Myth Busting: High-Performance Students Rarely Prefer to Work Alone

Cheryl L. Walker

Department of Educational and Counselling Psychology

McGill University, Montreal

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Contributions of Authors

This thesis is the combination of two articles currently submitted for publication (Walker, Shore, & French, 2010; Walker & Shore, 2010). The first article is a review article, whereas the second article is the empirical follow-up. The literature review of the empirical article contains a condensed review of the literature. As first author for both of these articles, my role included researching relevant literature, refining the research question and methodology, developing the questionnaire and interview items, recruiting participants, conducting statistical analyses, condensing and interpreting the results, and writing the manuscript. My supervisor and co-author Professor Bruce M. Shore assisted with the conceptualization, extensive editing of style, flow, grammatical structure, and coherence of both manuscripts. Through several conversations, Bruce also guided me throughout the research process, helping me to clarify my ideas and synthesize my findings. Lisa R. French was an additional co-author on the review article and her research was the springboard for that manuscript. She also assisted with the final proofreading.

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Abstract

Through the topic of cooperative and collaborative learning, the need for refinement of definitions and expanded methodologies is identified. Past research narrowly focused on only one or two variables of interest, often ignored contextual variables, and has been limited by the use of forced-choice survey data. Research that adopts a social-learning or social-constructivist theoretical framework can help to overcome some of these limitations by considering the context of the learning environment and taking into account individual differences. Some research has moved in this direction, although more is needed that integrates such theories into both research questions and methodology. The current study expands on this research to determine some of the more nuanced learning preferences of these students. Sixty-nine high- and average-performance students in Grade 5 and Grade 6 participated. A questionnaire comprising 26 locally-developed items, including some items adapted from previous learning-style related research, addressed students learning preferences. Nine students were interviewed after the completion of the questionnaire to gather further information regarding their answers. Although there were some indications of a preference for high-ability students to work alone, there was substantial evidence to support their preferences for working with others. These preferences were quite complex and varied depending on the learning situation. Sex differences also emerged.

Résumé

Le besoin de peaufiner les définitions et les méthodologies développées est identifié par le biais de l'apprentissage par coopération ou collaboration. Dans le passé, la recherche s'est surtout consacrée à l'étude d'une ou deux variables d'intérêt, ignorant fréquemment les variables contextuelles, et s'est trouvée limitée par l'utilisation de réponses imposées par le questionnaire. La recherche adoptant un point de vue théorique lié à l'apprentissage social ou au socio-constructivisme peut aider à passer outre certaines de ces limitations en considérant le contexte de l'environnement d'apprentissage et en tenant compte des différences individuelles. Quelques travaux ont déjà exploré ces pistes, quoiqu'il faille pousser plus loin afin d'intégrer pareilles théories dans les questionnaires de recherche ainsi que dans la méthodologie. La présente étude approfondit ce domaine de recherche afin de déterminer quelles sont les préférences plus nuancées dans l'apprentissage chez ces élèves. Soixante-neuf étudiants de cinquième et sixième années primaires situés dans la moyenne ou à un niveau supérieur y ont participé. Un questionnaire de 26 questions élaborées localement, incluant certaines questions tirées de l'ancienne méthode de recherche dans le domaine, abordait les méthodes d'apprentissage préférées des élèves. Neuf étudiants ayant rempli le questionnaire ont ensuite été interviewés afin d'amasser plus d'information au sujet de leurs réponses. Quoiqu'il appert que les élèves plus performants préfèrent travailler seuls, les données colligées ont aussi montré une tangente préférentielle au travail avec les autres. Ces préférences étaient assez complexes, et dépendaient de la situation d'apprentissage. Des différences liées au sexe des participants ont aussi émergé.

Introduction to the Manuscripts

This collection of manuscripts was inspired by the PhD dissertation of Lisa R. French. French (2007) examined the longstanding assumption that gifted individuals prefer working alone. Specifically, she explained differing responses regarding preferences for working alone when this question was asked in several ways, both fixed and open-ended. Gifted students more often selected "Work Alone" when asked with traditional Likert-style items, however, this preference was not significant when asked in a more open-ended format. Preferences were also affected by the social and learning environment, highlighting the importance of considering contextual variables of the educational environment.

Research is lacking specifically addressing some of the contextual variables that affect learning preferences. The current study aimed to gather more information about these learning preferences across different contexts and ability levels by developing a more open-ended instrument. The first manuscript is a literature review summarizing what has been done in the areas of cooperative and collaborative learning, and more broadly, learning preferences, and identifies the gaps in which there is limited information. The second manuscript addresses those gaps in our knowledge regarding learning preferences of high-performance and community-school students through the presentation and interpretation of empirical data.

The first manuscript is presented in the format in which it was submitted to the journal *High Ability Studies*. The second manuscript is presented in complete draft form for submission to *Gifted Child Quarterly,* however, it will be shortened and submitted once the review article can be appropriately cited. The literature review for the second manuscript briefly summarizes the first manuscript, with a recommendation to read the first for a more comprehensive review. References for each manuscript heavily overlapped and were therefore merged.

Chapter 1

A Theoretical Context for Examining Students' Preferences Across Ability Levels for Learning Alone or in Groups

Refining Definitions

There are many varied definitions for giftedness, cooperative and collaborative learning, and learning preferences, many of which are characterized by a very global set of expressions and concerns. This makes research in the area difficult to conduct, difficult to analyze, and difficult to interpret.

Giftedness. There are multiple meanings of the term "giftedness" and there is a recognizable difficulty in defining such a construct due to several associated synonyms including high ability, aptitude, and talent. Difficulty also arises due to conflicting theoretical and practical uses of the term, along with differing emotional reactions that each term evokes such as the negative connotation of elitism that is often associated with the term giftedness (Mönks & Katzko, 2005). Mönks and Katzko overviewed four main groups of definitions including giftedness as a trait, as a cognitive component, as a factor of achievement and performance, and finally as a construct that is influenced by environmental factors. Based on previous literature, they defined giftedness as "an individual potential for exceptional or outstanding achievements in one or more domains" (p. 191).

Gruber (1998) similarly addressed the difficulties in defining giftedness due to overlapping domains, specifically regarding the common misconception that creativity and giftedness are the same construct. The lack of precision and lack of consensus about the meaning of giftedness led Borland (2005) to propose that there should be no conception of giftedness at all. However, if we are clear about the particular characteristics of giftedness that

we are examining and the context in which these apply, then the catch-all term "gifted" can still be useful to draw attention to a larger set of characteristics.

As an additional example of how giftedness can be operationalized within the literature, Renzulli (2002) reviewed previous definitions and proposed a conception of giftedness that focuses on three clusters of traits. These traits include above-average ability, creativity, and task commitment, all of which characterize a "gifted" individual. This directly contradicts Gruber's notion of creativity and giftedness as separate constructs, and provides further evidence for the challenge of establishing consistent definitions for the term.

Difficulties with definitions contribute to the currently identifiable gap in the literature regarding gifted learners and how they prefer to learn. There has not been an open-ended investigation of the learning preferences of gifted individuals; a comprehensive picture of specific contextual factors that contribute to the different and complex learning preferences of gifted individuals is needed. Some studies have begun to address these subtleties (French, 2007), although the addition of greater precision regarding the processes being examined, along with the consideration of contextual variables, will allow for more meaningful statements about how gifted children prefer to learn.

As will be discussed, some of the more recent literature has begun to consider contextual variables along with individual differences. For example, the Integrated Curriculum Model (ICM) emphasizes advanced content, encourages higher-order thinking, focuses on real-world applications, and has been proposed for gifted learners in particular (VanTassel-Baska, 2003). Recognizing contextual variables when implementing this model is of critical importance. One contextual variable includes maintaining flexibility, which refers to the recognition of existing skills, learning rates, and special interests. Other variables for consideration include grouping of

students, the level of training among teachers, and finally, considering the climate of excellence, which refers to the combination of educational standards with challenging opportunities.

Cooperative and collaborative learning. Although collaborative and cooperative learning are not the focus of this review, they do provide one lens through which the key issues can be introduced and examined, as they are often the focus of investigations regarding gifted individuals' learning preferences. Collaborative, cooperative, and more recently, inquiry activities, are widely advocated for gifted students, although with important qualifications. For cooperative learning in particular, Nelson, Gallagher, and Coleman (1993) surveyed 314 members from several cooperative learning and gifted education associations (e.g., the National Association for Gifted Children) and discovered that proponents of both cooperative learning and gifted education expressed the need for further staff development, research, and information on cooperative learning. Furthermore, the need for a variety of strategies in the classroom was stressed as a requirement to meet the needs of all students. Similarly, Robinson (1991) reviewed the literature and determined that high-ability students' motivation levels were affected by the type of task, as well as the effort levels of group members. She also provided recommendations for implementing cooperative learning with gifted students. For example, cooperative learning should not replace differentiated gifted programs, gifted students should be provided with opportunities for acceleration within cooperative-learning settings, the differences in achievement levels among group members should not be large, and, finally, opportunities to work individually also need to be provided so as not to overuse techniques of cooperative learning.

There have been extensive reviews regarding the effectiveness of cooperative and collaborative learning amongst gifted students, but more detailed information is required

regarding not only the effectiveness of cooperative and collaborative learning, but about learning preferences more generally. Working with others is an important aspect of any curriculum, and by reframing the existing questions concerning whether gifted students prefer working with others, the literature can benefit from added precision, specifically, under what circumstances do these students prefer working with others? This section, therefore, will describe cooperative and collaborative learning in general, as well as some of the qualities of these environments. Examples from within the literature will highlight ways in which students of varying abilities may differ in terms of their preferences, and also in terms of the context-dependent effectiveness with which they learn.

A good example of an introduction to the topic of cooperative learning was provided by Johnson, Johnson, and Holubec (1993), who included chapters on relevant research, basic elements of cooperative learning, and how to teach skills of cooperation, among others. They defined cooperative learning as "the instructional use of small groups so that student's work together to maximize their own and each other's learning" (p. 6).

Collaborative learning differs from cooperative learning. Based on several discussions among scholars who participated in a series of collaborative-learning workshops, Dillenbourg (1999) broadly defined collaborative learning as "a situation in which two or more people learn or attempt to learn something together" (p. 1). However, he did recognize that this definition is unsatisfactory and that there are multiple ways to interpret its meaning, illustrating the difficulty of defining the construct. Dillenbourg went on to state that "a situation is termed 'collaborative' if peers are more or less at the same level, can perform the same actions, have a common goal and work together" (p. 7). He clearly differentiated the two terms in a description of division of labour within group work. Cooperative learning involves the expectation that every group

member has a task to complete within the group, whereas collaborative groups work together on the larger task. Collaborative learning also involves a certain degree of interaction, synchronous communication, and negotiation (Dillenbourg, 1999).

Collaborative learning has similar characteristics to that of an inquiry-learning environment. Inquiry instruction is an active process of learning through problem solving, dialog, as well as generating and answering higher-order questions. A role shift also occurs between students and teachers, and among students. Gifted students not only are well suited to inquiry, but they also tend to seek out and subsequently thrive within these environments. Although appropriate implementation of inquiry in the classroom can be quite challenging for teachers, one of the essential components of inquiry involves the use of open-ended questions, especially when these questions are generated by the students themselves (Aulls & Shore, 2008).

Although an inquiry-based educational framework is ideal for gifted individuals, the efficacy of cooperative-learning frameworks for the success of gifted individuals is controversial. There are several different cooperative learning models implemented by teachers. Coleman and Nelson (2009) thoroughly reviewed cooperative learning, specifically in reference to gifted individuals and provided a useful overview of the four most common models. The Johnson and Johnson model (1994) refers to cooperative learning that emphasizes social skills and meaningful contributions from every group member. Students are assigned to groups and within each group, are assigned particular roles. Within this model, the construction of groups containing students of similar ability levels (heterogeneous groups) is emphasized.

The Slavin model (1995) refers to cooperative learning that is more focused on content, individual accountability, and motivators in the form of competition between teams or groups. Within each group, students work at their own pace through the learning activities. The Kagan

model (1985) refers to cooperative learning that encourages active participation of group members, individual assessment, and incentives in the form of group rewards. This is accomplished through various structured activities, such as Think-Pair-Share activities, involving individual reflection, discussion with a partner, and sharing to the class or group. The final model briefly discussed was that of Sharan and Sharan (1992), in which cooperative learning involves presenting one large problem to an entire class. Students are then allowed to form their own groups to tackle an aspect of the problem, and later present their findings to the class. This model does not use any reward incentives.

Teachers may use techniques from several of these models and such eclecticism can be a strength when the models are selectively used to optimally fit the content and group composition in a given lesson. However, it can be quite difficult to apply a theoretical model to the practical classroom (Coleman & Nelson, 2009). For example, the model or elements of models chosen may not be an optimal fit to the learning situation, particularly with gifted learners. Coleman and Nelson cited their own previous work to the effect that gifted students expressed concerns relating to: not being heard within the group, a lack of help to finish a project, anxiety about being accepted or liked within the group, being held back by other members, always being asked for the answers, and also lower grades due to lesser contributions of other group members. This last concern often occurs within teacher-selected heterogeneous groups, but it can also apply to self-selected groups of friends.

These deterrents to successful group work have been examined in a number of studies of cooperative learning that address different learning contexts and content. For example, with regard to context, the unequal contributions of team members contributes to what is known as the "free-rider effect" (Orbell & Dawes, 1981), in which a member or several members of a group

take advantage of the efforts of others in order to limit the amount of work they have to complete, but still take credit for the final outcome. A "sucker" refers to a member or several members of a group who complete all or most of the work for the group. In reference to some of his previous research, Slavin (1995) explained how the free-rider effect within cooperative learning groups can negatively impact student achievement through a diffusion of responsibility, and went on to overview other relevant studies about cooperative learning's impact on achievement.

Social cues may also mediate the relationship between the free-rider effect and group dynamics, which can in turn influence achievement outcomes. Schnake (1991) summarized social cues as informal comments made subtly by particular members of a group, which can then impact another person's attitudes and perceptions about a task. He empirically examined these social cues by assigning 140 undergraduate business majors who wished to participate in the study as an extra-credit assignment, to one of six groups. Each group completed a task related to the stock market and were told they would receive 30 bonus points. The study consisted of one 30-minute trial work period, followed by a two-hour work period. In the conditions containing social cues, confederates created the impression that they would withhold effort during the activity. For example, during the work trial period, the first confederate stated loudly, "This sounds boring to me. I'm not going to break my back doing this kind of work," followed by the second confederate who loudly replied, "You're right. This doesn't sound like much fun to me either." Punishment and goal-setting were also of interest to determine if decreased performance due to the sucker effect is counteracted by the presence of punishment and specific, challenging goals. Punishment was also administered during the trial work period and in this instance, the supervisor walked over to one of the confederates and stated out loud that the work was not up to

the level of the others and therefore he would not receive the 30 bonus points, and if he wanted to continue, he would only receive 20 bonus points. The confederate passively accepted and continued working. The conditions included a social cues and punishment group, a social cues and goal setting group, and various other control groups. Negative social cues contributed to lower task performance, although the development of challenging goals and, to a lesser extent, vicarious punishment helped to counteract the effects.

This indicated that the desire to avoid becoming a sucker was quite strong, even in situations where individual performance was measured. Understanding the contributing factors to the free-rider effect can lead to improved cooperative group dynamics. For example, understanding social cues can influence who students choose to work with during an educational activity, which in turn can affect interpersonal relationships within the classroom. However, caution should be taken in interpreting these results because the social cues in the conditions were stated loudly and publicly, as opposed to subtly, and there may also be a self-selection bias due to fact that these people were motivated to obtain extra credit for their course.

The free-rider effect can also be reduced by adjusting pedagogy. In an example that addressed both process and specific content factors, Garfield (1993) reviewed several cooperative learning techniques within the domain of statistics and suggested that these cooperative learning groups could benefit if students were first asked to solve the problem individually—and, as will be discussed later, gifted students have sometimes expressed this preference—and then compare and discuss answers with other group members. This creates a relationship in which the evaluation of one's performance is less dependent on that of another's, thereby mitigating the risk of the free-rider effect. Garfield also suggested applying the "Jigsaw Method" (Aronson, Blaney, Stephin, Sikes, & Snapp, 1978) in which every member of a group

learns something new and is then responsible for teaching the other members of the group—another example of how a combination of individual and group work can be beneficial in reducing the presence of free riders.

Learning preferences. There are issues that arise when some gifted individuals work in cooperative learning situations, but there is still a lack of research that actually asks about the learning preferences of these children. Although it is critical to know and understand their opinions regarding working in a cooperative learning situation for example, it is also important to understand their individual learning preferences more generally. Student learning preferences will be defined as "student choices of the type of classroom structure with which they prefer to work to accomplish academic goals—whether in cooperation with their peers, in competition with their peers, or having no involvement with their peers" (Johnson & Engelhard, 1992, p. 385). In addition to some of the previously mentioned disadvantages of the free-rider effect, this phenomenon is also often believed to contribute to gifted individuals' assumed preference for working alone, to avoid becoming a "sucker." However, blanket assumptions for working alone need to be more carefully considered before coming to such conclusions.

More careful considerations need to include an examination of the process of cooperative learning, in addition to the content of the activity. Anticipating Slavin's (1995) focus on achievement, VanTassel-Baska, Landrum, and Peterson (1992) argued that many conclusions regarding the effectiveness of cooperative learning are based on achievement outcomes as opposed to understanding the process while it is underway. By focusing on achievement outcomes, process variables are overlooked and only inferences can be made regarding which parts of the process lead to desirable outcomes. By either querying students about the process or directly observing it in action, or ultimately both, the definition of what works in cooperative

learning must address both the process and the outcome. Coleman (2005) examined the process of cooperative learning in greater depth. Some suggestions for improvement included the use of open-ended tasks, allowing students to work at their own pace, allowing alternatives, and encouraging the use of technology. To facilitate the success of all students within cooperative learning situations, tasks need to be flexible, challenging, and include several levels of difficulty and choice. Without these components, gifted students in particular may be negatively impacted. Teachers are primarily responsible for creating successful cooperative-learning situations. Success requires planning, time, reflection, supervision, and skills in troubleshooting and problem-solving. This is why it becomes very important to understand the dynamics of students' learning preferences in varying contexts, especially when selecting groups in the classroom.

Refining Methodologies

In addition to the need to refine definitions of giftedness and learning processes in cooperative environments, it is necessary to re-examine the methods by which learning and learning preferences are studied. Similar to the issue of broad definitions, there is emerging evidence that the current view of children's learning preferences is oversimplified. Examining specific contextual factors can provide insight into the different and complex learning preferences of gifted individuals. For example, the effects of group work depend on many factors including group organization, the task, the individual group members who participate, and the accountability of the group and its individual members (Blumenfeld, Marx, & Soloway, 1996). Furthermore, many studies have grouped students into relatively broad categories (e.g., based on ability levels), as though each category comprised a uniform group across contexts such as school subject, or the type of group activity. In many cases, students are grouped together on the basis of their ability alone. One question that has been asked repeatedly in the literature is,

do students perform better academically when the group is homogeneous—in other words, when there are similar ability levels among children, or do students perform better academically when the group is heterogeneous—that is, when there is a range of abilities among the children? Often inaccurate generalizations result when students are grouped globally based on ability alone.

During the 1990s, a debate raged regarding the benefits of these homogeneous versus heterogeneous groupings for gifted students, however, current evidence has emerged that this debate could be well informed by greater precision and different approaches to the question. In the early stages of the debate, many of the researchers attempted to determine which form of grouping was better for gifted individuals, but this led to an array of mixed findings. For example, Feldhusen and Moon (1992) raised concerns about heterogeneous grouping and its impact on underachievement. Concerns included decreased motivation with tasks that were too easy or too difficult, potentially leading to limited progress for gifted individuals. Furthermore, homogeneous grouping was summarized as more beneficial for gifted individuals due to increased academic performance, and the ability to have unique needs met. Some of these needs included complex instruction and unstructured learning environments. Feldhusen and Moon also distinguished between two important types of homogeneous groups. They defined tracking as "assignment to a special sequence or program of classes with other students of similar general ability for a relatively long period of time," and grouping as "a flexible process, based mainly on prior achievement levels in particular curricular areas" (pp. 64-65). Providing specific operational definitions for constructs such as "ability," differentiating similar terms, and being more precise about the context can help alleviate some of the methodological issues that often lead to inaccurate generalizations.

In addition to the difficulty of determining which form of grouping is more beneficial for

gifted individuals, many research studies have only focused on one or two key dependent variables such as achievement (Baer, 2003; Melser, 1999), self-esteem (Melser, 1999), or satisfaction (e.g., Coleman & Gallagher, 1995). For example, Coleman and Gallagher (1995) completed case studies within two different groups of schools. The first group of schools was recruited for their focus on meeting the needs of gifted students in the form of differentiated curriculum, teacher education, and program evaluation. This group of schools only included middle schools, but with a wide range of gifted services (e.g., gifted students in cluster groups and gifted students in separate classes). The second group of schools was recruited for their focus on providing opportunities for, and addressing the needs of, gifted individuals within cooperative-learning groups, facilitating the progression of individuals at their own pace, in addition to teacher education and program evaluation. This group of schools spanned elementary, middle, and high-school grades and also included a wide range of gifted services (e.g., advanced classes available for the gifted students and acceleration).

Through interviews with key informants in each school, focus groups amongst teachers and students, and classroom observations, Coleman and Gallagher concluded that both groups of schools effectively provided appropriate and challenging educational opportunities for their gifted students, with the help of careful planning, staff training, and ongoing support. Within the schools that focused on cooperative learning, the gifted individuals showed enthusiasm for placement in homogeneous groups, but expressed concerns in heterogeneous groups, including having to teach other students, finish all of the work, getting lower marks, not being challenged, and feeling uncomfortable about being smart. These concerns regarding heterogeneous groups were consistent with some of the concerns discovered by Feldhusen and Moon (1992).

Similarly, Baer (2003) examined the effects of homogeneous and heterogeneous

grouping in cooperative learning, but amongst college students' achievement scores. In the first five weeks of the course, students worked in randomly-assigned cooperative-learning groups. A quiz was then administered and students were grouped homogeneously or heterogeneously based on their scores. Students worked in their respective cooperative-learning groups for the remaining nine weeks. Homogeneous groups demonstrated greater achievement in terms of final examination grades compared to the heterogeneous groups. The high- or average-achieving students benefited more from the homogeneous group, whereas the low-achievers benefited from both types of grouping.

That said, not all researchers have converged in support of homogeneous groupings. Melser (1999) examined grouping strategies in terms of achievement and self-esteem outcomes amongst six classes of fourth- and fifth-grade students, although only the fourth-grade students were included in the study. Giftedness was defined through test scores, and parent and teacher nominations; homogeneous and heterogeneous groups were developed based on this information. Reading achievement was assessed with the Gates-MacGinite Reading Test, and self-esteem was assessed with the Coopersmith Self-Esteem Inventory, both before and after the cooperative learning activity. Both groups participated in reading-based cooperative-learning activities within a ten-week period. Reading achievement improved for both homogeneous and heterogeneous groups of students after treatment, whereas the self-esteem of the gifted students increased in heterogeneous groups, but decreased in homogeneous groups. Flexible grouping is therefore important for cooperative learning and both groups may be used depending on the learning task. Overall, cooperative learning is beneficial for gifted students because it allows for the sharing of ideas, teaching of concepts, and the opportunity to work with others (Melser, 1999). Although Melser and Baer helped to answer the question regarding achievement, student

attitudes or learning preferences were not considered.

Although many studies have examined different contexts or learning situations, no studies have examined several contexts within one study. In addition, most studies have generated their data from forced-choice, for example, Likert-style survey instruments. There has not been an open-ended investigation of the learning preferences of gifted individuals; this is problematic considering the previously described issue of different definitions of giftedness across studies. As an example of some of these limitations, Singhanayok and Hooper (1998) examined learner control, referring to students' ability to choose their own pace in terms of completing a learning activity. Sixth-grade students were grouped heterogeneously based on prior achievement and were later classified as high or low achieving based on reading results from the Stanford Achievement Test. Students completed a computer-based lesson within one of four conditions, including a learner-controlled/individual learning condition, learner-controlled/cooperative learning condition, program-controlled/individual learning condition, or a program-controlled/cooperative learning condition; they then completed a Likert-scale attitude questionnaire. Cooperative learning groups tended to have more favorable attitudes towards grouping compared to individual learning groups, showed better performance on the task, and also spent more time on task. High-achieving students performed better in the learner-control groups whereas low-achieving students performed better in the program-control groups. Singhanayok and Hooper concluded that heterogeneous grouping is beneficial to low-achieving students and does not negatively impact high-achieving students. These results need to be interpreted with caution however, because results may not be generalizable. Computer-based tasks may differ from many of the cooperative-learning situations in classrooms and furthermore, laboratory settings usually differ greatly from a typical classroom. In addition, Likert-style items

also limit generalizability due to their forced-choice nature.

Further methodological limitations involve cultural factors or differences. Many studies neglect to differentiate groups in their samples based on cultural background, which affects generalizability. For example, Ellison, Tyler, Boykin, and Dillihunt (2005) addressed cultural factors in their study of learning preferences amongst fifth- and sixth-grade students. The sample of participants consisted of White-American and African-American students, both from the same school in a low-income community. Cooperative, competitive, and individualistic learning styles were determined based on the Social Interdependence Scales (Johnson & Norem-Hebeisen, 1979). These scales were determined to be more user-friendly for younger students compared to the commonly-used Learning Preference Scale—Students (LPSS). The Social Interdependence Scales consist of 22 seven-point Likert-scale items. Cooperative learning was the most preferred learning style and this was the case regardless of ethnicity and sex, however, this preference was stronger for African-American students. On the other hand, a preference for individualistic and competitive learning styles was stronger for White-American students. There could be a culturally-based difference in terms of learning preferences, and this needs to be more closely considered in research within this area.

In a study that came closer to specifically examining learning preferences, Kenny, Archambault, and Hallmark (1995) examined grouping effects on achievement and self-esteem, but also included measures of attitudes towards school subjects as well as peer perceptions. A sample of 786 fourth-grade students included 128 (29%) who were identified as gifted based on teacher information about academic ability, participation in a gifted and talented program, and previous performance on standardized achievement tests within the school district. Three groups were assembled, consisting of a homogeneous gifted group, a homogeneous nongifted group,

and a heterogeneous group of gifted and nongifted children. Children were randomly assigned to homogeneous or heterogeneous groups. Cooperative-learning strategies were implemented in science and mathematics. Gifted and nongifted students achieved similar levels of performance in both homogeneous and heterogeneous groupings after treatment. For the self-esteem measures, both gifted students in homogeneous and nongifted students in heterogeneous groups experienced a decrease in self-esteem, although academic self-esteem increased across groups, especially for nongifted students. Attitudes toward school subjects did not differ across the groups, although both gifted and nongifted students reported more negative perceptions towards each other. Overall, Kenny et al. were unable to conclude that one form of grouping was better than another. Limitations in their study included a short intervention of only seven hours, and a sample of predominantly White students. Although valuable information was gathered from this research study in terms of student attitudes toward certain school subjects, outcomes may not be generalizable across contexts, and preferences for the learning situation were not considered.

The inclusion of qualitative data such as individual evaluations, student and teacher interviews, and observational data, allows for a greater focus on context. Incorporating these qualitative measures into a study of the effects of homogeneous versus heterogeneous groups in a cooperative-learning context, Stout (1993) interviewed 23 students in Grades 4 and 6 and gathered individual evaluations from 116 students. Gifted students were identified by scores of 129 or higher on standardized ability tests. Evaluation and interview questions included open-ended items such as “What did you enjoy about working with a group on this project?” and “What would you have liked better about working alone?” (p. 107). Stout concluded that group work benefited gifted students, because they enjoyed working with others and did not mention concerns about working with less-able students or having to teach other students. Some

concerns that were cited by students included higher instances of arguments among group members and having to wait for others in the group to catch up. This study was useful because it provided a more open-ended examination of gifted students' learning preferences, although it did not directly address specific contexts or types of learning situations.

The previously mentioned studies are helpful in terms of improving the knowledge base regarding grouping preferences within cooperative learning situations, but more specific information is required in terms of general learning preferences, especially among gifted students. In particular, there is a lack of contextual information. In an attempt to settle the debate between opponents and proponents of grouping based on ability levels, Kulik and Kulik (1991) conducted a meta-analysis. Studies were classified into several categories: 49 studies that examined between-class grouping, in which students of varying abilities were taught in different classrooms; 15 studies that examined within-class grouping, in which students were taught in the same classroom; 16 studies that examined the "Joplin plan," in which students from several grade levels are placed in one classroom for reading; 25 studies that examined grouping of gifted students in separate classrooms; and 26 studies that examined acceleration programs for gifted students. Kulik and Kulik concluded that gifted students taught separately from other students benefited academically, and especially so when these gifted students were placed in specialized gifted programs. The largest academic benefit resulted from programs in which gifted students were accelerated. In terms of noncognitive outcomes of grouping, only tentative conclusions were stated due to the lack of previous research; for example, grouping by ability did not seem to impact self-esteem. The importance of noncognitive variables cannot be understated in terms of impact, however, and this finding highlighted research gaps that exist in terms of understanding these noncognitive variables. Overall, Kulik and Kulik proposed that providing gifted students

with separate instruction is beneficial for these students, and does not negatively impact other students.

Kulik and Kulik identified one form of instruction as more beneficial for gifted individuals, but application of a particular instructional regime within a classroom, regardless of the form, should be critically examined beforehand. In an example specific to cooperative learning, Mills and Durden (1992) reviewed the pertinent literature and constructed a research-based argument stating that, although cooperative learning is beneficial, it is inadequate on its own in meeting the needs of highly-able students. The appropriateness of the educational content and instruction is the factor that most strongly affects achievement. Therefore, grouping by ability level or differentiating instruction based on levels of knowledge is the most beneficial in terms of effectiveness and efficiency of learning. Grouping by ability level allows higher-achieving students to move at a faster pace. They argued for widely variable educational methods in order to meet situation-dependent individual needs. This is something that not only needs to be addressed within practice, but also needs to be further examined within the research. Mills and Durden also challenged the usefulness of the debate concerning which method is better (i.e., homogeneous or heterogeneous grouping). This type of debate diverts attention from individual differences and the complexity and diversity of individual student needs.

In a further argument against the utility of the homogeneous-versus-heterogeneous debate, Reis and Renzulli (2009) reviewed and summarized past research and concluded unequivocally that a homogeneous group of gifted children does not exist and giftedness is amenable to change. For example, abilities can differ depending on age, population, sex, and ethnic group, while achievement can vary depending on motivation, affect, effort, interest, and the level of support. Reis and Renzulli also discussed how the ease of identification with one

cut-off score and outdated understandings of the term giftedness contribute to the longstanding assumption that gifted students comprise a homogeneous group.

Other reasons include confusion between the terms "equality" and "fairness." Equality is usually associated with fairness, in other words, if everyone is treated equally, then this is considered fair. However, this association should not be applied to education. Individual characteristics differentially affect how every student learns. Fair does not have to mean equal, and students of differing abilities will require different instructional techniques (Cooper, 2009).

New Directions for Future Research

Social-learning and social-constructivist theories might enable researchers in the field of learning preferences, including cooperative learning, to gain further insight into more nuanced understandings of how gifted individuals prefer to learn. Some of the previous research questions and methodologies can be reframed within these useful theoretical frameworks. A discussion of some studies that have begun to move in this direction will also illustrate how we can more usefully view these concepts through a social-constructivist lens. Although several studies have begun to take such an approach, no study has integrated both social-constructivist- or social-learning-based research questions and methodology.

Research questions. The 1980s were a high point for research and publication on giftedness, but the questions posed then were typically not addressed in terms of social-learning theories (Bandura, 1977). Within the social-learning theoretical framework, learning occurs through the observation of others' behavior. Bandura described human nature as "a vast potentiality that can be fashioned by direct and vicarious experience into a variety of forms within biological limits" (p. 13). Social-constructivist theory (Vygotsky, 1978) "emphasizes that an individual's meaning-making (or learning in general) is mediated by adults or more

knowledgeable peers, even though it is ultimately constructed by the individual learner on people's collective efforts to impose meaning on the world" (Ormrod, Saklofske, Schwean, Andrews, & Shore, 2010, p. 160). Social-cognitive theory further recognizes that learning should match the developmental level of the individual. Vygotsky (1978) derived the very useful concept of the "zone of proximal development" (ZPD), "the distance between the actual developmental level as determined by independent problem solving and the level of potential development as determined through problem solving under adult guidance or in collaboration with more capable peers" (p. 86). Furthermore, he suggested that individuals learn through a social process of interacting with other peers in their environment, especially through dialog. He stressed the need to consider the changing nature of development. Relationships between learning and development are complex, vary depending on the subject matter, and therefore, one formula or hypothesis is not sufficient to explain these processes. Current curricular reform, specifically inquiry education, has adopted some of the main tenets from these theories.

By incorporating tenets from social-learning and social-constructivism theories, we can shift the focus to examine situations in which modeling is more likely to occur, and in which students can be engaged in dialog within the ZPD; in turn the conditions for effective learning as implied by these theories can be translated into questions explored in investigations of more specific learning preferences. Slavin (1990) provided a good example of how research can build on and reframe existing questions. He voiced an opinion in favor of heterogeneous grouping, claiming that homogeneous grouping should be avoided at all costs. He also argued that high-achieving students in heterogeneous cooperative-learning groups tend to benefit the most as a result of gaining a deeper understanding of the concepts through explanation to other group members. This directly relates to constructing knowledge through dialog with others, a main

tenet of social-constructivist theory, and also inquiry education, but it omits an important part of both theories for gifted students: It places the more able or knowledgeable learner in the position of being modeled or scaffolding the less able or knowledgeable learner who is in the ZPD in some learning domain or context, but it does not create conditions of defining suitable models for the gifted child, nor leading the latter in her or his ZPD. Although there was a hint of recognizing the importance of social-constructivist pedagogy within Slavin's argument, there is still little known about the exact circumstances in which homogeneous or heterogeneous grouping might be beneficial.

Slavin (1996) built on some of his previous research and addressed grouping in more depth. He outlined four different theoretical perspectives of cooperative learning (e.g., motivational, social cohesion) to help explain how achievement is impacted by cooperative learning. More specifically, the development of group goals and the promotion of individual accountability affects achievement outcomes, but there are other learning situations in which these are not required to positively affect achievement. Some of the ones proposed included tasks with no one right answer, voluntary study groups, and structured tasks with a partner. These tasks incorporate several characteristics from social-learning theories and inquiry environments in particular. For example, voluntary study groups and structured-partner tasks facilitate student modeling and learning through the observation of how others approach an educational task or activity, a direct application of social-learning theory. Tasks that have more than one right answer encourage the use of complex problem-solving skills, creativity, and the encouragement of dialog among students, all components of an inquiry environment. Slavin also suggested directions for future research within cooperative learning. He highlighted the need to address the conditions in which group goals and individual accountability may not be as

important to achievement outcomes, as well as the need to look at other outcomes besides achievement. This research supported the fact that, in many instances, simply considering social-constructivist and social-learning theories can lead to new insight, although this review merely scratched the surface in terms of full application of these useful theoretical frameworks.

Going beyond merely criticizing past research methodology, Patrick, Bangel, Jeon, and Townsend (2005) examined some of the underlying assumptions of these research studies, and similarly to Reis and Renzulli (2009), examined the common assumption that gifted students are a homogeneous group. Gifted individuals are quite unique, with different strengths and weaknesses. Patrick et al. (2005) provided an analysis of the cooperative-learning research regarding its utility for gifted individuals. More collaborative, social-constructivist-based formats of teaching were suggested in order to stimulate learning amongst all students. In this type of environment, understanding develops through discussion and dialog with others, therefore allowing lower ability students to also participate and contribute actively to the group. Although they concluded that heterogeneous grouping may not be the best option for gifted individuals, they argued that the focus needs to be shifted from what the outcomes are in terms of homogeneous or heterogeneous grouping, to the cognitive processes and interactions that occur based on the type of task assigned within groups. Recognition of how research can be improved provides a good starting point for reconsidering not only research questions, but also research methodologies. A consideration of context within research questions and methodologies can provide a different perspective and additional insight into nuanced learning preferences that are sometimes overlooked.

Methodologies. There is a preponderance of literature to support the effects of different grouping configurations on students' achievement (Baer, 2003; Feldhusen & Moon, 1992;

Melser, 1999; Slavin, 1995), however, most of these studies do not directly address the opinions or preferences of the actual individuals in relation to their learning experiences or expectations. There may be complex processes within learning situations that cannot be adequately analyzed without taking individual opinions and preferences into account, while also paying close attention to the context. A discussion of some studies that have begun to move in this direction, specifically in terms of their actual methodology, will also illustrate how we can more usefully view these concepts through a theoretical social-constructivist or social-learning lens.

Supporting the lack of research regarding context, a meta-analysis of 12 quantitative studies indicated the need for more theoretical research (Neber, Finsterwald, & Urban, 2001). The studies that were included specifically differentiated between gifted and high-achieving samples. The effectiveness of cooperative learning groups amongst gifted and high-achieving individuals was inconclusive. The tasks that should and should not be used for cooperative learning, as well as when and how cooperative learning should be implemented with gifted or high-achieving students, were identified as essential areas requiring additional research.

As previously noted, qualitative data often can provide important contextual information. Matthews (1992) interviewed 15 sixth- and eighth-grade gifted students in a wealthy suburban area about cooperative learning. She discovered that these students resented others who did not listen to them, did not enjoy taking time out of their own learning to work with uncooperative students, and feared that they would have to complete all of the work. Matthews concluded that, although gifted students benefit from group work in the form of improved self-esteem and improved attitudes regarding school, homogeneous cooperative learning groups (to the extent they can ultimately be homogeneous) are more beneficial for gifted individuals. She provided six suggestions to improve the effectiveness of cooperative learning, including appropriate

teacher modeling of group-work skills, flexibility when designing groups, setting group goals that are meaningful to the students, and designing group activities that encourage interaction and that include every member. All of these suggestions relate to the application of social-constructivist or social-learning theories.

Despite these suggestions, Sapon-Shevin and Schniedewind (1993) disputed some of the research by Matthews. In particular, they argued, all students need to learn how to work effectively with uncooperative students, students from different backgrounds, and students with differing skills. Furthermore, cooperative learning encourages respecting individual differences and helps to prepare students for a multicultural world. Finally, they argued that Matthews' six suggestions for improving cooperative learning simply related to how cooperative learning should be done with students of all abilities. Complaints regarding cooperative learning from gifted individuals can be mediated by teaching social skills and problem-solving skills, instead of simply proposing homogeneous grouping. A difficulty with Sapon-Shevin and Schniedewind's counterargument is that there is not a body of evidence that gifted students especially need to learn how to work in the ways mentioned, or that others especially need to learn to work with them, or that one group or the other is deficient in these matters. There is the persistent belief that gifted children prefer to work alone, but that very assumption is, in part, the object of this review as it was in the consideration by French and Shore (2009), and there are emerging empirical data to support the challenge (addressed below).

Although considering contextual variables is important, more information regarding specific learning preferences across these contexts is essential. Owens and Barnes (1982) hypothesized that perceptions about classroom atmosphere depend on students' preferences for cooperative, competitive, or individualistic learning styles. Students in Grades 7 and 11 from

Sydney, Australia completed the LPSS and the Classroom Learning Atmosphere Scale-Secondary (CLASS; Owens, Barnes, & Straton, 1978) for the subjects of English and mathematics. The LPSS consists of a set of statements that are answered by selecting one of four response options including true, sort of true, sort of false, or false. Many of these items address preferences for working alone or in groups, for example, "I prefer to work by myself so I can go as fast as I like" or "Working in a group now helps me work with other people later" (Barnes, Owens, & Straton, 1978). Preferences varied depending on the subject, with older students preferring cooperative and competitive learning styles compared to the younger sample of students. Furthermore, girls preferred cooperative learning styles. A similar study by Li and Adamson (1992) found partly contradictory results in that cooperative learning style preferences did not differ depending on the subject, and males tended to prefer individualistic and competitive learning styles in mathematics, whereas females tended to prefer cooperative learning. These partly contradictory results indicate that differences in outcomes can occur depending on the exact situation, and even slight modifications to methodology. These studies did improve upon previous research by examining learning preferences more broadly and across subject domain, although in both studies limitations included the closed-ended nature of the questionnaire items. For example, the LPSS is an instrument that taps into some of the subtleties of learning preferences, although true-false statements do not allow for a deep understanding of some of the complexities of these preferences. A further limitation of the Owens and Barnes (1982) study was a lack of consideration of ability differences.

Seeking to address this limitation, Rayneri, Gerber, and Wiley (2006) examined the relationship between learning-style preferences and perceptions of the classroom environment, but also included information about ability differences and academic achievement. Twenty-six

sixth-grade, 34 seventh-grade, and 20 eighth-grade gifted students from the southeast Unites States completed the Learning Style Inventory (LSI; Dunn, Dunn, & Price, 2000) as well as the Student Perception Inventory (SPI) developed by Rayneri et al. (2006). Gifted students were identified by scores on standardized and nationally-normed tests as well as data pertaining to performance. The LSI is a Likert-style questionnaire that examines many different variables including preference for sound, temperature, and light within the learning environment, as well as the desire to work alone or with others. The SPI is also a Likert-style questionnaire that examines perceptions as opposed to preferences and corresponds to 15 of the 22 LSI items. Examples of gifted students' preferences included the preference for informal seating arrangements, opportunity for "hands-on" activities, dim lighting, the ability to move around the environment, permission to eat or drink while learning, and a desire for learning in the afternoon or evening. No preference for working alone emerged, although this sample was homogeneous in terms of ability. Most of the gifted students had high levels of performance, but many preferences were incompatible with their perceptions of the classroom environment. For example, students with high reading grades evidenced significant discrepancies between their preference for and perception of factors such as seating design, presence of authority figures, and "hands-on" learning. This study did help overcome the limitation of neglecting to consider ability differences, but the measures were still primarily based on Likert-style forms of data collection.

Although still collecting data based on Likert-style questionnaires, Nelson (1995) also incorporated focus groups to tap into the differing attitudes and perceptions towards cooperative learning among students with varying ability levels. Two groups of seventh-grade students, 38 of whom were identified as gifted, participated in focus groups and completed both the

Cooperative Learning Attitude Survey (Ramsay & Richards, 1997) and the LPSS (Barnes et al., 1978). The teachers of these two groups were selected based on their previous effectiveness in implementing cooperative learning in the classroom. Focus groups ranged in size from four to ten students, with one focus group consisting of gifted students and the other group containing nongifted students. Students who participated in the focus groups were interviewed across 10 different sessions, and examples of questions included, "What is the best part about cooperative learning? Why?", "Tell me about your worst cooperative learning experience. Why?", and "If your teachers could make some changes in cooperative learning, what would you suggest? Why?" These questions added additional open-ended information to the questionnaire data.

MANOVAs were used to analyze responses to questionnaire items. There were significant differences between gifted students and their nongifted peers in terms of attitudes on the Cooperative Learning Attitude Scale. Nongifted students viewed cooperative learning more positively. On the LPSS, competitive and individualistic learning styles were preferred by the gifted sample. In terms of gender, females tended to prefer cooperative learning based on the results of the Cooperative Learning Attitude Survey, although there were no significant gender differences on the Cooperation or Individualism subscales of the LPSS. Focus-group discussions revealed fewer positive comments about heterogeneous cooperative learning from gifted individuals, who also had more of a preference for less cooperative learning in the classroom, although regardless of group, there were strong complaints regarding "free riders." Consistent with previous research, group members expressed limited tolerance for those members who prevented group members from finishing the task or for those who refused to work. Students' suggestions for some of these issues were to select their own group members, or to take certain individuals out of a group if necessary. Some benefits of cooperative learning listed by students

included the fun involved in talking to other members, making assignments less boring, and also the reward of helping others.

In a study specific to mathematics, Diezmann and Watters (2001) also collected a variety of useful data to examine the learning preferences of six gifted children between the ages of 11 and 12 years. Gifted students were selected based on performance on research-administered mathematics tests, as well as both teacher and peer nomination based on mathematics ability. This exploratory case study examined task difficulty and gifted students' preferences for collaboration during a 65-minute problem-solving session. Four work zones were developed including a quiet zone, work zone, chat zone, and a teacher zone. Learning preferences were determined based on the task difficulty, the use of the four different zones, actual task performance, as well as observational data. Task difficulty was related to the collaborative preferences of these children. For example, for challenging tasks, the gifted students preferred collaboration, whereas for tasks that were at grade level, these students preferred to work alone. When students were placed into collaborative groups, many positive outcomes were observed including mutual scaffolding and critical thinking. Although this study was useful in examining gifted students' preferences for collaboration in a more open-ended format, limitations included its exploratory focus, with a very small sample and no comparison group. In addition, it exclusively focused on the subject of mathematics.

Learning-style preferences closely relate to social and emotional needs. Peterson (2009) argued that individuals have differing social and emotional needs depending on the degree of giftedness, sensitivity, and comorbidity with other disabilities, among others. She claimed that profoundly gifted children often have no intellectual or interest peers, and may not fit into the school environment as a result. The absence of true peers relates to the common assumption

previously mentioned, that gifted individuals prefer working alone, an assumption that often carries negative connotations. Expanding the examination of learning preferences within cooperative learning environments, Peterson and Miller (2004) examined cognitive, emotional, and motivational learning experiences within a university cooperative-learning environment and within a large-group instruction setting. Differences in experiences based on prior achievement levels (GPA) were also examined. Collaboration skills were taught to the participating undergraduate education students at the beginning of the year and were monitored throughout, and cooperative learning groups were assembled to reflect diversity within each group based on the student's intended area of teacher certification, gender, and writing skills. Cooperative learning activities were based on a modified Jigsaw approach. Group members were individually responsible for learning one section of the task and then teaching it to the rest of the group.

Cognitive, emotional, and motivational experiences were measured with questionnaire data. Prior achievement levels, as well as the type of instruction, significantly affected the quality of the students' learning experience. For example, in terms of the cognitive domain, students within the large-group instruction were more likely to be off-task, although experienced greater cognitive efficiency in terms of attention. Within the emotional domain, cooperative learning led to increased feelings of self-consciousness, whereas the large-group instruction resulted in less confusion. The variable of mood did not differ between contexts. For the motivational domain, students tended to be more engaged, and rated the learning task as more important within the cooperative learning context. Furthermore, measures of achievement indicated that low-achieving students were not as active in the cooperative-learning group, although these differences did not exist in the large-group instruction.

Although ability was not considered, Hijzen, Boekarts, and Vedder (2006) also recognized the importance of student perceptions within the social context of cooperative learning. They recruited 1920 secondary students from 11 different schools in the Netherlands to complete a series of questionnaires examining how students' goal preferences impact their perceptions of cooperative-learning environments. Four specific goal preferences were selected for this study. Mastery goals are academically focused; superiority and individuality goals are socially focused on impressing other peers; social-support goals include wanting to help others; and finally, belongingness goals are focused on the desire to make friends. Hijzen et al. predicted that perceptions of support from peers would affect perceptions of the quality of the cooperative learning, males would rate cooperative learning lower than would females, and that mastery, social, and belongingness goals would be positively related, whereas superiority goals would be negatively related to the students' perceptions of the quality of the cooperative-learning environment. Context variables (e.g., type of task, evaluation, clarity of teacher) and social climate variables (e.g., academic and social support) were also considered and low scores on some of these variables were predicted to lead to negative perceptions of cooperative learning. Mastery goals were most preferred, followed by social-support goals and belongingness goals. Although social-support goals were most strongly related to student perceptions of the quality of cooperative learning, superiority goals did not relate to the quality of cooperative learning. Males did score the quality of cooperative learning lower, as predicted. In addition, the social climate and context did influence ratings of cooperative learning quality. For example, students who had high perceptions of peer support rated the quality of cooperative learning higher. Although limitations included the lack of a more open-ended investigation due to questionnaire data with only a four-point Likert scale, this study began to address some of the previous

research limitations in terms of learning preferences. This study would have benefited from controlling for ability level and examining some of these variables in more depth.

In a similar consideration of how cooperative learning and interpersonal interactions relate to one another, Johnson and Johnson (1995) reviewed a wide range of cooperative-learning literature and highlighted some of their previous findings. Specifically, within a secondary school, successful cooperative learning requires careful implementation and the inclusion of factors such as positive interdependence, face-to-face interaction, and individual accountability, all of which tend to facilitate the academic success of all students. Not only is academic success facilitated, but interaction patterns tend to be positively influenced, which in turn affects communication patterns, relationship quality, psychological health, self-esteem, and social competencies. In other words, students who work together cooperatively tend to like each other regardless of sex, ethnicity, social class, or academic ability (Johnson & Johnson, 1989). Johnson and Johnson (1995) reviewed over 175 studies investigating the impact of cooperative, competitive, and individualistic environments on relationship quality and concluded that cooperative-learning environments generally improved interpersonal attraction. Individualistic environments were determined to often lead to inaccurate communication, egocentrism, static viewpoints, and feelings of rejection. These are powerful statements regarding the negative value of working individually. Assumptions about gifted individuals' preference to work alone can be quite misleading as a result of some of these negative outcomes. This assumption is prevalent within many books on giftedness (e.g., Davis & Rimm, 1998; Winebrenner, 2001), however, evidence is accumulating that this may not be the case (French, 2007; French & Shore, 2009; French, Walker, & Shore, in press).

French (2007) challenged the assumption that gifted children prefer working alone, and

surveyed school-identified gifted students (based on standardized test scores), high-achieving students (who did not reach test score cut-offs, but were achieving nonetheless), and nonidentified students in terms of personality, and social and learning characteristics. Items included both fixed and open-ended questions. Questions about preferences can be asked in many different ways. French therefore examined whether or not preferences for working alone or with others differed depending on how the question was asked. She also addressed why students have different learning preferences, in addition to examining the variable of perceived support in terms of learning preferences. Although gifted students demonstrated a preference for working alone, French determined that this depended on how the question was asked. For example, gifted students chose the option "Work Alone" more often when asked in the traditional way, with Likert-style items, but this preference was no longer significant when the students were asked in a more open-ended format. In terms of why students have different learning preferences, the gifted sample cited personality factors more often than the other groups, and the nonidentified students struggled to come up with reasons as to why some students might actually prefer working alone. Support also happened to be an important factor in determining learning preferences. Gifted students who did not feel supported in the learning environment demonstrated a preference for working alone. This preference for working alone tended to increase with age and was more prominent for females. French concluded that a preference for working alone is heavily affected by the social and learning environment and, furthermore, may simply be the result of an inadequate learning environment that lacks the support that these students need to be well served in cooperative-learning situations. This is why a deeper understanding of the contextual factors that influence learning preferences is so important. Perhaps these gifted children prefer working with others, but the classroom environment they are

in or familiar with does not support these preferences or needs.

Conclusions

Based on a closer examination of some of the literature, gaps exist. Definitions of giftedness, as well as what encompasses cooperative learning, require refinement across research studies, in order to obtain consistency. For example, individuals need to be treated as unique, and membership in one category should not constitute broad generalizations regarding cooperative-learning outcomes. In addition, research questions need to be reframed accordingly. For example, as opposed to asking if homogeneous or heterogeneous grouping is better, it might be more useful to determine in which context each form of grouping is the most useful. Similarly, methodologies need to consider a more comprehensive examination of contextual factors pertaining to the outcomes of cooperative learning for gifted individuals and incorporate tenets from social-constructivist and social-learning theories. There are a limited number of studies that address some of the issues related to the learning preferences of gifted individuals and a more open-ended examination is required to uncover some of the contextual subtleties of these preferences. Furthermore, a more open-ended examination can also help challenge some of the common assumptions pertaining to gifted individuals in general.

Chapter 2

Linking Text

As previously discussed, the above manuscript was a literature review and therefore the following empirical manuscript does not contain an extensive literature review. Rather, the literature review for this second article briefly summarizes the literature review of the first article, and the reader is referred to the first article for further reading.

Although the review reveals gaps in the literature including vague definitions of giftedness and methodologies that neglect contextual factors, incorporating tenets from social-constructivist and social-learning theories can help to address some of these gaps. There is a common assumption in the literature that gifted individuals prefer working alone. The second manuscript attempted to debunk this myth by incorporating aspects of social-constructivist and social-learning theories (e.g., contextual factors) in an open-ended investigation of learning preferences amongst individuals of differing performance levels. The second manuscript is a follow-up study based on the conclusions of the first review paper, which identified the need for a more detailed examination of contextual factors that influence learning preferences of students.

Chapter 3

Under Most Conditions High-Performance Students Prefer to Work with Others

A common assumption exists in the literature describing how gifted students often prefer to work alone (Davis & Rimm, 1998; Winebrenner, 2001), however, some research suggests that this may not be the case. To improve our understanding of gifted students' learning preferences, contextual variables need to be considered, including the question format. For a comprehensive review of the literature, see Walker et al. (2010) and French et al. (in press). These and other studies have begun to address contextual considerations (French, 2007).

French (2007) examined social, learning, and personality characteristics amongst school-identified gifted, high-achieving, and nonidentified students (also see French et al., in press). School-identified gifted students were selected based on standardized test scores, whereas "high-achieving" students did not meet the cut-offs for standardized test scores, but were achieving within the classroom. French further examined the assumption that gifted children prefer working alone through the collection of survey and interview data, specifically by asking the questions in different ways, with both fixed and open-ended formats. School-identified gifted students revealed a preference for working alone, however, this depended on the format of the question. For example, these students selected "Work Alone" more often when questioned with Likert-style items, compared to more open-ended question formats. Also, perceived support was significantly correlated with students' learning preferences. Specifically, school-identified gifted students who did not feel supported, reported stronger preferences for working alone. Preferences for working alone were also stronger for older students and for females. French concluded that preferences for working alone strongly depended on the social and learning contexts, such as the need to feel supported in the learning environment, before preferring to

work with others. A better understanding of contextual factors within educational settings can provide valuable information about the learning preferences of students across ability levels.

Consistent with previous research (Walker, Shore, & French, 2010),

> Student learning preferences will be defined as "student choices of the type of classroom structure with which they prefer to work to accomplish academic goals—whether in cooperation with their peers, in competition with their peers, or having no involvement with their peers" (Johnson & Engelhard, 1992, p. 385). (p. 11)

Several studies of cooperative or collaborative learning have identified disadvantages to working in groups. Walker et al. (2010) previously summarized:

> With regard to context, the unequal contributions of team members contributes to what is known as the "free-rider effect" (Orbell & Dawes, 1981), in which a member or several members of a group take advantage of the efforts of others in order to limit the amount of work they have to complete, but still take credit for the final outcome. A "sucker" refers to a member or several members of a group who complete all or most of the work for the group. In reference to some of his previous research, Slavin (1995) stated how the free-rider effect within cooperative learning groups can negatively impact student achievement through a diffusion of responsibility, and went on to overview other relevant studies about cooperative learning's impact on achievement. In addition to the disadvantages of the free-rider effect, this phenomenon is also often believed to contribute to gifted individuals' assumed preference for working alone, to avoid becoming a "sucker." However, blanket assumptions for working alone need to be more carefully considered before coming to such conclusions. (p. 11)

The theoretical framework for the current study included tenets from social-learning and

social-constructivist theories. These theoretical viewpoints were beneficial for gaining a better understanding of how individuals with different ability levels preferred to learn. Walker et al. (2010) summarized this theoretical context:

> Within the social-learning theoretical framework, learning occurs through the observation of others' behavior. Bandura [1977] described human nature as "a vast potentiality that can be fashioned by direct and vicarious experience into a variety of forms within biological limits" (p. 13). Social-constructivist theory (Vygotsky, 1978) "emphasizes that an individual's meaning-making (or learning in general) is mediated by adults or more knowledgeable peers, even though it is ultimately constructed by the individual learner on people's collective efforts to impose meaning on the world" (Ormrod, Saklofske, Schwean, Andrews, & Shore, 2010, p. 160). Social-cognitive theory further recognizes that learning should match the developmental level of the individual. Vygotsky (1978) derived the very useful concept of the "zone of proximal development" (ZPD), "the distance between the actual developmental level as determined by independent problem solving and the level of potential development as determined through problem solving under adult guidance or in collaboration with more capable peers" (p. 86). Furthermore, he suggested that individuals learn through a social process of interacting with other intellectuals or peers in their environment, especially through dialog. He stressed the need to consider the changing nature of development. Relationships between learning and development are complex, vary depending on the subject matter, and therefore, one formula or hypothesis is not sufficient to explain these processes. Current curricular reform, specifically inquiry education, has adopted some of the main tenets from these theories. (p. 22)

By incorporating tenets from social-learning and social-constructivist theories, we can shift the focus to examine situations in which modeling is more likely to occur, and in which students can be engaged in dialog within the ZPD; in turn, conditions for effective learning as implied by these theories can be translated into investigations of specific learning preferences.

Furthering these conclusions, the current study explained nuanced learning preferences of high-performance students. The addition of greater precision, and the consideration of contextual variables, allowed for more meaningful statements about how gifted children preferred to learn. The research question was, "under what conditions and on what kinds of tasks do high-performance and community-school students prefer to work alone or with others?"

Methodology

Design

This exploratory study examined the relations between learning preferences and contextual factors of the learning environment. Other variables of interest included performance, sex, and grade level. Giftedness can be defined in several ways (Mönks & Katzko, 2005; Renzulli, 2002), and for the purposes of this study, giftedness was defined as high performance, based on attendance at a school with selective admission. Performance was not controlled at an individual level. For example, participants in the community-school sample were recruited from a suburban, English-speaking public elementary school in the Montreal area, and individuals were assumed to represent a wide range of performance levels. The second elementary school in the Montreal suburbs was an International Baccalaureate school with selective admission (this information was published on the school website, but the precise citation is not given here to preserve the anonymity of the school). The process of admission within this school was based on test scores, and interviews with staff members. Students with the highest scores on the entrance test had priority over other students. Students with siblings attending the school had

priority over other students with the same entrance score, and within these students, those who lived within the school district took priority. These students were assumed to be high performers. Students from the former school will be referred to as the community-school sample, whereas students from the latter school will be referred to as the high-performance sample. Independent variables also included sex (males and females) and grade level (Grade 5 and Grade 6).

The dependent variables included learning preferences and the environmental context. Learning preferences reflected variables such as the desire to work alone, work with a friend, work in a small group, and work in a large group. These preferences were ascertained through questionnaire and interview data. The environmental context was also examined and included contexts such as working on easy or self-marked assignments.

Participants

Seventy-four students in Grades 5 and 6 participated from two English-speaking elementary schools in Montreal. Five participants were later dropped from the analysis for various reasons including only completing one question on the questionnaire. The two schools selected were actively involved in related research projects with the *High Ability and Inquiry Research (HAIR)* team. After obtaining university and school-board ethics approval, principals were contacted to ask if they would be interested in participating. Both principals consented and asked their Grade 5 and 6 teachers if their classes would be willing to participate. Two Grade 5 teachers and three Grade 6 teachers consented. Consent forms and information packages were delivered to the principals and then to the teachers, for distribution to the students (see Appendix A).

Out of the 69 participants, 27 were community-school students and 42 were high-

performance students. Table 1 summarizes demographic characteristics of the participants. All were English-speaking and representative of the population of Montreal, although no data were collected regarding cultural or economic background. A question about how often individuals participated in group-work activities was included to determine if the amount of group-work participation affected learning preferences across contexts.

Table 1

Demographic Characteristics of Participants Across Schools

Group	Count	Percentage
Academic Performance		
High (Gifted)	42	61%
Community	27	39%
Gender		
Female	35	51%
Male	34	49%
Grade		
5	18	26%
6	51	74%
Group Work Frequency		
Never	0	0%
Sometimes	32	46%
Often	36	52%
Always	1	2%

Certain questions were prefaced by a yes-no choice to ensure that the question applied to the student. For example, the following question was asked before Item 23, “Do you ever complete assignments with a partner that your teacher chooses? If you chose yes, please answer

question #23, and if you chose no, please skip question #23."

Instruments and Procedure

After the distribution of consent forms to students, school visits were scheduled, appropriate for each teacher in terms of being the least disruptive to their daily classroom routine. Data were collected during the last week of school in June. For the purposes of confidentiality, teachers were asked to leave the room if possible, for the duration of the administration of the assent forms and questionnaires. If this was not possible, teachers worked at their desk. Scripts were read aloud to introduce the study to the class, including an explanation of the purpose of the study, the types of questionnaire items to expect, and how long the questionnaire should take. Students were informed that their participation would not affect their grades. Students with consent forms were identified and the remaining students were asked to work on a quiet activity at their desk, or depending on the preferences of the teacher, were moved to a computer lab to be supervised by the teacher. Participating students were given an assent form and a questionnaire package (see Appendices B and C). Signed assent forms were then collected.

Next, students completed an active and passive practice question to ensure understanding of the questionnaire. In the passive practice, an example in the same format as the actual questionnaire items but pertaining to food as opposed to learning preferences was written on the chalkboard. One of the researchers verbally demonstrated how to respond to the question by ranking each response option. To ensure complete understanding, all student questions were answered. In the following active example, each student was asked to complete an example questionnaire item distributed to students. This example was in the same format but was food-related. One or two research assistants monitored responses to ensure understanding (e.g.,

students ranked each option as opposed to checking only one). Students were also monitored during administration of the actual instrument. Practice sheets were collected and if a student did not understand the ranking process, further explanation was provided. On the questionnaire, prompts were provided every four questions to remind students to rank each option.

Questionnaires were completed within approximately 30 minutes. Students requiring additional time completed the task at their desk, or in a different room depending on teacher preferences. Due to time constraints, students who completed questionnaires quickly were interviewed. Nine students participated in a 15-minute interview (see Appendix D). Each interview was audiotaped, after ensuring these students had parental permission. To respect participants' privacy, and the principles of confidentiality, students were interviewed in an empty, quiet room.

Questionnaire items were organized into clusters based on content. For example, Items 1 to 5 comprised Cluster 1, relating to school grades, whereas Items 6 to 12 comprised Cluster 2, relating to the type of assignment. Items 13 and 14 comprised Cluster 3 relating to the choice of assignment topic. Cluster 4 comprised Item 15 related to selection of groups. Cluster 5 included Items 16 and 17 and focused on group dynamics, whereas Cluster 6 and 7 included Items 18 and 19 respectively, relating to ability. Cluster 8 included Item 20 and related to group discussion. Cluster 9 included Item 21 and related to the type of assignment. Finally, Cluster 10 included Items 22 to 26 relating to assignment variety. Clusters were developed for cross-tabulation analyses to determine if rank distribution differed based on performance or sex.

Questionnaire items met criterion-referenced validity. Each questionnaire item was constructed based on existing literature, although all items were original.

Table 2

Criterion-Referenced Questionnaire Items

Item(s)	Source	Rationale
1-2	Feldhusen & Moon (1992)	Raised concerns regarding group composition and achievement (based on academic performance).
3-5	Hijzen et al. (2006)	Discussion of contextual variables within cooperative learning including academic and social support and evaluation.
6-12, 17, 21-22	VanTassel-Baska (2003)	Integrated Curriculum Model (ICM) recognizes contextual variables including recognition of existing skills, learning rates, special interests, and grouping of students.
13, 23	French et al. (in press)	Item 13 was adapted from *How I Like to Learn* Survey Item 13. Item 23 was adapted from *How I Like to Learn* Survey Item 8.
14-15, 25	Owens, & Barnes (1982) Owens, & Barnes (1992)	Items 14, 15, and 15 were adapted from *Learning Preference Scale-Students* Item 28.
16, 18-19	Robinson (1991)	High-ability students' motivation is affected by the effort of group members and differences in achievement or performance levels among group members need to be similar.

20	Owens, & Barnes (1992)	Item 20 adapted from *Learning Preference Scale-Students* Item 10, 12, and 13.
24, 26	Slavin (1996)	Examination of group goals, individual accountability, and achievement outcomes.

Content validity was established based on discussion amongst the HAIR team at McGill. The purpose of the study was presented, followed by the proposed questionnaire items. Several items were revised based on feedback from team members before administration of the final version. Following these revisions, the questionnaire was administered to two children, aged 9 and 13 to ensure that a child younger and older than the targeted age group could complete the questionnaire. These questionnaires were given to the volunteer parent, a faculty member in the department, to take home to administer to his children. The parent was instructed to have his children complete the questionnaire, circle any unclear items, provide general or specific feedback regarding the questionnaire, and to identify areas of confusion. No specific feedback was provided and the general feedback included that the questionnaire felt long but that the items and the ranking procedure were understandable. This indicated adequate content validity. In terms of construct validity, the rationale for comparing the two selected schools was verified through a question that asked participants to rate how often they completed group work in their class. Group-work frequency was consistent with existing differences between the schools.

Item 21 provided an additional validity check. This item stated, "When a teacher asks you to work in groups, rank the following in terms of your preference for the type of assignment." One of the options was "a boring assignment," and it was assumed that consistently low preferences for this option (as ultimately found) would indicate to a certain degree that each option was being read and ranked accordingly.

Test-retest reliability was not possible due to the scope of this project, and practice effects. Also, split-half reliability did not apply to the questionnaire format. However, reliability inferences can be postulated because valid instruments must first be reliable (Goodwin, 2005).

Confidentiality

A unique participant identification code was assigned to students who completed questionnaires or interviews. Students were asked to refrain from writing their names on anything and names that were written were later removed. All data collected were confidential and kept in a lockable filing cabinet in a locked laboratory at McGill University.

Scoring

Each subitem was ranked as a number between 1 and 7 depending on the number of options, where a 1 represented the most preferred, and a 7 represented the least preferred choice. Items 1, 4, 5, 13, 23, 24, 25, and 26 were prefaced by a yes-no choice to ensure the question was applicable. For example, if the student selected no to Pre-Item 1, "Do you ever complete assignments that do not count for marks?", he or she was instructed to skip the subsequent item.

SPSS was the statistical program used for all analyses. Frequency counts for each subitem were calculated and cross-tabulation analyses were calculated based on the above-identified clusters. The means for each performance group and sex for all subitems were correlated to determine differences in response patterns. A one-way *t*-test was run on all subitems on the mean ranks for school and for sex. Effect sizes were calculated with overall standard deviation values as opposed to pooled standard deviation. For significant results, effect sizes below 0.1 were not considered, even if the *t*-test was significant. In these cases, it was assumed that this reflected a lack of variability in at least one variable.

Results and Interpretation

Due to the multidimensionality of the data, substantial compression was required in order to achieve interpretable results. The analysis did not explore every possible interaction or subtlety in the data, but focused on meaningful information regarding the context of learning preferences.

Cross-Tabulation Analyses

Frequency counts for each of the two groups were completed for each subitem within a cluster. For example, for "Working Alone," frequencies were calculated across items in the cluster, for each performance group, in terms of how many students ranked this option as their first choice, second choice, etc. Chi-square analyses calculated by performance group and by sex across each cluster indicated few instances of significance (6 of 161, 3.7%, for both school and sex), with those instances potentially reflecting chance findings or insufficient power. Therefore, the distribution of ranks did not differ between the two groups or by sex.

Spearman Rank-Order Correlation Coefficient

Descriptive statistics for each subitem within an item were calculated. Spearman rank-order correlation coefficients were calculated with an online calculator (Lowry, 2010). There were few instances of nonsignificance (5 of 26, 19.2%, for both school and sex). Therefore, the order of ranks between groups did not differ significantly across subitems. In other words, both performance groups and sexes ranked subitems similarly.

Group-Work Frequency

A chi-square test was performed on the categorical variable of group-work frequency, based on a four-point scale of how often respondents completed group work. Options included Never, Sometimes, Often, and Always, however, "Never" was not included because no student selected this option. Seventeen (63%) community-school students selected Sometimes, 9

selected Often (33%), and only 1 selected Always (3.7%). For the high-performance group, 15 selected Sometimes (35.7%), whereas 27 selected Often (64.3%).

The significant relationship between performance and group-work frequency (χ^2 (2, N = 69) = 7.21, p = .027) indicated that high-performance students engaged in group work more often. Although two cells had an expected count less than five, this was acceptable. High-performance students may have been more accustomed to completing group work, which may have affected mean ranks. The following discussion must therefore be interpreted with caution.

***t*-Tests**

For ease of reporting, results for each subitem were described separately by cluster. Preferences to work alone, henceforth referred to as "Working alone," were further summarized separately from the other response options. All other response options were summarized together, henceforth referred to as "Working with others." This category included "Working with a friend," "Working with a classmate who is not a friend," "Working in a small group of 3 or 4," "Working in a large group of over 4," "It doesn't matter with whom I work," and "It doesn't matter how many people I work with." One-way *t*-tests were calculated on each subitem on the mean ranks for performance groups and sex, and Cohen's *d* values for effect sizes.

The format for the first 14 questionnaire items was the same, whereas the format for the last 12 questions varied. Therefore, significant differences between performance groups or sex were summarized separately. Table 3 summarizes significant differences for Items 1 to 14.

Table 3

Summary of Significant Differences Across Performance Groups and Sex for Items 1 to 14

Options	Does Not Count	Counts for Marks	Teacher-Marked	Classmate-Marked	Self-Marked	Easy	Difficult	Difficult Interesting	Fun	Boring	Big	Easily Completed	Student-Chosen Topic	Teacher-Chosen Topic
Alone			M	C			H	H						
Friend	H F	M	F	M	C M	F						F	H	C
Non-friend	M	C M		C M	M	M	C M	M	C M	C M	H	C F	H M	
Small group of 3 or 4	F		H F		F	H	C	C F	C	H	F	H F	C F	
Large group of over 4	H F	M		H F	C F	H F	C	F		H	C	F	C	H F
Does not matter who	H F	H F	C M	H	H M		H	H	H M	H F	H M	M	H M	F
# does not matter	F	C	F	C F	C F	F	F	F	H F	H	C	C M		F

Preferences about marks (Cluster 1). Five questions constructed around the marking of assignments included preferences for completing an assignment that did not count for marks, did count for marks, were teacher-marked, classmate-marked, or self-marked. Preferences were summarized according to the average ranks of responses within groups**.**

Performance-group differences.

Working alone. Community-school students ranked working alone as their first choice for a self-marked assignment (high-performance students ranked this second) and this was the only instance in which working alone was ranked first by either group. All students ranked working alone as their second choice for a teacher-marked assignment, and an assignment that counted for marks. Community-school students ranked working alone second for a classmate-marked assignment ($M_C = 2.95$), significantly higher than the high-performance students, who ranked it third ($M_H = 3.18$, $t(67) = 26.65$, $p = .024$, $ES = 0.11$). Furthermore, working alone was ranked as one of students' top three choices in all but one case.

Working with others. Working with a friend was ranked first by all students for assignments that did not count for marks, did count for marks, or were teacher-marked. This option was also ranked first for self-marked assignments by high-performance students and second for community-school students. Working with another classmate who was not a friend was ranked fifth or lower by all students and working in a small group of three or four was ranked as third choice or higher by all students within this cluster. Working in a large group was ranked as fourth choice by both groups, except on an assignment that did not count for marks, in which case, high-performance students ranked this third, compared to the community-school students, who ranked it fifth. In all instances, both groups ranked "It does not matter with whom I work" and "It does not matter with how many I work with" as fifth or lower.

Community-school students ranked working with a friend higher for self-marked assignments (M_C = 2.00, M_H = 2.21, t(67) = 20.05, p = .032, ES = 0.19), whereas high-performance students ranked this higher for an assignment that did not count for marks (M_H = 2.03, M_C = 2.25, t(67) = 19.46, p = .033, ES = 0.15). Community-school students ranked working with a classmate who was not a friend higher (lower mean rank) for an assignment that counted for marks (M_C = 4.70, M_H = 4.92, t(67) = 43.73, p = .015, ES = 0.12), and for a classmate-marked assignment (M_C = 4.89, M_H = 5.23, t(67) = 29.77, p = .021, ES = 0.21). High-performance students ranked working in a small group higher for a teacher-marked assignment (M_H = 3.37, M_C = 3.74, t(67) = 19.22, p = .033, ES = 0.24). These students also ranked working in a large group higher for an assignment that did not count for marks (M_H = 3.89, M_C = 4.5, t(67) = 13.75, p = .046, ES = 0.41) and for a classmate-marked assignment (M_H = 4.03, M_C = 4.26, t(67) = 36.04, p = .018, ES = 0.15), whereas community-school students ranked this higher for a self-marked assignment (M_C = 4.05, M_H = 4.36, t(67) = 27.13, p = .023, ES = 0.21).

Ranking "It doesn't matter with whom I work" and "It doesn't matter how many people I work with" higher indicated that these students may have less of a preference for whom and how many others they worked. High-performance students ranked the former option significantly higher for assignments that did not count for marks (M_H = 4.89, M_C = 5.17, t(67) = 35.93, p = .018, ES = 0.18), ones that did count for marks (M_H = 5.36, M_C = 5.52, t(67) = 68.00, p = .009, ES = 0.12), classmate-marked assignments (M_H = 5.23, M_C = 5.53, t(67) = 35.87, p = .018, ES = 0.21), and self-marked assignments (M_H = 5.39, M_C = 5.86, t(67) = 23.94, p = .027, ES = 0.37). Community-school students ranked this option higher for teacher-marked assignments (M_C = 5.37, M_H = 5.76, t(67) = 28.54, p = .022, ES = 0.27). The high-performance group demonstrated a stronger preference in terms of how many people they worked with for assignments that

counted for marks (M_C = 4.67, M_H = 5.03, t(67) = 26.94, p = .024, ES = 0.19), classmate-marked assignments (M_C = 4.95, M_H = 5.49, t(67) = 19.33, p = .033, ES = 0.35), and self-marked assignments (M_C = 4.95, M_H = 5.18, t(67) = 44.04, p = .014, ES = 0.12).

Sex differences.

Working alone. Neither sex ranked working alone as first and in nine of 10 instances, this option was ranked second or third. Males ranked working alone significantly higher for a teacher-marked assignment (M_M = 2.27, M_F = 2.61, t(67) = 14.35, p = .044, ES = 0.17).

Working with others. Working with a friend was ranked first by both sexes for all questions. Working with another classmate who was not a friend was ranked fifth or lower for both sexes, similar to performance comparisons. Both sexes ranked working in a small group as second or third. Working in a large group was ranked fourth, except females ranked working in a large group as third for assignments that did not count for marks and as fifth for assignments that did count for marks. Both sexes ranked "It doesn't matter with whom I work" and "It doesn't matter how many people I work with" as fifth or lower, however, there were three instances in which the latter option was ranked fourth (in every case by females). This only occurred in one instance when comparing across performance differences.

Females ranked working with a friend higher for assignments that did not count for marks, and teacher-marked assignments (M_F = 2.03, M_M = 2.20, t(67) = 24.88, p = .026, ES = 0.12; M_F = 2.03, M_M = 2.17, t(67) = 30.00, p = .021, ES = 0.11, respectively), whereas males ranked this higher for assignments that counted for marks, were classmate-marked, and were self-marked (M_M = 2.34, M_F = 2.50, t(67) = 30.25, p = .021, ES = 0.11; M_M = 1.90, M_F = 2.14, t(67) = 16.83, p = .038, ES = 0.18; M_M = 2.07, M_F = 2.19, t(67) = 35.50, p = .018, ES = 0.12, respectively). Working with a classmate who was not a friend was ranked higher by males for

assignments that did not count for marks, ones that did count for marks, were classmate-marked, and were self-marked (M_M = 5.40, M_F = 5.61, $t(67) = 52.43$, p = .012, ES = 0.17; M_M = 4.62, M_F = 4.87, $t(67) = 37.96$, p = .017, ES = 0.14; M_M = 4.84, M_F = 5.43, $t(67) = 17.10$, p = .037, ES = 0.36; M_M = 5.07, M_F = 5.35, $t(67) = 37.21$, p = .017, ES = 0.18, respectively). Females ranked working in a small group higher for assignments that did not count for marks, were teacher-marked, and were self-marked (M_F = 2.61, M_M = 2.90, $t(67) = 19.00$, p = .033, ES = 0.22; M_F = 3.45, M_M = 3.77, $t(67) = 22.56$, p = .028, ES = 0.21; M_F = 3.31, M_M = 3.66, $t(67) = 19.91$, p = .032, ES = 0.27, respectively). Females also ranked working in a large group significantly higher for assignments that did not count for marks, were self-marked, and were classmate-marked (M_F = 4.00, M_M = 4.27, $t(67) = 30.63$, p = .021, ES = 0.18; M_F = 4.12, M_M = 4.34, $t(67) = 38.46$, p = .017, ES = 0.15; M_F = 3.86, M_M = 4.33, $t(67) = 17.43$, p = .036, ES = 0.30, respectively). Males ranked this higher for assignments that counted for marks (M_M = 4.21, M_F = 4.47, $t(67) = 33.39$, p = .019, ES = 0.16).

Males ranked “It doesn’t matter how many people I work with” significantly higher on self-marked and teacher-marked assignments (M_M = 5.38, M_F = 5.81, $t(67) = 26.02$, p = .024, ES = 0.34; M_M = 5.40, M_F = 5.68, $t(67) = 39.57$, p = .016, ES = 0.12, respectively), whereas females ranked this higher for assignments that did not count for marks, were teacher-marked, classmate-marked, and self-marked (M_F = 4.10, M_M = 4.63, $t(67) = 16.47$, p = .039, ES = 0.26; M_F = 4.71, M_M = 5.20, $t(67) = 20.22$, p = .031, ES = 0.32; M_F = 5.07, M_M = 5.53, $t(67) = 23.04$, p = .028, ES = 0.30; M_F = 4.85, M_M = 5.31, $t(67) = 22.09$, p = .029, ES = 0.25, respectively). Females also ranked “It doesn’t matter with whom I work” significantly higher for assignments that did not count for marks, and those that did count (M_F = 4.77, M_M = 5.23, $t(67) = 21.74$, p = .029, ES = 0.29; M_F = 5.13, M_M = 5.62, $t(67) = 21.94$, p = .029, ES = 0.37, respectively).

Interpretation. High-performance students ranked working with a friend higher for unmarked assignments, working in a small group higher for teacher-marked assignments, and working in a large group higher for unmarked and classmate-marked assignments. Most of these conditions are "low-stake" because they have less impact on overall grades. Schapiro, Schneider, Shore, Margison, and Udvari (2009) discovered that gifted students were more scholastically task-oriented as opposed to other-oriented. Perhaps these "low-stake" conditions contributed to a decreased emphasis on task orientation and a preference to work with others. Community-school students ranked working with a friend higher for self-marked assignments, working with a non-friend higher for marked and classmate-marked assignments, and working in a large group higher for self-marked assignments. Both groups were generally more accepting of working with others when the stakes were low. Exceptions were working in a small group on teacher-marked assignments for the high-performance group, and with a non-friend for a marked assignment for the community-school group; neither indicated a preference to work alone. Furthermore, community-school students had stronger preferences in terms of whom they worked with for unmarked, marked, classmate-marked, and self-marked assignments, whereas high-performance students had stronger preferences for teacher-marked assignments and also demonstrated stronger preferences in terms of how many they worked with for assignments that counted for marks, classmate-marked, and self-marked assignments.

Both groups demonstrated the "free rider" effect (Orbell & Dawes, 1981). When working with a non-friend classmate, there were only two conditions in which high-performance students ranked this significantly higher, however, community-school students ranked this higher in six conditions. High-performance students may have stronger preferences to work with students whom they are better acquainted, to avoid becoming a "sucker." Furthermore, high-

performance students preferred to work with others in several low-stake conditions (e.g. classmate-marked assignments). Similarly, community-school students ranked working with a friend higher for self-marked assignments and for assignments with a teacher-chosen topic. Marking your own assignment helps alleviate the free-rider effect and having a topic already selected can help mitigate arguments within a group. When interviewed, high-performance students mentioned difficulty selecting a topic when working with others, which can be avoided by completing assignments with a preselected topic.

Males ranked working alone significantly higher for a teacher-marked assignment, a relatively high-stake condition. This supports the claim that males have stronger preferences for competition (Schapiro et al., 2009). Females ranked working with a friend higher for assignments that did not count for marks, were teacher-marked, easy, and easily completed. Males ranked working with a friend higher for assignments that counted for marks, were self-marked, and classmate-marked. Both males and females demonstrated preferences to work with a friend in several low-stake conditions.

Type of assignment (Clusters 2 and 9). These clusters included preferences pertaining to easy, difficult, difficult but interesting, fun, boring, big, and easily-completed assignments, along with one question (the single item that constituted Cluster 9) that also included preferences for assignments that counted or did not count for marks.

Performance-group differences.

Working alone. Community-school students ranked working alone as first and high-performance students ranked it as second for an easy assignment. All students ranked working alone as first for easily-completed assignments. High-performance students ranked working alone higher than community-school students for difficult, and difficult but interesting

assignments (M_H = 3.93, M_C = 4.48, $t(67) = 15.29$, p = .042, ES = 0.23; M_H = 2.95, M_C = 3.38, $t(67) = 14.72$, p = .043, ES = 0.19, respectively).

Working with others. As in Cluster 1, students ranked working with a friend as first or second and working in a small group was ranked first for big assignments, second for difficult, fun, and boring assignments, and third for easy and easily-completed assignments. For difficult but interesting assignments, all students ranked working in a small group second or third. Working in a large group was ranked third or fourth for all conditions. "It doesn't matter with whom I work" and "It doesn't matter how many people I work with" were ranked fifth, sixth, or seventh, except one instance in which high-performance students ranked the latter fourth.

Community-school students ranked working with a classmate who was not a friend significantly higher for difficult (M_C = 4.44, M_H = 5.02, $t(67) = 16.31$, p = .039, ES = 0.35), fun (M_C = 5.04, M_H = 5.19, $t(67) = 68.20$, p = .009, ES = 0.11), boring (M_C = 5.00, M_H = 5.29, $t(67)$ = 35.48, p = .018, ES = 0.19), and easily-completed assignments (M_C = 4.78, M_H = 5.00, $t(67)$ = 44.46, p = .014, ES = 0.14), whereas high-performance students ranked this higher for big assignments (M_H = 5.12, M_C = 5.30, $t(67) = 57.89$, p = .011, ES = 0.12). Community-school students ranked working in a small group significantly higher for difficult (M_C = 2.70, M_H = 3.02, $t(67) = 27.40$, p = .023, ES = 0.23), difficult but interesting (M_C = 3.04, M_H = 3.40, $t(67) = 17.89$, p = .036, ES = 0.27), and fun assignments (M_C = 3.00, M_H = 3.24, $t(67) = 37.22$, p = .017, ES = 0.15). High-performance students ranked this option higher for easy (M_H = 3.38, M_C = 3.70, $t(67) = 23.50$, p = .027, ES = 0.24), boring (M_H = 2.83, M_C = 3.07, $t(67) = 14.86$, p = .043, ES = 0.17), and easily-completed assignments (M_H = 3.55, M_C = 3.74, $t(67) = 94.56$, p = .007, ES = 0.15). Community-school students also ranked working in a large group higher for difficult and big assignments (M_C = 3.30, M_H = 3.55, $t(67) = 27.40$, p = .023, ES = 0.14; M_C = 2.81, M_H =

3.02, $t(67) = 27.76$, $p = .023$, $ES = 0.13$, respectively), whereas high-performance students ranked this higher for easy and boring assignments ($M_H = 4.05$, $M_C = 4.41$, $t(67) = 23.50$, $p = .027$, $ES = 0.23$; $M_H = 2.98$, $M_C = 3.41$, $t(67) = 14.86$, $p = .043$, $ES = 0.25$, respectively).

High-performance students ranked "It doesn't matter with whom I work" higher for difficult but interesting, difficult, fun, boring, and big assignments ($M_H = 5.43$, $M_C = 5.77$, $t(67) = 32.94$, $p = .019$, $ES = 0.26$; $M_H = 5.07$, $M_C = 5.81$, $t(67) = 14.70$, $p = .043$, $ES = 0.52$; $M_H = 5.12$, $M_C = 5.63$, $t(67) = 21.08$, $p = .030$, $ES = 0.35$; $M_H = 5.05$, $M_C = 5.59$, $t(67) = 19.70$, $p = .032$, $ES = 0.39$; $M_H = 5.24$, $M_C = 5.74$, $t(67) = 21.96$, $p = .029$, $ES = 0.40$, respectively). They also ranked "It doesn't matter how many I work with" higher for fun and boring assignments ($M_H = 4.83$, $M_C = 5.15$, $t(67) = 31.19$, $p = .020$, $ES = 0.18$; $M_H = 4.67$, $M_C = 5.19$, $t(67) = 18.96$, $p = .034$, $ES = 0.30$, respectively), whereas community-school students ranked this higher for big and easily-completed assignments ($M_C = 4.70$, $M_H = 5.00$, $t(67) = 32.33$, $p = .020$, $ES = 0.19$; $M_C = 5.07$, $M_H = 5.45$, $t(67) = 27.68$, $p = .023$, $ES = 0.24$, respectively).

Cluster 9 (Item 21) asked about preferences for the type of assignment when working in groups and included the response options of easy, difficult, and boring. For all students, a fun assignment was ranked most preferred, followed by an easy assignment (second choice on average). Difficult and boring assignments were ranked as the two least-preferred choices. An assignment that counted for marks was ranked higher than one that did not count (third for both schools). High-performance students ranked an easy assignment, an assignment that counted for marks, and a difficult assignment higher ($M_H = 2.69$, $M_C = 2.89$, $t(67) = 27.90$, $p = .023$, $ES = 0.13$; $M_H = 3.81$, $M_C = 4.00$, $t(67) = 41.11$, $p = .015$, $ES = 0.14$; $M_H = 5.55$, $M_C = 5.74$, $t(67) = 59.42$, $p = .011$, $ES = 0.13$, respectively), whereas community-school students ranked a boring and a difficult but interesting assignment higher ($M_C = 5.56$, $M_H = 5.76$, $t(67) = 56.60$, $p = .011$,

$ES = 0.12$; $M_C = 4.15$, $M_H = 4.55$, $t(67) = 21.75$, $p = .029$, $ES = 0.25$, respectively).

Sex differences.

Working alone. For an easy assignment, males ranked working alone first on average, whereas females ranked this as second. Similarly, both sexes ranked working alone as their first choice for easily-completed assignments. No significant differences between the sexes emerged.

Working with others. Both sexes ranked working with a friend as first or second choice. Working with another classmate who was not a friend was ranked fifth or lower for all but difficult but interesting assignments, in which case males ranked this fourth. However, working in a small group was ranked within the top three across conditions. Working in a large group was ranked between second and fifth and in 23 out of 28 cases, "It doesn't matter with whom I work" and "It doesn't matter how many people I work with" were ranked second-last or last.

Females ranked working with a friend significantly higher for easy and easily-completed assignments ($M_F = 2.00$, $M_M = 2.31$, $t(67) = 13.90$, $p = .046$, $ES = 0.26$; $M_F = 2.04$, $M_M = 2.38$, $t(67) = 13.00$, $p = .049$, $ES = 0.23$, respectively), and ranked working with a classmate but not a friend higher for easily-completed assignments ($M_F = 4.81$, $M_M = 5.07$, $t(67) = 38.00$, $p = .017$, $ES = 0.16$); males ranked this higher for easy, difficult, difficult but interesting, fun, and boring assignments ($M_M = 4.69$, $M_F = 5.27$, $t(67) = 17.17$, $p = .037$, $ES = 0.37$; $M_M = 4.41$, $M_F = 5.04$, $t(67) = 15.00$, $p = .042$, $ES = 0.38$; $M_M = 4.25$, $M_F = 4.77$, $t(67) = 17.35$, $p = .037$, $ES = 0.31$; $M_M = 4.86$, $M_F = 5.38$, $t(67) = 19.69$, $p = .032$, $ES = 0.37$; $M_M = 5.07$, $M_F = 5.23$, $t(67) = 64.38$, $p = .010$, $ES = 0.10$, respectively). Females ranked working in a small group higher for difficult but interesting, big, and easily-completed assignments ($M_F = 3.04$, $M_M = 3.54$, $t(67) = 13.16$, $p = .048$, $ES = 0.37$; $M_F = 2.38$, $M_M = 2.76$, $t(67) = 13.53$, $p = .047$, $ES = 0.28$; $M_F = 3.46$, $M_M = 3.72$, $t(67) = 27.62$, $p = .023$, $ES = 0.20$, respectively), and also ranked working in a large group higher

for easy, difficult but interesting, and easily-completed assignments (M_F = 4.08, M_M = 4.41, t(67) = 25.73, p = .025, ES = 0.21; M_F = 3.81, M_M = 4.39, t(67) = 14.14, p = .045, ES = 0.36; M_F = 4.08, M_M = 4.28, t(67) = 41.80, p = .015, ES = 0.15, respectively).

Females ranked "It doesn't matter with whom I work" significantly higher for boring assignments (M_F = 5.08, M_M = 5.55, t(67) = 22.62, p = .028, ES = 0.34) and males ranked this higher for fun, big, and easily-completed assignments (M_M = 5.31, M_F = 5.46, t(67) = 71.80, p = .009, ES = 0.10; M_M = 5.38, M_F = 5.69, t(67) = 35.71, p = .018, ES = 0.25; M_M = 5.45, M_F = 5.95, t(67) = 22.80, p = .028, ES = 0.45, respectively). Females ranked "It doesn't matter how many I work with" higher for easy, difficult, difficult but interesting, and fun assignments (M_F = 5.04, M_M = 5.66, t(67) = 17.26, p = .037, ES = 0.36; M_F = 4.69, M_M = 5.07, t(67) = 25.68, p = .025, ES = 0.24; M_F = 5.31, M_M = 5.64, t(67) = 33.18, p = .019, ES = 0.21; M_F = 4.81, M_M = 5.28, t(67) = 21.47, p = .030, ES = 0.26, respectively), whereas males ranked this higher for easily-completed assignments (M_M = 5.17, M_F = 5.65, t(67) = 22.54, p = .028, ES = 0.30).

Within Cluster 9, fun assignments were ranked as students' first choice on average, followed by easy assignments, assignments that counted for marks, those not counting for marks, difficult but interesting, difficult, and boring assignments, respectively. Males ranked assignments that counted for marks and difficult assignments significantly higher than females (M_M = 3.81, M_F = 4.03, t(67) = 35.64, p = .018, ES = 0.16; M_M = 5.44, M_F = 5.66, t(67) = 50.46, p = .013, ES = 0.15, respectively).

Interpretation. Assignments that counted for marks were ranked higher by all students compared to unmarked assignments. Perhaps grades provided an extrinsic motivation for learning. High-performance students ranked working alone higher for difficult and difficult but interesting assignments, two "high-stake" conditions. This contradicts Diezmann and Watters

(2001) who identified a relation between task difficulty and collaborative preferences within mathematics. Specifically, gifted students preferred working with others for challenging tasks but preferred to work alone for grade-level tasks. Perhaps these high-performance students assumed they would have to complete most of the work in the latter conditions, and therefore preferred to work alone to avoid free riders (Orbell & Dawes, 1981).

High-performance students ranked working with a classmate who was not a friend significantly higher for big assignments, working with a small group higher for easy, boring, and easily-completed assignments, and working in a large group higher for easy and boring assignments. Most of these conditions were "low-stake." Community-school students ranked working with a classmate who was not a friend higher for difficult, fun, boring, and easily-completed assignments, working in a small group higher for difficult, difficult but interesting, and fun assignments, and working in a large group higher for difficult and big assignments. Several of these conditions were "high stake."

All students ranked "It doesn't matter with whom I work" and "It doesn't matter how many people I work with" fifth or lower, except in one case in which high-performance students ranked the latter fourth on average. High-performance students ranked the former higher for difficult but interesting, difficult, fun, boring, and big assignments and ranked the latter higher for fun and boring assignments, whereas community-school students ranked the latter higher for big and easily-completed assignments. When working in a group, high-performance students ranked an assignment that counted for marks, difficult, and easy assignments higher, whereas community-school students ranked boring and difficult but interesting assignments higher.

Males had stronger preferences for how many people they worked with for easy, difficult, difficult but interesting, and fun assignments, whereas females had stronger preferences

for how many they worked with for easily-completed assignments. This is consistent with Hijzen et al. (2006), who reported that males have stronger preferences for superiority or individuality goals. In other words, males have a preference to work on assignments that allow for competition between peers. Other research has also confirmed males' preference for competition (Schapiro et al., 2009).

Teacher- or self-chosen topic (Cluster 3).

Performance-group differences.

Working alone. There were no instances in which either group ranked working alone as their first choice, and there were no significant differences between the groups.

Working with others. Working with a friend was ranked first on average for both groups, and working in a small group was ranked second or third. High-performance students ranked working with a friend and working with a classmate who was not a friend significantly higher when the topic was student-chosen (M_H = 2.21, M_C = 2.50, $t(67) = 16.24$, $p = .039$, $ES = 0.18$; M_H = 5.03, M_C = 5.32, $t(67) = 35.69$, $p = .018$, $ES = 0.19$, respectively), whereas community-school students ranked this higher when the topic was teacher-chosen (M_C = 1.96, M_H = 2.20, $t(67)$ = 17.33, $p = .037$, $ES = 0.16$). Community-school students also ranked working in a small group and a large group higher for an assignment with a student-chosen topic (M_C = 2.68, M_H = 2.88, $t(67) = 27.80$, $p = .023$, $ES = 0.15$; M_C = 3.41, M_H = 3.65, $t(67) = 29.42$, $p = .022$, $ES = 0.14$, respectively). In contrast, high-performance students ranked working in a large group higher for an assignment with a teacher-chosen topic (M_H = 3.66, M_C = 4.22, $t(67) = 14.07$, $p = .045$, ES = 0.34). Finally, high-performance students ranked "It does not matter with whom I work" significantly higher for assignments with a student-chosen topic (M_H = 5.24, M_C = 5.77, $t(67)$ = 20.77, $p = .031$, $ES = 0.40$).

Sex differences.

Working alone. There were no instances in which working alone was ranked first and there were no significant differences between the sexes.

Working with others. Working with a friend was ranked first across conditions; however, working with a classmate who was not a friend was ranked fifth or sixth. Working in a small group was ranked as second or third choice whereas working in a large group was ranked third or fourth. "It doesn't matter with whom I work" and "It doesn't matter how many people I work with" were ranked as fifth, sixth, or seventh choice. Males ranked working with another classmate who was not a friend significantly higher for assignments with a student-chosen topic ($M_M = 5.04$, $M_F = 5.24$, $t(67) = 51.40$, $p = .012$, $ES = 0.13$). Females ranked working in a small group significantly higher for assignments with a student-chosen topic ($M_F = 2.62$, $M_M = 3.00$, $t(67) = 14.79$, $p = .043$, $ES = 0.29$) and also ranked working in a large group significantly higher for an assignment with a teacher-chosen topic ($M_F = 3.71$, $M_M = 3.96$, $t(67) = 30.68$, $p = .021$, $ES = 0.15$). Finally, males ranked "It doesn't matter with whom I work" significantly higher for an assignment with a student-chosen topic ($M_M = 5.30$, $M_F = 5.59$, $t(67) = 37.55$, $p = .017$, $ES = 0.22$), whereas females ranked this option significantly higher for an assignment with a teacher-chosen topic ($M_F = 5.46$, $M_M = 5.67$, $t(67) = 53.00$, $p = .012$, $ES = 0.15$). Females also ranked "It doesn't matter how many people I work with" significantly higher for assignments with a teacher-chosen topic ($M_F = 4.86$, $M_M = 5.67$, $t(67) = 13.00$, $p = .049$, $ES = 0.48$).

Interpretation. High-performance students ranked working with a friend and working with a classmate who was not a friend significantly higher when the topic was student-chosen, and ranked working in a large group higher for assignments with a teacher-chosen topic. Student choice is a central component of inquiry education, an educational framework in which high-

performers thrive (Aulls & Shore, 2008; Clark & Shore, 2004; Robinson, Shore, & Enersen, 2006). Community-school students ranked working with a friend higher when the topic was teacher-chosen, and ranked working in a small group and a large group higher for assignments with student-chosen topics.

Males ranked working with another classmate who was not a friend, and females ranked working in a small group, significantly higher for assignments with a student-chosen topic. Females also ranked working in a large group higher for assignments with a teacher-chosen topic. This might imply that females prefer working in groups regardless of whether the topic is student- or teacher-chosen, and have less of a preference to work with classmates whom they do not know well. Finally, males ranked "It doesn't matter with whom I work" higher for assignments with a student-chosen topic, whereas females ranked this higher for assignments with a teacher-chosen topic. Females also ranked "It doesn't matter how many people I work with" significantly higher for assignments with a teacher-chosen topic. In general, females tended to have fewer preferences in terms of whom they worked with when the topic was teacher chosen. Teacher-assigned topics might make it easier for females to exercise their preference for group harmony by decreasing potential arguments that may arise among group members when selecting a topic. This concern was also mentioned during student interviews.

Selection of groups (Cluster 4). These questions related to group selection for curricular activities, including group selection by the students, teacher, or an attendance sheet.

Performance-group differences. Both groups ranked student-selection of groups first, followed by drawing names from a hat second. Students' last choice was by attendance sheets. High-performance students ranked selection by students, and by attendance sheets significantly higher (M_H = 1.40, M_C = 1.56, $t(67) = 18.50$, $p = .034$, $ES = 0.16$; M_H = 3.86, M_C = 4.22, $t(67)$ =

22.44, $p = .028$, $ES = 0.32$, respectively), whereas community-school students ranked classroom-seating arrangement higher ($M_C = 3.33$, $M_H = 3.60$, $t(67) = 25.67$, $p = .025$, $ES = 0.25$).

Sex differences. Both sexes ranked group selection by the student as first on average, and by an attendance sheet as last. Males ranked group selection by an attendance sheet, and teacher significantly higher ($M_M = 3.85$, $M_F = 4.07$, $t(67) = 36.00$, $p = .018$, $ES = 0.20$; $M_M = 3.04$, $M_F = 3.55$, $t(67) = 12.92$, $p = .049$, $ES = 0.35$, respectively), whereas females ranked drawing names from a hat higher ($M_F = 2.79$, $M_M = 3.19$, $t(67) = 14.95$, $p = .043$, $ES = 0.40$).

Interpretation. All students demonstrated the strongest preference for group selection by the students, with the least preferred selection method based on an attendance sheet. This indicated general preferences for control over group selection.

Group dynamics (Clusters 5 and 8). Cluster 5 included preferences surrounding time and effort when working in a group, whereas Cluster 8 related to discussion within groups.

Performance-group differences. Both groups had the strongest preference for every group member to give equal time and effort, followed by every group member contributing as much time and effort as possible. The least preferred option was that the amount of time or effort contributed did not matter. Community-school students ranked every group member giving as much effort as possible and "Most of the group members give equal amounts of effort" significantly higher ($M_C = 2.04$, $M_H = 2.29$, $t(67) = 17.32$, $p = .037$, $ES = 0.22$; $M_C = 2.96$, $M_H = 3.07$, $t(67) = 54.82$, $p = .012$, $ES = 0.12$, respectively). High-performance students ranked "The amount of effort does not matter, as long as the assignment is completed" higher ($M_H = 3.76$, $M_C = 3.93$, $t(67) = 45.24$, $p = .014$, $ES = 0.18$). Although both groups ranked "Every group member gives equal amounts of time" as first, community-school students ranked this significantly higher ($M_C = 1.56$, $M_H = 1.69$, $t(67) = 25.00$, $p = .025$, $ES = 0.12$). High-performance students ranked

"Most of the group members give equal amounts of time" and "The amount of time it takes to complete the assignment does not matter" higher (M_H = 2.81, M_C = 3.07, $t(67) = 22.62$, $p = .028$, $ES = 0.26$; M_H = 4.26, M_C = 4.44, $t(67) = 48.33$, $p = .013$, $ES = 0.16$, respectively).

In Cluster 8, high-performance students ranked everyone understands even if a long discussion is required significantly higher (M_H = 1.40, M_C = 1.59, $t(67) = 15.74$, $p = .040$, ES = 0.31), whereas community-school students ranked everyone discusses and contributes ideas significantly higher (M_H = 1.59, M_C = 1.79, $t(67) = 16.90$, $p = .038$, $ES = 0.31$).

Sex differences. Overall mean ranks were the same as for performance groups, and although there were no significant differences in terms of effort, males ranked "Most of the group members give equal amounts of time" and "The amount of time does not matter, as long as the assignment is completed" significantly higher (M_M = 2.74, M_F = 2.97, $t(67) = 24.83$, $p = .026$, $ES = 0.23$; M_M = 3.70, M_F = 4.17, $t(67) = 16.75$, $p = .038$, $ES = 0.49$, respectively). Females ranked that every group member should contribute as much time as possible significantly higher (M_F = 2.10, M_M = 2.26, $t(67) = 27.25$, $p = .023$, $ES = 0.15$).

Within Cluster 8, females ranked that everyone should discuss and contribute ideas significantly higher (M_F = 1.62, M_M = 1.70, $t(67) = 41.50$, $p = .015$, $ES = 0.12$), whereas males ranked that the assignment should be completed as quickly as possible, with little discussion higher (M_M = 2.78, M_F = 2.86, $t(67) = 70.50$, $p = .009$, $ES = 0.17$).

Interpretation. Community-school students ranked more highly that every group member should contribute as much effort as possible, and members should give equal amounts of effort and time. High-performance students ranked more highly that effort did not matter as long as the assignment was completed. This contradicts Robinson (1991) whose review of the literature argued that high-ability students' motivation levels were affected by the effort levels of

group members.

High-performance students more highly ranked that, before beginning the collaboration, everyone in the group understands what needs to be done, that is, the goal, even if it takes a long time to discuss. Community-school students more highly ranked that everyone discusses and contributes ideas about how to complete the assignment. Both groups saw value in broad participation, but the high-performance group seemed to place more value on careful goal setting, which might indicate higher metacognitive functioning in terms of planning (Shore, 2000).

Females ranked that all members should contribute as much time as possible significantly higher, however, males ranked higher that most members should give equal time, and time does not matter as long as the assignment was completed. Females ranked more highly that everyone discusses and contributes ideas, whereas males ranked more highly that the assignment should be completed as quickly as possible, with little discussion.

This indicated that high-performance students and females were more tolerant of taking more time to complete the task. These groups may have therefore placed more value on the quality of the process, for example planning, rather than quickly completing the task or assignment. However, community-school students placed more emphasis on group members contributing equal amounts of time and effort, and contributing as much effort as possible, suggesting that these students were more concerned about every member making a fair contribution. Perhaps these students were attempting to avoid the free-rider effect.

Ability (Clusters 6 and 7). Items 18 and 19 dealt specifically with ability, including preferences for working with someone of lower ability, higher ability, or equal ability.

Performance-group differences. Both groups ranked a preference for working with

students of equal ability first and working with students of lower ability as either second last or last. When working in a group, all students ranked that every member should participate to the best of their ability as first, followed by most of the group members should participate to the best of their ability. "The ability of the group members does not matter" was ranked as least preferred for both groups. Community-school students ranked "Every group member participates to the best of their ability," and "Most of the group members participate to the best of their ability" significantly higher (M_C = 1.04, M_H = 1.14, $t(67) = 21.80$, $p = .029$, $ES = 0.29$; M_C = 2.00, M_H = 2.07, $t(67) = 58.14$, $p = .011$, $ES = 0.19$, respectively), whereas high-performance students ranked "The ability of the group members does not matter" significantly higher (M_H = 2.79, M_C = 2.96, $t(67) = 33.82$, $p = .019$, $ES = 0.37$). Community-school students ranked working with students of lower ability higher (M_C = 4.00, M_H = 4.36, $t(67) = 23.22$, $p = .027$, $ES = 0.33$), whereas high-performance students ranked working with students of equal ability, and working with friends as higher (M_H = 1.69, M_C = 1.93, $t(67) = 15.08$, $p = .042$, $ES = 0.27$; M_H = 2.14, M_C = 2.44, $t(67) = 15.27$, $p = .042$, $ES = 0.29$, respectively).

Sex differences. Mean ranks were the same as for performance groups. Females ranked "Every group member participates to the best of their ability" and "Most of the group members participate to the best of their ability" significantly higher than males (M_F = 1.03, M_M = 1.11, $t(67) = 26.75$, $p = .024$, $ES = 0.23$; M_F = 2.00, M_M = 2.04, $t(67) = 101.00$, $p = .006$, $ES = 0.11$, respectively), whereas males ranked that the ability did not matter higher (M_M = 2.85, M_F = 2.97, $t(67) = 48.50$, $p = .013$, $ES = 0.26$). Females also ranked working with lower-ability students, students whom they did not know, and friends higher (M_F = 4.21, M_M = 4.33, $t(67) = 71.17$, $p = .009$, $ES = 0.11$; M_F = 4.21, M_M = 4.33, $t(67) = 71.17$, $p = .009$, $ES = 0.13$; M_F = 2.14, M_M = 2.26, $t(67) = 36.67$, $p = .017$, $ES = 0.12$, respectively). Males ranked working with equal-ability

students higher (M_M = 1.59, M_F = 1.83, $t(67) = 14.25$, $p = .045$, $ES = 0.27$).

Interpretation. All students ranked working with equal-ability students first, and working with lower-ability students second last or last. Furthermore, all students showed the strongest preference for every group member to participate to the best of their ability. These preferences were consistent with the "free-rider" effect, in which students avoid becoming the "sucker" of the group (Orbell & Dawes, 1981). One high-performance student reflected, "If you're the smartest one in your group, let's say, and everybody else has a lower ability in math, it would be kind of hard because you'd do all the work" (P7).

A strong preference to work with others emerged despite the preference to work with equal or higher-ability students. Perhaps the students were of equal-ability levels, although this exploratory, qualitative analysis did not control for ability. When specifically asked about ability, community-school students and females ranked that every member and most members should participate to the best of their ability, and working with someone of lower ability significantly higher than high-performance students and males, respectively. Perhaps the former groups preferred equal effort from members and had fewer objections to working with lower-ability students. High-performance students and males ranked more highly that ability did not matter, but also had stronger preferences for working with members of equal ability. These somewhat contradictory findings could be attributed to the free-rider effect; these groups may not believe that ability levels matter, however, do prefer that group members contribute a solid effort.

Assignment variety (Cluster 10). Items 22 to 26 related to classroom assignments including art projects, writing stories, or memorizing vocabulary lists. These assignments were ranked across contexts such as working individually, working with a teacher-chosen or self-

chosen partner, or working in a teacher-chosen group.

Performance-group differences. Across conditions, both groups ranked developing a game as first or second, working on an art project within the top three, and memorizing a vocabulary list last, with the exception of working in a teacher-chosen group, ranked as fifth. When working individually, community-school students ranked working on an art project and completing mathematics problems higher ($M_C = 2.81$, $M_H = 3.17$, $t(67) = 16.61$, $p = .038$, $ES = 0.21$; $M_C = 3.81$, $M_H = 4.14$, $t(67) = 58.20$, $p = .011$, $ES = 0.20$, respectively). When working with a teacher-chosen partner, high-performance students ranked completing a science-fair project, and memorizing vocabulary higher than the community-school students, who ranked writing a story higher ($M_H = 3.38$, $M_C = 3.58$, $t(67) = 34.80$, $p = .018$, $ES = 0.13$; $M_H = 4.18$, $M_C = 4.58$, $t(67) = 21.90$, $p = .029$, $ES = 0.30$; $M_C = 3.79$, $M_H = 4.08$, $t(67) = 27.14$, $p = .023$, $ES = 0.18$, respectively). With a self-chosen partner, community-school students ranked developing a game higher ($M_C = 1.96$, $M_H = 2.13$, $t(67) = 24.06$, $p = .026$, $ES = 0.12$), whereas the high-performance students ranked completing a science-fair project, and memorizing a vocabulary list higher ($M_H = 3.33$, $M_C = 3.68$, $t(67) = 20.03$, $p = .032$, $ES = 0.26$; $M_H = 4.62$, $M_C = 4.76$, $t(67) = 67.00$, $p = .010$, $ES = 0.13$, respectively). High-performance students ranked memorizing a vocabulary list significantly higher when working in a teacher-chosen group ($M_H = 4.30$, $M_C = 4.64$, $t(67) = 26.29$, $p = .024$, $ES = 0.27$), whereas the community-school students ranked completing a science-fair project higher ($M_C = 3.08$, $M_H = 3.60$, $t(67) = 12.85$, $p = .049$, $ES = 0.37$). Within a self-chosen group, high-performance students ranked developing a game, completing mathematics problems, and memorizing vocabulary higher ($M_H = 1.80$, $M_C = 2.05$, $t(67) = 15.40$, $p = .041$, $ES = 0.18$; $M_H = 4.10$, $M_C = 4.50$, $t(67) = 21.50$, $p = .030$, $ES = 0.28$; $M_H = 4.32$, $M_C = 4.86$, $t(67) = 17.00$, $p = .037$, $ES = 0.48$, respectively).

Sex differences. Both sexes ranked developing a game and working on an art project as first or second, except when working individually, in which case females ranked developing a game third. Memorizing vocabulary was again ranked second last or last choice. When working individually, males ranked completing a science project significantly higher (M_M = 3.59, M_F = 4.17, $t(67) = 13.38$, $p = .047$, $ES = 0.39$) and with a teacher-chosen partner, ranked memorizing vocabulary higher (M_M = 4.19, M_F = 4.47, $t(67) = 30.93$, $p = .021$, $ES = 0.21$), whereas females ranked writing a story as higher (M_F = 3.78, M_M = 4.16, $t(67) = 20.90$, $p = .030$, $ES = 0.24$). With a self-chosen partner, males ranked completing mathematics problems higher (M_M = 3.82, M_F = 4.26, $t(67) = 18.36$, $p = .035$, $ES = 0.26$), whereas females ranked a science fair project, and writing a story higher (M_F = 3.39, M_M = 3.55, $t(67) = 43.38$, $p = .015$, $ES = 0.12$; M_F = 3.81, M_M = 4.21, $t(67) = 20.05$, $p = .032$, $ES = 0.23$, respectively). Within a teacher-chosen group, females ranked completing mathematics problems and science fair projects significantly higher (M_F = 3.84, M_M = 4.12, $t(67) = 28.43$, $p = .022$, $ES = 0.17$; M_F = 3.26, M_M = 3.53, $t(67) = 25.15$, $p = .025$, $ES = 0.19$, respectively). Finally, within a self-chosen group, females ranked an art project, a science project, and writing a story higher (M_F = 2.52, M_M = 2.88, $t(67) = 15.00$, $p = .042$, $ES = 0.23$; M_F = 3.45, M_M = 3.63, $t(67) = 39.33$, $p = .016$, $ES = 0.12$; M_F = 3.81, M_M = 4.44, $t(67) = 13.10$, $p = .049$, $ES = 0.39$, respectively), whereas males ranked completing mathematics problems, and memorizing a vocabulary list higher (M_M = 3.97, M_F = 4.52, $t(67) = 15.44$, $p = .041$, $ES = 0.39$; M_M = 4.41, M_F = 4.61, $t(67) = 45.10$, $p = .014$, $ES = 0.18$, respectively). To summarize, females ranked mathematics higher within a teacher-chosen group, whereas males ranked this higher with a self-chosen partner and self-chosen group. When working individually, males ranked a science project higher, whereas females ranked this higher when working with a self-chosen partner, teacher-chosen group, and self-chosen group.

Interpretation. All students ranked developing a game and working on an art project within the top three and memorizing a vocabulary list as their second last or last choice. Students may therefore be more likely to prefer working with others under a variety of conditions, if the assignment allowed for more creativity, such as developing a game. When working individually, community-school students ranked completing an art project and a page of mathematics problems significantly higher, whereas males ranked completing a science-fair project higher. Males tend to show more interest in mathematics and science as they approach adolescence (Wigfield et al., 2002, as cited in Vasta, Miller, Ellis, Younger, & Gosselin, 2004). When working with a teacher-chosen and a self-chosen partner, high-performance students ranked completing a science-fair project, and memorizing a vocabulary list higher, whereas community-school students ranked writing a story higher with a teacher-chosen partner, and developing a game higher with a self-chosen partner. With a teacher-chosen partner, males ranked memorizing vocabulary higher than females, who ranked writing a story higher. However, with a self-chosen partner, males ranked completing mathematics problems higher, whereas females ranked a science-fair project, and writing a story higher. This is consistent with research suggesting that males have stronger preferences for mathematics and science, although females do have different and specific interests within science (Vasta et al., 2004). Within a teacher-chosen group, high-performance students ranked memorizing vocabulary higher whereas community-school students ranked completing a science-fair project higher. Females ranked completing mathematics problems and science-fair projects significantly higher, contradictory to aforementioned research, providing further support to the importance of considering context. Within a self-chosen group, community-school students ranked developing a game, completing mathematics problems, and memorizing vocabulary higher. Females ranked working on an art

project, writing a story, and completing a science-fair project higher than males, who ranked completing mathematics problems and memorizing a vocabulary list higher.

Although all students generally did not prefer to memorize a vocabulary list, males and high-performance students consistently ranked this option higher than respective comparison groups. High-performance students may have potentially viewed this as a desirable task because they were thinking of memorizing vocabulary in terms of spelling bees, scrabble, or other vocabulary competitions. This may have reflected a certain comfort with competition; when competition is mastery- versus other-oriented, it is not a threat to the quality or stability of friendships among high-ability students (Schapiro et al., 2009). However, for self-chosen groups, the community-school students ranked memorizing a vocabulary list higher. Perhaps these students assumed that memorizing vocabulary would be less boring among self-chosen group members, and were not thinking in terms of competition.

Interviews

Four students from the community-based and five from the high-performance school were interviewed. Questions elaborated on questionnaire items to understand how the items had been interpreted. For example, students were asked to describe a boring assignment, or their favorite part about working in a group.

Although no clear patterns emerged between performance groups, three of the four community-school students mentioned history as an example of a boring assignment. Several students selected subjects as opposed to specific assignments, however, it was assumed that the students were referring to assignments within the subject. Ten of 16 students felt their classmates would definitely agree with their examples.

When asked to describe their best group-work experience, some of the high-performance

students expressed the following, “We made a big song and a dance. We had all our research and we knew everything about this . . . Very, very, very fun. It was pretty interesting too” (P9), “The exhibition, for sure. My group and I, we all had fun researching and talking about robotics . . . it was really fun ’cause, we had to work together, and use different technology to research things” (P7). Community-school students stated, “Project about the digestive system. That was fun to work with in groups” (P3), “When I was in a four group doing a project about space . . . Because they, they agreed me with me a lot about what we would do. They put my alien in the project” (P1).

High-performance students’ worst group experiences included, “It was about democracy. It was so, like boring and we, everybody was like off topic and we would never really get together that much” (P9), and “Hmm, probably our exhibition, because once we got it altogether, it was nice, but we had difficulties while we were doing, like while we were getting everything ready and like researching things because like we were late coming up with an idea of what to do . . . it was difficult and we got in arguments” (P8). Community-school students described, “We had to do like these posters, and I was with two people that I didn't know, so, it was kind of boring” (P4), and “When one of the other students said, nope, we're not going to listen to you . . . They wouldn't let me have an idea” (P1).

When asked if their answers would have changed for different subjects, all students responded yes, although two students changed their responses to no. One student stated, “It kind of answers all my questions to all the subjects and classes” (P7).

High-performance students listed their favorite parts about working in group including, “If an assignment is boring, you can make it fun because you're with someone, so they can like help you, they can cheer you up” (P8) and “When you get to discuss about it with your friends

and they both give like, they give their point of view and all that" (P6). These students also listed their least favorite parts about working in a group including, "I don't like it when people don't get along in a group because it can get chaotic and then they're rude to you, they don't have respect towards you and your work and then there's a hassle" (P9), "We just sometimes argue if we have different ideas and you may not like someone" (P8), and "sometimes you have to like always like explain a few times and they still don't understand . . . it bothers me because I have to like use . . . more time than I should and I have to explain and help someone" (P5).

Community-school students expressed their favorite parts about working in a group including, "Interacting with other people. Getting to like talk to them and stuff. It's fun" (P3), and "Even for partners, that I get to share information that I find out and they share with, what they've learned with me. So . . . both of us learn" (P4). These students mentioned that their least favorite parts about working in a group included, "I guess the boring parts of it that no one wants to do and then they start talking and then they're not ready to do it" (P3), and "If some of them don't work and they don't want to work" (P2).

Favorite parts about working alone for high-performance students included "making my own choices without having people saying, like that's not right, it's wrong" (P9), "I concentrate better" (P8), and "If you're working alone, you just stick to what your opinion is and go from your project from there" (P7). Least favorite aspects included "the project is kind of big, I don't finish it and I don't get a very good mark and that kind of bugs me" (P9), and "[If] I get really confused, it's like I wouldn't really be able to get any help, so I have to take some really like large guesses to find the answers" (P5). Community-school students identified favorite parts about working alone as "You can work and no one can copy you and get the credit for it" (P3) and "just being independent" (P4). Least favorite parts included "You can't like ask something

and I'll be like stuck on something" (P3), and "Sometimes, it can . . . get boring, so it's kind of nice to have someone to cheer you up . . ." (P4).

When asked how often these students would prefer group work, high-performance students responded all the time, not for a big or important assignment, seven out of 10 projects, once in 10 projects, whereas community-school students responded all the time, three times a week and once a week. High-performance students wanted to work alone sometimes depending on the project, for big projects, six out of 10 projects, for writing projects, and for most projects, whereas community-school students mentioned not much, three times a week, only once in awhile or once per week, and equal amounts of time.

When asked if it matters who works with whom in a group, community-school students responded with answers varying from no to it depends on the project, it depends if members are friends, and yes, when not working with friends. High-performance student responses included yes it does matter because sometimes students will not get along, it does not really matter, and sometimes it matters if the students are of differing abilities. For example, "Well, not really. Because, well, sort of . . . if you're lower ability and higher ability in different subjects, you're equaled out . . . It would be frustrating if you're not too good in that subject" (P7).

Interpretation. Both groups mentioned working with a friend, working well with others, and the fun of working in a group as part of their best group-work experiences and community-school students also mentioned advantages of dividing the workload. This is consistent with Melser's (1999) suggested benefits to cooperative learning for gifted individuals including allowing ideas to be shared, concepts to be taught, and opportunities to work with others. In addition, Nelson (1995) summarized benefits of cooperative learning identified by students including fun of talking with group members and having others to make assignments less boring.

Both groups mentioned boring assignments as contributing to some of their worst group-work experiences and high-performance students also mentioned arguments, being unable to come up with ideas, or not having enough time. Community-school students mentioned students ignoring ideas, working with students they did not know, and students who did not want to work. Many of the latter examples involved other group members whereas several former examples expressed difficulties inherent in the task, consistent with research that described high-performance or high-ability students as more task-oriented (Schapiro et al., 2009).

Most of the responses about favorite aspects of working in a group reflected the social dimension of group work (e.g., discussing fun things within the group, opportunity to get to know others better). Responses by high-performance students regarding their least favorite parts about working in groups included arguments between group members with different ideas, explaining something to a group member who did not understand, and complications from dividing tasks amongst members. Community-school students mentioned not being listened to, students who did not do the work, and decision-making regarding division of labor.

High-performance students mentioned being able to make their own choices, easier time concentrating and figuring things out, and having nothing to slow them down as their favorite parts about working alone. Community-school students mentioned independence, fewer distractions, and the inability for students to copy. Despite reasons against working in a group, both groups mentioned requiring more help, or not being able to ask others for help as their least favorite parts about working alone. Community-school students also mentioned increased boredom, and high-performance students mentioned difficulties dividing the workload.

Stout (1993) interviewed Grade 4 and 6 gifted students and consistently concluded that group work was beneficial because they enjoyed working with others, although many stated

concerns about higher instances of arguments among group members and having to wait for others in the group to catch up. These students did not mention concerns about having to teach others, which was inconsistent with the current findings.

There was a wide range of responses when asked how often students would want to be engaged in individual assignments versus group work, and if it matters who works with whom. No real differences between the groups emerged, versus Nelson (1995) who determined that gifted students had fewer preferences for cooperative learning in the classroom.

Conclusions

Students' learning preferences across performance levels are extremely complex. The research question was, under what conditions and on what kinds of tasks do high-performance and community-school students prefer to work alone or with others? In general, high-performance students did not prefer to work alone; there was only one instance in which this option was selected as most preferred (easily-completed assignments), however, all students selected this option first in this condition. Some of the conditions were low-stake (e.g., does not count for marks, classmate-marked, self-marked, easy, fun, boring), while some were high-stake (e.g., difficult but interesting, counts for marks, teacher-marked, difficult). There were only three of 14 conditions in which there were significant differences between performance groups for the option of working alone, and high-performance students had significantly stronger preferences in two of these instances, both high-stake. This suggests a partial lingering truth in the old assertion that gifted individuals prefer to work alone, however, this only occurred in two of the high-stake conditions. There were instances in which these same individuals, under other high-stake conditions, demonstrated stronger preferences to work with others. Although effect sizes were small, this suggests that learning preferences are nuanced, and the literature needs to

be careful about sweeping generalizations.

In addition, there were only a few instances in which students ranked working alone second, specifically for assignments that counted for marks and teacher-marked assignments. High-performance students ranked working alone as their second choice on average for a self-marked assignment and an easy assignment. Overall, within Cluster 1 (preferences about marks), both sexes ranked working alone second or third, and within Cluster 2 (type of assignment), females ranked working alone second for easy assignments.

Although there were some conditions in which working alone was ranked highly, further examination into preferences for working with others was warranted. For instance, all students ranked working with a friend first on average for assignments that did not count, counted for marks, and were teacher-marked. High-performance students ranked self-marked assignments first. Furthermore, within Cluster 2, all students ranked working with a friend as first or second and, within Cluster 3 (teacher- or self-chosen topic), ranked this option first. These numerous instances in which working with a friend was ranked first supported the notion that, regardless of performance, a strong preference to work with others emerged across conditions. Furthermore, working in a small group was ranked within all students' top three choices across conditions of marking, type of assignment, and topic. Consistent with French (2007), who determined that gifted students demonstrated different preferences for working alone depending on how the question was asked, the current study determined that high-performance students' preferences differed depending on the context.

If "It doesn't matter with whom I work" and "It doesn't matter how many people I work with" were ranked highly, this indicated that it might not matter as much to these students in terms of with whom and how many others they worked. However, in approximately 75% of

cases, all students stated strong general preferences for whom and how many others they worked.

Finally, amongst both student-performance groups, there were several instances in which preferences indicated awareness of the "free-rider" effect. For example, high-performance students ranked working in a small group higher only for easy, easily-completed, and boring assignments, and community-school students ranked working with a friend higher only for self-marked assignments or assignments with a teacher-chosen topic. When directly questioned about ability, all students on average ranked working with students of equal ability as their first choice, and working with students of lower abilities as their second last or last choice. High-performance students and males also demonstrated a potential comfort with competition, because these groups ranked memorizing vocabulary higher across several contexts. In addition, all students preferred to have control over group selection, and demonstrated strong preferences for every group member to give equal amounts of time and effort.

Limitations

Limitations of this study included the small sample size, the inability to perform further statistical analyses due to data complexity, and the lack of cultural data. Furthermore, group-work frequency differed amongst groups, which may have subsequently affected mean rankings. In addition, most of the students stated that their answers would have changed depending on the subject. Further research needs to consider contextual variables such as group-work frequency and the school subject matter (Kanevsky, 2010). This could also be accomplished by devising separate versions of the same survey. Another limitation included the inability to control for individual ability or performance. Additional information would enhance confidence in conclusions regarding learning preferences.

Multiple *t*-tests are sometimes problematic because they may overestimate the power of

the statistical tests. However, there were only two comparison groups in this study, and these groups were compared within independent contexts or questions, therefore, the problem of overlapping variance due to a lack of independence was not seen as an issue (Nural, 2001).

Despite limitations, this study was unique, because it included a school in which working with others is the norm. Past studies often only included students from traditional schools, in which the pedagogy focused on direct teaching. The high-performance students attended a school in which inquiry education is the norm. Perhaps the pedagogy directly influences learning preferences, emphasizing the importance of understanding the curricular milieu. In addition, past studies may have presented unattractive alternatives to working alone. The current study presented several different alternatives to working alone, allowing for a more complex picture to emerge.

Implications

Theoretical. No study has fully integrated social-constructivist theories into the research questions and methodology, however, this study emphasized the benefit of considering learning preferences from a social-constructivist framework. Current educational reforms have implemented some aspects of this theory, specifically inquiry education, and such a school was the context for the high-performance sample. However, the community school is also in the process of becoming an IB school without selective admission, and the provincial curriculum emphasizes inquiry-type pedagogy. Mills and Durden (1992) argued that the educational content and instruction strongly impact achievement, and grouping students based on ability will result in effective and efficient learning. They also argued for a highly variable and flexible curriculum in order to meet the needs of students in different situations. This study attempted to uncover some of these learning needs within somewhat different situations or contexts.

For teachers. Learning preferences are largely context-dependent. Gifted, high-ability, or high-performance individuals do not necessarily always wish to work alone, in fact, in several contexts, these individuals prefer working with others, namely assignments that do not count for marks, easy, and boring assignments. In addition, increased awareness and understanding of the "free-rider" effect by teachers can help decrease some of the negative impacts of this phenomenon, for example, modifying marking systems for group-work assignments. This research also has implications for provincial or state-wide testing, specifically, in that the context of the activity or school work will affect student's learning preferences, potentially motivation, and therefore achievement. Perhaps some of the provincial or state-wide testing should include opportunities to work with others.

Furthermore, this research has implications for inclusive education, specifically in that these environments need to consider that individuals will have different preferences depending not only on their ability or performance levels, but also the context of the school assignment. Perhaps administering this questionnaire at the beginning of the year would provide teachers with a sense of how each student prefers to learn.

For researchers and school psychologists. This research helped clarify existing points of debate between proponents and critics of homogeneous and heterogeneous groups. The question needs to change from "Which form of grouping is better?" to "Under which conditions should these groups be formed?" The assumption that gifted individuals prefer working alone within the gifted-education literature needs to be accepted as a misconception and further adjusted to recognize context. High-performance students prefer to work with others under several conditions. For school psychologists, this information can help develop interventions for underachieving gifted or high-performance students. As opposed to merely providing additional

or more challenging individual work (part of the solution), incorporating appropriately designed interactions with other classmates has its place.

Future Directions

Future directions for this research include gathering classroom observational data, information from teachers, and a measure of the strength with which each of the students held his or her viewpoint, which would also allow for an easier calculation of reliability. In addition, based on interview feedback, it would be beneficial to organize questions by subject. A longitudinal study would allow for a developmental picture of learning preferences to emerge. This could also be extended to college-level learning, allowing for a determination of the extent to which specific pedagogical environments affect these preferences. Finally, further examination of the impact of specific pedagogical environments (e.g., inquiry-based), would allow for comparisons in terms of preferences for working alone or with others.

Chapter 4

Final Conclusions

Research questions and methodologies need to be refined and reframed to gather a more comprehensive picture of the factors that influence learning preferences amongst individuals of differing performance or ability levels. Social-learning and social-constructivist theories can aid in this process through consideration of contextual variables in the learning environment including the social milieu. Through a more open-ended investigation, Study #1 and Study #2 taken together, asked, under what conditions and on what kinds of tasks do high-performance and community-school students prefer to work alone or with others? We uncovered highly complex and nuanced learning preferences amongst high-performance and community-school students through the collection of survey and interview data. This greater precision in terms of context-dependent preferences for working alone allowed for more specific statements regarding how high-performance and community-school students preferred to learn.

Contextual factors were summarized into high-stake or low-stake learning conditions. Both high-performance and community-school students generally did not prefer to work alone, however, in two instances, high-performance students showed significantly stronger preferences to work alone in the high-stake conditions. Although this provided support for the longstanding assumption that gifted or high-performance students often prefer to work alone, there were many more instances in which these individuals preferred to work with others, across conditions. Perhaps providing more alternatives to working alone allowed for the emergence of the nuanced preferences that were uncovered. This study supported the need to eliminate the myth that gifted individuals prefer working alone. Future research should now focus on gathering information about how strongly students hold these learning preferences in different learning contexts as well

as gathering information from other sources, including parents and teachers. Other contextual variables that need to be considered include the pedagogical environment and the subject matter. Longitudinal research would also allow for a more detailed developmental picture of these learning preferences.

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Appendix A: Parental Letter of Informed Consent

Project Title: Homogeneous or heterogeneous grouping: Clarifying the criteria for students' preferences for learning alone or in groups.
Principal Student Investigator: Cheryl L. Walker
University: McGill University
Dept: Educational and Counselling Psychology
Phone: H: 514-933-2472; W: 514-398-2892; F: 514-398-6968
Email: cheryl.walker@mail.mcgill.ca
Supervisor: Professor Bruce M. Shore
Contact Information: Phone: 514-398-7685 Email: bruce.m.shore@mcgill.ca

Dear Parent or Legal Tutor,

I am currently a student in the Master of Arts in Educational Psychology program in School/Applied Child Psychology at McGill University, under the supervision of Professor Bruce M. Shore. My research is about students' preferences for working alone or with others on different kinds of projects and with different kinds of groups, for example, large or small, or chosen by the teacher or by the students. The specific research question to be answered is: What are the circumstances under which students prefer working alone or in groups? This information will be gathered through the completion of a questionnaire by the students in your child's class, which will take approximately 30 minutes of your child's class time. In addition, three children from the class will be randomly selected to participate in a 20 to 30 minute interview during class time, for which your child might be chosen. The questions on the questionnaire focus on rating different learning situations along a continuum based on each student's preferences, while the interview questions focus on open-ended questions about learning preferences.

The interviews will be audiotaped but anonymity of your child will be assured because no names will be recorded on the questionnaires, interview protocols, or audiotapes. The only information that will be recorded is the school that your child attends, the grade level, sex, and birth date. Privacy will be enhanced by asking the teacher to be out of the room when the questionnaire and interviews are being completed because participating or not has no impact on school grades. Data will be kept confidential, and will be stored in a locked office at McGill University, only accessible to researchers directly involved with the project. I will be using these results for the completion of my Master's thesis, as well as for various conferences and other publications. We also expect to combine these data with results from other studies in our research group. In all cases, data will be anonymous. Data will be kept for no longer than ten years and then destroyed.

There are no foreseeable harms to having your child participate and some of the potential benefits include having your child reflect on their individual learning preferences, as well as allowing your child to learn more about the process of collecting research data. Your child is under no obligation to participate, and may withdraw from the research at any time. We will only include data from children whose parents or legal tutors give consent, and who also personally agree to take part. Grades and all other class evaluations will not be affected in any way by the

decision to have your child participate or not. In addition, should you choose to have your child participate, any answers your child provides will be kept confidential, and will not be viewed by your child's teacher.

If you have any questions or concerns about your rights or your child's rights as a participant in this project, you may contact the McGill Research Ethics Officer at 514-398-6831. If you have questions about the research, please contact Cheryl L. Walker at 514-933-2472 or Professor Bruce M. Shore at 514-398-7685. A summary of the results of the research will be available several months after the questionnaires and interviews are completed. If you would like a copy of this summary, please check the appropriate boxes and provide contact information on the consent form page. Please retain this letter for your records.

Cheryl L. Walker (Principal Investigator)
Department of Educational and Counselling Psychology, Faculty of Education,
McGill University

Professor Bruce M. Shore
Department of Educational and Counselling Psychology, Faculty of Education,
McGill University

Consent Form

Homogeneous or heterogeneous grouping: Clarifying the criteria for students' preferences for learning alone or in groups.

I have been informed about the above information and I agree to have my child participate in this study of student's learning preferences involving a questionnaire, and a potential interview, about learning preferences for working alone and in groups.

My Child's Name (Printed) _____

Parent/Tutor Signature: _____

Parent/Tutor Name (Printed) _____

Date: Month and Day: _____, 2009

If my child is selected to participate in an interview, I give permission to the researcher to use examples of direct quotes without giving the name of the student.

☐ Yes ☐ No

If my child is selected to participate in an interview, I give permission to the researcher to audio-record the interview.

☐ Yes ☐ No

Parent/Tutor Signature: _____

I would like a copy of the summary of the research results sent:

☐ By mail (please provide postal address): ☐ By e-mail (please provide e-mail address):

_____ _____

_____

_____

Please return the signed form to your child's teacher.
Thank you.

Appendix B: Participant's Letter of Assent

Project Title: Clarifying the criteria for students' preferences for learning alone or in groups

Hello, my name is Cheryl Walker and I am a Master's student at McGill University, working on completing my Master's thesis in School/Applied Child Psychology. You are being asked to participate in my research project. This topic is about the learning preferences of students and will involve completing a questionnaire and possibly participating in an interview. There are no risks to participating and you may find that you learn something interesting about yourself. If you do not wish to participate, you will be allowed to participate in a teacher-approved free activity for the duration of the questionnaire or to look at our questionnaire but we will not keep your replies. The information that you provide in the questionnaire or interview will be kept private, and no names will be written on the questionnaire or interviews. Teachers and classmates will not see your answers or responses. Your parents have also been sent a form about this project and they are passing this page on to you if they have agreed to your participation. Please ask me if you have any questions. It is your choice whether to participate or not and this choice will have no impact on your class grade and your teacher will not be told if you participated or not. If you do choose to participate, you can choose to stop participating at any point, and you can skip any questions that you do not feel comfortable answering.

I have been informed that my parent has given permission for me to participate and I understand that my participation in this project is voluntary. I have been told that I may stop my participation in this study at any time. If I choose not to participate, it will not affect my marks in class in any way. I have been told that I can ask questions at any time.

Student's Name (Please Print):_____

Student's Signature:_____

Date:_____

Appendix C: Questionnaire Items

You will be asked to complete the following questions. These questions will take approximately 30 minutes to complete. Please follow the directions carefully.

Birthdate

Month_____ Date _____ Year _____

Sex (CIRCLE ONE)

Girl Boy

How often do you do group work in your class? (CIRCLE ONE)

Never Sometimes Often Always

For Yes-No questions, just check or X one choice in the box.

For the questions **that are numbered**, RANK each option IN ORDER of most preferred to least preferred
First choice (most preferred) = 1
Second choice = 2, and so on . . .
Last choice (least preferred) = 3, 4, 5 or 6, depending on how many options are presented

---

Do you ever complete assignments that do not count for marks?

☐ Yes ☐ No

If you chose yes, please answer question #1, and if you chose no, please skip question #1.

1. When completing an assignment that **does not count for marks**, I prefer:
   _____ Working alone
   _____ Working with a friend
   _____ Working with another classmate who isn't a friend
   _____ Working in a small group of 3 or 4
   _____ Working in a large group of over 4
   _____ It doesn't matter with whom I work
   _____ It doesn't matter how many people I work with

2. When completing an assignment that **counts for marks**, I prefer:
   _____ Working alone
   _____ Working with a friend
   _____ Working with another classmate who isn't a friend

_____ Working in a small group of 3 or 4
_____ Working in a large group of over 4
_____ It doesn't matter with whom I work
_____ It doesn't matter how many people I work with

3. When completing an assignment that will be **marked by the teacher**, I prefer:

_____ Working alone
_____ Working with a friend
_____ Working with another classmate who isn't a friend
_____ Working in a small group of 3 or 4
_____ Working in a large group of over 4
_____ It doesn't matter with whom I work
_____ It doesn't matter how many people I work with

Do you ever complete assignments that are marked by your classmates?

☐ Yes ☐ No

If you chose yes, please answer question #4, and if you chose no, please skip question #4.

4. When completing an assignment that will be **marked by my classmates**, I prefer:

_____ Working alone
_____ Working with a friend
_____ Working with another classmate who isn't a friend
_____ Working in a small group of 3 or 4
_____ Working in a large group of over 4
_____ It doesn't matter with whom I work
_____ It doesn't matter how many people I work with

For every question, please put a 1 beside your first (most preferred) choice, then 2 beside your second preferred choice, then 3, and so on for every choice.

Do you ever complete assignments that are marked by you?

☐ Yes ☐ No

If you chose yes, please answer question #5, and if you chose no, please skip question #5.

5. When completing an assignment that will be **marked by me**, I prefer:

_____ Working alone
_____ Working with a friend
_____ Working with another classmate who isn't a friend
_____ Working in a small group of 3 or 4
_____ Working in a large group of over 4

_____
_____ It doesn't matter with whom I work
_____ It doesn't matter how many people I work with

6. If faced with an **easy assignment**, I prefer:

_____ Working alone
_____ Working with a friend
_____ Working with another classmate who isn't a friend
_____ Working in a small group of 3 or 4
_____ Working in a large group of over 4
_____ It doesn't matter with whom I work
_____ It doesn't matter how many people I work with

7. If faced with a **difficult assignment**, I prefer:

_____ Working alone
_____ Working with a friend
_____ Working with another classmate who isn't a friend
_____ Working in a small group of 3 or 4
_____ Working in a large group of over 4
_____ It doesn't matter with whom I work
_____ It doesn't matter how many people I work with

8. If faced with a **difficult but interesting assignment**, I prefer:

_____ Working alone
_____ Working with a friend
_____ Working with another classmate who isn't a friend
_____ Working in a small group of 3 or 4
_____ Working in a large group of over 4
_____ It doesn't matter with whom I work
_____ It doesn't matter how many people I work with

For every question, please put a 1 beside your first (most preferred) choice, then 2 beside your second preferred choice, then 3, and so on for every choice.

9. If faced with a **fun assignment**, I prefer:

_____ Working alone
_____ Working with a friend
_____ Working with another classmate who isn't a friend
_____ Working in a small group of 3 or 4
_____ Working in a large group of over 4
_____ It doesn't matter with whom I work
_____ It doesn't matter how many people I work with

10. If faced with a **boring assignment**, I prefer:

_____ Working alone

_____
_____ Working with a friend
_____ Working with another classmate who isn't a friend
_____ Working in a small group of 3 or 4
_____ Working in a large group of over 4
_____ It doesn't matter with whom I work
_____ It doesn't matter how many people I work with

11. For a **big assignment**, I prefer:

_____ Working alone
_____ Working with a friend
_____ Working with another classmate who isn't a friend
_____ Working in a small group of 3 or 4
_____ Working in a large group of over 4
_____ It doesn't matter with whom I work
_____ It doesn't matter how many people I work with

12. For assignments that can be completed **easily**, I prefer:

_____ Working alone
_____ Working with a friend
_____ Working with another classmate who isn't a friend
_____ Working in a small group of 3 or 4
_____ Working in a large group of over 4
_____ It doesn't matter with whom I work
_____ It doesn't matter how many people I work with

For every question, please put a 1 beside your first (most preferred) choice, then 2 beside your second preferred choice, then 3, and so on for every choice.

Do you ever complete assignments where the topic is chosen by the students?

☐ Yes ☐ No

If you chose yes, please answer question #13, and if you chose no, please skip question #13.

13. When completing an assignment in which the topic is to be **chosen by the student(s),** I prefer:

_____ Working alone
_____ Working with a friend
_____ Working with another classmate who isn't a friend
_____ Working in a small group of 3 or 4
_____ Working in a large group of over 4
_____ It doesn't matter with whom I work
_____ It doesn't matter how many people I work with

14. When completing an assignment where the topic is to be **chosen by the teacher**, I prefer:

_____ Working alone
_____ Working with a friend
_____ Working with another classmate who isn't a friend
_____ Working in a small group of 3 or 4
_____ Working in a large group of over 4
_____ It doesn't matter with whom I work
_____ It doesn't matter how many people I work with

15. When asked to work in a group on an assignment, I prefer the **groups to be selected**:

_____ By the teacher
_____ By the students
_____ By drawing names out of a hat
_____ Based on classroom seating arrangement
_____ Based on an attendance sheet

16. When I am **working in a group**, it is important that:

_____ Every group member gives equal amounts of **effort**
_____ Most of the group members give equal amounts of **effort**
_____ Every group member gives as much **effort** as possible to the assignment
_____ The amount of **effort** does not matter, as long as the assignment is completed.
_____ The amount of **effort** each team member gives does not matter.

For every question, please put a 1 beside your first (most preferred) choice, then 2 beside your second preferred choice, then 3, and so on for every choice.

17. When I am **working in a group**, it is important that:

_____ Every group member gives equal amounts of **time**
_____ Most of the group members give equal amounts of **time**
_____ Every group member gives as much **time** as possible to the assignment
_____ The amount of **time** does not matter, as long as the assignment is completed.
_____ The amount of **time** it takes to complete the assignment does not matter.

18. When I am **working in a group**, it is important that:

_____ Every group member participates to the best of their **ability**
_____ Most of the group members participate to the best of their **ability**.
_____ The **ability** of the group members does not matter.

19. When a teacher asks you to work in groups, rank the following in terms of your preference for **whom you wish to work with**:

_____ Students who work at a lower ability than yourself
_____ Students who work at a higher ability than yourself
_____ Students who work at an equal ability with yourself

_____
_____ Students who are your friends
_____ Students whom you don't know

20. When I am **working in a group**, it is important that:

_____ Everyone understands exactly what needs to be done, even if we need to take a long time to discuss it.
_____ Everyone discusses and contributes ideas about how to complete the assignment
_____ The assignment be completed as quickly as possible, with little discussion

For every question, please put a 1 beside your first (most preferred) choice, then 2 beside your second preferred choice, then 3, and so on for every choice.

21. When a teacher asks you to work in groups, rank the following in terms of your preference for the **type of assignment**:

_____ Boring assignment
_____ Easy assignment
_____ Fun assignment
_____ Counts for marks
_____ Does not count for marks
_____ Difficult assignment
_____ Difficult but interesting

22. Rank the following in terms of your preference for school assignments that involve **working individually**:

_____ Developing a game
_____ Working on an art project
_____ Completing a page of math problems
_____ Completing a science fair project
_____ Memorizing a vocabulary list
_____ Writing a story

Do you ever complete assignments with a partner that your teacher chooses?

☐ Yes ☐ No

If you chose yes, please answer question #23, and if you chose no, please skip question #23.

23. Rank the following in terms of your preference for school assignments that involve **working with a partner whom the teacher chooses**:

_____ Developing a game
_____ Working on an art project
_____ Completing a page of math problems
_____ Completing a science fair project

_____
_____ Memorizing a vocabulary list
_____ Writing a story

Do you ever complete assignments with a partner that you choose?

☐ Yes ☐ No

If you chose yes, please answer question #24, and if you chose no, please skip question #24.

24. Rank the following in terms of your preference for school assignments that involve **working with a partner whom you choose**:

_____ Developing a game
_____ Working on an art project
_____ Completing a page of math problems
_____ Completing a science fair project
_____ Memorizing a vocabulary list
_____ Writing a story

For every question, please put a 1 beside your first (most preferred) choice, then 2 beside your second preferred choice, then 3, and so on for every choice.

Do you ever complete assignments in a **group chosen by the teacher**?

☐ Yes ☐ No

If you chose yes, please answer question #25, and if you chose no, please skip question #25.

25. Rank the following in terms of your preference for school assignments that involve working in a **group chosen by the teacher**:

_____ Developing a game
_____ Working on an art project
_____ Completing a page of math problems
_____ Completing a science fair project
_____ Memorizing a vocabulary list
_____ Writing a story

Do you ever complete assignments in a **group that you choose**?

☐ Yes ☐ No

If you chose yes, please answer question #26, and if you chose no, please skip question #26.

26. Rank the following in terms of your preference for school assignments that involve working in a **group that you choose**:

_____ Developing a game
_____ Working on an art project
_____ Completing a page of math problems
_____ Completing a science fair project
_____ Memorizing a vocabulary list
_____ Writing a story

Thank you for answering these questions.

Appendix D: Interview Items

1. Please give me an example of a difficult but interesting assignment? Would your classmates agree with you?
2. Please give me an example of a boring assignment? Would your classmates agree with you?
3. Tell me about one of your best group-work experiences--but don't mention any other children's names.
4. Tell me about one of your worst group-work experiences--but don't mention any other children's names.
5. Think about the questionnaire you just did: Would your answers change for different class subjects? (prompt?) For example . . . ?
6. What is your "most favorite" part about doing school work in a group with other classmates?
7. What is your least favorite part about doing school work in a group with other classmates?
8. What is your "most favorite" part about doing school work on your own?
9. What is your least favorite part about doing school work on your own?
10. If you had a choice, how often would you want to do school work in a group? Why?
11. If you had a choice, how often would you want to do school work alone? Why?
12. Does it matter who works with whom on school work in a group? Please explain. Without giving names, can you describe an example of when it does matter and tell me why it matters?