Learning Preferences and Skill Patterns among Underachieving Gifted Adolescents

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Abstract
The performance of achieving and underachieving gifted adolescents was compared on achievement subtests requiring either analytic/convergent or holistic/divergent cognitive processing. Underachievers exhibited a significant performance discrepancy between these two types of subtests that favored those requiring holistic rather than analytic information processing. The achievers showed no such discrepancy. Underachievers then, perform as well as achievers on tasks which require holistic processing but do not perform as well on detailed or computational tasks which require precision, attention to detail, and/or convergent problem solving.

A topic of seminal interest in gifted education has been the phenomenon of academic underachievement. Gifted underachievers are usually considered to be students whose actual grades fall significantly below their predicted performance based on standardized achievement and/or intelligence tests. Moreover, the performance of some underachievers may be uneven or “inefficient,” as reflected by significant subtest scatter on tests of achievement (Jastak & Jastak, 1965; Norman, Clark, & Bessemer, 1962). This academic underachievement may be due in part to a preference for a learning style which may lead to poorly developed skills and study habits for tasks requiring analytical skills and attention to detail, as many school tasks do (Redding, 1989). The study was an exploratory investigation to test this hypothesis.

The effects of learning styles and/or cognitive styles on learning and achievement have been a topic of much investigation recently (e.g., Biggs, 1984; Entwistle, Hanley, & Hounsell, 1979), and with reference to gifted children (e.g., Dunn & Price, 1980; Griggs & Price, 1980). Impulsive children, for instance, have been found to perform better on tasks which require attending to a holistic gestalt than on “analytic” tasks which require attention to detail (Zelinker & Jeffrey, 1976). Similarly, gifted underachievers may underachieve because of a learning preference which results in relative performance deficits in analytical or computational tasks which require precise and detail-oriented information processing. Some investigators have characterized this pattern as a learning disability among the gifted (Schiff, Kaufman, & Kaufman, 1981). In contrast, gifted underachievers appear to perform well in and to be interested in tasks which are more highly creative and less detail oriented (Redding, 1989; Whitmore, 1980). Such “holistic” tasks are often verbal tasks involving reading, writing, or conceptual synthesis of ideas rather than computational or procedural tasks. Teachers have noted that many underachieving gifted prefer reading as a hobby as well as abstract, conceptual tasks (Griggs & Dunn, 1984; Whitmore, 1980).

There has been much research relating to learning styles among various populations; however, this study was designed to evaluate how learning preferences and skills (rather than intellectual abilities, per se) are reflected in differential performance across tasks which differ according to the type of cognitive processing they require.

Specifically, this study tested whether, relative to gifted achievers, gifted underachievers exhibit relative performance deficits in tasks which require analytic information processing. If underachievement is associated with such a differential performance pattern, then academic performance (in

Putting the Research to Use
The results of this study suggest that the performance of underachievers can be improved by explicitly modeling analytical problem-solving strategies and by motivating them to persist at detail-oriented, analytical tasks. Gifted underachievers who show deficits in detailed, computational, and convergent problem-solving should be taught explicit strategies for disciplined, reflective problem solving. The strategies should stress the importance of accuracy and persistent concentration toward solving problems. The instruction should be designed so that students can see for themselves the difference using the strategies taught makes in their performance.

Counselors can help motivate underachievers by explicitly pointing out their weaknesses in analytical problem solving, showing them how such weaknesses impair their school performance. They should emphasize that such weaknesses are not due to lack of ability but simply to a lack of motivation for such tasks and demonstrate through modeling and coaching the relative ease with which such deficits can be overcome. Ideally, such efforts would be coordinated among the counselor, a special education teacher, teachers, and the parents. Group counseling and practice problem solving with other students is also helpful.
terms of grades) should be related to the degree of discrepancy between performance on “analytic” versus “holistic” tasks or knowledge domains. Furthermore, if such underachievement reflects simply a learning preference or skill pattern (which over time may result in discrepant achievement) rather than a cognitively “hardwired” aptitude pattern, then neither verbal nor performance IQ should be related to such differential achievement test performance. The Wechsler, for example, was designed to measure innate abilities as well as incidental knowledge acquired, whereas achievement tests typically assess specific academic skills learned at school.

Method

Subjects

Participants were 50 junior high school boys and girls. (Mean age = 13.1 years). These students were drawn from an initial subject pool of 130 junior high school students. Parental as well as participant consent was obtained from all students in the pool. Participants were from middle to upper-middle class families and were enrolled in a school for the gifted in a suburban school district. (Criteria for admission into the school include a score of 130 or greater on the Wechsler Intelligence Scale for Children [WISC-R] and favorable recommendations from teachers.)

Measures

Achievement Level. Students’ achievement subtest scores on the Comprehensive Assessment Program of the Scott-Foresman Achievement Test Series (e.g., Wick, Beggs, Smith, & Monie, 1980), WISC-R scores, and grades were obtained from school records.

The mean GPA for each student was calculated based on the grades he or she had obtained in courses during the previous school year in English, mathematics, science, social studies, and foreign language. In accordance with the school’s grade weighting procedure, an “A” was assigned a value of five points for “honors” courses. In order to control for regression effects, as suggested by Thorndike (1963), underachievement was defined as the discrepancy between actual GPA and predicted GPA, based upon a regression procedure used to predict GPA based upon full scale WISC-R IQ scores. (This initial regression was performed using the SPSS bivariate regression program on the entire initial pool of subjects.) The “underachievers” were those whose predicted GPA (based on their WISC-R score) was at least 1.0 standard error of estimate higher than their actual GPA during the previous school year. This procedure resulted in 25 “achievers” and 25 “underachievers.” Additionally, the WISC-R performance composite score was subtracted from the verbal composite score to obtain the measure of “verbal superiority” (V-P IQ).

Achievement Scores on “Analytic” versus “Holistic” Tasks. The achievement subtests were dichotomized into two categories in a manner congruent with the research hypothesis. The Mathematics Computation, Capitalization, and Vocabulary subtests were considered to reflect achievement in tasks requiring analytical, convergent thinking. These tests tap analytic computational and syntactical skills which require precision and attention to detail. Subtests considered to be characteristic of less analytic tasks requiring more holistic information processing were Mathematics Concepts, Reading Comprehension, and Vocabulary. Reading comprehension requires synthesis of a body of material, mathematics concepts requires conceptual thinking, and vocabulary requires an understanding of word meanings.

Results

As predicted, underachievers’ mean scores on achievement subtests requiring analytical processing were significantly lower than their mean scores on subtests requiring a holistic information processing style.

A median split was performed based on verbal superiority (V-P IQ). A 2 x 2 ANOVA (achievement level x verbal superiority) was performed, with differential subtest performance (i.e., analytic versus holistic) as the dependent measure. A significant interaction was obtained for achievement level and subtest performance [F (1,48) = 11.25, p < .001]. The underachievers’ mean percentile score on the holistic subtests was significantly greater (M = 87.40, SD = 1.52) than their mean percentile score on analytic subtests (M = 75.70, SD = 2.44). The mean score on holistic subtests for the achievers (M = 90.0, SD = 6.87), however, was not significantly greater than the achievers’ mean score on analytic subtests (M = 88.8, SD = 14.53). Underachievers’ mean scores on all of the individual “analytic” subtests were lower than their scores on the “holistic” subtests. Thus, this discrepancy in favor of the holistic subtests appears to be characteristic only of the underachieving gifted.

Forty of the 50 participants (80%) had verbal IQ scores which exceeded their performance IQ score, and this proportion is significantly greater than would be expected by chance (Z = 4.32, p < .001). No significant effect on differential achievement test performance, however, was found for verbal superiority (V-P IQ) or verbal or performance IQ scores considered separately. This suggests that the relative deficit underachievers exhibit in analytic tasks is not a function of an underlying cognitive inferiority in “performance IQ” (which loads more heavily on analytical, convergent problem solving skills and perceptual organization [Zimmerman & Wooten, 1973]) compared to “verbal IQ”.

Discussion

While differential performance on the achievement subtests is not related to a difference between verbal and performance IQ, it is related to level of school achievement (i.e., GPA). The underachievers showed a significant performance differential between holistic and analytic tasks, whereas the achievers showed no such discrepancy. Underachievers’ performance on subtests requiring detail analysis was significantly
lower than on subtests requiring holistic information processing.

Underachievers perform at a high level on tasks which require synthesizing but do not perform as well on detailed, computational, or convergent problem-solving tasks which require precise and analytic information processing. A significantly greater proportion of this sample (including both underachievers and achievers) had verbal scores greater than performance scores, which is consistent with the findings of Kennedy, Willicutt, and Smith (1963) who reported the same pattern among gifted adolescents, as well as those of Schiff, Kaufman, and Kaufman (1981) who found an average P-V IQ differential in superior, learning-disabled children double that typically found in average populations. Relative verbal superiority, however, did not predict performance on either analytic or holistic subtests in this study. Thus, the relative deficit underachievers exhibit in analytical tasks appears not to be due to an underlying cognitive inferiority in analytical or convergent problem-solving skills. Learning styles or specific skill deficits, rather than discrepant intellectual abilities, may determine the resulting achievement patterns.

In an important paper on research issues in studying children's achievement, Crandall, Katkovsky, and Preston (1960) noted that "our observations suggested that achievement motivation, achievement standards, achievement expectations, and achievement effort may vary markedly from one achievement area to the other" (p. 790). Similarly, the present results suggest that achievement is not unidimensional; the achievement patterns of gifted achievers differ from those of underachievers, and gifted underachievers themselves show unevenness in their achievement. Unfortunately, however, achievement areas in which the underachievers may excel are not those emphasized by most traditional secondary school curricula, and those areas in which they are relatively weak are often those most valued and include the skills most frequently assessed within the school system (Redding, 1989; Whitmore, 1980).

In general, gifted youngsters prefer tasks and learning environments which emphasize independent learning, application, creativity, and the integration of knowledge (Griggs & Dunn, 1984; Whitmore, 1980); such tasks tend to be relatively unstructured and emphasize concepts rather than facts (Domino, 1971). The empirical as well as the case study literature indicates that the gifted are generally low in conformity and highly independent (Clark, 1979; Griggs & Dunn, 1984) and that they prefer learning which involves a search for "meaning" rather than the mastery of discrete facts and details or rote learning (see Entwistle, Hanley, & Hounsell, 1979; Redding, 1989).

The central issues for pedagogy revolve around matching the educational curriculum to the learning preferences of these students and helping underachievers modify their learning styles and improve their problem-solving skills so that they may function better academically. Since achievement can be viewed as a function of the interaction between learning style and learning environment, the school system also needs to adjust to these students' special needs, so that there is a better match between the school curriculum and their learning preferences. Research has shown improvement in student performance when teaching style is matched to students' learning styles or preferences (Brown, 1978). Rimm (1986), however, argues that "...if school is to become a preparation for the real world" (p. 258), it should not be communicated to underachievers that the school will simply change to accommodate their preferences.

Although the present results suggest that ability differences do not account for the discrepant achievement among underachievers, gifted underachievers have been found to have poor study habits and weak skills, and to make little effort on those school tasks which they claim are boring or irrelevant (Newman, Dember, & Krug, 1973; Rimm, 1986). Because they may prefer conceptually oriented, holistic tasks, underachievers may have poor study habits and make little effort, particularly when presented with analytical, convergent problem-solving tasks. Learning-disabled gifted children, for instance, have been found to have difficulty in structured tasks, such as spelling and mathematics, which require convergent thinking in spite of having special talents in verbal and expressive skills and exceptional creativity (Schiff, Kaufman, & Kaufman, 1981).

The gifted may prefer holistic tasks, although the present results indicate that only underachievers have relative performance deficits in analytic tasks as compared to holistic tasks. One possible correlate of this skill pattern among underachievers may be a tendency toward sensation-seeking. Underachievers may tend to be impulsive, anxious, high-strung, and sensation-seeking (see Redding, 1989 for a review). This tendency hinders their performance in structured, convergent problem-solving tasks, which necessarily require patience and perseverance. Impulsive, sensation-seeking individuals prefer continuous stimulation; they are less likely to persist at tedious tasks, since they quickly lose their intrinsic appeal. This results in rapid responses and less accuracy, as the student tries to complete (or, often only partially complete) one task quickly in order to pursue the next novel task. This temperamental pattern may result in poorly developed skills in concentration, attention-allocation, goal-directed task persistence, and accuracy in convergent problem solving.

Underachievers, then, need to be taught skills appropriate for achievement in those tasks which require rote learning, detail-analysis, and convergent problem solving. Intervention programs which teach specific study skills to underachievers have generally proven effective in bolstering achievement (Crittenden, Kaplan, & Heim, 1984; Haggett, 1971). This is in contrast to counseling aimed at improving underachievers' self-image, which has generally been unsuccessful (Dowdall & Colangelo, 1982). Underachievers must be explicitly taught strategies for modifying their idiosyncratic
learning styles, study habits, and temperament in order to become achievers within the school system.

Educators and counselors could help these students by motivating them to persist at detailed problem solving tasks which they find boring or tedious, and by stressing the payoffs in doing so. Counseling of underachievers should be directed towards helping them to identify the links between learning efforts and outcomes, and to recognize and improve their specific skill or temperament problems (Rimm, 1986) so that they may compete effectively in school. Mandel and Marcus (1984) have proposed a treatment approach which uses "constructive confrontation" as a way of challenging underachievers to directly confront their relative skill deficits and/or attitudinal shortcomings and to modify them appropriately.

The results of this study have implications for the assessment of gifted children. Educators should attend to the pattern of subtest scores across achievement domains, to assess differential abilities which impact upon the direction of achievement. Although overall IQ and achievement test scores have been generally found to be moderately correlated (Jastak & Jastak, 1965), the present results indicate that differential achievement test performance was not associated with similar differential performance on an IQ test, providing further support for the notion that IQ and achievement tests lend themselves to differential prediction. Finally, it should be recognized that because underachievers may have learning preferences and study skills which hinder performance in typical school tasks, but which may be beneficial for creativity and higher-order thinking, their actual grades may underestimate their true academic potential and undervalue their creativity.

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References