DO HIGH ABILITY LEARNERS ENJOY LEARNING ALONE *OR* IN GROUPS? IT DEPENDS….

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Pedagogical shifts favouring collaborative learning and findings of recent studies have raised concerns regarding the claim that gifted students prefer to learn alone. The purpose of this study was to further investigate if, when and how high ability learners want to work with or without others. The distributions of 416 high ability students (n=416; Gr. 3-8) responses to survey items were analyzed. Items assessed their general feelings about working alone and in a group and the appeal of specific conditions. Although a majority indicated they enjoyed learning alone, more also enjoyed group work-under certain conditions. Age differences were found but none related to gender. More of the younger students enjoyed teaching their peers while more of the older students were eager to contribute to group discussions and be seated in clusters. Sitting alone became increasingly unpopular with older students. The broad variability in the distribution of students' ratings across conditions demonstrated the preferences of high ability learners are sensitive to many factors in the setting, not just the involvement of others. High ability learners may prefer to work alone when attractive conditions for working in groups are not available. Evidence-based guidelines for group work are offered.

Do High Ability Learners Enjoy Learning Alone or In Groups? It Depends….
Calls for collaborative learning experiences as well as the findings of recent studies (e.g., Adams-Byers, Whitsell & Moon, 2004; French, Walker & Shore, 2011) clash with claims that high ability learners (HAL) may prefer to work alone (e.g. Davis, Rimm & Siegle, 2011, p. 39; Manning, 2006, p. 66). The research findings indicate students' feelings about working alone and in groups are dynamic, and vary under different conditions. The work described here continues to *reconsider* (French & Shore, 2009) the belief that HAL prefer to work alone, extending the findings of studies that challenge this *common assumption* (Walker, Shore & French, 2011, p. 135). Its purpose is to further investigate if, when and how HAL, in general, as well as girls and boys of different ages, want to work with or without the company of others.

Within class grouping has strengths and weaknesses. When compared to individual learning experiences, small group learning offers greater individual academic benefits, better group task performance as well as other positive process and affective outcomes (Lou, Abrami & d'Apollonia, 2001), however students identified as gifted (SIG) have expressed numerous concerns when they are grouped heterogeneously with students of differing abilities (e.g., Clinkenbeard, 1991; French et al., 2011; Robinson, 1990, 1991). Although many may enjoy peer teaching (Ristow, Edeburn & Ristow, 1985), many resent being employed as a *junior teacher* (Coleman, Gallagher & Nelson, 1993; Robinson, 1990, 2003) and worry that their grade will suffer if they do not accept a disproportionate amount of the work (Robinson, 2003). Saloman and Globerson (1989) described a number of potential adverse *effects* of unfair group dynamics, particularly when members differ in ability. They include the *free rider* (when one members does less than her or his share and expects the high ability member to do it), the *sucker* (when all other members expect the most able to do all the work), and the *status differential* (*Higher status members dominate group activity…they receive and give more help than lower status ones.* (p. 95)).

Studies have not provided consistent support for the belief that HAL prefer to learn alone more than their peers. While some findings indicated gifted students preferred *independent study* (e.g., Boultinghouse,

1984; Chan, 2001; Li & Bourque, 1987; Ricca, 1984; Ristow et al., 1985; Stewart, 1981) and learning alone (French et al, 2011; Griggs & Price, 1980; Li & Adamson, 1992; Pyryt, Sandals & Begoray, 1998), others did not (e.g., Burns, Johnson & Gable, 1998; Dunn & Price, 1980; Rayneri, Gerber & Wiley, 2006). Burns, et al. (1998) work was the only study found to intentionally replicated an earlier study, Dunn and Price's (1980) comparison of the learning style preferences of gifted and non-gifted students. Extensive differences in the findings of these two studies and most of those on this topic, continue to raise concerns that the rigorous, consistent body of evidence needed to support characterizations that gifted students may prefer to learn alone does not exist.

Most of the studies cited above employed one or both of two conceptually disparate instruments, which shared very similar names: Dunn, Dunn and Price's Learning Style Inventory (DDPLSI; 1978/1989/2000) and Renzulli, Smith and Rizza's Learning Styles Inventory (RSRLSI; Renzulli, Rizza & Smith, 2002; Renzulli & Smith, 1978; Renzulli, Smith & Rizza, 1998). The Dunns and their colleagues defined learning style as modalities that reflect *the way in which individuals begin to concentrate on, process, internalize, and retain new and difficult academic information* (Dunn, Griggs, Olson, Beasley & Gorman, 1995, p. 353). Their survey was designed to determine the environmental, emotional, sociological, physiological and processing characteristics of an activity an individual finds most conducive to her or his learning. Renzulli, Smith and Rizza's instrument focused on determining the extent which students enjoyed particular *instructional techniques* as assessed by items clustered in nine subscales including Independent Study, group Projects, Peer Teaching (being taught by a peer, not teaching a peer) and Discussion. Age-specific versions of both instruments have been developed in recent years however all have retained their original goals.

For the purposes of their research, French et al. (2011) designed an instrument to investigate factors that might influence gifted individual's desire to work alone and in groups. It included items from the RSLSI (1978) addressing independent study, group projects, and peer tutoring. Other items addressed popularity, personality and perceived support. Comparative analyses of the responses of school identified gifted, high achieving and non-gifted students revealed numerous main and interaction effects related to ability, gender and age. Students identified as gifted indicated a preference for working alone however their eagerness to work in groups increased when they felt they would be supported and appreciated in their group. In light of this result and others, French et al. concluded, *Some gifted students prefer to work alone some of the time*. (p. 154)

In Kanevsky's (2011) study, more than 70% of the students identified gifted (SIG) as well as 58.3% of students not identified gifted (SNIG) enjoyed *working in groups sometimes and alone sometimes*, i.e., a majority of students in both groups felt the same way but a larger proportion of the SIG than SNIG. When working on projects, the same percentage of students in both groups (40.5%) reported they liked to work alone, 17.8% less than those who had said *sometimes*. The popularity of project work in groups varied from a high of 89.1% of SIG and 85.1% of SNIG when they were able to chose their group, to the least popular condition, working with others who learned more quickly, to which 61.5% of SIG and 64.4% of SNIG gave negative ratings. Apparently many highly able learners and their peers enjoyed learning both with and without peers … it depended upon with whom they worked. The similarities in the proportions of SIG and SNIG's responses cast doubt on the validity of claims that a preference for working alone distinguishes highly able learners from their peers and raises inevitable questions regarding when and under what conditions they like learning alone rather than in groups, vice versa, and when they don't care.

SIG have also been found to prefer working on their own when they felt they would be expected or have to do more than their share of the work (French et al., 2011), or when the task was easy (Diezmann & Watters, 1997). And when do many SIG say they prefer to learn in a group? More than 70% of SIG in Kanevsky's (2011) study enjoyed it when they were able to choose their group and worked in a group with peers who learned at their pace. They did not want to work with others if they were assigned to a group by their teacher, taught by classmates, or worked with others who learned at a faster pace.

Some studies examining ability- and gender-related differences in the learning preferences of SIG have found differences in some preferences related to individual and group work, other studies have not. When using the DDPLSI, Pyryt et al. (1998) found boys preferred learning with peers while girls preferred to learn on their own. Similarly, boys also had more positive attitudes toward cooperative learning (Ramsay & Richards, 1997). In contrast, Ewing and Yong (1992), Hlawaty (2009), and Yong and McIntyre (1992) found gender-related differences in other learning style preferences but not in

learning alone or with peers. Using the RSRLSI, Ristow et al. (1985) found more girls enjoyed Discussion than boys (83.3% versus 66.7% respectively), and French et al. (2011) found girls rated Peer Teaching and Independent Study higher than boys with their survey. When comparing individual, cooperative and competitive learning, Li and Adamson (1992) reported differences that were dependent upon school subject. Gifted students preferred individual activities overall; they were rated highest by girls in English and boys in Science, and by both genders in Math. These inconsistent findings do not offer a clear sense of the nature or direction of gender-related differences in students' preferences for working alone or with others, or when they arise.

Studies of high ability learners' preferences that included age in their analyses have also generated diverse results. Again, some studies found no differences in students' preferences for learning alone or in groups although they did find others (Ewing & Yong, 1992; Hlawaty, 2009; Yong & McIntyre,1992). French et al. (2011) found SIG in junior high and high school preferred to work alone while those in elementary grades did not. Interestingly, these preferences only appeared in data derived from a *suggested-choice* item but not in their responses to open-ended questions. They recommended further research to clarify the effects of gender and age on preferences and the learning conditions that influence them (French et al., 2011).

As the evidence base for social constructivist and sociocultural theories and pedagogies grow in strength and influence classroom practices, educators seek to create learning activities and settings in which students co-construct knowledge and develop increasingly sophisticated psychological functions. Collaboration is a central concept in Vygotsky's (1978) zone of proximal development (ZPD) and therefore sociocultural theory. The ZPD is often characterized as a zone of intellectual readiness, however it is more than that; affect is involved as well (Goldstein, 1999; Levykh, 2008). The way students feel about learning in a particular way influences their willingness to engage and take risks. These feelings play significant roles in ZPDs, healthy collaborative relationships and learning communities. Given the mutual contributions of intellect and affect in sociocultural accounts of development, it is essential that we understand their dynamics, including students' feelings about features of individual and shared learning activity.

The data reported here were collected as part of a larger study of students' feelings about learning experiences differentiated in ways recommended for gifted students by Maker and Nielson (1996). The results of comparative analyses of gifted and non-gifted students' responses are reported elsewhere (Kanevsky, 2011). During that analysis it became apparent that students responses to items focused on group and individual work could address potential age and gender-related differences not included in the analysis focused only on ability. In addition to high ability learners' general feelings about learning alone and in groups, their feelings about conditions related to these options could also be considered. These include seating arrangements, choice of group members and the pace of their learning, as well as activities often involved in group work (discussion, peer teaching, and sharing reasoning). As a result, the research questions addressed in these analyses are:

1. Do high ability learners enjoy learning alone and in groups?
2. When learning alone or in groups, which conditions do highly able students like most and least?
3. Are there differences in the proportions of high ability girls and boys who like and dislike those conditions?
4. Are there age-related differences in the proportions of high ability students who like and dislike those conditions?

Methods
Participants
The 416 students in this study were enrolled in Grades 3 to 8 in two suburban school districts, one in western Canada (*n*=171) and one in the northeastern United States (*n*=245). Table 1 provides the number of participants by gender and grade level. All had been identified as intellectually, academically, spatially or creatively gifted according to criteria and procedures established by their school districts and all were enrolled in a part-time pullout program up to three hours each week. The sample was 81.7% Caucasian, 14.4% Asian, and 3.9% were of other ethnicities.

Table 1.   Number of Participants by Gender and Grade Level

Grades	Girls	Boys	Total
3 & 4	75	59	134
5 & 6	59	84	143
7 & 8	66	73	139
Total	200	216	416

Instrument
The *Possibilities for Learning* (PFL; Kanevsky, 1996) was a 110-item survey designed to assess students' preferences for specific features of learning experiences. Each item began with *I really like* which was followed by a description of learning in a manner consistent with of one of Maker and Nielson's (1996) principles of curriculum differentiation for gifted learners. Students rated each item on a 5-point Likert scale: strongly agree (SA), agree (A), neutral (N), disagree (D) and strongly disagree (SD). Participants were asked to identify which of five school subjects (Reading, Writing, Math, Science, Social Studies) was their favourite before beginning the survey and then to rate each item in the context of that subject. This was to focus their ratings on content they valued most as a passion for learning is often a defining characteristic of gifted students (Gross, 1998; Porath & Lupart, 2009; Winner, 1996). It was believed that the way they learned in their favourite subject would be more important to them than it might have been in those they valued less.

This analysis focuses on participants' responses to 15 of the 110 items that focused on either working alone or in a group. The text of all 15 items appears in each table in the Results section. The process of the survey's development and establishing its psychometric properties (reliability, face and content validities) were described in detail in Kanevsky (2011).

Procedure
The PFL survey was administered in students' classrooms either by their regular teacher, the teacher or coordinator of the pullout program, or the author. Participants took 40 to 90 minutes to complete the survey.

Results
Do high ability learners enjoy learning alone <u>and</u> in groups?
This general question was addressed by examining responses to the first three of the 15 items (see Table 2). The distribution of students' scores across the five rating categories (strongly agree to strongly disagree) indicated on the relative popularity of each learning condition as well as the homogeneity or heterogeneity of participants' feelings about them.

 As can be seen in Table 2, yes, many highly able learners enjoyed learning alone (58% positive on Item 1) and even more of them *sometimes* enjoyed learning with others *as well as* learning alone (72.2% positive on Item 3).   Of the 125 students (30% of the sample) who strongly agreed with *I really like learning by working on my own*, 76 (60.8% of them) felt the same way about doing projects in a group when they were able to choose their group; only 16 (12.8%) strongly disagreed. Sixty-seven of the 125 (53.6%) also strongly agreed with working in a group with others who learn at their pace.   It appears that the *preference* to work alone may be the default for many of these students when attractive conditions for working with others were not available.

Another factor influencing their desire to work solo appears to be the nature of the task as only 40.5% wanted to work on projects by themselves. This is 17.5% fewer than the 58% who had indicated they *really like learning by working on their own*. Again, these results indicate many students who indicated they enjoyed working alone also enjoyed learning with others under some conditions. For example, when given the opportunity to choose their group or work with others who learn at their pace, more said they enjoyed group work than working alone. As will be described in the next section, they also enjoyed working in a group in other situations as well.

Conditions highly able students liked most and least
Table 2 also provides the distribution of participants' ratings for each of the 12 conditions related to learning alone or in groups while studying their favourite subject. They have been clustered in to four categories to facilitate their interpretation: seating arrangements, control over group composition, pace of group members' learning and activities in group settings. In order to be considered a most or least

popular condition for learning their favourite subject, an item must have received positive (SA + A) or negative (SD + D) ratings from a majority of participants. Eight items met this criterion, four positive and four negative. Being able to choose the members of their group when working on a project was most popular (83.5% positive), followed by opportunities to work *with kids who learn as quickly as* they did (76.8% positive). Many were also eager to sit with their desks in clusters (62.4% positive) and enjoyed talking in group discussions (54.7% positive).

Table 2. Percentages of Item Responses in Each Rating Category for All Participants

Items	SA	A	N	D	SD
Learning alone					
1. I really like learning by working on my own.	30.3	27.7	25.2	10.0	6.8
2. I really like to work alone on big projects.	26.0	14.5	24.8	18.1	16.7
3. Sometimes I like to work in groups and sometimes I like to work alone.	40.7	31.5	19.9	4.4	3.6
Seating arrangements					
4. I really like sitting alone.	14.5	7.5	18.7	19.2	40.1
5. I really like sitting in clusters of 3 - 6 desks.	36.7	25.7	21.7	6.5	9.5
Control over group composition					
6. I really like doing projects in a group when I get to choose my group.	62.2	21.3	11.1	2.9	2.4
7. I really like doing projects in a group when my teacher assigns me to my group.	4.5	13.1	27.0	26.5	29.0
Pace of group members' learning					
8. When I'm learning in a group, I really like working with kids who learn more slowly than I do so I am teaching them what I already know.	10.4	15.1	27.2	23.3	24.0
9. When I'm learning in a group, I really like working with kids who learn as quickly as I do.	46.0	30.8	16.5	4.6	2.2
10. When I'm working in a group, I really like working with kids who learn more quickly than I do so I have to work very hard to keep up with them.	5.9	11.3	21.2	30.0	31.5
Activities in group settings					
11. I really like to talk in group discussions.	31.5	23.2	24.1	11.2	10.0
12. I really like teaching other kids in my class.	16.8	22.6	28.2	19.7	12.7
13. I really like having kids in my class teach me.	3.5	11.0	30.3	27.8	27.5
14. I really like hearing about how other students are thinking about something I'm having trouble with.	15.3	32.8	26.6	13.0	12.3
15. I really like explaining my thinking to other students.	19.8	25.4	26.6	17.3	11.0

Working with others *who learn more quickly than I do so I have to work very hard to keep up with them* was least popular as it received negative ratings from 61.5% of these students. This was followed closely by *sitting alone* (59.3% negative), being assigned to a group for project work by their teacher (55.5% negative), and being taught by classmates (55.3% negative).

Participants' ratings on the remaining four items were dispersed across the response categories (from SA to SD) indicating students' feelings about those conditions were heterogeneous, i.e., some liked it, some did not and some were neutral. This was true of ratings for teaching classmates, hearing others' reasoning, explaining their reasoning to others and working with others who learned at a slower pace.

Gender-related differences in feelings about the conditions
Percentages of positive and negative responses are provided for the gender-related analysis in Table 3. They represent the proportion of students who liked and disliked each condition. Pooled results for all participants are provided as a reference. Chi-square analyses were performed to compare the distribution of responses to each item based on gender. In response to the increased risk of Type I error due to multiple comparisons (30), the Bonferroni correction was applied to an alpha level of .1. This resulted in a very conservative adjusted significance criterion of .003 for group differences to achieve statistical significance. Although this would avoid false-positives, it would also likely result in false-negatives so an adjusted critical value of .01 was set due to the exploratory nature of this work. None of the chi-squares comparing the responses of girls and boys revealed statistically significant group differences (see

Table 3) indicating the distributions of their responses were similar for all four categories of learning conditions.

Table 3. Percentages of Ratings (Positive = SA + A; Negative = SD + D) and Chi-Square Statistics for Each Item for All Participants and by Gender

Items	All N = 416		Girls N = 200		Boys N = 216		χ^2 (df=4)	p
	Positive	Negative	Positive	Negative	Positive	Negative		
Learning alone								0.133
1. I really like learning by working on my own.	58.0	16.8	62.1	14.2	54.2	19.1	7.06	
2. I really like to work alone on big projects.	40.5	34.8	42.6	29.9	38.4	39.4	4.23	0.376
3. Sometimes I like to work in groups and sometimes I like to work alone.	72.2	8.0	76.0	7.0	68.6	8.9	3.25	0.474
Seating arrangements								
4. I really like sitting alone.	22.0	59.3	19.1	61.8	24.6	57.0	3.70	0.448
5. I really like sitting in clusters of 3 - 6 desks.	62.4	16.0	64.2	15.0	60.6	16.8	2.91	0.574
Control over group composition								
6. I really like doing projects in a group when I get to choose my group.	83.5	5.3	85.9	5.0	81.3	5.6	2.01	0.733
7. I really like doing projects in a group when my teacher assigns me to my group.	17.6	55.5	18.0	57.3	17.1	53.8	2.63	0.621
Pace of group members' learning								
8. When I'm learning in a group, I really like working with kids who learn more slowly than I do so I am teaching them what I already know.	25.5	47.3	22.3	48.7	28.5	45.9	4.99	0.288
9. When I'm learning in a group, I really like working with kids who learn as quickly as I do.	76.8	6.8	77.9	5.5	75.7	7.9	1.33	0.856
10. When I'm working in a group, I really like working with kids who learn more quickly than I do so I have to work very hard to keep up with them.	17.2	61.5	14.1	66.2	20.2	57.2	7.15	0.128
Activities in group settings								
11. I really like to talk in group discussions.	54.7	21.2	52.0	23.7	57.1	18.9	4.90	0.298
12. I really like teaching other kids in my class.	39.4	32.4	44.4	28.5	34.8	35.8	9.39	0.052
13. I really like having kids in my class teach me.	14.5	55.3	14.4	52.3	14.7	58.1	4.71	0.319
14. I really like hearing about how other students are thinking about something I'm having trouble with.	48.1	25.3	51.8	21.5	44.6	28.9	12.66	0.013
15. I really like explaining my thinking to other students.	45.2	28.3	47.9	27.3	42.4	29.2	5.29	0.258

Age-related differences in feelings about the conditions
The same frequency and chi-square analyses performed in the gender comparison were undertaken to contrast grade level groups. The results appear in Table 4. Statistically significant age differences were found for both items referring to seating arrangements and two activities in group settings. No grade-related differences achieved significance in the remaining eight conditions indicating the distribution of students' responses in all three grade groups were similar.

Seating arrangements: Initial chi-square analyses of students' responses to items related to sitting alone and in clusters revealed complementary, statistically significant age differences (sitting alone: χ^2=27.16, df=8, p=.001; sitting in clusters: χ^2=23.55, df=8, p=.003). Post hoc paired comparisons were undertaken to determine which differences among the three grade groups contributed most to these findings. Although a majority of students in all three grade groups disliked sitting alone, significant increases were found between the Grade 3/4 and 5/6 groups (χ^2=17.395, df=4, p=.002), as well as the Grade 3/4 and 7/8 groups (χ^2=23.961, df=4, p=.000). The differences were most evident in the percentage of students who felt strongly about sitting alone. Of the Grade 3/4s, 26.4% strongly agreed with this item and 36.8% strongly disagreed, while 9.6% of the 5/6s and 7.7% of the 7/8s strongly agreed, and 45.9% of the 5/6s and 46.4% of the 7/8s strongly disagreed. Younger students' feelings about sitting alone were more heterogeneous than the more negative responses of the older students.

Table 4. Distributions of Ratings (Positive = SA + A; Negative = SD + D) and Chi-Square Statistics for Each Item for All Participants and Each Grade Level Group

	All N = 416		3 & 4 N = 134		5 & 6 N = 143		7 & 8 N = 139		χ^2 (df=8)	p
Items	Positive	Negative	Positive	Negative	Positive	Negative	Positive	Negative		
Learning alone										
1. I really like learning by working on my own.	58.0	16.8	66.4	9.9	56.7	18.2	51.4	21.7	10.78	0.214
2. I really like to work alone on big projects.	40.5	34.8	39.7	38.9	40.7	34.3	40.8	31.3	10.35	0.241
3. Sometimes I like to work in groups and sometimes I like to work alone.	72.2	8.0	66.1	12.1	75.6	7.0	74.4	5.1	13.86	0.085
Seating arrangements										
4. I really like sitting alone.	22.0	59.3	34.4	52.0	20.9	58.3	11.7	67.2	27.16	0.001
5. I really like sitting in clusters of 3-6 desks.	62.4	16.0	55.9	26.0	62.8	10.7	67.9	12.0	23.55	0.003
Control over group composition										
6. I really like doing projects in a group when I get to choose my group.	83.5	5.3	82.8	9.0	83.6	4.9	84.1	2.1	10.26	0.247
7. I really like doing projects in a group when my teacher assigns me to my group.	17.6	55.5	20.1	57.4	17.5	57.7	15.2	51.5	15.97	0.043
Pace of group members' learning										
8. When I'm learning in a group, I really like working with kids who learn more slowly than I do so I am teaching them what I already know.	25.5	47.3	35.7	38.0	24.1	46.0	17.4	57.2	16.92	0.031
9. When I'm learning in a group, I really like working with kids who learn as quickly as I do.	76.8	6.8	73.7	12.1	80.5	4.2	75.9	4.4	14.04	0.081
10. When I'm working in a group, I really like working with kids who learn more quickly than I do so I have to work very hard to keep up with them.	17.2	61.5	20.3	64.0	16.4	58.6	15.2	62.3	12.92	0.115
Activities in group settings										
11. I really like to talk in group discussions.	54.7	21.2	46.6	32.0	57.1	15.5	59.9	16.8	21.02	0.007
12. I really like teaching other kids in my class.	39.4	32.4	51.5	28.0	37.3	31.0	29.9	37.9	20.98	0.007
13. I really like having kids in my class teach me.	14.5	55.3	14.8	57.1	13.1	59.2	15.6	49.6	12.70	0.123
14. I really like hearing about how other students are thinking about something I'm having trouble with.	48.1	25.3	38.8	32.5	54.4	23.2	50.7	20.4	16.96	0.075
15. I really like explaining my thinking to other students.	45.2	28.3	42.0	29.8	46.5	28.1	46.8	27.0	9.50	0.302

The declining popularity of sitting alone was matched by a statistically significant increase in the number of students who wanted to sit in clusters (χ^2 =23.55, *df*=8, *p*=.003). This finding was driven by differences between the youngest and middle grade groups. As above, the proportion of students who strongly agreed increased and strongly disagreed fell significantly. The who were enthusiastic rose from 33.9% of the Grade 3/4s to 43.1% of 5/6s, and those who disdained it dropped from 17.3% of the 3/4s to 5.8% of the 5/6 group. Neither of the comparisons with the Grade 7/8 group achieved significance. These results indicate that from Grades 3 to 6, as their age rose, so did the proportion of these students who *did not* want to sit alone and *did* want to sit with others.

Activities in group settings: Differences among the three grade groups' feelings about speaking in group discussions was significant (χ^2 =21.02, *df*=8, *p*=.007), however the post hoc comparisons did not produce *p* values less than the .01 level set for significance in this study. The closest was a *p* value of .036 (χ^2 =10.30, *df*=4) for the comparison of the Grade 3/4 and 7/8 groups in which more of the older group strongly agreed (35.7% of Grade 7/8s versus 26% of Grade 3/4s) and 10.6% fewer strongly disagreed (7.7% of Grade 7/8s versus 8.3% of Grade 3/4s). As can be seen in Table 4, students' responses to Item 11 indicate a growing proportion of these students enjoyed contributing to group discussions in the subject they liked most as the grade level increased.

A statistically significant grade-relate decline in the popularity of opportunities to teach peers in their class was also found (χ^2 =20.98, *df*=8, *p*=.007). Both post hoc paired comparisons with the Grade 3/4

group were significant (with Grade 5/6: $\square^2$ =15.415, *df*=4, *p*=.004; with Grade 7/8: $\square^2$ =27.303, *df*=4, *p*=.001), however the comparison of the two older groups was not. A slight majority of students in the youngest grades felt positively about teaching others (51.7%) and 27.3% of them felt strongly so. This contrasts with the older group's ratings which were greater in the *neutral* and *disagree* categories (Grade 3/4: 20.5% neutral and 15.9% disagree; Grade 5/6 29.1% neutral and 23.8% disagree; Grade 7/8 29.8% neutral and 25.5% disagree). These results suggest that after Grade 4, teaching peers was significantly less attractive to an increasing number of students when learning their favourite subject.

Discussion
As French et al. (2011) found, a majority of HAL in this study reported they enjoyed learning alone <u>and</u> in groups when studying their favourite subject. Their preference depended on factors other than the mere presence of peers. Most wanted to work in groups if they were able to choose their group, could work with students who learned at their pace, and could sit in a cluster. They also enjoyed contributing to group discussions. Group work was unattractive to a majority when it involved peers who learned faster, being assigned to a group, or being taught by classmates. Participants' responses were heterogeneous with regard to working with students who learned slower, teaching classmates, hearing others describe their reasoning and explaining their thinking to others.

As previously summarized, some studies have found differences in girls and boys feelings about learning with and without peers (Pyryt et al., 1998) in certain ways (French et al., 2011; Ristow et al., 1985) and in certain subjects (Li & Adamson, 1992), however no evidence of gender differences appeared in this analysis. This result is consistent with other work in which girls and boys preferences were similar (Ewing & Yong, 1992; Hlawaty, 2009; Yong & McIntyre, 1992). The samples, school contexts, instruments, and analyses employed in these studies have differed substantially so it is possible that some are more sensitive to gender differences than those employed in this study. For example, girls have rated being taught by peers higher than boys in a study involving participants in a summer program (French et al., 2011) while high ability learners in this study were assessed in their regular school and no differences were found. It may be that girls did not want to teach peers during the school year but enjoyed it during summer, i.e., students' ratings may have been influenced by differences between conditions in the settings in which the data is collected.

Although girls and boys did not differ in their ratings for the 12 conditions, younger and older students differed on four. Sitting in clusters became attractive to a growing number of students in higher grades and sitting alone appealed to fewer. More students in the oldest than youngest group enjoyed talking in discussions and more in the youngest liked to teach their peers than either of the other groups. These findings contrast with those in studies of that have not found age differences among SIG participants (Ewing & Yong, 1992; Yong & McIntyre, 1992), however the similarities across the age groups on the remaining eight conditions for learning are consistent with them.

Although the grade groups in this study did not differ in their feelings about learning alone, French et al. (2011) found elementary school participants rated Independent Study higher than students in junior high or high school, but found no differences in Peer Teaching or group Projects. As in studies exploring gender differences, interaction effects involving age and ability have been found however none of the post hoc analyses revealed preferences for working alone or with others contributed significantly to those results (e.g., Chan, 2001).

The finding that a large majority of these students wanted to work with students who learn at their pace aligns well with findings indicating students grouped homogeneously for ability interact more collaboratively (e.g., Diezmann & Watters, 1997; Fuchs, Fuchs, Hamlett & Karns, 1998) and are compatible with meta-analyses that reported positive academic outcomes of homogeneous versus heterogeneous groups, particularly when the curriculum is differentiated (Kulik, 1992; Lou, Abrami, Spence, Poulsen, Chambers & d'Apollonia, 1996; Wilkinson & Fung, 2002). Authors of these works and hundreds like them have made it clear that learning is a complex process. Therefore attempts to account for the effects of learning with and without others need to consider more than group size or composition as *peer influences interact with instructional processes to mediate the effects of group composition on learning*. (Wilkinson & Fung, 2002, p. 425) These influences include peer politics, status, their ability to articulate their reasoning, interest in the task, and others.

In addition to highlighting the importance of collaborative activity while learning, sociocultural theories of development emphasize consideration be given to an individual's history with similar activities and

their current context when attempting to understand how they feel about them. Inconsistencies in the results of studies investigating students desire to learn with and without peers are understandable when viewed through this theoretical lens. Learning preferences are not stable *traits*; they are unstable, varying *states* (Curry, 2002; Riding, 1997) that reflect a convergence of past experiences and traits related to current conditions. As such, they can be expected to vary depending on a variety of factors including the conditions addressed here as well as their relationships with peers and their teacher, their interest in the subject and much more. Given this position, the work presented here is not intended to explain high ability learners' complex preferences, but to challenge the simplistic claim that they prefer to learn alone. This is true of some, some of the time, but few all of the time.

It should be remembered that although collaboration has its benefits, so does solitude. Students' ambivalence regarding group and individual learning contexts is also valuable in the grand scheme of talent development.   It might offer *the solitude necessary to develop their talent…* (p. 33, Csikszentmihalyi, Rathunde & Whalen, 1993). While learning *alone* may diminish opportunities for peer-to-peer interactions, it may also provide time and space for students to interact with experts beyond the classroom through their written works, online resources and mentorships.

The heterogeneity of participants' feelings about each condition supports the provision of opportunities to work alone <u>and</u> offering flexible grouping options and conditions. A collection of guiding principles can be distilled from the findings of this and other studies investigating means of optimizing group learning activities (see also Blumenfeld, Marx, Soloway & Krajcik, 1996). Learning in groups is maximally effective when:

- Students feel they have some control or choice of features of the activity (Ryan & Deci, 2000, 2009; Housand & Housand, 2012)
- Others in each group learn as quickly as the highly able student does or the range of abilities is narrow (Nihalani, Wilson, Thomas, & Robinson, 2010; Wilkinson & Fung, 2002)
- The task is complex and challenging; it requires collaboration in order to be completed because no group member would be able to complete it alone (Diezmann & Watters, 1997; Lou, et al., 2001; Ross & Smyth, 1995; Winstanley, 2010)
- Tasks and instruction are designed for small groups (Wilkinson & Fung, 2002)
- Students have learned and know how to collaborate well (Blatchford et al., 2003; Fuchs et al., 1998)
- Workload is distributed fairly (Salomon & Globerson, 1989)
- Students feel supported and appreciated (Diezmann & Watters, 1997; French et al., 2011)
- The task is structured so students learn to (if necessary), and are required to, explain their understandings and reasoning particularly in response to questions and errors generated by members of their group (Howe, Tolmie, Thurston, Topping, Christie & others, 2007; Webb, 1989)
- The task must engage students and maintain their intrinsic motivation (Housand & Housand, 2012)
- The teacher knows how to facilitate small group activities (problem finding, problem solving, inquiry, sharing reasoning and resources, providing feedback and feedforward, etc.) (Lim, 2006; Webb, 2009)
- Groups have 3-5 members (Lou, et al., 2001)

Given the context-specificity of students' feelings about learning with others, educators should not interpret the results of this study prescriptively but as encouragement to assess their students' preferences for learning in different subjects and conditions. The questions to ask are not *if* students prefer learning in particular ways at all times, but *when* and *how* they prefer to learn. Educators, as well as researchers, need to explore students' responses to activities that do and do not match their stated preferences. In the midst of students' diverse preferences, educators also have to find a balance between offering what students want and what they need.

All studies have their limitations. The findings reported here are limited to students similar in age, ethnicity and school experiences to those who contributed to this data. They should not be generalized to students who are grouped homogeneously full-time, or are not involved in part-time homogeneous settings. It should also be remembered that the survey, the *Possibilities for Learning,* assessed HALs' feelings about learning in the ways recommended for them, not all possible learning conditions. Also,

students' responses were focused on learning one subject, their favourite, so the findings should not be generalized to all subjects or to those of less interest to students.

Significant differences between girls and boys, and younger and older students have been found occasionally, but not with sufficient consistency to justify characterizing gifted girls or boys of any age as preferring to work with or without peers. Ideally, future research on students' preferences needs to give simultaneous consideration to a number of factors believed to influence them: learner characteristics (e.g., ability, age, gender), peer effects (e.g., group composition, perceived support), school culture, task characteristics (e.g., difficulty or challenge, suitability of task for small group work) and participants' preparation (e.g., students' preparation for collaboration, teachers' task design and facilitation skills). In order to improve our understanding of the effects preference-matched instruction has on academic outcomes, engagement, relationships, attitudes and more, studies need to examine variations across settings and time, and the effects of matching and mismatching instruction to learning conditions students' prefer.

This study provides an evidence-based challenge to long-held beliefs that gifted students tend to prefer to work alone. The feelings of these students were diverse, nuanced and depended upon a variety of task conditions. Theorists and researchers, as well as educators, might heed Burns et al.'s (1998) recommendation that we recognize the emerging nature of learning style preferences (Hunt, 1981) and come to grips with the seemingly topical and temporal nature of such preferences…the instrument should be used to take a *snapshot* of an individual in a particular situation, at a specific point in time. It should not be used to take a group portrait (p. 280).

We need to accept the complex, varied nature of learning and preferences as consistent with the realities of classroom life and theories of learning that situate it in dynamic contexts populated with individual histories and dynamic relationships among those present. As the students have said, *It depends….*

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