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Developmental patterns and the related factors of the gifted: 18 years after their identification

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To find out achievement, personality characteristics, family characteristics, and developmental patterns of the 65 young adults and 60 of their parents were followed up 18 years after their identification of giftedness at the age of 3 to 5. Only 12% of them attended colleges of high academic standing and the rest have not achieved as much as their potential predicted. Their developmental patterns were classified into 4 different ones: The full boomer, the everchanging, the fade away, and the late bloomer. The fullbloomer were characterized by their stronger preference for challenging tasks, family emphasis and supports for their studies and reading books in their early childhood. The everchanging were characterized by their parents who did not emphasize on study or reading in early years, but strong support for their study from junior high school period. The fadeaway and the late bloomer were characterized by the absence of parental support for learning throughout their schooling period. However, the fadeaway and the late bloomer were contrasting in their achievement motivation, academic self-concept, and social competency. The most influential factors contributed to the academic achievement in each school level were various including preference for challenging tasks and reading books in early childhood in common. It was found that the influence of these variables was found to be cumulative, not additive since the

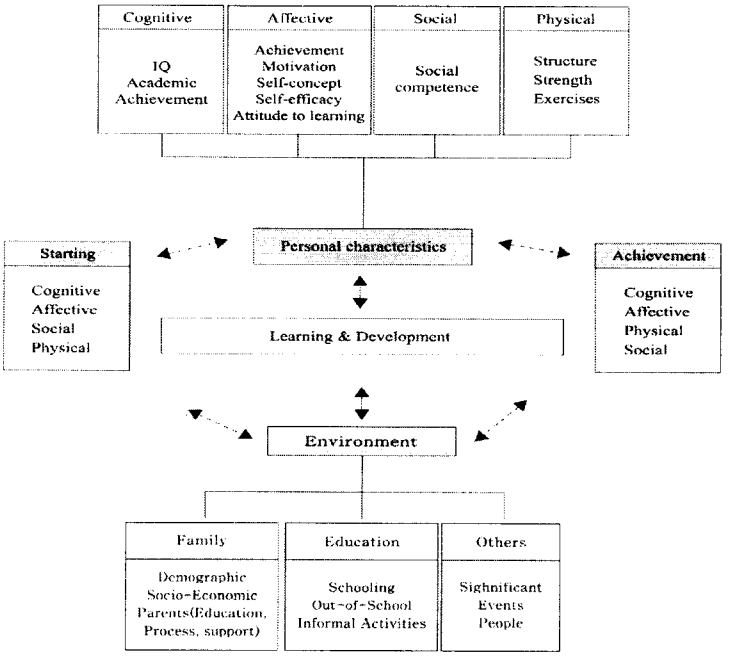
final academic achievement was explained not only by the learning experiences during that period but also by learning experiences and achievement in the previous developmental stages. For a long time, the gifted have been generally expected that they will realize their potential to the maximum extent in the future. Some studies found most of the gifted were superior in their achievement with some exceptions (Hollingworth, 1942; Subotnik, Karp & Morgan, 1989; Subotnik, Kassan, Summers & Wasser. 1993; Terman & Oden, 1959). However results of these studies should be interpreted with some caution, since most of the subjects included in these studies belonged to the families of either middle class or above and had been provided with special programs appropriate to their psychological characteristics. In other studies, not all the gifted identified in their childhood were found to become productive professionals (Czikszentmihalyi, Rathunde & Whalen, 1993; Schoon, 1999). In Korea, 144 preschool children at their ages of 3 to 5 were identified in 1985 throughout the country through a national project. In 2001, 57 of them were contacted through governmental and nongovernmental channels at their ages in 18 to 21 years old. It was reported, in the newspaper, only 10 of them were attending colleges of highest academic standing. Twenty-five gifted responded that they have lost their interest in academics. Ninety-five percent of them have not experienced special programs for the gifted at all from preschool to high schools. Seven prodigies (12%) benefited from special program by attending Science High Schools. Only two of them skipped grades during either the elementary or high school days. The fact that only few gifted preschoolers realized their potential triggered the researchers to study further regarding the reasons why not all the gifted realized their potential, when and how they were channeled into the paths of either the underachievers or the achievers, and what factors contributed to and obstruct their achievement at their young adulthood.

Theoretical Background

Developmental Model of Giftedness

Several models show that there are interactions between giftedness and

personality characteristics and environment (e.g., Gagne, 2003; Schoon, 1999: Ziegler & Heller, 2000). After the review of the models, it was concluded that there are three stages of development and two big factors. Three developmental stages consist of the starting stage, the learning and development stage and the achievement stage. Two factors, personal and environmental characteristics, interact with giftedness from the start of learning stage as shown in <Figure 1>.



< Figure 1> Developmental Model of Giftedness and related Factors

Practical Problems in the Retrospective Study

In order to delineate the contributing factors and developmental patterns, several studies on the development of giftedness have been carried out. Some of them employed retrospective approaches (Bloom, 1985; Goertzel & Goertzel, 1962; Hollingworth, 1942; Roe, 1953; Zuckerman, 1977). Through these studies, many contributing factors to the superior achievement were identified. However, it was

very difficult to single out the most critical factors among the many contributing factors, since their subjects were mostly eminent people and very few retrospective studies included gifted underachievers.

Some problems in retrospective studies or longitudinal studies were the lack of comparison group and lack of studies which follow-up the gifted since when they are very young (e.g., Arnold, 1994; Hany, 1994; Perleth & Heller, 1994; Subotnik & Steiner, 1994). Therefore, it is worthwhile to track down the very young gifted and retrospect their developmental patterns and processes to analyze the influences of personal and environmental characteristics to the academic achievement.

Research Questions

In the limited space of this paper, it was intended to provide answers on the following specific questions.

1. Are there different developmental patterns among those who were identified as the gifted in preschool years?
2. What are the differences among the groups of different developmental patterns in terms of their personal characteristics, educational experiences, and family characteristics?
3. What are the most contributing factors to their achievement?

Methods

Subjects

The subjects included in this study were 65 young adults of 20-23 years old who were once identified as gifted in ages of 3 to 5 years old and 60 of their parents. The subjects were composed of two groups of the gifted. One group was composed of 39 students and 34 of their parents who were among the 144 students identified through the national plan. The level of intellectual abilities was described as extremely gifted, highly gifted and gifted without specific IQ scores. The other group was identified by private educational institutes based on their IQ scores at the Korean version of the 2nd edition of the Wechsler Intelligence Test.

Their intelligence scores were above IQ 130. Out of 116 children, only 59 students could be contacted and 26 students and 22 parents agreed to participate in the study. Their average IQ was 142, which was upper 0.5%.

Instruments

ACADEMIC ACHIEVEMENT: KSAT

Indicator of students' latest academic achievements was T scores on the Korean Scholastic Aptitude Tests (KSAT) administered to the 12th grade students. Students' T scores of SAT in different years were calculated based on the average and frequencies of each year. Equation for calculation of T scores of KSAT was as follows:

$$Z_i = \frac{(X_{ij} - \overline{X_j})}{SD_i}, \quad T_i = 10(Z_i) + 50$$

X_i = Raw score of SAT for each individual, = year of SAT test

GPA's at elementary, junior high and senior high schools were transformed into 7 scales so that students' achievement could be compared with each other. In the transformation, academic standings of senior high schools were considered, since there were different types of senior high schools.

QUESTIONNAIRES

To measure personality characteristics such as self-concept, achievement motivation, belief in intellectual ability, and general self-efficacy, and family psychological environment, questionnaires were used. Self-concept developed by Marsh & O'Neill (1984), achievement motivation test developed by Nicholls (1984), self-efficacy developed by Kim (1977), beliefs in one's intellectual ability developed by Dweck (1984), family processes developed by Verna & Campbell (1998) were translated and adapted to Korean context. They were pilot tested to 109 graduate students. Students were asked to respond from 1 to 5 on questionnaires of self-concept and belief in intellectual ability, 1 to 6 on general self-efficacy test,

and 1-4 on family process questionnaire. Students were asked to select appropriate items on achievement motivation. Through factor analyses and item analyses, inappropriate items were revised and final versions were developed. The higher their scores are, the more positive they are about their intellectual ability and themselves. Reliability coefficients measured by Cronbach a ranged from .62 -.87 and they were found to be reasonably reliable.

Questionnaires were developed for subjects and their parents to collect information on various aspects of academic achievement, cognitive, affective, social, physical characteristics, formal and informal learning experiences and significant events or persons along the time line from elementary school period to present time. Same questions were included to verify exactness of the facts when inconsistent responses between subjects and parents were discovered.

Procedure

Nine graduate students were trained twice on implementing questionnaires and tests, interviewing, recording, and transcribing. Each graduate students interviewed about 7 to 8 gifted students and their parents. The responses on students' and parental questionnaires were coded and analyzed. Basic analyses on the means and standard deviations, cluster analyses for classification of developmental patterns were carried out. To differentiate critically influential factors, correlation and multiple regression analyses were carried out between academic achievement and related variables. The transcribed interview content was analyzed qualitatively to complement the quantitative information regarding their personality characteristics, learning characteristics and family characteristics.

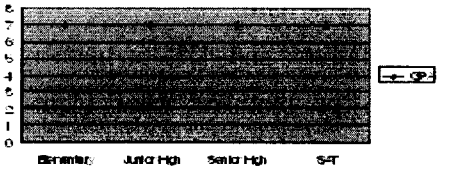
Results

Distribution of T scores on SAT of the gifted was found to be various compared to general population. Only 3.3 % of the gifted got higher than 91, 11.7% of students marked between 81 and 90, 78.3% of the gifted marked between 61 and 80. There were 4 subjects even below 60. Among the 144 nationally identified gifted, there were some who did not continue to study in the colleges.

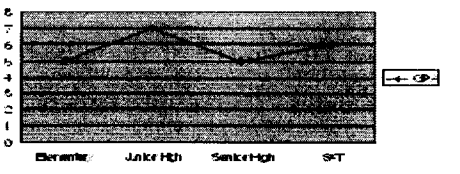
However, those who attended colleges agreed to participate in this study only. The colleges classified into three categories of the best, the good, and the others according to tacit knowledge on the standing of colleges in Korean context. Only 25% of the gifted were attending or attended best colleges, 18% good universities, and 57% colleges of low academic standing. It was found that only few of the gifted preschoolers realized their potential by their young adult hood.

Developmental Patterns

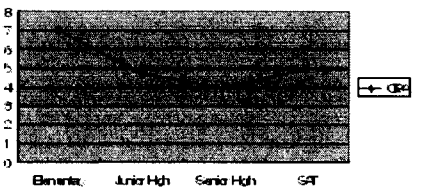
Cluster analyses based on the changes in GPA's from elementary, junior high, senior high, and to KSAT classified the subjects into four developmental patterns: The full bloomer, the everchanging, the fadeaway, and the late bloomer as shown in <Figure 2>. The full bloomer consisted of 43 subjects whose GPA's consistently high throughout from elementary to KSAT. The everchanging included 9 subjects whose GPA's were low in the elementary school, high in junior high school, low in senior high school, and slightly higher on KSAT. The fadeaway included 10 subjects whose GPA's gradually declined from elementary school to KSAT. The late bloomer included 3 subjects whose GPA's were low in the elementary school and improved gradually from junior high to KSAT.



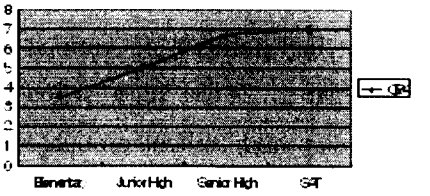
The full bloomer



The everchanging



The fadeaway



The late bloomer

<Figure 2>

To examine the influence of their family characteristics, personal characteristics, and educational experiences on academic achievement in each stage of the development, each aspect has been compared among the 4 groups. However, rigorous statistical analyses was not possible, since the number of subjects in each group was quite different, assumption of normal distribution of data could not be secured for statistical analyses.

Family characteristics

Most of the gifted were from families of both parents and two children. More than 60% of the full bloomers were born and raised as the first child in the large cities. There was less number of first-born children in other groups. The first-borns might have been intellectually stimulated more and better by their parents until their younger brothers or sisters were born.

73.3% of the gifted were from families of middle level or above the middle in terms of economy. Economy level of families showed difference among groups of different developmental patterns: The economy level of the full bloomer was middle; the everchanging and the fadeaway upper middle; and the late bloomer either low or high. The gifted from families of middle level of economy continuously strived hard to get higher achievement, meanwhile the gifted from families of upper middle level of economy studied less hard.

Among the 60 parents of the gifted, 59.3% of fathers and 45% of mothers were college graduates. 23.7% of fathers and 30.0% of mothers were high school graduates. However, it seems quite difficult to assert that education level of parents is closely related with academic achievements. Among the full bloomer, there were various levels of formal education parents received. For example, the full bloomer had fathers of various education level: 38.1% of the fathers were college graduates; 28.6% high school graduates; 23.8% graduates degree holders; and 7.1% junior high school graduates.

Major fields of mothers of the full bloomer were mostly in education or humanistic science, while mothers of the everchanging majored in natural science and technology. However, no particular pattern was observed in the major fields

of fathers of the four groups and mothers of the fadeaway and the late bloomer. No significant differences were found in the family processes during the subjects' early childhood among the 4 groups. The scores ranged from 2.27 to 3.00 with maximum 4. Among 7 family processes, parents' responses were higher on support for children's study (m=2.89, SD=.35), early reading and intellectual stimulation (m=2.83, SD=.51), behavioral discipline (m=2.98, SD=.39), and family cohesion with fathers' participation (m=3.00, SD=.36). Scores on such family processes as stress on children (m=2.27, SD=.33), supervision of TV watching and homework (m=2.51, SD=.36) and direct help (m=2.42, SD=.35) were lower than on other processes.

Personal Characteristics

Since the intellectual abilities of the gifted identified through a national plan had been described as extremely gifted, highly gifted, or gifted, the gifted identified through private educational institutes were reclassified into the same three categories according to their IQ scores of above 151, between 141 and 150, and between 131 and 140 respectively. The full bloomer included the most number of the extremely gifted. The average IQ of the everchanging was similar to that of the full bloomer, but with less number of the extremely gifted. Close relationship between IQ and the academic achievement was not observed, since the full bloomer and the everchanging showed similar IQ patterns among the members but the patterns of academic achievement were quite different.

Number of the books they read during the school periods was different among the 4 groups. The full bloomer read the most. Especially during the elementary school period, 54.8% of the full bloomers, 33.3% of the everchanging, 10% of the fadeaway read more than 8 books per month. Many parents of the full bloomers recalled their children were devouring books everyday. They continued reading even at the high schools when they need to spend more time for the preparation of exams. The everchanging read the most during their junior high schools, when they achieved the highest. It seems that reading is closely related to high

achievement. In terms of their efforts to improve academic achievement, the late bloomer and the fadeaway showed contrasting pictures. One hundred percent of the late bloomer and only 50% of the fadeaway reported they worked hard to improve their academic achievement. 76.7% of the full bloomer and 77.8% of the everchanging reported that they worked hard to improve their academic achievement. Most of the families supported financially for private throughout their schooling periods. 'Private tutoring' means either working on extra worksheets for study, or providing the child with a tutor or extra educational programs at the private institutions after school hours mainly with purpose of preparation for exams. Most of the private tutoring is characterized by repeated practice of simple problem solving or rote memorization. When the gifted were preschoolers, they generally studied with extra worksheets for study at home. As they grew up as high school students, they studied more at the private educational institutions after school hours. However, less number of the full bloomer had private tutoring compared to other groups.

In terms of personality characteristics, the gifted showed higher self-concept and belief in intellectual ability than self-efficacy and social competency in general. Their general self-efficacy was the lowest among 6 personality characteristics. There were differences in personality characteristics among the 4 groups. The everchanging showed highest self-concept, belief in intellectual ability, and self-efficacy than other groups. The late bloomers' self-concept was higher than those of other groups, meanwhile other personality characteristics were lower than those of other groups. On the contrary, the fadeaway showed lowest self-concept. In terms of social competency, the full bloomer and the late bloomer showed lower scores than other groups. The low social competency of the bloomer seemed to be resulted from the lack of social contacts since they spent more time for self-study than other groups. Scores on attitude toward schools of the full bloomer, the everchanging, and the fadeaway was lower than that of the late bloomer.

In summary, it was found that there were a great variety of educational experiences, family characteristics and personality characteristics among the gifted

in this study. Meanwhile, their cognitive characteristics and family processes were similar to each other. Found were four different developmental patterns among the gifted: The full bloomer, the everchanging, the fadeaway, and the late bloomer. With supplementary information acquired from interview with them, the typical individuals in each group are described as follows: The full bloomer, 'A', was the first-born child between the college graduate father and high school graduate mother of middle level of economy and had one younger brother or sister. Parents considered school learning as the most important. They started reading books for their child and disciplined 'A' since when 'A' was very young. 'A' read more than 8 books per month during the elementary school years and studied alone or with parents at home and did not have private tutoring during the after-school hours. Their mothers were either teachers or full-time housewives with major in humanities, so that they knew how to teach their young children. A's academic achievement level was highest but did not have the highest self-concept, self-efficacy, belief in intellectual ability, and social competency. 'A' considered GPA at school very important so that 'A' studied hard by him/herself with high achievement motivation. The everchanging, 'B's parents had the highest education than those belonged to other groups and did not consider school learning as the most important when 'B' was young. 'B' read 5 books per month and B's academic achievement at the elementary school was not as high as the full bloomer. Once 'B' entered into junior high school, parents expected 'B' to get higher GPA and provided B with private tutoring. Then, 'B' started studying hard and his/her academic achievement improved. Since 'B' experienced rapid improvement in his academic achievement in junior high school, his/her self-concept, self-efficacy, belief in intellectual ability, and social competence were highest among the 4 groups, but lower achievement motivation. 'B's family went through difficult situations during the senior high school and 'B's senior high school GPA became lower again.

The fadeaway, 'C', read 4 books per month in elementary school and did not study hard either at school or at home. 'C's parents were busy working, since

they were not as affluent as other groups when 'C' was young. 'C' did not consider school learning very important from elementary throughout to the high schools. During senior high school period, parents' income became higher and provided private tutoring with purpose of improving C's GPA. However, self-study hours of 'C' were much less compared to those of other groups and the high school GPA did not improve. Rather it fell down further. The late bloomer, D, is from families of either very low or very high economy level and parental education level. Their parents did not have time to pay attention to the education of their children. D read one book per month in the elementary school. D, at the junior and senior high schools, realized that s/he needs to study harder in order to establish him/herself and his GPA's gradually improved from junior high and senior high to KSAT.

Factors Influencing Academic Achievements

Correlation coefficients among academic achievement (KSAT score), cognitive characteristics, educational experiences, personality characteristics, and family processes have been computed. Stepwise multiple regression analyses were carried out with academic achievement as criterion variable and highly correlated characteristics as predictors. During the elementary school period, breast feeding, the number of books read, academic self-concept, self-study hours and experience of traveling overseas during the elementary school period were positively correlated and the degree of mother's concern for academic achievement was negatively correlated with the elementary school average GPA. Among these variables, the number of books read explained the most of variance in the average GPA and the variance explained was 17% ($F(1,53)=10.83$, $p<.01$).

During the junior high school period, the elementary school average GPA, number of books read during the elementary school years, academic self-concept, experience of hospitalization, and self-efforts to improve junior high school GPA were positively correlated with academic achievement, which was the average GPA during the 3 years at the junior high school. Degree of mother's concern for

academic achievement, private tutoring during the elementary school period, overseas traveling and cinema watching during the junior high school period were negatively correlated. Stepwise multiple regression analyses showed that the elementary school GPA, self-efforts for improving GPA influenced positively and time spent for private tutoring influenced the junior high school GPA negatively. The three predictors explained 65.8% of academic achievement during the junior high school period ($F(3,48)=30.80$, $p<.001$).

During the senior high school period, breast feeding, junior high school GPA, achievement motivation, academic self-concept, and self-study hours during the senior high school period were positively correlated with academic achievement, the average GPA during the 3 years at the senior high school. On the contrary, experience of private tutoring during the elementary school period, financial investment for private tutoring during the junior high school period, parents' monthly income and cinema viewing during the senior high school period was negatively related with senior high school average GPA. Among these variables, the junior high school GPA and achievement motivation explained 65.3% of academic achievement during the senior high school period ($F(3,47)=20.11$, $p<.001$).

With KSAT, senior high school GPA, academic self-concept, preference for challenging tasks, self-study hours during the senior high school years, and parents' contribution to the child's development during the preschool period were positively correlated. Economy level and financial investment for private tutoring during the senior high school years were negatively correlated with academic achievement, KSAT. Multiple regression analyses showed that the senior high school GPA, preference for challenging tasks, and parents' contribution to the child's development during the preschool period explained 52.6% of the variance of SAT ($F(3,47)=17.38$, $p<.001$).

The correlation coefficients between IQ and academic achievement, the KSAT score, was as low as $r= .038$ and not significant at $\alpha=.05$ level. It could be resulted from narrow range variances in IQ and KSAT scores of the gifted included in this study.

Discussion and Conclusion

Through this study, it was found that not all the gifted achieve high. The giftedness interacts dynamically with their personal and family characteristics, and their educational experience. In addition, it was also found that the learning experiences are cumulative rather than additive. The correlation of IQ and academic achievement was found to be insignificant, probably because the number of subjects was very small and the group was homogenous in terms of IQ. In groups of IQ higher than 130, it seems quite general not to obtain high correlation coefficients between IQ and academic achievement as claimed by Walberg (1988) and Tannenbaum (1983).

Among several personality characteristics, the most critical predictor was found to be the preference for challenging tasks explaining 17.6% of the academic achievement after all. It is quite high ratio considering the Pajares' assertion that the self-efficacy, one of whose sub-factor is preference for challenging tasks, explains 25% of the academic achievement (Madewell & Shaughnessy, 2003). The gifted in Korea in 1980's and 1990's did not have opportunities to be challenged in regular schools except in the 34 high schools with special purposes, such as science or foreign language high schools. However, to enter into these schools, their mothers needed to provide enriched learning environment through reading books for their children by themselves since when their children were very young (Cho, Ahn, and Han, 2003). It has been known by many studies that the gifted prefers challenging tasks (Stanley, 1979). However, it was not well known that the gifted who did not prefer challenging tasks achieve less. In other words, the gifted need to be provided with challenging tasks since when they are young and have them commit themselves to work or study. However, the educational system during the schooling period of the subjects in this study failed to provide such challenging tasks since the educational system was equity oriented with intention of providing equal education to everybody.

The finding suggests that the gifted in regular classes may not get enough challenges and their academic achievement can become lower in such educational

settings. Therefore, it seems necessary that opportunities to choose challenging tasks should be provided for the gifted in order for them to be challenged, get positive feed back frequently when they accomplished the tasks and develop higher self-efficacy (Madewell & Shaughnessy, 2003) Other personal characteristics were found to be insignificantly related with high academic achievement. These findings are different from those of other studies with all children. It seems to be necessary to carry out further studies on this matter.

With high aspiration to provide better education for their children, most of the Korean parents provided private tutoring, whether the child is gifted, average, or learning disabled. However for the gifted, private tutoring could not be of too much help. Rather, to get higher GPA's, reading many books when young and self-study or self-efforts in high school years were found to be more effective for the gifted in 1990's. However, in 2000's, the gifted should be able to be provided with special programs appropriate for them on the basis of gifted education law promulgated in 2000 (Seo, Cho, & Jeong, 2003). It is hoped that the gifted who attend schools in 2000's be provided with more challenging tasks so that they can develop high self-efficacy with challenging tasks and achieve higher than the gifted in this study.

Strengths of this study with retrospective approaches on the young adult, identified as the gifted when they were 3-5 years old are several. A variety of developmental patterns and dynamic interactions of giftedness with personal characteristics, educational experiences, and environmental characteristics were observed during their growing up period of 18 years. This study included the gifted who achieved high and those who achieved low. Therefore, it was possible to observe their developmental processes and single out critical factors which contributed to the development either positively or negatively by comparison of the achieved and non-achieved.

However, weaknesses of this study were the nature of the data collected based on their memory and some raw data had inconsistency in their scales, so that exactness of the data is limited. For example, the KSAT was transformed into T

score from % ile score each year to apply the multiple regression analyses. Through this transformation, KSAT score of the 80% of the subjects were placed in 60-79, meanwhile 72% of the subjects was beyond 90 in percentile score of KSAT. Therefore, there is some possibility that their KSAT score could have been underestimated. In addition, there was not a specific IQ score of the subjects who were identified through a national plan. It was not possible to analyze the correlations or multiple regression analyses with exact IQ scores. However with qualitative data collected through intensive interview, these weaknesses in the quantitative data were compensated.

In addition, those who felt that they did not achieve as much as they could did not agree to participate in the study. Therefore, there can be systematic bias in the data and the actual achievement of the high intellectual abilities might be lower than shown in this paper.

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