

DETERMINANTS AND CONSEQUENCES OF CREATIVITY IN A COHORT OF GIFTED WOMEN

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Forty women who had been selected by Lewis Terman in 1921 for his study of intellectually gifted California school children were reinterviewed in 1987 (Mean = 77 years, $SE \pm 1$). These women had been prospectively followed by questionnaire over the intervening 65 years. Their capacity for creativity—putting something in the world that was not there before—was assessed by review of their prospectively gathered questionnaires and by retrospective interview. The 20 women viewed as most creative (usually for literary publication, art, music, or starting an organization) were more likely in the past to have manifested generativity, and at the present to have adjusted well to old age. Although the ego defenses of sublimation, humor, and altruism were more frequent among the creative women, no differences were noted in the happiness of their childhoods or their mental health prior to the present.

We wish to review a study of the relative creativity of 40 gifted women prospectively studied for 65 years. But in order to study creativity, certain precautions are necessary. First, since creativity, like beauty, often lies in the eyes of the beholder, to be studied, the trait of creativity must be operationally defined. The platonic definition of creativity that we shall use is “putting something in the world that was not there before.” The research definition is described in the Methods section.

Second, in judging creativity, we must also remember the odds. For example, when we note creativity in our friends and children, we set very different standards than when we judge creativity in the outside world. On the one hand, we may regard a friend who writes poetry and in 20 years

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has come no nearer to publication than a rejection slip from *The New Yorker* as creative. On the other hand, we may believe that Sinclair Lewis and Pearl Buck were insufficiently creative to deserve their Nobel Prizes, even though the chances of winning a Nobel Prize are about 1 in 20 million. Indeed, the chances that an American, born in 1910, would ever have written a book or exhibited their art or musical expertise in a professional setting are perhaps only 1 chance in 1,000. If we assume that creativity is a direct consequence of intelligence—an incorrect assumption—and that women in America are given equal opportunity to create—another incorrect assumption—then the chances of such creativity occurring among women in the top 1% of intelligence might be 100 times better than average. By such odds, 10% of our sample of gifted women might have been expected to have written a book, or exhibited their art publicly, thus we observed. However, since no more than 1% of Terman's sample of gifted children actually supported themselves in the arts, in this article, we are assessing creativity in amateurs, not professionals.

METHODS

Sample

Between 1920–1922, Lewis Terman, a professor of education at Stanford University, attempted to identify all the children in urban California with Stanford-Binet IQs of 140 or greater (Terman, 1925). From approximately 100,000 grammar school children in the three California metropolitan areas of Oakland, San Francisco, and Los Angeles, Terman selected 1,000 children. In the next few years he unsystematically added additional gifted children until his sample grew to 1,528 children, 672 of whom were girls. Children who attended private or Chinese-speaking schools were deliberately excluded. Children for whom English was a second language were at risk for inadvertent exclusion. The sample was lower-middle to upper-middle class. Twenty percent of the Terman women had fathers in blue-collar occupations and 29% had fathers in the professions, broadly defined to include high school teachers.

From 1922–1986, Terman (Terman & Oden, 1959) and his successors, Melitta Oden (1968) and Robert Sears (1984), followed these gifted children by questionnaire (every 5 years). By age 45, due to withdrawal and loss ($N = 68$) and early death ($N = 39$), Terman's sample of women had shrunk by 16% (from 672 to 565). In 1987, from these remaining women we selected a representative 16% subsample of 90 women for reinterview. These 90 women included all the women with birthdates 1909–1913 who lived within a single metropolitan area. Socially and psychologically this group could not be distinguished from the rest of the sample.

Of these 90 women, 29 died after age 45, and of the 61 surviving participants, 13 women refused interview, the most common reason for refusal in these 75–78-year-old women was poor health. An additional 8 had not

returned their 1986 questionnaires, which we interpreted as withholding "informed consent." However, since these un-interviewed 50 women had been followed for half a century, they could be included in most of the data analysis. Except for physical health after age 70, these 50 women did not differ significantly from the 40 women who consented to interview at age 77 on any major variable, including creativity.

The 40 participating women were interviewed for 2 hours. The interviewer, kept blind to the past record, assessed each woman's current status. The recorder, who had reviewed and assessed all past data, was allowed to ask clarifying questions only in the absence of the interviewer. This interview strategy permitted each woman's present adjustment to be assessed by two raters — one of whom was blind to all prior ratings.

SCALES

Assessed by Recorder

Creativity 1 = statewide recognition for a creative product, 2 = community recognition for creativity (published papers or newspaper articles, public musical recitals or other exhibitions, or created community organizations), 3 = women with creative personal hobbies, 4 = women with little evidence of sustained creativity of any kind

Sustained Activity Outside of Home (age 45) More than 20 hours/week at meaningful work or community service outside of home or creative hobby recognized by community 1 = true, 2 = not true

Use of Leisure Time (age 45) 1 = creative, imaginative use of free time, 2 = lack of ability to play

Psychosocial Adaptation (ages 65-75) This was a global assessment of each woman contrasted with her peers on the basis of three questionnaires 1 = good, 2 = ?good, 3 = ?poor, 4 = poor

Husband's Support of Career and Outside Activities 1 = no husband or husband supportive of creative activities, 2 = husband overtly or covertly opposes wife's career, or no husband but sole support of parents

Erikson Stage <6 = never achieved intimacy, 6 = achieved intimacy (i.e., able to live with another adult in an interdependent manner for 10 years) but without career consolidation, 6a = achieved career consolidation (i.e., competence at, commitment to, and contentment from job or homemaking) but never achieved generativity, 7 = achieved generativity (i.e., sustained care and/or responsibility for the development of adolescents or of young adults or of a community organization). In 11 of the 17 cases, the tasks of intimacy, career consolidation, and generativity were achieved in sequential order. See Vaillant and Milofsky (1980) for a more detailed discussion.

Questionnaire Self-Report

No Career Plan (age 26) 1 = no, 2 = yes

Work Satisfaction (age 40) Job viewed as a major satisfaction 1 = yes, 2 = no

Joy in Living (age 60) Each woman was asked her relative satisfaction in each of 5 separate categories—family life, friendship, richness of cultural life, total service to society, and joy in living on separate 5-point scales 1 = had excellent fortune, 3 = mixed experience, 5 = found little satisfaction in category Total score could range from 5–25, and a score of 5–9 was defined as joy in living

Assessed by Interviewer

A 5-point scale was used to assess *Adaptation at Interview (ages 77–78)* 5 = unusually vigorous aging characterized by cheerful, realistic enjoyment of life, openness to new ideas, a sense of humor, an acceptance of what has been Respondent is a woman who maintains utility and reality testing, helps others, is graceful about dependency, is willing to take charge when appropriate and do for self what she is able, maintains hope in life, and, if physically ill, is a patient a doctor would want to have 3 = real strengths, real limitations—someone meeting about half the criteria for a 5 1 = the kind of elderly person doctors do not like as a patient and that young relatives withdraw from, a woman with moderate depression, complaining dependency, rigidity, withdrawal, timidity, and who is self-centered and unable to accept the indignities of old age Rater reliability equaled .75 (Kendell's tau *b*)

Assessed by Interviewer and Recorder

Each of 15 Defensive Styles were assessed by the recorder from ages 20–70 on the basis of the entire record and by the interviewer on the basis of the 2-hour interview 0 = defensive style was not observed, 1 = occasional use, 2 = dominant style If both independent assessors (i.e., the interviewer and recorder) saw the defense as present and at least one saw the defense as a *dominant* style, it was characterized as a *major* style If both assessors failed to note a defense, it was characterized as *absent* The definitions for repression, fantasy, sublimation, altruism, and humor, the five defenses discussed in this article, have been defined elsewhere (Vaillant, 1977) Use of the other 10 defenses (projection, turning against the self, hypochondriasis, acting out, neurotic denial, isolation, reaction formation, displacement, suppression, and anticipation) did not distinguish the two groups

RESULTS

The Terman women were precocious They had walked 1 month earlier than their schoolmates and they had talked 3 months earlier Twenty percent read before age 5, and 60% had graduated from high school at 16 or younger The high intelligence of the Terman women did not handicap

them psychologically. Rather, their mental health was demonstrably better than that of their classmates. In personality traits they showed significantly more humor, common sense, perseverance, leadership, and even popularity. Their health was also better. Compared to their classmates, they had better nutrition, better mental stability, fewer headaches, and fewer middle-ear infections (Terman, 1925). Up to the age of 80, their adult mortality has also been only half what was expected for white women in their birth cohort. Perhaps the most convincing evidence that their average IQ of 155 was not just a product of environmental privilege but based on biologic potential was the fact that 75 times as many of their children as would be expected by chance had IQs over 170 (Terman & Oden, 1959).

But the opportunities for these gifted women were filled with paradox. On the one hand, the Terman women's mothers did not have the vote until their daughters were about 10 years old. On the other hand, since California tuition was cheap (\$15-\$50 per term for both Stanford and Berkeley), 67% attended excellent colleges, and 24% of the Terman women attended graduate school. On the one hand, the Depression, which began when they were 20, and World War II, which began when they were 30, put pressures on these women to enter the workforce. On the other hand, the jobs that society permitted them were often limited in scope and opportunity. When asked what occupational opportunities World War II had opened for her, one woman with a Berkeley degree replied, "I learned to type."

On the one hand, the same proportion of the gifted women as controls married, but there the similarity stopped. For these women, successful career and childrearing were negatively correlated. Out of the 30 occupationally most successful women in the study, (top 5%), only 5 became mothers, and as a group, these 30 women produced only 7 children.

On the other hand, almost half the Terman women had full-time jobs *and* were homemakers most of their lives. (Of those with jobs, 10% were college faculty, physicians, or lawyers, 20% were office workers, and 20% were school teachers.) At age 65, only 5% of those with lifetime jobs wished they had been only housewives. In contrast, at age 65, 30% of the lifelong homemakers wished that they had *also* had a career. This evidence suggests that even in a 1910 birth cohort, gifted women preferred dual careers. However, the mean maximum annual income (\$30,000 in 1989 dollars) of the fully employed Terman women was the same as the mean income of our longitudinally studied cohort of undereducated inner-city men, 50% of whom did not complete high school and 30% of whom had IQs less than 90 (Vaillant, 1983). Admittedly, earning power is only a very superficial way of measuring the value that society places on a career. Nevertheless, it would appear that society did not fully capture the Terman women's potential to put in to the world what was not there before.

Table 1 contrasts the basic differences between the most and least creative women that we interviewed. These same differences were also ob-

Table 1
Major differences among the more and the less creative Terman women

	Creative N = 20	Less Creative N = 20
<i>Basic differences</i>		
Generative***	75%	10%
Published something***	60%	10%
Published a book**	25%	0%
Public art or music***	40%	0%
Started an organization***	55%	0%
<i>Antecedents</i>		
No career plan (age 26)	10%	30%
Work satisfaction (age 40)*	50%	20%
Active outside home at 45*	80%	50%
Poor use of leisure at 45***	30%	70%
<i>Consequences</i>		
Age 60 joy in living (subjective)**	40%	10%
Age 65-75 adaptation good (rater)**	85%	50%
Age 75-78 adaptation good (interviewer)*	65%	35%

* $p < .05$, ** $p < .01$, *** $p < .001$

served among the 50 women whom we did not interview. Of the 20 women categorized as 1 or 2 on the creativity scale, 19 had published something or had organized a community activity. The single exception was a woman who was a serious amateur painter, a community leader, a trustee of art museums, and a serious art collector. The 20 women categorized as less creative included many who had hobbies such as sewing, gardening, pottery glazing, or flower arranging, who were active in pastimes like dog shows, stamp collecting, or ornithology, or who, rather than being creative in, enjoyed *taking courses* in art or folk dancing. However, their creative efforts were not known to have affected others outside their immediate family and close friends.

In Table 1 the link between creativity and generativity is obvious. While there are definite theoretical differences between the creative "artist" and the creator of social organizations, the two skills tended to go together. Of the 20 women deemed creative, 5 of the 20 had *both* published or given public recitals and started a community organization. When young, the creative women had been more interested in accomplishing an active life for themselves outside the home. Table 1 reveals that at age 26 they were less likely to be without career plans and at 40 more likely to enjoy their job or homemaking. At age 45, they were more likely to be engaged in some

activity—occupational, volunteer, or creative—that took them outside of their homes. The creative women—many of whom had been chosen for creativity at work—appeared also to make more imaginative use of leisure time than women who just had creative hobbies.

There were many ways by which women in the high and low creativity groups could *not* be distinguished. For example, there were no differences between creative and less creative women in intelligence as measured by the Binet in childhood or by the Concept Mastery Scores (analogous to the Graduate Record Exam) in middle life. Differences in creativity were not significantly correlated with years of mother's or father's education, social class, number of books in their childhood home, or parental support for a career. Creativity, however, was facilitated by either having a supportive husband or being without a husband *and* not being the sole support of parents. About half the women in each of the two groups had no education beyond college, and in adult life, about half the women in each group confined their reading to popular magazines and light fiction.

With the exception of increased happiness and generativity, there were no differences between the two groups on measures of mental health. The creative women did not show greater subjective estimation of their physical health, or greater recollected happiness in childhood. Marital happiness and mental health (assessed in several different ways) prior to age 65 did not distinguish the two groups of women. Creative women were neither less likely, nor more likely, to be "psychiatric cases." However, poor mental health and poor education *were* both associated with allowing oneself no creative outlets at all.

Among the 20 most creative women were 9 women who continued to "put things in the world" after the age of 65. Among them was a previously inhibited writer who after 75 became the editor of a small newspaper. There was a woman who published her first serious book at 65, another woman whose public literary achievements peaked at 75, 2 women who were more serious graphic artists after 60 than they had ever been before, and 2 women who had, after 60, been able to give their first public musical recitals. Still another woman won her first sculpture prize after 70. We believe, but cannot prove, that this upsurge was more a reflection of their escape from prior societal inhibition than it was evidence that creativity normally peaks in late life.

Table 1 documents that the creative women displayed more vigorous aging in other ways. The table notes a difference in *joie de vivre* between the two groups. At 60, the creative women were more likely to express joy in living. Both the recorder, on the basis of recent questionnaires, and the interviewer perceived the creative women as making a more vigorous adaptation to old age.

Table 2 suggests that the choice of ego defenses sharply distinguished the two groups of women. As Freud (1916–17/1964), in his *Introductory Lectures*, would have predicted, repression was less frequently noted among

Table 2
Differences in ego mechanisms of defense between the
more and less creative women

	<i>Creative</i> N = 20	<i>Less</i> <i>Creative</i> N = 20
Altruism, humor, or sublimation major defense***	85%	15%
Sublimation major defense***	55%	0%
Repression absent	65%	40%
Fantasy absent	80%	50%

*** $p < .001$

the creative women. The difference, however, was not statistically significant due to small numbers. As Freud also suggested in the same text, the creative person "understands how to work over his [or her] daydreams in such a way as to make them lose what is too personal about them and repels strangers and how to make it possible for others to share in the enjoyment of them" (p. 376). Thus, in our sample, creative women were noted to use *less* autistic fantasy than the women who were not creative. Virtually all the creative women and virtually none of the non-creative women deployed altruism, humor, and/or sublimation as a major defense. Individually, each of these three mature defenses was also more common among the creative women. Significantly, however, these three defenses were the "mature" defenses *least* highly correlated with mental health. Suppression and anticipation, two defenses significantly associated with mental health, were not more common among the creative women.

Case History

The life of Florence Knight illustrates a creative amateur and also illustrates the close relationship of creativity with altruism and generativity. Her life underscores the creativity of every day living. In college and for 10 years afterwards she had been interested in little theater and in helping advance the careers of published novelists. She admitted, "I saw it was more important to support artists than to do it myself." She next worked as a script editor and ghost writer, and in her 30s she helped to found a pioneering interracial church. As she put it at the time, she had spent "most of those last three years in intensive race relations which have helped me work out some of my own problems." As tangible evidence that her creativity was recognized by others, she was honored by being invited to work on the staff at the founding of the United Nations.

For most of her working life, Florence Knight was a teacher of journal-

ism and English in a northern California school system. The counselor, she said, "always sent me the oddballs. I like to rescue people that others turn down." She served as a judge for the prize essay contest in California high-school writing. She was nominated as one of the best teachers in the United States. Many successful journalists and students came back to thank her for her help, but after age 40, she herself did not write professionally except for unpublished short stories.

The playful and generative quality of Florence Knight's creativity was illustrated at her high-school retirement ceremony. She received not a gold watch but rather a silver bowl. Her "Janusian" response was to place her new grandson, James, inside. What a better symbol of immortality, of the link between death and rebirth, than to place her first newborn grandson in the bowl that was supposed to symbolize her retirement? Five years later, she confessed to the Study that "part of my delight with my grandson is watching my son become the kind of father than he never had." Generativity serves to facilitate others' putting in the world what was not there before.

After her retirement, Florence organized a continuing education workshop for imaginative teaching. At age 75 she presented an original and provocative paper at a statewide conference. She was still shaking up the stereotyped thinking of 30- and 40-year-old teachers. Her house was filled with good original American art. In her desk drawer was a book that she was writing but might never find the time to finish. Florence Knight was not very good at being selfish.

DISCUSSION

Our sample is small, esoteric, and from an outdated birth cohort. Our methods are those of anthropology, not academic psychology. Granted we have shown numbers—but our numbers are only adequate to make qualitative, not quantitative, distinctions. Nevertheless, our findings echo what others have noted with respect to creativity.

Although the sources of creativity will probably never be fully understood, they are multiple, complex, and fascinating. First, in some ways the ego and creativity are one and the same. As Anthony Storr (1976) wrote, "Perhaps creativity is more closely bound up with what might be called a 'dynamic of the normal' than with psychopathology, and maybe one weakness of current psychoanalytic thinking is a failure to make sufficient distinction between normal and neurotic in this context as in others" (p. 13). We would agree. Psychoanalysis, after all, is powerless to distinguish between bad art and good. And much of what we regard as psychopathology is, like coughing and fever, a "dynamic of the normal."

In addition, creativity most surely is a form of play, a means of having fun and not just a means of resolving conflict. However, we would agree with Freud (1908/1959) that "as people grow up they cease to play, and

they seem to give up the yield of pleasure which they gain from playing" (p 145) For example, only about 10% of child prodigies at art, mathematics, or music grow up to be adult virtuosos One of the most striking impressions gained from reading the 60-year dossiers of the Terman women was noticing how creative they had been as children Virtually all the Terman women were active in high school dramatics and/or editors of the school literary magazine, and in their teens dreamed of becoming artists, poets, or novelists After age 18, for most women these dreams evaporated As we read through their long case records, we watched parents sending their bright daughters out to support the family during the Depression We watched the separations and divorces associated with World War II make the Terman women into single mothers without alimony Throughout we watched the socialization of adulthood nip promising careers in the bud This was painful In contrast, the late-life flowering of these women was reassuring, and we suspect that retention of the capacity for play may be a critical ingredient for successful aging Perhaps, only adults who have not forgotten how to play are those likely to put something in the world that was not there before

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