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ABSTRACT

This study investigated cognitive style as a screening mechanism for placing students in gifted education programs. Middle school (n=156) and high school students (n=94) were included in this study. Slightly fewer than half of the students had been previously identified as academically gifted, while the remainder were from the regular studies program. Approximately half of the students were female. Participants completed the Group Embedded Figures Test (GEFT), an instrument designed to measure cognitive style. A factorial analysis of variance showed no significant interactions between program type and school year on scores from the GEFT. Main effects, however, were significant for gender and program type. Students identified as gifted scored significantly higher than their counterparts in the regular education program, and males in both programs scored significantly higher than their female classmates. The data were entered into a logistic regression procedure to determine the probability of predicting a given student's program type based on his or her gender and GEFT score. The statistical software removed the gender variable and was able, using the GEFT score, to predict program type in 74% of the cases. Some cautions based on study design and the fact that cognitive style may change with age are discussed. (Contains 1 table and 12 references.) (SLD)

The Use of Cognitive Style as a Predictor of Membership in Middle and High School Programs for the Academically Gifted

by

Steven R. Terrell, Ed.D.

Paper Presented at the Annual Meeting of the American Educational Research Association, April 1-5, 2002, New Orleans, Louisiana.

Introduction

Methods by which children are identified and selected for inclusion into programs for the academically gifted vary from school to school, district to district and state to state. Data upon which these decisions are based may come from standardized achievement and intelligence tests, interviews with teachers and parents, portfolio assessment and various forms of alternative, authentic and performance-based evaluation (Fischetti, Emanuelson & Shames, 1998; Johnsen & Ryser, 1997; Kingore, 1995; Ryser, 1994). While, overall, these methods are effective, criticism has been leveled toward the racial and gender bias inherent in standardized testing as well as the large amounts of time and money generally involved in assessment and testing of this type. Critics note that much of this effort and expenditure is wasted as only about 50% of children initially identified and tested are ultimately placed into a gifted program (Linville, Rust & Kim, 1999).

Given that, researchers have called for the identification or development of alternative screening tools to be used before the full assessment of a given student (Linville, Rust & Kim, 1999). Such screening, it is felt, would decrease the time and money spent on students who ultimately are not placed into a program for gifted students. This study investigates one construct, cognitive style, which should be considered when developing such a screening mechanism.

Cognitive Style

According to Witkin, Oltman, Raskin and Karp (1971), cognitive styles are the "characteristic, self-consistent modes of functioning which individuals show in their perceptual and intellectual activities" (p. 3). One aspect of cognitive style is perceptual style or the manner in which a person cognitively approaches a learning situation. In terms of perceptual style, a

person can be classified as field independent or field dependent. Prior studies (Witkin, Moore, Goodenough & Cox, 1977) have shown that field-independent and field-dependent students do not differ in learning ability but may respond differently to the content being presented as well as the learning environment. Students classified as field-independent tend to be highly analytical, are internally motivated, have self-defined goals and are more likely to solve problems without explicit instructions or guidance. Field-dependent learners have difficulty learning unstructured material, tend to need externally defined structure, goals and reinforcement and may need explicit instructions on how to solve a problem. Identification of gifted children based on cognitive style is not a new idea but the research has been limited primarily to elementary school children (Steel, 1989; Young & Fouts, 1993).

Methodology

Given these issues, this study addresses the use of cognitive style to predict membership in middle and high school programs for the academically gifted. Both middle and high school students (n=250) were included in this study. Ninety-four of these students were enrolled in a first-year biology class in a large urban high school with the remainder (n=156) enrolled in an 8th grade history class. Slightly less than half of the students (n=119) had been previously identified as academically gifted while the remainder (n=131) came from the regular studies program. Approximately half of the students (n=122) were females with an average age of 14.01 for all students. Although the specific race or ethnic group of the participants was not recorded, both schools involved in the study are located in an upper-middle class, predominantly non-Hispanic white neighborhood.

After obtaining parental permission, the children were administered the *Group Embedded Figures Test* (GEFT), an instrument designed to measure cognitive style. The respondent is

asked to identify eighteen simple forms hidden within complex figures with scores ranging from zero (field dependency) to 18 (field independency). The validity of the GEFT has been established by significant positive correlations with the individually administered *Embedded Figures Test* as well as other instruments, such as the *Rotated Figures Test*, designed to measure like constructs. Reliability scores (r= .82) have been shown to be acceptable (Witkin, Oltman, Raskin & Karp, 1971). Studies have shown males tend to score slightly, but significantly higher (p< .005), than females. This is consistent with the literature that suggests, overall, that males have higher levels of field independence than females (Witkin, Oltman, Raskin & Karp, 1971). Studies investigating cognitive style and race have shown mixed results (Kush, 1996; Shade, 1981).

Data Analysis

Descriptive statistics for this study are shown in Table 1. A factorial analysis of variance showed no significant interactions between gender, program type and school year on scores from the Group Embedded Figures Test. Main effects, however, were significant for gender and program type. Students identified as gifted scored significantly higher than their counterparts in the regular education program (F = 87.749, p = .000). Males, in both programs, scored significantly higher than their female classmates (F = 14.036, p = .0000).

Based on these results, the data were entered into a logistic regression procedure to determine the probability of predicting a given student's program type based on their gender and GEFT score. Although a significant overall difference existed between males and females, the statistical software removed the gender variable (p = .1988) because of a non-significant interaction between program type and gender (F = .272, p = .602). The software was able, using the GEFT score, to correctly predict program type in 74% of all cases (p = .0000). This included

a prediction rate of 74.79% for gifted students and 73.28% for students in the regular education classroom.

Table 1

Descriptive Statistics by Program, School Year and Gender

TYPE	SCHOOL	GENDER	Mean	Std. Deviation	N
Gifted	Middle	Female	13.3226	4.30803	31
		Male	14.7805	2.32929	41
		Total	14.1528	3.38039	72
	High	Female	12.5909	3.41787	22
		Male	14.7200	3.16912	25
		Total	13.7234	3.42435	47
	Total	Female	13.0189	3.94428	53
		Male	14.7576	2.65481	66
		Total	13.9832	3.38987	119
Regular	Middle	Female	7.8444	4.40018	45
		Male	10.5385	4.57594	39
		Total	9.0952	4.65592	84
	High	Female	8.000	4.56832	24
		Male	9.5217	4.40939	23
		Total	8.7447	4.50829	47
	Total	Female	7.8986	4.42634	69
		Male	10.1613	4.50571	62
		Total	8.9695	4.58918	131
Total	Middle	Female	10.0789	5.11146	76
		Male	12.7125	4.16797	80
		Total	11.4295	4.82080	156
	High	Female	10.1957	4.63618	46
		Male	12.2292	4.59528	48
		Total	11.2340	4.70284	94
	Total	Female	10.1230	4.91847	122
		Male	12.5312	4.32159	128
		Total	11.3560	4.76824	250

Summary, Discussion and Conclusions

While these results are promising, care must be taken for several reasons. First, cognitive style may change with age. Schunk (2000), for example, points out that children tend to be more field-dependent in their preschool years with a subsequent increase in field-independence that

extends into adolescence. Since most children are identified for placement into gifted programs early in their academic careers, it is quite possible that the use of cognitive style as an identification tool with that age group could be discriminatory toward children who are cognitively delayed. At the same time, use of cognitive style for the group under consideration in this study seems quite appropriate.

Cognitive style has also been criticized due to gender differences. As Witkin, Oltman, Raskin and Karp (1971) point out, males tend to be more field independent than females although these differences seem negligible before about age eight. Knowing this, many researchers might be hesitant to use cognitive style for fear of bias toward female students. To allay these concerns, attention should be paid to the fact that, in this study, females identified as gifted scored significantly higher ($t = 3.626$, $p = .0000$) than males in the regular education curriculum. This observation is substantiated by the fact that the logistic regression software excluded the gender variable in the calculations.

There are several opportunities for further research along this vein. For example, it should be noted that giftedness, in the context of this paper, describes children identified as academically gifted. With the continued push to approach giftedness from a multiple intelligences perspective, further research should be conducted to determine if cognitive style is a valid predictor of giftedness in other domains. Additional work should also be conducted regarding the validity of using cognitive style to predict giftedness in various racial and ethnic groups. Given these caveats and opportunities for further research, the use of this construct could become an effective and highly reliable method for predicting inclusion in programs for the academically gifted.

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