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ABSTRACT

Interrelationships of intellectual ability, task commitment, and creativity were examined for gifted fifth through seventh graders. Ss were administered the Crockett Role Category Inventory, the Iowa Tests of Basic Skills and the Torrance Tests of Creative Thinking. As expected, no significant correlations among test results were noted. However, when grade and gifted category were used as factors, the developmental trend expected--cognitive complexity increasing with grade level--was not found, nor did the category of giftedness differentiate cognitive complexity scores. Creative Ss chosen by teachers performed well on the creativity test. Results did not support the use of cognitive complexity as a measure of intellectual sophistication. (CL)

COGNITIVE COMPLEXITY AND GIFTED EDUCATION:

A STUDY OF 5th, 6th, & 7th GRADERS

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The developmental approach to the study of communication has spawned a research tradition that focuses on the increasing sophistication of children's persuasive communication as they grow older. These studies have aided both the explication of the developmental process and the development of criteria for communication effectiveness.[1]

This area of interpersonal communication is centrally positioned in the construct theory of human development. In this framework, Kelly posits that perceivers rely on sets of personal judgemental dimensions (constructs) which form their understandings of social situations and thus predict and control events.[2] O'Keefe and Delia note that "as communicators develop the capacity to more effectively conceptualize the subjective perspectives and psychological characteristics of their listeners, they should be better able to produce listener-adapted persuasive strategies."[3] These effective conceptualizations," are described--from the constructivist perspective--as complex systems of interpersonal constructs which tend to elect stable, differentiated, and psychologically centered impressions. These interpersonal constructs are said to be a necessary prerequisite for the production of sensitively adapted messages by children.[4]

Studies from the constructivist perspective often focus on the differences which occur across the course of childhood development. For example, Clark and Delia find that with increasing

age, communication strategies and requests become progressively more sophisticated, and the number and variety of types of arguments they produce increases.[5] In this manner, interpersonal communication becomes a primary basis for both the social prediction of communication effectiveness as well as a developmental measurement.[6]

Another body of research focuses on the development of a targeted group of youngsters--those who appear to be "gifted." The original perspective, which categorized youngsters according to content-centered and memory-oriented criteria, has given way to an emphasis on the cognitive and affective developmental processes.[7] Gifted behavior is now considered to be the result of three clusters of traits; above average ability, task commitment, and creativity.[8] "Outstanding accomplishments occur when these interacting traits are brought to bear on one or a combination of specific performance areas (i.e., the numerous ways and means through which human beings express themselves in real life situations)."[9]

The difficulties with the gifted education movement rest in two major areas. First, broadening the conceptions of "giftedness" to move beyond good test-taking skills and encompass the cognitive and creative developmental process conception. The concern here is for developing more complex behaviors and more comprehensive products.[10] Second, the shift away from a single-measurement definition of giftedness (i.e., the IQ test) to sets of behaviors has complicated the identification of children who can benefit from gifted education programs. "Both the broadened

conceptualization of gifted behaviors, and the identification process, can be enhanced by the introduction of interpersonal construct theory approaches to studying childhood development. The gifted education movement wishes to focus on the ways and means humans express themselves in real life situations, and "develop more complex behaviors and more comprehensive products. It seems most reasonable that the development of constructs which guide interpersonal communication and facilitate sophisticated real-life interactions is an important area to be considered by gifted educators.

The constructivist communication research tradition has found that a good overall index of the developmental status of the construct system is the degree of differentiation in the system.[12] Development of the construct system proceeds along a number of interrelated dimensions such as differentiation, integration, abstractness, predictability, comprehensiveness, etc. which are moderately and positively correlated.[13] Clark and Delia report significant correlations between the level of perspective-taking underlying persuasive messages and independent assessments of both the children's perspective-taking skills and the differentiation of their free description of others (cognitive complexity), even with the effect of age partialled out.[14] Applegate and Delia showed that among children of the same age group, cognitively complex subjects produced messages better adapted to features of the context and the listener's perspective than did noncomplex subjects.[15] And O'Keefe and Delia discovered that in a college sample, cognitive complexity was a significant predictor of the number of appeals, arguments, and adaptions produced in a persuasive communication task.[16]

Because cognitive complexity appears to be related to children's increased perspective-taking skills and the ability to strategically plan their interpersonal communication, this construct measure is suggested as a means for tapping the more complex behaviors and means of expressing onseself in real situations deemed important by gifted educators. That another measure may be more developmental than the traditional measure of intellectual ability, the IQ test, is especially important given the attacks against the IQ test (culturally biased; socio-economic bias, etc.)[17] as an indicator of giftedness. As one frequently used definition of "intellectual ability" is the identification of pupils whose general mental development is significantly accelerated beyond that of their chronological peers, cognitive complexity seems particularly appropriate given its differentiation from age.

The identificmcion problem also requires that task commitment and creative ability be assesed when focusing on gifted behavior. The operationalization of task commitment varies a good deal depending on its conceptualization as an input, process or output variable. As an input variable it is primarily referred to a pre-disposition to be motivated toward a task, as a process variable it could be conceived of as sets of behaviors which display determination or stick-to-it-iveness, or as achievement on tasks as an output variable. Standardized achievement tests are the most common indicators in gifted education programs as well as general classroom practice (we all remember taking the Iowa tests every year).[18]

Exactly what constitutes creative ability is a more

controversial issue. Again, creativity does not appear to be a unitary ability but the combination of a number of abilities. The most extensive research in the field lists: sensitivity to problems, fluency, flexibility, originality, elaboration, and redefinition.[19] Because people can be creative in a large number of ways and because creativity is primarily viewed as a process (the ability to rise to the occasion, a heightened experience) developing a test to measure this set of abilities is quite difficult. The key appears to be in isolating real life creative behaviors and developing tests that correlate with these behaviors, not necessarily with each other.[20] An important criteria, however, is that creativity be something other than another type of intelligence test.

Research Question

This study is primarily interested in using the more developmental approach to gifted education to determine measurements of the three primary traits of gifted behavior (intellectual ability, task commitment, and creativity). These measures will be explored for interrelationships and for their ability to predict which category of giftedness students are associated with.

Method

The research took place in the suburbs of a large west coast city. Seventeen schools with students in a gifted education program participated. The students are enrolled in grades five through seven. All students who were selected for the gifted program were chosen on one of the three trait criteria (intellectual, task commitment, or creativity). Students are placed in

in the program on the basis of teacher recommendations (although parents may request that their children be evaluated by the teacher for entrance into the program.) The teachers, on the basis of their experience with the children, determine which trait is primarily responsible for the child's placement in the program (no formal testing). Classmates of the students in the gifted program participated in some of the data collection procedures. A total of 485 students participated in some part of the study.

Measures

Instruments were chosen to reflect each of the three trait areas of gifted behavior.

Intellectual Ability is measured by Crockett's Role Category Questionnaire test of cognitive complexity. In this test the student identifies people filling certain role descriptions (from two to eight roles). In this case there were two roles, one a "liked" peer and one a "disliked" peer. Each respondent has five minutes to write a detailed impression of the person filling the role category. The instructions require the students to describe the person as fully as possible and to pay particular attention to the person's habits, beliefs, ways of treating others, mannerisms, and similar attributes. Scoring is completed by counting the number of discrete attributes or characteristics within each impression.[11] Reliabilities are reported from .95 to .98.

Task commitment was operationalized as achievement for this study as this is the interpretation of the gifted education program. All students in the schools are given the Iowa Achievement Tests on an annual basis. The test is broken down into sub-sections and

covers Reading, Language, and Math. The tests have reliabilities in the high nineties and are nationally normed.

Creativity is measured by the Torrance Tests of Creative Thinking. This measures three mental characteristics: fluency--the production of a large number of possibilities or hypotheses; flexibility--the use of many different approaches or strategies; and originality--the production of bold new ideas off the beaten path or the making of mental leaps. The tests have shown high validity and retest potential and are normed nationally.[12]

Procedure

The Crockett Role Category Inventory was administered to non-gifted and students in the gifted program (n=235). Ten individuals from the school district office went to the individual schools and took the students out of the classroom to a central meeting place to administer the test. The tests were not administered by the students' regular classroom teachers. The inventory was scored by two clerks from the school district who were trained by the researchers (interrater reliability r=.89).

The Iowa Tests of basic skill achievements were administered to every pupil by every classroom teacher in the district. The tests are computer scored (n=485).

The Torrance Tests of Creative Thinking were administered by ten people from the school district. They went to the individual schools and took only gifted students out of the classrooms to a central meeting place to administer the test. The tests were not administered by the students' regular classroom teachers. The tests were scored by the Scholastic Testing Service (n=285).

Data Analysis

The relationships between the variables were analyzed via Pearson Product Moment Correlation coefficients. The prediction of students into their gifted trait category was accomplished by a discriminant analysis. Levels of significance were set at .05.

Results

Inspection of the correlation coefficients (see Table 1) shows a number of significant correlations, but no important ones (all under r=.25). This is as it should be. The tests were chosen to measure distinct abilities and, therefore, the tests and sub-test measures should not be highly correlated.

TABLE 1

Pearson Correlation Coefficients

	Iowa Reading	Iowa Language	Iowa Math	Crockett Inventory
Torrance Fluency	0.07 (285) p=0.12	0.07 (285) p=0.12	0.11 (281) p=0.03	0.19 (92) p=0.03
Torrance Flexibility	0.12 (285) p=0.02	0.09 (285) p=0.06	0.15 (281) p=0.01	0.16 (92) p=0.06
Torrance Originality	0.15 (285) p=0.01	0.01 (285) p=0.46	0.08 (281) p=0.09	0.24 (92) p=0.01
Crockett Inventory	0.14 (97) p=0.09	0.11 (97) p=0.13	0.03 (95) p=0.37	1.00 (97)

To make sure the cognitive complexity measure was functioning as expected, an analysis of variance was done using grade (5,6,7) and gifted category (intellectual ability, achievement, creativity) as factors. The results indicate that the developmental trend expected--cognitive complexity increasing with grade level--was

not found, nor did the category of giftedness differentiate cognitive complexity scores (see Table 2).

TABLE 2

Cognitive Complexity by Grade and Gifted Category

Source of Variation	Sum of Squares	DF	Mean Square	F	Sig. of F
Within Cells	2733.29	81	33.74		
Regression	171.76	3	57.25	1.70	.17
Constant	1552.71	1	1552.71	46.01	0.0
Grade	35.36	2	17.68	.52	.59
Gifted Category	5.38	2	2.69	.08	.92
Grade by Gifted	44.03	3	14.68	.43	.73

The discriminant analysis is not so easily interpretable. Because of missing data, the sample size dropped to 88, so interpretations must be cautious as larger sample sizes are needed to overcome the compounded error in multivariate techniques. With this in mind, several interesting points are observed. First, the best individual variable predictor of gifted category is the score on the Iowa Language test (sig. at .04). The next best individual predictor is the Torrance Flexibility score (not sig.). These two variables formed the discriminant roots (canonical discriminant functions). The cognitive complexity score was the worst discriminator between categories of giftedness.

Because they are defined by so few variables, the functions are not very comprehensive guides to group identification but the first function is characterized by high positive relationships with Iowa Language scores and high negative relationship with Torrance Flexibility. Function 2 also has a positive relationship with Iowa Language (mid-level) but has a high positive relationship with Torrance Flexibility. Only the first root is

significant (df=6, p=0.02). Broken down by groups, the functions most accurately predicted the creative group (50.8), then the achievement group (39.3%) and least accurately, the intellectual group (17.1%). The total percent of grouped cases correctly classified was no better than chance (33.61%).

TABLE 3

Discriminant Analysis

Variable	Wilk's Lambda	F	Significance
Crockett	.99	0.28	0.84
I. Rdg	.96	1.17	0.32
I. Math	.99	0.32	0.81
I. Lang	.91	2.78	0.04
T. Fluen	.97	0.97	0.41
T. Flex	.93	1.97	0.12
T. Orig	.98	0.41	0.75

df=84

	Func 1	Func 2
I. Lang	0.86	0.55
T. Flex	-0.71	0.73

Discussion

The most important finding was that the creative group chosen by the teachers did turn out to be rather creative on the testing instruments. The other two groups fare less well although the achievement group is not completely misanalyzed. The disappointing showing of the cognitive complexity score, to discriminate between groups or to show an increasing sophistication with increasing grade levels of gifted children, does not support its use as a measure of intellectual sophistication.

Two possible explanations for this finding are: First, cognitive complexity (construct differentiation) is not a very important construct dimension when measuring intellectual ability.

Second, although these youngsters are not yet completely in the adolescent age-range, they may be more socially developed than others the same age and thus the cognitive complexity construct may be waning in its predictive ability (which happens during adolescence).[23]

These results call for further investigation into a better measure for the developmental approach to intellectual ability, and to more closely examine the relationship between perspective taking, development, and their relationship to real world behaviors. Presuming the gifted students are indeed gifted, and developmentally superior to their peers in some capacities (intellectual ability), should not cognitive complexity represent some of these developmental processes?

Notes

[1]Melvin N. Feffer, "Developmental Analysis of Interpersonal Behavior," Psychological Review, 77 (1971), 197-214; and George Mead, Mind, Self and Society, ed. Charles W.Morris (Chicago: University of Chicago Press, 1934).

[2]George A. Kelly, The Psychology of Personal Constructs (New York: W.W. Norton, 1955) 2 vols.

[3]Barbara J. O'Keefe and Jesse G. Delia, "Construct Comprehensiveness and Cognitive Complexity as Predictors of the Number and Strategic Adaptation of Arguments and Appeals in a Persuasive Message," Communication Monographs 46 (1979), 231-240.

[4]Jesse G. Delia, Susan L. Kline and Brant R. Burleson, "The Development of Persuasive Communication Strategies in Kindergarteners through Twelth-Graders," Communication Monographs, 46 (1979) 241-256.

[5]Ruth Anne Clark and Jesse G. Delia, "The Development of Functinal Persuasive Skills in Childhood and Early Adolescence," Child Development, 47 (1976), 1008-1014.

[6]O'Keefe and Delia

[7]Joseph S. Renzulli, "Will the Gifted Child Movement be Alive and Well in 1990?" Gifted Child Quarterly, 24 (1980), 3-9.

[8]Renzulli, "What Makes Giftedness: Reexamining a Definition," Phi Delta Kappan, 60 (1978), 180-184.

[9]Renzulli, 1980, p. 4.

[10]ibid

[11]Although gifted education programs have often been attacked on the grounds that the environments being provided for these youngsters would be good for all youngsters, this new approach focuses on children continually "earning the right" to participate in a gifted education. Thus the program motivates task commitment--one of the requisite behaviors--rather than a student merely being included or excluded from a given program.

[12]Jesse G. Delia, "A Constructivist Analysis of the Concept of Credibility," Quarterly Journal of Speech, 62 (1976), 361-375.

[13]O'Keefe and Delia

[14]Ruth Anne Clark and Jesse G. Delia, "Cognitive Complexity, Social Perspective Taking, and Functional Persuasive Skills in Second to Ninth-Grade Children," Human Communication Research 3 (1977), 128-134.

[15]James L. Applegate and Jesse G. Delia, "Person-Centered Speech, Psychological Development and the Content of Language Usage," in the Social and Psychological Contexts of Language, ed. Robert St. Clair and Howard Giles (Hillsdale, NJ, 1980).

[16]O'Keefe and Delia

[17]E. Paul Torrance, Creativity in the Classroom, National Association of Education Publishers, 1977.

[18]E. Paul Torrance, Guiding Creative Talent (Englewood Cliffs, NJ: Prentice-Hall, 1962).

[19]Torrance, 1977

[20]ibid

[21]Clark and Delia, 1977

[22]Torrance, 1977

[23]Delia, Kline and Burleson