

A Longitudinal Study of Academic Intrinsic Motivation in Intellectually Gifted Children: Childhood Through Early Adolescence

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Abstract

Academic intrinsic motivation of intellectually gifted children and a comparison group was examined in the Fullerton Longitudinal Study. Children at ages 9 through 13 years were administered the Children's Academic Intrinsic Motivation Inventory which assesses intrinsic motivation for school learning in reading, math, social studies, science, and for school in general. Analyses showed that across the ages, relative to a peer comparison, gifted children had significantly higher academic intrinsic motivation across all subject areas and school in general. It is suggested that: Children who become intellectually gifted enjoy the process of learning to a greater extent; intrinsic motivation is important for potentiation of giftedness; Assessment of academic intrinsic motivation be included in selection of children for gifted programs.

While there are many forms of giftedness and talent, the area of intellectual giftedness continues to be a major focus in research and educational practice (Pendarvis, Howley, Howley, 1990), perhaps due to the importance of this type of giftedness for children's schooling. An area that has received relatively less attention than gifted children's intellectual and academic achievement concerns their intrinsic motivation. Academic intrinsic motivation is defined as enjoyment of school learning characterized by an orientation toward mastery, curiosity, persistence, task-endogeny, and the learning of challenging, difficult, and novel tasks (Berlync, 1971; Brophy, 1983; Deci, 1978; A. E. Gottfried, 1985, 1986a, 1990; A. E. Gottfried,

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Putting Research to Use

This research shows that from childhood through early adolescence, gifted children as a group have consistently stronger academic intrinsic motivation than their comparison cohort across different subject areas and for school in general. These findings raise a number of possible applications pertaining to assessment and instruction.

First, selection procedures for entry into gifted education programs may seek to include academic intrinsic motivation, using the Children's Academic Intrinsic Motivation Inventory (CAIMI), to augment other assessments. Second, the CAIMI may also be useful for assessing instructional programs for gifted children. Since the CAIMI provides a profile of scores in reading, math, social studies, science, and for school in general, comparisons can be made across these areas. Areas that are lower than others may need to be given more attention in order to strengthen the motivational component of the instructional program. On the other hand, areas that are higher with regard to student motivation may be examined to determine the particular qualities of instruction related to stronger motivation. A third application could be to determine the motivational profiles of gifted students across subject areas and for school in general for instructional development and for enhanced knowledge about the students. Since the CAIMI provides a profile form, it is possible to compare scores across areas to determine significant differences. This information could help in analyzing specific interests and talents of gifted students, or areas that could benefit from more enrichment.

Finally, since gifted children as a group show strong academic intrinsic motivation, it is important that programs for gifted students support such motivation. This may be accomplished by providing curriculum consistent with the definition of academic intrinsic motivation including an emphasis on enjoyment of learning through provision of opportunities to learn challenging, difficult, and novel tasks, as well as provide an orientation toward mastery, curiosity, and persistence.

White, 1959). Academic intrinsic motivation has been shown to be positively related to children's school achievement and intelligence (A. E. Gottfried, 1985, 1990; A. E. Gottfried et al., 1994). Children with higher academic intrinsic motivation function more effectively in school, with higher achievement, better perception of competence, and lower academic anxiety.

Other researchers have found that intellectually gifted children have higher motivation. For example, Henderson, Gold, and McCord (1982) reported that gifted children and adolescents had higher curiosity than their comparison group. Davis and Connell (1985) reported that gifted fourth and sixth graders had higher mastery motivation than their comparison group, as did Li (1988) for fourth and seventh graders, Hom (1988) for third graders, and Vallerand, Gagné, Senecal, & Pelletier (1994) for fourth through sixth graders. In the Terman sample, Tomlinson-Keasey and Little (1990) found that childhood intellectual determinism, a motivational construct bearing a resemblance to achievement and intrinsic motivation, predicted the maintenance of intellectual skills over the life course. Renzulli's (1986) conception of giftedness includes task commitment, defined as perseverance and a belief in one's ability to pursue significant work. Feldman (1986) describes prodigies as evidencing an intense intrinsic motivation in their domain of giftedness. Hence, the motivational differences between gifted individuals and their comparison group have been identified in the literature.

Heretofore, there has been no systematic, comprehensive, and longitudinal investigation of academic intrinsic motivation in gifted children. This type of motivation is particularly relevant to the gifted as it focuses specifically on motivation for school learning, the area in which intellectually gifted children excel. In our longitudinal study of gifted children (A. W. Gottfried, A. E. Gottfried, Bathurst, & Guerin, 1994), relative to a comparison group, intellectually gifted children (those with WISC-R full scale IQ scores at age 8 at or above 130) had consistently higher academic intrinsic motivation during childhood through age 8 and also showed greater cognitive mastery motivation in the infancy, preschool, and early school years as measured by the cognitive task motivation items of the Bayley Behavior Record (A. W. Gottfried et al., 1994). The current research examines the academic intrinsic motivation of these children through early adolescence to determine whether they continue to evidence superior motivation. Since intrinsic motivation data have been collected throughout the course of infancy, childhood, and early adolescence, the current study provides a unique opportunity to examine the prospective or cross-time consistency of academic intrinsic motivation in the gifted during this period, and to compare their motivational development with the comparison group in the longitudinal study.

Method

Participants and Designation of Giftedness

In the fall of 1979, a longitudinal investigation of children's development was initiated, known as the Fullerton Longitudinal Study. One hundred thirty 1-year-olds and their families were selected from birth notifications of hospitals surrounding California State University, Fullerton. The only selection criteria were that infants have no neurological or visual abnormalities (A. W. Gottfried & Gilman, 1983). All infants were full-term and of normal birth weight. Additionally, all families spoke English. Return rates of the participants have been substantial, and have not fallen below 80% across the course of the study. At age 8, the year in which Giftedness group status was determined, the sample consisted of 107 children; 58% boys and 42% girls, 92% white and 8% other ethnic groups (e.g., Chicano, Asian, East Indian, Hawaiian, and Iranian); and 51% first-borns, 33% second-borns, and 16% third- or later-borns (A. W. Gottfried et al., 1994). The families represented a wide range of middle socioeconomic status as measured by the Hollingshead Four Factor Index of Socioeconomic Status (A. W. Gottfried, 1985) ranging from skilled workers to professionals ($M = 49.8$ on the Hollingshead Index at age 8) (Hollingshead, 1975).

Throughout the course of development, a wide range of developmental and environmental data have been collected using highly reliable and valid measures including standardized tests (A. W. Gottfried & A. E. Gottfried, 1984; A. W. Gottfried, et al., 1994). Children's development was assessed every 6 months from ages 1 to 3.5 years, and yearly from age 5 years onward. Developmental assessments were conducted in a university lab. A detailed description of the Fullerton Longitudinal Study can be found in A. W. Gottfried et al. (1994).

The full scale IQ score obtained with the Wechsler Intelligence Scale for Children (WISC-R) (Wechsler, 1974) at the 8-year assessment was used to create the gifted and comparison groups. This score was used because of its reliability, validity, and relative stability at that age (A. W. Gottfried et al., 1994), and because of the pervasive use of IQ as a criterion for giftedness in the schools today (Pendarvis et al. 1990). Children were designated as gifted if they obtained a score of 130 or greater on the full scale WISC-R score at age 8. This resulted in 20 children who placed in the gifted range, and 87 who did not. The average IQ score of the gifted children was 137.8 with scores ranging from 130 to 145. The average IQ score of the comparison group was 110.9 with scores ranging from 84 to 128.

In the realm of studies concerning the gifted, the present longitudinal study is unique inasmuch as children were not preselected into the study based on their IQ score. Hence, there is no ascertainment bias in the present research as the children all entered the study at the same time, and were not a preselected sample. As parent and

teacher nominations were not present in the current study, factors that may bias a study when nominations are used were not operating in the present research. The gifted children emerged as gifted later in the research, and hence the comparison group comes from the same study sample, or cohort, and does not suffer from matched group design problems (A. W. Gottfried et al., 1994).

Procedure

Academic Intrinsic Motivation. Academic intrinsic motivation was assessed at ages 9, 10, and 13 years with the Children's Academic Intrinsic Motivation Inventory (CAIMI) (A. E. Gottfried, 1986a). The CAIMI is a published scale providing reliable and valid assessment of children's intrinsic motivation for school learning measuring: enjoyment of learning, an orientation toward mastery, curiosity, persistence, task endogeny, and learning challenging, difficult, and novel tasks. The CAIMI provides separate scores for reading, math, social studies, science, and school in general. Details regarding instrument development can be found in A. E. Gottfried (1985, 1986a). Briefly, the CAIMI was developed to measure academic intrinsic motivation as differentiated across subject areas according to the theoretical definitions in the literature cited above. It has substantial internal consistency reliability within and across subscales, and stability over a 2-month period, as well as considerable criterion related and construct validity (A. E. Gottfried, 1985, 1986a, 1990; A. E. Gottfried, Fleming, & A. W. Gottfried, 1994; A. W. Gottfried et al., 1994). Principal components analysis supported the distinction into subject areas (A. E. Gottfried, 1985). Children individually completed the CAIMI during their yearly assessments at the University Laboratory.

In previously reported data (A. W. Gottfried et al., 1994) earlier measures of academic intrinsic motivation were collected at ages 7 and 8 using the Young Children's Academic Intrinsic Motivation Inventory (Y-CAIMI; A. E. Gottfried, 1990), and from ages 1 through 6 years, cognitive mastery motivation was measured using the Bayley Behavior Record (A. W. Gottfried et al., 1994; also see Matheny, 1980). Continuity between the Bayley Behavior Record and the CAIMI through age 13 has been previously reported (A. E. Gottfried & A. W. Gottfried, 1994). The continuity of earlier measures of mastery motivation with the CAIMI further supports the construct validity of the CAIMI as a measure of intrinsic motivation. This earlier data will be discussed in relation to the current findings.

Results

The data from the 9, 10, and 13 year CAIMI administrations were analyzed using repeated measures MANOVA in which age (9, 10, and 13 years) was the repeated factor, and giftedness status (Gifted vs. Comparison Group) and gender (Boys vs. Girls) were the between subjects factors. The total number of participants included in the repeated

measures analyses was 99 due to selection of only complete cases (20 gifted children and 79 children in the comparison group; 43 girls and 56 boys). A two step analysis was conducted. In the first analysis, a doubly multivariate MANOVA was conducted in which age was the repeated factor and CAIMI subscales (Reading, Math, Social Studies, Science, and General) were the multiple dependent measures (using the total score of each scale). Subsequent to obtaining a significant multivariate F , the F 's for each subject area were evaluated for significance separately. In order to do this each subject area subscale was analyzed with univariate repeated measures ANOVA. When evaluating the alpha value of each univariate F for significance, the p value was adjusted using Holm's sequential Bonferroni procedure in order to control for alpha error (A. W. Gottfried et al., 1994). All reported significance values exceeded the adjusted critical values.

The results consistently showed highly significant effects for giftedness status. Regarding MANOVA, the Multivariate F was significant, $F(5, 91) = 3.63, p = .005$. Across all the subject areas, and for school in general, the gifted children had significantly higher academic intrinsic motivation relative to the comparison group. Univariate F values for the Giftedness Status factor were the following: Reading — $F(1, 95) = 8.25, p = .005$; Math — $F(1, 95) = 15.91, p < .001$; Social Studies — $F(1, 95) = 8.48, p = .004$; Science — $F(1, 95) = 10.81, p = .001$; and General — $F(1, 95) = 15.22, p < .001$. Mean differences between the gifted and comparison groups on the CAIMI are presented in Table 1.

There was no significant main effect for gender, or significant interactions between giftedness and gender. There was no multivariate significant main effect for age, and no reliable significant interactions between age and the other factors.

Discussion

Relative to the comparison group children, those who were identified as gifted at age 8 evidenced superior academic intrinsic motivation at ages 9 through 13 years across academic subject areas and for school in general. These findings are consistent with the body of data we have collected regarding the motivation of gifted children from infancy through early childhood (A. W. Gottfried et al., 1994). From the early years through adolescence, children who are identified as gifted evidence superior persistence, attention, curiosity, enjoyment of learning, and orientation toward mastery and challenge. The present findings extend the body of data into adolescence. Not only did gifted children have superior motivational behaviors in infancy, but they continued to maintain their superiority in academic intrinsic motivation during adolescence.

Based on these data, we propose that intrinsic motivation is a developmental process associated with the development of giftedness. Since gifted children in the

Table 1
Means and Standard Deviations for Gifted Children's and Comparison Cohorts' Academic Intrinsic Motivation
Across Ages 9, 10, and 13 years: Reading, Math, Social Studies, Science, and General

Giftedness Status	Academic Intrinsic Motivation				
	Reading	Math	Social Studies	Science	General
Gifted					
9	106.25 (13.70)	107.30 (14.05)	103.85 (14.65)	107.85 (13.14)	73.95 (6.66)
10	100.85 (17.40)	103.85 (10.79)	99.50 (21.29)	103.45 (17.97)	73.35 (8.14)
13	93.95 (19.75)	106.30 (12.30)	97.05 (16.91)	104.25 (13.61)	73.90 (7.97)
Comparison Group					
9	91.38 (20.06)	98.66 (16.41)	87.80 (20.44)	96.20 (19.67)	68.57 (8.38)
10	91.07 (17.80)	94.77 (17.66)	90.98 (19.37)	96.44 (17.10)	67.85 (8.74)
13	88.63 (16.24)	89.98 (14.88)	88.66 (17.96)	89.04 (16.64)	66.58 (7.91)

Note: Standard deviations are in parentheses. Academic intrinsic motivation scores are the totals of each CAIMI scale. The General scale consists of a fewer number of items than the subject area scales resulting in lower total scores.

present sample evidenced significantly higher cognitive mastery motivation indices on the Bayley Behavior Record as early as 18 months of age, we conceptualize motivation as a developmental process that is important to the development of giftedness and potentiation of gifted achievements as we have advanced in Potentiality-Enrichment Theory (A. W. Gottfried et al., 1994). It is possible that children who find cognitive task engagement enjoyable at an early age are more likely to continue to immerse themselves in cognitive tasks enhancing both exposure to stimulation and children's intellectual development. This view is suggested by the present data in which the group of children who were identified as gifted at age 8 continued to evidence significantly greater academic intrinsic motivation through early adolescence. Further, this group of children had evidenced superiority in early indices of intrinsic motivation as early as infancy. It is therefore proposed that intrinsic motivation is a significant construct for further study regarding the development of giftedness. Future research may seek to examine whether directional relationships exist between academic intrinsic motivation and giftedness.

We suggest that more attention needs to be paid to the nurturance of motivation. This study offers support for the

practice of including academic intrinsic motivation in selection procedures, using motivational assessments that have been shown to be valid with regard to detecting differences between gifted children and a comparison cohort. Finally, curriculum needs to be attentive to providing the optimal level of challenge for gifted children, and indeed for all children, in order to continue to provide motivating experiences (A. E. Gottfried, 1986b). Motivational assessment is also relevant to the ongoing gifted programs as it may be able to strengthen instructional programs based on the motivational profiles of gifted students.

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