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Using Reasoning and Writing With Gifted Fifth-Grade Students

Abstract: This study examined the effectiveness of the Direct Instruction program *Reasoning and Writing* in improving the writing and reasoning abilities of gifted fifth-grade students. A quasi-experimental, nonequivalent pretest-posttest comparison group design was used to evaluate the effects of the program. The experimental group received instruction using Level F of *Reasoning and Writing*. Three comparison groups received nonexplicit unit-focused gifted instruction, the current model for gifted programming in the school system. The dependent variables were the Test of Written Language-3 (Hammill & Larsen, 1996) and the New Jersey Test of Reasoning Skills (Shipman, 1983). Students using *Reasoning and Writing* made significant improvements in their writing skills. No significant differences between the experimental group and the comparison groups were found for reasoning skills. Implications for instruction in gifted education programs and suggestions for future research in this area are provided.

Gifted programs have been the subject of controversy for many years. Gifted education is not regulated by any federal mandate and is not a required service under the Individuals with Disabilities Education Act. Consequently, states choose the manner in which they fund these services and school systems are free to determine how services will be implemented. Only 26 states require special services for gifted students. The philosophy of the school system in which students are enrolled dictates the delivery model and the curriculum for gifted education.

Most of the research in gifted education has emphasized either appropriate identification methods, such as the need for multi-criteria identification methods, methods for identifying creative potential (Purcell, 1996), or the effectiveness of instructional delivery models such as enrichment versus acceleration models. In the push to build gifted programs, curriculum specifications frequently are the last consideration.

A common misconception about gifted students is that they are automatically destined for high achievement because of their abilities and, consequently, do not require additional attention (Borland, 1996; Callahan, 1996). Another fallacy is that gifted students need only facilitation in learning, never explicit instruction (Sawyer, 1988; Tomlinson, 1996). It might be argued that the mode of instruction for gifted learners is less critical, given their ability to relate to content and master it quickly, yet these students need high quality instruction to maximize their knowledge attainment (Van Tassel-Baska, 1996). These learners may need less explicit instruction than other learners, but the assumption can not be made that concepts will be acquired through osmosis (Shaughnessy & Gerkey, 1986).

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Several authors suggest that eclectic instruction in the gifted classroom (i.e., selecting elements from various systems while not consistently following any one system) jeopardizes the development of comprehensive knowledge by gifted students (Mullis, 1990; Purcell, 1996). Developing a curriculum that is sufficiently rigorous, challenging, and coherent for students who are gifted is a challenging task, but Borland (1996) and Sawyer (1988) suggest that the standard curriculum can be used as the primary context for enrichment.

Because core domains, such as language arts, are frequently ignored as content for gifted learners, gaps develop in the skills in some of the most capable students (Borland, 1996). The national outcry for improvement in the language arts curriculum makes it clear that most students, including those who are gifted, are not achieving well in reading and writing. These weaknesses are well documented in reports such as the 1990 National Assessment of Educational Progress (Mullis, 1990). Fewer than 1% of fourth- and eighth-grade students can develop a persuasive essay at a satisfactory level, and verbal achievement levels in even the best students in school tend to be lower than they were 20 years ago. Shaughnessy and Gerkey (1986) state, "all too often, education of the gifted is so over-focused on acceleration and higher order thinking that little attention is paid to certain of 'the basics'" (p. 3).

Conflicting opinions about the best way to teach reading and writing abound. The purpose of this study was to investigate the effectiveness of *Reasoning and Writing, Level F* (Engelmann & Grossen, 1995) for improving the writing and reasoning abilities of academically-gifted fifth graders. Specifically, we ask whether the Direct Instruction program, *Reasoning and Writing, Level F* (Engelmann & Grossen, 1995), results in better performance on measures of writing (Test of Written Language–3) and reasoning (New Jersey Test of Reasoning Skills) than a traditional nonexplicit model of writing instruction for fifth-grade gifted students?

Method

Participants. Participants were 74 fifth-grade students in gifted resource classrooms in four suburban elementary schools in a northeast Georgia school system. Students who attended one of the classrooms constituted the experimental group and those who attended each of the other three classrooms made up the three comparison groups. The four classrooms were located in elementary schools within the same high school cluster and within a five-mile radius. Most participants lived in single-family homes in a high socioeconomic area. The three comparison schools were selected based on their proximity to the experimental school and similarity of the socioeconomic status of the families served.

Placement of students in gifted programs was based on two factors: (a) all students had a score of at least the 96th percentile on either the Otis-Lennon School Ability Test (Otis & Lennon, 1989) or the Cognitive Abilities Test (Thorndike & Hagen, 1986), and (b) all students had a score of at least the 90th percentile on either the mathematics or reading section of a standardized achievement test such as the Iowa Test of Basic Skills (Hieronymus, Hoover, & Lindquist, 1986).

Procedure. Treatment was implemented for 10 weeks from March through the end of May. Students in the experimental group were assessed with the placement test provided in the *Reasoning and Writing* program materials (Engelmann & Grossen, 1995); all students placed in Level F. *Reasoning and Writing, Level F* teaches skills necessary for written expression and reasoning skills. The assumption of this instructional curriculum is that writing is improved through clear reasoning. In order to write in a consistent, understandable manner, one must be able to think, read, and comprehend in a logical way. The program consists of 80 lessons. Explicit teaching of strategies is ensured through scripted lessons, and little is assumed about the students' prior knowledge,

other than skills assessed using the placement test. *Reasoning and Writing, Level F* teaches deduction and inference, critiquing, drawing conclusions, clarifying meaning, synthesizing information, using similes and analogies, and grammar and usage in compositions.

Students in the experimental group completed four lessons per week from the *Reasoning and Writing* program. The program was taught twice per week, the group covered two lessons in each of these two-hour sessions. For each lesson, the researcher presented a script from the *Reasoning and Writing Teacher's Presentation Book*. Each student used the *Reasoning and Writing Student Textbook*. Forty lessons, comprising 50% of the total instructional program, were completed. The first author served as the instructor for the students in the experimental group. Although an experienced gifted education teacher, she had not previously taught a Direct Instruction program. She was trained in the delivery of the *Reasoning and Writing* program by the second author, an experienced Direct Instruction teacher and trainer. Several observations indicated a high rate of procedural fidelity in implementing the scripted lessons as written.

Instruction for the comparison groups was delivered by three other gifted education teachers. Instruction in typical gifted programs is centered around integrated units of study that include advanced academics, creativity, research and reference skills, communication skills, leadership, and motivation. Individual gifted education teachers typically choose their own unit themes; therefore, content was not uniform from classroom to classroom. Each teacher, however, stated that the goals of the units chosen were consistent with the reasoning skills taught in *Reasoning and Writing*: deduction and inference, critiquing, drawing conclusions, clarifying meaning, synthesizing information, and using similes and analogies.

Each teacher also reported a strong emphasis on writing skills, including both composing and editing. The comparison-group teachers documented the instructional procedures used in their classrooms through a weekly log. In addition, a graduate student certified in gifted education observed in all four classrooms to determine whether the reported goals and activities were addressed.

Measures. Students' writing achievement was measured before the implementation of *Reasoning and Writing* and again at the end of the study, using two forms of the Test of Written Language-3 (TOWL-3) (Hammill & Larsen, 1996). The TOWL-3 is a standardized test of writing that includes both contrived tasks that target specific skills and spontaneous writing scales that provide a more holistic measure of use of writing skills in context. The contrived tasks include vocabulary, spelling, style, logical sentences, and sentence combining. The spontaneous scales are rating scales applied to a sample of the student's writing; these scales are: contextual use of writing conventions, contextual use of language, and story construction. In this study, we use the Overall Writing Quotient from the TOWL-3 for analysis of results. This score is recommended by the test authors as the best estimate of a person's general ability in written language. As "quotient scores," these scores are standard scores that describe students' performance relative to the test's norm group; quotient scores have a mean of 100 and a standard deviation of 15. We also report summary results in national percentile ranks based on the quotients.

In addition, students' reasoning abilities were measured before and after the intervention using two forms of The New Jersey Test of Reasoning Skills (NJTRS) (Shipman, 1983). The NJTRS consists of 50 multiple-choice items said to represent 22 areas of reasoning skills. The test was developed for the purpose of evaluating a large-scale year-long project designed to improve elementary students' thinking skills. NJTRS scores were shown to be sensitive to differences caused by that program, therefore they may be sensitive to the effects of *Reasoning and Writing*. Raw scores

from the NJTRS were analyzed and summary percentile ranks are also reported. Percentile ranks were calculated using data from Shipman's (1983) sample of 668 fifth-grade students (Grossen, personal communication).

Results

Writing Performance

Table 1 presents the pretest and posttest means, standard deviations, and percentile ranks for the Overall Writing Quotient for each group. Figure 1 shows group means on pretest and posttest. From the figure, it is clear that although the *Reasoning and Writing* group began with the lowest writing score, it ended the study with the highest score by a substantial margin. The changes seen in this group are quite unlike those seen in any of the other four groups. Three ANCOVAs were conducted; each compared the experimental group with a different comparison group on the posttest Overall Writing Quotient score from the TOWL-3. The pretest Overall Writing Quotient TOWL-3 score, the composite score on the Cognitive Abilities Test, and age were covariates. The *p*-value for each ANCOVA was less than .001. The assumptions of homogeneity of variance for the dependent variable and each of the three covariates were shown to be valid for each ANCOVA by both the Cochran *C* test and the Bartlett-Box *F* test.

A measure of treatment magnitude was applied to the data because the ANCOVAs only report the presence of a significant difference, not the size or importance of the difference (Keppel, 1991). Omega-squared, a measure of treatment magnitude, indicates that from 30–36% of the variance in the TOWL-3 Overall Writing

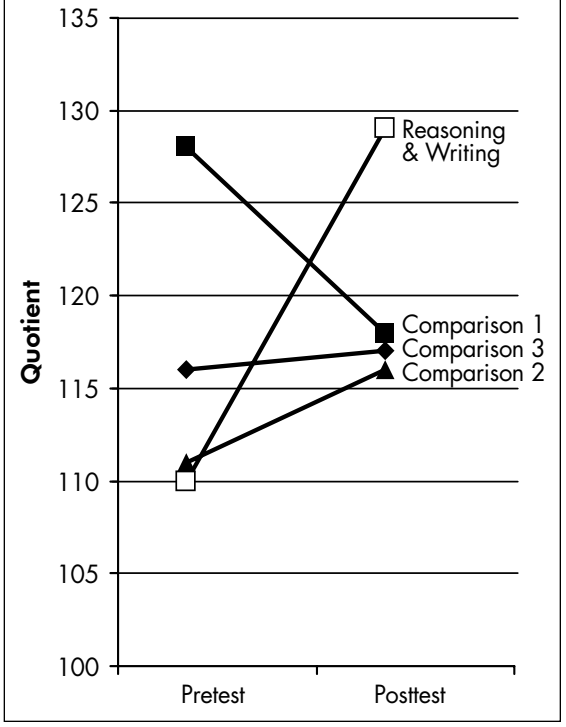
Table 1

Pretest and Posttest Mean TOWL-3 Overall Writing Quotients, Standard Deviations, and Percentile Ranks

Group	*n*	Quotient Mean (s.d.)	Percentile Rank
Reasoning & Writing			
Pretest	20	109.7 (7.4)	73
Posttest	20	129.4 (9.4)	97
Comparison 1			
Pretest	13	127.5 (7.3)	96
Posttest	13	117.8 (9.1)	88
Comparison 2			
Pretest	21	110.7 (9.6)	75
Posttest	21	115.7 (9.5)	86
Comparison 3			
Pretest	20	116.0 (9.4)	86
Posttest	20	116.9 (8.6)	87

Figure 1

Mean TOWL-3 Overall Writing Quotient for Each Group.



posttest scores was associated with what group students were in. This is a very large magnitude effect, one that is clearly educationally important. Therefore, the Direct Instruction curriculum, *Reasoning and Writing, Level F*, appears to have improved the writing skills of this sample of gifted fifth-grade students as measured by the TOWL-3 when compared to the fifth-grade students who received nonexplicit gifted instruction. In addition, *Reasoning and Writing* appears to have had a very large, educationally important effect.

Reasoning Skills Performance

Table 2 presents the pretest and posttest mean percent correct, standard deviations, and percentile ranks for each group on the NJTRS. Figure 2 shows pretest and posttest performance on this measure. The pattern of results on this measure does not clearly distinguish the four groups. All showed substantial increases from pre to post, and the amounts of gain are roughly comparable in three of the four groups. Comparison Group 3 appears to have made less growth than the other three groups. Three ANCOVAs were conducted using the experimental group with a different comparison group for each ANCOVA. The NJTRS posttest score was the dependent variable. The pretest NJTRS, the composite score on the Cognitive Abilities Test, and age were the covariates. None of these comparisons were statistically significant; the *p*-values for the three ANCOVAs were .307, .774, and .533 for Comparison Groups 1, 2, and 3, respectively.

Given the three nonsignificant ANCOVAs and the patterns evident in Figure 2, it appears that *Reasoning and Writing, Level F*, did not improve the reasoning skills of gifted fifth-grade students as measured by the New Jersey Test of Reasoning Skills when compared to

Figure 2

Mean Percent Correct on New Jersey Test of Reasoning Skills (22 items).

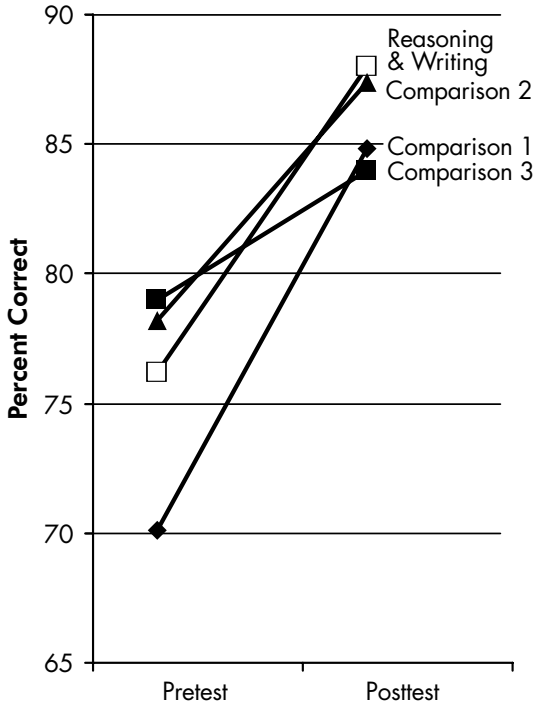


Table 2

Pretest and Posttest Mean Percent Correct, Standard Deviations, and Percentile Ranks for the New Jersey Test of Reasoning

Group	*n*	Quotient Mean (s.d.)	Percentile Rank
Reasoning & Writing			
Pretest	20	76.2 (11.7)	57
Posttest	20	88.0 (7.6)	93
Comparison 1			
Pretest	13	79.0 (13.0)	65
Posttest	13	84.0 (9.6)	74
Comparison 2			
Pretest	21	78.2 (8.5)	61
Posttest	21	87.4 (7.2)	81
Comparison 3			
Pretest	20	70.1 (9.4)	50
Posttest	20	84.8 (6.5)	74

fifth-grade students who received nonexplicit gifted instruction.

Discussion

The findings from this study suggest that the instruction in *Reasoning and Writing*, *Level F* resulted in improvement of the overall writing of the gifted fifth graders. The magnitude of the treatment effect is impressive given the short, 10-week duration of the study, and the fact that only one half of the *Reasoning and Writing, Level F,* program was completed. These findings are supported by the literature that suggests that gifted students need explicit instruction in core domains to achieve their potential (Sawyer, 1988; Tomlinson, 1996). Weakness in writing abilities across exceptionalities and in general education, including gifted education, are well documented (Shaughnessy & Gerkey, 1986). The *Reasoning and Writing* curriculum evaluated in this study may be one potential solution for alleviating these weaknesses.

There were no significant differences between the experimental and comparison groups on reasoning skills. These findings suggest that perhaps reasoning skills are being addressed adequately using the methods already in place in typical gifted classrooms; however, teaching both reasoning and writing skills in a single curriculum through Direct Instruction is time effective when considering the large writing gains made by the experimental group.

Future research on using *Reasoning and Writing* with gifted students might assess the effects of the Direct Instruction program on the reasoning skills of gifted ability students after completing the entire 80 lessons, rather than the 40 completed in this study. The short length of time available for the study may not have permitted a sufficiently sensitive measure of the effects of the Direct Instruction curriculum on the students' reasoning skills. Another important area that needs additional research is the efficacy of decreasing the number of repetitions of instructional activities for gifted students. Gifted students frequently require fewer repetitions than others, and excessive repetition may be counterproductive. Implementing a specific criterion for skipping additional practice activities might improve the efficiency of Direct Instruction programs with gifted students. This idea is, of course, the rationale for the fast cycle Direct Instruction reading programs and the fast cycle procedures built into *Language for Learning* (Englemann & Osborn, 2000) and other programs.

If, indeed, educating gifted students to their full potential is part of the thrust for improving education, then it is incumbent upon us as reflective practitioners to identify those methods that are most effective. As Robert Sawyer (1988) so aptly put it in describing gifted education, "it is robbery of the gifted to merely teach them how to learn without teaching something worth learning" (p.8). The study described here provides us with evidence that even academically-gifted students can make significant improvements in their writing skills using *Reasoning and Writing.*

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