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Comparison of Intellectually and Artistically Gifted on Five Dimensions of Mental Functioning*

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Summary.—Two talented groups (artists and intellectually gifted) and one comparison group (graduate students from various disciplines) were examined on five dimensions of mental functioning: psychomotor, sensual, intellectual, imaginal, and emotional. These dimensions constitute a model of developmental potential representing, respectively, the personal level of energy, sensual aliveness, pursuit of knowledge and truth, imagination, and life of feeling. According to this model, the strength, richness, and depth of talent are a function of the strength of these five dimensions, measured on an open-ended questionnaire. Analysis showed that intellectual talent tends to be associated with high scores on three dimensions (especially strong on imaginal and emotional). In contrast, the graduate students had lower scores on all five dimensions.

There are important characteristics of talented people which current approaches to the study of talent (Bloom, 1982; Stanley, 1976) have ignored. A number of authors have noted in talented people their heightened intensity of experience. Goertzel, Goertzel, and Goertzel (1978, p. 338) observed that the eminent as children and as adults "continue to react strongly to stimuli—sexual, esthetic, emotional, intellectual." Roe (1975) found that for many painters "visual stimulation, reaction to things seen is intense, sometimes almost painfully so." Bachtold (1980) quoted several writers: "I feel too much, sense too much, am exhausted by the reverberations" (May Sarton); "Language is a clumsy medium to express the pounding surge of intense feeling . . . Music could drive my blood and suffuse my entire being" (Malvina Hoffman.) From his study of English men of science, Galton (1872) concluded that "in a man of genius, the ideas come as by inspiration; in other words, his character is enthusiastic, his mental associations are rapid, numerous and firm, his imagination is vivid, and he is driven rather than drives himself." (p.233).

To study these characteristics we employed a model of developmental potential positing five broadly defined areas of psychic life each with many possible expressions and manifestations: psychomotor (P)—movement, restlessness, drivenness, a capacity for being alive and energetic; sensual (S)—enhanced differentiation and aliveness of sensual experience; intellectual (T)—avidity for knowledge, discovery, questioning, love of ideas and

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theoretical analysis, search for truth; imagination (M)—vividness of imagery, richness of association, facility for dreams, fantasies and inventions, animisms and personifications, liking for the unusual; and emotional (E)—great depth and intensity of emotional life expressed in a wide range of feelings, compassion, attachments, heightened sense of responsibility, self-examination (Piechowski, 1979). Without some degree of intensity in these five areas in the individual, talent is mere technical facility, a computational machinery without conception or heart.

These five dimensions may be thought of as channels of information flow and as modes of experiencing. They can be wide open, narrow, or barely present. They were originally called "forms of psychic overexcitability" (Dabrowski, 1937) and the term is still used. The term overexcitability denotes enhanced and intensified mental activity distinguished by characteristic forms of expression which are above common and average. As enhanced forms of experiencing, they contribute to the individual's psychological development, and so the strength of overexcitabilities is taken as a measure of developmental potential (Dabrowski & Piechowski, 1977; Piechowski, 1979). To some, "overexcitability" suggests something dysfunctional, but the term is a translation of the Polish word "*nadpobudliwość*" meaning "superstimulatability"; the intended sense is of robust surplus and intensity.

Our study compares overexcitability profiles of three groups: (1) adults active in art, music, literature, and other artistic fields, (2) intellectually gifted adults, and (3) university graduate students in a variety of fields. One of our objectives was to test the usefulness of the Overexcitability Questionnaire for the study of different forms of talent. We expected the three groups to have quite different overexcitability profiles.

Method

The five forms of overexcitability were assessed by means of the Overexcitability Questionnaire (OEQ), a 21-item, free-response instrument (Lysy & Piechowski, 1983). Subjects wrote their responses at their leisure. Responses on each of the 21 items were rated on a scale of intensity from 0 to 3. Zero indicates no overexcitability, 1 indicates weakly expressed overexcitability, 2 indicates a distinctly recognizable expression, and 3 indicates a rich and intense expression. The range of possible scores on each dimension is 0 to 63. In this study the highest assigned score was 43, on emotional, the lowest was 0. Examples of responses are reported by Piechowski and Colangelo (1984).

Each protocol was scored independently by two raters. Disagreements on item scores were resolved by consensus. Items resisting consensus were submitted to a third, more experienced rater for arbitration. The Pearson interrater correlation coefficients across all five dimensions and with different pairs of raters ranged from .60 to .95, the most common being .70 to .80. The average correlation for all 10 raters in this study was .75. These values of *r* were obtained prior to consensus. The correlation between the individual rater's score and the final consensus was .82.

The subjects were adults identified as intellectually gifted by membership in Mensa (98th percentile rank or better on some standard test of

intelligence) or persons similarly qualified in gifted classes, or recognized scholarly achievement (*n* = 37, 11 men and 26 women, 22 to 55 years old, mean age 35.6 years). Neither intellectual heterogeneity nor the wide spread in age are significant factors in our study. The presumably more defined Mensa subgroup (*n* = 13) had virtually the same distribution of overexcitability scores and the same mean scores as the whole sample, and the whole sample, which is adult, had the same mean overexcitability scores as a sample of gifted adolescents (Piechowski & Colangelo, 1984). The artists included writers, poets, musicians, fine artists, film producers, and dancers-choreographers (*n* = 23, 11 men and 12 women, 18 to 59 years old, mean age 36.2 years). This diversity is also not a factor for this study. Eiduson (1958) showed that artists share common cognitive, emotional and motivational characteristics that set them apart from nonartists. The graduate students were taken from the study by Lysy and Piechowski (1983); they included students in counseling, history, linguistics, natural sciences, education, library science, political science, and religious studies (*N* = 42, 30 women, 12 men, 22 to 50 years old, mean age 29 years).

Results and Discussion

Statistical computations were carried out using BMDP (Bio-medical Package) 2v computer program for analysis of variance and analysis of covariance (including repeated measures). Equal *N*s and unequal *N*s analyses of variance and two-way analysis with repeated measures yielded virtually identical results. For the equal-*N* comparison, subjects from the larger samples were selected at random. For ease of interpretation we shall discuss the results from the standard two-way analysis. There were overall significant differences between groups on forms of overexcitability (Table 1). The finding of a significant group by overexcitability interaction was further analyzed with the Scheffe procedure for pairwise comparisons (Table 2). Because the Scheffe procedure is conservative, the Type I probability requirement was relaxed to compensate for its decreased power. The conservative nature of the Scheffe produced with unequal *N*s suggests that

TABLE 1
SUMMARY OF ANALYSIS OF VARIANCE WITH UNEQUAL *N*s

Source	df	MS	F	p
Two-way Analysis of Variance				
Overexcitability	4	1329.70	35.37	.01
Group	2	1837.32	48.88	.01
Overexcitability × Group	8	141.71	3.77	.01
Residual	500	37.59		
Two-way Analysis with Repeated Measures				
Group	2	1837.32	19.86	.01
Residual	100	92.53		
Overexcitability	4	1329.70	55.74	.01
Overexcitability × Group	8	141.71	5.94	.01
Residual	400	23.85		

TABLE 2
MEANS AND STANDARD
DEVIATIONS OF MEASURES BY GROUPS

Over- excitability	Artists n = 23		Intellectually Gifted n = 37		Graduate Students n = 42	
	M	SD	M	SD	M	SD
Psychomotor	7.79	3.87	5.92	3.71	3.97	2.50
Sensual	8.08	4.58	6.14	5.08	4.52	4.08
Intellectual	11.21	5.52	12.19	6.84	6.78	5.01
Imaginational	17.25	8.93	10.94	7.66	6.28	5.28
Emotional	20.54	10.38	14.11	8.94	9.42	6.53

probabilities .20 be considered significant (Hays, 1963, pp. 487-489). Of the 15 pairwise comparisons between groups, 10 were significantly different.

The mean overexcitability scores for each of the three groups are given in Table 2 and Figure 1. Overall, the artists are significantly higher than the graduate students on all five forms of overexcitability (psychomotor, $p < .20$, sensual, $p < .20$, intellectual, $p < .05$, imaginational, $p < .01$, emotional $p < .01$, and they also have significantly higher emotional and imaginational scores ($p < .01$) than the gifted. The gifted have significantly higher scores on emotional ($p < .01$), and imaginational and intellectual overexcitabilities ($p < .05$) than the graduate students. There is a general monotonic trend among the overexcitabilities with the emotional highest and followed in order by imaginational, intellectual, sensual and psychomotor. Specific results for each group on each index of overexcitability are discussed below by group and related to similar findings by other authors.

Artists

The presence of high emotional overexcitability in artists, significantly higher than in the other two groups, agrees with Drevdahl and Cattell's (1958) finding of a high index of sensitive emotionality in artists. The depth, intensity of feeling, and emotional sensitivity, especially in introverted individuals, can set them apart, hence the finding that artists often appear to be socially aloof (Barron, 1963; Getzels & Csikszentmihalyi, 1976). Barron (1952) observed that artists and creative persons in general have a greater range and depth of feeling ("unrepressed intense sensibility"); beautiful or sad things can move them to tears. In Patrick's (1935, 1937) studies, 80% of her 100 painters and poets reported that they created in a "warm stirred-up emotional state." But Gotz and Gotz (1979) reported findings that seem to contradict this. They have shown that successful artists have a higher mean psychoticism score, and indication of their being solitary, lacking in feeling, lacking in empathy, being hostile to others, etc. However, the psychoticism index is not an appropriate measure of emotionality. Bachtold (1980) pointed out that the higher psychoticism score of successful artists is really an index of their aggressiveness and drive, not evidence of harsh or cold emotionality. A minority of artists might be like

that—in Patrick's study about 20%. Two things have to be kept in mind: one, there are important individual differences, and two, the use of productivity and success as measures of talent is inappropriate and misleading because neither bears a direct relationship to the nature of talent.

The concept of emotional overexcitability is intended to capture individuals' experience of their emotional life. Artists occupy a special position in regard to this. They experience life most intensely and have the capacity to express their image of life and "thus (to) invite others to test the reality of their perceptions and, in a sense, to join them" (Barron, 1963, p.235). Susanne Langer views artists as experts in the knowledge of subjectivity. Subjectivity as the life of feeling encompasses "the whole realm of awareness and thought, the sense of absurdity, the sense of justice, the perception of meaning, as well as emotion and sensation" (Langer, 1967, p. 55). According to Langer, art serves to make sense of our experience by giving us the form of the experience (Piechowski, 1981). This is what makes art significant.

Langer's theoretical perspective provides the logic for the artists' high imaginational and intellectual scores. Only highly developed imagination can transpose lived experience into significant images and highly developed intellect enables the artist to solve the technical problem of how the transposition is to be done.

The concept of imaginational overexcitability stands for the spontaneous activity of a mind that freely makes unexpected associations, reaches into invented realms, takes any form as a stimulus to perceive other forms, including nonvisual ones. Drevdahl and Cattell (1958) and Getzels and Csikszentmihalyi (1976) found artists to be very high on autia ("imaginative, careless of practical matters, unconventional, absentminded"), one of the 16 source traits in Cattell's personality inventory. A person high on autia is characterized by an intense subjectivity and inner mental life, and by an "internally autonomous" thinking with impracticality and hysterical mood swings thrown in for good measure (Cattell, Eber, & Tatsuoka, 1982, p. 82). Clearly, the autia construct includes, besides imagination, also feelings, moods and intellectual inclinations.

The construct of imaginational overexcitability is aimed at imagination alone as "the force of invention" (Gerard, 1774). As a free-response instrument the Overexcitability Questionnaire can, through content analysis, give insight into the workings of a person's imagination; it has the advantage of providing both quantitative and qualitative data.

The artists' mean score on intellectual overexcitability is virtually equal to that of the intellectually gifted. Intellectual overexcitability must not be equated with intelligence. Intellectual overexcitability encompasses curiosity, inquiringness, thirst for knowledge and truth; it represents a theoretical, probing, reflective stance. The Allport-Vernon-Lindzey Study of Values similarly defines a "theoretical value" as an interest in and pursuit of truth, a desire to gain knowledge, systematize it, and bring order to it.

MacKinnon (1960) and Getzels and Csikszentmihalyi (1976) described artists' and architects' "inquiringness"—their unending curiosity about things, people and nature—and their strong preference on the Study of Values for the theoretical value. The artists score low on economic value, an expression of their disregard for material values. Hazell (1984) found a high

correlation of intellectual overexcitability with the theoretical value and a high negative correlation with the economic value. Roe (1946), Eiduson (1958), Getzels and Csikszentmihalyi (1976), and Rothenberg (1979) also found in artists a strong tendency toward abstract and theoretical thinking.

The artists' high score on sensual overexcitability is also corroborated by previous research. Creative persons prefer the experiential, primitive and sensual (Barron, 1952, 1963). Lowenfeld (1962), Getzels and Csikszentmihalyi (1975, 1976), and Piechowski and Cunningham (1986) observed artists' unusual sensitivity to what they see, hear, and touch, and their ready response to the "feel" and texture of qualities of materials.

The artists also have a higher mean psychomotor score which suggests a higher energy level than the other two groups. This parallels Barron's (1963) and Roe's (1946) findings that artists are vigorous people capable of unusual energy output and perseverance.

Intellectually Gifted

Intellectual giftedness is often manifested in avidity for learning, curiosity, inquisitiveness, problem solving and the like. Because these characteristics partly overlap with expression of intellectual overexcitability we expected to find in our sample of intellectually gifted adults a dominant peak on this dimension. Surprisingly, however, emotional, imaginal, and intellectual scores of our sample are more or less equal. If scientists are taken as exemplars of intellectual giftedness, then we should find also in them evidence of emotional overexcitability.

The scientist is often presented as impersonal and dispassionate. Most of the highly creative chemists and mathematicians studied by Clifford (1958) were cold, objective and highly competitive. Some denied the importance of emotion in achieving significant accomplishments in science. But Mitroff (1974) in interviews with Apollo scientists found these statements to be typical: "The idea of the dispassionate, disinterested observer just isn't so. The more you work on a subject the deeper the commitment becomes;" "No one is able to do anything with liberal energy if there is no emotion connected with it" (p. 65). Mitroff concluded that these highly competitive scientists displayed only that part of emotionality that contains the aggressive and harsh emotions. Yet there are scientists, such as Pasteur, Edison, or Norbert Wiener, who show the tender emotions as well. In Clifford's study a few exceptions were just like these. Again, we are dealing with a wide range of individual differences. It is worth remembering that intellectual talent is not limited to science alone and that our intellectually gifted group was highly heterogeneous. Their emotional scores ranged from 2 to 36 with a median of 11, as compared with the artists' range from 6 to 43 with a median of 22, and graduate students' range from 0 to 22 with a median of 7.5.

Leta Hollingworth (1942) observed particularly enhanced emotional and moral sensitivity in the highly gifted. Silverman (1982) found evidence of emotional sensitivity and intensity of feeling in parental reports of nearly every young gifted child she tested. Colangelo (1982) found that the majority of gifted adolescents think about moral issues in terms of interpersonal

relationships and responsibilities, which is to say, in emotional rather than abstract intellectual terms of rights and justice. All this underscores the importance of emotional endowment in the makeup of intellectually gifted persons. We may wonder, however, what emotional changes less gifted people undergo in the competitive regime of graduate study and professional work.

Graduate Students

The intellectually gifted and the graduate students are both intellectual groups. Their mean overexcitability scores are parallel.

The low excitability profile of the graduate students is not unexpected. Wing and Wallach (1972) showed that college admissions to prestigious institutions rely primarily on test scores and high school class rank, not on evidence of talent. Yet real-life postgraduate achievement is not correlated with test scores and grade averages but with nonacademic accomplishments, e.g., distinction in writing, art, drama, music, social service. Barron (1963) found that departments in the sciences and the professions rated highest on personal soundness students who were adaptable, calm, moderate, realistic, and serious, and rated lowest those who were perceived as immature, tense, emotional, peculiar, etc. Departmental raters were selecting the pattern of high stability combined with low responsiveness, in other words, no marked overexcitability. The selection is for solid work and against imagination. Historians of science have come to similar conclusions (Brush, 1974). When the departments rated their graduate students on originality, the favored profile was of "the more scholarly type in a single field of endeavor, efficiently self-disciplined, and socially somewhat inflexible and withdrawn" (MacKinnon, 1975, p. 65). The selective process for graduate studies appears to favor candidates with an attenuated overexcitability profile. In fairness, however, we must mention that 14 out of the 42 graduate students in our sample, i.e., one third, showed an overexcitability profile identical to that of the intellectually gifted (Piechowski & Colangelo, 1984). One would expect this proportion to vary depending on the selection criteria of the institution.

Conclusion

The model of developmental potential integrates five dimensions of mental functioning: the life of feeling (E), imagination (M), the pursuit of knowledge and truth (T), level of personal energy (P), and sensual aliveness (S). The model is particularly well suited to the study of individual differences. The picture that emerges is this: artistic talent tends to be associated with high levels of all five overexcitabilities, most markedly imaginal and emotional, while intellectual talent tends to be associated with a high level of intellectual, imaginal, and emotional overexcitabilities. Our results for these groups show good agreement with previous research as well as with Susanne Langer's (1967) view of the artist as one who has the skills to discover, capture, and express the varied forms of human experience.

The model of developmental potential treats imagination as a human capacity distinct from emotion and cognition. The boldness of one's imagi-

nation is a major contributor to the originality of talent. A recent inventory, the Wilson-Barber Inventory of Childhood Memories and Imaginings (Myers, 1983), appears to tap most of the characteristics of imaginal overexcitability which we find in the content analysis of responses to the Overexcitability Questionnaire.

Assessment of creativity has not always taken imagination sufficiently into account. Although Dearborn (1988) devised a simple yet highly effective quantitative method of tapping imaginative responses, he nevertheless concluded that "the qualitative side better suggests the mysteries of association and imagination." The Overexcitability Questionnaire has the advantage of providing both quantitative and qualitative data in regard to all five dimensions.

The model of developmental potential also contributes to our understanding of individual differences in talented people. For each group of subjects there is a wide range of scores on each form of overexcitability. Added to this is the varied individual content of responses. One may well ask which way lie the more interesting differences: between different kinds of art or scholarly disciplines such as poetry vs. music or biology vs. physics, or between individuals within a given domain. Piechowski and Cunningham (1986) found three different overexcitability patterns among artists: Pattern A with strong, balanced overexcitabilities, Pattern B with emotional overexcitability and sensitivity so dominant that it colored all other forms of overexcitability, and Pattern C with lower emotional overexcitability but the remaining ones unharmonized, strident, restless and driven.

The nature of talent, its particular tone and direction of development must be seen as an interplay of imagination, intellectual acumen, and richness of feeling. The model of developmental potential enables us also to look into the interaction of the intellectual and emotional dimensions for the source of unrelenting self-evaluation and striving for perfection which are the mark of a truly compelling talent.

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