Reis, S. M., Westberg, K. L., Kulikowich, J. M., & Purcell, J. H. (2016). Curriculum compacting and achievement test scores: What does the research say? In S. M. Reis (Ed.), *Reflections on gifted education: Critical works by Joseph S. Renzulli and colleagues* (pp. 271–284). Routledge.

Curriculum Compacting and Achievement Test Scores: What Does the Research Say?*

Sally M. Reis, Karen L. Westberg, Jonna M. Kulikowich, and Jeanne H. Purcell
University of Connecticut

Introduction From Joe

Although the Enrichment Triad Model has been the centerpiece of my recommendations for developing creative and productive giftedness, it is also necessary to have within any comprehensive model for talent development a systematic component to accommodate those students who are capable of covering the regular curriculum at a faster pace than average and lower achieving students. To accomplish this goal, I developed a process in the 1970s called curriculum compacting.

Curriculum compacting is an instructional technique designed to make appropriate curricular adjustments for students in any curricular area and at any grade level. Essentially, the procedure involves (1) defining the goals and outcomes of a particular unit or segment of instruction, (2) determining and documenting which students have already mastered most or all of a specified set of learning outcomes, and (3) providing replacement strategies for material already mastered through the use of instructional options that enable a more challenging and productive use of the student's time.

Staff development for compacting should be provided to all classroom teachers, and we further recommend that gifted education specialists work with classroom teachers to discuss the various acceleration and enrichment options that may be used for the time that students accrue as a result of demonstrating comprehension of regular curriculum material. In this article, Sally and her colleagues describe the results of a large national study that used advanced research methodology. This research demonstrates that most teachers could eliminate approximately 40%–50% of curriculum for academically talented students in their classrooms. It also showed that the students whose regular curriculum work was compacted because they had already mastered it did as well or better on standardized achievement tests than a control group of similarly high-potential students.

* Reis, S. M., Westberg, K. L., Kulikowich, J. M., & Purcell, J. H. (1998). Curriculum compacting and achievement test scores: What does the research say? *Gifted Child Quarterly, 42*, 123–129.

Recent research seems to indicate that increasing numbers of high ability and high achieving students spend large proportions of their time in regular classrooms and that few curricular modifications are made for high ability students in regular classrooms (Archambault et al., 1993; Purcell, 1993; Renzulli & Reis, 1991; U.S. Department of Education, 1993; Westberg, Archambault, Dobyns, & Salvin, 1993). The minimal use of differentiation strategies persists even though a variety of instructional strategies are recommended to better meet the academic needs of high ability and high achieving students.

Several strategies can be used to differentiate curricula and instruction for high ability students including the use of advanced content, higher level questioning skills, curriculum compacting, independent study, tiered assignments, flexible grouping, and others. Little empirical research has examined the use of these strategies and this study of curriculum compacting was an attempt to address this area. Curriculum compacting (Reis, Burns, & Renzulli, 1992; Renzulli & Reis, 1985; Renzulli & Smith, 1978) is an instructional strategy that has been used to streamline the learning activities for students who demonstrate proficiency on curricular objectives prior to teaching. It has been widely recognized and suggested by educational experts as a method to address the needs of high ability and high achieving students (Barbour & Kiernan, 1994; George & Grebing, 1995; Winebrenner, 1992). The curriculum compacting process uses a document called The Compactor (Renzulli & Smith), which enables record-keeping. The Compactor form includes three columns which parallel the steps of the curriculum compacting process. In the first column, teachers document what a student knows prior to beginning a curricular unit or area of study. The second column provides space for teachers to indicate the concepts or material a student has yet to master, and in the third column, teachers list appropriate replacement activities which are usually enrichment or acceleration options for a student whose curriculum has been compacted. The following case study provides an example of the use of curriculum compacting.

Shanoah is a 9-year-old attending fourth grade in a large, urban setting. Within the first two weeks of the school year, her teacher noted that she was a voracious reader. He subsequently checked the scores she received on state-wide mastery tests and discovered that she scored above the 90th percentile in all subtests related to reading and writing. Shanoah scored 100% in literal understanding and inference making and at the 90th percentile on evaluation skills. With respect to writing, she had mastered 100% of the skills required at her grade level.

Shanoah appeared restless in class, frequently asked for more challenging assignments, and, on occasion, began to disturb other students around her. It was clear that her classroom work in reading and writing needed to be compacted. Her teacher eliminated the workbook assignments related to the reading skills she had mastered, as well as basic writing assignments. To extend Shanoah's understanding in reading and writing, he substituted advanced-level reading in a subject of Shanoah's choice and provided her with choices for creative writing assignments. Through the time that was gained with compacting, he and Shanoah pursued several enrichment options. She had choices including: reading for pleasure, working on monthly reading projects of her choice, pursuing her interest in African American history, and working as co-editor on the school newspaper. Shanoah chose to work on all of these enrichment options during fourth grade.

Research about curriculum compacting has indicated that high achieving students may already know between 40%–50% of their lessons before they are taught (Reis et al., 1993). This research and other studies about curriculum compacting also indicated that teachers discuss several reasons when asked why curriculum compacting is not widely adopted, including: lack of sufficient teacher preparation to initiate preassessment and differentiation, limited time during the school day and year to prepare supplemental lessons, and financial exigencies that preclude the purchase of enrichment material necessary for replacement learning activities (lmbeau, 1991; Westberg, Archambault, & Brown, 1997). One of the reasons frequently cited by teachers is their fear that students whose curriculum is compacted may not score as well on state mastery tests and other standardized measures of achievement. Many teachers indicate that their administrators do not want teachers to eliminate any skills, even for high ability students, for fear of lower standardized achievement tests or state mastery scores.

Little empirical research exists to address teachers' questions related to the effect of compacting on elementary students' academic achievement. Schultz (1991) conducted one study in which she examined the effect of curriculum compacting on the mathematics achievement of fourth grade mathematics students in a midwestern school district. One hundred and thirty-two students participated in Schultz' research, in which achievement was measured in both October and May of one school year using the Mathematics Concepts, Mathematics Problem Solving, and Mathematics Computation subtests of the Iowa Tests of Basic Skills. Schultz reported no significant differences between control and treatment groups with respect to scores on any of the mathematics subtests; students whose curriculum was compacted achieved equally as well as their agemates whose curriculum had not been compacted.

This article describes the results of a national research study that examined the academic achievement of elementary students whose curriculum was compacted. Three research questions guided the study.

1. Do students whose curriculum was compacted in one or more content areas perform differently on measures of achievement than students whose curriculum was not compacted?
2. Do students whose curriculum was compacted in mathematics perform differently than their control counterparts on measures of achievement?
3. Do students whose curriculum was compacted in language arts perform differently than their control counterparts on measures of achievement?

The findings related to these research questions can be used to address questions related to the academic achievement of students who have sections of curriculum eliminated from their curricula, and the diverse replacement strategies employed by their classroom teachers.

The Curriculum Compacting Study

Sample

A sample of 27 school districts and 436 second through sixth grade classroom teachers throughout the country from collaborative school districts that are a part of The National

Research Center on the Gifted and Talented (NRC/GT) was selected for this study. The achievement data of 336 students are reported here. These data represent complete sets of pretest and posttest scores on all subscales of the *Iowa Tests of Basic Skills*. To participate, districts had to meet two criteria: no previous training or implementation of curriculum compacting and a willingness to accept random assignment to one of three treatment groups or a control group. Efforts were made to recruit districts with widely varying demographics including elementary school populations that included economically disadvantaged, limited English proficient, and students with disabilities. The districts participating in the study represented elementary schools from across the country, ranging from a small rural school in Wyoming to a magnet school for Hispanic students in California. Districts were randomly assigned to a control group or to one of three treatment groups in which teachers received increasing amounts of inservice about curriculum compacting.

After receiving staff development about curriculum compacting and the characteristics of students who need their curricula modified, the teachers selected one or two students from their classrooms. These students had either been identified as gifted and talented and participated in a district's program or had demonstrated high achievement in a content area which indicated that they would benefit from curriculum compacting. Students were used as the unit of analysis because the treatment, curriculum compacting, was provided to individual students rather than to the class as a whole.

Several out-of-level (one grade higher) *Iowa Tests of Basic Skills* subtests were given to the students in the fall (pre-achievement test), and again at the end of May or beginning of June (post-achievement test). The median percentile for all students on the out-of-grade-level reading and math concepts subtests was 93. The median percentile in the out-of-level math computation subtest was 90. These data indicate that teachers selected students for whom compacting was appropriate.

Procedure

Three treatment groups of teachers who received increasing levels of staff development were used to examine the most efficient but effective method for training teachers to modify curricula. All treatment group teachers received the first staff development session which provided two half-hour videotapes and a book about the compacting process. After receiving the first staff inservice session in October, teachers were asked to select one or two qualified students from their classroom. Teachers in Treatment Group 2 received the videotape training and book, as well as approximately two hours of group compacting simulations (Starko, 1986) conducted by the local gifted and talented resource teacher or consultant. The simulations developed by Starko have been a standard resource in this type of training. Treatment Group 3 received the same training as Treatment Group 2, with the addition of local peer coaching or consultant services. Local consultants provided informal peer coaching throughout the year and provided 6–10 hours of organized peer coaching between March and June. All treatment group teachers completed the Compacter form detailing the amount of content eliminated or compacted, as well as replacement strategies used.

Instrumentation

Three instruments were used to address the research questions stated earlier in this article: the Classroom Practices Questionnaire, the Compactor, and the *Iowa Tests of Basic Skills*.

The Classroom Practices Questionnaire and the Compactor form were used to assess classroom teachers' practices related to the curriculum compacting procedure. At the end of the treatment period, teachers were asked to indicate the content areas in which curriculum compacting had been completed and to estimate the percentage of curricula that had been eliminated for each selected student. The Compactor was used to identify the amount of content eliminated or streamlined as well as the type of replacement strategies used by classroom teachers. Teachers in all treatment groups provided curriculum compacting most frequently in mathematics in which 39%–49% of content was eliminated. The next most frequently compacted content area was language arts in which 36%–54% of the content was eliminated. Research about these replacement strategies indicated that many diverse strategies were used and that teachers who had higher levels of professional development (Treatment Group 3) used more enrichment strategies within content areas than did the other treatment groups (Reis & Purcell, 1993). Replacement strategies included: independent study, projects, alternative assignments, advanced content, interdisciplinary units and studies, learning games, self-selected study topics, technology opportunities, and a variety of other choices. Replacement strategies were not necessarily provided in the same content area as the one in which curriculum compacting occurred.

Pre and post student achievement was assessed by the *Iowa Tests of Basic Skills* (ITBS), which was administered to students in the control and experimental groups. The reading, mathematical concepts, mathematical computation, science, social studies, and spelling subscales of Form J of the ITBS were administered. Tests designed for students one grade level above each student's current grade level were administered to guard against potential ceiling effects.

Validity and reliability information on the ITBS is well documented as is additional technical support. Detailed information is reported in *The Tenth Mental Measurement Yearbook* in which Willson (1989) concludes, "the ITBS is not a perfect battery, but it represents the best that modern educational measurement can produce" (p. 398). The reliability coefficients for the various subscales range from .85 to .95 (see *Iowa Tests of Basic Skills,* Form J, 1990).

Data Analysis

Multivariate analysis of covariance procedures were conducted to address the research questions in this study. For these analyses, all subscale scores of the *Iowa Tests of Basic Skills* (i.e., reading, spelling, mathematical concepts, mathematical computation, social studies, and science) which were administered at posttest measures were the dependent variable. All subscale pretest measures were covariates, and treatment (i.e., three treatment levels and control) was the independent variable. Multivariate analysis of covariance was selected for the analysis because we anticipated strong correlations among the set of dependent variables and the multivariate covariate vector (Stevens, 1986). The results of these analyses follow.

Results

Question 1: Do students whose curriculum was compacted in one or more content areas perform differently on measures of achievement than students whose curriculum was not compacted?

To address research question one, the complete data sets of 336 students were submitted to a multivariate analysis of covariance procedure. The results demonstrated that all covariates were significant. Wilks' Lambda (Λ) values, corresponding F-ratios, and levels of significance were as follows: a) Reading Pretest, ($\Lambda = .73$, $F[6, 321] = 20.12$, $p < .0001$); b) Spelling Pretest, ($\Lambda = .50$, $F[6, 321] = 54.50$, $p < .0001$); c) Mathematical Concepts Pretest, ($\Lambda = .72$, $F[6, 321] = 21.15$, $p < .0001$); d) Mathematical Computation Pretest, ($\Lambda = .67$, $F[6, 321] = 26.90$, $p < .0001$); e) Social Studies Pretest, ($\Lambda = .87$, $F[6, 321] = 8.35$, $p < .0001$); and f) Science Pretest, ($\Lambda = .79$, $F[6, 321] = 14.06$, $p < .0001$). The main effect for treatment was also significant, ($\Lambda = .85$, F[l8, 908.41] = 2.98, $p < .0001$).

Table 1 displays the overall means and standard deviations for the dependent variables and covariates. Means, standard deviations, and adjusted means are reported by treatment groups.

Interpretations of the adjusted means at the univariate level should be made with care as the significant main effect for treatment is a multivariate effect. Upon examination of the adjusted posttest means, descriptively, Treatment Group 2 had the highest means for three of the six subscales (i.e., reading, mathematical concepts, and social studies). Treatment Group 1 had the highest adjusted mean for science. In spelling and mathematical computations, the control group outperformed all curriculum compacting groups. While these mean comparisons should be made with care, we determined that for Treatment Group 2, 86% of the students in the group had curriculum that was compacted in language arts, mathematics, or both areas simultaneously. By comparison, we determined that71 % of the students assigned to Treatment Group 1 had their curriculum compacted in language arts, mathematics, or both areas. Finally, the lower results observed for Treatment Group 3 may be in part due to the fact that only 67% of the students' curriculum was compacted in the areas of language arts, mathematics, or a combination of both content areas.

Question 2: Do students whose curriculum was compacted in mathematics perform differently than their control counterparts on measures of achievement?

Question 3: Do students whose curriculum was compacted in language arts perform differently than their control counterparts on measures of achievement?

To address the effects of the content areas (i.e., mathematics or language arts) in which one's curriculum was compacted on achievement scores, two multivariate analyses of covariance (MANCOVAs) were performed on two randomly selected subsamples of the students' data. The random selection of subsamples was considered necessary in order to examine the effects of content area curriculum compacting given specific subscales of the ITBS instead of the full battery of scores. Because the full battery of subscales is highly correlated, we anticipated that

Table 1.
ITBS Means, Adjusted Means, and Standard Deviations by Levels of Treatment

	Pretests						**Posttests**					
	Read *M* *(SD)*	**Spell *M* *(SD)***	**MathC *M* *(SD)***	**Comp *M* *(SD)***	**SS *M* *(SD)***	**Science *M* *(SD)***	**Read Adj. *M* *(SD)***	**Spell Adj. *M* *(SD)***	**MathC Adj. *M* *(SD)***	**Comp Adj. *M* *(SD)***	**SS Adj. *M* *(SD)***	**Science Adj. *M* *(SD)***
Treatment Group 1 (*n*=72)	139.17 (25.16)	135.60 (28.98)	132.68 (21.80)	125.88 (22.88)	136.44 (30.02)	147.26 (28.74)	141.64 (25.71)	135.02 (28.96)	137.26 (24.97)	130.75 (23.95)	140.44 (32.70)	153.28 (27.22)
Treatment Group 2 (*n*=57)	135.98 (24.11)	129.14 (27.66)	128.07 (24.78)	119.07 (17.78)	134.18 (27.18)	146.91 (25.16)	144.45 (22.65)	136.92 (25.45)	137.42 (23.87)	127.70 (19.87)	144.63 (30.10)	151.12 (23.68)
Treatment Group 3 (*n*=66)	139.73 (24.47)	131.36 (27.92)	132.97 (24.48)	127.70 (19.79)	135.08 (27.73)	147.71 (26.40)	142.05 (24.45)	133.90 (24.63)	134.08 (24.32)	127.28 (21.25)	136.40 (26.03)	146.08 (27.36)
Control (*n*=141)	131.61 (25.21)	127.09 (28.36)	123.41 (21.88)	117.86 (20.37)	127.01 (34.93)	135.08 (30.36)	143.59 (24.68)	138.85 (27.49)	136.67 (23.33)	132.03 (21.44)	141.18 (30.77)	149.15 (28.13)
Total (*n*=336)	135.58 (25.20)	130.09 (28.36)	128.06 (23.20)	121.71 (20.77)	131.83 (31.48)	142.18 (28.68)	143.01 (24.62)	136.73 (26.88)	136.42 (24.21)	130.09 (21.86)	140.67 (30.37)	149.76 (27.53)

the random subsample selections would eliminate some of the problems associated with the variance inflation attributable to the strong intercorrelations among dependent variables and covariates.

For research question two, two levels of curriculum compacting (i.e., those students in Treatment Groups 1, 2, or 3 whose curriculum was compacted specifically in mathematics versus control) made up the independent variable. The dependent variables were scores on the ITBS mathematics concepts and computation subscales. Pretest scores for these two measures served as covariates. While covariates were significant (Λs> .66, Fs > 47.57, ps < .0001), there were no significant differences between treatment levels.

For research question three, a parallel analysis to the one described above was performed for language arts. A random subsample was selected to examine the effects of curriculum compacting in language arts on achievement scores. For this analysis, reading scores, spelling scores, and social science scores of the posttests were the dependent variable and the pretest scores of these scales were covariates. As with the analysis for mathematics curriculum compacting, treatment had two levels: students in any of the three treatment groups with curriculum compacting in language arts and the control group. Results were similar to those observed for the mathematics analysis. While all covariates were significant (Λs> .45, Fs > 16.51, ps < .0001), there was no main effect for treatment.

A discriminant function analysis was run as a follow-up procedure to the MANCOVA. This analysis was conducted to identify whether partial correlations among the subscales would have discriminated among the groups. The discriminant function coefficients were comparable across groups, which indicates that each treatment group made similar pretest to posttest gains.

Discussion

Three research questions were addressed in this study: Do students whose curriculum was compacted in one or more content areas perform differently on measures of achievement than students whose curriculum was not compacted? Do students whose curriculum was compacted in mathematics perform differently than their control counterparts on measures of achievement? Do students whose curriculum was compacted in language arts perform differently than their control counterparts on measures of achievement? To answer these three questions, students' achievement test scores were examined by three multivariate analyses of covariance. Results of these multivariate analyses supported that there were no significant differences in favor of the control group over the treatment groups.

The findings related to these questions provide empirical support for concerned practitioners who want to 1) provide alternative learning activities for high achieving students in heterogeneous classrooms, and 2) ensure that highly able students continue to score well on standardized tests. Three findings from this research are particularly salient. First, as mentioned above, the achievement test scores of gifted students whose curriculum was compacted did not differ significantly from gifted students whose curriculum was not compacted. Even when as much as 40%–50% of content was eliminated for some students, they still scored as well as their counterparts who did not have their curricula eliminated or streamlined. These results are based

on out-of-level tests scores which were used to increase the sensitivity to gains and declines at the upper end of the scale. The median percentile performance on all post subscales of the ITBS was greater than 90. Using one year beyond grade level tests may still not have been sufficient to prevent ceiling effects, however, If ceiling effects had an impact, a Type II error occurred; namely gains in post scores, not declines, would have been masked.

Second, the descriptive findings, as shown in Table 1, suggest that students in some of the treatment groups performed better than the control group on some of the subscales. For example, students in Treatment Group 1 had higher adjusted posttest scores in science than all other groups. Similarly for Treatment Group 2, students had higher adjusted posttest social studies scores than the other groups. We did note two trends which suggested that students in the control group performed slightly better than students in the treatment groups in mathematical computation and spelling. This probably reflects that they experienced more drill practice in these areas. All differences are minimal, however, and should not be interpreted as having practical significance.

Third, the findings in the Compacting Research Study support the beliefs of many classroom teachers who maintain that high ability and high achieving students need curriculum differentiation. The median pretest achievement test scores of students selected by teachers for curriculum compacting were high; selected children scored above the 90th percentile on one year above grade level tests in reading and mathematics. This clearly indicated classroom teachers' ability to identify high achieving students who would benefit from curriculum compacting. The scores of these children support the opinions of teachers and underscore the critical need for practitioners to identify advanced students and provide appropriate instruction for young people who know a great deal of the curriculum before it is taught.

Finally, the findings prompt questions related to the use of curriculum compacting over long periods of time and at the secondary level. Specifically, what are the effects of compacting students' curricula over several years? Would the continuous use of this instructional strategy be associated with long-term achievement and attitudinal gains? In addition, new research should focus on eliminating basic skill instruction for gifted students in favor of complex, faster paced, problem-based learning and the effects of this change on future achievement test scores. Empirical research must also examine the achievement effects of compacting at the secondary level. Can substantial portions of secondary students' curriculum be eliminated without affecting students' scores on standardized achievement tests? Answers to these research questions will provide classroom practitioners with the additional empirical data necessary to make well-grounded decisions about students' learning opportunities at all grade levels.

Conclusion

Our research began with a question that teachers have wrestled with for some time: What effect will compacting elementary school students' curricula have on standardized measures of academic achievement? As demands for accountability grow, the question is a critical one for professionals who want students to perform at high levels on standardized achievement tests. The results of this study may provide support for elementary teachers who seek empirical evidence for eliminating content which students have already mastered. Curriculum compacting provides

documentation of students' knowledge of the regular curriculum covered in class, and it enables teachers to provide many types of differentiated replacement learning opportunities. The research presented in this article suggest that elementary teachers can preassess students' prior knowledge of content, eliminate portions of the curriculum that students already know, replace those portions with various types of interdisciplinary learning activities, and remain reasonably confident that students' achievement test scores will not decline. Furthermore, it should be noted that students' scores did not decline, even when the replacement material is not within the same content area, rather in students' interest areas.

References

Archambault, F. X., Jr., Westberg, K. L., Brown, S. W., Hallmark, B. W., Zhang, W., & Emmons, C. L. (1993). Classroom practices used with gifted third and fourth grade students. *Journal for the Education of the Gifted, 16*(2), 103–119. https://doi.org/10.1177/016235329301600203

Barbour, C. M. (Director & Writer) & Kiernan, L. J. (Writer). (1994). *Challenging the gifted in the regular classroom* [Videotape]. (Available from Association for Supervision and Curriculum Development, Alexandria, VA)

George, P. S., & Grebing, W. (1995). Talent development and grouping in the middle grade: Challenging the brightest without sacrificing the rest. *Middle School Journal, 26*(4), 12–17. https://doi.org/10.1080/00940771.1995.11496119

Imbeau, M. B. (1991). *Teachers' attitudes toward curriculum compacting: A comparison of different inservice strategies.* Unpublished doctoral dissertation, University of Connecticut, Storrs.

Iowa Tests of Basic Skills. (1990). *Manual for school administrators supplement.* Chicago: Riverside.

Purcell, J. (1993). The effects of the elimination of gifted and talented programs on our most able students and their parents. *Gifted Child Quarterly, 37*(4), 177–187. https://doi.org/10.1177/001698629303700407

Reis, S. M., Burns, D. E., & Renzulli, J. S. (1992). *Curriculum compacting: The complete guide to modifying the curriculum for high ability students.* Mansfield Center, CT: Creative Learning Press.

Reis, S. M., & Purcell, J. H. (1993). An analysis of content elimination and strategies used by elementary classroom teachers in the curriculum compacting process. *Journal for the Education of the Gifted, 16*(2), 147–170. https://doi.org/10.1177/016235329301600205

Reis, S. M., Westberg, K. L., Kulikowich, J., Caillard, F., Hébert, T., Plucker, J., Purcell, J. H., Rogers, J. B., & Smist, J. M. (1993). *Why not let high ability students start school in January? The curriculum compacting study* (Research Monograph 93106). University of Connecticut, The National Research Center on the Gifted and Talented. https://nrcgt.uconn.edu/wp-content/uploads/sites/953/2015/09/rm93106.pdf

Renzulli, J. S., & Reis, S. M. (1985). *The Schoolwide Enrichment Model: A comprehensive plan for educational excellence*. Mansfield Center: Creative Learning Press.

Renzulli, J. S., & Reis, S. M. (1991). The reform movement and the quiet crisis in gifted education. *Gifted Child Quarterly, 35*(1), 26–35. https://doi.org/10.1177/001698629103500104

Renzulli, J. S., & Smith, L. H. (l 978). *A guidebook for developing individualized educational programs for gifted and talented students.* Mansfield Center, CT: Creative Learning Press.

Schultz, C. B. (1991). *The effects of curriculum compacting upon student achievement in fourth grade mathematics.* Unpublished Master's Thesis, The University of Northern Iowa, Cedar Falls, Iowa.

Starko, A. J. (1986). *It's about time: Inservice strategies for curriculum compacting.* Mansfield Center, CT: Creative Learning Press.

Stevens, J. (1986). *Applied multivariate statistics for the social sciences.* Hillsdale, NJ: Lawrence Erlbaum.

U.S. Department of Education. (1993). *National excellence: A case for developing America's talent*. Washington, DC: Government Printing Office. https://files.eric.ed.gov/fulltext/ED359743.pdf

Westberg, K. L., Archambault, F. X. Jr., & Brown, S. W. (1997). A survey of classroom practices with third and fourth grade students in the United States. *Gifted Education International, 12*(1), 29–33. https://doi.org/10.1177/026142949701200106

Westberg, K. L., Archambault, F. X., Jr., Dobyns, S. M., & Salvin, T. J. (1993). The classroom practices observation survey. *Journal for the Education of the Gifted, 16*(2), 120–146. https://doi.org/10.1177/016235329301600204

Willson, V. L. (1989). Review of the Iowa Tests of Basic Skills, forms G & H. In J. C. Conoley & J. J. Kramer (Eds.), *The tenth mental measurement yearbook* (pp. 395–398). Lincoln, NE: Buros Institute of Mental Measurements.

Winebrenner, S. (1992). *Teaching gifted kids in the regular classroom: Strategies and techniques every teacher can use to meet the academic needs of the gifted and talented.* Minneapolis, MN: Free Spirit.