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 sophisi-
cation 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 effective-
ness.1

This area of interpersonal communication is centrally described
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 Delis
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 construct-
ivist perspective--as complex systems of interpersonal constructs
which tend to create stable, differentiated, and psychologically
centered impressions. These interpersonal constructs are said
also as 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 develop-
ment. For example, Clark and Delis find that with increasing

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

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. Gifted behavior is now considered to be the result of three clusters of traits: above average ability, task commitment, and creativity. "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)."

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 to develop more complex behaviors and more comprehensive products. 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. Development of the construct system proceeds along a number of interrelated dimensions such as differentiation, integration, abstractness, perspective-taking, comprehensiveness, etc., which are moderately and positively correlated. 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 partialed out. 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. And O'Keefe and Delia discovered that in a college sample, cognitive complexity was a significant predictor of the number of appeals, arguments, and adoptions produced in a persuasive communication task.
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 oneself 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.) 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 identification problem also requires that task commitment and creative ability be assessed 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 predisposition 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). 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. 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. 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.

**Procedure**

The Crockett Role Category Inventory was administered to non-gifted 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 teachers (interrater reliability t=.89).

The Iowa Tests of Basic Skills 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>
<thead>
<tr>
<th>Test</th>
<th>Reading</th>
<th>Language</th>
<th>Math</th>
<th>Crockett Inventory</th>
</tr>
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<tbody>
<tr>
<td>Iowa</td>
<td>.07</td>
<td>.07</td>
<td>.11</td>
<td>.19</td>
</tr>
<tr>
<td>Fluency</td>
<td>p=.12</td>
<td>p=.12</td>
<td>p=.03</td>
<td>p=.02</td>
</tr>
<tr>
<td>Torrance</td>
<td>.12</td>
<td>.09</td>
<td>.13</td>
<td>.16</td>
</tr>
<tr>
<td>Flexibility</td>
<td>p=.02</td>
<td>p=.06</td>
<td>p=.01</td>
<td></td>
</tr>
<tr>
<td>Torrance</td>
<td>.15</td>
<td>.01</td>
<td>.08</td>
<td>.24</td>
</tr>
<tr>
<td>Originality</td>
<td>p=.01</td>
<td>p=.09</td>
<td>p=.01</td>
<td></td>
</tr>
<tr>
<td>Crockett</td>
<td>.34</td>
<td>.11</td>
<td>.03</td>
<td>1.00</td>
</tr>
<tr>
<td>Inventory</td>
<td>p=.09</td>
<td>p=.13</td>
<td>p=.17</td>
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</tr>
</tbody>
</table>

To make sure the cognitive complexity measure was functioning as expected, an analysis of variance was done using grade (3,6,7) 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>
<thead>
<tr>
<th>Source of Variation</th>
<th>Sum of Squares</th>
<th>DF</th>
<th>Mean Square</th>
<th>F</th>
<th>Sig. of F</th>
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</thead>
<tbody>
<tr>
<td>Within Cells</td>
<td>2751.29</td>
<td>81</td>
<td>33.74</td>
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<td>Regression</td>
<td>171.76</td>
<td>3</td>
<td>57.25</td>
<td>1.70</td>
<td>.17</td>
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<tr>
<td>Constant</td>
<td>1552.71</td>
<td>1</td>
<td>1552.71</td>
<td>46.01</td>
<td>.00</td>
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<tr>
<td>Grade</td>
<td>35.26</td>
<td>2</td>
<td>17.63</td>
<td>.52</td>
<td>.59</td>
</tr>
<tr>
<td>Gifted Category</td>
<td>5.38</td>
<td>2</td>
<td>2.69</td>
<td>.08</td>
<td>.92</td>
</tr>
<tr>
<td>Grade by Gifted</td>
<td>44.03</td>
<td>3</td>
<td>14.68</td>
<td>.43</td>
<td>.73</td>
</tr>
</tbody>
</table>

The discriminant analysis is not so easily interpretable. Because of missing data, the sample size dropped to 81, 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 (50.1%), then the achievement group (30.3%) and least accurately, the intellectual group (17.1%). The total percent of grouped cases correctly classified was no better than chance (53.6%).

### TABLE 3

<table>
<thead>
<tr>
<th>Variable</th>
<th>Wilk's Lambda</th>
<th>F</th>
<th>Significance</th>
</tr>
</thead>
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<tr>
<td>Crockett</td>
<td>0.99</td>
<td>0.28</td>
<td>0.84</td>
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<td>T. Rdg</td>
<td>0.96</td>
<td>1.17</td>
<td>0.32</td>
</tr>
<tr>
<td>I. Math</td>
<td>0.99</td>
<td>0.53</td>
<td>0.81</td>
</tr>
<tr>
<td>I. Lang</td>
<td>0.91</td>
<td>2.72</td>
<td>0.04</td>
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<td>T. Fluent</td>
<td>0.97</td>
<td>0.97</td>
<td>0.41</td>
</tr>
<tr>
<td>T. Flex</td>
<td>0.93</td>
<td>1.97</td>
<td>0.12</td>
</tr>
<tr>
<td>T. Orig</td>
<td>0.98</td>
<td>0.41</td>
<td>0.13</td>
</tr>
<tr>
<td>df=64</td>
<td></td>
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<td></td>
</tr>
<tr>
<td>Func 1</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Func 2</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>T. Lang</td>
<td>0.86</td>
<td>0.55</td>
<td></td>
</tr>
<tr>
<td>T. Flex</td>
<td>-0.71</td>
<td>0.73</td>
<td></td>
</tr>
</tbody>
</table>

### Discussion

The most important finding was that the creative group chosen by the teachers 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 assessing 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


6 O'Keefe and Delia


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 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.


13 O'Keefe and Delia