Do Gifted Children Prefer to Work Alone?

A Social-Constructivist Re-Examination of the Longstanding Claim

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Table of Contents

List of Tables and Figures

Abstract

The long-held notion that gifted students prefer to work alone is reported in several general textbooks on gifted children. However, studies addressing this issue are mixed and certainly not conclusive. Earlier studies disagree on whether those gifted children who claim a preference for working alone do so as a function of grade and maturational stage, sex, or personality characteristics commensurate with increasingly higher IQs. The current study re-examines this notion through the lens of motivation through social-constructivist theory. Two hundred and forty-seven American school-identified gifted, high achieving, and non-identified (i.e., non-gifted, regular education) students in grades 4 through 12 participated. The measure used in this study was a survey comprising items used in past learning style-related research, items adapted from a personality index and an interest profile, as well as locally-developed open-ended questions regarding preferred learning conditions, learning-related personality characteristics, and perceptions of support in their learning. Participants also had the opportunity to offer ideas about ideal learning situations, and their beliefs on why some children versus others might prefer to work alone. Finally, this study attempted to confirm the hypothesis that those gifted students who feel adequately supported by those in their environment will be less likely to indicate a preference for working alone, compared to those who do not feel supported. Although some indication of a preference of gifted students to work alone was present, this preference was not strong because it varied based on how the question was posed. Moreover, sex and grade-related differences were noted. Perhaps most interestingly, in support of the hypothesis of the study, those participants who reported feeling least supported by others reported the strongest preference to work alone. Implications of these findings on classroom curriculum, future career functioning, and mental health are discussed.

Résumé

La notion de longue date que les enfants doués préfèrent travailler seuls est rapportée dans plusieurs textes généraux sur les enfants doués. Cependant, les études abordant cette question sont mixtes et sûrement non déterminantes. Des études antérieures sont en désaccord au sujet des enfants doués qui réclament une préférence pour travailler seuls s'ils le font en fonction du niveau de leur scolarité et maturation, leur sexe, ou leurs caractéristiques de personnalité proportionnées à un quotient intellectuel de plus en plus élevé. L'étude courante réexamine cette notion à travers du perspectif de motivation via la théorie de constructivisme social. Deux cent quarante-sept étudiants américains identifiés comme étant doués, d'hautes accomplissements et non identifiés dans les années scolaires de 4 à 12 ont participé. La mesure utilisée dans cette étude était un sondage comprenant des items utilisés précédemment dans des recherches sur le style d'apprentissage, des items adaptés d'un index de personnalité, un profil d'intérêts, et en plus d'une série de questions développées sur place concernant des conditions d'étude préférées, des caractéristiques d'apprentissage reliées à la personnalité, et des perceptions de soutien dans leur études. Les participants ont également eu l'occasion d'offrir des idées au sujet d'une situation d'apprentissage idéale, et leurs opinions sur la question de pourquoi certains enfants, contrairement aux autres, préféreraient travailler seuls. En conclusion, cette étude a essayé de confirmer l'hypothèse que ces étudiants doués qui se sentent soutenus convenablement par ceux dans leur environnement seront moins disposés d'indiquer une préférence pour travailler seuls comparée à ceux qui ne se sentent pas aussi bien soutenus. Bien qu'il existait une certaine indication d'une préférence des étudiants doués de travailler seuls, cette préférence n'était pas prépondérante parce qu'elle a varié basé sur la façon dont la question a été posée. D'ailleurs, les effets de sexe et de scolarité ont été notés. Peut-être le plus intéressant, à l'appui de l'hypothèse

de l'étude, furent les participants qui se sentaient le moins soutenus par d'autres ont rapporté la préférence la plus forte de travailler seuls. Les implications de ces résultats sur le programme d'études, le fonctionnement en carrière futur et la santé mentale sont discutées.

Chapter 1

Introduction and Review of the Literature

> Although Ann is a high achiever, her persistence level suggests that when interested in a topic, she may resist moving from class to class because of schedules and, instead, may linger to continue discussions or writing. She is not a youngster who enjoys peer learning, and is not likely to thrive on assigned projects as part of a team; she much prefers learning alone. Because she does not need or enjoy high levels of structure, a teacher who imposes stringent regulations for ordinary assignments will find that Ann often does things her own way, in apparent defiance of imposed requirements. (Griggs & Dunn, 1984)

Ann evidences precocity, a rage to master, and an insistence on marching to her own drummer--frequently observed characteristics of gifted children (Winner, 1996). Ann also demonstrates a marked preference for learning independently of her classmates, but do gifted students on the whole prefer independent learning? According to Clark (1997), gifted children are not a homogeneous group; however, she acknowledged that many characteristics recur in groups of gifted individuals. A preference for working alone has been argued to be one such characteristic.

Current Perspectives

The viewpoint that gifted children prefer to work alone, seemingly warranted according to professional experience and opinion, seems to have lasted several decades, despite evidence to the contrary. As suggested by Dr. Sanjay Gupta, CNN's medical correspondent, in his September 2006 broadcast, *Genius: Quest for Extreme Brain Power*,

> In the popular imagination, the genius is a loner, standing head and shoulders above the crowd. The artist Leonardo Da Vinci, Isaac Newton who invented calculus and explained gravity, Mozart created music by the age of five, and of course Albert Einstein whose ideas about time and space turned the universe inside out.

Even recent literature regarding standardized intelligence tests includes the claim that teachers of those individuals achieving IQ scores of 120 and above need to create opportunities for these students to seek and find information independently, as these students enjoy reasoning things through alone (Ruf, 2003). However, empirical studies discussed below addressing this issue have generated mixed findings, from supporting this notion, to being inconclusive, to determining that gifted children had an outright preference for engaging with others and working in groups. Moreover, as also mentioned in the CNN broadcast on genius, Keith Sawyer (author of *Explaining Creativity*), a psychologist who has studied children, jazz musicians, and comedians, insists even the most celebrated minds build on the work of others.

Discussion of the Literature

Kitano (1986) considered the socialization of gifted children to be of utmost importance in gifted education. She insisted that, if gifted children are expected to become the leaders of the future, the values of teamwork, appreciation of individual differences, empathy, and humanistic understanding would be more critical attributes to promote than competitiveness. This goal can be achieved through cooperative learning experiences, for example, wherein students work together toward a common goal (e.g., completion of a project). However, cooperative learning (where students work together in small groups to complete a project or master content) is not considered by all to be an invariably beneficial teaching or learning strategy. Preliminary data

gathered by McGill University's High Ability and Inquiry Research (HAIR) group suggest that parents of gifted learners are less convinced of the importance of group-learning activities within an inquiry-based classroom, compared to individualized instruction for their children (Syer & Shore, 2001). Parents ranked group-learning tasks as being relatively less important than did teachers. This finding may have emerged for several reasons. Teachers may have been reacting to the logistical difficulty of tailoring each individual student's lesson to their needs. At the same time, parents may have been expressing a desire for their children to be given a fair share of individual attention, or to perform at full potential and receive recognition for their accomplishments. This is not to say that parents of gifted children seek accolades for their child's talents; rather, they may be responding appropriately to the special learning needs of their children. Also, as will be discussed later, teachers may be further divided into similar camps. Depending on the teacher's professional identification, that is, whether his or her domain was gifted education or cooperative learning, group learning activities for gifted students seem to take on differing levels of importance or desirability (Gallagher, Coleman, & Nelson, 1993).

The parents (and subset of teachers) mentioned above may have been responding to the long-held perception that gifted children prefer to work alone. Several general textbooks on gifted children make this claim (e.g., Davis & Rimm, 1994; Gowan & Bruch, 1971; Whitmore, 1980). For example, Whitmore (1980) stated that "the gifted child enjoys independent investigation outside the classroom, and often finds it difficult to conform to a group activity in school" (p. 154). According to Griggs and Price (1980), gifted students "are highly persistent, more self-motivated than teacher motivated, prefer a quiet learning environment, and prefer to learn alone rather than with peers" (p. 361). Alexander and Muia (1982) also suggested that gifted students tend to be independent, self-motivated learners who prefer to learn alone. A table

on characteristics of the gifted (Seagoe, 1974) included "independence in work and study; preference for individualized work; self-reliance; need for freedom of movement and action" (p. 44). Csikszentmihalyi, Rathunde, and Whalen (1993) also maintained that gifted children gain stimulation from themselves more than from others, and report liking solitude far more than do most other people.

Although Csikszentmihalyi, Rathunde, and Whalen (1993) asserted that gifted adolescents like solitude more than do typical children, they also acknowledged that gifted adolescents may prefer to be with others rather than alone. Perhaps both qualities are true. Whereas ordinary children come home after school to play, gifted children come home after school eager to paint, play music, work on mathematics problems, read, or write. Although gifted children gain more from solitude than do others, they still yearn for peer contact (Csikszentmihalyi, Rathunde, & Whalen, 1993). However, it is difficult for these atypical children to find like-minded peers (Winner, 2000). This was corroborated by Enersen (1993), who stated that gifted children tend to "[go] off alone, but never [give] up the hope of finding peers who will accept and like them just as they are" (p. 173). Theories are varied, and research on the matter is mixed.

Learning Preference as a Main Effect

This purported preference for learning alone has often been attributed to a *gifted personality*--a constellation of social and intellectual characteristics including a tendency toward introversion (Ruf, 2002). The notion that gifted children tend to have an introverted personality was supported by Myers (1980), co-author of the Myers-Briggs Type Indicator (MBTI), who asserted, specifically, that one's tendency toward intuition-introversion increases as academic giftedness increases. "For instance, researchers (Delbridge-Parker & Robinson, 1989; Gallagher,

1990; Hoehn & Bireley, 1988) reported that about 50% or more of the gifted population is introverted compared to the general population, whose preference for introversion is 25%" (Sak, 2004, p. 2).

Burns, Johnson, and Gable's (1998) disagree. Their survey-based investigation of 500 late elementary and junior high school students (gifted and non-gifted) revealed that students in the general education population preferred learning alone, whereas students in the gifted population did not. Likewise, Li and Adamson (1995) reported that a significant preference for working alone did not appear in their sample of gifted children on the abridged *Learning Preference Scale--Students* (LPSS) (Owens & Straton, 1980) and *Self-Perception Profile for Adolescents* (SPPA) (Harter, 1986). Li and Adamson's sample consisted of 30 gifted secondary school students, and 32 siblings of these students within four years of grade of their gifted siblings. No group differences in learning styles were found between these children and their siblings not identified as gifted; both gifted and non-identified siblings preferred working alone at similar rates.

Additional Factors

Learning preference as a function of age or grade. Perhaps different findings could be attributed to students' age or grade. Boultinghouse (1984), Griggs and Price (1980), Dunn and Price (1980), and Price, Dunn, Dunn, and Griggs (1981) revealed differences between gifted students' preferred learning styles not only at the elementary but at the junior high, and high school levels. Boultinghouse's cohort of gifted early elementary students (number unspecified and gifted screening tool unknown; but the total gifted and non-identified = 420) demonstrated a preference to work alone and outwardly rejected peer teaching, as indicated on a locally-developed learning-style scale for young children. Stewart (1981) surveyed 300 gifted students

and 298 general education students in grades four through six using Renzulli and Smith's (1978) *Learning Style Inventory* (LSI). Her results demonstrated that Independent Study was the second of four most powerful indicators discriminating between group preferences of gifted students and general education students, with gifted students preferring this instructional strategy more so than the general education students. Using both the Dunn, Dunn, and Price (1981) LSI and the LSI by Renzulli and Smith (1978), Ricca (1984) also demonstrated that late elementary gifted students (425 participants) preferred to work alone compared to general education students (number unreported).

However, a study by Dunn and Price (1980) called this into question. Using Dunn, Dunn, and Price's *Learning Style Inventory* (LSI) (1975), Dunn and Price surveyed 109 gifted students (identified by IQ scores of 130 or above on the *Otis-Lennon Test of Mental Abilities* or IQ scores between 120 and 129, and 95th percentile scores in mathematics or reading on *Standardized Achievement Tests*) and 160 non-gifted students. These elementary-aged gifted students did not reveal a preference for working alone. However, this group did not indicate a strong preference for working with others, either. The authors speculated that "it may be that the gifted are so goal-oriented that with whom they learn is of less importance to them than where (formal design) and how (persistently and creatively)" (p. 34).

Clear preferences do however continue to be revealed in other studies of gifted students' learning preferences. At the junior high school level, Griggs and Price (1980) found strong learning style preferences among the gifted group. They studied 170 gifted (identified through the *Lorge-Thorndike Test of Mental Ability* and the *Stanford Achievement Tests*) and non-gifted learners in junior high school (grades 7 through 9) on Dunn, Dunn, and Price's LSI (1975). The

gifted junior high school students in Griggs and Price's (1980) cohort demonstrated a significant preference for learning alone, as compared to the non-gifted sample.

Price, Dunn, Dunn, and Griggs (1981) discovered somewhat different grade-related effects. They conducted two learning-preference studies of gifted children and non-identified students. In the first study, 109 fourth- through eighth-grade students who had achieved *Otis-Lennon* IQ scores of 130, or IQ scores between 120 and 129 and scores in the 95th percentile on standardized mathematics or reading achievement tests, were compared to 160 randomly selected average students. It was originally anticipated that these elementary students would evidence a preference for working alone on Dunn, Dunn, and Price's (1978) LSI, but this did not happen. Rather, these elementary-aged gifted students demonstrated a preference for learning with others. The second study involved 70 gifted seventh through ninth grade students who achieved *Lorge-Thorndike Intelligence Test* scores of 130, or IQ scores of 125 to 129 and two or more years above grade level in reading or mathematics on the *Stanford Achievement Test.* These students were compared with 100 randomly selected average performing students on the LSI; junior high and high school gifted students preferred to work alone more than either their non-gifted grade level peers, or the gifted and non-gifted elementary populations. This was corroborated by Chan (2001), who studied the learning styles of 398 Chinese secondary students (using a Chinese version of Renzulli & Smith's LSI, 1978, and the LSI by Renzulli, Smith & Rizza, 1998), gifted students preferred autonomous learning compared to their non-gifted counterparts.

Perhaps these findings, although somewhat inconsistent, mirror social developmental change in children. It should be noted that these studies include cross-sectional rather than longitudinal data, so this suggested developmental change is based on inference. Boultinghouse's (1984) findings suggested that younger children may prefer to work alone; Gross (1993) asserted

that profoundly gifted children in middle childhood tend to try to hide their abilities in the hopes of becoming more popular. It is possible that a growing awareness of the importance of friendships and perceived importance of popularity could have resulted in differing learning-style preferences in children of this grade. A more recent study by Rayneri, Gerber, and Wiley (2006) (using the Dunn, Dunn, and Price's LSI) examining learning styles of 80 6th, 7th, and 8th grade gifted students did not reveal a preference for working alone. However, Dunn and Price (1980), Griggs and Price (1980), and Dunn, Dunn, and Price's (1978) studies suggested that with increasing age (or, increasing grade) comes an increasing reported preference for working alone. Based on personal experience, I speculate that this latter change might reflect an increasing understanding that one's own academic prowess will be judged at the time of college applications. Perhaps a desire to compete against and outshine other students would become more pronounced as gifted children progress through higher grades.

Learning preference as a function of sex. It is possible that age or grade-related differences cannot be adequately examined without consideration of additional variables. A recent synthesis of research on psychological types of gifted adolescents (Sak, 2004) involving the Myers-Briggs Type Indicator (MBTI) revealed a difference in sex on introversion and extraversion. Although gifted adolescents overall were found to be more introverted than the normative group, gifted females were significantly higher in extraversion when compared to gifted males (53.4% vs. 45.8%; p. 74). In a study on mathematically precocious youth, Haier and Denham (1976) conducted a study involving 71 seventh, eighth, and academically accelerated ninth-grade boys, and 25 academically accelerated girls. One finding that emerged on the *California Psychological Inventory* (CPI) (Gough, 1956) was that mathematically gifted girls rated themselves as being more successful on Achievement via Independence (i.e., academic

achievement involving independent work) compared to mathematically gifted boys. This suggests the possibility that sex differences could be dependent on the domain of giftedness (e.g., mathematics vs. language arts) or type of academic exercise the student is engaging in. Also, Lessinger and Martinson (1961) found the tendency toward gifted female extraversion to be somewhat inconsistent across grades. In their study conducted in California using the CPI (Gough, 1956), Lessinger and Martinson surveyed 929 gifted students in grades one through twelve; of these, 436 participants were in junior and senior high school. In comparing gifted eighth-grade girls and gifted eleventh-grade girls, the more senior students rated themselves significantly higher on Achievement via Independence. Through in-depth observations of students involved in informal and organized peer activities in a middle school setting (approximately 250 students per grade in sixth, seventh and eighth grades), Eder (1985) also found that early adolescent girls were more focused on interpersonal relations than on school achievement. Similar results did not emerge for boys. Indeed, these findings are in keeping with a large body of research on girls and popularity, the development of relational aggression, and so on (see works by N. Crick, D. Pepler, and J. Kupersmidt) but description of related studies goes beyond the scope of the current review.

Other variables. Moreover, we might expect certain gifted minority students to demonstrate strong preferences for working alone, as an interaction between culture and giftedness. This was discovered by Chan (2001), who as previously mentioned found that gifted Chinese students preferred autonomous learning compared to their non-gifted counterparts. In contrast, Ewing and Yong (1992) surveyed 155 African-American, Mexican-American, and American-born Chinese junior high school gifted students (identified by 90th percentile scores on *Raven's Progressive Matrices* or WISC-R) using Dunn, Dunn, and Price's LSI (1987),

finding no evidence of a preference for working alone within this group as a whole, or within separate cultural groups.

Recent Reanalysis

In 2003, I conducted a pilot study to revisit the question of whether or not gifted students preferred to work alone (featured in French & Saunders, 2004, see Appendix A for ethics approval) in light of some variables under debate, namely, grade and sex. I developed a learning style questionnaire, entitled *How I Like to Learn*, which I administered to self- or family-nominated gifted students ($N = 49$) participating in the *Explorations* summer enrichment program (affiliated with McGill University) in July, 2003. In total, 25 girls and 24 boys returned completed surveys. Thirty-five participants fell in the age 9 to 11 group (elementary), 10 participants were between the ages of 12 and 14 (junior high school), and three were age 15 or above (high school). One respondent did not indicate his age.

In keeping with previous research by Gross (1993), the younger girls and boys preferred *preparing, on [their] own, to make a presentation to the class* (LSI, Renzulli & Smith, 1978) compared to those in high school. Gross suggested that such a preference may reflect a growing awareness of the importance of friendships and perceived importance of popularity in young adolescents. On the other hand, because this was cross-sectional research, this may simply suggest a Zeitgeist effect. In other words, it could have had more to do with school climate than anything else.

According to Haier and Denham (1976) and Lessinger and Martinson (1961), the change in preference (from working alone to working with others) is more marked in girls than boys. Young girls and older adolescent girls seem to prefer working alone, compared to highly social early adolescent girls. Indeed, boys demonstrated a stronger (i.e., more consistent) preference for

working alone compared to girls. Grade effects did not emerge on responses to Question 3, but this was explored further (albeit cross-sectionally) with the larger study sample. Finally, the interaction found between Grade and Sex on *having the teacher give specific instructions on how to do things*, a peer teaching item, also speaks to the notion that older boys continued to prefer learning alone compared to girls, who liked this condition the least during the early adolescent period. The results both corroborated and challenged findings discussed in earlier research.

Table 1.

Summary of Previous Research

Author & Year	Measures	Design	Age or Grade Level & Number	Gifted Prefer to Work Alone?
Sak (2004)	MBTI	Meta-Analysis	n/a	Yes
Burns, Johnson, & Gable (1998)	Local Survey	Quantitative	Late Elementary & Junior High School $N = 500$	No
Li & Adamson (1995)	Owens & Straton LPSS (1980)	Quantitative	High School $N = 62$	No
Ewing & Yong (1992)	Dunn, Dunn, & Price LSI (1987)	Quantitative	Junior High School $N = 155$	No
Boultinghouse (1984)	Local Survey	Quantitative	Early Elementary $N = 420$	Yes
Stewart (1981)	Renzulli & Smith LSI (1978)	Quantitative	Late Elementary $N = 598$	Yes
Ricca (1984)	Dunn, Dunn, & Price LSI (1981); Renzulli & Smith LSI (1978)	Quantitative	Late Elementary $N = 425$	Yes
Dunn & Price (1980)	Dunn, Dunn, & Price LSI (1975)	Quantitative	Elementary $N = 269$	No
Griggs & Price (1980)	Dunn, Dunn, & Price LSI (1975)	Quantitative	Junior High School $N = 170$	Yes
Price, Dunn, Dunn, & Griggs (1981) *a*	Dunn, Dunn, & Price LSI (1978)	Quantitative	Late Elementary & Junior High School $N = 169$	Mixed Findings
Price, Dunn, Dunn, & Griggs (1981) *b*	Dunn, Dunn, & Price LSI (1978)	Quantitative	Junior High School $N = 170$	Yes
Chan (2001)	Renzulli & Smith; Renzulli, Smith, & Rizza LSI (1978;1998)	Quantitative	High School $N = 398$	Yes
Rayneri, Gerber, & Wiley (2006)	Dunn, Dunn, & Price LSI (2000/1997)	Quantitative	Junior High School $N = 80$	No
Haier & Denham (1976)	CPI (1956)	Quantitative	Junior High School $N = 71$	Mixed Findings
Lessinger & Martinson (1961)	CPI (1956) & Classroom observations	Mixed Methods	Early Elementary through High School $N = 929$	Mixed Findings
French & Saunders (2004)	Locally-developed survey	Quantitative	Late Elementary through High School $N = 49$	Mixed Findings

Findings and Insights from Cooperative Learning Literature

The vast body of the cooperative learning literature only partly supports findings related to gifted students preferring to work alone. While studies document consistent benefits of cooperative learning to gifted students, some drawbacks seem to exist which may put the gifted student at a disadvantage in these learning situations. In cooperative learning, students work in small groups to help each other complete a project or master content. Cooperative learning is being considered as any kind of group learning in this review, but it can involve homogeneous or heterogeneous ability groups (and is further specified with regard to each study discussed). Cooperative learning is widely used across North America and recommended as a solution (or panacea) "to promote peer interaction and cooperation for studying academic subjects" (Sharan, 1980, p. 242). Different models have varying emphases on competition within the collaborative groups, the use of external rewards, and grading practices (Robinson, 1991). On the whole, cooperative learning is "often cited as a means of emphasizing thinking skills and increasing higher-order learning: as an alternative to . . . special education, as a means of improving race relations . . . and as a way to prepare students for an increasingly collaborative work force" (Slavin, 1991, p. 71). Proponents have pushed to de-track students and return them to the mainstream classroom (Utay & Utay 1997) for numerous reasons, some of which include the presumed costs of pull-out enrichment classrooms, less than desirable inter-ability relations between students, and an aim to further improve academic achievement of all students. Indeed, substantial literature exists addressing the effectiveness of this now common pedagogical approach.

In large part, related literature proposes that learning-disabled children benefit, socially and academically, from cooperative learning situations (Anderson, 1985; Collins, 1989; Jenkins, Jewell, Leicester, O'Connor, Jenkins, & Troutner, 1994; Wood, Algozzine, & Avett, 1993). However, the evidence concerning gifted children is less clear, or at least more conditional. Again, claims have been made that gifted students preferred to work alone (e.g., Davis & Rimm, 2004; Gowan & Bruch, 1971; Whitmore, 1980), rather than in mixed ability groups, but studies described below cite important contextual factors that influence gifted students' openness to cooperative learning.

Nelson, Gallagher, and Coleman (1993) discussed the impact of cooperative learning on the education of gifted children. The purpose of their study was to identify and compare the views of cooperative learning advocates and proponents of gifted and talented education on the use of cooperative learning with gifted students. As part of the Gifted Education Policy Studies Program at the University of North Carolina, a questionnaire was sent to 20 experts in the fields of cooperative learning and gifted education. Recipients were asked to state what they believed were the major issues and important factors in cooperative learning as it related to gifted students. Notably, they were not asked to identify research to support their beliefs; they were only asked for opinion.

Six major issues were identified by the experts: (a) preparing teachers in effective utilization of cooperative learning techniques, (b) discovering which form of cooperative learning works best with gifted students, (c) determining how cooperative learning can be effectively combined with programs for the gifted, (d) ensuring that social and emotional needs of gifted students are considered, (e) evaluating strategies to assess effectiveness of cooperative learning, and (f) clarifying appropriate uses of ability grouping and cooperative learning with

gifted students (Gallagher, Coleman, & Nelson, 1993; Nelson, Gallagher, & Coleman, 1993). From this questionnaire, a survey comprised of questions pertaining to these major issues was developed and sent out to 400 pre-established proponents of either cooperative learning or (separate) gifted education.

Three-hundred fourteen of the 400 surveys were returned; 173 came from cooperative learning educators and 141 came from gifted and talented educators. Responses given on a four-point Likert scale revealed that cooperative learning and gifted and talented groups differed on whether or not curriculum used in cooperative learning is challenging enough for gifted students, and whether or not cooperative learning is a strategy that can educate all students in heterogeneous settings. Not surprisingly, cooperative learning educators thought more highly than gifted and talented members on these two points. The two groups agreed, however, that there was a need for more teacher preparation in the appropriate uses of cooperative learning with gifted students.

Perhaps most interesting are the additional comments made by both groups at the end of the survey. Forty-four percent of the respondents made additional comments regarding the use of cooperative learning in heterogeneous groupings (gifted children together with less able students) within the mainstream classroom. A distinct difference was found: cooperative learning educators responded favorably to the use of heterogeneous grouping, whereas those from the gifted and talented group had reservations about this method. The gifted and talented group, on average, felt that cooperative learning would benefit gifted children most when it was used in homogeneous groups, that is, groups which consisted solely of gifted children.

Although it is not surprising that educators using cooperative learning in their classrooms would hold cooperative learning in higher esteem than would proponents of gifted and talented

education, this information does provide a springboard to examine important factors involved in cooperative learning and gifted education. We can now focus on the research fostering the debate on what kinds of factors best serve gifted children when using cooperative learning.

Stevens and Slavin (1995) performed a longitudinal study comparing mainstream classrooms using cooperative learning and mainstream classrooms using a more traditional method (a teacher lecturing to many students). Twenty-one classes in grades two through six were part of the intervention group, that used cooperative learning (i.e., using cooperative learning across a variety of content areas, full-scale mainstreaming of academically handicapped students, and teachers using peer coaching) and 24 classes in the same range of grades were part of the comparison (traditional) group. The schools were located in predominately working-class neighborhoods, and the students were matched on achievement pretest mean scores (the *California Achievement Test*) for reading, language, and mathematics. Prior to implementation of the treatment (cooperative elementary school learning) model, teachers and administrators were extensively trained on the types of goals and components, including:

> widespread use of cooperative learning in academic classes, mainstreaming learning disabled students in regular education, teachers coaching one another, teachers collaborating in instructional planning, principal and teachers collaborating on school planning and decision making, and principal and teachers encouraging active involvement of parents (Stevens & Slavin, 1995, p. 325).

Those using the traditional method were not specially trained; they continued using their regular teaching methods and curriculum.

Both groups of classrooms were again assessed on the *California Achievement Test* two year post-implementation of the treatment method. Participants were also given attitude and

social relations pre- and post- measures. Posttests indicated significant effects favoring the cooperative learning group (gifted and those with learning disabilities) on the following variables: reading vocabulary, reading comprehension, language expression, mathematics computation, and perceived ability in reading and language arts. Similarly, attitude and social relations measures were higher after two years for the gifted students in the treatment program compared to those in the traditional program.

This study demonstrated that cooperative learning can indeed benefit the achievement and social behavior of gifted children, in the same ways that it benefited academically handicapped students in the same studies. This study showed that gifted students benefit in a number of ways by participating in cooperative learning environments with heterogeneous grouping, but the alternative method of using cooperative learning in homogeneous groups was not considered here. The question therefore arises as to what would happen if gifted children in the mainstream classroom were involved in cooperative learning in homogeneous ability groups rather than with mixed-ability groups.

Two studies by Coleman and Gallagher (1995) addressed the issue of whether heterogeneous or homogeneous groups in cooperative learning were more beneficial in the achievement and social behavior of gifted students in the mainstream classroom. Both studies were longitudinal in nature, and both involved very detailed research in five cooperative learning sites. Educators and administrators from all sites were asked, before the study, to identify factors that they felt were important in using cooperative learning with gifted students. Like the Nelson, Gallagher, and Coleman (1993) study, the use of cooperative learning in classes with or without ability grouping (homogeneous or heterogeneous groups) was identified as critical.

Classrooms in each study were divided into three groups according to school, with each school's classrooms implementing a different variation of cooperative learning. In one variation, the heterogeneous group, gifted students were paired within the mainstream classroom with non-identified peers to solve problems. In the other variation, the homogeneous group, gifted students were paired within the mainstream classroom with other gifted students. One year after implementation, students were assessed to uncover any differences between the two groups of cooperative learners.

Unlike the Stevens and Slavin (1995) study, this research did not assess achievement on standardized tests. Instead, researchers observed classrooms, noting such things as teacher enthusiasm, task complexity, and student enthusiasm. They also sought in-depth to uncover students' opinions about their learning environments. Students were given questionnaires and participated in interviews with the researchers at the conclusion of the study, revealing very interesting information. Particularly, gifted students expressed "clear and overwhelming enthusiasm" (p. 380) for cooperative learning in homogeneous groups. There seemed to be no difference between social behaviors of gifted children in homogeneous and heterogeneous groups; it seems that as long as they were in the mainstream classroom, ability grouping therein did not have an adverse effect in this regard (Coleman & Gallagher, 1995). Conversely, students involved in cooperative learning in heterogeneous groups highlighted a number of concerns, such as having to act as the teacher (for the less-able peer), doing "all" of the work, being slowed down, and feeling uncomfortable when they appeared "too smart" (p. 380).

In a study yielding similar findings, Diezmann and Watters (2001) examined the needs of mathematically gifted students when engaging in collaborative activities. Using an exploratory case study design, Diezmann and Watters studied six mathematically gifted students aged 11 and

12 years. Four were boys and two were girls, selected from mixed-ability classrooms within a single elementary school in Virginia. The researchers had participants work through a series of problem-solving sessions. During a problem-solving phase, students worked in a quiet zone (independent work), work zone (working beside each other), a chat zone (group discussion about the task), and a teacher zone (to receive assistance from the teacher). Data on participants' behavior throughout the tasks was gathered through video observations; participants were observed and surveyed to determine how students used the different zones. Task difficulty, performance, and feedback were gathered through brief assessments and informal surveys, respectively. Diezmann and Watters found that "gifted students preferred minimal interaction with others when they worked on at- or near-grade-level tasks, and they were independently successful on these tasks" (p. 24). However, students preferred collaborating with peers when the task was more difficult--when the task was challenging. And, again, these students reported enjoying collaboration because it was with similarly able peers. This type of situation is one in which, contrary to popular belief, gifted children *did not* prefer to work alone.

These studies go beyond previously described research in their consideration of different kinds of grouping in cooperative learning. Even though achievement test scores were not taken into consideration in these studies, it would seem unlikely that achievement of gifted students in the homogeneous cooperative learning groups would be lower given their overwhelming enthusiasm for this method compared to the heterogeneous group. One might wonder, based on the results of these findings, whether ability grouping such as that found in separate enriched programs might in fact be an easier way to achieve this zeal in gifted students. However, Stevens and Slavin (1995) demonstrated that, in general, gifted students participating in cooperative learning environments prosper more both academically and socially than do those in the separate

enriched programs. Creating cooperative learning situations with homogeneous groups in the mainstream classroom versus separate enriched programs seems to be a minor distinction, but it may be one with strong effects.

I found no studies indicating that cooperative learning had a deleterious effect on the academic achievement or social outcomes of gifted children. According to findings of the above studies, cooperative learning, especially when using homogenous groups, can successfully serve the needs of gifted children in the mainstream classroom. Programs like the Center for Talented Youth (CTY) affiliated with the Johns Hopkins University, and the Program for Exceptionally Gifted Students (PEGS; found in Missouri, Kansas, and other southern states, Sullivan & Rebhorn, 2001) were created partly in response to literature suggesting that ability grouping is "absolutely essential for exceptionally and profoundly gifted children if they are to have any chance of finding intellectual and social companionship" (Gross, 1993, p. 272; also see Colangelo, Assouline, & Gross, 2004). Indeed, there are cooperative learning situations in which bright children thrive.

Nonetheless, researchers evaluating cooperative learning insist that precautions be taken when applying this to groups of gifted learners. Robinson (1991) identified the following recommendations for using cooperative learning with academically talented students, some of which also emerged as recommendations by authors whose studies are mentioned above:

1. Cooperative learning in the heterogeneous classroom should not be substituted for specialized programs and services for academically talented students;
2. If a school is committed to cooperative learning, models which encourage access to materials beyond grade level are preferable, as are models which permit flexible pacing; and
3. Student achievement disparities within the group should not be too severe.

Finally, and most relevant to the current study, Robinson (1991) stated that, should cooperative learning be used with academically talented students, they must also "be provided with opportunities for autonomy and individual pursuits during the school day" (p. 23). She stated this in response to earlier research on the learning styles of gifted students, as well as for the following reasons:

> An interest-based curriculum provides students with the opportunity to make choices about what they learn, to have a greater stake in the choices they make, and to seek out educational experiences at an appropriate level of sophistication. Such autonomy in terms of individual interests is not always possible in group learning. (p. 23)

It cannot be ignored that cooperative learning may remain a last resort for those educating gifted and talented learners. A meta-analysis of learning styles research (Rogers, 2002) revealed that, out of eight commonly-used educational strategies used with gifted learners, cooperative grouping ranked last (because of a paucity of supporting research) that is, least preferable.

Based on experts' recommendations and this literature on the whole, we might conclude that gifted children often consider cooperative learning to be that which occurs in heterogeneous ability groups, and therefore may not consistently express interest in it. The desire to work in isolation of others rather than cooperatively with other students may be a preference that changes under certain conditions beyond group composition. This notion is demonstrated by studies discussed in the previous sections regarding gifted students' preferred learning styles across certain key variables including age or grade group and sex.

Although evidence exists to support the idea that gifted children prefer to work alone, the above literature on cooperative learning suggests that the evidence is mixed and dependent on

other key variables, like group composition (also see Lieber & Semmel, 1987). Therefore, the original claim that gifted children prefer to work alone may be an oversimplification of the data. Perhaps the *gifted child as loner* is something of a stereotype. Perhaps the gifted child who indicates a preference for working alone can be predicted by age or sex; or, as suggested through the cooperative learning literature, through his or her experience of the learning context.

Theoretical Framework

Another explanation for these mixed results may be the lack of a consistent theoretical framework embracing the original research questions across studies. Many (but not all) studies reviewed above anticipated differences between the learning preferences of gifted and non-identified students, but lacked an explanation as to why this prediction was being made. A powerful theory that drives much contemporary curricular thinking is Vygotsky's (1930/ trans. 1978) theory of social constructivism. Vygotsky emphasized the critical importance of culture and the importance of the social context for cognitive development. According to this theory, learning always happens on a social level. Through interactions with more knowledgeable others, including but not limited to classmates, older peers, teachers and parents, learners grow to understand new cognitive concepts and strategies. If properly supported, individuals eventually are capable of using and extending these concepts and strategies to other contexts (Hiebert & Raphael, 1996).

One major tenet of social constructivism is that learning is never purely internal. In other words, learning always occurs within a social setting in which societal or cultural mores are continuously at work. Oftentimes, individuals who deviate from the norm in their culture are subject to varying degrees of scrutiny, if not disenfranchisement. Gifted individuals certainly fall into the category of non-normative and may suffer for it (see Csikszentmihalyi, Rathunde, &

Whalen, 1993; Enersen, 1993). Whitmore (1980, 1986) pointed to a tendency for gifted children to perceive any negative social feedback as rejection, and thereby feel socially isolated: "Because the gifted child is different by virtue of superiority, the social penalties will include indifference in the forms of ignoring accomplishments and encouraging independent activity alone" (Whitmore, 1980, p. 150). Perhaps the gifted child feels compelled by others to work alone; eventually, as this becomes habitual and comfortable, he or she considers this to be the preferred- or normal-way of learning. This notion was corroborated by Buescher, Olszewski, and Higham (1987), who drew on clinical case studies to delineate eight specific coping strategies used by gifted adolescents, two of which are isolating oneself and hiding one's academic ability from other students. Both coping strategies are especially common in adolescent girls.

Another related tenet of social constructivism is that learning is not context-independent. How the child performs, or the extent to which he or she develops within a classroom, is dependent on the learning context. Peers, teachers, instructional strategies, curriculum, and the format of activities all serve to make up the typical learning context, in this case, the classroom. One's cognitive development is impacted by others' assistance with their work, but so also is their initial motivation to learn.

> Behavioral motivation is essentially extrinsic--a reaction to positive and negative reinforcements. Cognitive motivation is essentially intrinsic--based on the learner's internal drive. Social constructivists see motivation as both extrinsic and intrinsic. Because knowledge is actively constructed by the learner, learning depends to a significant extent on the learner's internal drive to understand and promote the learning process. Because learning is essentially a social

> phenomenon, learners are partially motivated by rewards provided by the knowledge community. (*Theories of learning: Social constructivism*, 2007)

Moreover, according to Sivan (1986), the social constructivist conceptualization of motivation sees it as part and parcel of the instructional process and the classroom environment. She maintained that "the culturally determined joint activity between student and social context results in an internal state of interest and cognitive and affective engagement, and motivated behaviors" (p. 209).

Perhaps the mixture of findings on learning conditions reported through prior research mirrors the varying quality of the context--the environmental support--provided in the childhood and adolescence of able students. The learning context of the gifted child may, at times, lack productive and positive social interaction. Also, classroom activities and content adaptation may fail to support the child's potential development in a balanced way. This idea is indeed supported by the mixed findings that emerged from reviewed research on cooperative learning, in which homogeneous ability grouping was preferred over heterogeneous grouping. According to findings from Diezmann and Watters (2001), "collaboration provided students with a supportive learning environment in which there was practical *and affective* support to assist them in overcoming obstacles within a task" (p. 25, emphasis added).

In an ordinary mixed-ability or inclusive classroom, gifted children may not feel consistently encouraged, and they may not feel as if their work is appreciated. The inclusive classroom is intended to accommodate children of varying needs and abilities, and the curricular needs of gifted children are addressed tokenly if at all (Archambault, Westberg, Brown, et al., 1993). It is quite possible that an inadequate learning context leads to some gifted children preferring to design independent study activities, or opting to work alone. Therefore, the

supposed preference to work alone may not represent the original or natural preference of gifted children. Rather, when this preference is reported, it may be by default--if students do not feel supported by others; if they instead feel at best taken advantage of, and at worst berated for their abilities, it is understandable that they may wish to work alone. If gifted children are given adequate support in the learning process, perhaps they would be more inclined to report a preference for working with others. When thinking of social constructivism, one often thinks about cognitive support, but as described above, affective support (in the form of encouragement and appreciation) may be just as important to the academic experience of students. The goal of the current study is to focus on the latter forms of support in learning.

Need for the Study

Technical need. In light of the range of findings on gifted children or some subgroup of gifted children preferring to work alone, plus the absence of a theoretical framework for the range of prior work, a re-examination of the notion that gifted children prefer to work alone is warranted. In addition, a series of technical issues plague the data. Burns, Johnson, and Gable (1998) proposed that weak research designs, lack of randomly selected samples, and a "premature rush into print and marketing with very early and preliminary indications of factor loadings based on one data set" (p. 277) limits the degree to which results of learning style studies can be generalized to the broad population of gifted students.

Other limitations also affect this body of research. For example, in many of the above-mentioned studies, a single (quantitative) inventory was used on a homogeneous population--many of these studies lacked a comparison group. Without such a comparison group, it is impossible to determine the extent to which a given preference is common among gifted students or simply those in a particular grade group or sex. Such a limitation in findings is evidenced in

the work of Griggs and Dunn (1984): not only were there no comparisons, but also only two gifted participants were included. Stahl (1988) also pointed to the unknown reliability and validity of some learning-style instruments used in past research. For example, Boultinghouse (1984) included an entirely locally-developed survey which had not been tested for validity or reliability. Granted, the purpose of Boultinghouse's study was to evaluate the utility of a learning-style survey with early elementary students, but none of the items on this particular instrument had undergone research to establish validity or reliability. What is needed is a comprehensive re-analysis of the learning preference question with a more sizeable participant pool across grade (age group), sex, and IQ group (e.g., gifted vs. non-identified), utilizing well-documented valid and reliable instruments.

Indeed, certain limitations exist in this type of research that cannot completely be overcome. For instance, random assignment cannot be achieved when selecting for giftedness. Also, the majority of gifted students are identified through IQ testing, making individuals with high IQ scores (versus motivational factors or classroom products) overrepresented in populations of *gifted* individuals, especially at the elementary school level. However, one goal of the current study is to strategically address previous limitations to the extent possible, to provide a clear view of the nature of solitude in giftedness.

As well, in past research, the question posed was simply *Do gifted children prefer to work alone?* This could be, and was, answered in a straightforward, quantitative fashion. Students responded to a direct question, or ranked this learning condition as being more or less favorable than others. In no studies were participants given the opportunity to choose learning activities from among a series of activities, to compare and contrast different activities side by side. Furthermore, participants were not given open-ended questions about their most or least

preferred learning activities or situations. It would be expected that the strongest preferences or dislikes would surface under open-ended conditions--without being led by suggestions; therefore, when making claims about the strength of a given group's preferences, this type of methodology is imperative. Therefore, an evolution of learning style-related research is called for.

Philosophical need. Indeed, past research has considered variables beyond IQ levels or school performance, such as sex and grade, when examining learning style preferences of gifted children. However when couched in terms of social context, the question takes on a wider scope. Acknowledging that learning alone (compared to group learning situations) may be preferable to a significant percentage of gifted students, we must now ask, under what circumstances? Could students' preferences change depending on the subject of study, or with whom they were working in collaborative groups? Could students' preferences change depending on how supported (encouraged in their work and appreciation of their work) they felt by others? In the present study, social constructivism provides the needed lens through which to interpret learning style preferences among gifted students. Therefore, the current focus of study narrows in on the latter question; namely, do differing perceived levels of support impact students' reported desire to work alone?

Pedagogical and social need. The current study is most needed for social and pedagogical reasons. The issue of individualized education of the gifted versus cooperative or integrated education remains a topic of academic and ethical debate. Proponents of accelerated learning and academic enrichment for the gifted are more likely to emphasize individual accomplishment and support more competition than their cooperative-learning counterparts, who, instead, focus on teamwork and group accomplishment (Thorkildsen, 1994; Oakes, 1985;

Slavin, 1991). As noted by Thorkildsen (1994), the differing world-views of the competitive versus cooperative have powerful implications for the social development of gifted students and their classmates, as well as their future career success. Spence and Helmreich (1983) elaborated on this idea, suggesting that businessmen who were low in competitiveness and high in work and mastery (part of a communal orientation) earned higher annual incomes than those holding other combinations of these characteristics. Similarly, academic scientists who were part of a communal orientation had the greatest impact in their fields (Thorkildsen, 1994). The same should be true for those in other professions as well. For example, teachers who collaborate with fellow instructors in their school (and elsewhere) have greater opportunities to learn the method and appropriateness of varied teaching strategies, and may have a greater variety of teaching materials available to them compared to if and when they design a course on their own.

The struggle to achieve a balance between competition and cooperation may be reflected most clearly in fields where members have historically worked in isolation. More and more, collaboration and teamwork in these work environments is being encouraged. As increasing importance is being placed on collaboration in the workplace, it is reasonable to expect that cooperative learning experiences will become an even greater priority in schools than it already is (Rogers, 2002; Utay & Utay, 1997).

Indeed, for many years, the proponents of competitive and cooperative education have talked past each other. Although a legitimate argument is made for the benefits of cooperative learning, it is arguably just as important to consider performance variables, and especially to study optimal conditions for development, as it is to examine social and equity variables with the gifted. Students permitted to learn through their preference achieve statistically higher achievement (and attitude) scores (Dunn et al., 1989; DeBello, 1985; Miles, 1987; Perrin, 1984;

1985), and supporting one's academic achievement and cognitive growth is, after all, a prime goal and responsibility of education. As proposed by Gardner (1999; 1983), individuals may have multiple forms of intelligences in which they have varying degrees of aptitude; traditional schooling mostly values and supports logical-mathematical intelligence. Supporting academic achievement and cognitive growth through other areas (i.e., intrapersonal and interpersonal intelligence) is necessary; students' propensities and subsequent needs must be considered when designing curricula. According to Cattell (1971), three kinds of abilities or intelligences may exist, one of which involves "agencies, which are primary (group) factors that take shape largely from cultural and general learning" (Sternberg & Davidson, 1986, p. 224). Indeed, the classroom culture must be cultivated properly, in order to foster individual growth, in both cognitive and social realms. This cultivation may even carry legal implications. Learning through non-preferred learning modalities can impact individual students' performance to the extent of impacting high school graduation odds and college acceptance, regardless of their having a normal or even high IQ. Therefore, [well-funded] schools will likely become more and more responsible for catering to individual students' needs, to ensure the highest academic, and therefore vocational, success rates (Dunn, Dunn, & Price, 1977).

Finally, and perhaps most importantly, is the concern about gifted students' social and emotional well-being (Garland & Zigler, 1999; Neihart, 1999; Norman, Ramsay, Matray, & Roberts, 1999). Although studies such as Terman's (1925; 1959) suggested that bright children were better-adjusted than their less-gifted counterparts, other studies (e.g., Hollingworth, 1942) have suggested otherwise, revealing that gifted individuals indeed have difficulties in making both educational and social adjustments. Hollingworth (1942) reported that gifted individuals have a series of issues to face in life, including "to suffer fools gladly, to keep from becoming

negativistic toward authority, and to keep from becoming hermits" (p. 299). It is possible that if a clear preference for working alone emerges within the population of gifted students, recommendations regarding psychological intervention may be necessary to prevent these individuals from feeling or truly becoming increasingly socially maladjusted.

Research Questions

A number of prior studies and texts suggest that some gifted children prefer to work alone. This notion has become widely accepted as fact, arguably with insufficient or contradictory supporting evidence. Previous studies have answered the original question of *do gifted students prefer to work alone?,* but this query does not satisfy the need to understand underlying mechanisms behind this preference. The proposed study seeks to answer the above, and more: (a) Do the majority of students labeled as gifted prefer to work alone? If so, which gifted students prefer this learning condition; are they defined by formal identification (School-Identified Gifted versus High Achieving students), grade, or sex? (b) Moreover, how strong is the preference to work alone? Do gifted students consistently respond more positively to questions regarding working alone, or are responses varied across methodologically different types of questions? Specifically, are gifted students just as likely to report positive ideas about working alone to open-choice and open-ended questions as they are to give positive ratings to items which directly speak to working alone? (c) Why is it that some students identified as gifted opt to work alone? Are there differences between School-Identified Gifted, High Achieving, and Non-Identified students in their ideas about why people opt for different learning conditions? (d) With regard to social constructivism, do those who feel adequately supported in their learning tend to welcome opportunities to work with others, compared to those who do not feel supported?

It is possible that an inadequate learning context leads to some gifted children preferring to design independent study activities, or opting to work alone. The present re-examination, considered through the lens of social constructivism, will allow us to better predict variability across the population of gifted students. This theoretical approach would lead to the expectation that those gifted children who do not feel socially and cognitively supported by their environments, regardless of grade, sex, or presence or lack of established giftedness, will claim a stronger preference for learning alone. Further, those children who are sufficiently stimulated and supported by their environments are predicted to be less likely to demonstrate this preference, and evidence a desire to interact with peers (i.e., chronological agemates). Should such findings emerge, the continuation of the social imperative in learning will be substantiated. Such potential discoveries will, of course, have implications for teaching methodologies at various curricular levels. Findings will also inform the counseling field, as a tendency toward nonconformity and preference for independent learning can result in feelings of isolation and loneliness (Griggs, 1991).

Chapter 2

Method

The majority of past research on learning styles made use of self-reported data from questionnaires. Although studies utilizing a case-study design yield richer data than questionnaires have typically allowed, the current study adhered to the survey model in order to conduct the research with a large number of students across several grades. In an effort to gather richer data to supplement the survey, the questionnaire designed for this study comprised locally-developed, open-ended questions, in addition to items from well documented measures used in earlier studies. The goal of this survey was to gather quantitative and qualitative data regarding students' learning preferences, their interests and activities inside and outside school, perceived level of support in academic endeavors, and perceived social status. A variety of definitions of *learning style* can be found in the educational and psychological literature, ranging "from concerns about preferred sensory modalities to descriptions of personality characteristics that have implications for behavior patterns in learning situations" (Renzulli & Smith, 1978, p. 2). The purpose of the current study pertained to the latter definition.

Participants and Data Collection

During the summer of 2004, I served as the Academic Counselor for the Johns Hopkins University Center for Talented Youth (CTY) in Saratoga Springs, NY. This was my third summer working for CTY; previously, I had served as a teaching assistant and instructor in psychology (at sites in Maryland). This experience with this agency made it possible to gain permission from the research board to recruit participants for my research from the CTY population in 2004 (see Appendix B). Because I wished to include additional participants from regular academic programs, I reached out to contacts in gifted education (in Ontario, Vermont,

and Connecticut) provided by my supervisor, Prof. Bruce M. Shore. Only one school board was able to participate in my study; this was the Fairfield, CT school board (see Appendices C-E). Through these agencies, 111 School-Identified Gifted students, 44 High Achieving students (not formally identified, but in Advanced Placement or honors-level courses and identified as being high-achieving), and 92 Non-Identified students participated. CTY students comprised 37 participants. Three schools in Fairfield, CT provided the remainder of the participant pool: North Stratfield Elementary School ($N = 50$), Fairfield Woods Middle School ($N = 109$), and Fairfield Ludlowe High School ($N = 51$).

In order to gain admission to the CTY program, students must have scored between the 95th and 99th percentile on any reasoning section of their most recent or next-most-recent nationally-normed test. Historically, the main admission test used by CTY was the Scholastic Achievement Test (SAT), a standardized test with verbal, quantitative, and analytical subtests. Other tests commonly used to gain admission include the *Piaget Individual Aptitude Test* (PIAT), *Raven's Progressive Matrices*, *Stanford-Binet Intelligence Test* (Stanford-Binet), and *Cognitive Ability Test* (CogAT). All tests have verbal and nonverbal components, even though students need high scores on just one portion to gain admission to CTY. Students identified as gifted from the Fairfield CT sample were selected through standardized testing as well. Specifically, these students were identified at the end of the third grade on the basis of achieving scores at or above the 97th percentile on the CogAT and *Connecticut Mastery Tests* (CMT). These students were also required to have teacher recommendations and consistently high scores on district-wide academic assessments (e.g., *Gates-McGinnity* language arts or TOMAS mathematics test); if their scores were insufficient but teacher recommendations spoke to high performance, stellar product evaluations of classroom work could result in granting a student the

gifted label. Although less common, some students at the middle and high school levels were also identified as being gifted after leaving elementary school, through consistently high state-wide test performance.

In accord with an agreement between the author and the Fairfield Ludlowe High School, which recently solicited the Fairfield Board of Education's Learning Task Force to investigate the learning preferences of students in their advanced placement (AP) and honors level classrooms, both School-Identified Gifted and High Achieving students were included in this study, and analyzed separately. Non-Identified (control) students were only recruited from the Fairfield schools because formal identification of giftedness is a necessary criterion for being part of the CTY program.

The Johns Hopkins University Research Committee allowed me to include letters and consent forms in orientation packets for all CTY parents (see Appendix F), but a public announcement was not allowed as part of orientation proceedings. Perhaps due to this lack of announcement, only 60 (of approximately 400) were returned. Of these, 37 students returned their own consent forms (see Appendix H) and surveys, yielding a 62% return rate (or 9% of the total population who received the request for participation). In the Fairfield schools, in accordance with an agreement reached with the Fairfield Board of Education, 18 classrooms (7 elementary, 8 middle school, and 3 high school) (approximately 395 parents) received letters and consent forms (see Appendix G). Two-hundred twenty-five were returned, and, of these, 210 students returned their own consent forms (see Appendix H) and surveys, yielding a 93% return rate (or 53% of the total population who received the request for participation). The ultimate sample included students at the elementary ($N = 50$), junior high ($N = 117$), and high school ($N =$

79) levels, encompassing students in grades 4 to 12. One hundred ten males and one hundred thirty seven females participated.

CTY students were mailed surveys and given stamped envelopes in which to return them to me. To gather data from Fairfield, CT students, I visited each classroom and discussed my research with students. I then distributed surveys to all students whose parents had returned signed consent forms, and gave other students packets complete with parent consent forms in case they had simply been unable to return them earlier. I then returned to each classroom in two days' time to collect the completed surveys before my return to Montreal. As indicated in the letters that went out to parents and the student consent forms, all participants' names were entered into a drawing for a pair of tickets to their local movie theater. Five participants' names were drawn and movie tickets were mailed to each of them.

Table 2

Survey participants

Sex	Group	Grade			Total
		Elementary	Junior High	High School	
Girls	Non-Identified	19	24	5	48
	School-Identified Gifted	10	22	22	54
	High Achieving students	0	21	14	35
	Total	*29*	*67*	*41*	*137*
Boys	Non-Identified	13	20	11	44
	School-Identified Gifted	8	25	24	57
	High Achieving students	0	5	4	9
	Total	*21*	*50*	*39*	*110*
Total		***50***	***117***	***80***	***247***

Measure

Learning style inventories considered due to their use in previous research included Kolb's *Learning Style Inventory* (1976) and Dunn, Dunn and Price's *Learning Style Inventory* (2000,1997,1987,1985,1981), and Renzulli and Smith's (1978) *Learning Style Inventory*. Kolb's

LSI was not used because it measures constructs irrelevant to the current study, including Concrete Experience (feeling), Reflective Observation (watching), Abstract Conceptualization (thinking), and Active Experimentation (doing) (Cornwall, Manfredo, & Dunlap, 1991). Moreover, this instrument has demonstrated both low validity and test-retest reliability over several studies (Cornwall, Manfredo, & Dunlap, 1991). Dunn, Dunn and Price's (2000,1997,1987,1985,1981) LSI, while popular in the literature and containing items relevant to the current study, requires respondents to answer in a categorical fashion (i.e., *yes* or *no*). Renzulli and Smith's (1978) LSI contains relevant items where respondents answer on Likert-type scales to determine variability in their preferences.

Because the purpose of the current study pertains to personality characteristics and subsequent behavior patterns in learning situations, as well as to determine strength of reported learning preferences, Renzulli and Smith's LSI (1978) was found to be the most suitable learning style inventory from which to adapt items for the *How I Like to Learn* survey (see Appendix I). Content validity of items on the survey was established by expert judges including professors of education, teachers, administrators, and advanced graduate students in the subject area. Construct validity was established by a principal components analysis, which yielded 14 components, followed by a factor analysis. Items which loaded .35 or higher on a given factor were assigned to that factor; when an item loaded over .35 on multiple factors, it was assigned to the factor it loaded on most highly. Nine factors emerged, but items from only three factors were utilized in the current study. In Renzulli and Smith's (1978) original analysis, only one factor (also included in the current study) achieved sufficient internal consistency reliability, using .70 as a criterion: Factor I, Projects, achieved an Alpha Reliability score of .77. However, Peer Teaching achieved an Alpha Reliability score of .57, and Independent Study achieved a score of .50. To improve

internal consistency reliability, Renzulli and Smith later (in 1978) added items to each of the latter two factors, but the detailed content of these items was not available in the published versions. Additionally, I wished to use an instrument that had appeared in several earlier studies, so as to truly compare and contrast my findings with them. I also wished to keep the Likert-type item section relatively short to ensure compliance in completion of later open-ended questions. In my application, internal consistency was adequate for all three factors; this was likely due to the large overall sample size in my main study. Specifically, Project attained an Alpha reliability score of .80, Peer Teaching attained a score of .70, and Independent Study attained a score of .75.

To provide data to respond to the main research questions of the current study, questions about perceived affective support were created and included, as were open-ended items regarding students' most ideal learning situation. Affective support was operationally defined as *encouragement* and *appreciation of work*; this decision was corroborated by research on support pertaining to learning communities (Gencoz & Ozlale, 2004; Mullen & Tallent-Runnels, 2006). Face validity of the related items was established through presentation of these (and the open-ended) items to members of the HAIR laboratory. Furthermore, I collected pilot data in order to determine the utility of the current study survey (French & Saunders, 2004). In response to pilot study findings, support questions remained the same, except for the addition of a *sometimes* answer option to the original binary *yes* or *no*. Because many pilot participants expressed confusion over the locally-developed open-ended questions included in the survey, these items were either removed or reworded (see Appendix C for these original items). These modifications were performed in an effort to increase response rates and to gather meaningful data.

Moreover, in order to address students' social self-perception, *Popularity* factor items from the *Piers-Harris Children's Self-Concept Scale* (Piers & Harris, 1996) (items #1, 3, 6, 11, 40, 46, 49, 51, 58, 65, 69, and 77) were added. The *Piers-Harris Children's Self-Concept Scale* (or, *The Way I Feel About Myself)* is a "brief, self-report measure designed to aid in the assessment of self-concept in children and adolescents" (p. 1). The original survey contains 80 questions answered by dichotomous *yes* or *no* responses. The *Piers-Harris* provides six cluster scales (created and refined using factor analyses): Behavior, Intellectual and School Status, Physical Appearance and Attributes, Anxiety, Popularity, and Happiness and Satisfaction. The *Piers-Harris* is a well-researched and popular measure which has achieved relatively high levels of internal consistency reliability (range = .88 to .93) and test-retest reliability (median = .73); it has well-established content validity and correlates highly with a number of other measures of children's self-concept (i.e., *Coopersmith Self-Esteem Inventory*, 1959; *Lipsitt's Children's Self-Concept Scale*, 1958) and indices of behavior (i.e., *Children's Manifest Anxiety Scale*, 1956).

One suggested-choice item was created to allow respondents to choose their preferred learning situations from a list of options. Another item requiring respondents to choose with whom they wished to spend time after school (during extracurricular time) was taken from the *Personality and Interest Inventory* (Hildreth, 1936) was used, but only one subitem was used in the study (i.e., no companions). Finally, an open-ended question was added to the end of the survey, asking students to speculate on why some students might prefer to work alone, whereas others prefer to work in groups. This was intended to serve as a projective item for those who did not feel comfortable speaking to their preferences directly, but who had opinions nonetheless; it might also provide some explanatory assistance.

Ultimately, the current study survey comprised items selected from measures addressing students' self-reported personality, social, and learning characteristics, and locally-developed fixed response and open-ended items to ensure comprehensive answers to the research questions at hand. Again, original measures, from which items were taken and merged into a single questionnaire, included the *Learning Style Inventory* (LSI) (Renzulli & Smith, 1978), the *Personality and Interest Inventory* (Hildreth, 1936), and *Popularity* factor items from the *Piers-Harris Children's Self-Concept Scale* (Piers & Harris, 1996). The following items were included from the LSI: Projects items (#2, 9, 10, 21, 28, 36, 44, 47, 51), Peer Teaching items (#3, 23, 30), and Independent Study items (#4, 13, 17, 50). Item IX was taken from the *Personality and Interest Inventory*. Items #1, 3, 6, 11, 40, 46, 49, 51, 58, 65, 69, and 77 (the *Popularity* factor) were taken from the *Piers-Harris Children's Self-Concept Scale*. Additionally, the survey contained fixed response and open-ended questions pertaining to students' classroom experience (learning activities and teachers' and peers' support), extracurricular experience (learning activities and companions), and self-perception (social and intellectual); these were described above. These data were analyzed using MANOVA, Generalized Linear Modeling (GLZ), post-hoc analyses and planned contrasts, where applicable. The rationale for these choices is presented in the following pages.

Before submitting all items to statistical analysis, in order to handle the qualitative data garnered from three locally-developed open-ended questions on the survey, the author read through several responses and used an informal selective coding process to create a series of codes according to presenting themes. This process did not include all of the steps of standard content analysis or a standard open coding approach (e.g., Miles & Huberman, 1994) to code the entirety of any given response, because the goal was to find one particular piece of information

evident in responses (i.e., with whom are respondents working, if anyone, in the outlined learning situation?). According to Keele (2004), "in certain situations the application of more precise or empirically contentful sociological terms . . . will be helpful to break up the data . . . [to answer] specific research questions" (p. 481). Given the separation of group situations versus working with one other peer in other learning style instruments (e.g., Renzulli & Smith, 1978; Dunn, Dunn, & Price, 2000, 1997, 1987, 1985, 1981), and the desire to provide a clearer understanding of respondents' desired group composition, a non-standardized content analysis approach derived the following five codes for survey item #18--*Please describe your ideal (best possible or most enjoyable) kind of learning situation*:

1. involves working alone or "independently,"
2. involves working with one other person, or "in a small group,"
3. involves working with several peers (number unspecified, or "in a large group"),
4. involves working alone in combination with working with others,
5. does not specify if working alone or with others, and inference either way is not easy to make.

The same codes were applied to responses on survey item #20, *Please describe your worst or least enjoyable kind of learning situation.* These questions elicited responses not necessarily pertaining to the individuals one liked or disliked working with, but, because this study was attempting to examine that specific preference, responses were classified and coded to allow analysis of whether or not participants felt strongly enough about this particular preference to report work partners (or lack thereof) without being led to do so.

Codes were also derived for responses to survey item #40, which states *I'd welcome your thoughts on why some students prefer to do things alone, and some students prefer to do things with others. How would you explain this difference? Why do you think this is so?* After perusing

responses to this question, informal open coding was applied and a series of codes was established. Basic procedures of open coding (Corbin & Strauss, 1990) were used: Reasons were compared with others for similarities and differences and given conceptual labels, forming categories. The resulting categories or codes were:

1. involves ability levels (uses words like "smarter," "faster," "not as smart"),
2. involves personality (e.g., "introverted," "independent," "extraverted," "more comfortable with others"),
3. involves level of popularity, social self-perception, or level of desire to socialize,
4. involves fairness of work distribution (e.g., "take charge," "lazy," "can split up work"),
5. involves ability to tailor the content or method of completing the task (e.g., "distracted by others' ideas," "can reflect on others' ideas"), and
6. vague response (e.g., "people are different," "some work better alone").

One third of the data (75 surveys) were coded by two other members of the McGill High Ability and Inquiry Research (HAIR) lab, of which this study is a part. Inter-rater reliability across these three items was 92.6% (97% for Item 18, 93% for Item 20, and 88% for Item 40), and a consensus was easily reached on discrepant codes before I finished coding the remainder of the 247 surveys. While some participants offered multiple answers to this question, only their first response was analyzed here as their initial answer (and likely strongest opinion) was of most interest to me.

There were some missing data in the database. Missing categorical data were not replaced because it is difficult to anticipate responses to such items. In order to make use of these participants' contributions on the (continuous) Renzulli items, because they were part of one of three composite factors scores, missing cells needed to be replaced with usable data. According

to Roth, Switzer, and Switzer (1999), a good way to handle missing data is to substitute the person's mean response for their missing data. I used this conservative method to replace missing Renzulli item responses. As the independent study and peer teaching factors comprised only five and three items, respectively, only those cases where only one cell was missing were replaced with data. Nine items comprised the project factor; for this, cases for which up to two cells were missing were replaced with mean data. In all, nine cases were managed this way. Also, a series of analyses were run with School-Identified Gifted and High Achieving students as separate groups. Given that statistically significant differences were found between these two groups, they remained separate for the final analyses presented below. Indeed, while previous research by Shore and Tsiamis (1986) demonstrated minimal differences between school-identified gifted and otherwise-identified gifted students, a difference emerged on a measure of personal independence. Finally, a series of analyses were run with CTY school-identified and Fairfield CT school-identified participants considered as separate groups. No significant differences were found, so these groups remained together for analyses.

MANOVA and ANOVA. Whether or not there were any main effects or interactions between independent variables and the dependent variable was tested using multivariate analysis of variance (MANOVA), and for those MANOVAs that were significant, individual analyses of variance (ANOVAs) were run on School-Identified Gifted and High Achieving students versus Non-Identified participants, the three grade groups, sexes, support from others, and survey-preference outcome variables. The dependent variables examined were the LSI factors of Peer Teaching, Projects, and Independent Study. MANOVA was applied first to protect from Type I error; ANOVAs and post-hoc analyses followed. The SPSS statistical package was used for MANOVAs and ANOVAs and post-hoc analyses.

Generalized linear modeling. Generalized linear modeling (GLZ) is a statistical technique commonly used in fields like epidemiology, and it is now gaining popularity in social science research. This technique is considered an extension of General Linear Modeling (GLM), such as the above-mentioned MANOVA. Essentially, GLZ is used to analyze data of a non-normal distribution (i.e., categorical data), such as poisson, binomial, and multinomial distributions. "GLZ also relax[es] the requirement of equality or constancy of variances that is required for hypothesis tests in traditional linear models" (Connor, 2004, webpage). GLZ analyses are similar to Chi-square (in fact, this is the test statistic reported), but GLZ also allows for examination of interactions between independent variables. Moreover, GLZ produces similar output to GLM, making results easy to compare and contrast with continuous data. The difference is that, once statistically significant findings are noted, frequency counts are given, rather than a comparison of means.

GLZ was conducted on the three items of a categorical nature relating to the present research questions, as were planned contrasts on significant results. Of the major statistical computer packages, SPLUS and SAS provide the greatest flexibility in fitting and evaluating GLZs; because it is readily available, SAS was used. School-identified Gifted and High Achieving students versus Non-Identified participants, sexes, and the support variable were analysed to determine differences on survey-preference outcome variables. Grade was removed and examined separately, because of differences in groups available for each grade level. Item 17 was examined to determine the frequency and type of respondents who choose *Work Alone* and who chose *Read a Textbook* (this latter was chosen for analysis as it was considered an exclusively independent learning activity on Renzulli's LSI) and what percentage of those who chose this chose other items that are exclusively independent activities. Similarly, item 38 was

analyzed to determine the frequency of respondents who chose to play with *no companions* in their free time. The link function used was logit, as most categorical variables involved a binomial distribution. Item 38 was originally coded three ways (*selected*, *crossed off*, and *not selected*). Because I did not consider the difference between *crossed off* and *not selected* to be sufficiently meaningful, items were recoded in two ways (*selected* or *not selected;* the latter included crossed off responses).

Items 18, 20, and 40 were also analyzed using GLZ, items 18 and 20 to determine the most ideal and worst learning situations reported by different types of respondents, and item 40 was analyzed to determine what School-Identified Gifted versus High Achieving and Non-Identified students believe drives students' (others', or their own) preferences for working alone versus working with others. The link function used in these three analyses was Log, because of the Poisson distribution of the data. The Poisson distribution is most commonly used to model the number of random occurrences of some phenomena in a specified unit of space or time (Lethan, 1996); in this case, this refers to the number of times a response was given (codes 1 to 5 for items 18 and 20; codes 1 to 6 for item 40).

Chapter 3

Results

Data generated from this study yielded a large number of tables. To facilitate the reading of this section, only those tables providing an overall picture of the results have been retained here. Tables including means (for MANOVA) and number of cases (for GLZ) have been moved to the appendices, but pertinent information from these tables has been included in the narrative discussion of significant findings within this chapter.

MANOVA and ANOVA. MANOVA was first applied to the dependent variables represented in the learning style questionnaire for four independent variables, Group, Grade, Sex, and Support. Support items and the Popularity item within the survey were determined to be significantly and positively correlated with one another, therefore one item from among these was to be chosen to be considered the support proxy item to avoid redundancy. The statistic used to make this determination was Spearman's rank-order correlation, a statistic used as a measure of correlation in nonparametric statistics when the data are in ordinal form.

Table 3

Correlations between Support and Popularity variables

Variable	*R*	*P*
People Encourage, Work Appreciated	.306	< .001**
People Encourage, Popularity	.129	= .043*
Work Appreciated, Popularity	.217	< .001**

As demonstrated in Table 3, the two locally-developed support items were significantly and positively correlated. The two support variables were also significantly and positively correlated with Popularity. Because the People Appreciate my Work (hereafter named Work Appreciated or Appreciated) variable was most highly correlated with the other two variables, this was used as the support variable in all analyses, and People Encourage Me in My Academic Pursuits and Popularity were removed from all analyses to avoid redundancy. Although I recognized that these variables were not very highly correlated with one another, their relationship to outcome variables was tested and similar. If I had left in all three variables, this may have resulted in an overestimate of the variance related to support; the use of a proxy variable was done to maintain a conservative approach to data analysis.

As previously mentioned, because a difference was noted between High Achieving students' responses and school-identified gifted students' responses, these groups remained separate for the following analyses. Furthermore, because these groups were kept separate and High Achieving students did not exist at the elementary level, all analyses were done twice: first with all three groups (Non-Identified, School-Identified Gifted, and High Achieving students) at the junior high and high school level, and second with two groups (Non-Identified and School-Identified Gifted) at the elementary school level. Grade-based analyses involved elementary, junior high, and high school participants, but only included School-Identified Gifted and Non-Identified participants because High Achieving students were not available at the elementary level.

All significant MANOVAs were followed by a series of individual ANOVAs; significant ANOVAs indicated a main effect of, or interaction between, Group, Grade, Sex, and Work Appreciated for each specific factor. Nonsignificant ANOVAs demonstrated that participants

across Grade and Sex gave similar ratings to that particular learning condition. The assumption of normal distribution was met on continuous variables, as demonstrated by the below figures. MANOVAs are sensitive to the effects of outliers. However, since most of the measures relied on 5-point rating scales, only the onset and the count variables were susceptible to the existence of outliers, and no outliers were noted (Tabachnick & Fidell, 2000).

Figure 1. Distribution of LSI Project Item Responses

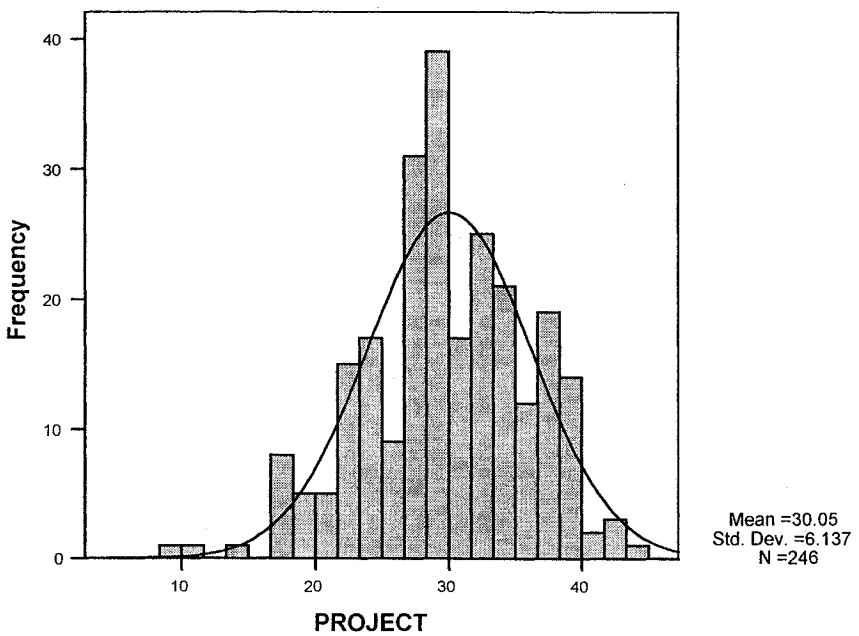


Figure 2. Distribution of LSI Peer Teaching Item Responses

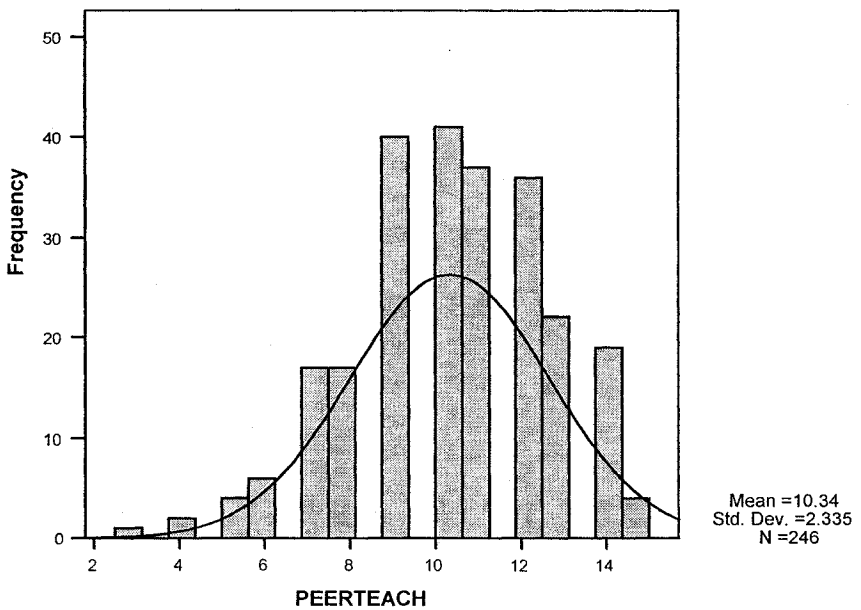
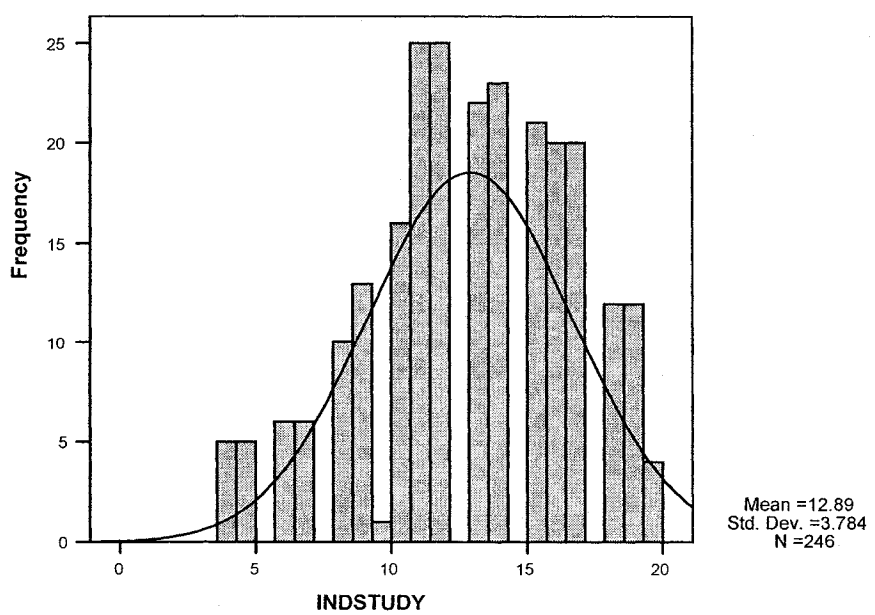


Figure 3. Distribution of LSI Independent Study Item Responses



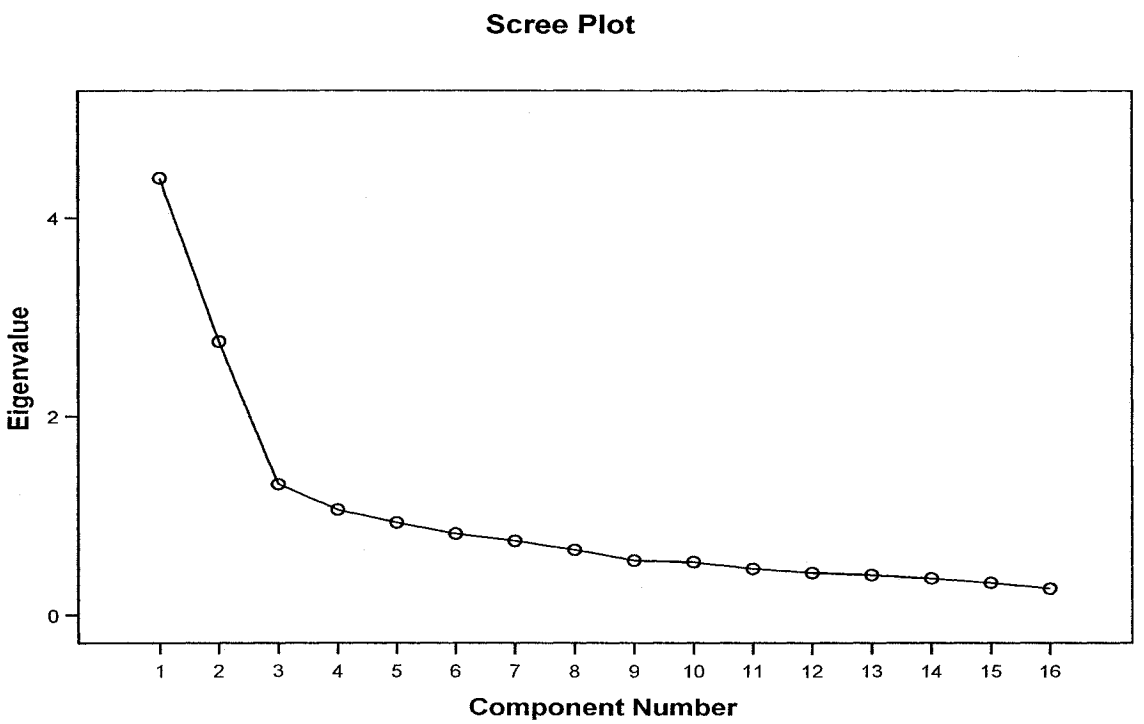
Assumptions regarding covariance (Box M's test) were also met. Assumptions related to homogeneity of variance (Levene's test) were also met, with few exceptions. These cases are noted in their respective tables. The *F* test is robust against violations of these assumptions. Although the robustness of multivariate statistics is not well-known, because the interpretation of MANOVA results rests on the interpretation of significant univariate effects (after the overall test is significant), the robustness of the *F* test is assumed (StatSoft, 2003).

Wilks's Lambda and other statistics reported by SPSS do not account for any single large underlying factor that could be detracting from main effects and interactions. Roy's Greatest Root is the only multivariate significance test that corrects for multivariate data that contain one large underlying common factor, such as attitude towards school, among multiple dependent variables. Once this underlying factor is accounted for, main effects and interactions based on the three dependent variables become clearer.

Therefore, Roy's Greatest Root is the multivariate significance test reported in this section. Roy's Greatest Root was consistently more sensitive when detecting main effects and interactions across all models tested. This is logical, given that the Renzulli LSI (1978) was comprised of three subscales (the three dependent variables in the below MANOVAs), all of which measured some aspect of school-related activity. Just because Renzulli's validation of this instrument indicated three distinct factors, in no way would one predict that these subscales are completely independent of each other. It makes intuitive sense that there is an underlying factor that may represent attitudes toward school. Indeed, I conducted a principal components analysis, demonstrating a strong single component across all 16 Renzulli LSI items. It makes intuitive sense that the LSI measures attitudes toward school on the whole, but can still be broken down

into various factors (types of activities within school), making analysis based on factors still appropriate.

Figure 4. Principal Components Analysis of LSI Items



Insert Table 4.1 about here (c.f. Appendix K)

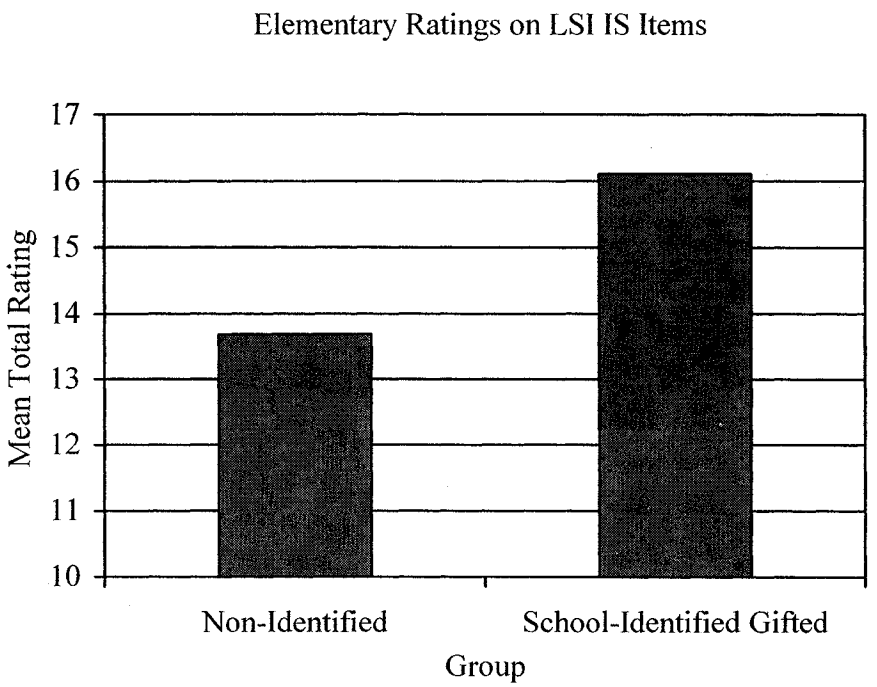
Table 4.2

Multivariate and Univariate Analyses of Variance F Ratios for Group x Sex x Work Appreciated for Learning Style Inventory (LSI) Factor Scores for Elementary School Participants

		Univariate		
Source	Omnibus *F*	Project *F*	Peer Teaching *F*	Independent Study *F*
Group (Gp)	2.88*	.26	2.37	5.45*
Sex (S)	.943	1.41	2.86	.061
Work Appreciated (WA)	1.68	.947	2.52	.353
Gp x S	.638	.046	1.13	.038
Gp x WA	.513	.036	.488	1.23

* $p < .05$.

Figure 5. Elementary Ratings on LSI Independent Study Items (GLM)



As shown in Table 4.2 and Figure 5, a small main effect of Group was observed (F (3,40) = 2.88, p = .048; ES = .178, power = .645) on the LSI Independent Study factor. This occurred because a significant difference (but small effect) was noted between elementary aged School-Identified Gifted participants and Non-Identified participants on this factor (F (1,42) = 5.45, p = .024; ES = .115, power = .626). Specifically, elementary School-Identified Gifted participants rated Independent Study activities higher (M = 16.11, SD = 2.7) than Non-Identified participants (M = 13.68, SD = 3.8).

Insert Table 4.3 about here (c.f. Appendix K)

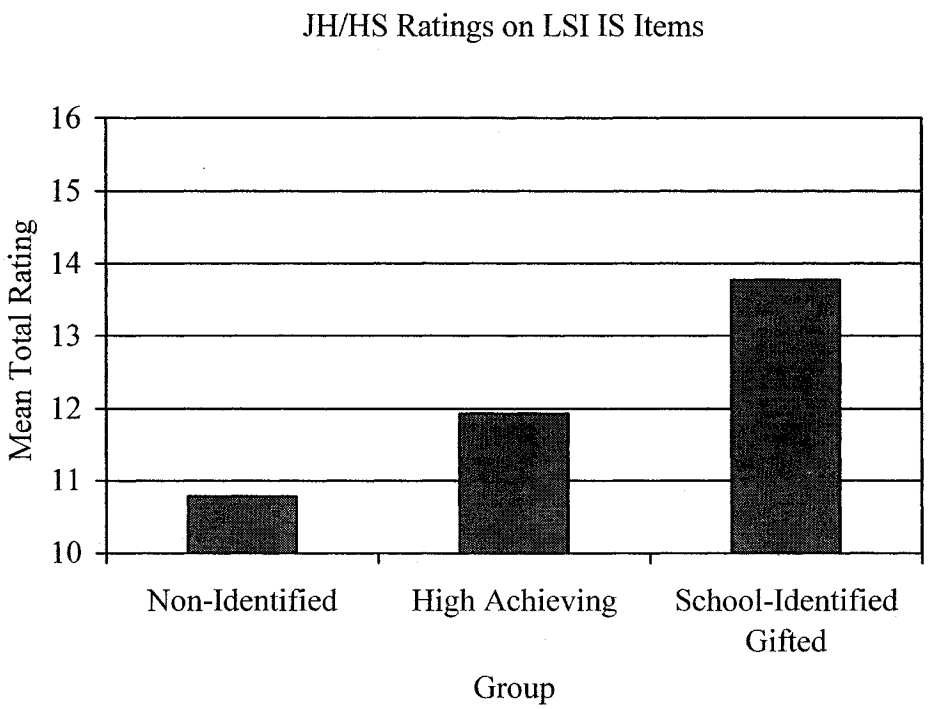
Table 4.4

Multivariate and Univariate Analyses of Variance F Ratios for Group x Sex x Work Appreciated for Learning Style Inventory (LSI) Factor Scores for Junior High & High School Participants

		Univariate		
Source	Omnibus *F*	Project *F*	Peer Teaching *F*	Independent Study *F*
Group (Gp)	6.49**	.089	2.94	8.68**
Sex (S)	.277	.001	.618	.134
Work Appreciated (WA)	2.60*	3.58*	1.75	1.51
Gp x S	4.69**	.745	6.01**	3.18*
Gp x WA	3.26**	.601	2.98*	2.41*

* $p < .05$. ** $p < .01$.

Figure 6. JH/HS Ratings on LSI Independent Study Items (GLM)

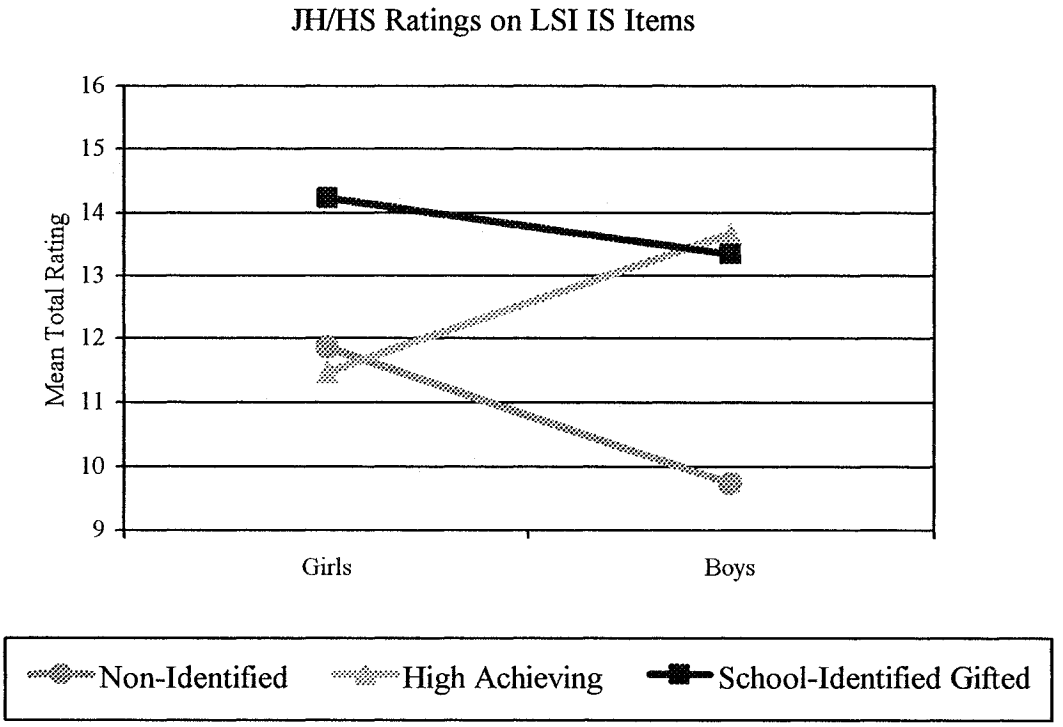


As shown in Table 4.4 and Figure 6, a small overall main effect of Group was observed (F (3,181) = 6.49, p < .001; ES = .1, power = .969). A significant difference (but weak association) was noted between junior high and high school (JHHS) aged School-Identified Gifted participants and both High Achieving students and Non-Identified participants on the LSI Independent Study factor (F (2,182) = 8.68, p < .001; ES = .08, power = .967). Specifically, JHHS School-Identified Gifted participants rated Independent Study activities higher (M = 13.77, SD = 3.5) than High Achieving students (M = 11.93, SD = 3.7) and Non-Identified participants (M = 10.78, SD = 3.4).

Another small overall main effect of Work Appreciated was observed (F (3,181) = 2.6, p = .054; ES = .04, power = .632). A significant difference (but small effect) was noted between junior high and high school (JHHS) aged participants who did not feel their work was appreciated (hereafter referred to simply as Appreciated, Sometimes Appreciated, or Not

Appreciated) and both those who felt their work was *Sometimes Appreciated* and those who felt Appreciated on the LSI Project factor (F (2,182) = 3.58, p = .03 ; ES = .04, power = .659). Specifically, JHHS participants who did not feel their work was appreciated rated Project activities lower (M = 25.06, SD = 8.8) than those who felt their work was Sometimes Appreciated (M = 29.81, SD = 5.9) or Not Appreciated (M = 29.98, SD = 5.6).

Figure 7. JH/HS Ratings on LSI Independent Study Items, Group by Sex (GLM)

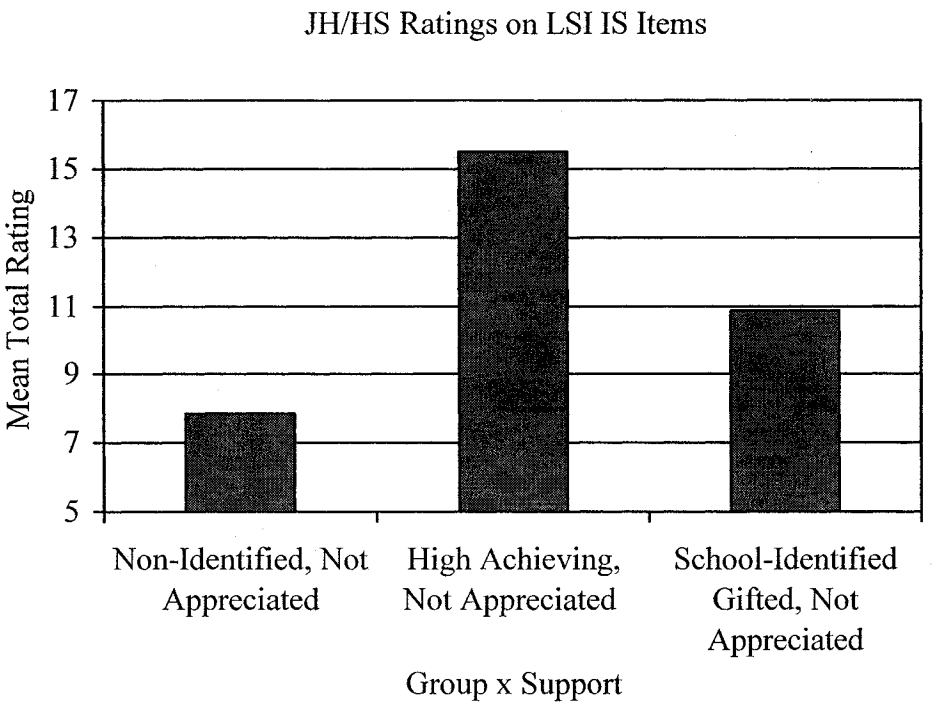


As shown in Figure 7, a small overall interaction was observed between Group and Sex (F (3,181) = 4.69, p = .004, ES = .07, power = .891) on both the Peer Teaching and Independent Study factors. A significant difference (but small effect) was noted between School-Identified Gifted girls and School-Identified Gifted boys. Specifically, School-Identified Gifted girls rated Peer Teaching activities higher (F (2,182) = 6.01, p = .003, ES = .06, power = .878) (M = 11.20,

SD = 2.2) than School-Identified Gifted boys (*M* = 9.34, *SD* = 2.4). Also, School-Identified Gifted girls rated Independent Study activities significantly higher than Non-Identified boys group (*F* (2,182) = 3.18, *p* = .05, *ES* = .05, power = .684) (*M* = 14.23, *SD* = 3.7 and *M* = 9.74, *SD* = 3.3, respectively); however, there was a weak association between variables.

Another small overall interaction was observed between Group and Work Appreciated (*F* (4,182) = 3.26, *p* = .013, *ES* = .07, power = .829) on both the Peer Teaching and Independent Study factors. A significant difference (but small effect) was noted between Non-Identified, Not Appreciated participants and both Non-Identified, Sometimes Appreciated and Non-Identified, Appreciated participants on the Peer Teaching factor (*F* (4,182) = 2.98, *p* = .02, *ES* = .06, power = .787). Non-Identified, Not Appreciated participants rated Peer Teaching activities lower (*M* = 7.00, *SD* = 2.6) than Non-Identified, Sometimes Appreciated and Non-Identified, Appreciated participants (*M* = 10.62, *SD* = 2.2; *M* = 11.25, *SD* = 1.7, respectively).

Figure 8. JH/HS Ratings on LSI Independent Study Items, Group by Support (GLM)



Also, as seen in Figure 8, a significant difference (but small effect) was noted across all Groups and Work Appreciated groups on the Independent Study factor (F (4,182) = 2.41; p = .05, ES = .05, power = .684). Those who were Non-Identified and Not Appreciated rated Independent Study activities the lowest (M = 7.83, SD=4.2). High Achieving students, Not Appreciated participants rated Independent Study activities the highest (M = 15.50, SD = .7). School-identified Gifted, Appreciated participants rated Independent Study activities the next highest (M = 14.38, SD = 3.4) and School-Identified Gifted, Sometimes Appreciated rated Independent Study activities the third highest of all the groups (M = 13.50, SD = 3.3).

Insert Table 4.5 about here (c.f. Appendix K)

Table 4.6

Multivariate and Univariate Analyses of Variance F Ratios for Group x Grade for Learning Style Inventory (LSI) Factor Scores

		Univariate		
Source	Omnibus *F*	Project *F*	Peer Teaching *F*	Independent Study *F*
Group (Gp)[1]	11.99**	.678	.820	29.47**
Grade (Gr)	9.63**	2.80	.017	10.75**
Gp x Gr	1.44	.679	.885	.490

** $p < .01$.

[1] *Group by Grade analyses had to be conducted separately from the full models presented above, to incorporate all grades. The group main effect noted here has already been addressed.*

As shown in Table 4.6, a small overall main effect of Grade was observed (F (3,195) = 9.63, $p < .001$; $ES = .129$, power = .997). A significant difference (but weak association) was noted on planned comparisons between elementary participants and both junior high and high school aged participants on the LSI Independent Study factor (F (2,196) = 10.75, $p < .001$; ES = .1, power=.989). Elementary school participants rated Independent Study activities higher (M = 14.58, SD = 3.6) than junior high (M = 12.40, SD = 3.6) and high school participants (M = 12.85, SD = 3.9).

MANOVA was also applied to Renzulli LSI items for locally-developed learning preference items to determine relationships between the two for methodological purposes.

Insert Table 5.1 about here (c.f. Appendix K)

Table 5.2

Multivariate and Univariate Analyses of Variance F Ratios for Renzulli LSI Factor Items x Locally-developed Independent Learning Preference Items

		Univariate		
Source	Omnibus *F*	Project *F*	Peer Teaching *F*	Independent Study *F*
Elementary Analyses				
Suggested Choice Items				
Work Alone	8.09**	.09[e]	.67	21.83**
Read	1.84	.71	1.69	3.11
Open Ended Items				
Best Learning	5.35**	.49	.82	5.24**
Worst Learning	2.81	.27	1.22	2.50
JHHS Analyses				
Suggested Choice Items				
Work Alone	25.72**	10.57[f]**	1.52	52.46**
Read	6.73**	7.40[e,f]**	.98	10.48**

Open Ended Items				
Best Learning	14.39**	4.00**	2.52*	9.64**
Worst Learning	17.13**	3.65**	.45	11.18**

* $p < .05$. ** $p < .01$.

[e] *Box's M test significant, but not at the critical level of .01*

[f] *Levene's Test significant at .01 level, but F sufficiently robust.*

For the suggested choice Work Alone and Renzulli (1978) factors, an overall more moderate effect (F (3,45) = 8.09, $p < .001$; ES = .351, power = .986) and individual low-to-moderate main effect (F (1,47) = 21.83, $p < .001$; ES = .317, power = .998) was noted at the elementary level. Students who selected Work Alone had a higher mean score on Independent Study factor (M = 16.46 SD = 2.6) than those who did not select Work Alone (M = 12.43, SD = 3.4).

At the JHHS level, an overall low-to-moderate (F (3,190) = 25.72, $p < .001$; ES = .289, power = 1.00) and individual low-to-moderate main effect was noted as well, indicating a relationship between Work Alone and Project (F (1,192) = 10.57, $p < .001$; ES = .1, power = .899) and Independent Study factors (F (1,192) = 52.45, $p < .001$; ES = .215, power = 1.00). Those who selected Work Alone had a lower mean score on the Project (group work) factor (M = 28.33, SD = 6.6) than those who did not select Work Alone (M = 31.09, SD = 4.8). Also, as at the elementary level, those who selected Work Alone had a higher mean score on Independent Study factor (M = 14.02, SD = 3.3) than those who did not select Work Alone (M = 10.58, SD = 3.3).

For the Suggested Choice Read a Textbook item and Renzulli Items, there were no significant effects at the elementary level. At the JHHS level, however, small overall (F (3,190)

= 6.73, $p < .001$; $ES = .1$, power = .974) and individual main effects emerged indicating a relationship between Read a Textbook and Project and Independent Study items [(F (1,192) = 7.4, $p = .007$; $ES = .04$, power = .772) and (F (1,192) = 10.48, $p < .001$; $ES = .1$, power = .896, respectively)]. Those who selected Read a Textbook had a lower mean score on Project (group work) factor ($M = 26.75$, $SD = 8.8$) than those who did not select Read a Textbook ($M = 30.03$, $SD = 5.3$). Also, those who selected Read a Textbook had a higher mean score on Independent Study factor ($M = 14.54$, $SD = 3.9$) than those who did not select Read a Textbook ($M = 12.15$, $SD = 3.5$).

For the Open-Ended Best Learning Situation item and Renzulli Items, a relationship was observed in the elementary and JHHS levels. At the elementary level, a more moderate overall (F (3,27) = 5.35, $p = .005$; $ES = .373$, power = .893) and individual main effects (F (2,28)= 5.23, $p = .012$; $ES = .272$, power = .789) of Best Learning response were noted on the Independent Study factor. Those students who mentioned *work alone* as most ideal had a higher mean score on Independent Study factor ($M = 17.33$, $SD = 2.2$) than did those who cited *working with several peers* ($M = 12.71$, $SD = 4.1$).

At the JHHS level, a low-to-moderate overall (F (4,182) = 14.38, $p < .001$; $ES = .240$, power = 1.00) and small individual main effects were noted between Best Learning response and all three Renzulli factors: Project (F (4,182) = 4.00, $p = .004$; $ES = .1$, power = .904)., Peer Teaching (F (4,182) = 2.52, $p = .043$; $ES = .1$, power = .707), and Independent Study (F (4,182) = 9.64, $p < .001$; $ES = .175$, power = 1.00). Those who cited *work alone* as most ideal had a lower mean score on Project (group work) factor ($M = 26.53$, $SD = 6.7$) than those who cited *work with several peers* ($M = 31.53$, $SD = 5.1$). A similar difference on the Project factor was observed between those who gave an *unclear response* about whom they most liked to work with

($M = 27.93$, $SD = 6.7$) and those who cited a preference to *work with several peers*. Also, as noted at the Elementary level, students who cited *work alone* as a Best Learning situation had a higher mean score on Independent Study factor ($M = 14.59$, $SD = 3.3$) than those who cited a preference for *work with several peers* ($M = 11.09$, $SD = 3.5$). Differences were also noted between those who cited *work with several peers* and those who mentioned *work alone and work with others* ($M = 15.46$, $SD = 3.4$). Finally, differences were noted between those who mentioned *work alone and work with others* compared to those whose responses were *unclear* ($M = 12.30$, $SD = 3.2$).

With regard to the Open-Ended Worst Learning situation item and Renzulli items, no significant effects were observed at the elementary level. At the JHHS level, however, a low-to-moderate overall ($F(4,185) = 17.13$, $p < .001$; ES = .270, power = 1.00) and a low individual main effect were noted on the Project ($F(4,185) = 3.65$, $p = .007$; ES = .073, power = .873) and Independent Study factors ($F(4,185) = 11.17$, $p < .001$; ES = .195, power = 1.00). Specifically, those who cited *work alone* as a Worst Learning situation had a higher mean score on the Project (group work) factor ($M = 31.54$, $SD = 5.5$) than those who cited *work with several peers* ($M = 27.44$, $SD = 6.8$). Also, those who cited *work alone* as a Worst Learning situation had a lower mean score on the Independent Study factor ($M = 11.32$, $SD = 3.7$) than those who cited *work with several peers* ($M = 15.26$, $SD = 2.8$). Differences were also noted between those who cited *work with several peers* and those who cited *work alone and work with others* ($M = 10.25$, $SD = 4.7$); and those whose responses were *unclear* ($M = 11.89$, $SD = 3.2$).

In all cases, effect sizes were at best low-to-moderate, but usually relatively low. This phenomenon is common in social science research, given the nature of research (e.g., questionnaire-based). According to McCartney and Rosenthal (2000):

> Theory and conceptualization in social science far exceed measurement . . . Measurement error biases effect size estimates downward toward zero and so the psychometric properties of measures provide one context for effect size estimates . . . [Drawing conclusions based strictly on low effect sizes] may be more warranted if the psychometric properties associated with measures of constructs . . . were already maximal (p. 176).

One purpose of the current study was to address past research findings (partly) using similar measures to increase the ability to compare and contrast findings. Because such measures were used, i.e., questionnaires, effect sizes were lower than would be desirable. It is likely that effect sizes in past research were relatively low as well, but given that the reporting of effect sizes is a relatively new trend, I did not have access to this information. And, regardless of the effect sizes found in the current study, interesting significant findings suggestive of psychological trends emerged which can later be re-visited with the use of improved psychometric measures. "A small effect may have important consequences if it distinguishes two models, while a large effect may not matter if it was already expected under any theory" (*ANOVA, Power and Size,* year unknown). A small effect is sufficient for this study, considering its purpose to add sophistication to the original assertion that gifted students prefer to work alone.

Generalized linear modeling. As previously discussed, GLZ is used to fit non-normal data into a MANOVA-like model, and to look at interactions. Statistical significance tests to determine effects in the GLZ model can be performed via the Wald statistic, the likelihood ratio (LR), or score statistic. The Wald statistic is an analogue to the F test; it is just calculated differently under a different distribution to accommodate non-continuous data. It is estimated from the chi-square distribution, but it is advanced because it allows for the interpretation of

main effects and interactions. Moreover, the Wald statistic is easily computed (StatSoft, 2003). This is the statistic reported by SAS, and utilized in the current study.

Insert Table 6.1 about here (c.f. Appendix K)

Table 6.2

Generalized Linear Model Analyses for Group × Sex × Work Appreciated for Suggested-Choice Learning Preference Questions for Elementary Participants

	Generalized Linear Model			
Source	LR Statistics Chi-Square	Suggested Choice-Alone Chi-Square	LR Statistics Chi-Square[d]	Suggested Choice-Reading Chi-Square
Group (Gp)	2.29	3.63	--	.01
Sex (S)	.06	1.03	--	3.27
Work Appreciated (WA)[c]	.76	.05; 1.61	--	0.00; .92
Gp × S	2.09	2.00	--	1.77
Gp × WA[c]	1.93	1.74	--	0.00

[c] *In cases where there are more than 2 levels of a variable, multiple Chi-Squares are reported representing effects between the levels. When only one Chi-Square is listed for such variables, additional Chi-Squares could not be computed due to low Ns.*

[d] *The SAS program does not generate LR Statistics or individual Chi-Squares when data are sparse, as indicated by the "negative of Hessian being not positive definite" (Pedan, year unknown).*

Insert Table 6.3 about here (c.f. Appendix K)

Table 6.4

Generalized Linear Model Analyses for Group × Sex × Work Appreciated for Suggested-Choice Learning Preference Questions for Junior High and High School Participants

	Generalized Linear Model			
Source	LR Statistics Chi-Square	Suggested Choice-Alone Chi-Square	LR Statistics Chi-Square	Suggested Choice-Reading Chi-Square
Group (Gp)	4.00	.50; .70	2.74	183.22**, 246.64**
Sex (S)	.31	.03	.14	.34
Work Appreciated (WA)[c]	4.74	698.63**; .43	8.74*	190.09**, 1563.60**
Gp × S	1.41	.86; .01	2.23	.92, .04
Gp × WA[c]	1.98	281.66**; .33; .06	4.97	128.14**, 350.87**, 166.19**

* $p < .05$. ** $p < .01$.

[c] *In cases where there are more than 2 levels of a variable, multiple Chi-Squares are reported representing effects between the levels. When one Chi-Square (or fewer than would be expected based on possible interactions) is listed for such variables, this means that additional Chi-Squares could not be computed due to low Ns.*

Insert Table 6.5 about here (c.f. Appendix K)

Table 6.6

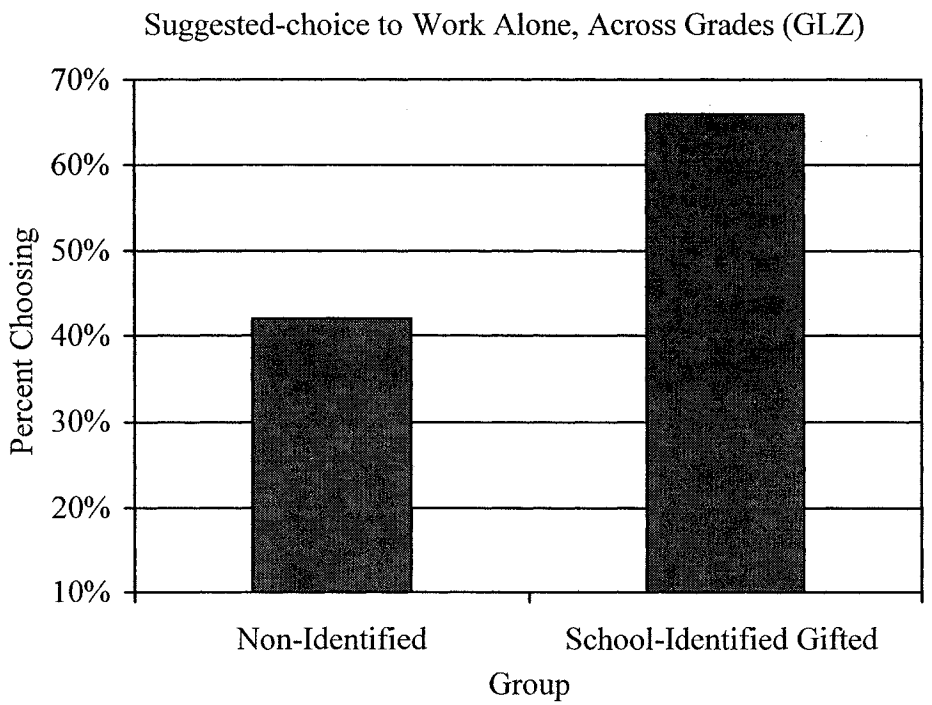
Generalized Linear Model Analyses for Grade for Suggested-Choice Learning Preference Question

	Generalized Linear Model			
Source	LR Statistics Chi-Square	Suggested Choice-Alone Chi-Square	LR Statistics Chi-Square	Suggested Choice-Reading Chi-Square
Group (Gp)	7.56**	3.87*	1.65	.18
Grade (Gr)[c]	.75	.67, 1.05	1.66	.10, 1.19
Gp x Gr[c]	.62	.61, .14	.55	.38, .00

* $p < .05$. ** $p < .01$.

[c] *In cases where there are more than 2 levels of a variable, multiple Chi-Squares are reported representing effects between the levels. When only one Chi-Square is listed for such variables, additional Chi-Squares could not be computed due to low Ns.*

Figure 9. Suggested-Choice to Work Alone, Across Grades (GLZ)

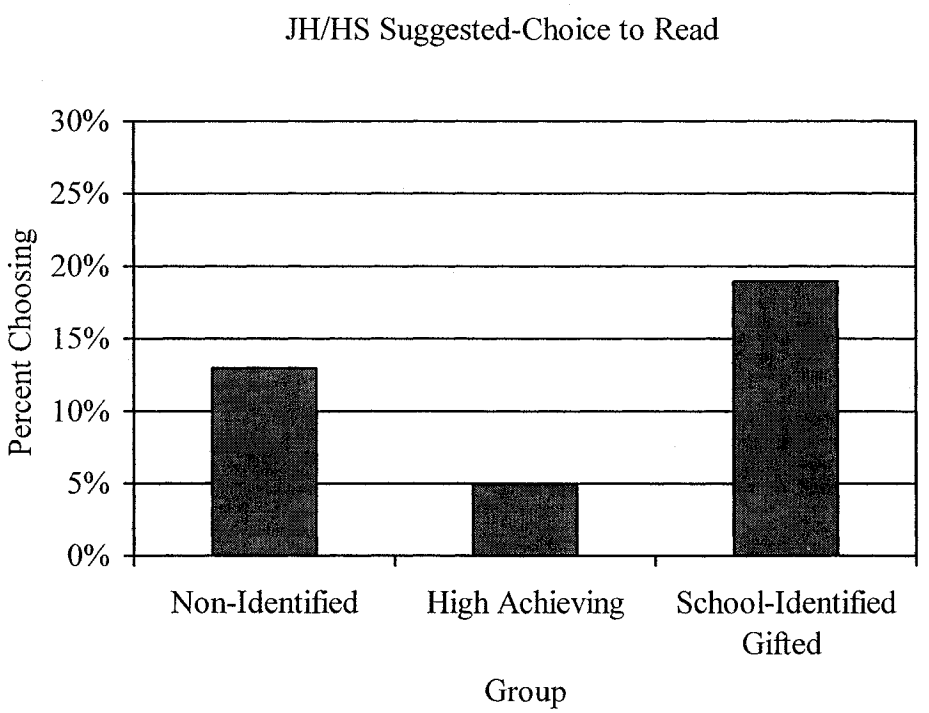


Tables 6.2, 6.4, and 6.6 present statistical findings for responses to Suggested-Choice Items (Work Alone and Read a Textbook). In the Group × Grade analysis (presented in Table 6.6 and Figure 9), in which High Achieving students participants were removed because they were not present at the elementary level, a main effect for Group emerged. A significant difference was present between Non-Identified and School-Identified Gifted participants. School-Identified Gifted participants chose Work Alone more (66%; 34% did not select this) than did Non-Identified participants (42%; 55% did not select this). No other significant effects were noted at the elementary level for either Suggested-Choice item.

At the JHHS level, there were no significant overall effects, but several individual main effects and interactions were observed. First, a main effect of Work Appreciated on Work Alone was observed, because a significant difference was present between responses of *Not*

Appreciated and *Sometimes Appreciated. Not Appreciated* selected Work Alone more (69%) than those who were *Sometimes Appreciated* (48%); conversely, those who felt their work was *Not Appreciated* did not choose Work Alone as often (25%) as those who felt their work was *Sometimes Appreciated* (52%). Second, an interaction between Group and Work Appreciated was observed. Participants who were Non-Identified, *Not Appreciated* selected Work Alone more (50%; 33% did not select this) than those who were Non-Identified, *Sometimes Appreciated* (36%; 64% did not select this).

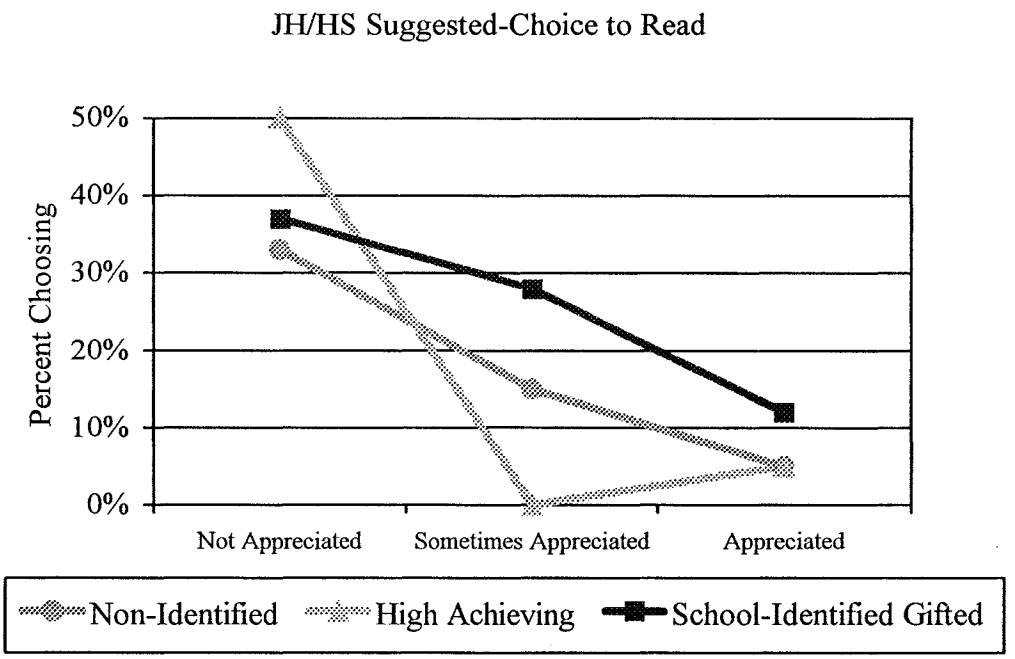
Figure 10. JH/HS Suggested-Choice to Read (GLZ)



With regard to the Suggested Choice Read a Textbook item (see Table 6.3 and Figure 10), a main effect for Group was observed at the JHHS level. There was a significant difference between Not Identified, School-Identified Gifted and High Achieving students. School-Identified

Gifted chose Read a Textbook more often (19%; 81% did not select this) than Non-Identified (13%; 85% did not select this) and High Achieving students participants (5%; 93% did not select this). A main effect of Work Appreciated was also noted, with significant differences being observed between participants who felt their work was *Not Appreciated*, those who felt their work was *Sometimes Appreciated*, and those who felt their work was *Appreciated*. Those participants who felt their work was *Not Appreciated* chose Read a Textbook more (38%; 56% did not select this) than those who felt their work was *Sometimes Appreciated* (17%; 83% did not select this) and *Appreciated* (8%; 91% did not select this).

Figure 11. JH/HS Suggested-Choice to Read, Group by Support (GLZ)



As shown in Figure 11, an interaction was noted between Group and Work Appreciated on the Suggested-Choice to Read a Textbook item. This occurred because a significant difference existed between Non-Identified, *Not Appreciated* participants, who chose Read a

Textbook more often (33%; 50% did not select this) than Non-Identified, *Sometimes Appreciated* (15%; 85% did not select this) and *Appreciated* participants, less (5%; 95% did not select this). Finally, another interaction was noted between School-Identified Gifted, *Not Appreciated* participants, who chose Read a Textbook more (37%; 63% did not select this) than School-Identified Gifted, *Appreciated* (12%; 89% did not select this). No Group by Grade effects emerged on this item.

Insert Table 7.1 about here (c.f. Appendix K)

Insert Table 7.2 about here (c.f. Appendix K)

Table 7.3

Generalized Linear Model Analyses for Group x Sex x Work Appreciated for Suggested-Choice Extracurricular Companion Question for Junior High and High School Participants

	Generalized Linear Model	
Source	LR Statistics Chi-Square	Suggested Choice-No Companion Chi-Square[c,d]
Group (Gp)	1.51	.55, .67
Sex (S)	2.57	2.49
Work Appreciated (WA)	.23	1.21, .17
Gp x S	1.11	1.09, .70
Gp x WA	3.40	.38, .19, 2.67, .55

[c] *In cases where there are more than 2 levels of a variable, multiple Chi-Squares are reported representing effects between the levels. When only one Chi-Square is listed for such variables, additional Chi-Squares could not be computed due to low Ns.*

[d] *The SAS program does not generate LR Statistics or individual Chi-Squares when data are sparse, as indicated by the "negative of Hessian being not positive definite" (Pedan, year unknown).*

Insert Table 7.4 about here (c.f. Appendix K)

Table 7.5

Generalized Linear Model Analyses for Group x Grade for Suggested-Choice Extracurricular Companion Question

	Generalized Linear Model	
Source	LR Statistics Chi-Square	Suggested Choice-No Companion Chi-Square
Group (Gp)	.27	3.00
Grade (Gr)[c]	8.99**	557.54**, 2.72
Gp x Gr	3.99	.47

** $p < .01$.

[c] *In cases where there are more than 2 levels of a variable, multiple Chi-Squares are reported representing effects between the levels. When only one Chi-Square is listed for such variables, additional Chi-Squares could not be computed due to low Ns.*

A table is not included for elementary level analyses because no statistics were computed due to low *N*s across subcategories. No effects were noted for Group, Sex, or Work Appreciated at elementary or JHHS levels on the Preference for No Companions After School item. However, as indicated in Table 7.5, an overall and individual main effect of Grade ($p = .01$) on Preference for No Companions After School was observed. This occurred because a significant difference was present between elementary and high school participants' responses; high school participants chose this option more (29%; 71% did not select this) than elementary participants (4%; 94% did not select this).

Insert Table 8.1 about here (c.f. Appendix K)

Table 8.2

Generalized Linear Model Analyses for Group x Sex and Group x Work Appreciated on Best and Worst Learning Situation Questions for Elementary Participants

	Generalized Linear Model			
Source	LR Statistics Chi-Square	Best Learning Situation Chi-Square	LR Statistics Chi-Square	Worst Learning Situation Chi-Square
Group (Gp)	3.21	.78	.05	.23
Sex (S)	.18	.29	1.22	.95
Group (Gp)	1.39	.04	.24	1.71
Work Appreciated (WA)[c]	.05	.27, .62	4.22	2.15, 2.30
Gp x S	.23	.23	.20	.20
Gp x WA	2.15	2.21	2.46	2.49

[c] *In cases where there are more than 2 levels of a variable, multiple Chi-Squares are reported representing effects between the levels. When only one Chi-Square is listed for such variables, additional Chi-Squares could not be computed due to low Ns.*

Insert Table 8.3 about here (c.f. Appendix K)

Table 8.4

Generalized Linear Model Analyses for Group x Sex and Group x Work Appreciated on Best and Worst Learning Situation Questions for Junior High and High School Participants

	Generalized Linear Model			
Source	LR Statistics Chi-Square	Best Learning Situation Chi-Square	LR Statistics Chi-Square	Worst Learning Situation Chi-Square
Group (Gp)[c]	2.50	2.29, 1.42	2.45	.84, 2.13
Sex (S)	.26	.82	.60	1.14
Group (Gp)[c]	5.03	1.68, 1.35	2.71	1.69, .95
Work Appreciated (WA)[c]	.13	1.15, .62	1.77	.03, 2.47
Gp x S[c]	1.36	1.25, .44	1.27	.68, 1.22
Gp x WA[c]	5.01	1.99, 1.40, 1.56, .79	5.09	.06, 3.54, .63, .77

[c] *In cases where there are more than 2 levels of a variable, multiple Chi-Squares are reported representing effects between the levels. When only one Chi-Square is listed for such variables, additional Chi-Squares could not be computed due to low Ns.*

Insert Table 8.5 about here (c.f. Appendix K)

Table 8.6

Generalized Linear Model Analyses for Group x Grade on Best and Worst Learning Situation Questions

	Generalized Linear Model			
Source	LR Statistics Chi-Square	Best Learning Situation Chi-Square	LR Statistics Chi-Square	Worst Learning Situation Chi-Square
Group (Gp)	2.54	.33	.29	.21
Grade (Gr)	3.30	3.69*, .41	4.03	.28, 3.69
Gp x Gr	2.06	.92, .15	.07	.02, .07

* $p < .05$.

[c] *In cases where there are more than 2 levels of a variable, multiple Chi-Squares are reported representing effects between the levels. When only one Chi-Square is listed for such variables, additional Chi-Squares could not be computed due to low N's.*

No significant effects for Group, Sex, or Work Appreciated were noted on the Open-ended Best Learning or Worst Learning situation questions. However, an individual main effect of Grade ($p \leq .05$) was observed, reflecting a significant difference between elementary and high school participants' responses. As seen in Table 8.5 above, elementary participants mentioned situations involving working alone on the Best Learning item (18%) more often than did high school participants (6%). Also, high school participants mentioned situations where they were working alone and working with others more (23%) than did Elementary (2%) and Junior High School participants (7%).

A significant difference was also observed between junior high and high school participants on the Worst Learning item (main effect of Grade; $p \leq .05$). This occurred because junior high participants mentioned working alone as a worst learning situation more frequently (42%) than did high school participants (23%).

Insert Table 9.1 about here (c.f. Appendix K)

Table 9.2

Generalized Linear Model Analyses for Group x Sex and Group x Work Appreciated on Reason for Learning Preference Question for Elementary Participants

	Generalized Linear Model	
Source	LR Statistics Chi-Square	Why Preference? Chi-Square
Group (Gp)	.84	2.04
Sex (S)	2.09	2.78
Group (Gp)	.24	1.11
Work Appreciated (WA)[c]	14.17**	7.29**
Gp x S	.10	2.45
Gp x WA	2.09	1.97

** $p < .01$.

[c] *In cases where there are more than 2 levels of a variable, multiple Chi-Squares are reported representing effects between the levels. When only one Chi-Square is listed for such variables, additional Chi-Squares could not be computed due to low Ns.*

Insert Table 9.3 about here (c.f. Appendix K)

Table 9.4

Generalized Linear Model Analyses for Group x Sex x Grade x Work Appreciated on Reason for Learning Preference Question for Junior High and High School Participants

	Generalized Linear Model	
Source	LR Statistics Chi-Square	Why Preference? Chi-Square
Group (Gp)	8.12	4.84*, 1.01
Sex (S)	0.00	.61
Group (Gp)	2.79	3.43, .83
Work Appreciated (WA)	.40	.82, .09
Gp x S	1.65	1.57, .68
Gp x WA	1.32	.64, .00, .64, .45

* $p < .05$.

[c] *In cases where there are more than 2 levels of a variable, multiple Chi-Squares are reported representing effects between the levels. When only one Chi-Square is listed for such variables, additional Chi-Squares could not be computed due to low Ns.*

Insert Table 9.5 about here (c.f. Appendix K)

Table 9.6

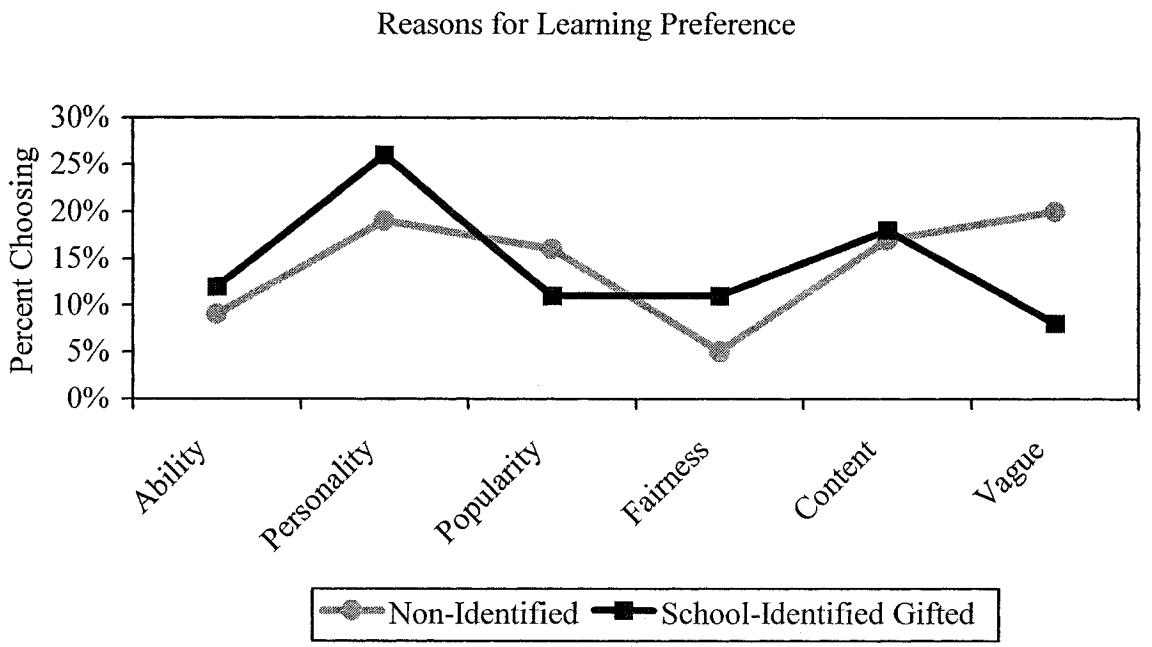
Generalized Linear Model Analyses for Group x Grade on Reason for Learning Preference Question

	Generalized Linear Model	
Source	LR Statistics Chi-Square	Why Preference? Chi-Square
Group (Gp)	2.02	4.11*
Grade (Gr)	.06	1.86, .24
Gp x Gr	3.55	3.56, .66

* $p < .05$.

[c] *In cases where there are more than 2 levels of a variable, multiple Chi-Squares are reported representing effects between the levels. When only one Chi-Square is listed for such variables, additional Chi-Squares could not be computed due to low Ns.*

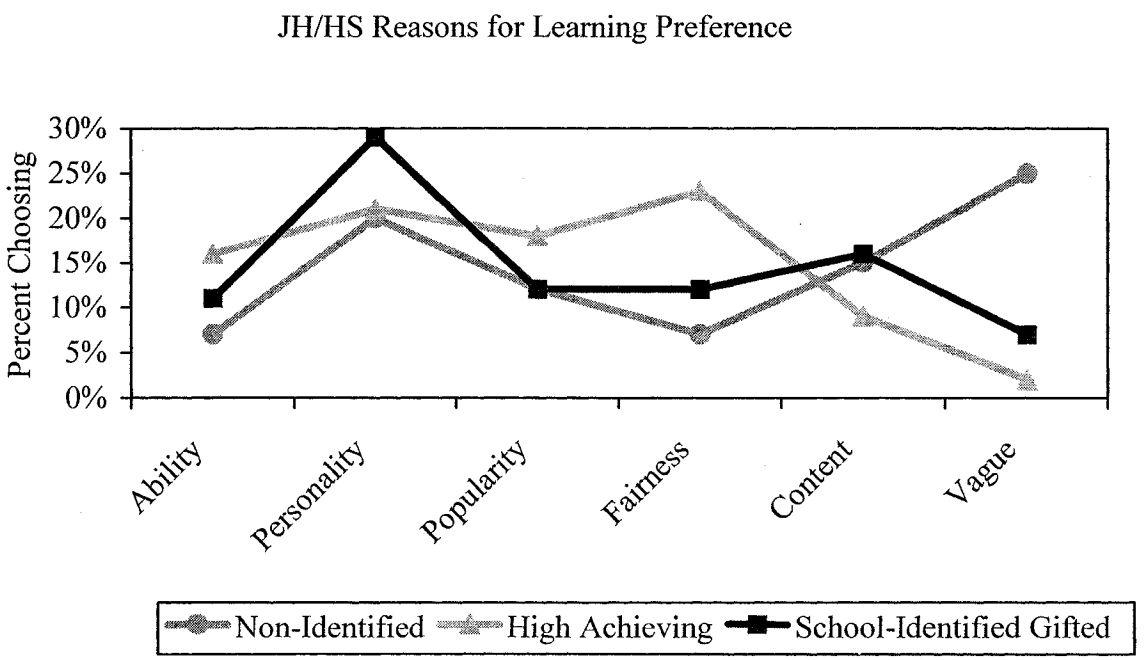
Figure 12. Reasons for Learning Preferences, Across Grades (GLZ)



As shown in Table 9.6 and Figure 12, an individual main effect of Group ($p = .04$) across grades was observed on the Reason for Learning Preference item. A significant difference existed between responses of Non-Identified participants and School-Identified Gifted participants. School-Identified Gifted participants (26%) cited *personality* as a reason why people might wish to work alone rather than with others more than did Non-Identified participants (19%). Non-Identified participants also gave a *vague response* (e.g., "people are different") (20%) more often than School-Identified Gifted participants (8%). Also, as in the

overall (cross-grade) Group analysis, Non-Identified participants at the JHHS level gave a vague response (e.g., "people are different") (25%) more often than High Achieving participants (2%).

Figure 13. JH/HS Reasons for Learning Preferences (GLZ)



As indicated in Table 9.3 and Figure 13, a significant difference was found between the responses of Non-Identified and High Achieving participants at the Junior High and High School levels. High Achieving students gave *fairness of work distribution* as a reason for why some may wish to work alone rather than with others more frequently (23%) than did Non-Identified participants (7%).

An overall and individual main effect of Work Appreciated for elementary participants was also observed ($p = .006$). A significant difference was present between those who felt that their work was *Appreciated* and those who felt that their work was only *Sometimes Appreciated. Sometimes Appreciated* participants cited *ability* as a reason why some may wish to work alone rather than with others more often (35%) than *Appreciated* participants (0%) (who cited *ability to*

tailor work content most frequently; 33%). *Sometimes Appreciated* participants also cited *fairness of work distribution* as a reason more frequently (12%) than *Appreciated* participants (0%). *Appreciated* participants saw *popularity* as a reason more often (23%) than did those who felt *Sometimes Appreciated* (12%), and as previously mentioned *Appreciated* participants also cited *ability to tailor work* as a reason why some may wish to work alone rather than with others more often (33%) than did *Sometimes Appreciated* participants (12%).

Chapter 4

Conclusions and Discussion

In this chapter, I first summarize the evidence obtained relevant to each of the research questions. Next, I assess the extent to which the claims made about gifted children's preference to work alone hold up to empirical scrutiny. Third, I discuss original contributions of the study, Fourth, limitations of the study are acknowledged and future directions suggested. A discussion of the broader implications of the results follows.

Table 10

Summary of Findings

Research Questions	Answers	Implications
1a. Do the majority of students labeled as gifted prefer to work alone? 1b. Is this preference related to formal identification (school-identified gifted versus High Achieving students), grade, or sex?	1a. Yes, the preference to work alone was replicated (on Likert-type items and one suggested-choice item). 1b. School-Identified Gifted had a stronger preference to work alone. There were no grade differences (on Likert-type items), but there were some sex-interaction differences.	Gifted students prefer to work alone, when asked in the traditional way. This finding supports previous research, but does not provide rich information on the nature of the preference.
2a. Moreover, how strong is the preference to work alone? 2b. Are gifted students just as likely to report positive ideas about working alone to suggested-choice and open-ended questions as they are to give positive ratings to items which speak directly to working alone?	2a. Arguably, the preference is not strong, as revealed especially on open-ended items. 2b. JHHS School-Identified Gifted may have a slightly stronger preference to work alone than Elementary School-Identified Gifted, based on suggested-choice responses.	Gifted students prefer to work alone, but to a limited extent. This has both theoretical and methodological implications, as students' revealed preferences depend on how preferences are asked about.

Research Questions	Answers	Implications
3. Are there differences between gifted and non-identified students in their ideas about why people opt for different learning conditions?	3. Yes, School-Identified Gifted respondents gave more thoughtful responses than did Non-Identified respondents, and different groups had different ideas about people's learning preferences.	Formally and informally identified students have different ideas about learning preferences. This has practical implications, in that teachers may not be able to treat all gifted students the same way in terms of curricular design.
4. With regard to social constructivism, do those who feel adequately supported in their learning tend to welcome opportunities to work with others, compared to those who do not feel supported?	4. Yes, non-supported School-Identified Gifted preferred to work alone compared to those who reported feeling supported.	There is a relationship between learning preference and perceived support, for gifted students and other students as well. The less supported students are or feel, the more inclined they are to report a desire to work alone. These children could be isolated, or isolating themselves, which may suggest existing social or emotional difficulties, or it may lead to these difficulties. This has implications on mental health, among other areas.

Conclusions

Research question one: Do gifted prefer to work alone? If so, which gifted students prefer this learning condition? Are they defined by formal identification (school-identified gifted versus high achieving students), grade, or sex? As suggested in past research using learning-style surveys comprising Likert-type items (e.g., Boultinghouse, 1984, Griggs & Price, 1980, Price, Dunn, Dunn, & Griggs, 1981), school-identified gifted students demonstrated a preference for working alone compared to other groups. This preference was evident at both the elementary and junior high-high school (JHHS) levels. On the whole, this group also demonstrated a preference to work alone on one suggested-choice item. Sex interaction differences were also noted. Specifically, school-identified gifted (JHHS) girls rated Independent Study more highly than did non-identified boys. Interestingly, school-identified gifted girls also rated Peer Teaching higher than did school-identified gifted boys.

Research question two: Does how you ask the question matter? How strong is the preference to work alone? Do gifted students consistently respond more positively to questions regarding working alone, or are responses varied across methodologically different types of questions? Specifically, are gifted students just as likely to report positive ideas about working alone to open-choice and open-ended questions as they are to give positive ratings to items which speak directly to working alone (i.e. Likert-type items)? School-identified gifted students across grades chose Work Alone more often when the option was suggested. However, this was not observed in separate grade subsets when additional variables were entered into the equation. Elementary level school-identified gifted students did not demonstrate a preference to work alone on suggested-choice or open-ended items. Although the preference to work alone was demonstrated for JHHS school-identified gifted students on one of the suggested-choice items,

this preference did not emerge on self-generated responses to open-ended items for either elementary or JHHS school-identified gifted students.

Research question three: Why do students have different learning preferences? Why is it that some students identified as gifted opt to work alone? Are there differences between gifted and non-identified students in their ideas about why people opt for different learning conditions? Students reported various explanations for differing learning preferences, including ability level, personality, popularity, perceived fairness of work distribution, and ability to tailor one's work. School-identified gifted students saw working preference as an attribute of personality more so than did other groups. Non-identified participants at elementary and high school levels appeared to have more difficulty articulating reasons why people might prefer to work alone versus with others, as compared to other school-identified gifted and high achieving students.

More broadly, at the elementary level, students who felt consistently supported selected popularity most in explaining why people might want to work alone or with others. Also, supported participants in general saw the ability to tailor work to their own interests or approach as a determining factor in this preference. Those who felt their work was only sometimes appreciated saw issues with others' ability levels or fairness of work distribution as a determining factor in learning preferences.

Research question four: Does perceived support influence learning preferences? With regard to social constructivism, do those who feel adequately supported in their learning tend to welcome opportunities to work with others, compared to those who do not feel supported? Based on the main hypothesis of this study, supported gifted students would prefer activities in which they worked with others. Support, as a variable alone and in interaction with group, was related to participants' choice (among a group of other options) to work alone and read. Those school-identified gifted students who did not feel supported chose an independent learning activity

(reading) more than did those who were more consistently supported. High achieving students who did not feel supported rated Renzulli Independent Study items most highly compared to all other groups. Finally, non-identified students who did not feel supported rated all learning activities lower than other groups.

Discussion

Do gifted prefer to work alone? Differences according to formal identification emerged in response to the question *do gifted students prefer to work alone?,* when asked in a traditional manner (i.e, using Likert-type items), and on one (new) suggested-choice item. School-identified gifted students preferred independent learning activities more so than did other groups. Perhaps the independent learning activities described were familiar to them; perhaps the described activities seemed like what they were accustomed to doing in school and had thus become more comfortable with them. Taking into account varying findings in response to later questions, I hesitate at this point in the discussion to offer explanations that reach any further beyond the data. This question is addressed further below.

Differences emerged with regard to sex and its interaction with group. Specifically, school-identified gifted girls at the JHHS level rated Independent Study more highly than did non-identified boys, and they also rated Peer Teaching as being more enjoyable than did school-identified gifted boys. It is possible that these higher ratings, on the whole, are a reflection of more socially conditioned, sex-related, people-pleasing behavior. Also, although giftedness was related to a greater preference to work alone for girls, they were also significantly more interested in Peer Teaching activities compared to self-identified gifted boys. This points to an inconsistency, or perhaps an overall greater enjoyment of various types of learning activities. Previous studies that did not tease apart male and female differences and that may have observed a stronger preference overall for gifted students to prefer working alone might not have

considered the relative meaning of girls' responses to these items compared to their responses to learning situations in general.

It has been suggested in past research (Eder, 1985; Lessinger & Martinson, 1961), the preference of girls to work with others may change at different ages (e.g., early adolescence versus late childhood and late adolescence). However, in the current study, the elementary school-identified gifted girls did not demonstrate the previously-discussed preference to work alone. Separate analyses did not reveal a stronger preference for school-identified gifted high school girls to work alone compared to those in junior high school. Perhaps instead, sex-related preferences are dependent upon students' area of giftedness (e.g., mathematics may not necessitate as much collaboration as a subject area such as comparative literature). This last variable was not considered in the current study, but is certainly a point of interest appropriate for future research.

In contrast to learning style preference differences, no difference was found between school-identified gifted and high achieving students and their non-identified peers in terms of whom they want to spend time with after school. As indicated by responses to a suggested-choice item, gifted participants do not indicate a preference to spend time alone after school any more than did non-identified participants. This corroborates previous research by Csikszentmihalyi, Rathunde, and Whalen (1993) and Enersen (1993) suggesting that, even if gifted students may spend time alone during and outside of school, they desire contact with peers (not necessarily same age peers) just as much as do their non-identified counterparts. However, high school students chose to have no companions more than did elementary students on the whole (see following pages for discussion).

Does how you ask the question matter? Likert-type items were first compared to the suggested-choice and open-ended questions. A positive relationship was established between the

LSI factors (based on Likert-type items) and several locally-developed suggested-choice and open-ended questions. However, this positive relationship was not noted across grades on open-ended responses involving working with one other person or in small groups and LSI items; a relationship would have been expected between this response and the Peer Teaching factor. But, one of the reasons for this is that they do not have true *peers* teaching them. Likert-type items may not be as sensitive to more specific preferences regarding the number of others with whom students like to work. This is important because students in different classroom cultures with the same IQ or high achievement may respond differently because of the current local context in their classroom.

One locally-developed suggested choice item (Read a Textbook) was not related to Renzulli (LSI) factors at the elementary level, nor was the open-ended Worst Learning situation. Perhaps some suggested-choice and open-ended items do not detect such a strong preference or aversion for different learning situations among elementary aged participants. Research which did not include suggested-choice or open-items yielded the finding that elementary level gifted students had a strong preference to work alone. That being said, given the mere nature of these different types of items, we would expect differences to occur.

Regardless of relative similarity of Likert-type items to the suggested-choice and open-ended items, responses to Likert-type items may have led to an overstatement of the strength of this learning preference because of the possibility of patterned responses. This conclusion is based on findings that the elementary school-identified gifted students did not demonstrate the same preference to work alone on suggested-choice or open-ended items as they did on Likert-type items. My results suggest that perhaps learning preference is stronger, or more consistent, or well-formed at higher grades, as JHHS school-identified gifted students. Consistent with earlier findings by Dunn and Price (1980), Griggs and Price (1980), and Dunn, Dunn, and Price (1978),

I found that with increasing age (or increasing grade) comes an increasing reported preference for working alone. As I speculated earlier, this shift might reflect an increasing understanding that one's own academic performance will be judged at the time of college applications. Perhaps a desire to compete against and outshine other students would become more pronounced as gifted students progress through higher grades. Or, this may be a function of the fact that elementary classroom cultures have more opportunities for a social organization which allows for the pursuit of individual projects compared to high school, where lectures and more highly defined assignments reign.

It is also possible that findings were not demonstrated on the open-ended items because the most important attributes of a learning situation should have been identified when asking students about most ideal and worst imagined learning situations. While many students described their ideal or worst imagined learning situations in sufficient detail, others just listed one attribute about the learning situations (e.g., what subject they were studying, where they were studying).

Why do students have different learning preferences? Students reported various explanations for differing learning preferences, including ability level, personality, popularity, perceived fairness of work distribution, and ability to tailor one's work. Similar to Ruf (2002), school-identified gifted students saw working preference as an attribute of personality more so than did other groups. If projective, perhaps this suggests that they see themselves as more introverted compared to students of different abilities. I speculate that the finding that high achieving students named fairness of work distribution as a contributor to working preference more so than did non-identified participants may be due to high academic motivation levels of those who are high achieving students, and their corresponding perception that others are not as

motivated to take on work. Or, these students may not see others as able, and so they feel obliged to take on more of the work.

Non-Identified participants at elementary and high school levels appeared to have more difficulty articulating reasons why people might prefer to work alone versus with others. This could suggest that (non-identified) students at the junior high school level have managed to reflect upon their elementary school experience. During junior high school (during the early part of the Piagetian formal operations years), they may be capable of metacognition and retrospective reflection on their elementary school experiences. But given new learning experiences at the junior high school level and beyond, high school students again struggle to make sense of why they and students in general have varying preferences. Additionally, the gifted group may be more able to articulate their reasoning compared to others. They may have more defined learning preferences, they may have reflected more on learning conditions which work best for them, they may be more able to speculate on reasons for others' learning preferences, and they may be more able to communicate these ideas more effectively in writing than other groups.

More broadly, at the elementary level, students who felt consistently supported noted popularity most in explaining why people might want to work alone or with others. If responses were projective, these individuals likely feel adequately popular, and thus perceive themselves as being adequately supported. Also, supported participants in general saw the ability to tailor work to their own interests or approach as a determining factor in this preference. Those who felt their work was only sometimes appreciated saw issues with others' ability levels or fairness of work distribution as a determining factor in learning preferences. Again, if responses were projective, students experiencing others as not as bright, or less motivated, may perceive themselves as being less supported.

Does perceived support influence learning preferences? School-identified gifted students' perceived level of support serves to strengthen--or exacerbate--their preference to work alone. This is consistent with the notion that working alone may be somewhat of a last resort for certain students, rather than a preference based entirely on learning styles. Based on the main hypothesis of this study, non-supported gifted students preferred activities in which they worked alone compared to those who felt supported. Support, in interaction with group, was related to participants' choice (among a group of other options) to work alone and read. As was expected, (sub)groups of respondents who did not feel supported rated Independent Study activities more highly, and chose working alone or reading more than did those who were more consistently supported.

More broadly, students who are judged to have lower aptitudes (i.e., non-identified students) and who are not supported may have more generally negative attitudes toward school-related activities. Both Peer Teaching and Independent Study activities were rated as least enjoyable for those students who were non-identified and not supported. The evidence suggests that support is critical, not only for gifted students, but perhaps especially for those who are not endorsed by a label speaking to their intelligence or aptitude. Regardless of how students are asked to learn academic material, teachers must encourage a supportive climate within their classrooms to foster greater appreciation of school by all students.

At the elementary level, students who felt consistently supported selected *popularity* most in explaining why people might want to work alone or with others. Also, supported participants saw the ability to tailor work to their own interests or approach as a determining factor in this preference. Those who felt their work was only sometimes appreciated saw issues with other ability levels or fairness of work distribution as a determining factor in learning preferences. If we see this as a projective item, it makes sense that participants who felt less support or

appreciation from others in their academic pursuits might attribute issues with others' ability or work ethic as a reason why they prefer to work alone. Popularity and an *ability to tailor work* are less academic in nature. Supported participants across groups may be better able to work comfortably with others' differences in ability in academic situations, because of having a history of being well-accommodated themselves. As suggested by Diezmann and Waters (2001), gifted students preferred collaborating with peers when the task was more difficult--when the task was challenging--these students felt well-supported when they worked with similarly able peers.

Summary

In conclusion, evidence exists that some gifted students prefer to work alone some of the time. Overall, school-identified gifted students exceed high achieving students in this preference. But formal identification does not seem to be the single determining factor predicting students' reported learning preferences. The strength of this preference seems to be dependent upon one's sex (i.e., gifted girls demonstrated the strongest preference) and grade level (i.e., it was less evident at the elementary level). Moreover, perceived support from others, which increases one's comfort in a social group, is significantly related to reported preferences for group work. In support of the main hypothesis of the present study, those students who did not feel consistently supported by others demonstrated a stronger, more consistent preference for working alone than did those who perceived being more supported. A general proclivity toward working alone in the gifted population is indeed strengthened, or exacerbated, by their social and learning environment. Also, attitudes toward learning activities across the board diminish for those mainstream students who do not feel supported. Social constructivism does provide a helpful lens through which to view learning preferences.

Original Contributions to Knowledge

Unlike past studies on learning preferences of gifted students, I examined student learning preferences both quantitatively and qualitatively across a wide range of grades (4 to12; elementary through late high school) and across sexes. Lessinger and Martinson (1961) looked at independent activities across these groups, but did not directly examine learning preferences. The current study also included a population of high achieving students in addition to traditionally-examined, school-identified gifted students (as well as a control group of non-identified students). Although academic attributes of these two populations are similar (Shore & Tsiamis, 1986), they indeed appear to differ in their preference to work alone or with others.

The majority of past research has involved surveys comprising only Likert-type items which may not adequately reveal the elements of students' ideal learning conditions. No item listed read simply "Learning alone," without other situational aspects described. Also, Likert-type items may be susceptible to patterned responses. For example, responses may speak to an underlying construct such as *attitude toward school* more than to distinct learning preferences. Studies in the past that did not detect differences between groups may not have examined this distinction. I attempted to tease out differences by accounting for this underlying construct.

Moreover, the current study included a series of open-ended and suggested-choice responses to yield richer data, and determine the strength of the purported preference to work alone. Another open-ended question was included to tap students' ideas as to why others may prefer to work alone rather than work with others. This was intended to both allow them to speculate on the reason for others' preferences, and to have the opportunity to project a reason for their own preferences. While non-identified students had difficulty articulating reasons for their or others' learning preferences, this item served as a useful tool to detect differences between the gifted and high achieving (not formally identified) students.

The main theoretical contribution of this study is to confirm the idea that social constructivism can provide a useful lens through which to understand purported learning preferences. The main hypothesis of this study was that gifted students who perceived support from others (peers, teachers and parents) in their academic pursuits would be more inclined to report a preference to work with others, given that others were meeting some of their academic and affective needs. The inverse of this hypothesis is that gifted students who did not feel supported would be the ones most likely to report a preference to work alone, given that their academic and affective needs were not being met by others. This relationship to perceived support was demonstrated in the current study. While correlated with the support variable used in the study, other variables (e.g., perceived popularity) may be also having an impact on students learning preferences, both actual and reported (in light of methodological issues discussed above). The current study demonstrated the necessity of examining issues such as learning preferences in a more context-specific manner, which should guide future research in this area.

Limitations of the Present Study and Future Directions

A number of analyses could not be run, due to insufficient numbers of participants in certain groups. While a sample size of 247 seems large, when conducting three-way analyses, an even larger sample may be necessary. Alternatively, the measure of support may not have been sensitive enough to differences in students' experiences of support. The response demand characteristics may have led some respondents to exaggerate the extent to which they were supported. It is possible that an intimate, one-to-one interview with the researcher would have yielded more honest, accurate data about perceived support. However, as I served as an academic counselor for some of the CTY respondents, an interview may have only worsened this exaggeration--this need to please. Researchers wishing to address this in the future may wish to conduct interviews with a subsample of participants to gather even richer data relating to this

construct of perceived support. Moreover, a more standardized qualitative methodology may have yielded slightly different codes adding to the richness of the findings. This, coupled with analyzing effect sizes of qualitative data (Onwuegbuzie, 2003), could help increase the confidence one has in reporting results related to learning preferences.

While one variable related to support was explored in the current study for the first time, others may have had an impact. For example, although popularity was removed from analyses to avoid redundancy with support variables, it was positively but not highly correlated with support variables in the current study. Cultural differences also emerged in earlier research. Therefore, it may be worthy of separate investigation as another variable having an impact on reported learning preferences. Moreover, while the main crux of this study was to consider support as a variable, an examination of preferences across grades, sexes, perceived support (variables) *and* groups (three- or four-way analyses) may have provided the most interesting information about the stability (or instability) of preferences.

Students' grade level was clustered by methods used in past research (elementary, junior high school, and high school). It is possible that an analysis using age or individual grades as interval variable might yield interesting data in terms of when, exactly, preferences change. These data were gathered through the current study, and will be analyzed separately. The survey did not, however, allow for the gathering of information on students' areas of giftedness, in order to determine whether giftedness in a given subject also impacts students' reported learning preferences. As noted in past research on sex differences within the gifted population, area of giftedness may provide an additional explanation for differences. Socioeconomic status was not highly varied. Fairfield is considered to be one of the most affluent towns in Connecticut, and although the Johns Hopkins University CTY has an outreach program targeting urban students who may not otherwise be able to afford the summer camp, the majority of students come from

affluent homes. However, with so many variables, power becomes a problem and larger sample sizes are needed.

Methodological, Theoretical and Practical Implications

Limitations aside, interesting findings emerged, yielding methodological, theoretical, and practical implications. The main methodological implication of this study is that different methods of questioning yield different responses, which may speak to the relative lack of strength of reported learning preferences in this case. In the current study, when information was not pre-generated in the item description, students were by-and-large less inclined to cite *working alone* as being part of a highly preferable learning situation. This has wide implications for survey research in general: How one asks the research question impacts the results one yields.

The main theoretical implications of this study are that gifted students differ depending on whether or not they are formally identified as gifted, and that learning preferences may rely on situational constraints. School-identified gifted students believed that one's personality results in a preference to work alone, and high achieving students attributed motivation to take on work as a reason for this preference. This is likely based on high achieving students' experience of being highly motivated in the classroom, which is what resulted in their academic success arguably more so than intelligence as quantified on a standardized IQ test. While some teachers, administrators, parents or politicians believe that all *gifted* students (whether identified through standardized testing or merely high performance in the classroom) can be similarly accommodated, this finding challenges that argument.

With regard to the initial re-visitation question, the strength of association between certain learning preferences and a child being labeled gifted (or not) is relatively weak. Moreover, when variables like sex are considered, learning preferences of gifted students are more inconsistent. Within the current study, an additional relationship between reported learning

styles and perceived support was demonstrated. This finding hints that a series of other variables beyond the scope of this study may be having an impact on students learning preferences, both actual and reported.

This finding regarding support implies that, as suggested by cooperative-learning proponents (Thorkildsen, 1994; Oakes, 1985; Slavin, 1991), under optimal conditions, an increased focus on teamwork and group accomplishment may, in fact, be beneficial to foster cognitive and social growth of all students, including gifted students. As it currently stands, a preference--albeit a mild to moderate preference--for working alone does emerge within the population of gifted students, and this is increased for those who do not feel supported by others. Given that this preference could be somewhat of a default or last resort in the face of an inadequate learning environment or in the absence of supportive others, classrooms need to continue moving toward a cooperative learning format. Homogeneous ability grouping may allow for greater perceived levels of appreciation in students, as has been suggested in past research. In other words, working with like-minded peers may lead to a more natural propensity to provide support to one another and to appreciate one another's work.

This may be why Robinson (1991) insisted that cooperative learning in the heterogeneous classroom should not be substituted for specialized programs and services for academically talented students, and that student achievement disparities within the group should not be too severe. However, if teachers work to emphasize students' strengths across ability groups, creating a climate of support and appreciation, it may not be necessary to only use homogeneous ability groups to make collaborative learning workable at least, and at best, an effective form of learning to address many of the needs of all students. As determined by results in this study, all students who did not perceive themselves as being supported were less positive about their

ratings of academic activities in general. All students, not just gifted students, could benefit from an improved, more supportive, classroom climate.

Beyond the classroom, the social development of gifted students and their classmates should have an impact on their future career success, as traditionally isolated career fields (e.g., laboratory science) are becoming increasingly more collaborative. For some students, support (such as counseling) and training to work with others may be necessary to prevent individuals with the strongest preference to work alone, or reluctance to work with others, to feel comfortable socially. The findings regarding support and learning preference certainly speak to the need for closer attention to students who work alone or isolate themselves, rather than to just continue stating, matter-of-factly and nonchalantly, that gifted students prefer to work alone.

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APPENDICES

Appendix B: Request to Conduct Research at JHU/CTY

May 20, 2004

To: Johns Hopkins University Center for Talented (CTY)Youth Research Review Board
Fr: Lisa R. French
Re: Request to advertise research to parents of CTY participants

Dear Members of the Research Review Board,

This letter is to request your permission to allow me to advertise my research to parents of CTY participants. My research examines the learning preferences of children in grades 4 through 12. I am conducting this project as part of my PhD research under the supervision of Professor Bruce M. Shore, in the School/Applied Child Psychology program of the Department of Educational and Counseling Psychology at McGill University in Montreal. One purpose of this study is to attempt to understand the ways in which learning preferences might affect students' daily learning activities at school and at home in general. Another purpose is to re-examine the long-held assertion that gifted children prefer to work alone. As such, I am recruiting identified gifted (and high-ability students, as well as non-identified students in regular education programs).

My study involves a learning style survey, which comprises items from the *Learning Style Inventory* (Renzulli & Smith, 1978), the *Piers-Harris Children's Self-Concept Scale* (Piers & Harris, 1996), and the *Personality and Interest Inventory* (Hildreth, 1936), as well as a few locally-developed items. Questions probe students' learning preferences in school and at home, with regard to various types of assignments and collaborators (peers, adults). As well, some questions regard students' social self-perceptions. No questions are considered intrusive, nor are they considered in any way psychologically risky. Moreover, students consent to participation (after their parents consent) and are allowed to withdraw from participation at any point without penalty. In order to encourage participation, a small incentive is offered (raffled movie tickets), but withdrawal from the study will not impact students' chance to receive the reward. As well, all data are confidential. Each participant will be assigned an identification code; no names or identifying information will be used. Only I will be privy to students' names; people in my lab helping me with the study will only see the data after identification codes have been assigned. As well, the primary emphasis of the survey analysis is on grouped data, illustrated with anonymous quotations where relevant, rather than individual or identifiable responses. These data will be used to research presentations or publications; upon request, parents will receive a copy of the completed research paper or a summary. Because of these factors, my project has been given full approval by the McGill University Ethics Committee.

In general, I believe findings of my research will inform future educational interventions for gifted and regular-education students; they will provide teachers with valuable information to aid in classroom activity selection, and give students themselves insight into their learning styles. In addition to providing information to support or refute my hypotheses, I am eager to provide any information to participants about learning preferences and needs, so that we might all benefit from this study. For your records, please find my approved dissertation proposal with the survey appended. As well, I have included a copy of the parent and student consent forms, for your review.

Thank you for your time and consideration. I look forward to hearing from you.

Sincerely,

Lisa French, Ph.D. (School/Applied Child Psychology) Candidate
Department of Educational and Counseling Psychology, Faculty of Education

encl.

Appendix C: Request to Conduct Research in Fairfield, CT

December 16, 2004

To: Fairfield, CT Board of Education
Fr: Lisa R. French
Re: Request to conduct research in Fairfield Public Schools

Dear Members of the Fairfield Board of Education,

This letter is to request your permission to allow me to conduct a small-scale study in Fairfield, CT about the learning preferences of children in grades 4 through 12. I am conducting this project as part of my PhD research under the supervision of Professor Bruce M. Shore, in the School/Applied Child Psychology program of the Department of Educational and Counseling Psychology at McGill University in Montreal. One purpose of this study is to attempt to understand the ways in which learning preferences might affect students' daily learning activities at school and at home in general. Another purpose is to re-examine the long-held assertion that gifted children prefer to work alone. As such, I am recruiting identified gifted and high-ability students, as well as non-identified students in regular education programs.

My study involves a learning style survey, which comprises items from the *Learning Style Inventory* (Renzulli & Smith, 1978), the *Piers-Harris Children's Self-Concept Scale* (Piers & Harris, 1996), and the *Personality and Interest Inventory* (Hildreth, 1936), as well as a few locally-developed items. Questions probe students' learning preferences in school and at home, with regard to various types of assignments and collaborators (peers, adults). As well, some questions regard students' social self-perceptions. No questions are considered intrusive, nor are they considered in any way psychologically risky. Moreover, students consent to participation (after their parents consent) and are allowed to withdraw from participation at any point without penalty. In order to encourage participation, a small incentive is offered (raffled movie tickets), but withdrawal from the study will not impact students' chance to receive the reward. As well, all data are confidential. Each participant will be assigned an identification code; no names or identifying information will be used. Only I will be privy to students' names; people in my lab helping me with the study will only see the data after identification codes have been assigned. As well, the primary emphasis of the survey analysis is on grouped data, illustrated with anonymous quotations where relevant, rather than individual or identifiable responses. These data will be used to research presentations or publications; upon request, parents will receive a copy of the completed research paper or a summary. Because of these factors, my project has been given full approval by the McGill University Ethics Committee.

So far, my study involves students from the Johns Hopkins University Center for Talented Youth, as well as students in a McGill sponsored summer enrichment program called Explorations. A few months ago, I spoke with Dr. Jeanne Purcell at the Connecticut Board of Education, and she agreed to collaborate with me on my project. She then referred me to Mrs. Laureen Mody, Gifted Education Specialist at Fairfield Schools. Mrs. Mody reviewed my project, and graciously agreed to collaborate with me as well. At this point, my project has also been reviewed and approved by Mrs. Maureen Minnick (Language Arts Specialist, Fairfield Woods Middle School) and Mr. Greg Hatzis (Housemaster, Fairfield Ludlowe High School). In total, I am looking for 150 identified gifted (and high-ability) participants, and 150 non-identified regular education participants evenly distributed across elementary, junior high school, and high school levels. In order to complete my subject pool, I

am looking to recruit participants from one to two classrooms in each grade, ranging from grade 4 to 12.

Mrs. Mody, Mrs. Minnick, and Mr. Hatzis have all identified classroom teachers who would be willing to accommodate my request. Specifically, my request is to give teachers parent consent forms to send home with their students, and collect completed forms. Then, I wish to take just 5 minutes of class time (during the month of February, or whenever possible) to present my study, and send students home with participant consent forms and surveys. Students will then use approximately 30 minutes of their free time, outside of school, to complete surveys; then they will return them to their teacher or me within a few days time. As parents provide me with contact information, I will conduct follow up telephone interviews (with parents' and students' consent) with a stratified random subset of participants, but this part does not require teacher or class time in any way.

In general, I believe findings of my research will inform future educational interventions for gifted and regular-education students; they will provide teachers with valuable information to aid in classroom activity selection, and give students themselves insight into their learning styles. Specific to Fairfield, I believe there will be additional benefits of my study. In speaking with Mr. Hatzis of Fairfield Ludlowe High School, I have learned that their Leveling Task Force is interested in examining learning styles of students across levels (low, middle, high, and mixed). As my study would involve students in classrooms across these levels, I would be able to provide valuable information to this end. I am providing the Johns Hopkins CTY program with information about their population of students, I would be more than happy to provide a separate report to Fairfield schools as well. In addition to providing information to support or refute my hypotheses, I am eager to provide any information to participants and participants' schools about learning preferences and needs, so that we might all benefit from this study.

For your records, please find my approved dissertation proposal with the survey appended. As well, I have included a copy of the parent and student consent forms, for your review. Upon meeting with the Board of Education, I will also provide a hard copy of my approved ethics application.

Thank you for your time and consideration. I look forward to hearing from you.

Sincerely,

Lisa French, Ph.D. (School/Applied Child Psychology) Candidate
Department of Educational and Counseling Psychology, Faculty of Education

encl.

Appendix D: Fairfield, CT Board of Education Presentation of Study

Fairfield BOE meeting outline, February 8, 2005

1. *Overview of study*
    a. **General textbooks** on gifted children make claim that **"gifted children prefer to work alone,"** but **research reveals mixed findings** on differences between gifted and non-identified learners in their learning preferences. **Differences found btwn sexes, and across ages; pilot data confirm these differences.**
    b. The **current study re-examines this notion more comprehensively**, both through **surveys** (like previous studies) and **interviews** with subset of population. Specifically, participants will respond to survey items regarding **preferred learning conditions**, learning-related personality characteristics, and **perceptions of teachers, parents, and peers support**. Participants will also have the opportunity to offer **ideas about ideal learning situations,** and their beliefs on whether gifted children indeed prefer to work alone.
    c. This study will attempt to confirm the **hypothesis that those gifted students who feel adequately supported by those in their environment will be less likely to indicate a preference for working alone, compared to those who do not feel supported.**

2. *How will this benefit Fairfield?*
    a. Specific to Fairfield, I have learned that their **Learning Task Force** is interested in examining learning styles of students across levels (low, middle, high, and mixed) in high school. My study will inform this mission.
    b. Upon receiving and analyzing survey data, I am willing to provide a **preliminary report** to Fairfield schools about findings related to their students.

3. *Request for participants*
    a. Ideally, looking for **150 identified gifted/high-ability** students and **150 non-identified** participants. So far, 60 gifted participants from JHU CTY summer camp.
    b. In Fairfield, 1-2 classes from grades 4 to 12. Mrs. Mody, Mrs. Minnick, and Mr. Hatzis have identified teachers who will accommodate my request.
    c. After receiving parental permission, I need **5 minutes of class time** to introduce study to students. I will then hand out surveys for them to complete at home. It will take them approximately **20 minutes to complete** surveys. Teachers will either collect surveys, or I will provide envelopes for them to mail them directly to me. Follow-up interviews will not involve teacher or classroom time at all, and only approximately 30 minutes of students' time. Both survey completion and interview participation are voluntary.

Appendix E: Thank You Letter to Fairfield, CT Board of Education

May 28, 2005

Dr. Ann Clark and BOE Members
Fairfield Board of Education
501 Kings Highway East, Suite 210
P.O. Box 320189
Fairfield, CT 06825

Dear Dr. Clark and Members of the Fairfield Board of Education,

I would like to thank you, a bit belatedly, for approving my study on learning preferences during the meeting on February 8, 2005. I was very impressed by the Board's reception and willingness to help me with my research.

I also wanted to give you an update on my work within the Fairfield schools. From May 9-11, 2005, I visited North Stratfield Elementary School and Fairfield Woods Middle School to hand out surveys and collect them the following day. I would like to acknowledge Ms. Maureen Minnick (FWMS) and Mr. Ian Banner's (NSES) hard work and cooperation before and during this data collection period. They both made my visit run smoothly, and they were very kind, welcoming, and accommodating to me. The same is true for Mr. Greg Hatzis at Fairfield Ludlowe High School, who has kindly and generously undertaken the majority of my data collection duties at his school. As well, he arranged my BOE meeting presentation, and has been extremely instrumental in making my data collection happen across schools. I would also like to acknowledge the cooperation and generosity of teachers in these schools.

Upon leaving the Fairfield area, I had over 100 completed surveys in hand, and they continue to come in via mail. I am very impressed by the amount of responses I received and continue to receive. I see that your students are generous with their time, and committed to helping others. I will not forget their contribution.

I will be in touch again once I have analyzed my data and have some feedback to report. I plan to dedicate most of the summer months to this effort; you can expect to hear from me again before I begin my internship in September, 2005.

Sincerely yours,
Lisa French
Ph.D. candidate
McGill University

CC: Mr. Greg Hatzis
Mr. Ian Banner
Ms. Maureen Minnick

Statement of Consent:

I give permission for my child to participate in the research project called: *Do Gifted Children Prefer to Work Alone? A Re-examination of the Longstanding Claim.*

I understand…

that this study is being conducted by Lisa French, under the supervision of Professor Bruce M. Shore in the Department of Educational and Counselling Psychology at McGill University.

the purpose of this pilot test, and that there are no anticipated risks or inconveniences.

that participation is voluntary and my child and I are free to withdraw from this pilot test at any time without penalty or prejudice.

that confidentiality will be maintained during this research project.

that the data will be presented in aggregated and totally anonymous form in publications and presentations of results.

Cut here

I have carefully studied the above and understand my participation in this agreement. I freely consent and voluntarily agree to my child's participation in the study *Do Gifted Children Prefer to Work Alone?: A Re-examination of the Longstanding Claim.*

First (Given) Name of child (please print) _____

Family Name of child (please print) _____

Child's Birth Date (MM-DD-YY) _____ Child's Sex (M or F) _____

Name of parent or guardian (please print) _____

E-mail Address: _____

Mailing Address: _____

_____

Parent's Signature _____ Date _____

Appendix G: Request for Research Participation for Fairfield, CT Students

March 21, 2004

Dear Parent or Guardian,

This letter is to request permission for your child's participation in the pilot test of a survey, to be used in an upcoming study about the learning preferences of gifted children. This study will also attempt to determine the extent to which these learning preferences affect the child's daily learning activities at school and in the home. This research may have important implications for future educational interventions for gifted children. The project is being conducted by Lisa French, under the supervision of Dr. Bruce M. Shore, Professor, School/Applied Child Psychology Program in the Department of Educational and Counselling Psychology at McGill University.

The purpose of pilot testing this survey is to see how well it addresses my research questions. All identifying information that is collected will remain confidential, as each participant will be assigned an identification code. No names or identifying information will be used. Notwithstanding, the primary emphasis of the survey analysis is on grouped data, rather than individual responses.

If you agree to participate, your child will be asked to complete a survey for approximately 30 minutes during the lunch period on **Monday, July 7th**. On this survey, each child will consider a variety of classroom and research activities, for which he or she will indicate on a scale of 1-5 whether it is a pleasant or unpleasant way to learn. Also, your child will respond to questions tapping his or her preferences for play activities and play partners. There are no anticipated risks or inconveniences to participants. Still, your child will be asked for verbal consent before participation, and will be free to stop participating at any time. Regardless of whether your child elects to fully complete the survey, he or she will be given a small reward at the completion of survey administration. Moreover, your child's name will be entered into a raffle for a $40 gift certificate to the HMV music store.

If it is deemed that the survey is adequate for use in the actual study, pilot test data will be included in later data analyses. In this case, data may be included in future presentations or publications, but no names will be associated with these data. Upon request, parents will receive a copy of the completed research paper.

I hope that you will consider allowing your child to participate in this project. If you agree to participate, please read and sign the attached consent form and return it to your child's teacher by **Friday, July 4th**. Thank you for your time!

Sincerely,
Lisa French, Ed.M.
Ph.D. Student in School/Applied Child Psychology
Department of Educational and Counselling Psychology

Bruce M. Shore, Ph.D.
Professor, School/Applied Child Psychology Program

Statement of Consent:

This is to state that I give permission for my child to participate in the pilot test of a survey for the following project: *Do Gifted Children Prefer to Work Alone?: A Re-examination of the Longstanding Claim.*

I understand that this pilot test is being conducted by Lisa French, under the supervision of Dr. Bruce M. Shore in the Department of Educational and Counselling Psychology at McGill University.

I understand the purpose of this pilot test, and that there are no anticipated risks or inconveniences.

I understand that participation is voluntary and my child and I are free to withdraw from this pilot test at any time without penalty or prejudice.

I understand that confidentiality will be maintained during this research project.

I understand the uses of this pilot data, especially with regard to informing survey development, publication, and dissemination of results.

∃ Cut here

I have carefully studied the above and understand my participation in this agreement. I freely consent and voluntarily agree to my child's participation in the pilot project *Do Gifted Children Prefer to Work Alone?: A Re-examination of the Longstanding Claim.*

Name of child (please print) _____

Child's age _____

Name of parent or guardian (please print) _____

Signature _____ Date _____

Appendix H: Request for Research Participation for CTY and Fairfield, CT Students

DEAR STUDENT,

I am a university student studying to be a school/child psychologist. As part of my program, I am doing a research project that will help teachers and parents better understand the ways children and adolescents prefer to learn (e.g., where? with whom?).

In order to answer questions as part of my project, I would like you to fill out the enclosed survey. In the first part of the survey, you will be asked to rate the learning activity as being relatively enjoyable or unenjoyable, on a scale of 1-5. There are no "right" or "wrong" answers here, your responses only indicate personal preferences. Altogether this will take about 30 minutes. In thanks for your participation, your name will be entered into a raffle to receive a gift certificate to your local movie theater.

Your parents have given permission for you to participate in this research. However, you do not have to participate if you don't want to. If you do want to participate, you will not have to answer any questions that you don't want to, and you can stop at any time.

Your responses on the survey are confidential. Only myself and the other people working on this research project will see your answers. The results of this research may be published or presented, but your name will not be used and no one will know that you participated in this project.

If you have any questions before completing the enclosed survey, please email me at lisa.french@mail.mcgill.ca.

If you agree to participate and do not have any questions, please fill in the information below, complete the attached survey, and **mail it in the enclosed pre-paid envelope** (CTY) or **return it to Lisa French in school tomorrow** (Fairfield). Thank you very much!!

I, _____, understand that the information I provide in the learning styles survey will be kept confidential, and I agree to participate.

Signature _____ Date _____

Appendix I: How I Like to Learn Survey

Participant Code: #_____ School:_____
Group :_____Program:_____

HOW I LIKE TO LEARN

adapted[1] by: Lisa French
Department of Educational and Counselling Psychology
McGill University

I am a (Circle one): Boy Girl

Date of Birth:_____

Grade (Circle one; if you are in between grades, please indicate the grade you just completed):

4 5 6 7 8 9 10 11 12

Parents' Jobs (if any): Mother_____ Father_____

Do you have brothers or sisters (Circle one)? Yes No

The information you give on this survey will help me to understand the ways you like to learn, and the ways you do not like to learn. This is not a test, and there are no "right" or "wrong" answers to any of the questions. Also, all of your answers are confidential. Please answer all of the questions, and respond to each item as honestly as you can.

Directions

This survey asks for your opinion about different classroom activities.

How enjoyable or not enjoyable do you find each one?

Please answer questions #1-16 on a scale of 1 to 5, where 1 = not enjoyable, 2 = mostly not enjoyable, 3 = somewhat enjoyable, 4 = mostly enjoyable, and 5 = very enjoyable.

Directions will be provided later for questions #17-46.

Turn Over to the Next Page →

1. **Going to the library with a group of people to look up information.**

1	2	3	4	5
Not Enjoyable				Very Enjoyable

2. **Having a friend help you learn material you are finding difficult to understand.**

1	2	3	4	5
Not Enjoyable				Very Enjoyable

3. **Studying on your own to learn new information.**

1	2	3	4	5
Not Enjoyable				Very Enjoyable

4. **Working with other students on a project with little help from the teacher.**

1	2	3	4	5
Not Enjoyable				Very Enjoyable

5. **Discussing class material with a group of other students.**

1	2	3	4	5
Not Enjoyable				Very Enjoyable

6. **Preparing, on your own, to make a presentation to the class.**

1	2	3	4	5
Not Enjoyable				Very Enjoyable

7. **Reading a book in order to learn all about some topic.**

1	2	3	4	5
Not Enjoyable				Very Enjoyable

Turn Over to the Next Page →

8. Working with other students on a project the teacher suggests.

1	2	3	4	5
Not Enjoyable				Very Enjoyable

9. Having a classmate teach you how to do something he or she is especially good at.

1	2	3	4	5
Not Enjoyable				Very Enjoyable

10. Working with other students to develop a project related to a topic you are studying.

1	2	3	4	5
Not Enjoyable				Very Enjoyable

11. Learning new information or how to solve a problem from another student in your class.

1	2	3	4	5
Not Enjoyable				Very Enjoyable

12. Preparing a written report with a group of people.

1	2	3	4	5
Not Enjoyable				Very Enjoyable

13. Working on your own on a project you choose yourself.

1	2	3	4	5
Not Enjoyable				Very Enjoyable

14. Working with a group of people to prepare a lesson to present to the class.

1	2	3	4	5
Not Enjoyable				Very Enjoyable

15. Working with other students in planning and completing a project.

1	2	3	4	5
Not Enjoyable				Very Enjoyable

Turn Over to the Next Page →

16. Doing research in the library for a paper you want to write.

1	2	3	4	5
Not Enjoyable				Very Enjoyable

17. In the table below, please tick off (√) the learning situations that you enjoy (or prefer) compared to the others listed.

☐ working one-on-one with an older student	☐ giving a presentation
☐ working one-on-one with a younger student	☐ listening to a presentation by a classmate
☐ working with boys	☐ listening to a teacher's presentation
☐ working with girls	☐ going to the library
☐ working with a group of students	☐ being involved in a discussion group with peers
☐ working alone	☐ working one-on-one with your teacher
☐ writing an exam	☐ working one-on-one with one of your parents
☐ working on a project	☐ working at home
☐ role-playing in class	☐ working in a different place (not home or school) (specify):_____
☐ reading a textbook	☐ working with another person (not teacher or parent) (specify):_____

18. Please describe your ideal (best possible or most enjoyable) kind of learning situation:

_____

_____

_____

_____

19. About how often do you experience your ideal kind of learning situation (as described in #18)? (Circle one)

1	2	3	4	5
Never	Once or twice a year	Several times a year	Once a month	Once a week or more

Turn Over to the Next Page →

20. Please describe your worst or least enjoyable kind of learning situation:

_____

_____

_____

_____

21. About how often do you experience your least enjoyable kind of learning situation (as described in #20)? (Circle one)

1	2	3	4	5
Never	Once or twice a year	Several times a year	Once a month	Once a week or more

22a. When you work in a group at school, do you get to choose your group?

No Sometimes Yes

22b. Whom do you usually get to work with? Please tick off (√) one:

☐ Classmates I like working with ☐ Classmates I do not like working with

23. Do you feel that people around you (for example, parents, teachers, or classmates) help you/encourage you in your learning?

No Sometimes Yes

24. Do you feel that you have enough resources (for example, books or computer programs) to help you in your learning?

No Sometimes Yes

25. Do you feel that people around you (for example, parents, teachers, or classmates) appreciate your work (think your work is valuable or important)?

No Sometimes Yes

For Items 26-37, please indicate whether you agree or disagree with each statement:

26. My classmates make fun of me.	Agree	Disagree
27. It is hard for me to make friends.	Agree	Disagree
28. I am shy.	Agree	Disagree
29. I am unpopular.	Agree	Disagree

Turn Over to the Next Page →

30. I feel left out of things.	Agree	Disagree
31. I am among the last to be chosen for games.	Agree	Disagree
32. My classmates in school think I have good ideas.	Agree	Disagree
33. I have many friends.	Agree	Disagree
34. People pick on me.	Agree	Disagree
35. In games and sports, I watch instead of play.	Agree	Disagree
36. I am popular with other young people.	Agree	Disagree
37. I am different from other people.	Agree	Disagree

38. Please circle your top 3 choices of people you *like* to be with during your free time. Please put a *line through* the 3 people you *do not like* to be with in your free time.

Older boys	Younger girls	Mother	No companions
Younger boys	Boys your own age	Father	Little children
Older girls	Girls your own age	Teacher	Other adults

39. Please circle your top 3 choices of the things you *like* to do during your free time. Please put a *line through* the 3 things you *do not like* to do during your free time.

Talk on the phone	Video/Computer games	Cook/bake	Watch movies
Play individual sports	Play team sports	Arts or crafts	Do email
Go out to eat with friends	Work on my hobby	Play with a friend	Read

40. I'd welcome your thoughts on why some students prefer to do things alone, and some students prefer to do things with others. How would you explain this difference? Why do you think this is so?

_____

_____

_____

_____

When you are finished, please return the completed survey to your teacher, or return it to Lisa French via mail using the envelope provided.

THANK YOU!

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[1] Survey items #1-16 were adapted from the *Learning Style Inventory* (Renzulli & Smith, 1978). Survey items #26-37 were adapted from the *Piers-Harris Children's Self-Concept Scale* (Piers & Harris, 1996). Survey item #38 was adapted from the *Personality and Interest Inventory* (Hildreth, 1936).

Appendix J: Original Survey Items Removed or Re-worded

(Removed) Some of the learning situations in Items 1-16 probably included things that you enjoy and things that you do not enjoy. Please describe any learning situation listed above that you would enjoy, if one aspect of it were different (e.g., "For instance, in Item 15, I would like planning and completing a project, but I would prefer to work on my own instead of with other students" or "For instance, in Item 4, I would like to work with other students on a project, but I'd prefer to have a lot of help from the teacher").

(Reworded) Please describe your ideal (best possible) learning situation, addressing the following questions: What subject are you studying? What kind of assignment are you working on? Are you working with anyone? If so, whom? Where are you working (e.g., at school, at home, at the library)? Is anyone helping you (e.g., teacher, parent, peer)?

Appendix K

Table 4.1

Mean Scores and Standard Deviations for Renzulli Learning Style Inventory (LSI) Factor Scores as a Function of Group, Gender and Work Appreciated for Elementary Students

		Renzulli LSI factors					
		Project		Peer Teaching		Independent Study	
Group		*M*	*SD*	*M*	*SD*	*M*	*SD*
Non-Identified Students							
Girls		33.50	(4.4)	10.78	(1.6)	13.56	(3.9)
	Not Appreciated	29.00	(--)	9.00	(--)	10.00	(--)
	Sometimes Appreciated	35.38	(4.1)	11.50	(1.4)	12.50	(4.9)
	Appreciated	32.33	(4.3)	10.33	(1.6)	14.89	(2.8)
Boys		31.00	(6.9)	10.38	(3.3)	13.85	(3.6)
	Not Appreciated	27.00	(2.8)	5.00	(--)	14.00	(--)
	Sometimes Appreciated	33.18	(5.9)	8.00	(3.5)	13.00	(4.6)
	Appreciated	32.61	(5.6)	11.78	(2.3)	14.11	(3.8)
Total		32.45	(5.6)	10.61	(2.4)	13.68	(3.8)
	Not Appreciated	27.00	(2.8)	7.00	(2.8)	12.00	(2.8)

	Sometimes Appreciated	33.18 (5.9)	10.55 (2.5)	12.64 (4.6)
	Appreciated	32.61 (5.6)	11.06 (2.0)	14.50 (3.3)
School-Identified Gifted Students				
Girls		32.40 (4.9)	10.50 (1.9)	16.30 (2.7)
	Not Appreciated	-- (--)	-- (--)	-- (--)
	Sometimes Appreciated	33.33 (5.7)	11.00 (1.0)	17.00 (2.0)
	Appreciated	32.00 (4.9)	10.29 (2.3)	16.00 (3.1)
Boys		30.80 (6.0)	8.63 (2.5)	15.88 (2.9)
	Not Appreciated	-- (--)	-- (--)	-- (--)
	Sometimes Appreciated	30.81 (1.4)	8.67 (1.2)	16.00 (2.6)
	Appreciated	30.80 (7.9)	8.60 (3.2)	15.80 (3.4)
Total		31.69 (5.3)	9.67 (2.4)	16.11 (2.7)
	Not Appreciated	-- (--)	-- (--)	-- (--)
	Sometimes Appreciated	32.07 (4.0)	9.83 (1.6)	16.50 (2.2)
	Appreciated	31.50 (6.1)	9.58 (2.7)	15.92 (3.1)
Total				
Girls		33.11 (4.5)	10.68 (1.7)	14.54 (3.8)
	Not Appreciated	29.00 (--)	9.00 (--)	10.00 (--)
	Sometimes Appreciated	34.82 (4.4)	11.36 (1.3)	13.73 (4.7)
	Appreciated	32.19 (4.5)	10.31 (1.9)	15.38 (2.9)
Boys		30.93 (6.5)	9.71 (3.1)	14.62 (3.5)
	Not Appreciated	25.00 (--)	5.00 (--)	14.00 (--)
	Sometimes Appreciated	29.07 (4.7)	8.33 (2.3)	14.50 (3.7)
	Appreciated	32.14 (7.0)	10.64 (2.9)	14.71 (3.6)

Total		32.17 (5.5)	10.27 (2.4)	14.57 (3.6)
	Not Appreciated	27.00 (2.8)	7.00 (2.8)	12.00 (2.8)
	Sometimes Appreciated	32.79 (5.2)	10.29 (2.2)	14.00 (4.3)
	Appreciated	32.17 (5.7)	10.47 (2.4)	15.07 (3.2)

Table 4.3

Mean Scores and Standard Deviations for Renzulli Learning Style Inventory (LSI) Factor Scores as a Function of Group, Gender and Work Appreciated for Junior High & High School Participants

		Renzulli LSI factors					
		Project		Peer Teaching		Independent Study	
Group		*M*	*SD*	*M*	*SD*	*M*	*SD*
Non-Identified Students							
Girls		30.90	(4.7)	10.48	(2.1)	11.86	(3.2)
	Not Appreciated	26.00	(--)	9.00	(--)	14.00	(--)
	Sometimes Appreciated	29.73	(3.3)	9.64	(2.1)	11.64	(3.1)
	Appreciated	31.94	(5.3)	11.12	(2.1)	11.88	(3.4)
Boys		28.79	(7.3)	10.03	(2.6)	9.74	(3.3)
	Not Appreciated	22.20	(9.7)	6.60	(2.7)	6.60	(3.2)
	Sometimes Appreciated	30.27	(6.6)	10.62	(2.2)	10.63	(3.1)
	Appreciated	29.25	(1.9)	11.25	(1.7)	9.00	(2.2)
Total		29.86	(5.9)	10.25	(2.4)	10.78	(3.4)
	Not Appreciated	32.00	(6.6)	7.00	(2.6)	7.83	(4.2)
	Sometimes Appreciated	27.76	(5.3)	10.28	(2.2)	10.98	(3.1)
	Appreciated	30.61	(6.0)	11.14	(2.0)	11.33	(3.4)

High Achieving Students				
Girls		29.47 (6.2)	10.56 (1.7)	11.47 (3.7)
	Not Appreciated	33.00 (--)	11.00 (--)	15.00 (--)
	Sometimes Appreciated	29.27 (6.2)	10.60 (2.0)	9.73 (3.7)
	Appreciated	29.44 (6.4)	10.50 (1.7)	12.72 (3.2)
Boys		31.11 (7.3)	11.11 (2.0)	13.67 (3.5)
	Not Appreciated	18.00 (--)	12.00 (--)	16.00 (--)
	Sometimes Appreciated	35.50 (5.8)	10.75 (2.9)	13.25 (4.5)
	Appreciated	30.00 (5.0)	11.25 (1.3)	13.50 (3.1)
Total		29.81 (6.4)	10.67 (1.8)	11.93 (3.7)
	Not Appreciated	25.50 (10.6)	11.50 (0.7)	15.50 (0.7)
	Sometimes Appreciated	30.58 (6.5)	10.63 (2.2)	10.47 (4.0)
	Appreciated	29.55 (6.1)	10.64 (1.6)	12.86 (3.1)
School-Identified Gifted Students				
Girls		29.86 (5.9)	11.20 (2.2)	14.23 (3.7)
	Not Appreciated	32.00 (6.6)	13.00 (1.0)	11.33 (2.5)
	Sometimes Appreciated	27.76 (5.3)	11.08 (1.9)	13.31 (3.5)
	Appreciated	30.61 (6.0)	11.07 (2.4)	14.96 (3.7)
Boys		28.50 (6.5)	9.34 (2.4)	13.35 (3.3)
	Not Appreciated	23.40 (9.8)	7.80 (1.9)	10.60 (3.8)
	Sometimes Appreciated	29.99 (6.5)	9.79 (2.9)	13.63 (3.3)
	Appreciated	28.30 (5.3)	9.31 (1.8)	13.71 (3.0)
Total		29.15 (6.2)	10.23 (2.5)	13.77 (3.5)
	Not Appreciated	26.62 (9.3)	9.75 (3.1)	10.88 (3.2)

	Sometimes Appreciated	29.08 (6.0)	10.31 (2.7)	13.50 (3.3)
	Appreciated	29.58 (5.8)	10.26 (2.3)	14.38 (3.4)
Total				
Girls		30.02 (5.6)	10.80 (2.1)	12.71 (3.8)
	Not Appreciated	31.00 (5.4)	11.80 (1.9)	12.60 (2.5)
	Sometimes Appreciated	38.89 (5.2)	10.49 (2.0)	11.46 (3.7)
	Appreciated	30.63 (5.9)	10.92 (2.1)	13.49 (3.7)
Boys		28.87 (6.8)	9.76 (2.5)	12.14 (3.7)
	Not Appreciated	22.36 (8.9)	7.64 (2.6)	9.27 (4.4)
	Sometimes Appreciated	30.63 (6.5)	10.27 (2.6)	12.17 (3.5)
	Appreciated	28.79 (4.9)	9.80 (1.9)	13.09 (3.3)
Total		29.50 (6.2)	10.34 (2.3)	12.46 (3.7)
	Not Appreciated	25.06 (8.8)	8.94 (3.1)	10.31 (4.1)
	Sometimes Appreciated	29.81 (5.9)	10.37 (2.3)	11.83 (3.6)
	Appreciated	29.98 (5.6)	10.54 (2.1)	13.36 (3.5)

Table 4.5

Mean Scores and Standard Deviations for Renzulli Learning Style Inventory (LSI) Factor Scores as a Function of Group and Grade

	Renzulli LSI factors					
	Project		Peer Teaching		Independent Study	
Group	*M*	*SD*	*M*	*SD*	*M*	*SD*
Non-Identified Students	30.74	(6.1)	10.43	(2.4)	11.82	(3.8)
Elementary Participants	32.44	(5.5)	10.75	(2.5)	13.72	(3.7)
Junior High Participants	29.63	(6.4)	10.33	(2.3)	11.03	(3.4)
High School Participants	30.36	(5.7)	10.06	(2.7)	10.13	(3.4)
School-Identified Gifted Students	29.63	(6.1)	10.13	(2.4)	14.12	(3.5)
Elementary Participants	31.69	(5.3)	9.67	(2.4)	16.11	(2.7)
Junior High Participants	30.10	(5.9)	10.17	(2.3)	13.66	(3.2)
High School Participants	28.34	(6.4)	10.27	(2.6)	13.80	(3.7)
Total	30.13	(6.1)	10.26	(2.4)	13.08	(3.8)
Elementary Participants	32.17	(5.4)	10.36	(2.5)	14.58	(3.6)
Junior High Participants	29.87	(6.1)	10.24	(2.3)	12.40	(3.6)
High School Participants	28.86	(6.2)	10.22	(2.6)	12.85	(3.9)

Table 5.1

Mean Scores and Standard Deviations for Renzulli Learning Style Inventory (LSI) Independent Study Scores as a Function of Locally-Developed Item Responses

	Renzulli LSI factors					
	Project		Peer Teaching		Independent Study	
Group	M	SD	M	SD	M	SD
Suggested Choice Item: Work Alone						
Elementary						
Selected	32.43	(5.4)	10.00	(2.5)	16.46	(2.6)
Not Selected	31.94	(5.7)	10.57	(2.3)	12.43	(3.4)
JH/HS						
Selected	28.33	(6.6)	10.18	(2.4)	14.02	(3.3)
Not Selected	31.09	(4.8)	10.58	(2.1)	10.58	(3.3)
Suggested Choice Item: Read						
Elementary						
Selected	30.78	(6.9)	9.33	(3.2)	16.44	(2.9)
Not Selected	32.49	(5.2)	10.48	(2.2)	14.15	(3.6)
JH/HS						
Selected	26.75	(8.8)	9.96	(2.7)	14.54	(3.9)
Not Selected	30.03	(5.3)	10.42	(2.2)	12.15	(3.5)

Open-ended Item: Best Learning Situation			
Elementary			
Working alone	30.00 (5.5)	9.00 (2.6)	17.33 (2.2)
Working with 1 or 2 others	31.38 (5.9)	10.25 (3.1)	14.38 (2.7)
Working with several peers	32.36 (5.4)	10.43 (2.6)	12.71 (4.1)
Working alone and with others	40.00 (--)	9.00 (--)	20.00 (--)
Not clear	33.28 (5.4)	10.94 (1.8)	14.37 (3.3)
JH/HS			
Working alone	26.53 (6.7)	9.59 (2.0)	14.59 (3.3)
Working with 1 or 2 others	29.91 (5.5)	10.64 (1.6)	12.82 (3.8)
Working with several peers	31.53 (5.1)	10.49 (2.2)	11.09 (3.5)
Working alone and with others	23.99 (7.1)	11.23 (2.5)	15.46 (3.4)
Not clear	27.93 (6.7)	9.71 (2.6)	12.30 (3.2)
Open-Ended Item: Worst Learning Condition			
Elementary			
Working alone	33.00 (5.7)	10.83 (2.2)	13.56 (3.5)
Working with 1 or 2 others	33.67 (8.5)	8.67 (2.5)	16.00 (4.0)
Working with several peers	30.80 (7.6)	10.60 (2.1)	17.00 (1.9)
Working alone and with others	29.00 (--)	8.00 (--)	10.00 (--)
Not clear	31.83 (4.8)	10.05 (2.6)	14.80 (3.8)
JH/HS			
Working alone	31.54 (5.5)	10.48 (2.0)	11.32 (3.7)
Working with 1 or 2 others	30.78 (3.5)	11.11 (1.9)	13.22 (4.2)
Working with several peers	27.44 (6.8)	10.39 (2.3)	15.26 (2.8)

Working alone and with others	31.13 (5.4)	10.00 (3.6)	10.25 (4.7)
Not clear	28.86 (6.2)	10.16 (2.5)	11.89 (3.2)

Table 6.1

Responses to Suggested Choice Learning Preference Questions for Elementary Students

	Work Alone		Read a Textbook	
	Selected	Not Selected	Selected	Not Selected
	N (%)	*N (%)*	*N (%)*	*N (%)*
Non-Identified Students				
Girls[b]	10 (53)	8 (42)	3 (16)	15 (79)
Not Appreciated	1 (100)	0 (0)	1 (100)	0 (0)
Sometimes Appreciated	4 (50)	4 (50)	3 (37)	5 (63)
Appreciated	6 (66)	3 (33)	0 (0)	9 (100)
Boys	5 (39)	8 (62)	1 (8)	12 (92)
Not Appreciated	1 (100)	0 (0)	0 (0)	1 (100)
Sometimes Appreciated	1 (33)	2 (67)	1 (33)	2 (67)
Appreciated	3 (33)	6 (67)	0 (0)	9 (100)
Total	15 (47)	16 (50)	4 (13)	27 (84)
Not Appreciated	1 (50)	1 (50)	0 (0)	2 (100)
Sometimes Appreciated	5 (45)	6 (55)	4 (36)	7 (64)
Appreciated	9 (50)	9 (50)	0 (0)	18 (100)
School-Identified Gifted Students				
Girls	5 (50)	5 (50)	1 (10)	9 (90)
Not Appreciated	-- (--)	-- (--)	-- (--)	-- (--)

	Sometimes Appreciated	2 (67)	1 (33)	0 (0)	3 (100)
	Appreciated	3 (43)	4 (57)	1 (14)	6 (86)
Boys		6 (75)	2 (25)	4 (50)	4 (50)
	Not Appreciated	-- (--)	-- (--)	-- (--)	-- (--)
	Sometimes Appreciated	3 (100)	0 (0)	1 (33)	2 (67)
	Appreciated	3 (60)	2 (40)	3 (60)	2 (40)
Total		11 (61)	7 (39)	5 (28)	13 (72)
	Not Appreciated	-- (--)	-- (--)	-- (--)	-- (--)
	Sometimes Appreciated	5 (83)	1 (17)	1 (17)	5 (83)
	Appreciated	6 (50)	6 (50)	4 (33)	8 (67)
Total					
Girls		15 (52)	13 (45)	4 (14)	24 (83)
	Not Appreciated	0 (0)	1 (100)	0 (0)	1 (100)
	Sometimes Appreciated	6 (55)	5 (45)	3 (27)	8 (73)
	Appreciated	9 (56)	7 (44)	1 (6)	15 (94)
Boys		11 (52)	10 (48)	5 (24)	16 (76)
	Not Appreciated	1 (100)	0 (0)	0 (0)	1 (100)
	Sometimes Appreciated	4 (67)	2 (33)	2 (33)	4 (67)
	Appreciated	6 (43)	8 (57)	3 (21)	11 (79)
Total[b]		26 (52)	23 (46)	9 (18)	40 (80)
	Not Appreciated	1 (50)	1 (50)	0 (0)	2 (100)
	Sometimes Appreciated	10 (59)	7 (41)	5 (29)	12 (71)
	Appreciated	15 (50)	15 (50)	4 (13)	26 (87)

Table 6.3

Responses to Suggested-Choice Learning Preference Questions for Junior High and High School Students

	Work Alone		Read a Textbook	
	Selected	Not Selected	Selected	Not Selected
	N (%)	*N (%)*	*N (%)*	*N (%)*
Non-Identified Students				
Girls	14 (48)	15 (52)	4 (14)	25 (86)
Not Appreciated	1 (100)	0 (0)	0 (0)	1 (100)
Sometimes Appreciated	4 (36)	7 (64)	3 (27)	8 (73)
Appreciated	9 (53)	8 (47)	1 (6)	16 (94)
Boys [b]	10 (32)	20 (65)	4 (13)	26 (84)
Not Appreciated[b]	2 (40)	2 (40)	2 (40)	2 (40)
Sometimes Appreciated	8 (36)	14 (64)	2 (9)	20 (91)
Appreciated	0 (0)	4 (100)	0 (0)	4 (100)
Total [b]	24 (40)	35 (58)	8 (13)	51 (85)
Not Appreciated[b]	3 (50)	2 (33)	2 (33)	3 (50)
Sometimes Appreciated	33 (36)	21 (64)	5 (15)	28 (85)
Appreciated	9 (43)	12 (57)	1 (5)	20 (95)
High Achieving Students				
Girls [b]	17 (49)	17 (49)	1 (3)	33 (94)
Not Appreciated	1 (100)	0 (0)	0 (0)	1 (100)

	Sometimes Appreciated	6 (40)	9 (60)	0 (0)	15 (100)
	Appreciated [b]	9 (50)	8 (44)	1 (6)	16 (89)
Boys		5 (56)	4 (44)	1 (11)	8 (89)
	Not Appreciated	1 (100)	0 (0)	1 (100)	0 (0)
	Sometimes Appreciated	2 (50)	2 (50)	0 (0)	4 (100)
	Appreciated	2 (50)	2 (50)	0 (0)	4 (100)
Total[b]		22 (50)	21 (48)	2 (5)	41 (93)
	Not Appreciated	2 (100)	0 (0)	1 (50)	1 (50)
	Sometimes Appreciated	8 (42)	11 (58)	0 (0)	19 (100)
	Appreciated[b]	11 (50)	10 (46)	1 (5)	20 (91)
School-Identified Gifted Students					
Girls		29 (66)	15 (34)	6 (14)	38 (86)
	Not Appreciated	2 (67)	1 (33)	1 (33)	2 (67)
	Sometimes Appreciated	7 (54)	6 (46)	2 (15)	11 (85)
	Appreciated	20 (71)	8 (29)	3 (11)	25 (89)
Boys		33 (67)	16 (33)	12 (25)	37 (75)
	Not Appreciated	4 (80)	1 (20)	2 (40)	3 (60)
	Sometimes Appreciated	13 (68)	6 (32)	7 (37)	12 (63)
	Appreciated	15 (63)	9 (38)	3 (13)	21 (88)
Total		62 (67)	31 (33)	18 (19)	75 (81)
	Not Appreciated	6 (75)	2 (25)	3 (37)	5 (63)
	Sometimes Appreciated	20 (63)	12 (38)	9 (28)	23 (72)
	Appreciated	35 (67)	17 (33)	6 (12)	46 (89)

Total					
Girls[b]		60 (56)	47 (44)	11 (10)	96 (89)
	Not Appreciated	4 (80)	1 (20)	1 (20)	4 (80)
	Sometimes Appreciated	17 (44)	22 (56)	5 (13)	34 (87)
	Appreciated[b]	38 (60)	24 (38)	5 (8)	57 (91)
Boys[b]		48 (54)	40 (45)	17 (19)	71 (80)
	Not Appreciated[b]	7 (64)	3 (27)	5 (46)	5 (46)
	Sometimes Appreciated	23 (51)	22 (49)	9 (20)	36 (80)
	Appreciated	17 (53)	15 (47)	3 (9)	29 (91)
Total[b]		108 (55)	87 (44)	28 (14)	167 (85)
	Not Appreciated[b]	11 (69)	4 (25)	6 (38)	9 (56)
	Sometimes Appreciated	40 (48)	44 (52)	14 (17)	70 (83)
	Appreciated [b]	55 (58)	39 (41)	8 (8)	86 (91)

Table 6.5

Responses to Suggested Choice Learning Preference Questions Across Grades

	Work Alone		Read a Textbook	
	Selected	Not Selected	Selected	Not Selected
	N (%)	*N (%)*	*N (%)*	*N (%)*
Non-Identified Students[b]	*39 (42)*	*51 (55)*	*12 (13)*	*78 (85)*
Elementary Participants	15 (47)	16 (50)	4 (13)	27 (84)
Junior High Participants	17 (39)	26 (59)	5 (11)	38 (86)
High School Participants	7 (44)	9 (56)	3 (19)	13 (81)
School-Identified Gifted Students	*73 (66)*	*38 (34)*	*23 (21)*	*88 (79)*
Elementary Participants	11 (61)	7 (39)	5 (28)	13 (72)
Junior High Participants	29 (62)	18 (38)	7 (15)	40 (85)
High School Participants	33 (72)	13 (28)	11 (24)	35 (76)
Total[b]	*134 (54)*	*110 (45)*	*37 (15)*	*207 (84)*
Elementary Participants[b]	26 (52)	23 (46)	9 (18)	40 (80)
Junior High Participants	55 (47)	60 (51)	13 (11)	102 (87)
High School Participants	53 (66)	27 (34)	15 (19)	65 (81)

Table 7.1

Responses to Suggested-Choice Extracurricular Companion Question for Elementary Students

	No Companion	
	Selected	Not Selected
	N (%)	*N* (%)
Non-Identified Students		
Girls[b]	0 (0)	18 (95)
Boys	2 (15)	11 (85)
Total[b]	2 (6)	29 (91)
School-Identified Gifted Students		
Girls	0 (0)	10 (100)
Boys	0 (0)	8 (100)
Total	0 (0)	18 (100)
Total		
Girls[b]	0 (0)	28 (97)
Boys	2 (10)	19 (91)
Total[b]	2 (4)	47 (94)

Table 7.2

Responses to Suggested Choice Extracurricular Companion for Junior High and High School Students

	No Companion	
	Selected	Not Selected
	N (%)	*N (%)*
Non-Identified Students		
Girls	3 (10)	26 (90)
Boys	4 (13)	27 (87)
Total	7 (12)	53 (88)
High Achieving Students		
Girls	4 (11)	31 (89)
Boys	3 (33)	6 (67)
Total	7 (16)	37 (84)
School-Identified Gifted Students		
Girls	10 (23)	34 (77)
Boys	17 (35)	32 (65)
Total	27 (29)	66 (71)
Total		
Girls	17 (16)	91 (84)
Boys	24 (27)	65 (73)
Total	41 (21)	156 (79)

Table 7.4

Responses to Suggested Choice Extracurricular Companion Question Across Grades

	No Companion	
	Selected	Not Selected
	N (%)	*N (%)*
Non-Identified Students[b]	*9 (10)*	*82 (89)*
Elementary Participants[b]	2 (6)	29 (91)
Junior High Participants	5 (11)	29 (89)
High School Participants	2 (13)	14 (88)
School-Identified Gifted Students	*27 (24)*	*84 (76)*
Elementary Participants	0 (0)	18 (100)
Junior High Participants	10 (21)	37 (79)
High School Participants	17 (37)	29 (63)
Total[b]	43 (17)	203 (82)
Elementary Participants[b]	2 (4)	47 (94)
Junior High Participants	18 (15)	99 (85)
High School Participants	23 (29)	57 (71)

Table 8.1

Responses of Elementary Participants to Locally-developed Open-Ended Learning Preference Questions: Best and Worst Learning Situations

	Codes[a]				
	1	2	3	4	5
	N (%)	*N (%)*	*N (%)*	*N (%)*	*N (%)*
Best Learning Situation					
Non-Identified Students					
Girls[b]	2 (11)	3 (16)	5 (26)	0 (0)	8 (42)
Not Appreciated	0 (0)	0 (0)	0 (0)	0 (0)	1 (100)
Sometimes Appreciated	1 (13)	2 (25)	3 (37)	0 (0)	2 (25)
Appreciated	1 (11)	1 (11)	2 (22)	0 (0)	5 (56)
Boys	1 (8)	2 (15)	5 (39)	0 (0)	5 (39)
Not Appreciated	0 (0)	1 (100)	0 (0)	0 (0)	0 (0)
Sometimes Appreciated	1 (33)	0 (0)	2 (67)	0 (0)	0 (0)
Appreciated	0 (0)	1 (11)	3 (33)	0 (0)	5 (56)
Total	3 (9)	5 (16)	10 (31)	0 (0)	13 (41)
Not Appreciated	0 (0)	1 (50)	0 (0)	0 (0)	1 (50)
Sometimes Appreciated	2 (18)	2 (18)	5 (46)	0 (0)	2 (18)
Appreciated	1 (6)	2 (11)	5 (28)	0 (0)	10 (56)
School-Identified Gifted Students					
Girls[b]	3 (30)	2 (20)	3 (30)	0 (0)	1 (10)
Not Appreciated	-- (--)	-- (--)	-- (--)	-- (--)	-- (--)
Sometimes Appreciated	0 (0)	0 (0)	1 (33)	0 (0)	1 (33)

	Appreciated	3 (42)	2 (29)	2 (29)	0 (0)	0 (0)
Boys		3 (38)	1 (13)	1 (13)	1 (13)	2 (25)
	Not Appreciated	-- (--)	-- (--)	-- (--)	-- (--)	-- (--)
	Sometimes Appreciated	2 (67)	0 (0)	0 (0)	0 (0)	1 (33)
	Appreciated	1 (20)	1 (20)	1 (20)	1 (20)	1 (20)
Total		6 (33)	3 (17)	4 (22)	1 (6)	3 (17)
	Not Appreciated	-- (--)	-- (--)	-- (--)	-- (--)	-- (--)
	Sometimes Appreciated	2 (33)	0 (0)	1 (17)	0 (0)	2 (33)
	Appreciated	4 (33)	3 (25)	3 (25)	1 (8)	1 (8)
Total						
Girls[b]		5 (17)	5 (17)	8 (28)	0 (0)	9 (31)
	Not Appreciated	0 (0)	0 (0)	0 (0)	0 (0)	1 (100)
	Sometimes Appreciated	1 (9)	2 (18)	4 (36)	0 (0)	3 (27)
	Appreciated[b]	4 (25)	3 (19)	4 (25)	0 (0)	5 (31)
Boys		4 (19)	3 (14)	6 (29)	1 (5)	7 (33)
	Not Appreciated	0 (0)	1 (100)	0 (0)	0 (0)	0 (0)
	Sometimes Appreciated	3 (50)	0 (0)	2 (33)	0 (0)	1 (17)
	Appreciated	1 (7)	2 (14)	4 (29)	1 (7)	6 (43)
Total[b]		9 (18)	8 (16)	14 (28)	1 (2)	16 (32)
	Not Appreciated	0 (0)	1 (50)	0 (0)	0 (0)	1 (50)
	Sometimes Appreciated[b]	4 (24)	2 (12)	6 (35)	0 (0)	4 (24)
	Appreciated	5 (17)	5 (17)	8 (26)	1 (3)	11 (37)

	Worst Learning Condition				
Non-Identified Students					
Girls[b]	8 (42)	1 (5)	1 (5)	1 (5)	7 (37)
Not Appreciated	1 (100)	0 (0)	0 (0)	0 (0)	0 (0)
Sometimes Appreciated	5 (63)	0 (0)	0 (0)	0 (0)	3 (37)
Appreciated	2 (22)	1 (11)	1 (11)	1 (11)	4 (44)
Boys	4 (31)	1 (8)	2 (15)	0 (0)	6 (46)
Not Appreciated	1 (100)	0 (0)	0 (0)	0 (0)	0 (0)
Sometimes Appreciated	0 (0)	1 (33)	0 (0)	0 (0)	2 (67)
Appreciated	3 (33)	0 (0)	2 (22)	0 (0)	4 (44)
Total[b]	12 (38)	2 (6)	3 (9)	1 (3)	13 (41)
Not Appreciated	2 (100)	0 (0)	0 (0)	0 (0)	0 (0)
Sometimes Appreciated	5 (46)	1 (9)	0 (0)	0 (0)	0 (0)
Appreciated	5 (28)	1 (6)	3 (17)	1 (6)	8 (44)
School-Identified Gifted Students					
Girls	4 (40)	0 (0)	2 (20)	0 (0)	3 (30)
Not Appreciated	-- (--)	-- (--)	-- (--)	-- (--)	-- (--)
Sometimes Appreciated[b]	1 (33)	0 (0)	0 (0)	0 (0)	1 (33)
Appreciated	3 (42)	0 (0)	2 (28)	0 (0)	2 (28)
Boys	2 (25)	1 (12)	0 (0)	0 (0)	5 (63)
Not Appreciated[b]	-- (--)	-- (--)	-- (--)	-- (--)	-- (--)
Sometimes Appreciated	0 (0)	0 (0)	0 (0)	0 (0)	3 (100)
Appreciated	2 (40)	1 (20)	0 (0)	0 (0)	2 (40)

Total		6 (33)	1 (6)	2 (11)	0 (0)	8 (44)
	Not Appreciated	-- (--)	-- (--)	-- (--)	-- (--)	-- (--)
	Sometimes Appreciated	1 (17)	0 (0)	0 (0)	0 (0)	4 (67)
	Appreciated	5 (42)	1 (8)	2 (17)	0 (0)	4 (33)
Total						
Girls		12 (41)	1 (3)	3 (10)	1 (3)	10 (35)
	Not Appreciated	1 (100)	0 (0)	0 (0)	0 (0)	0 (0)
	Sometimes Appreciated	6 (55)	0 (0)	0 (0)	0 (0)	4 (36)
	Appreciated[b]	5 (31)	1 (6)	3 (19)	1 (6)	0 (0)
Boys		6 (29)	2 (10)	2 (10)	0 (0)	11 (52)
	Not Appreciated	1 (100)	0 (0)	0 (0)	0 (0)	0 (0)
	Sometimes Appreciated	0 (0)	1 (17)	0 (0)	0 (0)	5 (83)
	Appreciated	1 (36)	1 (7)	2 (14)	0 (0)	6 (43)
Total[b]		18 (36)	3 (6)	5 (10)	1 (2)	21 (42)
	Not Appreciated	2 (100)	0 (0)	0 (0)	0 (0)	0 (0)
	Sometimes Appreciated6	(35)	1 (6)	0 (0)	0 (0)	9 (53)
	Appreciated	10 (33)	2 (7)	5 (17)	1 (3)	12 (40)

[a] *Code 1= Working alone, 2 = Working with 1 or 2 others, 3 = Working with several peers, 4 = Working alone and others ; 5 = Not clear*

[b] *Percentages that do not add up to 100% reflect the presence of missing data.*

Table 8.3

Responses to Locally-developed Open-Ended Learning Preference Questions: Best and Worst Learning Situation for Junior High and High School Students

	Codes[a]				
	1	2	3	4	5
	N (%)	*N (%)*	*N (%)*	*N (%)*	*N (%)*
Best Learning Situation					
Non-Identified Students					
Girls[b]	5 (17)	0 (0)	13 (45)	0 (0)	9 (31)
Not Appreciated	0 (0)	0 (0)	0 (0)	0 (0)	1 (100)
Sometimes Appreciated	2 (18)	0 (0)	5 (46)	0 (0)	4 (36)
Appreciated[b]	3 (18)	0 (0)	8 (47)	0 (0)	4 (24)
Boys[b]	2 (7)	1 (3)	13 (42)	0 (0)	11 (36)
Not Appreciated	0 (0)	0 (0)	1 (20)	0 (0)	3 (60)
Sometimes Appreciated[b]	1 (5)	0 (0)	11 (50)	0 (0)	7 (82)
Appreciated	1 (25)	1 (25)	1 (25)	0 (0)	1 (25)
Total[b]	7 (12)	1 (2)	26 (43)	0 (0)	20 (33)
Not Appreciated[b]	0 (0)	0 (0)	1 (17)	0 (0)	4 (67)
Sometimes Appreciated[b]	3 (9)	0 (0)	16 (49)	0 (0)	11 (33)
Appreciated[b]	4 (19)	1 (5)	9 (43)	0 (0)	5 (24)
High Achieving Students					
Girls[b]	1 (3)	7 (20)	16 (46)	6 (17)	4 (11)

	Not Appreciated	0 (0)	1 (100)	0 (0)	0 (0)	0 (0)
	Sometimes Appreciated	0 (0)	4 (27)	8 (53)	1 (7)	1 (7)
	Appreciated	1 (6)	2 (11)	8 (44)	4 (22)	3 (17)
Boys		1 (11)	3 (33)	4 (44)	1 (11)	0 (0)
	Not Appreciated	1 (100)	0 (0)	0 (0)	0 (0)	0 (0)
	Sometimes Appreciated	0 (0)	2 (50)	2 (50)	0 (0)	0 (0)
	Appreciated	0 (0)	1 (25)	2 (50)	1 (25)	0 (0)
Total[b]		2 (5)	10 (23)	20 (46)	7 (16)	4 (9)
	Not Appreciated	1 (50)	1 (50)	0 (0)	0 (0)	0 (0)
	Sometimes Appreciated[b]	0 (0)	6 (32)	10 (53)	1 (5)	1 (5)
	Appreciated	1 (14)	1 (14)	10 (46)	5 (23)	3 (14)
School-Identified Gifted Students						
Girls[b]		2 (5)	5 (11)	15 (34)	13 (30)	8 (18)
	Not Appreciated	0 (0)	0 (0)	2 (67)	0 (0)	1 (33)
	Sometimes Appreciated	0 (0)	1 (7)	8 (62)	2 (15)	2 (15)
	Appreciated[b]	2 (7)	4 (14)	5 (18)	11 (39)	5 (18)
Boy[sb]		6 (12)	6 (12)	16 (33)	6 (12)	14 (29)
	Not Appreciated	0 (0)	1 (20)	0 (0)	1 (20)	3 (60)
	Sometimes Appreciated[b]	1 (5)	3 (16)	5 (26)	4 (21)	5 (26)
	Appreciated	5 (21)	2 (8)	10 (42)	1 (4)	6 (25)
Total[b]		8 (9)	11 (12)	31 (33)	19 (20)	22 (24)
	Not Appreciated	0 (0)	1 (13)	2 (25)	1 (13)	4 (50)
	Sometimes Appreciated[b]	1 (3)	4 (13)	13 (41)	6 (19)	7 (22)
	Appreciated[b]	7 (14)	6 (12)	15 (29)	12 (23)	11 (22)

Total						
Girls[b]		8 (7)	12 (11)	44 (41)	19 (17)	21 (19)
	Not Appreciated	0 (0)	1 (20)	2 (40)	0 (0)	2 (40)
	Sometimes Appreciated[b]	2 (5)	5 (13)	21 (54)	3 (8)	7 (18)
	Appreciated[b]	6 (10)	6 (10)	21 (33)	15 (24)	12 (19)
Boys		9 (10)	10 (11)	33 (37)	7 (8)	25 (28)
	Not Appreciated[b]	1 (9)	1 (9)	1 (9)	1 (9)	6 (55)
	Sometimes Appreciated[b]	2 (4)	5 (11)	18 (40)	4 (9)	12 (27)
	Appreciated	6 (19)	4 (12)	13 (41)	2 (6)	7 (22)
Total[b]		17 (9)	22 (11)	77 (39)	26 (13)	46 (23)
	Not Appreciated[b]	1 (6)	2 (13)	3 (19)	1 (6)	8 (50)
	Sometimes Appreciated[b]	4 (5)	10 (12)	39 (46)	7 (8)	19 (23)
	Appreciated[b]	12 (13)	10 (11)	34 (36)	17 (18)	19 (20)
			Worst Learning Condition			
Non-Identified Students						
Girls[b]		12 (41)	1 (3)	3 (10)	1 (3)	10 (35)
	Not Appreciated	1 (100)	0 (0)	0 (0)	0 (0)	0 (0)
	Sometimes Appreciated	3 (27)	1 (9)	0 (0)	1 (9)	6 (55)
	Appreciated[b]	8 (47)	0 (0)	3 (18)	0 (0)	4 (24)
Boys[b]		14 (45)	1 (3)	2 (7)	1 (3)	11 (36)
	Not Appreciated	0 (0)	0 (0)	1 (20)	1 (20)	2 (40)
	Sometimes Appreciated[b]	12 (55)	0 (0)	1 (5)	0 (0)	8 (36)
	Appreciated	2 (50)	1 (25)	0 (0)	0 (0)	1 (25)

Total [b]		26 (43)	2 (3)	5 (8)	2 (3)	21 (35)
	Not Appreciated[b]	1 (17)	0 (17)	1 (17)	1 (17)	2 (33)
	Sometimes Appreciated [b]	15 (46)	1 (3)	1 (3)	1 (3)	14 (42)
	Appreciated	10 (48)	1 (5)	3 (14)	0 (0)	5 (24)
High Achieving Students						
Girls		14 (40)	1 (3)	6 (17)	3 (9)	11 (31)
	Not Appreciated	0 (0)	0 (0)	1 (100)	0 (0)	0 (0)
	Sometimes Appreciated	8 (53)	0 (0)	3 (20)	1 (7)	3 (20)
	Appreciated	6 (33)	0 (0)	2 (11)	2 (11)	8 (44)
Boys		3 (33)	1 (11)	5 (56)	0 (0)	0 (0)
	Not Appreciated	0 (0)	0 (0)	1 (100)	0 (0)	0 (0)
	Sometimes Appreciated	2 (50)	0 (0)	2 (50)	0 (0)	0 (0)
	Appreciated	1 (25)	1 (25)	2 (50)	0 (0)	0 (0)
Total		17 (39)	2 (5)	11 (25)	3 (7)	11 (25)
	Not Appreciated	0 (0)	1 (50)	1 (50)	0 (0)	0 (0)
	Sometimes Appreciated	10 (53)	0 (0)	5 (26)	1 (5)	3 (16)
	Appreciated	7 (32)	1 (5)	4 (18)	2 (9)	8 (36)
School-Identified Gifted Students						
Girls[b]		11 (25)	3 (7)	15 (34)	2 (5)	12 (27)
	Not Appreciated	0 (0)	0 (0)	1 (33)	0 (0)	2 (67)
	Sometimes Appreciated	7 (54)	0 (0)	4 (31)	0 (0)	2 (15)
	Appreciated[b]	4 (14)	3 (11)	10 (36)	2 (7)	8 (29)
Boys[b]		13 (27)	2 (4)	15 (31)	1 (2)	17 (35)
	Not Appreciated	0 (0)	0 (0)	1 (20)	0 (0)	4 (80)

	Sometimes Appreciated[b]	4 (21)	0 (0)	8 (42)	1 (5)	5 (26)
	Appreciated	9 (38)	2 (8)	5 (21)	0 (0)	8 (33)
Total[b]		24 (26)	5 (5)	30 (32)	3 (3)	29 (31)
	Not Appreciated	0 (0)	0 (0)	2 (25)	0 (0)	6 (75)
	Sometimes Appreciated[b]	11 (34)	0 (0)	12 (38)	1 (3)	7 (22)
	Appreciated[b]	13 (25)	5 (10)	15 (29)	2 (4)	16 (31)
Total						
Girls[b]		37 (34)	5 (5)	24 (22)	6 (6)	33 (31)
	Not Appreciated	1 (20)	1 (20)	1 (20)	0 (0)	2 (40)
	Sometimes Appreciated	18 (46)	1 (3)	7 (18)	2 (5)	11 (28)
	Appreciated[b]	18 (29)	3 (5)	15 (24)	4 (6)	20 (32)
Boys[b]		30 (34)	4 (5)	22 (25)	2 (2)	28 (32)
	Not Appreciated[b]	0 (0)	0 (0)	3 (27)	1 (9)	6 (55)
	Sometimes Appreciated[b]	18 (40)	0 (0)	11 (24)	1 (2)	13 (29)
	Appreciated	12 (38)	4 (13)	7 (22)	0 (0)	9 (28)
Total[b]		67 (34)	9 (5)	46 (23)	8 (4)	61 (31)
	Not Appreciated[b]	1 (6)	1 (6)	4 (25)	1 (6)	8 (50)
	Sometimes Appreciated[b]	36 (43)	1 (1)	18 (21)	3 (4)	24 (29)
	Appreciated[b]	30 (32)	7 (7)	22 (23)	4 (4)	29 (31)

[a] *Code 1= Working alone, 2 = Working with 1 or 2 others, 3 = Working with several peers, 4 = Working alone and others, 5=Not clear*

[b] *Percentages that do not add up to 100% reflect the presence of missing data.*

Table 8.5

Responses to Locally-developed Open-Ended Learning Preference Questions: Best and Worst Learning Situation Across Grades

	Codes[a]				
	1	2	3	4	5
	N (%)	*N (%)*	*N (%)*	*N (%)*	*N (%)*
Best Learning Situation					
Non-Identified Students[b]	*10 (11)*	*6 (7)*	*36 (39)*	*0 (0)*	*33 (36)*
Elementary Participants	3 (9)	5 (16)	10 (31)	0 (0)	13 (41)
Junior High Participants[b]	7 (16)	1 (2)	18 (41)	0 (0)	14 (32)
High School Participants[b]	0 (0)	0 (0)	8 (50)	0 (0)	6 (38)
School-Identified Gifted Students[b]	*14 (13)*	*14 (13)*	*35 (32)*	*20 (18)*	*25 (23)*
Elementary Participants	9 (18)	8 (16)	14 (28)	1 (2)	16 (32)
Junior High Participants	5 (11)	7 (15)	17 (36)	6 (13)	12 (13)
High School Participants[b]	3 (7)	4 (9)	14 (30)	13 (28)	10 (22)
Total[b]	*26 (11)*	*30 (12)*	*91 (37)*	*27 (11)*	*62 (25)*
Elementary Participants	9 (18)	8 (16)	14 (28)	1 (2)	16 (32)
Junior High Participants[b]	12 (10)	18 (15)	46 (39)	8 (7)	28 (24)
High School Participants[b]	5 (6)	4 (5)	31 (39)	18 (23)	18 (23)
Worst Learning Situation					
Non-Identified Students[b]	*38 (41)*	*4 (4)*	*8 (9)*	*3 (3)*	*34 (37)*
Elementary Participants	26 (43)	2 (3)	5 (8)	2 (3)	21 (35)

Junior High Participants[b]	20 (46)	2 (5)	4 (9)	1 (2)	14 (32)
High School Participants[b]	6 (38)	0 (0)	1 (6)	1 (6)	7 (44)
School-Identified Gifted Students[b]	*30 (27)*	*6 (5)*	*32 (29)*	*3 (3)*	*37 (33)*
Elementary Participants	6 (33)	1 (6)	2 (11)	0 (0)	8 (44)
Junior High Participants	16 (34)	4 (9)	14 (30)	2 (4)	11 (23)
High School Participants[b]	8 (17)	1 (2)	16 (35)	1 (2)	18 (29)
Total[b]	*85 (34)*	*12 (5)*	*51 (21)*	*9 (4)*	*82 (33)*
Elementary Participants[b]	18 (36)	3 (6)	5 (10)	1 (2)	21 (42)
Junior High Participants[b]	49 (42)	8 (7)	22 (19)	6 (5)	29 (25)
High School Participants[b]	18 (23)	1 (1)	24 (30)	2 (3)	32 (40)

Table 9.1

Responses of Elementary Participants to Locally-Developed Open-Ended Learning Preference Questions: Reason for Learning Preference

	Codes[a,b]					
	1	2	3	4	5	6
	N (%)	*N (%)*	*N (%)*	*N (%)*	*N (%)*	*N (%)*
Non-Identified Students						
Girls[b]	*2 (11)*	*4 (21)*	*3 (16)*	*0 (0)*	*5 (26)*	*0 (0)*
Not Appreciated[b]	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)
Sometimes Appreciated	2 (25)	2 (25)	1 (13)	0 (0)	2 (25)	0 (0)
Appreciated	0 (0)	2 (22)	2 (22)	0 (0)	3 (33)	1 (11)
Boys	*2 (15)*	*1 (8)*	*5 (39)*	*1 (8)*	*2 (15)*	*2 (15)*
Not Appreciated	1 (100)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)
Sometimes Appreciated	1 (33)	0 (0)	1 (33)	1 (33)	0 (0)	0 (0)
Appreciated	1 (11)	4 (44)	0 (0)	0 (0)	2 (22)	0 (0)
Total[b]	*4 (13)*	*5 (16)*	*8 (25)*	*1 (3)*	*7 (21)*	*3 (9)*
Not Appreciated[b]	1 (50)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)
Sometimes Appreciated[b]	3 (27)	2 (18)	2 (18)	1 (9)	2 (18)	0 (0)
Appreciated[b]	0 (0)	3 (17)	6 (33)	0 (0)	5 (28)	3 (17)

		School-Identified Gifted Students					
Girls[b]		*1 (10)*	*1 (10)*	*1 (10)*	*0 (0)*	*5 (50)*	*0 (0)*
	Not Appreciated	-- (--)	-- (--)	-- (--)	-- (--)	-- (--)	-- (--)
	Sometimes Appreciated	1 (33)	1 (33)	0 (0)	0 (0)	0 (0)	0 (0)
	Appreciated[b]	0 (0)	1 (14)	0 (0)	0 (0)	5 (71)	0 (0)
Boys		*2 (25)*	*1 (12)*	*0 (0)*	*1 (13)*	*0 (0)*	*3 (38)*
	Not Appreciated	-- (--)	-- (--)	-- (--)	-- (--)	-- (--)	-- (--)
	Sometimes Appreciated	2 (67)	0 (0)	0 (0)	1 (33)	0 (0)	0 (0)
	Appreciated[b]	0 (0)	1 (20)	0 (0)	0 (0)	0 (0)	3 (60)
Total[b]		*3 (17)*	*2 (11)*	*1 (6)*	*1 (6)*	*5 (28)*	*3 (17)*
	Not Appreciated	-- (--)	-- (--)	-- (--)	-- (--)	-- (--)	-- (--)
	Sometimes Appreciated[b]	3 (50)	1 (17)	0 (0)	1 (17)	0 (0)	0 (0)
	Appreciated	0 (0)	1 (8)	1 (8)	0 (0)	5 (42)	3 (25)
		Total					
Girls[b]		*3 (10)*	*5 (17)*	*4 (14)*	*0 (0)*	*10 (35)*	*1 (3)*
	Not Appreciated	-- (--)	-- (--)	-- (--)	-- (--)	-- (--)	-- (--)
	Sometimes Appreciated[b]	3 (27)	3 (27)	1 (9)	0 (0)	2 (18)	0 (0)
	Appreciated[b]	0 (0)	2 (13)	3 (19)	0 (0)	8 (50)	1 (6)
Boys[b]		*4 (19)*	*2 (10)*	*5 (24)*	*2 (10)*	*2 (10)*	*5 (24)*
	Not Appreciated	1 (100)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)
	Sometimes Appreciated	3 (50)	0 (0)	1 (17)	2 (33)	0 (0)	0 (0)
	Appreciated	0 (0)	2 (14)	4 (29)	0 (0)	2 (14)	5 (36)
Total[b]		*7 (14)*	*7 (14)*	*9 (18)*	*2 (4)*	*12 (24)*	*6 (12)*
	Not Appreciated[b]	1 (50)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)

Sometimes Appreciated [b]	6 (35)	3 (18)	2 (12)	2 (12)	2 (12)	0 (0)
Appreciated [b]	0 (0)	4 (13)	7 (23)	0 (0)	10 (33)	6 (20)

[a] *Code 1= Ability levels, 2 = Personality, 3 = Popularity, 4 = Fairness of Work Distribution ; 5 = Ability to Tailor Content; 6 = Vague.*

[b] *Percentages that do not add up to 100% reflect the presence of missing data.*

Table 9.3

Responses of Junior High and High School Participants to Locally-Developed Open-Ended Learning Preference Question: Reason for Learning Preference

	Codes[a]					
	1	2	3	4	5	6
	N (%)	*N (%)*	*N (%)*	*N (%)*	*N (%)*	*N (%)*
Non-Identified Students						
Girls[b]	*3 (10)*	*8 (28)*	*3 (10)*	*1 (3)*	*4 (14)*	*7 (24)*
Not Appreciated	0 (0)	1 (100)	0 (0)	0 (0)	0 (0)	0 (0)
Sometimes Appreciated	2 (19)	4 (36)	1 (9)	0 (0)	0 (0)	4 (36)
Appreciated[b]	1 (6)	3 (18)	2 (12)	1 (6)	4 (24)	3 (18)
Boys[b]	*1 (3)*	*4 (13)*	*4 (13)*	*3 (10)*	*5 (16)*	*8 (26)*
Not Appreciated[b]	0 (0)	1 (20)	1 (20)	0 (0)	0 (0)	2 (40)
Sometimes Appreciated[b]	1 (5)	3 (14)	3 (14)	2 (9)	5 (23)	5 (23)
Appreciated[b]	0 (0)	0 (0)	0 (0)	1 (25)	0 (0)	1 (25)
Total[b]	*4 (7)*	*12 (20)*	*7 (12)*	*4 (7)*	*9 (15)*	*15 (25)*
Not Appreciated[b]	0 (0)	2 (33)	1 (17)	0 (0)	0 (0)	2 (33)
Sometimes Appreciated[b]	3 (9)	7 (21)	4 (12)	2 (6)	5 (15)	9 (27)
Appreciated	1 (5)	3 (14)	2 (10)	2 (10)	4 (19)	4 (19)
High Achieving Students						
Girls	*4 (11)*	*7 (20)*	*7 (20)*	*8 (23)*	*3 (9)*	*1 (3)*
Not Appreciated	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	1 (100)

	Sometimes Appreciated[b]	2 (13)	4 (27)	4 (27)	2 (13)	2 (13)	0 (0)
	Appreciated[b]	2 (11)	2 (11)	3 (17)	6 (33)	1 (6)	0 (0)
Boys		*3 (33)*	*2 (22)*	*1 (11)*	*2 (22)*	*1 (11)*	*0 (0)*
	Not Appreciated	0 (0)	1 (100)	0 (0)	0 (0)	0 (0)	0 (0)
	Sometimes Appreciated	1 (25)	1 (25)	0 (0)	2 (50)	0 (0)	0 (0)
	Appreciated	2 (50)	0 (0)	1 (25)	0 (0)	1 (25)	0 (0)
Total[b]		*7 (16)*	*9 (21)*	*8 (18)*	*10 (23)*	*4 (9)*	*1 (2)*
	Not Appreciated	0 (0)	1 (50)	0 (0)	0 (0)	0 (0)	1 (50)
	Sometimes Appreciated[b]	3 (16)	5 (26)	4 (21)	4 (21)	2 (11)	0 (0)
	Appreciated[b]	4 (18)	2 (9)	4 (18)	6 (27)	2 (9)	0 (0)
		School-Identified Gifted Students					
Girls[b]		*6 (14)*	*14 (32)*	*4 (9)*	*8 (18)*	*8 (18)*	*2 (5)*
	Not Appreciated	1 (33)	2 (67)	0 (0)	0 (0)	0 (0)	0 (0)
	Sometimes Appreciated	2 (15)	3 (23)	1 (7)	3 (23)	2 (15)	2 (15)
	Appreciated[b]	3 (11)	9 (32)	3 (11)	5 (18)	6 (21)	0 (0)
Boys		*4 (8)*	*13 (27)*	*7 (14)*	*3 (6)*	*7 (14)*	*4 (8)*
	Not Appreciated[b]	0 (0)	1 (20)	0 (0)	0 (0)	2 (40)	1 (20)
	Sometimes Appreciated[b]	2 (11)	5 (26)	2 (11)	2 (11)	2 (11)	1 (11)
	Appreciated[b]	2 (8)	7 (29)	5 (21)	0 (0)	3 (13)	1 (4)
Total[b]		*10 (11)*	*27 (29)*	*11 (12)*	*11 (12)*	*15 (16)*	*6 (7)*
	Not Appreciated[b]	1 (13)	3 (38)	0 (0)	0 (0)	2 (25)	1 (13)
	Sometimes Appreciated[b]	4 (13)	8 (25)	3 (9)	5 (16)	4 (13)	4 (13)
	Appreciated[b]	5 (10)	16 (31)	8 (15)	5 (10)	9 (17)	1 (2)

		Total					
Girls[b]		*13 (12)*	*29 (27)*	*14 (13)*	*17 (16)*	*15 (14)*	*10 (9)*
	Not Appreciated	1 (20)	3 (60)	0 (0)	0 (0)	0 (0)	1 (20)
	Sometimes Appreciated	6 (15)	11 (28)	6 (15)	5 (13)	4 (10)	6 (15)
	Appreciated[b]	6 (10)	14 (22)	8 (13)	12 (19)	11 (18)	11 (18)
Boys[b]		*8 (9)*	*19 (21)*	*12 (14)*	*8 (9)*	*13 (15)*	*12 (14)*
	Not Appreciated[b]	0 (0)	3 (27)	1 (9)	0 (0)	2 (18)	1 (20)
	Sometimes Appreciated[b]	4 (9)	9 (20)	5 (11)	6 (13)	7 (16)	7 (16)
	Appreciated[b]	4 (13)	7 (22)	6 (19)	1 (3)	4 (13)	2 (6)
Total[b]		*21 (11)*	*48 (24)*	*26 (13)*	*25 (13)*	*28 (14)*	*22 (11)*
	Not Appreciated[b]	1 (6)	6 (38)	1 (6)	0 (0)	2 (13)	4 (25)
	Sometimes Appreciated[b]	10 (12)	20 (24)	11 (13)	11 (13)	11 (13)	13 (16)
	Appreciated[b]	10 (11)	21 (22)	14 (15)	13 (14)	15 (16)	5 (5)

[a] *Code 1= Ability levels, 2 = Personality, 3 = Popularity, 4 = Fairness of Work Distribution, 5 = Ability to Tailor Content, 6 = Vague.*

[b] *Percentages that do not add up to 100% reflect the presence of missing data.*

Table 9.5

Responses to Locally-developed Open-Ended Learning Preference Question: Reason for Learning Preference, Across Grades

	Codes[a]					
	1	2	3	4	5	6
	N (%)	*N (%)*	*N (%)*	*N (%)*	*N (%)*	*N (%)*
Non-Identified Students[b]	*8 (9)*	*17 (19)*	*15 (16)*	*5 (5)*	*16 (17)*	*18 (20)*
Elementary Participants	4 (7)	12 (20)	7 (12)	4 (7)	9 (15)	15 (25)
Junior High Participants	3 (7)	9 (21)	5 (11)	4 (9)	7 (16)	9 (21)
High School Participants[b]	1 (6)	3 (19)	2 (13)	0 (0)	2 (13)	6 (38)
School-Identified Gifted Students[b]	*13 (12)*	*29 (26)*	*12 (11)*	*12 (11)*	*20 (18)*	*9 (8)*
Elementary Participants[b]	3 (17)	2 (11)	1 (6)	1 (6)	5 (28)	3 (17)
Junior High Participants[b]	3 (6)	13 (28)	9 (19)	5 (11)	9 (19)	2 (4)
High School Participants[b]	7 (15)	14 (30)	2 (14)	6 (13)	6 (13)	4 (9)
Total[b]	*28 (11)*	*55 (22)*	*35 (14)*	*27 (11)*	*40 (16)*	*28 (11)*
Elementary Participants	7 (14)	7 (14)	9 (18)	2 (4)	12 (24)	6 (12)
Junior High Participants[b]	11 (9)	28 (24)	21 (18)	13 (11)	18 (15)	12 (10)
High School Participants[b]	10 (13)	20 (25)	5 (6)	12 (15)	10 (13)	10 (13)

[a] *Code 1= Ability levels, 2 = Personality, 3 = Popularity, 4 = Fairness of Work Distribution, 5 = Ability to Tailor Content, 6 = Vague.*

[b] Percentages that do not add up to 100% reflect the presence of missing data.