THE NATIONAL Newsletter 1997 SPRING

RESEARCH CENTER on the GIFTED and TALENTED

NRC G/T

NRC/GT: Research Should Inform Practice

E. Jean Gubbins
University of Connecticut
Storrs, CT

When we first started The National Research Center on the Gifted and Talented (NRC/GT) seven years ago, we hoped our research results would go beyond the library shelves of other researchers. We wanted our studies and commissioned papers to influence policies and procedures in the field and to reflect the priorities of the Jacob K. Javits Gifted and Talented Students Education Act. Programming issues became center stage for much of our work. Now, as we travel to conferences and read various publications, we note discussions about the NRC/GT findings. Sometimes presenters are not aware of our research teams' affiliations, and they ask if we have heard about a specific finding. Yes—indeed—we know about the finding. We realize that our research has definitely not stayed on the shelf. We also take notice of where and how our work is cited. We see references to our work in many journals, newsletters, newspapers, and videotapes. This life beyond the library shelf is possible because of various product formats: videotapes, monographs, practitioners' guides, and the world wide web site. We are proud of our accomplishments and continue to create products for various audiences that are responsive to the mission of the NRC/GT.

Periodically, we review our list of disseminated products to see which topics are most popular. The most popular topics with the general public are reflective of our original research needs assessment survey completed in 1991. The research topics of interest to people around the country were summarized and ranked, and then we designed studies accordingly. Luckily, we have a cadre of researchers associated with the NRC/GT to help us with our research agenda. Practitioners and parents expressed interest in program impact and curricular modifications. Delcourt, Loyd, Cornell, and Goldberg (1994) examined the effectiveness of various service delivery models on students' cognitive and affective outcomes and concluded:

- Gifted children in Pull-Out, Separate Class, and Special School programs showed higher achievement than gifted students who were not in programs and, in most cases, than those from Within-Class programs and nongifted students.
- Although a limited amount of time was spent in the resource room (approximately 2 hours/week), the emphasis on academics with the

(continued on page 2)

(continued from page 1)

Pull-Out model appears to have contributed to the achievement of these students.

- Students from the Separate Class programs scored at the highest levels of achievement and at the lowest levels of perception of academic competence, preference for challenging tasks, sense of acceptance by peers, internal orientation, and attitudes toward learning.

Recognizing that some special programs and services for high ability students are often not full-time solutions, practitioners and parents also wanted research data on curriculum modifications in the classroom. What are some appropriate informal and formal techniques to assess the students' mastery of content? Reis et al. (1993) examined one approach to modifying the curriculum known as curriculum compacting. Teachers of students in grades 2-6 were trained to use compacting and realized that several students had already mastered grade level concepts. The curriculum compacting study documented the following:

- Approximately 40-50% of traditional classroom material could be eliminated for targeted students in one or more of the following content areas: mathematics, language arts, science, and social studies.

- The most frequently compacted subject was mathematics, followed by language arts. Science and social studies were compacted when students demonstrated very high ability in those areas.

- While approximately 95% of teachers used enrichment as a replacement strategy, 18% of teachers also used acceleration. (p. 39)

Teachers and parents are asking more and more questions about curricular modifications, as evidenced by our e-mail and letters. Several people have already read our studies on classroom practices (Archambault et al., 1993; Westberg, Archambault, Dobyns, & Salvin, 1993) and acknowledge that few modifications were made for high ability students in regular classrooms. They can even quote statements that appear in several textbooks and journals in our field:

- The target gifted students {in grades 3 or 4 classrooms} spent the majority of their time in reading, language arts, mathematics, social studies, and science engaged in whole-class instructional activities; and whether these students worked with the entire class or in groups, students were heterogeneously grouped across all subjects for 79% of the time. (Westberg, Archambault, Dobyns, & Salvin, 1993, p. 41)

- . . . [T]arget gifted students spent the majority of their time doing written assignments and participating in review/recitation activities. In addition to spending a large portion of time in passive activities, 84% of the activities across all five subject areas in which target gifted students were involved contained no form of curricular differentiation. (Westberg, Archambault, Dobyns, & Salvin, 1993, p. 41)

- In a national survey of teachers of grades 3 and 4, the majority "reported they had no training in gifted education" (Archambault et al., 1993, p. 42). Of the 2,300 respondents, 61% of the public school sample and 53% of the private school sample had no training in gifted education.

The link between research recommendations and publications provided the public with the information they wanted to know. Thus, the research monographs by Delcourt, Loyd, Cornell, and Goldberg (1994); Archambault et al. (1993); Reis et al. (1993); and Westberg, Archambault, Dobyns, and Salvin (1993) are very popular.

The results of a national survey of middle school administrators mirror some of the results we gleaned from a focus on elementary classrooms:

- There is much room for greater awareness of the needs of academically diverse populations in the middle school and the specific instructional skills required to meet these needs.

- Classroom standardization and a "one-size fits all" environment predominates over classroom flexibility as the norm in today's middle schools.

- Educators' beliefs about differentiating the curriculum through instructional strategies do not convert into practice. Therefore, instructional and structural strategies, which support curriculum differentiation, appear to be underused.

- Middle school practitioners who perceive the middle school learner as being in a plateau period tend not to create and deliver high level, engaging curricula, but rather to teach basic skills, low-level thinking, and less complex reading assignments. (Moon, Tomlinson, & Callahan, 1995)

These research monographs provide direct and indirect glimpses into elementary and middle school classrooms around the country. The researchers also conclude that more needs to be done to challenge our students. But just doing something different the next time around is not the

answer; it is time to think about where we have been and where we want to go.

As practitioners reflect on their accomplishments during the school year, it is also a time to consider new or modified instructional and curricular techniques for the coming year. Local newspapers are filled with commentary concerning program changes. Some districts are revamping their curriculum, adopting block scheduling, or promoting the use of technology, while others are transforming their district by creating magnet schools. All these potential changes should be studied carefully; otherwise the same instructional and curricular techniques will be used under different nomenclature. One phrase that should become a refrain when we are considering new techniques is: What do we want students to know and be able to do? This phrase helps to focus our attention on dynamic learning. We should consult research studies, such as those listed above and others relevant to local issues, to ensure that purposeful change is made.

In a taped interview with Guskey (Sparks, 1995), there is a great suggestion that extends the earlier question of what do we want students to know and be able to do? We should ask students: Tell me what you learned today. And, as educators, we should ask: Tell me what you learned this week in teaching. Taken together, these three statements essentially provide a framework for instruction, curriculum, and evaluation. They remind us that we need to know where we want to go, and we also need to check to see if we are getting there. Studying relevant research, seeking professional opportunities, and reflecting on progress and accomplishments will guide us in designing effective and challenging educational plans for all students.

References

Archambault, F. X., Jr., Westberg, K. L., Brown, S. W., Hallmark, B. W., Emmons, C. L., & Zhang, W. (1993). *Regular classroom practices with gifted students: Results of a national survey of classroom teachers* (Research Monograph 93102). Storrs, CT: University of Connecticut, The National Research Center on the Gifted and Talented.

Delcourt, M. A. B., Loyd, B. H., Cornell, D. G., & Goldberg, M. D. (1994). *Evaluation of the effects of programming arrangements on student learning outcomes* (Research Monograph 94108). Storrs, CT: University of Connecticut, The National Research Center on the Gifted and Talented.

Moon, T., Tomlinson, C. A., & Callahan, C. M. (1995). *Academic diversity in the middle school: Results of a national survey of middle school administrators and teachers* (Research Monograph 95124). Storrs, CT: University of Connecticut, The National Research Center on the Gifted and Talented.

Reis, S. M., Westberg, K. L., Kulikowich, J. K., Caillard, F., Hébert, T. P., 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). Storrs, CT: University of Connecticut, The National Research Center on the Gifted and Talented.

Sparks, D. (1995). *Linking student learning and staff development: A conversation with Tom Guskey and Herb Walberg* [Cassette]. Oxford, OH: National Staff Development Council.

Westberg, K. L., Archambault, F. X., Jr., Dobyns, S. M., & Salvin, T. J. (1993). *An observational study of instructional and curricular practices used with gifted and talented students in regular classrooms* (Research Monograph 93104). Storrs, CT: University of Connecticut, The National Research Center on the Gifted and Talented.

Building a Bridge: A Combined Effort Between Gifted and Bilingual Education

Valentina I. Kloosterman
University of Connecticut
Storrs, CT

In the past few decades, a major concern of researchers and educators in gifted education has been the significant underrepresentation of linguistically and/or culturally diverse (LCD) students in gifted and talented programs. The primary reason cited in the most recent studies conducted on this topic is the absence of adequate assessment procedures and programming for gifted minority students (Baldwin, 1987; Bernal, 1989; Castellano, 1995; Cohen, 1988; Frasier, Garcia, & Passow, 1995; Frasier & Passow, 1994; Kitano & Espinosa, 1995; Masten, 1985; Mills & Tissot, 1995; Rhodes, 1992; Smith, LeRose, & Clasen, 1991). The absence of knowledge or misunderstanding about the cultural, linguistic, and cognitive skills of LCD students results in limited educational policies, school programs, or other educational services that address the unique needs of these increasing populations.

According to the 1990 census, approximately 4.2 million youngsters aged 5 to 17 who speak a non-English language at home speak Spanish (Waggoner, 1995). The majority of members of the Hispanic/Latino group are Spanish/English bilingual and their native language is usually Spanish. The range of proficiency skills in the two languages can vary widely, from fluent bilingualism to limited communicative skills in either one of the two languages. Bilingual children may develop their two languages at different proficiency levels, at different

(continued on page 4)

(continued from page 3)
developmental stages, and in different formal and informal settings.

In general, studies in bilingual education have supported the idea that bilingualism is a complex phenomenon involving personal and socio-cultural dimensions (Baker, 1993; Cummins, 1991; Pease-Alvarez & Hakuta, 1992; Snow, 1992). A parallel condition exists in education of gifted students; researchers in gifted education have also addressed the complexity of giftedness and the description of its factors (Grinder, 1985; Mönks & Mason, 1993; Renzulli, 1994; Sternberg & Davidson, 1986; Tannenbaum, 1983). Both bilingualism and talent development are multidimensional phenomena involving cognitive, affective, cultural, environmental, and situational factors.

The U.S. Department of Education report, *National Excellence: A Case for Developing America's Talent* (1993) states that "special efforts are required to overcome the barriers to achievement that many economically disadvantaged and minority students face" (p. 28). Various sections of this report clearly address the need to identify and nurture talents in youngsters of different socioeconomic and cultural backgrounds. It is clear from the extremely limited number of studies and educational practices which have focused on the dynamics of culture, bilingualism, and talent development in LCD students that insufficient information exists to describe the socio-emotional and cognitive characteristics of this target population (Frasier & Passow, 1994; Castellano, 1995; Cohen, 1988; Cummins & Swain, 1986; Kitano & Espinosa, 1995). Researchers in bilingual and gifted education have struggled with the assessment of these interrelated factors (culture, bilingualism, and talent development) for three major reasons: (1) variable definitions; (2) each factor has multiple components that provide different meanings; and (3) various methodologies have been used to study these factors separately and combined. Additionally, over the years, different philosophical, psychological, educational, and political perspectives have influenced the conception of the factors mentioned above.

For the past 30 years, in-depth studies have been conducted in the field of gifted education about definitions, identification systems, and development of youngsters who demonstrate talent or have the potential to demonstrate talent or high performance in one or more academic areas. An increasing body of knowledge is available in the field with respect to these issues. During the last few years, researchers in this field have increasingly turned their attention to the underrepresentation of some populations in programs for the gifted such as gifted females, gifted students with learning disabilities, gifted economically disadvantaged students, and gifted minority students. The last two groups have also been targeted by federal and state policies. For example, the Jacob K. Javits Gifted and Talented Students Act of 1988 established that "outstanding talents are present in children and youth from all cultural groups, across all economic strata, and in all areas of human endeavor" (U.S. Department of Education, 1993, p. 26). Moreover, one of the missions of The National Research Center on the Gifted and Talented (Renzulli, Reid, & Gubbins, 1990) is to place emphasis on "identifying the research needs of economically disadvantaged youth, individuals of limited English proficiency, individuals with handicaps, and other special populations that traditionally have been underserved in programs for gifted and talented students" (p. 1).

The evolution of the study of bilingualism has similarities with the field of gifted education, as researchers and practitioners in bilingual education have focused on defining bilingualism and developing theories and educational practices on the ability and use of more than one language (Baker, 1993; Cummins & Swain, 1986; MacLaughlin, 1984). As within the field of gifted education, social and political forces have influenced the provision of services for the specific needs of a portion of the society.

In the United States, bilingual and ESL (English as a Second Language) programs have been created primarily to respond to the needs of non-English or limited English speaking students who are continuously arriving in this country (Baker, 1993; Crawford, 1991; Keller & Van Hooft, 1982). In general, U.S. bilingual programs are transitional in nature, and the bilingual student or limited English proficient (LEP) student is moved as quickly as possible into the monolingual English instruction without maintaining the native language. As Baker (1993) points out, there is a clear difference between "a classroom where formal instruction is to foster bilingualism and a classroom where bilingual children are present, but bilingualism is not fostered in the curriculum" (p. 151). Essentially, bilingual and ESL programs differ in the type of instruction. In the first case, the curriculum is developed in two languages, and second language learning is built upon the student's first language. In the second case, ESL (English as a Second Language) instruction, students receive "pull-out" classes in the majority language for a few hours each week. The rest of the time the student is in the regular classroom, where the instruction is given in English. This is called submersion or "sink-or-swim language instruction" (Baker, 1993; Crawford, 1991; McLaughlin, 1984). However, in both types of programs the objective is mostly to shift the student from the home, minority first language to the dominant, majority second language

(Baker, 1993; Bialystok & Hakuta, 1994; Crawford, 1991).

According to Bialystok and Hakuta (1994), learning a second language is a cognitive task in itself. Cohen (1988) points out that gifted limited English proficient or language-minority students are usually unable to express themselves well in English, and subsequently their talents are unknown because of their language limitations and not their lack of talents. One of the main reasons for this is that the assessment tools and procedures commonly used in gifted programs rely upon measures and techniques which are primarily dependent on English oral and written language (Hartley, 1987). Recent studies suggest that flexible criteria using multiple sources to assess talents in linguistically and culturally diverse students is needed in order to identify and nurture students' outstanding abilities (Castellano, 1995; Cohen, 1988; Kitano & Espinosa, 1995). Indeed, all children benefit when multidimensional assessment procedures are used to explore their interests, abilities, and learning styles.

The most recent studies in bilingualism are consistent with the hypothesis that the development of a second language can have positive effects on cognitive skills (Cummins & Swain, 1986; Hakuta, 1987; Hakuta & Gould, 1987). In this regard, Bialystok and Hakuta (1994) explain that "bilingual speakers have two linguistic systems for expressing their thoughts" (p. 10). Two cognitive mechanisms are particularly developed in bilingual children, the *switching* between their two languages, and *transferring* information from one language to the other.

Research in gifted education and in bilingual education has indicated that, in general, the education system has focused attention on the weaknesses rather than the cognitive strengths of linguistically and culturally diverse students (Barkan & Bernal, 1991; Davidson, 1992; Hakuta & Gould, 1987; Kolesinski & Leroux, 1992). Lack of information and misconceptions of learning and cognitive styles' preferences among language minority students have also been mentioned (De Leon, 1983). Addressing the latter, Hartley (1987) argues that "many cultural groups value listening and learning and encourage considered thought before speaking. What appears to be slowness may only be what a student knows as correct behavior" (p. 6).

Each society or culture values and encourages the development of certain talents or "intelligences" (Gardner, 1993) in its youngsters, while simultaneously overlooking or dismissing others (De Leon, 1983; Tannenbaum, 1986). For example, from Brickman's (1988) point of view, gifted students with foreign languages or the "multilingual gifted" have been neglected and often excluded from gifted and talented programs in the United States. Linguistically and culturally diverse students come from cultures where special talents are valued but not recognized by the majority culture (Bermúdez, Rakow, Márquez, Sawyer, & Ryan, 1991; Cohen, 1988). On the other hand, with respect to culture and the development of language proficiency, Bialystok and Hakuta (1994) believe that "each learning situation, as well as the criteria for 'success' in that context, is created through the opportunities and constraints of language, brain, mind, self, and culture" (p. 206).

Very few educational models or programs have been specifically designed to identify and develop talents in linguistically and culturally diverse students. Furthermore, according to Bermúdez and Rakow (1993), there is an absence of specialized programs or instructional models focusing on gifted LEP students in gifted education. These programs can promote primary and second language development as well as cultural expression through the different academic areas. "Model Rocketry and the Space Sciences for the Gifted" (Cary, 1990) and Project EXCEL, developed in San Diego Unified School District (Hermanson & Perez, 1993) are two examples of such programs. Another program which addresses this goal is the Tucson Unified School District program, GATE, which integrates bilingual education and gifted education focusing the attention on limited English proficient (LEP) and other minority students (Barkan & Bernal, 1991).

Essentially, the transition from an old paradigm to a new one is a "reconstruction of the field from new fundamentals, a reconstruction that changes some of the field's most elementary theoretical generalizations as well as many of its paradigm methods and applications" (Kuhn, 1970, p. 85). The actual paradigms in gifted education and the studies conducted in the field seem to describe a reality in which opportunities for children of cultural and linguistic backgrounds other than the "majority group" are denied. Although this reality has been addressed and described by researchers and practitioners in the United States with respect to Hispanics and Native Americans, the underrepresentation of linguistically and culturally diverse children in gifted programs is a worldwide problem.

While some researchers in gifted education advocate new paradigms for identifying talent potential in culturally diverse populations (Frasier & Passow, 1994), researchers in bilingual education are trying to connect their field with programs for the gifted to meet the needs of LCD children (Barkan & Bernal, 1991).

Whether using the terms gifted LEP, LCD gifted, gifted ESL, or gifted bilingual, these official and theoretical

(continued on page 6)

(continued from page 5)

terminologies are addressing the particular characteristics of a child who demonstrates talent potential or outstanding talents while simultaneously developing two languages. Language proficiency depends on the use and meaning of language in context (Bialystok & Hakuta, 1994), and in some ways, talent development also depends upon these two factors.

The identification and nurturing of talents in linguistically and culturally diverse children will benefit not only from new research about the personal, affective, and cognitive needs of this population, but also from the recognition that a constantly changing society celebrates and promotes the diverse expression of talents in its youngest generations.

References

Baker, C. (1993). *Foundations of bilingual education and bilingualism.* Great Britain: Multilingual Matters.

Baldwin, A. Y. (1987). Undiscovered diamonds: The minority gifted child. *Journal for the Education of the Gifted, 10*, 271-285.

Barkan, J. H., & Bernal, E. R. (1991). Gifted education for bilingual and limited English proficient students. *Gifted Child Quarterly, 35*, 144-147.

Bermúdez, A. B., & Rakow, S. J. (1993). *Examining identification and instruction practices for gifted and talented limited English proficient students.* (ERIC Document Reproduction Service No. ED 360 871)

Bermúdez, A., Rakow, S., Márquez, J., Sawyer, C., & Ryan, C. (1991). *Meeting the needs of the gifted and talented limited English proficient student: The UHCL prototype.* National Association for Bilingual Education. (ERIC Document Reproduction Service No. ED 360 872)

Bernal, E. (1989). "Pluralism and power"- Dare we reform education of gifted along these lines? In C. J. Maker & S. W. Schiever (Eds.), *Critical issues in gifted education. Defensible programs for cultural and ethnic minorities* (pp. 34-36). Austin, TX: Pro-Ed.

Bialystok, E., & Hakuta, K. (1994). *In other words. The science and psychology of second-language acquisition.* New York: Basic Books.

Brickman, W. W. (1988). Profiles and perspectives. The multilingual development of the gifted. *Roeper Review, 4*, 247-250.

Cary, A. (1990). Model rocketry and the space sciences for the Hispanic bilingual/gifted child. *Gifted International, 6*(1), 46-62.

Castellano, J. (1995). Revisiting gifted education opportunities for linguistically and culturally diverse students. *National Association for Bilingual Education News, 18*(6), 27-28.

Cohen, L. M. (1988). *Meeting the needs of gifted and talented minority language students: Issues and practices.* (ERIC Document Reproduction Service No. ED 309 592)

Crawford, J. (1991). *Bilingual education: History, politics, theory, and practices.* Los Angeles: Bilingual Education Services.

Cummins, J. (1991). Interdependence of first- and second-language proficiency in bilingual children. In E. Bialystok (Ed.), *Language processing in bilingual children* (pp. 70-88). New York: Cambridge University Press.

Cummins, J., & Swain, M. (1986). *Bilingualism in education.* New York: Longman.

Davidson, K. L. (1992). A comparison of Native American and White students' cognitive strengths as measured by the Kaufman Assessment Battery for Children. *Roeper Review, 14*, 111-115.

De Leon, J. (1983). Cognitive style differences and the underrepresentation of Mexican Americans in the programs for the gifted. *Journal for the Education of the Gifted, 6*, 167-177.

Frasier, M., Garcia, J., & Passow, A. H. (1995). *A review of assessment issues in gifted education and their implications for identifying gifted minority students* (RM95204). Storrs, CT: University of Connecticut, The National Research Center on the Gifted and Talented.

Frasier, M., & Passow, A. H. (1994). *Toward a new paradigm for identifying talent potential* (RM94112). Storrs, CT: University of Connecticut, The National Research Center on the Gifted and Talented.

Gardner, H. (1993). *Multiple intelligences. The theory in practice.* New York: Basic Books.

Grinder, R. E. (1985). The gifted in our midst: By their divine deeds, neuroses, and mental test scores we have known them. In F. D. Horowitz & M. O' Brien (Eds.), *The gifted and talented: Developmental perspectives* (pp. 5-35). Washington, DC: American Psychological Association.

Hakuta, K. (1987). Degree of bilingualism and cognitive ability in mainland Puerto Rican children. *Child Development, 58*, 1372-1388.

Hakuta, K., & Gould, L. J. (1987). Synthesis of research on bilingual education. *Educational Leadership, 3*, 38-45.

Hartley, E. A. (1987). *How can we meet all their needs? Incorporating education for the gifted and talented into the multicultural classroom.* (ERIC Document Reproduction Service No. ED 336 968)

Hermanson, D., & Perez, R. I. (1993). *Project EXCEL*. San Diego, CA: San Diego City Schools, School Services Division, Exceptional Programs Development.

Keller, G. D., & Van Hooft, K. (1982). A chronology of bilingualism and bilingual education. In J. A. Fishman & G. D. Keller, *Bilingual education for Hispanic students in the United States* (pp. 3-19). New York: Teachers College Press.

Kitano, M. K., & Espinosa, R. (1995). Language diversity and giftedness: Working with gifted English language learners. *Journal for the Education of the Gifted, 18*, 234-254.

Kolesinski, M. T., & Leroux, J. A. (1992). The bilingual education experience French-English, Spanish-English: From a perspective of gifted students. *Roeper Review, 14*, 221-224.

Kuhn, T. S. (1970). *The structure of scientific revolutions* (2nd ed.). Chicago: The University of Chicago.

MacLaughlin, B. (1984). *Second-language acquisition in childhood: Volume 2. School age children* (2nd ed.). Hillsdale, NJ: Lawrence Erlbaum.

Masten, W. G. (1985). Identification of gifted minority students: Past research, future directions. *Roeper Review, 8*, 83-85.

Mills, C. J., & Tissot, S. L. (1995). Identifying academic potential in students from under-represented populations: Is using the Raven's Progressive Matrices a good idea? *Gifted Child Quarterly, 39*, 209-217.

Mönks, F., & Mason, E. J. (1993). Developmental theories and giftedness. In K. E. Heller, F. J. Mönks, & A. H. Passow (Eds.), *International handbook of research and development of giftedness and talent* (pp. 89-101). Oxford, Great Britain: Pergamon Press.

Pease-Alvarez, L., & Hakuta, K. (1992). Enriching our views of bilingualism and bilingual education. *Educational Researcher, 21*(2), 4-6.

Renzulli, J. S. (1994). *Schools for talent development: A practical plan for total school improvement.* Mansfield Center, CT: Creative Learning Press.

Renzulli, J. S., Reid, B. D., & Gubbins, E. J. (1990). *Setting an agenda: Research priorities for the gifted and talented through the year 2000.* Storrs, CT: University of Connecticut, The National Research Center on the Gifted and Talented.

Rhodes, L. (1992). Focusing attention on the individual in identification of gifted Black students. *Roeper Review, 14*, 108-110.

Smith, J., LeRose, B., & Clasen, R. E. (1991). Underrepresentation of minority students in gifted programs: Yes! It matters! *Gifted Child Quarterly, 35*, 81-83.

Sternberg, R. J., & Davidson, J. E. (1986). Conceptions of giftedness: A map of the terrain. In R. J. Sternberg & J. E. Davidson (Eds.), *Conceptions of giftedness* (pp. 3-18). New York: Cambridge University Press.

Snow, C. (1992). Perspectives on second-language development: Implications for bilingual education. *Educational Researcher, 21*(2), 16-19.

Tannenbaum, A. J. (1983). *Gifted children: Psychological and educational perspectives.* New York: Macmillan.

Tannenbaum, A. J. (1986). Giftedness: A psychological approach. In R. J. Sternberg & J. E. Davidson (Eds.), *Conceptions of giftedness* (pp. 21-52). New York: Cambridge University Press.

U.S. Department of Education. (1993). *National excellence: A case for developing America's talent.* Washington, DC: U.S. Government Printing Office.

Waggoner, D. (1995). Language information from the 1990 Census. *National Association for Bilingual Education News, 19*(6), 7-8.

Talent Development for Everyone: A Review of *Developing the Gifts and Talents of All Students in the Regular Classroom*

Bruce N. Berube
University of Connecticut
Storrs, CT

Many educators are beginning to realize that more needs to be done to challenge students in the regular classroom. The innovative ideas used to challenge high ability students are now being viewed as a means to provide rich curricular opportunities for all students.

Margaret Beecher is at the forefront of this movement. In the introduction to her book, *Developing the Gifts and Talents of All Students in the Regular Classroom: An Innovative Curricular Design Based on the Enrichment Triad Model*, Beecher provides a quote by Roland Barth that clarifies the primary mission she hopes to accomplish. Barth (1990) states, "Rarely do outside of school remedies work their way into the fabric of the school or into educators' lives, and more rarely into classrooms. Therefore, they offer only modest hope of influencing the basic culture of the schools" (p. 3). The ideas, strategies, and suggestions presented by Beecher begin in and focus on the regular classroom and provide guidance for how best to provide for the unique talents and abilities of *all* students. Beecher's objective is to improve schools from within by utilizing the best of what gifted education has to offer and making it available to each and every individual in the classroom.

To accomplish this task, Beecher relies heavily on the Enrichment Triad Model (1977), developed by Dr. Joseph Renzulli. For those not familiar with this model, it consists of three basic types of activities. Type I activities involve exploratory experiences that allow students to examine topics and ideas not ordinarily focused on as part of the regular curriculum. They are designed to pique student interest for the topic under investigation. A variety of mediums are often utilized, including guest speakers, interest centers, and computer software. Type II activities focus on providing students with the processes and skills necessary for higher level thinking. They are organized into four primary categories which include: 1) creative and critical thinking skills, 2) learning how-to-learn skills, 3) reference skills, and 4) communication skills. Included under these general headings are a multitude of more specific skills and tasks. It is important to note that Type II training is often a prerequisite that enables students to successfully complete Type III projects. Finally, Type III projects are the culminating and most important aspect of the Enrichment Triad Model. They focus on students assuming the roles of "practicing professionals" in a given area of study. Participants focus on real-life problems of interest to them, and by adopting the techniques and skills of an expert in that field, they eventually find a solution to their problem. This solution is then presented in a unique and creative way. For example, one Type III project described in the book focused on skiing. The student developed a videotape on the slopes of the Berkshires to provide an introduction to the basics of skiing techniques. The Enrichment Triad Model was initially intended for use with students identified as gifted. Beecher's primary concern in her book is to translate this model into an effective program for regular classroom teachers and for all students.

In order for this transition to be effective, Beecher provides a 12-step organizational framework to help educators develop units that will incorporate the enrichment activities of the Triad Model. While the author spends significant time elaborating on each step, for this review I will briefly summarize some of the important aspects of the process in general. Because emphasis is placed on the regular classroom, and because the time constraints often placed on teachers in such a situation need to be considered, the general themes and/or topics to be explored are often selected by the teacher and relate to some aspect of the prescribed curriculum. This is not to say that students are never allowed to select the general interest area, but the topics are usually curriculum related.

The first several steps in the process involve the teacher in preparatory activities that form the basis of the development of a unit of study. Before a unit, theme, or topic is examined the teacher must first select a broad theme that covers all or part of a particular year's curriculum. In a fourth grade class, for example, the overarching theme that was selected

(continued on page 8)

(continued from page 7)
for the year was "Survival." The more specific units developed over the course of the year were subsumed under this general theme. In addition to this thematic selection, the teacher is also involved in mapping the curriculum for the school year. This involves detailing the specific skills and processes to be taught in each content area. These skills are then integrated into the specific units and the general theme described above. The skills involve those found in the regular curriculum, such as analyzing cause and effect relationships, comparing and contrasting, and interpreting the main idea of a text. Once these two tasks have been completed, the topics or sub-themes are then developed, with the teacher always mindful of relating these sub-themes to the general theme and the necessary skills to be taught. The particular topic Beecher spends a significant amount of time describing is her Native Americans unit. In developing this unit she continued to monitor how the study of Native Americans would be effectively integrated with the all-inclusive theme of Survival.

The specific units or themes are then infused with the activities detailed in the Enrichment Triad Model. Brainstorming sessions begin the initial planning. The first session involves listing any and all ideas related to the unit. Resources such as textbooks, magazines, and the teacher's prior knowledge and expertise all play a role in this generative process. The thoughts developed in this brainstorming session are then translated into a web that helps to graphically organize these initial ideas. The second brainstorming session is an attempt to develop activities that will help students learn about the important topics detailed on the web. At this time the activities are considered in terms of how they relate to specific content areas and the required skills to be covered. It is recommended that the teacher confer with specialists in the school so that activities can be provided that focus on a broad range of topics and highlight a variety of student strengths and abilities. Beecher points out that integration of different subject areas is crucial to the development of such a unit, and that the teacher must make a concerted effort to highlight the interconnectedness of the individual content areas.

Also involved in the preliminary planning are such issues as determining student outcomes and surveying students as to their background knowledge and interests. In terms of outcomes, Beecher stresses the obvious emphasis on content to be mastered and skills to be acquired, but also focuses on student attitudes that will be developed by the end of the unit. Such attitudes that she deems important include an inquisitive nature and independent work habits. As far as surveying the students is concerned, Beecher is not only intent on gathering information related to what students already know about a given topic and what interests them about that topic, but also *how* they would like to approach their learning. By suggesting a variety of learning styles and finding out what styles pique the students' enthusiasm, more effective lessons and activities can be generated.

Once the students become involved in the Type I, II, and III activities a relatively sequential format is followed. For Type I activities, Beecher relies heavily on the use of interest centers and guest speakers. The interest centers and guest speakers focus on developing not only student interest in the unit, but attempt to provide a foundation of background knowledge that the students will need for more in-depth Type III activities later on. Beecher points out that the use of interest centers is of utmost importance in the primary grades. Younger students need hands-on materials they can interact with and learn from.

Type II process training lessons are infused throughout the course of the unit. The goal of such lessons and activities is to allow students to "process and interact with the content presented." This type of training is often needed in order for students to appreciate fully the Type I experiences, and provides the requisite skills necessary for in-depth Type III investigations. While specific Type II training activities will be necessitated by the specific independent projects the students are involved in, Beecher believes there are several Type II skills that are "a must" as students progress through the Triad process. These include:

- Brainstorming
- Webbing
- Decision Making
- Questioning
- Creative Problem Solving
- Planning

The culminating Type III training activities described by Beecher differ slightly from the Type III investigations ideally developed according to the Enrichment Triad Model. First and foremost, the Type III training activities involve each and every student in the classroom. They are not geared toward only those students who exhibit particular talents and abilities. As Beecher points out, this may mean that not all of the independent projects students work on will be as in-depth as a real Type III. This is not to say that those students who do exhibit talents and abilities will not be given the opportunity to reach their potential. The Type III training activities that begin in the classroom are often developed into expanded Type III projects with the help of the enrichment specialist. The second key difference related to these activities is that they are based on the unit or theme under

investigation. For example, with the Native Americans unit, students were allowed to select projects within the parameters of the topic being studied. They were not allowed to select any interest area, which is often a hallmark of Type III investigations.

To highlight the difference between a Type III training activity and an in-depth Type III investigation, Beecher provides several examples of each. One student, as a result of investigating the Native American culture, decided to become a "tribal storyteller." As part of her Type III training activity she learned the essential techniques of being a good storyteller and conducted extensive research on the myths and legends of the Plains Indian tribes. To display her knowledge and expertise, she presented a variety of myths and legends to parents during a culminating "powwow."

Going one step further, another student decided to explore her family's genealogy in detail. As part of her Type III project "this student wrote, directed, and produced a play entitled '*A Living Genealogy*,' which was videotaped for a local cable company and became a national award-winning video" (p. 100). This investigation involved the assistance of not only the teacher, but the enrichment specialist and parents as well.

It cannot be emphasized enough that as the Type III training activities begin, students and teacher need to take the time to plan their investigations carefully and focus on a clear and specific problem. As Beecher states, "Planning is a critical component of a Type III investigation and offers a challenging task for both teachers and students. Without a clear plan most endeavors are doomed to failure" (p. 88). To fulfill this objective, Beecher provides a detailed management plan for students to follow.

Once the Triad process has been completed for a topic or theme, assessment and evaluation take place. This assessment and evaluation not only center on the students, but on the teacher as well. In terms of the students, emphasis is placed on their "constructed responses," i.e., the products developed as a result of their independent investigations. Peer and self-assessment are of utmost importance as is feedback from the teacher on how to improve future investigations. The teacher also needs to examine his or her own teaching and be mindful of the modifications that can be made to improve future Triad experiences.

Finally, Beecher provides a section for the reader that deals with frequently asked questions related to the implementation of the Triad Model in the regular classroom. These questions address topics such as how to handle the awe-inspiring task of guiding 20 or more students through Type III investigations simultaneously, and dealing with the fact that you cannot be an expert on every specific topic that the students choose to explore. I found this question and answer section particularly helpful, because it provided answers to some of the key questions that may have otherwise prevented me from experimenting with the Triad Model in the future.

Overall, I found the book to be very "hands-on" and teacher friendly. For almost every step in the overall process of integrating Triad in the classroom, a useful chart or diagram is provided that enables the teacher new to the process to begin immediately. Also very helpful is the Appendix offered at the end of the book. It includes detailed descriptions of 21 lessons used to teach a variety of Type II training skills. These include decision making, creative problem solving, SCAMPER, and webbing. Also, the examples provided of successfully completed projects have inspired me to integrate these advanced investigations into my own curriculum. It was nice to see that enrichment learning and teaching do not have to be reserved for a select few students. Such an approach is available to all students with the help of a dedicated educator such as Margaret Beecher.

References

Barth, R. S. (1990). *Improving schools from within: Teachers, parents, and principals can make the difference.* San Francisco: Jossey-Bass.

Beecher, M. (1995). *Developing the gifts and talents of all students in the regular classroom: An innovative curricular design based on the enrichment triad model.* Mansfield Center, CT: Creative Learning Press.

Renzulli, J. S. (1977). *The enrichment triad model: A guide for developing defensible programs for the gifted and talented.* Mansfield Center, CT: Creative Learning Press.

The National Research Center on the Gifted and Talented Welcomes the Following New Collaborative School Districts:

Simsbury Public Schools – Simsbury, CT
Whitman-Hanson Regional School District – Whitman, MA
Long Branch Public Schools – Long Branch, NJ
Central Bucks School District – Doylestown, PA
Lake Chelan School District – Chelan, WA
Tumwater School District #33 – Tumwater, WA

Recent Research

The Effectiveness of Peer Coaching on Classroom Teachers' Use of Differentiation for Gifted Middle School Students

Caroline Sarah Cohen
University of Connecticut, 1997

Despite the obvious importance of educating all children to their fullest potential, gifted students remain underserved and unchallenged in many educational settings. Gifted students spend much, if not all, of their time in the regular classroom, yet classroom teachers have usually received little or no preservice or inservice training in gifted education. The implications are obvious: teachers who serve gifted students must receive appropriate training in techniques to meet the needs of these children, particularly in strategies and resources for differentiating the regular curriculum and instruction. Peer coaching has emerged in the research literature as one effective professional development technique which encourages and enables teachers to practice and implement newly learned strategies.

The purpose of this study was to examine whether peer coaching was perceived by participating middle school teachers as a useful professional development technique for the acquisition of curricular and instructional differentiation strategies for high ability and high achieving students in the regular classroom. Qualitative and quantitative methodologies were used to describe participating teachers' perceptions of the training and supported practice of peer coaching. Key participants in this study were middle school classroom teachers; additional participants were district administrators, peer coaches, students, and parents.

Findings from this study supported the use of the principles of peer coaching for the development of new strategies. Participating teachers reported positive perceptions of peer coaching and its usefulness in the acquisition and implementation of differentiation strategies. Quantitative data indicated conflicting perceptions among teachers, students, and parents about the amount of challenge and differentiation initially provided to high ability middle school students. Qualitative data yielded three emergent themes: 1) the variety and contradiction of teachers', students', and parents' perceptions throughout the study; 2) the initial absence of a common definition and shared understandings of differentiation among participants; and 3) the nature of change and the time and training needed for the strategies of differentiation to be widely implemented by classroom teachers.

Effects of Teaching Problem Solving Through Cooperative Learning Methods on Student Mathematics Achievement, Attitudes Toward Mathematics, Mathematics Self-Efficacy, and Metacognition

Edna Leticia Hernández Garduño
University of Connecticut, 1997

Recently, an emphasis has been placed on teaching mathematics in cooperative learning settings and through a problem solving approach (NCTM, 1989). Although numerous research studies have been conducted on the effects of cooperative learning on mathematics achievement, attitudes, and self-efficacy, no study was found that addresses the use of cooperative learning while teaching mathematical problem solving and heuristic strategies and its effect on metacognition. The purpose of this study was to assess seventh and eighth grade male and female students' metacognition, self-efficacy, attitudes toward mathematics, and achievement after participating in a two-week course on problem solving. Problem solving is an important area of inquiry, as previous research indicates that females demonstrate lower performance in solving non-routine problems.

This experimental study used a pretest-posttest control-group design in which students were randomly assigned to one of two experimental groups or a control group during a summer enrichment program offered to talented students in a southern state. All three groups received instruction in probability and

statistics through a mathematical problem solving approach using heuristic strategies. The two experimental groups were taught through cooperative learning methods. In the first experimental group, students worked in mixed-gender groups and, in the second one, in single-gender groups. The control group was taught using whole-group instruction in which competition and individual work were stressed. Students' achievement in probability and statistics, self-efficacy, and attitudes toward mathematics were assessed at the beginning and end of instruction. Data from the assessment of these three variables were analyzed using a multivariate analysis of covariance and a follow-up discriminant function analysis. Students' metacognitive episodes were assessed using content analysis procedures.

Although the literature suggests that cooperative learning settings, particularly single-gender groups, are more beneficial for females, no statistical differences in achievement or self-efficacy were found among the groups. Statistically significant differences in attitudes toward mathematics were found favoring students in the whole group instruction, competitive setting. Also, the highest achieving male and female students exhibited more metacognitive episodes in the competitive setting than students in the other groups. Lower achieving male and female students, however, exhibited fewer metacognitive episodes in this type of setting.

A Gender Study of Students With High Mathematics Ability: Personological, Educational, and Parental Influences on the Intent to Pursue Quantitative Fields of Study in College

Mary Katherine Gavin
University of Connecticut, 1997

It is well documented that more males than females enter and pursue mathematically related career fields. Research has generally examined gender issues concerning mathematics majors and related career goals as an integral part of majors and careers in the sciences. However, an examination of the distribution of women in these fields presents a picture of uneven advancement. Women are clustered in the life sciences with far fewer in physical sciences, mathematics, engineering, and computer science. Using data from the National Education Longitudinal Study of 1988 (NELS:88), this study examined personological and educational characteristics of females and males identified as having high ability in mathematics. These data consist of a sample of 24,599 students from 1,052 schools throughout the nation who completed surveys in eighth, tenth, and twelfth grades. Gender similarities and differences were explored using descriptive and inferential statistics.

Findings from this study revealed no gender differences with respect to performance or participation in mathematics courses. Males scored significantly higher on the verbal section of the SAT test, while no gender differences were found on the mathematics section. Also, males rated usefulness of mathematics significantly higher than females. In addition, significant differences were found between parental levels of education and expectation. The more educated the parent, the greater the expectations were for the child's educational goals. Logistic regression analyses were performed to predict the gender of students who intend to pursue a quantitative field. The odds ratios indicated that SAT verbal scores and teacher emphasis on further study in mathematics were significant influences on males, while credits in Calculus and SAT mathematics scores were significant influences on females. Analyses also revealed that high mathematics ability females who intend to pursue a quantitative field were more likely to consider mathematics as useful to their future and had more credits in Calculus than high mathematics ability females who do not intend to pursue a quantitative field.

Characteristics and Perceptions of Perfectionism in Gifted Adolescents in a Rural School Environment

Patricia Ann Schuler
University of Connecticut, 1997

This qualitative study investigated the characteristics of perfectionistic gifted male and female adolescents in a rural middle school, how they perceived their perfectionism, the influences on their perfectionism, and the consequences of their perfectionistic behaviors in the context of their perceived gender roles and their rural middle school experiences.

Qualitative and quantitative methods of data collection were employed to gather data from 20 gifted male and female adolescents who were identified as having perfectionistic tendencies. Semi-structured interviews, record and document review, self-report teacher survey, and participant

(continued on page 12)

(continued from page 11)
observation were used to identify factors which may influence the perceptions and behaviors of this population.

Findings from this study confirm the theoretical proposition that perfectionism is a characteristic of many gifted adolescents. In this study, 87.5% of gifted adolescents in accelerated courses in a rural middle school were identified as having perfectionistic tendencies. Results support the multidimensional theory of perfectionism which states that perfectionism exists on a continuum from healthy to dysfunctional behaviors (Hamachek, 1978). Several differences exist between the healthy perfectionists and the dysfunctional perfectionists. Healthy perfectionists possessed an intense need for order and organization; displayed self-acceptance of mistakes; enjoyed high parental expectations; demonstrated positive ways of coping with their perfectionistic tendencies; had role models who emphasize doing one's "best"; and viewed personal effort as an important part of their perfectionism. The dysfunctional perfectionists lived in a state of anxiety about making errors; had extremely high standards; perceived excessive expectations and negative criticisms from others; questioned their own judgments; lacked effective coping strategies; and exhibited a constant need for approval.

Family, teacher, and peer influences on perfectionism were perceived as mostly positive for the healthy perfectionists, but negative for the dysfunctional perfectionists. The impact of gender roles was not found as an influence. The perceived lack of challenge by a majority of the perfectionists was manifested in their enormous efforts to perfect school work, while exerting minimal intellectual effort and receiving high grades in return. Teacher difficulty in identifying mild perfectionistic distress may be due to the perception of perfectionistic gifted adolescents as being "model students" who have good school adjustment.

Gifted, But Gone: High Ability, Mexican-American, Female Dropouts

Nancy Lashaway-Bokina
University of Connecticut, 1996

The problem of students leaving school prior to high school graduation is particularly intense in south Texas. Approximately 25,000 Mexican-American students left school before graduation during the 1990-91 school year in Texas. This study examined one portion of the dropout population: high-ability Mexican-American females. Traditional identification measures were used to identify high-ability females who left school between 1990-93, and prior to their graduation from high school. These identification methods included the review of: cumulative records for grades, standardized achievement and creativity test scores, reports of awards or outstanding honors, and counselor, teacher, and self recommendations. Information was obtained from records of school districts with enrollments near or over 12,000 students. According to the Texas Education Agency (1992), the larger the student body, the greater the chance of students dropping out. The school systems included in this study are among the largest in Texas.

Non-traditional methods used by Mexican-Americans to identify high-ability students within their culture were investigated through qualitative research methodology as described by Lincoln and Guba (1985) and Strauss and Corbin (1991). Interviews were conducted with community members, educational personnel, family and extended family, and peers to identify high-ability dropouts who exhibited creativity or exceptional talent in the arts, leadership, or cultural activities.

The four major purposes of the study were: to describe the circumstances that influenced high-ability students to leave school prior to graduation, to determine if underlying characteristics of Mexican-American, female students exist that signify gifted or exceptional behavior in the Mexican-American culture, to examine the identification and gifted program guidelines for students' entry into gifted and talented programs in south Texas, and to compare the relationship between the lower Valley school population and the number of Mexican-Americans represented in gifted and talented programs.

Researchers at Boise State University are seeking school districts to participate in a study of procedures to identify students for gifted and talented programs. Classroom teachers of schools that elect to participate will be asked to read 12 student profiles and indicate whether they feel the students described in the profiles are probable candidates for a gifted and talented program. For more information on becoming involved in the project contact: Del Siegle, FTSE-BSU, 1910 University Drive, Boise, ID 83725, phone 208-385-3831.

Gender Differences in High School Students' Attitudes Toward Mathematics in Traditional Versus Cooperative Groups

Lisa A. Drzewiecki
Karen L. Westberg
University of Connecticut
Storrs, CT

Recent research indicates that the gap between male and female students' mathematics achievement is gradually beginning to diminish (Gutbezahl, 1995); however, female students are still underrepresented in advanced mathematics classes as well as in careers involving mathematics (Kerr, 1994; Stage & Maple, 1996). Bright, young women continue to lock themselves out of mathematically related professions. In the study reported briefly here, a survey was administered to high school students to better understand how students' attitudes toward mathematics differ by gender and by the grouping techniques used for mathematics instruction. More specifically, the survey examined the impact of cooperative grouping as an alternative to traditional mathematics instruction for improving females' attitudes toward mathematics. It is important to note that *cooperative grouping* procedures—not a particular theoretical model of *cooperative learning*—were investigated.

Background

When females enter high school, they take fewer and less advanced mathematics courses, self-selecting out of higher level mathematics classes. Because males enroll in more mathematics classes, they dominate professions that require higher level mathematical knowledge (Hanson, 1992). This is of particular concern to educators interested in the development of mathematical talent in capable young women. Several external and internal barriers have been cited in the literature for females' limited pursuit of mathematics. For example, some parents' and teachers' beliefs about the relative unimportance of mathematics for females and expectations for females' lower mathematical achievement have an impact on females' interest in pursuing mathematics coursework (Dickens & Cornell, 1993; Hanson, 1992). In addition, female students report less confidence in their mathematical abilities than their male counterparts (Cohen & Kosler, 1991; Hanson, 1992), and males and females differ in their attributions for success and failure in mathematics (Leder, 1984; Subotnik, 1988).

Several interventions and programs have been proposed for improving female students' attitudes toward mathematics, including the use of cooperative grouping procedures in mathematics classes (AAUW, 1992; Mulryan, 1992). The impact of this strategy has been examined at the elementary level, but only a few studies have investigated the effects of this strategy with high school students. Nichols and Miller (1994) examined the attitudes and achievement of algebra II students who received instruction in cooperative groups for 18 weeks, followed by instruction in a traditional manner for 18 weeks. While the researchers found that the students' attitudes were more positive and their achievement was higher when enrolled in classes that used cooperative grouping, the use of multiple treatments with the same subjects threatens the findings of their study. Additional investigations have been needed to address the impact of grouping procedures on students' attitudes toward mathematics at the high school level.

Research Design

In this study, survey research was used to collect data about high school students' attitudes toward mathematics. A 37 item survey was developed (Drzewiecki, 1996) to address several factors cited in the literature that reportedly affect students' attitudes toward mathematics. The survey contains 15 open-ended items and 22 items to which students respond on a 5-point scale. For example, "I like being able to work independently on a math problem" was followed by five responses, ranging from strongly disagree to strongly agree. The 22 items correspond to six categories: general attitudes, usefulness, confidence, parental influences, participation, and attitudes toward group work. The survey was administered to students who were participating in traditionally grouped classes and students who were in cooperatively grouped classes.

Sample

The sample consisted of 218 (107 males, 111 females) students enrolled in the mathematics classes taught by

(continued on page 14)

(continued from page 13)

four teachers in a suburban high school in the Northeast. The students were enrolled in algebra II, geometry, or pre-calculus classes, with the majority enrolled in algebra II classes. Two teachers instructed their mathematics classes in a traditional manner by having students solve mathematical problems independently. The other two teachers used a cooperative grouping procedure in which students worked in groups of two to four students to complete assignments. Again, it should be noted that *cooperative grouping*— not a specific theoretical model of *cooperative learning*— was used by two of the teachers. A chi square analysis indicated that there were no significant differences in the previous academic grades of the two groups of students, $x^2 = 3.72$ (4), $p > .05$; therefore, students in the traditionally grouped classes and the cooperatively grouped classes were assumed to be equivalent in ability. The survey was administered to the students in the middle of the academic year when the students had been enrolled in their respective mathematics classes for several months.

Summary of Results

The survey findings are presented below. All descriptive and inferential analyses were conducted using the StatView (1992) software program.

Attitudes Toward Mathematics by Gender and Instructional Method

The first research question addressed the general attitudes toward mathematics of students who were receiving mathematics instruction in traditional versus cooperative groups. A 2 x 2 analysis of variance indicated that there were no significant main effects for gender and instructional method ($p > .05$); however, there was a significant interaction between gender and instructional method with regard to students' general attitudes toward mathematics, F (1, 203) = 4.902, $p < .05$. Female students in the mathematics classes with traditional instruction had more positive general attitudes toward mathematics than the females in the cooperatively grouped classes, and the males in the cooperatively grouped classes had higher attitudes than the males in the traditionally grouped classes.

In addition to students' general attitudes, the relationship between gender and instructional method (traditional versus cooperative grouping) with regard to students' confidence in their mathematical abilities was investigated. A 2 x 2 analysis of variance revealed no main effect for instructional method ($p > .05$), a significant effect for gender, F (1, 214) = 4.84, $p < .05$, and a significant interaction between gender and instructional method with regard to students' reports of confidence in their mathematical abilities, F (1, 209) = 5.45, $p < .05$. Females in the cooperatively grouped classes reported less confidence in their mathematical ability than the females in the traditionally grouped classes, while the reverse of this was found for males.

Another category on the survey was students' attitudes toward working in groups. A significant difference was found between the traditionally grouped and cooperatively grouped mathematics classes, F (1, 210) = 58.52, $p < .05$, and a significant interaction was found between gender and instructional group with regard to attitudes toward working in groups, F (1, 210) = 5.55, $p < .05$. Males in the cooperatively grouped classes had the most positive attitudes toward working in groups, and females in the traditional classes had the least positive attitudes toward working in groups. No differences in gender and instructional method ($p > .05$) were found on the other categories represented on the instrument (participation in mathematics classes, attitudes toward usefulness of mathematics, and perceptions about parental influence).

Attitudes Toward Mathematics by Gender and Previous Grades

A few analyses were conducted in which the instructional method was disregarded. The relationship between gender and students' previous academic grades in mathematics classes with regard to students' general attitudes toward mathematics was analyzed. A 2 x 2 analysis of variance revealed a significant interaction between gender and previous grades with regard to students' general attitudes toward mathematics, F (4, 197) = 2.691, $p < .05$. Specifically, male students had more positive general attitudes toward mathematics than females at each grade point average with the exception of those who reported a B average in previous mathematics courses. Of the students with a B average, females had more positive general attitudes toward mathematics.

Attributions for Success in Mathematics by Gender and Instructional Method

Do female and male high school students' attributions for success in mathematics differ by gender and in traditional versus cooperatively grouped classes? Students selected responses on the survey to indicate why they are successful in mathematics. Their responses corresponded to the following attributions: effort, luck, task difficulty, or ability. A chi square analysis revealed significant differences between male and female students' attributions for success in mathematics, $x^2 = 10.5$ (3), $p < .05$, when grouping was not considered; namely, 49% of the males attribute success to ability and 45% of the females attribute success to effort. In addition, there were no significant differences in the attributions for success by males who were enrolled in traditional versus cooperatively grouped mathematics classes, $x^2 = 2.302$ (3), $p > .05$. However,

significant differences were found in the attributions for success by females in the traditional versus cooperative grouping classes, $x^2 = 7.84$ (3), $p < .05$. More female students attributed their success to ability when they were enrolled in traditional, not cooperatively grouped, mathematics classes. Specifically, 19% of the females in cooperatively grouped mathematics classes attributed their success to ability, but 41% of the females in traditional mathematics classes attributed their success to ability.

Conclusions

The results from this survey were interesting, and some of the findings were quite surprising. The results suggest that cooperative grouping may not be as advantageous for females as is traditional instruction for promoting positive, general attitudes toward mathematics. In addition, the results indicate that cooperative grouping in high school mathematics classes may not be a better method for helping females gain greater confidence in their mathematical abilities. The gender differences in attributions for success in mathematics and students' attributions for success in traditional versus cooperative groups are particularly intriguing. These findings suggest that participation in group learning for the majority of the class time in mathematics classes may actually undermine female students' motivation! Because the study was limited to a sample of students located in just one large high school, it would be inappropriate to generalize the results to other settings and populations. Nevertheless, if teachers have been using group learning as a strategy for improving female students' attitudes toward mathematics, perhaps they need to re-examine their use of this strategy and, at the very least, survey their own students about their preferences for instructional grouping procedures.

On the open-ended items on the survey, the students enrolled in the classes using cooperative grouping procedures indicated that, in general, they enjoyed working in cooperative groups because they were able to provide help and receive help from their peers, share ideas on solving mathematics problems, check answers with other students and, ultimately, understand the material more easily. A future examination of the students who give and receive help within the cooperative groups (for example, the number of students and the abilities of the students), and if any gender differences are related to this, may offer some explanation as to why females report less confidence in their mathematics abilities and lower general attitudes toward mathematics when participating in classes that use cooperative grouping for instruction. Clearly, additional investigations are needed to address issues related to the findings in this study.

References

American Association of University Women. (1992*). Shortchanging girls, shortchanging America: A call to action.* (ERIC Document Reproduction Service No. ED 340658)

Cohen, R., & Kosler, J. (1991). *Gender equity in high school math: A study of female participation and achievement.* (Technical Report No. 143). (ERIC Document Reproduction Service No. 345 935)

Dickens, M. N., & Cornell, D. G. (1993). Parental influences on the mathematics self-concept of high ability adolescent girls. *Journal for the Education of the Gifted*, *17*, 53-73.

Drzewiecki, L. A. (1996). *Differences between male and female students' attitudes toward mathematics in traditional and cooperative learning groups.* Unpublished honors thesis, University of Connecticut, Storrs.

Gutbezahl, J. (1995). *How negative expectancies and attitudes undermine females' math confidence and performance: A review of the literature.* Amherst, MA: University of Massachusetts. (ERIC Document Reproduction Service No. ED 380 279)

Hanson, K. (1992). *Teaching mathematics effectively and equitably to females. Trends and issues No. 17.* New York: Columbia University, Teachers College. (ERIC Document Reproduction Service No. ED 348 465)

Kerr, B. (1994). *Smart girls too.* Dayton, OH: Ohio Psychological Press.

Leder, G. (1984). Sex differences in attributions for success and failure. *Psychological Reports, 54,* 57-58.

Mulryan, C. M. (1992). Student passivity during cooperative small groups in mathematics. *Journal of Educational Research*, *85*, 261-273.

Nichols, J. D., & Miller, R. B. (1994). Cooperative learning and student motivation. *Contemporary Educational Psychology*, *19*, 167-178.

Stage. F. K., & Maple, S. A. (1996). Incompatible goals: Narratives of graduate women in the mathematics pipeline, *American Educational Research Journal, 33,* 23-51.

StatView. (1992). Berkeley, CA: Abacus Concepts.

Subotnik, R. F. (1988). The motivation to experiment: A study of gifted adolescents' attitudes toward scientific research. *Journal for the Education of the Gifted*, *11*, 19-35.

A complete listing of NRC/GT publications and abstracts of selected publications are now available from our World Wide Web site at the University of Connecticut. Any computer user with access to the Internet can use this service. Our address is: http://www.ucc.uconn.edu/~wwwgt.

University of Connecticut

City University of New York, City College

Stanford University

University of Virginia

Yale University

Newsletter Staff

The *NRC/GT Newsletter* is published by The National Research Center on the Gifted and Talented, University of Connecticut. The Research Center is supported under the Educational Research and Development Centers Program, PR/Award Number R206R50001, as administered by the Office of Educational Research and Improvement (OERI), U.S. Department of Education.

OERI Project Liaisons: Beverly Coleman and Patricia O'Connell Ross, Office of Educational Research and Improvement, United States Department of Education, Room 610F, Mail Stop 5521, 555 New Jersey Avenue NW, Washington, DC 20208

Please send change of address notification to NRC/GT Mailing List, University of Connecticut, 362 Fairfield Road, U-7, Storrs, CT 06269-2007. Please include the address label from this issue. Phone (860-486-4676) FAX (860-486-2900) Internet (http://www.ucc.uconn.edu/~wwwgt).

University of Connecticut
The National Research Center on the Gifted and Talented
362 Fairfield Road, U-7
Storrs, CT 06269-2007

Non-Profit Org.
U.S. Postage
PAID
University of Connecticut