (p. 29).

On the other hand, subsequent investigators have often looked at factors that attracted little or no interest on Galton's (1874) part.

One of the more curious findings is the tendency for eminent personalities to be born in the cooler months of the year (Bowerman, 1947; Huntington, 1938; Kaulins, 1979), a tendency that seems to hold for illustrious scientists as well (Visher, 1947b). I

Yet Galton did pioneer the investigation of one factor that concerns the timing of one's birth in a rather different fashion: The child's order of birth in the family.

Below I will review his empirical findings as well as those of subsequent researchers using different samples of luminaries.

Once the results are thus presented, I will examine some of the explanations for birth-order effects.

Empirical Findings

The research may be divided into three categories, depending on whether the samples consist of

- (a) eminent scientists from diverse disciplines,
- (b) great psychologists of various kinds, and
- (c) and more heterogeneous collections of historic personalities and geniuses.

The first and the last help put in context the middle category, and all three sets of findings provide a basis for evaluating alternative theoretical interpretations.

The birth order of illustrious scientists.

Galton (1874) obtained usable answers from 99 of his eminent respondents: “Only sons, 22 cases; eldest sons, 26 cases; youngest sons, 15 cases. Of those who are neither eldest nor youngest, 13 come in the elder half of the family; 12 in the younger half; and 11 are exactly in the middle” (p. 33). Hence, nearly half of these scientists were eldest or only sons.

Two features should be noted about these figures, however.

- First, the numbers are expressed in terms of males only, ignoring sisters. This decision reflects the bias of Galton’s times, as well as the complete lack of women among the FRS.
- Second, Galton made no adjustment for variation in family size even though firstborns will outnumber laterborns in any sample that is heterogeneous with respect to family size.

Nonetheless, Galton later reports that “the families are usually large to which scientific men belong” (p. 36). Counting the scientist himself among their parents’ offspring, their families consist of 6.3 children, or 4.8 if Galton only counted those who attained the age of 30 years. Given these statistics, there is ample room for laterborn scientists to dominate the sample.

Later investigators have mostly replicated Galton’s results.

- Roe’s (1953a) study 39 out of the 64 eminent scientists were firstborn, 15 of these being only children. Roe further observed that of the 25 who were laterborn, “5 are the oldest sons, and 2 who were second-born are effectly the oldest during their childhoods since the older children died at birth and at age 2” (p. 71), while another was separated by an appreciable age gap from the older brother immediately before him. In fact, for 15 of the remaining laterborns, “the average number of years between the subject and his next older brother was 5” (p. 72). Hence she concluded that “most of those who are not first-born are either oldest sons, or substantially younger than their next older brothers” (p. 72). There were only 6 who do not fit this pattern.
- Another investigation that used a different sample of eminent scientists arrived at the same generalization (Eiduson, 1962). Out of 40, 5 were only children and 19 the eldest, but of the remaining laterborns, 7 saw themselves as only children because of the large age difference between them and the sibling born immediately before.

Like her unmentioned predecessor, Roe (1953a) did not explicitly control for family size. Even so, the primogeniture effect emerges when such control is implemented.

- This effect still appeared, for instance, in a study of 813 scientists in six major research organizations (West, 1960) and
- in another study of 197 Nobel laureate scientists (Clark & Rice, 1982).
- There is also evidence that the more select is the sample of scientists, the greater is the overrepresentation of firstborn and only children (e.g., Chambers, 1964; Helson & Crutchfield, 1970; West, 1960).

To be sure, the literature is not always consistent with these conclusions.

- One recent investigation found that although laterborns were underrepresented, the eminent scientists in the sample were somewhat more likely to be lastborns (28% vs. 10%; Feist, 1993).
- In addition, among Nobel laureates, there is evidence that more recent prize recipients may actually be more inclined to be laterborns (Clark & Rice, 1982).

These inconsistencies suggest that there may be circumstances in which the effect of ordinal position can be reversed.

The birth order of great psychologists.

Galton (1874) did not break down his figures on birth order according to discipline, but Roe (1953b) did so.

- Out of the 14 eminent psychologists in her sample, 6 were born first, 3 second, 2 third, and 4 fourth, with an average family size of 3.0, a median of 3, and a mode of 5. Thus, the earlier-born children seem to hold an edge.
- Admittedly, her subsample here is rather small, but there is every reason to believe that her results are fairly typical. For instance, Table 9.1 provides the ordinal positions for some major figures in the history of psychology. Judging from this collection of representative names, it would seem that firstborns and only children again predominate.

Table 9.1

Representative Ordinal Positions

ONLY CHILD:

A. Anastasi, A. Binet, D. Broadbent, L. Carmichael, E. Erikson, H. Eysenck, J. R. Hilgard, B. Inhelder, C. Jung (until 9), G. W. Leibniz, J. Locke (older brother died in infancy), C. Mayo, B. Milner, M. Montessori, M. Riech, J. P. Sartre, E. S. Spelke, H. Spencer, W. Stern, H. S. Sullivan (2 older brothers died in infancy), S. Taylor, M. F. Washburn.

FIRST BORN OF:

2, Avicenna, S. Bem, R. Benedict, C. M. Bühler, B. S. Burks, C. Burt, J. M. Cattell, M. Clark, Galileo, E. Gibson, M. R. Harrower, C. Hull, A. Kinsey, M. Mead, W. R. Miles, C. S. Myers, B. L. Neugarten, C. Osgood, M. K. Phipps, S. L. Pressey, J. E. Purkinje, W. Reich, R. Sears, B. F. Skinner, J. T. Spence, B. R. Strickland, L. L. Thurstone, A. Treisman, H. C. Warren; 3, D. Dix, J. Dollard, J. Gibson, G. S. Hall, R. Helson, L. S. Hollingworth, J. Piaget, T. G. Thurstone, E. H. Weber, B. L. Wellman, L. Witmer, R. S. Woodworth (by mother); 4, E. S. Berscheid, J. Drever, C. H. Graham, D. O. Hebb, H. Helmholtz, L. J. Martin, L. Tyler, G. Watson, J. Wolpe, P. Zimbardo; 5, F. Brentano, M. Calkins, A. Gesell, E. Guthrie, W. James, C. Ladd-Franklin, I. Pavlov, P. Pinel, C. E. Seashore, R. Yerkes; 7, J. W. Goethe, A. Maslow; 8, S. Freud (3rd of father); 9, L. M. Gilbreth; ?, P. Abélard (oldest son), G. Berkeley (oldest son), Albertus Magnus, Maimonides.

MIDDLE CHILD:

2/3, M. E. Bernal, R. B. Cattell, K. M. Dallenbach, E. Frenkel-Brunswick, J. P. Guilford, E. Hilgard, T. Hobbes, D. Hume, Q. McNemar, S. Milgram, H. Murray, T. Newcomb, B. Pascal; 2/4, F. Allport, K. Lewin, E. E. Maccoby, S. Scarr, E. L. Thorndike; 2/5, W. McDougall, J. B. Rhine, J. B. Watson; 2/6, A. Adler, J. Garcia, J. J. Goodnow; 2/8, W. Harvey, K. Marx, L. Vygotsky; 3/4, J. Dewey, H. Harlow; 3/5, N. Bayley, R. M. Elliott, E. Heidebreder, D. C. McClelland, B. Spinoza; 4/4, R. A. Hinde; 4/5, R. Descartes, P. S. Sears; 4/6, C. Rogers; 4/7, B. Rush; 5/6, C. Darwin; 6/10, F. J. Gall; 7/8, D. Katz; 8/9, D. Krech; 9/12, J. F. Dashiell; 10/11, J. D. Matarazzo; 12/14, L. M. Terman.

LAST BORN OF:

2, F. Denmark, F. A. Geldard^a (s = 9), M. Henle (with twin sister), K. Horney (4 older step-sibs), F. D. Horowitz, W. S. Hunter, A. E. Michotte, C. L. Morgan, C. R. Payton, H. Pieron, H. A. Simon, W. Wundt^a (or only child; s = 8); 3, J. R. Angell^a (s = 6), C. H. Judd, H. O. Mowrer^a (s = 15), C. W. Sheriff, E. C. Tolman^a (s = 5), M. S. Viteles; 4, G. Allport, E. G. Boring, J. Bruner^a (s = 14), H. Deutsch, K. von Frisch, M. Klein, J. Konorski, V. S. Sexton; 5, E. Claparède, E. A. Doll, Voltaire; 6, W. Bingham, A. Freud; 7, T. Aquinas, F. Galton, S. A. Kierkegaard, D. Wechsler; 8, F. L. Goodenough; 9, W. E. Blatz; 11, J. B. Lamarck; ?, N. Malebranche (youngest child).

Note. The above list comes from various sources, and not all sources agree on the ordinal position of a particular individual. The main reason for discrepancies is how to treat special circumstances, such as half-siblings and siblings who died young. I thank W. Scott Terry at the University of North Carolina at Charlotte for providing me with the raw data he used in his investigation (Terry, 1989). I also thank Rochel Gelman, Brenda Milner, Elizabeth Spelka, Shelley Taylor, and Anne Treisman for responding to my e-mail inquiries.

^aSeparated by older sibling by at least 5 years (s = actual amount of separation in years).

- Many of the individuals in the table were included in a study of 79 figures who were honored by having their life stories included in the *History of Psychology in Autobiography* (Terry, 1989). Fully 52% were either firstborn or only children, a proportion that did not substantially change across various subsamples (viz., those elected president of the American Psychological Association, selected for membership in the National Academy of Sciences, or honored with APA's Distinguished Scientific Contribution Award). It was also shown that the proportion exceeds what would be expected according to the frequency distributions of the ordinal positions in their families.
- This correction is obviously important, especially since eminent psychologists tend to come from somewhat smaller families than do their less distinguished colleagues (Wispé, 1965).

Other investigations have obtained the same hegemony of the firstborn and only child among notable contemporary psychologists (e.g., Gupta, Gilbert & Pierce, 1983; Helmreich et al., 1980). Indeed, two additional findings are worth noting.

- First, one investigation found that the advantage was even greater for women than for men, by a contrast of 62% to 54% (Helmreich et al., 1980).
- Second, even after introducing the necessary statistical controls, the asset of primogeniture is reflected in the rates at which psychologists are cited in the professional literature (Helmreich et al., 1980).

Hence, firstborns and only children not only tend to outnumber the laterborns, but prove to have more contemporary impact on the discipline of psychology.

Nevertheless, it must be emphasized that the percentages reported above only represent statistical tendencies. As is immediately obvious from inspection of Table 9.1, there are many exceptions to the rule. The nomothetic principle operating here is fundamentally probabilistic rather than deterministic; ordinal position is not destiny.

Yet it is also conceivable that whenever there exist deviations from some statistical expectation, those outliers may reflect the operation of some other nomothetic regularity that functions independently of the one that generated the expectation.

One such principle has already been discussed, namely the intrusion of large age gaps that can convert a biological laterborn into a functional firstborn or only child.

Another possible complicating factor may be subtler. Perhaps the impact of ordinal position depends on the domain of achievement, some domains actually showing an advantage for those appearing later in the family lineup. To determine whether this actually happens requires that we look at studies that examine populations besides just scientists and psychologists.

The birth order of famous personalities.

At first glance, the primogeniture effect appears to be a universal phenomenon that is by no means confined to science and psychology.

- In one study of 1000 Americans who had achieved distinction in a diversity of fields, the eldest child appeared at a rate that was 172% larger than statistical expectation (Bowerman, 1947).
- A similar study of 227 famous Scots of the 19th century discovered that the eldest made up almost half of the total, even though they typically came from families with 4 to 5 children (Bullough, Bullough, Voight, & Kluckhorn, 1971).
- These statistics have not changed appreciably in samples consisting entirely of 20th-century notables (Goertzel, Goertzel, & Goertzel, 1978).
- The asset of primogeniture even appears to hold for more narrowly defined populations. Firstborns are overrepresented among classical composers (Schubert, Wagner, & Schubert, 1977), among astronauts and aquanauts (Helmreich, 1968), among representatives to the US Congress (Zweigenhaft, 1975), and even among First Ladies – and especially those women who are associated with highly powerful US Presidents (Simonton, 1996c).

Despite this seeming monopoly, the data also reveal that the effect of ordinal position is not always so simple.

- When Havelock Ellis (1926) scrutinized the birthorder of his British geniuses, the youngest children had an edge over middle children, even if both categories of laterborns were less frequent than the firstborns (also see Altus, 1966).
- A comparable pattern was found among Terman's (1925) sample of intellectually gifted children: Although the firstborn and only children were the most prominent, among those who came from large families the youngest actually outnumbered the middleborn children.

Hence, the effects of ordinal placement in the family do not necessarily operate in a linear fashion.

Even more critical is the fact that some types of achievement are more likely to be occupied by laterborn and lastborn children.

- For instance, highly charismatic US presidents are more prone to be laterborns (Simonton, 1988f).
- Moreover, although eminent scientists are more likely to be firstborns, eminent creative writers are more likely to be laterborns (Bliss, 1970; also see Eisenman, 1964).
- Even more telling, there is abundant evidence the firstborn preeminence in the sciences has a significant qualification: The laterborns display a higher likelihood of becoming revolutionary scientists – those who overthrow the accepted scientific paradigms of their data (Sulloway, 1996).
- What makes this finding most provocative is that a similar finding has been found in the realm of politics: Revolutionaries who aspire to overthrow status quo governments are also more likely to have been laterborn children (L. Stewart, 1977, 1991; Walberg, Rasher, & Parkerson, 1980).

So both intellectual and political revolutions may constitute laterborn forms of high achievement.

Theoretical Interpretations

What theory can possibly account for the prominence usually enjoyed by the firstborn child while at the same time accommodate these apparent departures?

When is eldest best?

Although Galton (1874) himself was a lastborn child, he was willing to consider the weight of the evidence obtained from his survey.

- Accordingly, he felt compelled to offer some explanation. Galton believed that “the elder sons have, on the whole, decided advantages of nurture over the younger sons” (p. 34). He specifically speculated that the eldest “are more likely to become possessed of independent means, and therefore able to follow the pursuits that have most attraction to their tastes; they are treated more as companions by their parents, and have earlier responsibility, both of which would develop independence of character” (pp. 34-35).
- This advantage would cut across socioeconomic class as well, because “the first-born child of families not well-to-do in the world would generally have more attention in his infancy, more breathing space, and better nourishment, than his younger brothers and sisters in their several turns” (p. 35).

In line with Galton’s speculations,

firstborns are not only more likely to attend college, but in addition they are more likely to be enrolled at highly prestigious colleges (Altus, 1966).

Furthermore, performance on intelligence and academic achievement tests tends to decline as a function of ordinal position (Zajonc, 1976).

Robert Zajonc (1976) has explained this trend in terms of the superior intellectual stimulation afforded those born earlier in the family. Not only is this position compatible with Galton’s views, but, in addition, Zajonc’s theory holds that a large age gap between a youngest child and his or her older siblings would make that child more like a firstborn in the level of intellectual stimulation.

Galton’s (1874) speculative account also suggests that birthorder may affect the development of personality traits, such as “independence of character,” which Galton believed was crucial to the attainment of eminence.

Alfred Adler (1938), the distinguished founder of individual psychology, also thought that birthorder shaped personality development, but in a somewhat different manner – the dethroned king.

Adler’s theory explains why firstborns tend to do very well in school, and go on to graduate from elite institutions (Altus, 1964).

According to Stanley Schachter (1963), the noted social psychologist, this educational repercussion alone could account for the preeminence of the eldest child among the great.

In addition, if the eldest are truly so preoccupied with obtaining recognition, they will surely do whatever they can to attract the attention of their colleagues.

This approval-seeking behavior may help account for the higher citation rates claimed by those firstborns who become psychologists (Helmreich et al., 1980).

Of course, those well-educated firstborns who do not become scientists or psychologists may achieve distinction in some other profession instead.

For example, they may become lawyers, enter politics, and become respected leaders.

Whatever the specific route, the eldest children will, one way or another, come out on top, obtaining the praise and acclaim they so eagerly sought ever since they were first dethroned by a younger sibling.

Adlerian theory also addressed the other ordinal positions. Although the youngest children are often spoiled by their parents, their lowly position in the sibling pecking order means that they frequently acquire potent feelings of inferiority, and thus end up with severe adjustment problems later.

Only the middle child experiences the ordinal position most optimal for personal development.

When is youngest best?

Frank Sulloway's (1996) recent book *Born to Rebel* offered an alternative developmental theory that also places major emphasis on this factor.

However, Sulloway's starting point was not Adler, but rather Charles Darwin and Darwinism.

Essentially, Sulloway wanted to understand why Darwin's 1859 *Origin of Species* provoked so much scientific controversy.

Sulloway observed that the controversy that whirled around Darwinism seemed to center very little on data or deduction. Instead, the differences hinged more on personality. Specifically, Sulloway surmised that the reception of Darwin's ideas reflected individual differences in openness to experience.

Given this conjecture, Sulloway sought the developmental source for the cross-sectional variation on this personality factor.

He believed he had found it in the scientist's ordinal position in the family. That is, on the average, the later a child appears in the birth sequence, the stronger that child's disposition on this factor.

There are three features of his explanation that deserve special emphasis:

1. Sulloway's theory is rooted in Darwinian theory. Sulloway viewed sibling competition as a critical feature in personality development. Each child in a multiple-child family must compete for the attention and resources of his or her parents. For the most part, this rivalry means that each child must find his or her special niche in the family. Unfortunately for the laterborns, the firstborn gets the first shot at the most privileged niche, which entails the early identification with parental authority and the fulfillment of parental aspirations. Denied this special status, the laterborns are obliged to carve their own niches, with the result that they must remain more open to environmental possibilities and personal potentials, including more unconventional options. This developmental thrust can explain many of the domain contrasts in the ordinal positions that were noted earlier (Simonton, 1999b). While the firstborns become conventional scientists and status quo politicians, the laterborns become the revolutionary scientists, charismatic presidents, and political revolutionaries. And where the firstborns enter a more traditional career like composing classical music, the laterborns pursue the more venturesome life of the artist or creative writer. Indeed, according to a study conducted by Richard Nisbett (1968), laterborns are even more likely to enter such high-risk activities as dangerous sports.
2. Sulloway's (1996) theory is far too sophisticated to rely on birthorder as the sole factor in the explanatory framework. On the contrary, his theory incorporates multiple developmental variables that combine in a complex manner to yield nonadditive and nonlinear consequences. In particular, his theory includes age gaps between adjacent siblings, gender, race, innate shyness, parent-offspring conflict, early parental loss and surrogate parenting by older siblings, and special friendships. The theory also recognizes the existence of different types of revolutions, including those that are conservative or reactionary in nature. Furthermore, all of these factors are not introduced post hoc, but rather follow from his Darwinian theory of personality development.
3. Sulloway (1996) actually gathered an awesome amount of data to test his theoretical model of birthorder effects. All told, he analyzed "121 historical events, which encompass biographical data on 6,566 participants. These 121 events include 28 revolutions in science, 61 reform movements in American history, 31 political revolutions and the Protestant Reformation" as well as "a database on U.S. Supreme Court voting behavior, which includes biographical information on the 108 justices to date" (p. 376). Statistical analyses show the same tendency: Laterborns are much more likely to be the first to endorse revolutionary ideas (even after introducing correction for the fact that laterborns outnumber firstborns in the population). The firstborns, in contrast, are more likely to support conservative movements, or to join revolutionary movements once they have already been well established by laterborns. In the case of the Darwinian revolution, for example, the laterborns were almost 5 times more likely to support evolution by natural selection than were the laterborns.

Sulloway (1996) scrutinized several scientific controversies that are obviously germane to the history of psychology.

TRIALS AND TRIBULATIONS

“When Heaven is about to confer a great responsibility on any man, it will exercise his mind with suffering, subject his sinews and bones to hard work, expose his body to hunger, put him to poverty, place obstacles in the paths of his deeds, so as to stimulate his mind, harden his nature, and improve wherever he is incompetent” (quoted in Chan, 1963, p. 78).

The history of psychology is replete with major figures who likewise emerged out of exceptional adversity.

- Both Abraham Maslow and Henry Stack Sullivan had extremely troubled relationships with their respective mothers (the former even refusing to attend her funeral).
- Many were frail or sickly as children, including Rene Descartes, Blaise Pascal, Thomas Hobbes, Johann Friedrich Herbart, Auguste Comte, William James, Alfred Adler, Carl Rogers, and Cyril Burt.
- Those plagued with tuberculosis included Baruch Spinoza, Dorothea Dix, Lewis Terman, and Albert Camus.
- Many had to endure some physical or cognitive disability, such as polio (Clark Hull), spinal malformation (Nicholas de Malebranche), asthma (John Locke), vision problems (Socrates and Jean Paul Sartre), or such speaking difficulties as stuttering (Henry Murray), stammering (Ruth Benedict), or lisping (Anna Freud).
- Sometimes the person suffered from the stigma of being exceptionally unattractive, like was the case for Socrates and Bruno Bettelheim.
- Other times the stigma was less public, yet no less powerful, such as Sullivan’s struggles with his homosexuality at a time when such a sexual orientation was socially unacceptable.

But especially conspicuous are the number of cases where the individual lost one or both parents at an early age, as illustrated in Table 9.2.

Table 9.2

Instances of Early Parental Loss

Philosophers: R. Descartes (m 0), J.-J. Rousseau (m 0, f 10), Montaigne (m 0), J.-P. Sartre (f 1), D. Hume (f 3), B. Russell (m 2, f 3), F. Nietzsche (f 4), G. W. Leibniz (m 18, f 6), B. Spinoza (m 6), Voltaire (m 7), T. Hobbes (f childhood), M. Merleau-Ponty (f childhood), G. W. F. Hegel (m 11), J. Bentham (m 12), I. Kant (m 13), A. Schopenhauer (f 17), F. Bacon (f 18), St. Thomas Aquinas, Aristotle, St. Augustine, Montesquieu.

Scientists: I. Newton (f 0), R. Benedict (f 2), P. Sorokin (m 3, f 11), B. Pascal (m 4), B. Rush (f 5), Paracelsus (m small boy), A. Quetelet (f 7), C. Darwin (m 8), N. Copernicus (f 10, m early age), C. S. Sherrington (f child), J. B. Lamarck (f 16).

Psychologists: E. Erikson (f before birth), A. Anastasi (f 1), M. Rioch (f 1), H. Hollingworth (m 1), L. Hollingworth (m 4), G. T. Fechner (f 5), C. Osgood (f 6), H. Eysenck (m, f when young), J. Cohen (f when young), W. S. Hunter (m 12), C. Ladd-Franklin (m 12), J. Bruner (f 12), R. Perloff (f 12), H. Rorschach (m 12, f 18), J. B. Watson (f 13), W. Wundt (f 14), E. Hilgard (f 14), E. Loftus (m 14), E. H. Weber (m 16), M. Klein (f 18), H. Münsterberg (m, f before 20).

Note. Loss through death or other form of separation, such as divorce or abandonment (when known, f = father, m = mother, following integer = age).

The loss may have entailed either actual death or some other dramatic and enduring absence, such as abandonment (e.g., Hobbes).

However, more chronic forms of parental loss are also possible.

- Otto Rank's father was an incorrigible alcoholic, and Karen Horney's father, a sea captain, was absent so much that she felt that she was fatherless.
- Moreover, sometimes the parents, though present, were emotionally remote, as was the case for Carl Jung and Wilhelm Wundt.

And yet, it must be admitted that not every eminent psychologist had to pass through such severe rites of passage. B. F. Skinner grew up in a warm, stable family environment, and R. B. Cattell claimed to have had a happy childhood. Francis Galton led a very contented life at home until he was shipped off to boarding school. These counterexamples oblige us to examine the available empirical data more systematically.

Empirical Results

Galton (1874) did not address this question in his *English Men of Science*. Perhaps it was an issue too delicate to inquire about in an impersonal questionnaire, especially in Victorian times, when private matters were usually protected by the rules of decorum.

- So the first to broach the topic was Havelock Ellis (1926), who noted the high frequency of “constitutional delicacy” in the early lives of his sample of British genius.
- Decades later, Roe (1952a) made a compatible observation about her 64 eminent scientists, a large proportion having spent their childhood suffering serious illnesses or physical handicaps – the theoretical physicists in her sample distinctively so.
- A totally different study of 400 eminent personalities found that about one quarter had to compensate for some disability (Goertzel & Goertzel, 1962).
- Unhappy childhoods can arise from other causes as well, such as family economic difficulties, including periods of outright poverty (Berry, 1981; Goertzel & Goertzel, 1962; Raskin, 1936).

Nonetheless, the bulk of the empirical research has concentrated on the high incidence of partial or complete orphanhood (i.e., the loss of one or both parents prior to attaining majority).

Several studies suggest high orphanhood rates for eminent personalities, with rates ranging around 25-50% (Eisenstadt, 1978; Illingworth & Illingworth, 1969; Walberg, Rasher, & Parkerson, 1980).

- Thus, an analysis of the luminaries in the Cox (1926) sample revealed that about one quarter suffered parental loss prior to attaining adulthood (Albert, 1971).
- Some evidence also exists that parental loss is to be found at elevated frequencies among distinguished scientists (Eiduson, 1964; Silverman, 1974).
- For instance, Roe (1953a) noted that “one of the first things that stands out is the frequency with which these subjects report the death of a parent during their childhood” (p. 84). The specific figure was 15%.
- Another inquiry that looked at historical rather than contemporary scientists – including notables like Copernicus, Descartes, Pascal, Newton, Leibniz, Quételet, and Maxwell – found that they typically lost their mother around age 4 or their father around age 7 (Silverman, 1974).
- Among 32 famous mathematicians, moreover, one quarter lost a parent before age 10 and almost one third suffered parental loss before the age 14 (Bell, 1937).

However, others have argued that when the figures are compared against the most appropriate baselines, the supposed orphanhood effect disappears (e.g., Woodward, 1974).

Although suitable comparison groups have been identified for certain domains of achievement, such as political leadership (Berrington, 1974; Simonton, 1988f), this has not been adequately attained for samples of eminent scientists, including psychologists.

Complicating the picture all the more is the fact that the magnitude and frequency of various trials and tribulations varies according to the achievement domain.

- Unhappy childhoods are much more common among artistic creators than among philosophers or scientists (Post, 1994; Simonton, 1986a).
- This contrast holds across different specific sources, such as poverty or orphanhood (Berry, 1981; Brown, 1968; Eiduson, 1964; Raskin, 1936).
- For example, those writers who receive the Nobel prize for literature are far more likely than laureates in the sciences to have “either lost at least one parent through death or desertion or experienced the father’s bankruptcy or impoverishment” (Berry, 1981, p. 387).
- Complicating matters yet more is the variation within distinct scientific activities. Among Roe’s (1953a) 64 scientists, for instance, 25% of the biologists lost a parent by death before age 10, but this was the case for only 13% of the physical scientists and 9% of the social scientists.
- Although the last statistic seems to hint that great psychologists have more happy childhoods than do great scientists in general, other empirical findings confound this simple conclusion. One study found that eminent psychologists, relative to other scientists, tended to come from homes in which their fathers were more emotionally remote and their parents less accepting of them (Chambers, 1964).

Theoretical Explanations

So what are we to make of the foregoing findings? One possibility is simply to reject altogether any statement that the results have any relevance for our scientifically informed history of psychology. Even so, it may stimulate future research on this question to review some of the offered explanations. These theoretical interpretations may also help direct such research toward more fruitful lines of inquiry. That in mind, the following three accounts deserve attention.

- First, various trials and tribulations in early life may make an enduring contribution to a youth's motivational development. For instance, it has been suggested that the loss of a parent in early life instills a "bereavement syndrome" which propels the individual on a life-long journey toward compensation (Eisenstadt, 1978). One difficulty with this explanation is that it requires that the child or adolescent actually experience bereavement, something that is not always safe to assume. But see Newton and Darwin. A final drawback of the bereavement explanation is that it only applies to one particular class of highly traumatic events – the loss of a loved one. Hence, other features of an unhappy childhood, such as being sickly or poor, would need some other theoretical interpretation.
- The second explanation would include a wider range of untoward circumstances, but still emphasize motivational development. Perhaps all those trials and tribulations, both big and small, help build a personality that has the determination and persistence essential for long-term success (Simonton, 1994a). As already noted, the life and career of any outstanding creator is full of obstacles and setbacks; an exceptional success may be succeeded by an equally phenomenal failure. Therefore, early and frequent encounters with various frustrations and difficulties may facilitate the growth of an individual who has the requisite robustness or hardiness. This interpretation can account for the diversity of hapless experiences. It might also accommodate the contrasts observed across creative domains. Conceivably, it may require more determination and persistence to become an artistic genius than a scientific genius. In fact, those artists who fail to acquire the needed personal strength and willpower may be those inclined to succumb to alcoholism, a common side-effect of this kind of creativity. As the Welsh poet Dylan Thomas once said, "there's only one thing that's worse than having an unhappy childhood, and that's having a too-happy childhood" (quoted in Ferris, 1977, p. 49).
- The third and last explanation also handles the contrasts across creative domains, but does so by emphasizing the impact that an unhappy childhood might have on cognitive development (Simonton, 1999b). This theory is predicated on a Darwinian model of the creative process first put forward by Donald Campbell (1960) and further elaborated by Hans Eysenck (1995). In essence, this theory assumes that: (a) creativity entails a variation-selection process; (b) different domains differ in the degree of variational freedom that they require, scientific creativity being more constrained than artistic creativity; and (c) a creator's capacity to produce relatively unrestricted variations is a partial function of the diversity, richness, and novelty of the experiences he or she had to assimilate in childhood and adolescence. Hence, the primary importance of the various trials and tribulations is simply that they are different from what most people encounter during development. These diversifying experiences serve to expand the range and variety of the variations that they can generate. But because artistic creators require greater spontaneity in their variations, they should have encountered more diversifying stimulation in youth, precisely as the data suggest. Notice that this third explanation can also account for cases like Newton and Darwin.

One's childhood can indeed be excessively unhappy as well. The eminent are not the only people who might have traumatic experiences in their early years. The rates of parental loss are also high among such unfortunate groups as juvenile delinquents, suicidal depressives, and homeless persons (Eisenstadt, 1978; Roe, 1953a).

At the same time, the magnitude of trauma that a potential talent can accommodate may partly depend on his or her inherent hardiness. Unhappy experiences that might set one person on an upward path to glory might condemn another on a downward path to oblivion. This contingency was suggested by the English novelist Samuel Butler (1903/n.d) in his *The Way of All Flesh*:

In quiet, uneventful lives the changes internal and external are so small that there is little or no strain in the process of fusion and accommodation; in other lives there is great strain, but there is also great fusing and accommodating power; in others great strain with little accommodating power. A life will be successful or not according as the power of accommodation is equal to or unequal to the strain of the fusing and adjusting internal and external changes. (p. 288)

Hence, the greatest psychologists may be those who experienced life challenges that were well matched to their constitutional capacity to cope constructively rather than destructively.

This latter suggestion leads to one last observation.

- Shortly before we noted how distinguished psychologists were more likely to have distant and unsupportive relationships with their parents, especially their fathers.
- Perhaps as a reaction, these same psychologists tended to have more unfavorable and rebellious attitudes toward their parents (Chambers, 1964).
- These results also are compatible with what Roe (1953a) reported about her social scientists on the basis of their performance on projective tests: In comparison to other eminent scientists, they appeared especially hostile and overly concerned about social relationships.

These results suggest that great psychologists may enter the field to work out some personal issues that originated in some less than favorable family circumstances. The life and work of Carl Rogers may best illustrate this possibility.