AN INVESTIGATION OF GIFTED STUDENTS' INTRINSIC MOTIVATION AND CLASSROOM PRODUCTIVITY

by

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ABSTRACT

The purpose of this study was to investigate the relationship between academic intrinsic motivation and classroom productivity in a sample of gifted students ($N = 99$) in Grades 4-8. Participants completed the Children's Academic Intrinsic Motivation Inventory (CAIMI) (Gottfried, 1986), a measure of intrinsic motivation in four subject areas (reading, math, social studies, science) and in general. Participants' teachers rated their classroom productivity using the Student Productivity Scale (SPS). Participants scored below the 51st percentile in all CAIMI subscales. Teachers rated 80.8% of students as having high levels of productivity (total SPS score between 11 and 16 out of 16) and only 19.1% were rated as having low levels (total SPS score between 6 and 11 out of 16). Low, but statistically significant, positive correlations were found between levels of student classroom productivity and two of the five CAIMI subscales (reading and social studies).

Keywords: gifted, academic intrinsic motivation, classroom productivity

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CHAPTER ONE

INTRODUCTION

The Problem

Why isn't everyone a "good" student? Why do some students fail subjects, courses, grades etc? Why are there students in classrooms and schools around the world who seem to have great potential to achieve but don't seem to *want* to learn in school? These are questions that researchers, psychologists and educators alike have been asking for centuries. At the heart of the issue is the ever elusive answer to the question "How do individuals vary?" Decades of research have gone into investigating how and why people differ from one another. As an educator, one is especially interested in how students differ in order to attempt accommodation within teaching styles, pedagogical practices and academic environment. This study is an investigation of variances among a specific group of students and the possible relationships between those variances and school-related behaviours.

When beginning any research project or academic inquiry, the investigator ponders questions that have personal meaning. These issues and concerns may overlap those expressed by society at large, or those posed by individuals within a particular social group, in this case – the gifted student population. With this in mind, my post-baccalaureate studies have led me towards an interest in student-specific variations in learning.

As a student growing up in Southern Ontario, my years in elementary and high school are filled with positive memories. Yearning to please teachers, being rewarded for socially acceptable behaviours and high academic performance are some of the vivid

experiences that emerge in my mind when I reminisce about my education experience. However, being a graduate student in the field of Education often inspires deeper reflection on childhood memories. Among my own burning questions, the most prevalent are those which draw me back to my own lived experiences within Canada's public education system.

As a high achieving student in Grade 3, I was one of four students out of a class of about 25 who were given an intelligence test in the resource room and one of three who were ultimately given the "gifted" label. The meanings of the term "giftedness" has not changed much from the early 1990's and can be defined as meaning an ability significantly higher than average. Therefore, a gifted person is someone who shows, or has the potential for showing, an exceptional level of performance in one or more areas of expression (www.NAGC.org, 2009). For the purpose of this study, giftedness will be defined as demonstrated or potential abilities that give evidence of exceptionally high capability in intellect, creativity or skills in a specific discipline, possibly in more than one area; extraordinary intensity of focus in an area of interest or talent that may be accompanied by disabilities (Coquitlam School District, 2009).

After being officially labelled as "gifted", even as a 9-year old, I could sense that there were differences between me and other gifted students in terms of treatment from teachers and academic performance. To clarify, there were high achieving students who never got into trouble, rarely disrupted the class, always followed instructions and went above and beyond classroom lessons and expectations by asking for extra assignments. In comparison, there were students who were highly intelligent but were constantly having to be reminded to hand work in, complete assignments and stay on task.

Part way through elementary school I began to notice variations in the way that students were treated by others within the school community, both socially and academically. I spent hours as a pre-teen and teenager finishing assignments and homework quickly and being offered little classroom enrichment. I found myself questioning why there were students who didn't master skills and concepts as quickly or easily as I did. At such a young age, I wondered why there were students who intellectually mastered skills and concepts as quickly as me, but weren't performing as well in school. By "not performing well", I mean that they were constantly nagged by teachers and other authority figures for things such as disrupting class, not handing in assignments and not working up to their potential. Here was a very smart young person, motivated to pursue his or her own interests outside of school yet sometimes those high-level intellectual skills were not applied to daily work in the classroom. Engaging in these comparisons was a normal act, according to Alexander and Schnick (2007) who claim that as children get older, they compare themselves to their peers and form theories about their levels of competence based on these comparisons.

However, it was not until high school that I began to believe that there were two main factors that came into play when I was thinking about my peers. First, I took into account whether a student *was* "smart". Did they understand concepts after one explanation? This could usually be judged based on how many confirmation or clarification questions they asked the teacher and how many of the teacher's oral questions they responded to correctly. Second, I took into account the work habits of the students who I had identified as smart, based on their ability to respond to questions and interact with the teacher - ways in which they *showed* that they were "smart". Did they

do good work? I usually made this judgement based on how neat their work was, how complete it was and how well they had followed the teacher's instructions.

With these two basic factors in mind, I deduced who was, and who was *not* the same type of student as me. I asked myself: "Why didn't all "smart" students like the type of work I liked?", "Why didn't some of the "smart" students do their assignments when they clearly knew the answers?" If other kids were finished early why didn't they simply read quietly at their desk like me? Why did some students have to talk to others when they were supposed to work quietly?

Throughout my university career, these questions have only intensified. My growing knowledge of educational psychology has answered many questions, but caused me to pose even more. Being surrounded by fellow academics and immersed in academia as a whole has enabled me to broaden my horizons when looking at everyday academic behaviours among myself and other students. Attending universities with populations much larger than any high school, I became part of a student body that was much more diverse in the ways they paid attention, behaved in classes, worked on assignments, studied, and produced assignments. There were many more levels of work ethic and student academic participation. This experience further excited my need to learn about variations among students.

Reaching my post-baccalaureate studies, the pressure was on to select one of my burning questions, and thus, I am drawn to those mentioned above – the personal questions which happen to reach into my academic studies. It is my strong belief that this is the best beginning to any inquiry. Thus, the topic that I chose to investigate was individual variance in the motivation of "smart" students – or variation in motivation

among gifted learners. I believe that one of the main variables distinguishing producing ("good", "compliant") students like myself, and non-producing ("nonperforming", "noncompliant") students is motivation. As such, my research began as an investigation into how motivation varies among gifted students.

Landau (1996) found a significant difference in the motivation scores of gifted and non-gifted students and believes that this link between motivation and giftedness works in both directions. That is, motivation spurs giftedness, while giftedness also enhances various components of motivation, such as curiosity, self-confidence, and communicativeness.

Historically, psychologists and educators have been concerned with the relationship between motivation and achievement. In his famous book "Hereditary Genius," Francis Galton (1978) circumscribed the roots of eminence in the following way: "By natural ability, I mean those qualities of intellect and disposition, which urge and qualify a man to perform acts that lead to reputation. I do not mean capacity without zeal, nor zeal without capacity, nor even a combination of both of them, without an adequate power of doing a great deal of very laborious work." (p. 77). Galton claimed, reputation (talent, eminence) will emerge from proper qualifications (high capacities, gifts), urges and zeal (needs, passions), and the power for laborious work (will power, persistence). Galton spent most of his life exploring variation in human populations and its implications. In this sense, he studied cognitive aptitudes and motivational factors as they affect individual behaviours and outcomes. Presently, cognitive aptitudes and motivation are the two most commonly mentioned factors affecting academic achievement. Not only are they included in theoretical models, but they have appeared as

independent variables in thousands of empirical studies of school learning, achievement and currently academic production. Renzulli's (2005) three ring conception of giftedness is reminiscent of Galton's ideas. Renzulli's use of above average ability, creativity and task-commitment to define giftedness echoes Galton's (1978) use of talent, high capacities, gifts, will power and persistence. Task commitment represents a directed form of motivation brought to bear on a particular problem or task (Renzulli, 2005). The phrase "task commitment" is seen by some (Clinkenbeard, 1994; Lens & Rand, 2000) to be interchangeable with the term motivation. Creativity, the development of high abilities and high levels of achievement are all dependent on motivation (specifically intrinsic motivation) (Lens & Rand, 2000).

All children, especially those who are intellectually gifted, want to master knowledge and skills, to feel successful in school, and to excel in some area of learning that is valued personally and socially (Whitmore, 1986). Therefore, it is not accurate to say that a student is unmotivated, instead the child may be unmotivated to do specific schoolwork assigned, but is motivated to engage in other learning activities or more rewarding alternatives, such as social interaction or daydreaming. Sometimes, gifted children described as "lazy" or "unmotivated" or "underachievers" are motivated to seek relief from pressure to excel or to increase personal comfort by protecting a weak self-concept when threatened by fear of failure or fear of success (Whitmore, 1986). In essence, this underachiever has learned to underachieve to avoid some discomforts or perceived penalties for effort.

Whenever a gifted child confronts a learning opportunity that appears to be intrinsically rewarding because the content and process are related to the student's special

interests, career goals and learning style, the natural response is one of high motivation to participate (Whitmore, 1986). Adults have a tendency to expect that a child be disciplined to work diligently even if the task is unrewarding, but these adults can be more effective in helping the student if they recognize the normality of the unmotivated response and seek to recapture the natural motivation to achieve (Whitmore, 1986). Very high levels of intrinsic satisfaction are often derived by gifted students from self-directed learning activities outside of school, a fact that makes it difficult for them to sustain disciplined effort to complete repetitive instructional tasks in school (Whitmore, 1986). Sustained effort on relatively dull, routine schoolwork is usually a consequence of extrinsic, social rewards that compensate for the lack of intrinsic satisfaction. Disciplined effort to complete unrewarding assignments may be necessary for a portion of the school day, but student motivation is diminished when at least equal time is not allocated daily to more rewarding learning activities involving inquiry, research, and self-expression (Whitmore, 1986).

Delisle (1992) distinguishes between gifted non-producers and gifted underachievers. Non-producers are at-risk academically but not psychologically in that they are self-assured, independent and have chosen not to attend classes or complete school assignments because they find them boring or irrelevant. On the other hand, underachievers are at-risk academically *and* psychologically in that they do not complete assignments because they have low self-esteem and are dependent learners. The focus of this study is on producers and non-producers rather than achievers and underachievers. This is due to my personal interest in gifted students who are academically able to achieve and psychologically self-assured, yet choose not to complete or participate in

classroom activities such as assignments, homework and projects. My question is, how do these students vary in their levels of participation and production? Do a gifted student's motivational beliefs interact with the context of the classroom to produce favourable or unfavourable learning outcomes?

Significance and Purpose of the Study

There is a wealth of educational research and practice that focuses on motivational characteristics of elementary, secondary and college students such as their perceptions of ability, intrinsic motivation, valuing of academic tasks and perceptions of belonging. All have been shown to directly impact achievement and achievement-related variables (Walker, Greene & Mansell, 2006; Gilman & Anderman, 2006; Linnenbrink & Pintrich, 2002). With this knowledge often comes attention and specialized classroom teaching and learning techniques. Exploring individuals within the population of gifted students may lead to more informed analysis of student learning behaviours. Often, a label, such as "gifted", brings certain expectations with it. The more information and detailed the descriptions of individual characteristics, the more educators can begin to understand ways in which different students are motivated to learn.

However, the research surrounding motivation seems to lack a clear picture of whether or how gifted learners vary from one another. This study looks into the motivational characteristics of gifted students within an academic setting. This study also looks into the classroom productivity of gifted students with a focus on amount of output, consistency among subject areas, punctuality in submission and willingness to complete assignments.

Organization of the Thesis

This thesis is organized into five chapters plus appendices. The problem, significance and purpose of the study are described in chapter 1. Literature on motivation in relation to gifted students is reviewed in chapter 2. The methodology used in the study is described in chapter 3. Research results are reported in the fourth chapter. Chapter 5 relates findings from this study to the existing literature. Also, a discussion of academic intrinsic motivation in gifted students based on these previous research findings are outlined in the fifth chapter. Finally, the limitations and conclusions of this study are discussed in chapter 5.

CHAPTER TWO

LITERATURE REVIEW

Defining Motivation: Intrinsic and Extrinsic

The term motivation is derived from the Latin verb *movere*, which means to move (Pintrich, 2003). Theories of motivation are concerned with the categorization and direction of behaviour. Therefore, theories of motivation attempt to answer questions about what gets individuals moving (energizes) and toward what types of activities or tasks. When discussing motivation in an academic or educational context, it is important to make clear a distinction between intrinsic and extrinsic motivation within a wider definition of "motivation". Intrinsically motivated students are motivated to learn, perform and/or succeed for the internal feeling of satisfaction (Deci & Ryan, 2000). Extrinsic motivation is motivation that is directed at attaining or avoiding something outside the self. The student will perform for the attainment of a desired grade or some other form of external reward (Walker et al., 2003).

Historically, definitions of intrinsic motivation have differed, but maintained a focus on an internal need for challenge, enjoyment and autonomy. Intrinsic motivation has been defined as (a) participation in an activity purely out of curiosity, a form of needing to know more about something (Deci, 1975; Gottfried, 1983; Woolfolk, 2008); (b) the desire to engage in an activity purely for the sake of participating in and completing a task (Bates, 1979; Deci, Vallerand, Pelletier, & Ryan, 1991); and (c) originating from within the individual and resulting in the enjoyment of the process of increasing one's competency in regard to particular academic tasks (Deci & Ryan, 2000). For the purpose of this study, Deci and Ryan's definition will be used, stating that

intrinsic motivation originates from within an individual and results in the enjoyment of the process of increasing one's competency in regard to particular academic tasks. The choice to use this particular definition as opposed to others is based on its focus on academic tasks and increasing competency, which are both of concern in the current study.

Gottfried (1986), made the distinction between *academic* intrinsic motivation, as enjoyment of school learning characterized by an orientation toward mastery, curiosity, persistence, task-endogeny, and the learning of challenging, difficult and novel tasks. Academic extrinsic motivation is therefore defined as completion of school tasks and activities based upon a need to gain an external reward such as marks, GPA or teacher approval. This definition will be revisited later in this chapter in relation to theories of motivation.

Gottfried (1983) described academic intrinsic motivation in the general student population as (a) the ability of the learner to persist with the task assigned; (b) the amount of time spent by the student tackling the task; (c) the innate curiosity to learn; and (d) the feeling of efficacy related to an activity. A student who is intrinsically motivated to achieve will persist with the assigned task, even though it may be difficult (Gottfried, 1983; Schunk, 1990), and will not need any type of reward or incentive to initiate or complete a task (Gottfried, 1983; Schunk, 1990). This type of student is more likely to complete the chosen task and be excited by the challenging nature of an activity. The intrinsically motivated student is also more likely to retain concepts learned (Woolfolk, 2008) and to feel confident about tackling unfamiliar learning situations (Deci, 1975; Gottfried, 1983; Woolfolk, 2008).

More recently, Gottfried & Gottfried (2004), have proposed a construct of "gifted motivation" which applies to those individuals who are superior in their strivings and determination pertaining to an endeavour. Hence, motivation in an extreme is considered a form of giftedness just as is intellectual performance in the extreme.

Reflecting on my personal experience, it is evident that there were distinct variations among myself and my gifted peers. Could these variations be related to their levels of both intrinsic and/or extrinsic motivation? Gottfried (1985) described the idea of *academic* intrinsic motivation, in reference to students in learning situations. Building on Deci and Ryan's (1985) discussion of intrinsic and extrinsic motivation, Gottfried (1985) claims that academic intrinsic motivation is a significant factor in children's educational functioning. With regard to my own early classroom experience, it seems entirely plausible that my fellow gifted students may have had differing levels of academic intrinsic motivation. This could explain their diverse participation, performance and production in classroom settings.

Synthesis. Motivation, in its most basic sense, is derived from the Latin verb *movere* , which literally mean to move. Theories of motivation attempt to answer questions about what get individuals moving and towards what types of activities or tasks, however, it is important to make distinctions between types of motivation. For the purpose of this study, a distinction is made between two types of motivation – intrinsic and extrinsic. Deci and Ryan (2000) define intrinsic motivation as being directed at attaining an internal feeling of satisfaction, enjoyment of the process of increasing one's competency. Gottfried (1983) defines intrinsic motivation similarly to Deci and Ryan but extends the definition of intrinsic motivation by including participation in an activity

purely out of curiosity, a form of needing to know more about something. Academic intrinsic motivation is defined as enjoyment of school learning characterized by an orientation toward mastery, curiosity, persistence, task-endogeny, and the learning of challenging, difficult and novel tasks (Gottfried, 1986). In opposition, Deci and Ryan (2000) describe extrinsic motivation is directed at attaining or avoiding something outside the self, while Gottfried (1986) expands by distinguishing academic intrinsic motivation as being motivated by external rewards such as teacher recognition, grades and competition within a school learning environment.

Gottfried (1986) made a distinction between *academic* intrinsic motivation as a separate construct. Academic intrinsic motivation is an orientation toward mastery, curiosity, persistence and challenging tasks in a school learning environment. Gottfried and Gottfried (2004) later proposed the construct of "gifted motivation" which applies to individuals who have superior determination to complete a task or reach a goal, but who are not necessarily intellectually gifted.

For the purpose of this study, Gottfried's (1985) definition of academic intrinsic motivation will be used for the duration of this thesis, as it describes intrinsic motivation in an academic setting, which is the setting of the present study.

Theories of Motivation

Throughout history there have been numerous theories of why individuals behave the way they do, however, for the purpose of this study, I am interested in theories of motivation which explain academic behaviours such as classroom productivity. Many contemporary theories of motivation describe goal-directed behaviours that are mediated by social and cognitive process (Pintrich, 2000; Deci & Ryan, 1985; Gilman &

Anderman, 2006). These social-cognitive theories focus on ways an individual's active regulation of their motivation, thinking and behaviour mediates relationships between the person, context and eventual achievement.

Achievement Goal Theory (Ames, 1992; Pintrich, 2000) has emerged as one of the most prominent theories to explain the relations between goal orientation and academic outcomes of students. This theory claims that underlying patterns of cognitive beliefs and attributions influence the type of activities that are pursued and engaged in (Pintrich & Schunk, 2002). These same beliefs and attributions also influence a teacher's subjective view of a student's performance, including whether the outcome was a success or failure and/or due to effort or error (Gilman & Anderman, 2006). Two types of goal orientations are explained under achievement goal theory: mastery goals (often called task goals, learning goals or task orientation) and performance goals (ego goals, ability goals or outcome orientation) (Pintrich, 2000). Students who pursue mastery goals are interested in understanding the material for its own sake rather than pursuing external rewards such as grades or parent/teacher approval and therefore focus on greater competence and improvement in already developed skills (Gilman & Anderman, 2006). The opposite is often found in students who pursue performance goals. Such students pursue goals that are extrinsic or secondary to the task itself and may avoid activities where their efforts may not meet the challenges inherent within the activity (Gilman & Anderman, 2006). Mastery goals orient learners to developing new skills, trying to understand their work, improving their level of competence or achieving a sense of mastery based on self-references standards whereas, performance goals orient learners to focus on their ability and self-worth, to determine their ability by outperforming others in

competitions, surpassing others in achievement or grades and receiving public recognition for their superior performance (Ames, 1992).

Pintrinch (2000) would describe intrinsic and extrinsic motivation in a similar way to Gottfried (1986). Achievement Goal Theory (Ames, 1992; Pintrinch, 2000) distinguishes between mastery and performance goals while Gottfried focuses on defining intrinsic versus extrinsic motivation. In this sense, motivation towards mastery goals might be indicative of intrinsic motivation as they both may be evident in a student who is interested in understanding material for its own sake, and who is focused on greater competence and improvement in skills for self satisfaction. Performance goals (as outlined in Achievement Goal Theory) might be viewed as being comparable to extrinsic motivation, as students associated with either may be described as focusing on external rewards such as teacher praise and public recognition for their achievements.

Attribution theory (Weiner, 1979) focuses on attempts to understand why events occur and suggests that for success, it is adaptive to attribute the success to stable, internal factors such as ability, skill or talent as these factors can be assumed to also be present for future tasks (Linnenbrink & Pintrich, 2002). This describes how the individual's explanation, justification, and excuses about self or others influence motivation. There are three dimensions that characterize success or failure: a) locus (two poles: internal vs. external); b) stability (do causes change over time or not?); and c) controllability (causes one can control such as skills vs. causes one cannot control such as luck, others' actions, etc.). Weiner (1979) claims that all causes for success or failure can be positioned on these three dimensions in some way. This is because the dimensions affect expectancy and value. The internal/external locus is closely related to feelings of

self esteem, while stability relates to expectations about the future and controllability is connected to emotions such as anger, pity or shame. When a student succeeds, they attribute successes internally ("my own skill'). When a rival succeeds, the student tends to credit external (e.g. luck). When a student fails or makes mistakes, they are more likely to use external attribution, attributing causes to situational factors rather than blaming themselves. When others fail or make mistakes, internal attribution is often used, saying it is due to their internal personality factors. Chan (1996) found that gifted students tend to attribute successes and failures to the amount of effort invested, while typically achieving students were more likely to attribute successes and failures to luck. Gifted students were also more likely to attribute failure to the use of ineffective strategies rather than a lack of ability (Chan, 1996).

Attribution theory (Weiner, 1979) might map onto Gottfried's (1986) ideas about intrinsic and extrinsic motivation by comparing each theorists focus on locus of control. Weiner's (1979) claim that one of the three dimensions that characterize success of failure of a task is locus polarized between internal versus external rewards. Similarly, Gottfried describes intrinsic and extrinsic motivation in terms of presence of internal or external rewards surrounding completion of a task.

Deci and Ryan's (1985, 2000) Self-Determination Theory (SDT) focuses on the extent to which an individual's behaviour is self-determined or intrinsically motivated. SDT is a theory of human motivation concerned with the choices people make of their own free will and sense of choice, without any external influence and interference. For example, a self-determined person chooses to behave in a manner that reflects his/her autonomy. Behaviour is not driven by the need to achieve an external reward or escape

aversive stimuli in the environment. Within this model of motivation there are three basic needs: competence (the desire to master and be competent in interactions with the environment), autonomy (the desire to be in control of or feel autonomous or self-determining in terms of one's own behaviour) and relatedness (a desire to belong or be attached to a group). These three basic needs drive intrinsic motivation.

Deci and Ryan (2000) proposed three dimensions of self-determination: (a) intrinsic motivation (b) extrinsic motivation, and (c) amotivation. They are distinguished by differing levels of self-regulation. Intrinsic motivation involves the highest level of self-regulated behaviour, and it comprises the inherent tendency of human beings to pursue learning and new challenges. Intrinsic motivation refers to initiating an activity for its own sake because it is interesting and satisfying in itself, as opposed to doing an activity to obtain an external goal (extrinsic motivation). Extrinsic motivation refers to motivation that comes from outside an individual. The motivating factors are external, or outside, rewards such as money or grades. These rewards provide satisfaction and pleasure that the task itself may not provide. Amotivation is a lack of motivation, in which students do not perceive a connection between academic efforts and goals or purposes.

Deci and Ryan's (2000) Self-Determination Theory could be used to understand classroom productivity of gifted students by describing their behaviours as either, intrinsically, extrinsically or amotivationally motivated. Deci and Ryan would view classroom productivity as being either an extrinsically motivated behaviour (focused on pleasing the teacher, achieving good grades etc.) or an intrinsically motivated behaviour (focused on personal satisfaction, accomplishment and curiosity). Essentially, Deci and

Ryan might view academic intrinsic motivation similarly to Gottfried (1986), as both theorists focus on intrinsic motivation as an orientation toward mastery, persistence and innate curiosity to learn.

Taking these three major theories of motivation into consideration, both similarities and differences appear among them. Linnenbrink and Pintrich (2002) claim that the four key families of motivational beliefs exist when discussing the currently accepted major social cognitive motivational theories (Ames, 1992; Weiner, 1979; Deci & Ryan, 2000; Pintrich & Schunk, 2002). These four families regarding motivation, student learning and achievement are: self efficacy, intrinsic motivation, attributions and goal orientation. It is important to note that these four components are not discrete and in fact interact to create an interrelated picture of motivation. Self-efficacy is defined as an individual's beliefs about their performance capabilities in a particular context or a specific task or domain (Bandura, 1997 in Linnenbrink & Pintrich, 2002). In turn, students who have more positive self-efficacy beliefs (i.e. they believe that they can do a task) are more likely to work hard, persist and eventually achieve at higher levels (Linnenbrink & Pintrich, 2002).

SDT fits into Linnenbrink and Pintrich's (2002) set of key motivation beliefs based on its focus on "intrinsic motivation" as key to task achievement. Achievement Goal Theory, mastery and performance goals are part of the "goal orientation" family of motivational beliefs. Also, Attribution Theory would be considered part of the "attributions" family and SDT would be categorized as part of the "intrinsic motivation" family. Thus, by positioning these three theories into Linnenbrink and Pintrich's (2002) four key families of motivational beliefs it becomes clear how each focus on an

individual's active regulation of their motivation, thinking and behaviour which mediates the relationship between the person, context and eventual achievement.

One of the most important assumptions of these social-cognitive models of achievement motivation is that motivation is a dynamic, multifaceted phenomenon, in contrast with the quantitative view taken by traditional models of achievement motivation (Linnenbrink & Pintrich, 2002). More recent social-cognitive models do not assume that students are simply "motivated" or "not motivated" or that student achievement motivation can be quantified in equal increments on a single continuum of motivation. Instead, these models suggest that students can be motivated in an academic setting in multiple ways, both intrinsically and extrinsically.

A second important assumption of social cognitive models of motivation is that achievement motivation is not a stable trait of an individual, but is more situated, contextual and domain-specific (Linnenbrink & Pintrich, 2002). A final assumption concerns the central role of cognition in social cognitive models of achievement motivation. The individual's cultural, demographic or personality characteristics influence motivation and achievement directly, similar to ways in which the contextual characteristics of the classroom environment shape motivation and achievement (Linnenbrink & Pintrich, 2002). The individual's active regulation of his or her motivation, thinking and behaviour mediates the relationships between the person, context and eventual achievement (Linnenbrink & Pintrich, 2002).

In relation to social cognitive theories of motivation, academic intrinsic motivation would be part of Linnenbrink and Pintrich's (2002) intrinsic motivation and goal orientation families of motivational beliefs. Academic intrinsic motivation

provides a further description of how an individual's active regulation of their motivation, thinking and behaviour mediates the relationships between the individual, context and achievement. Thus, active cognition (motivation) mediates social behaviour (achievement and/or production).

A controversy exists within the literature on motivation. Some theorists believe that intrinsic and extrinsic motivation are separate constructs which exist independently of each other, thus an individual would be either intrinsically *or* extrinsically motivation. However, others assume that students may be both extrinsically and intrinsically motivated to complete a task simultaneously, however, they remain discrete constructs. Although intrinsic and extrinsic motivation are discrete, each can be measured on a continuum. Intrinsic and extrinsic motivation can be measured independently or together. Both intrinsic and extrinsic motivation are best conceived as existing on a continuum from having little or no motivation to being highly motivated. Although intrinsic and extrinsic motivation are often measured as separate constructs, they may simultaneously contribute to the more complex construct of achievement motivation. Thus, when evaluating and assessing student levels of motivation it is inaccurate to believe that intrinsic or extrinsic motivation exclusively are responsible for achievement.

This past theorizing on motivation is a concern, as it insinuates that students who are intrinsically motivated may have lower levels of classroom production. In this case, these students would be less interested in achieving high GPA, teacher approval or public recognition and perhaps become uninterested in daily classroom assignments which often focus on such external rewards. Anecdotal evidence and observation of teachers, parents and administrators alike address diversity among the achievement, production level and

general attitudes towards learning among gifted students on a daily basis. One of the troubling aspects within classrooms is why gifted students do not produce the work that is expected of them. In essence, cognitive, social and environmental factors are influencing differing levels of motivation towards completion of schoolwork.

Synthesis. All three of these theories represent social-cognitive views of motivation, focusing on how an individual's behaviour is mediated by social and cognitive processes. Social-cognitive theories of motivation focus on how an individual's behaviour is mediated by social and cognitive processes. While Achievement Goal Theory (Ames, 1992; Pintrich, 2000) claims that underlying patterns of cognitive beliefs and attributions influence the type of activities that are pursued and engaged in, this theory also views intrinsic and extrinsic motivation as mediated by cognitive processes instead of placing a focus on internal or external rewards. Attribution Theory (Weiner, 1979) describes how an individual's explanation, justification and excuses about self and others influence motivation and suggests that intrinsic and extrinsic motivation are mediated by locus of control, controllability of a motive and stability over time. Both theories of motivation focus on how behaviour is mediated by social and cognitive processes, with Achievement Goal Theory focusing on cognitive beliefs of self and Attribution theory expanding beyond self to include the influences of others on one's own motivation. Finally, Self-Determination Theory (Deci & Ryan, 2000) focuses on the extent to which an individual's behaviour is self-determined or intrinsically motivated, varying between intrinsic or extrinsic motivation or amotivation (lack of motivation), clearly focusing on intrinsic and extrinsic motivation as having the possibility of existing together, but on two separate continua. Thus, Deci and Ryan's

(2000) focus on self-determination as the mediating cognitive process ties all three of these theories together under within the social-cognitive views of motivation.

Linnenbrink and Pintrich (2002) successfully outline assumptions of social cognitive models of motivation such that all three theories outlined above are included within the limits of "social-cognitive" models. All three of these theories will be used to analyze the results of this study.

Motivational Characteristics of Gifted Students

Two significant articles focus on the motivational characteristics of gifted individuals. First, McCoach and Siegle (2001) suggested five constructs which could be measured to provide a clearer picture of motivation of learning and academic achievement within a gifted population. The five constructs are: academic self-perception (views students have about their own skills), attitude toward school (students' self-reported interest in and affect toward school), attitude toward teachers and classes (interest and positive affect toward coursework and instructors), self-regulation (processes by which people are metacognitively, motivationally, and behaviourally active participants in their own learning) and goal valuation (valuing learning and believing in the importance of the task). All five of these constructs are motivational characteristics a student may possess which would influence their individual motivation orientation. For example, a student with low academic self-concept may be more likely to be highly extrinsically motivated as they may feel the need to prove their own competencies through academic achievement. Thus, each of these constructs influences the motivational orientation of an individual in a unique way.

McCoach and Siegle (2001) studied whether groups of gifted achievers and gifted underachievers differ in their attitudes towards school, attitudes towards teachers, goal-valuation, motivation and general academic self-perceptions. "Gifted" students in this study were those who ranked in the 92nd percentile or higher on a nationally norm-referenced test taken in the four years previous to the study. The researchers defined gifted underachievers as students who exhibit a severe discrepancy between expected achievement (as measured by standardized achievement test scores or cognitive or intellectual ability assessments) and actual achievement (as measured by class grades and teacher evaluations). One hundred and seventy eight gifted students (122 achievers and 56 underachievers) completed McCoach's (2000) School Attitude Assessment Survey-R. Results indicated that gifted achievers and gifted underachievers differ substantially in their attitudes towards teachers, attitudes towards school, motivation and goal valuation mean scores. The greatest mean difference between gifted achievers and gifted underachievers was in motivation/self-regulation. These findings are interesting because they suggest that gifted students who achieve or do not achieve vary in their levels of motivation. This suggests that motivation is a key factor in the achievement of gifted students. Also, these findings suggest that not all gifted students are intrinsically motivated, as one might be likely to believe.

In this study, McCoach and Siegle (2001) focused only on internal attributes that characterize student motivation while overlooking environmental influences such as teaching style and assignment type. This oversight of environmental factors contributes to this study's limited ability to claim results applicable to motivation on a large, general scale. Instead, this study focuses only on internal factors influencing motivation, thus

their findings are limited to making claims about only specific types of motivation, in this case intrinsic.

Alexander and Schnick (2007) built on previous work by Dai, Moon and Feldhusen (1998), Eccles (2005), Rhodewalt and Tragakis (2002) and Dweck and Molden (2005). They discuss the role of context in order to focus on gifted students' particular motivational factors. They claim that a number of factors are interrelated in the motivation of gifted students. They argue that personal factors affect motivation; socio-cultural factors affect both classroom context and past motivational history; socio-cultural factors and personal factors contribute to development and maintenance of self-beliefs and theories; self-beliefs and theories act as a filter for incoming information from the classroom context; classroom context affects how the self-beliefs play out on a day-to-day basis; and finally, all of these factors affect achievement behaviours such as effort, persistence, engagement, and challenge-seeking.

Synthesis. Motivational characteristics of gifted students may vary. Understanding of academic intrinsic motivation is influenced by these findings as McCoach and Siegle (2001) outline five constructs of motivation (academic self-perception, attitude toward school, attitude toward teachers and class, self-regulation and goal valuation), suggesting they differ in a specific context and influence either intrinsic or extrinsic motivation, depending on the setting and situation. McCoach and Siegle's (2001) findings sugest that all gifted students are not intrinsically motivated, but instead gifted students vary in their motivational characteristics. Simialrly, Alexander and Schnick (2007) further argue that personal and socio-cultural factors affect motivation.

Understanding of productivity is influenced by these findings as McCoach and Siegle (2001) suggest that as the five constructs of motivation differ contextually, so does productivity. Alexander and Schnick's (2007) focus on personal and socio-cultural factors influencing motivation suggests also that these factors may influence classroom productivity of gifted students.

Research on Intrinsic Motivation

Intrinsic Motivation and Achievement Test Scores in the General Population.

Several studies have revealed positive correlations between intrinsic motivation and GPA and/or standardized test scores. Corpus, McClintic-Gilbert and Hayenga (2009) investigated the nature, timing and correlates of motivational changes in an unspecified (may or may not have included gifted students) sample of 1051 students Grade 3-8. Motivation was measured using Lepper, Corpus and Iyengar's (2005) scales of intrinsic and extrinsic motivation. The intrinsic motivation scale included 17 items focusing on challenge–seeking, independent mastery and curiosity-driven engagement. Three dimensions of extrinsic motivation were assessed: a preference for easy work, orientation toward obedience and pleasing authority figures and a dependence on the teacher. Participants responded on a five-point Likert scale ranging from "not like me at all" to "exactly like me". Analyses of within-year changes in student motivational orientations revealed that both intrinsic and extrinsic motivations decreased from fall to spring. This is important, as within-year changes provide a more detailed indication of how motivation changes with age. It is also important to note that decreases in levels of both intrinsic and extrinsic motivation took place. These findings reinforce Deci and Ryan's (2000) idea that both intrinsic and extrinsic motivation is self-determined, despite

the inclusion or exclusion of external factors or rewards. These findings also support Gottfried's (1986) argument that intrinsic motivation is characterized by challenge-seeking, independent mastery and curiosity-driven engagement. This study supports the idea that intrinsic and extrinsic motivation can be defined in similar ways to Gottfried's (1986) definition and provide further evidence that *academic* intrinsic motivation is its own construct.

Lepper, et al. (2005) examined the relationships of both intrinsic and extrinsic motivation to academic outcomes in an unspecified (may or may not have included gifted students) sample of 797 students in Grade 3-8. This study utilized an adapted version of Harter's (1981) Scale of Intrinsic versus Extrinsic Orientation in the Classroom as well as GPA and the California Achievement Test. Intrinsic motivation showed a significant linear decrease from Grade 3 through Grade 8 and proved positively correlated with children's grades and standardized test scores across all grade levels. Extrinsic motivation showed few differences across grade levels and proved negatively correlated with academic outcomes. There was a significant positive correlation between overall GPA and intrinsic motivation ($r = .34$, $p<.001$). The correlation between extrinsic motivation and overall GPA was also significant but, in this case, negative ($r = -.23$, $p<.01$). Standardized test scores proved both positively correlated with intrinsic motivation ($r = .27$, $p<.01$) and negatively correlated with extrinsic motivation ($r = -.32$, $p<.001$). Building on Corpus, McClintic-Gilbert and Hayenga's (2009) findings of within year decreases in levels of both intrinsic and extrinsic motivation, this study looks at chronological changes on a larger scale. These findings further support past results that motivation towards classroom activities decreases with age.

Much of the recent research focuses on the relationship between intrinsic motivation and academic achievement as seen through GPA and standardized test scores. However, the direction of the relationship between intrinsic motivation and achievement may be bidirectional. Intrinsically motivated learners engage the material, enjoy the process of discovery and employ deep learning strategies – all of which are likely to result in learning and achievement (Deci & Ryan, 1985). Conversely, students who receive high marks (GPA and/or standardized tests) likely experience a sense of efficacy and receive competence-enhancing feedback, both of which have been found to promote intrinsic motivation (Harter & Connell, 1984). A suggested explanation is that the relationship between intrinsic motivation and achievement is synergistic and bidirectional with intrinsic motivation stimulating high achievement and the experience of successful achievement promoting intrinsic motivation (Corpus et al., 2009).

The Intrinsic Motivation of Gifted Students. With a vast amount of research on general school populations, motivation and achievement, some attention has shifted onto groups of learners with similar intellectual traits. In this case, gifted students have found themselves in the spotlight in regard to relationships between their motivation, achievement, school functioning and general academic performance. Clinkenbeard (1996) suggested that there have been two types of motivation research concerning gifted students. The first concentrated on motivation as a personality characteristic, and the second concentrated on motivation as something that is specific to the environment in which the individual finds him or herself. In the second, motivation was not seen as either a personality characteristic or an environmental characteristic. Instead, motivation

was viewed as multifaceted in the sense that both internal and external factors may influence an individual's motivation simultaneously.

Clinkenbeard (1996) classified studies on the motivation of gifted students into 8 categories, based on whether their methodology: compared scores of gifted students against the norms on a motivation measure; compared gifted students and non-selected students on quantity or type of motivation; used a motivation variable to predict achievement, underachievement or eminence, or to discriminate between groups of high achievers and low achievers; compared subgroups of the gifted on motivation type or style; described a special population of the gifted in terms of a motivation variable; looked at correlations between motivation and other variables in gifted students; classified motivation "types" of gifted students through cluster or factor analysis; and looked at level or type of motivation as an outcome of instructional practice or program enrolment. Only the last category focused on motivation as a transitory state that can be affected by the education situation, while the others focused on understanding motivation as a relatively stable characteristic of gifted students. Clinkenbeard (1996) concluded that neither of these approaches is better, or more valid than the other; each approach is useful for different applications. Research on motivation as a characteristic of gifted students is most useful for identification, counselling and some programming issues, while research on motivation as a state or outcome is most useful for instructional strategy decisions and program evaluation design.

Gottfried (1985) found that children (both gifted and non-gifted) with higher academic intrinsic motivation tend to have significantly higher school achievement on standardized tests, better grades, more favourable perceptions of their academic

competence, lower school anxiety, lower extrinsic orientations to school learning (i.e., less desire to do school work predominantly to receive external rewards), and tend to be perceived by their teachers as more intrinsically motivated. Children with higher academic intrinsic motivation tend to have significantly higher achievement, less anxiety, less extrinsic motivation and higher intellectual performance; in addition, academic intrinsic motivation becomes more stable over the adolescent years (Gottfried, 1985; Gottfried, 1990; Gottfried & Gottfried, 2004). While positive relationships between intrinsic motivation and performance (both in class and on standardized tests) have been found, recently, Lepper, Corpus & Iyengar (2005) found extrinsic motivation is negatively related to performance in class and on standardized tests. Students who reported working towards external rewards tended to perform worse than students working towards internal rewards on standardized tests and in regular classroom assessments.

Hoekman, McCormick and Barnett (2005) investigated relationships between motivational and affective variables, commitment to schoolwork and satisfaction with school in a sample of gifted students. In this study, gifted students were identified by their school using multiple-criteria. The sample consisted of 402 Grade 7 students who were in full-time ability-grouped classes in selective high schools, designed to specifically meet the needs of academically gifted high school students. The Feelings About School Inventory (FASI) was compiled for this study from established measures including Quality of School Life Scale (Epstein & McPartland, 1978), State-Trait Anxiety Inventory for Adults, Self-Evaluation Questionnare (Spielberger et al., 1983), Tedium Measure (Pines, Aronson, & Kafrey, 1981), Children's Perception of Academic

Competence (Harter, Whitesell & Kowalski, 1992) (as cited in Hoekman, McCormick & Barnett, 2005). A strong positive association was found among intrinsic motivation, satisfaction with school, and commitment to schoolwork. This research is important not only because of its multiple-measures procedure, but also because results show relationships among more than one motivational variable and satisfaction with school. These findings are significant, as "commitment to schoolwork" reflects a characteristic which may be correlated with student productivity.

One of the more frequently cited studies done involving motivation in gifted children was Gottfried, Gottfried, Bathurst & Guerin's (1994) Fullerton Longitudinal Study. This study examined motivational differences between intellectually gifted students and a non-gifted comparison group, which both emerged from the same cohort rather than constructing a control group. Child participants and their parents completed a battery of cognitive measures, developmental inventories, educational achievement and motivational measures, temperament inventories, child behaviour checklists, social functioning inventories and home and environment inventories between the ages of one through eight years. These developmental assessments were made nine times, at 1.5, 2, 2.5, 3, 3.5, 5, 6, 7, and 8 years from the original assessment date. At eight years old, participants completed the Wechsler Intelligence Scale for Children-Revised (WISC-R). Participants who scored 130 or greater were designated as gifted ($N = 20$), or not ($N = 87$). In regards to education, achievement and motivation, gifted children were viewed by their teachers as significantly harder working, learning more, and better behaved than non-gifted children. Gifted children appeared to be more able to adapt to the demands of school than non-gifted children.

This study used the Children's Academic Intrinsic Motivation Inventory (CAIMI) and variations of it (Young Children's Academic Intrinsic Motivation Inventory (YCAIMI) and Children's Academic Intrinsic Motivation Inventory – High School (CAIMI-High School)) to measure academic intrinsic motivation (A.E Gottfried, 1990 as cited in Gottfried et al., 1994). The CAIMI (Gottfried, 1986) is a self-report measure used to measure academic intrinsic motivation in 4 subject areas (Reading, Math, Social Studies and Science) and in general. Respondents rated their agreement or disagreement to statements on a 5 point scale. The YCAIMI, which is a downward extension of the CAIMI, was reworded for younger children, where children rated their agreement or disagreement to statements on a 3-point scale. On the CAIMI-High School, the subscales of Reading and Social Studies were changed to English and History respectively. Using these measurements gifted children showed evidence of stronger academic intrinsic motivation at ages seven and eight than non-gifted children. Hence, compared to non-gifted children, gifted children evidenced stronger enjoyment of learning, orientation toward mastery, curiosity, persistence, task endogeny and learning challenging, difficult and novel tasks. This finding is important, as it provides evidence for higher levels of academic intrinsic motivation in gifted individuals over time. Participants were measured using the YCAIMI at ages 7 and 8, using the CAIMI at ages 9, 10 and 13 and using the CAIMI-High School at ages 16 and 17. At each interval, gifted participants were found to have higher levels of academic intrinsic motivation than their non-gifted peers. This finding provided the basis for the conceptualization of Gottfried's (2004) construct of gifted motivation. However, this raises questions about the construct of gifted motivation

as the determination of giftedness in this study was based on a WISC-R score, a measure of intellect which does not take into consideration motivation.

Also studying motivation in gifted students, Vallerand, Gagné, Senecal & Pelletier (1994) compared school intrinsic motivation and perceived competence of gifted students and non-gifted students. One hundred and thirty five students in Grades 4 to 6 completed Harter's (1981) Intrinsic/Extrinsic Orientation Scale which measures intrinsic versus extrinsic motivation. The Cognitive Perceived Competence Scale (Harter, 1981) was used to measure student participant's self-report ratings of perceived competence. In this study, gifted students were designated through results of IQ tests and two standardized achievement tests in French and Math. Mean scores on Harter's (1981) scale were higher for gifted students ($M = 57.85$) than for non-gifted students ($M = 54.62$), indicating higher levels of intrinsic motivation. This is an important finding, as it provides evidence that these gifted students had higher levels of intrinsic motivation than non-gifted students.

Goldberg and Cornell (1998) examined the influence of intrinsic motivation and perceived competence on subsequent academic achievement among 949 second and third grade gifted students. This study's sample was comprised of students who were classified as gifted in their school district using multiple criteria and were participating in a Learning Outcomes Project of the National Center on the Gifted and Talented. This study also used Harter's (1981) self-report measure of intrinsic versus extrinsic orientation in the classroom, as well as Harter's (1985) Self-Perception Profile for Children to measure participant's motivational orientation (intrinsic/extrinsic) and self-perception. The Iowa Test of Basic Skills (reading comprehension, mathematics

concepts and mathematics problem solving scales were used) was used to measure academic achievement. Structural equation modeling indicated that intrinsic motivation influenced perceived competence and that perceived competence influenced subsequent academic achievement. The results indicated that perceived competence contributes to academic achievement, while intrinsic motivation did not directly influence subsequent achievement. This finding is important because it is one of very few studies that does not support the theory that high levels of intrinsic motivation are related to achievement. One suggestion for these differing results is that achievement was measured solely using a standardized test instead of inclusion of grades, and classroom test scores. Achievement scores based solely on a single standardized test limits generalizability due to potential instrument bias. These scores may not be a reliable or valid measurement of an individuals' achievement as tests differ in their focus (math, reading comprehension, analytical skills, etc). The preferred method of measuring achievement may be the inclusion of grades, classroom test scores and teacher reports in order to provide a more well-rounded view of a student's achievement across the curriculum. By including all subject areas and a wider range of skills (besides just the ability to take tests) researchers would gain a more thorough understanding of student achievement.

The construct of gifted motivation was studied by Gottfried, Gottfried, Cook and Morris (2005) through a comparison of adolescents with extremely high academic intrinsic motivation (i.e., gifted motivation) and their cohort peers on a variety of educationally relevant measures from elementary school through the early adulthood years. Assessment of academic intrinsic motivation was based on the Children's Academic Intrinsic Motivation Inventory (Gottfried, 1986). Across time, pervasive

differences resulted favoring the gifted motivation compared to the cohort comparison group on motivation, achievement, classroom functioning, intellectual performance, self-concept, and postsecondary educational progress. Meaningful effect sizes were obtained. Of the motivationally gifted, the majority of students were not intellectually gifted, thus, providing further evidence for considering gifted motivation as a construct in its own right (Gottfried, Gottfried, Cook & Morris, 2005). Also, students who were gifted in academic intrinsic motivation were educationally superior across a variety of indices (GPA, academic intrinsic motivation, SAT scores, classroom functioning, standardized tests and self-concept). Gifted motivation proved to be distinct from gifted intelligence. This research serves to expand the definition of giftedness to include the construct of gifted motivation in its own right.

Non-Production of Gifted Students. The non-production of gifted students is a perplexing phenomenon. Gifted students are one group of exceptional learners who are not normally considered at risk for academic failure or problems. However, sometimes students who show great academic promise fail to perform or produce at a level commensurate with their documented abilities, frustrating themselves, parents and teachers (Whitmore, 1986). It is important to recall Delisle's (1992) distinction between an underachiever and a non-producer. Delisle's (1992) definition states that underachievers are at-risk academically *and* psychologically in that they do not complete assignments because they have low self-esteem and are dependent learners. On the other hand, Delisle (1992) states that non-producers are at-risk academically but not psychologically in that they are self-assured, independent and have chosen not to attend

classes or complete school assignments because they find them boring or irrelevant (Delisle, 1992).

This literature review will be limited to studies of classroom productivity. These studies were found in literature on gifted students who underachieve. Definitions of gifted underachievers vary between emphasizing a discrepancy between potential and performance (Whitmore, 1980) and stressing predicted achievement versus actual achievement (Gallagher, 1991). Characteristics of a gifted underachiever may include: high IQ and problem solving abilities, avoidance of rote and repetitive tasks, inconsistent completion of academic work, better oral performances than written products, variable test results, restricted or non-traditional interests, low self-esteem, low or too high self-standards, self-centeredness, difficulty functioning constructively in a group, unresponsiveness to typical social rewards such as praise and grades and school-attendance problems (Whitmore, 1980). Within Whitmore's (1980) description of a gifted underachiever, there are traits such as inconsistent completion of academic work which indicate lack of classroom production as a distinct feature of underachievement. Although the population of gifted underachievers is as diverse as any other group of students, the common theme is that the student is not fulfilling their potential as reflected by a measure of academic performance (i.e., class work, grades, homework production, quizzes, tests) (Hishinuma, 1996). In this sense, Hishinuma (1996) uses class work and homework production (both measures of classroom productivity) as a measure of "achievement".

Although past research (Gottfried, 1985, 1986, 1990) tells us that students with high levels of intrinsic motivation have high academic achievement and tend to function

more effectively in schools, research on student functioning in academic settings indicates this may not be the case. While gifted learners are often highly motivated to achieve academically, this may not always manifest in practical classroom skills (Robinson & Noble, 1991). Gifted students are at risk for developing less adaptive patterns of beliefs and behaviours, and for failure to develop personal talent in spite of having abundant prerequisite abilities (Patrick, Gentry & Owen, 2006). This is the case for highly academically gifted students, who are used to learning almost effortlessly, to being very successful with very little effort, to scoring high marks without having to develop learning or self-regulatory strategies, and to consistently out-performing others.

Research has documented that gifted students spend a significant portion of their time in classrooms feeling bored (Kunkel, Chapa, Patterson & Walling, 1992; Larson & Richards, 1991) or unchallenged (Feldhusen & Kroll, 1991; Gallagher, Harradine & Coleman, 1997). As gifted learners become bored or unchallenged in class they may turn to other pursuits to provide the challengess they seek (Kanevsky & Keighley, 2004). Hoekman, McCormick, & Gross (1999) also emphasized that tasks that are interpreted as boring busywork may be stressful for individuals (both gifted and non-gifted) who prefer higher level thinking and reasoning activities. Kaplan (1990) has noted that as schoolwork becomes more difficult, students who have not yet experienced appropriate challenges may not have the study habits required to maintain a high level of achievement and stress may undermine their sense of self-worth. Simply stated, students who see classroom assignments as having little challenge may not be inclined to complete them. If this is the case, students who proceed through school without

experiencing challenging assignments may be unable to gain study habits and research skills that are necessary to complete tasks, thus possibly leaving them unable to succeed.

Synthesis. Academic research often treats gifted students as a homogeneous group who think and act like each other (Gottfried, Gottfried, Bathurst & Guerin, 1994; Goldberg and Cornell, 1998; Vallerand, Gagné, Senecal & Pelletier, 1994). Research has found that intrinsic motivation decreases with age (Corpus et al., 2009; Lepper et al., 2005) among unspecified samples (may or may not include gifted students). Also, research has found that there is a clear association among intrinsic motivation, satisfaction with school and commitment to work among gifted students (Hoekman et al., 2005). This finding suggests that gifted students with high academic intrinsic motivation may have high classroom productivity. The Fullerton Longitudinal Study (Gottfried et al., 1994) and other past research (Vallerand et al., 1994) found that gifted students had higher academic intrinsic motivation than there non-gifted peers across time, supporting arguments that strong motivation is a characteristic of giftedness (Renzulli, 2005).

In contrast, Goldberg and Cornell (1998) found that intrinsic motivation did not directly influence achievement. As many of the studies analyzed within this chapter focused on classroom productivity as a measure of achievement this suggests that perhaps academic intrinsic motivation may not be associated with classroom productivity.

Methods of Measuring Intrinsic Motivation

Measurement of the construct of motivation has progressed since the middle of the 20th century when researchers were interested in learning about repressed internal conflicts and unconscious, attitudes, drives, and motives of individuals. The Thematic Apperception Test (TAT) (Murray, 1943) was developed to tap the unconscious and to

make explicit these characteristics of personality. The TAT, required individuals to respond to cards featuring ambiguous pictures by telling stories about the characteristics and situations they saw and researchers then drew conclusions about the respondent's motivations from the nature of their stories. With no set responses, participants were free to create their own stories, thus, a different response was given virtually every time a participant the test. One of the main downfalls of this procedure was its reliance on the researchers' subjective interpretations of what a participants responses really meant. Building on this type of scenario testing where participants indicated how they would respond to a situation or what they would think in a certain scenario, Deci and Ryan (1985) streamlined the process into 12 scenarios, each with three possible responses. The General Causality Orientation Scale (Deci and Ryan, 1985) offered respondents a choice between three selections that most represents their thinking. The three choices reflect a) a sense of making one's own choices, 2) a focus on external rewards and 3) a perception that events often are out of one's control. One weakness of Deci and Ryan's (1985) instrument is respondents' inability to indicate motivational orientation on a continuum. Instead, respondents are given a limited number of choices (3) to choose from – none of which may describe their actual motivational orientation.

One of the other more frequently employed general measures of motivation includes Jackson's (1999) Personality Research Form (PRF) which is a self-judgement test of 20 motives based on Murray's TAT. The PRF (Jackson, 1999) is a 352 item instrument with 22 scales ranging from achievement to autonomy and cognitive structure to impulsivity. The PRF, created for use with adult participants, is a true-false, self-report instrument that includes items such as "People consider me a serious, reserved

person", and "There is no excuse for a messy desk". One strength of the PRF is that it uses even more direct queries than Murray (1943) or Deci and Ryan (1985). However, one of the main weaknesses of this instrument is the lack of possible responses built into the true-false item style.

Harter (1981), created another of the more widely used tools for measuring intrinsic versus extrinsic motivation – "Scale of Intrinsic vs. Extrinsic Motivational Orientation". This measure is among the most cited and used motivation scales found in recent research studies. Unlike Jackson's (PRF), this scale is aimed for use with school age children. On this measure, children are provided with an example of an academic activity (i.e., reading books) and are asked to indicate the extent to which they typically engage in that activity for enjoyment (i.e., intrinsic motivation) versus to please the teacher (i.e., extrinsic motivation). One benefit of this instrument lies in its ability to be used with child participants in academic settings, unlike many of the other instruments. A drawback of this measure is that respondents cannot indicate that both or neither of these reasons may apply, children can only indicate the degree to which they endorse one reason over another. However, strengths of this instrument include the development of age appropriate item format (choosing between only two choices – intrinsic or extrinsic) for children based on earlier scales that had been aimed at older respondents.

Gottfried's (1986) Children's Academic Intrinsic Motivation Inventory is yet another commonly used instrument used to measure academic intrinsic motivation in students between Grades 4 and 8. Similar to Harter's (1981) scale, the CAIMI also focuses on motivation towards academic tasks. However, unlike Harter's (1981) scale which measured motivation in its respondents as either intrinsic or extrinsic, the CAIMI

measures only intrinsic motivation from low to high. This instrument requires respondents to rate their level of agreement to statements such as "I enjoy learning new things".[1] These statements vary as to whether they are describing a low or high level of intrinsic motivation. Respondents are required to rate their agreement with each statement on a 5 point Likert scale. This instrument is unique in its division of academic intrinsic motivation into subscales for 4 subject areas (reading, math, social studies and science) as well as a general subscale.

Synthesis. Overall, instruments measuring motivational orientation were created with one of two goals in mind: 1) to measure intrinsic versus extrinsic motivation (Murray, 1943; Deci & Ryan, 1985) or 2) to measure motivation on a continuum ranging from highly intrinsic/extrinsic to low intrinsic/extrinsic (Harter, 1981; Gottfried, 1986). Various item types have been used in the past depending on the age of respondents expected, type of data needed (numerical, verbal etc) and depth of response needed. The choice of instrument should be based on research questions, respondent characteristics and method of planned analysis (Anastasi, 1997). Also, an instrument's reliability and internal validity should be taken into consideration when deciding between multiple measurement tools. Finally, any instrument used should align with the theory of motivation influencing the study. Keeping these critiques in mind, I decided that Gottfried's (1986) Children's Academic Intrinsic Motivation Inventory (CAIMI), was the best option for the current study based on its focus on academic intrinsic motivation,

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usability with elementary school children and past evidence of its reliability and internal validity.

Research Questions

Based upon the above literature, there seems to be a wealth of research and knowledge in the realm of motivation in learning. However, there seems to be a specific lack of research surrounding variations in motivational characteristics within the gifted population.

The current study goes beyond researching gifted students as a homogeneous group of students with similar motivational traits, to investigate variations in academic intrinsic motivation among individuals within a sample of gifted students. It will focus on the relationship between academic intrinsic motivation and student classroom production.

Essentially, by not attending to or ignoring the differing motivational characteristics among gifted students, educators may be unintentionally inhibiting their potential. Within classrooms, this lack of sensitivity can lead to what is commonly misperceived to be "underachievement" but is better described as non-production. Teachers may recognize gifted students who are at-risk academically and without recognizing the student's psychological state, label them "underachieving".

The following study examined academic intrinsic motivation in relation to academic production within a sample of gifted students. The purpose of the study is to examine relationships in intrinsic motivational characteristics between individual gifted students characterized by their classroom production.

Recalling the personal anecdote from the introduction to this thesis, the research question for this study asks "Is there a relationship between level of academic intrinsic motivation and level of classroom productivity in gifted students?" In order to investigate this issue, I decided to measure academic intrinsic motivation in a sample of gifted learners while simultaneously having classroom teachers rate these participants on their levels of classroom productivity. Gottfried (1983) claims that intrinsically motivated students are more likely to participate in an activity purely out of curiosity, and have a desire to engage in an activity purely for the sake of participating in and completing a task. With this in mind, it seems logical that gifted students with high levels of intrinsic motivation would be more likely to be interested by and engaged in tasks with relevance to them instead of teacher oriented tasks and assignments.

The current research was an extension of past research focusing on motivation in gifted students. Gottfried (1982, 1983, 1985) measured Grade 4-7's, Grade 5-8's and 4th and 7th Grades respectively. This work, combining all age/grade groupings previously studied by Gottfried into one sample included students in Grade 4-8. More specifically, Gottfried had no specific focus on students who had been identified as gifted in those particular studies. The current research studied gifted students, a subgroup of the general school population. Past studies have measured intrinsic versus extrinsic motivation (Harter, 1981) but the current research focused on differing levels of intrinsic motivation using a measure independent of extrinsic motivation in order to gain an understanding of only intrinsic motivation. In the past, the CAIMI has been used to seek relationships between academic intrinsic motivation and achievement as measured by GPA and standardized test scores (Gottfried, 1985). The current research extended this line of

research to include CAIMI scores in relation to specific aspects of classroom productivity. Productivity has been viewed to be a distinct construct from achievement. Results of this study will contribute to a greater understanding of whether or not there are variations in both academic intrinsic motivation and classroom productivity levels of gifted students. The focus of this study will be to evaluate the magnitude of association of productivity and intrinsic motivation.

Findings of this research will enhance a slowly growing body of evidence surrounding the distinct academic intrinsic motivational characteristics within a sample of the gifted population. Thus far, researchers have found relationships between academic intrinsic motivation and achievement (GPA, standardized tests etc.). This study will be investigating levels of academic production and levels of classroom production among a sample of gifted students. Academic production is defined as the written, verbal and physical output of a student in accordance with teacher expectations, assignment criteria and curriculum expectations.

This study will focus on classroom productivity behaviours that are mediated by a students' individual motivational characteristics. Aligning this study with Gottfried (1986) academic intrinsic motivation will be measured using an instrument which focuses on a respondents drive to complete a task because of the inherent challenge involved, participation in an activity purely out of curiosity, and meeting an internal need for enjoyment and autonomy. Therefore, the following study will investigate the extent to which gifted learners are intrinsically motivated in academic and educational contexts. Also, this study investigates teacher reports of student productivity, looking for

relationships between academic intrinsic motivation and classroom productivity in a sample of gifted students.

CHAPTER THREE

METHOD

This is a correlational study that investigates variability in classroom work productivity (independent measure) and the academic intrinsic motivation (dependent variable) of gifted students.

Participants

Students. A volunteer sample of children was drawn from the population of Grade 4-8 students (ages ranging from 9 years old to 13 years old) who had been identified as "gifted" according to their school district's definition. This school district, as with all school districts in British Columbia, is required to use the following Ministry of Education Definition of a gifted student.

"A student considered gifted possesses demonstrated or potential abilities that give evidence of exceptionally high capability in intellect, creativity or skills in a specific discipline, possibly in more than one area. Extraordinary intensity of focus in an area of interest or talent may be accompanied by disabilities, and students should not be expected to have strengths in all areas of intellectual functioning. Gifted students must be appropriately identified and receiving an additional special education service on a regular and ongoing basis, with a current IEP to be eligible for funding. Consistent access to programs should be unbiased with respect to language, culture, gender, physical ability, learning or other disability."

(Section E, Special Education Services: A Manual of Policies, Procedures and Guidelines as cited in Coquitlam School District, 200,9 p. 2)

Furthermore, this school district uses multiple criteria during the identification process. The full identification process is outlined in Appendix A. The first step in identification is a three part process which includes a) conducting individual/group/class testing using the Canadian Test of Cognitive Skills (CTCS); b) classroom teacher completion of Individual Screening Form (see Appendix B), Class Screening (see Appendix C) or Brilliant Behaviours Form (see Appendix D); and c) reviewing the

articulation form from the feeder school (Coquitlam School District, 2009). Next, the school-based team and the school's gifted contact review all the information collected, looking for students who score at or above the 95th percentile, students whose names are mentioned more than 3 times on a class screening form. Finally, the school contacts parents to discuss identification and begin program planning.

At the elementary level, according to the recommended plan for identifying gifted students, testing of all Grade 2 students takes place in April or May using the CTCS, looking for students who score in the 95th percentile or higher on Non-Verbal or Total scales. For each of the students at the 95th percentile and above, classroom teachers complete an Individual Screening Form or a Brilliant Behaviours Checklist. Teachers may complete a checklist for students who did not meet the 95th percentile criteria on the CTCS and these students would require further investigation.

At the middle school level, all teachers complete a Class Screening Form in April or May for all students in their class. Those students whose names are mentioned more than three times complete the CTCS. Similar to the elementary school plan, administrators are looking for a ranking of 95th percentile or higher to accompany the recorded behaviours from the Class Screening Form.

This school district was chosen due to two factors: ease of access and well-established gifted programming. In regards to ease of access, the district has a history of previous research participation (specifically with populations of gifted learners) in conjunction both with Simon Fraser University and with the senior supervisor of this study. Furthermore, this school district offers distinct gifted education programs, SHARP and District Zone Challenge Centres. The first, SHARP *(Students of High Ability in the*

Regular Classroom) is a pilot project that started in September 2003 in which elementary and middle school classroom teachers enrol cluster groupings (3-6) of gifted students in a mixed ability classroom and intentionally provide differentiated curriculum and socio-emotional support for them. Support is provided to these teachers in the form of individual consultation as well as bimonthly in-service and networking sessions.

The second gifted program, District Zone Challenge Centres, have specialist teachers offering special pull-out sessions for gifted students at one of several schools throughout the district. This program offers a series of approximately 10 morning or afternoon sessions three times a year to students in Grades 3 to 5, identified as gifted. These sessions are intended to supplement programs already in place in neighbourhood schools and may be included as part of a student's Individual Education Plan. Students are referred to sessions by school-based personnel and transportation is a parental responsibility. Using students from a school district with a very clear, regimented identification process ensures a more homogeneous group of gifted students.

Twelve schools participated, five SHARP Middle Schools and seven Elementary Schools. Two of the elementary schools were district challenge centres, but the student participants were all from that school, as opposed to students who might have been visiting for "Challenge" sessions. Principals and gifted co-ordinators/support staff at individual schools helped locate students who had been identified as "gifted".

Teachers. Thirteen male (31.7%) and 28 female (68.3%) teachers from 10 schools agreed to rank the work productivity of gifted students in their class. Of the 13 male teachers, six were SHARP Middle School teachers (two Grade 6, two Grade 6/7 split, and two Grade 8) and seven were elementary teachers (one Grade 4/5 split, and six

Grade 5). Of the 28 participating female teachers 13 were SHARP Middle School teachers (two Grade 6, three Grade 6/7 split, seven Grade 7 and two Grade 7) and 15 were elementary teachers (eight Grade 4, one Grade 4/5 split, five Grade 5, two Grade 6, three Grade 6/7 split, seven grade 7 and two Grade 8). Schools ranged from having two participating teachers to having 12 participating teachers per school.

Instrument

The Children's Academic Intrinsic Motivation Inventory (CAIMI). For the purpose of the current study, the CAIMI was the best instrument choice. Specifically, the CAIMI is focused on Grade 4-8 students. This grade grouping was the most interesting as it reflects the age at which I believe I began to wonder about this. Furthermore, the CAIMI was appropriate as it measured academic intrinsic motivation in five separate subscales, allowing for further investigation into "Are there variations in the levels of academic intrinsic motivation in gifted students?" Finally, after review of the validity and reliability measures undertaken during CAIMI development, it was chosen as the best, previously tested instrument to use for this study.

The CAIMI was developed to measure academic intrinsic motivation in upper elementary through junior high school students (Grades 4-8) (Gottfried, 1986). It is a self-report scale that consists of five subscales. Four measure intrinsic motivation separately for reading, math, social studies and science and the fifth assesses intrinsic motivation more generally (Gottfried, 1986). Each of the subject area scales contain 26 items; the General scale contains 18. Items in all four subject areas are identical, except they reference the particular subject. Items in the General subscale are similar in content to those in the subject area scales. The CAIMI does not measure intrinsic motivation

versus extrinsic motivation, but instead the scales assess intrinsic motivation from high to low (Gottfried, 1986). Reasoning for this is not explicitly stated within the CAIMI manual (Gottfried 1986), however it seems plausible that this instrument was influenced by social-cognitive theories implying intrinsic motivation is independent of extrinsic motivation.

Of the 26 items in each of the subject area scales, 24 require a response on a 5-point Likert scale ranging from strongly agree to strongly disagree (i.e. "I enjoy learning new things"), while the remaining two items require a forced choice between an intrinsic and non-intrinsic alternative (i.e. "It is more important to you to do a school assignment so that you will: LEARN MORE; or GET A GOOD GRADE").[2] Permission was granted by the CAIMI's publishers to reproduce items within this thesis (see Appendix E). In the General scale, all items require responses on the basis of the 5-point Likert scale ranging from strongly agree to strongly disagree. The items are balanced so that for approximately half of the items, high intrinsic motivation is indicated by agreement, and for the other half, high intrinsic motivation is indicated by disagreement.

On the reading, math, science and social studies subscales there were 26 items. Twenty-four of the items were rated from one to five during scoring, the remaining two forced choice items were rated one or two during scoring. The minimum possible score on any of these four subscales was 124. The General subscale consisted of 18 items, each scored from one to five during tabulation. The minimum possible score on the general subscale was 18, with a maximum score of 90.

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[2] Reproduced by special permission of the Publisher, Psychological Assessment Resources, Inc., 16204 North Florida Avenue, Lutz, Florida 33549 from the Children's Academic Intrinsic Motivation Inventory by Adele E. Gottfried, Ph.D., Copyright 1986. Further reproduction is prohibited without permission of PAR.

The CAIMI is the first instrument developed to measure children's academic intrinsic motivation in a comprehensive manner across school subject areas and as a general orientation toward school learning (Gottfried, 1986). The CAIMI manual (Gottfried, 1986) states that it was originally developed on the basis of theoretical foundations of intrinsic motivation, however, no information is given regarding which theory or theories influenced its development. Based on my analysis of multiple theories of motivation, the CAIMI uses reasoning similar to Pintrich's (2000) Achievement Goal Theory, which explains the relations between goal orientation and academic outcomes. Pintrich states that underlying patterns of cognitive beliefs and attributions influence the type of activities that are pursued and engaged in. Similarly, the CAIMI measures academic intrinsic motivation as it pertains to specific types of activities which are liked or disliked by respondents.

As mentioned in chapter 1, Achievement Goal Theory examines mastery goals and performance goals. Through the lens of Achievement Goal Theory, the CAIMI is measuring students' drive for mastery goals and understanding material for its own sake. Items reflect these constructs (i.e., I feel good inside when I have learned something new). Preference for new or familiar assignments, challenging or easy material/content/concepts and reviewing old lessons or learning something new are all investigated in the CAIMI's items.

Assessing academic intrinsic motivation within subject areas as well as a general orientation is included within the CAIMI due to: a) the scientific evidence that motivation exists both as a differentiated construct and a general orientation (Brophy, 1983; Gottfried, 1985); and b) the recognition that school curriculum is generally

organized into subject areas with important implications for children's motivation. Thus, motivation can occur at different levels in different areas of a child's daily life such as reading, math, social studies or science as well as school life in general.

Development of the CAIMI occurred over three major studies extending over six years. Items on the CAIMI were developed, worded and administered to eliminate the effects of social desirability and response biases and acquiescence. It is generally agreed (Jackson, 1967; Nunnally, 1978; Wylie, 1974) that the most effective method of reducing errors due to the variables added in later trials is through the construction of the test itself, such as inclusion of items presenting both positive and negative instances, reversals of items, clear and unambiguous wording and directions, and administrative procedures emphasizing examiner and subject rapport to maximize truthful responding (as cited in Gottfried, 1986). The CAIMI was developed in accordance with these recommendations.

Items were created based on the basis of application of theories of intrinsic motivation to school learning (Gottfried, 1985). Item construction therefore focused on a concept of academic intrinsic motivation as involving enjoyment of school learning characterized by an orientation toward mastery; curiosity; persistence; task-endogeny (growth from within); and learning challenging, difficult, and novel tasks (Berlyne, 1971; Deci, 1975; Brophy, 1983; Gottfried, 1985; Harter, 1981; Maw, 1971; Nicholls, 1983; Pittman, Boggiano, & Ruble, 1983 as cited in Gottfried, 1986).

In Study 1, the initial version of the CAIMI was developed. It contained 38 items, of which 28 were differentiated into the four subject areas and 10 were general. An initial pool of 60 items was developed and these items were subject to internal consistency analyses (coefficient alpha) for the subject area and general scales. Items

that contributed to coefficient alpha and having positive item-total correlations were selected for inclusion. From this initial pool, 38 items were retained (7 in each of the 4 subject areas and 10 in the general scale). A goal for Study 2 was to increase the internal consistency of the CAIMI scales. Hence, additional items were developed which were consistent with those developed in Study 1. An additional 84 items (19 in each subject area and 8 in the general scale) were added. All of the 122 items in Study 2 contributed to coefficient alpha reliability and thus the same 122 items were used in Study 3. In Study 2, internal consistency reliability coefficients ranged from .80 (general) to .91 (social studies). In Study 3, internal consistency reliability coefficients ranged from .83 (general) to .93 (math and social studies). Across the three studies, item-total correlations within the scales ranged from .30 to .82. Through this process of revisions, from Study 1 to Study 2, the CAIMI as it currently exists was created.

Studies 2 and 3 both measured academic intrinsic motivation, academic anxiety, perception of academic competence and academic achievement, as measured by the Total Battery of the Comprehensive Tests of Basic Skills (CTBS), as well as academic intrinsic motivation using the 122-item CAIMI inventory expanded following Study1. Study 2 (Gottfried, 1985) involved 260 Grade 4-7 students and Study 3 (Gottfried, 1985) measured 166 Grade 5-8 students. Bivariate and multiple correlations between the CAIMI scales, standardized achievement scores and teachers grades were completed. Multiple correlations (with all CAIMI scales) showed the achievement in every subject area (except for social studies standardized achievement scores) was significantly correlated with the CAIMI, with significant correlations ranging from .24 to .44. This indicates that there is a relationship between academic intrinsic motivation as measured

by the CAIMI and student achievement. However, the correlations were low, meaning that the relationships were weak.

Test-retest reliability over a 2-month interval was established on a random sample of subjects in Studies 1 and 2. These coeffiecients ranged from .66 to .76 ($df = 83, p < .01$) in Study 1 and .69 to .75 ($df = 136, p < .01$) in Study 2, indicating moderately high stability over a 2-month interval. For both internal consistency and test-retest reliability, coeffiecients were consistent across grade, sex, and race.

Contemporary views of validity (Anastasi, 1997) regard the entire construction of a measure, from the theoretical foundations, to the actual criteria to which the measure is related, as fundamental to test validity. From this perspective, the validity of the CAIMI has been established in a number of ways (Gottfried, 1986). The distinction into general and four subject areas subscales was based on scientific and practical considerations. Item selection and retention were based on subscale homogeneity. Hence, the focus of the CAIMI was to develop an instrument tapping the construct of academic intrinsic motivation. Both positive and negative correlations between items were predicted and obtained, indicating convergent and discriminate validity of the CAIMI. Concurrent criterion-related validity with anxiety, perception of competence, and achievement was demonstrated (Gottfried, 1986).

The wording of the items was reviewed, during initial development, by a panel of judges (elementary and junior high school teachers) to ensure the appropriateness of the vocabulary and syntactic constructions for elementary and junior high school students. Response set and acquiescence were minimized by varying wording and changing the content of the items in contiguous positions. Several items were included that were

reversals of each other, and both positive and negative instances of academic intrinsic motivation were included. This was done to eliminate participant acquiescence and bias throughout the items. Through the inclusion of reversed items, positive and negative instance of academic intrinsic motivation, I was able to recognize students who either a) did not read the questions and simply indicated random answers, and b) students who indicated the same answer for each item, despite the fact that items also appeared as reversals. High CAIMI scores correspond to high academic intrinsic motivation. Scores at the low end of the scales correspond to low academic intrinsic motivation characterized by little enjoyment of learning, an orientation toward accomplishing easy rather than difficult or challenging tasks, little curiosity for school learning, little interest in task mastery and low persistence (Gottfried, 1986).

The Student Productivity Scale (SPS). The Student Productivity Scale (SPS) is an original instrument developed for use in this study (see Appendix F). The purpose of the SPS was to measure teacher ratings of student's classroom productivity. The decision was made, in collaboration with the senior supervisor and committee member, to include only four items to minimize the demands on teacher participants' time in hopes that this would attract more teacher participants. In the early stages of scale development, it was decided to use a four point rating scale in order to discriminate a range of student productivity ("never", "sometimes", "often" and "always") in hopes of finding extreme groups (those who had very high and very low levels of classroom production). This decision was made during discussions between myself, the senior supervisor and thesis committee member. The discussion surrounded which of the quantitative characteristics of productivity were measurable, observable and evident in students' classroom

behaviour (i.e, Student goes above and beyond assignment criteria; level of production/completion is consistent across subjects; student completes assignments in accordance to assignment criteria regarding amount of output; and student completes assignments to criteria expectations without needing special reminders or constant teacher assistance). Using the SPS, individual teacher participants rated their student participants on four items addressing classroom productivity.

Procedure

Ethics approval was received from the Simon Fraser University Ethics Review Board between May and August 2008. After revisions, ethics approval was granted on August 25th, 2008. The official letter of ethics approval is included in Appendix G.

After receiving approval from Simon Fraser University's Department of Research Ethics, permission was sought from a local suburban school district to conduct research within their schools. Approval was granted on September 23rd, 2008. The letter of research approval is included in Appendix H.

My study's senior supervisor made contact with the Gifted Education Coordinator for the school district as a first step towards communicating with principals and school contacts who were possible participants. I then made follow-up contact with the Gifted Education Coordinator who sent out an introductory email, on my behalf, to Principals, Vice Principals and Gifted contacts (SHARP teachers) within SHARP participating middle (Grades 6-8) and elementary (Grades K-5) schools. The email is included in Appendix I. I followed up with a similar introductory email describing the research, tasks that would be involved, goals, etc. which was sent to the same school district staff. This email is included in Appendix J. Thus, four middle schools and four elementary

schools were contacted. Follow up phone contact was made to each of the principals to attempt to discuss the possibilities of gathering data in their schools and/or meeting with their students and teachers as eligible participants. This led to the collection of data in 3 schools (A, B & D).

Low participation from the district SHARP schools led to the inclusion of all middle schools in the district. I sent an introductory email to the principals and vice principals in all nine (non-SHARP) middle schools. This email is included in Appendix K. The email was followed up with a phone call to each school and resulted in the participation of Schools D and E.

Further need for participants led to contacting all elementary schools in the district. I sent an introductory email to the principals and vice principals from all 41 remaining elementary schools. This email is included in Appendix L. Interest was expressed by two schools and resulted in the collection of data at Schools F and G.

Finally, the gifted contact at School G used personal email communication to request participation from colleagues. Five schools were willing and I took over communication with gifted contacts at those schools to further describe the research, participation requirements and to set up dates and times for initial visits. This resulted in the collection of data at Schools H, I, J, K and L.

I made contact by email or phone with the principal or gifted contact person in each school. Plans were made for my preliminary visit to each school site to meet with eligible students in order to describe the study, the student's role in the study and the consent process. The first of these meetings took place on October 20th, 2008 and the last took place on January 29th, 2009. A mutually acceptable date was negotiated with the

gifted contact for me to return to administer the CAIMI to eligible students who returned their consent forms.

Consent was first gained from individual school principals to gain access to their classroom teachers and request teacher participation and access to gifted students. Teacher participation was necessary to ensure that students would be amicably excused from regular classes if necessary to facilitate the group administration of the CAIMI. Next, I was introduced to eligible gifted students during the initial school visits and each were given a Minor Consent Form (see Appendix M) for their parents to read, review, sign and return in acknowledgement of their agreement to allow their child to participate in the study. During these initial meetings, the goals, tasks and purposes of the study were verbally relayed to eligible students through an Introductory Script (see Appendix N). This began the informed consent process for the student participants. I stressed that participation was voluntary. Also, they were told that they could change their mind and end their participation in the study at any time. The informed consent process for the students was completed prior to the administration of the CAIMI when I recited the Administration Script (see Appendix O).

In order for teachers and students to participate, each had to return a signed consent form. The Teacher Consent Form (see Appendix P) gave permission for data collected on the SPS to be used anonymously in the study and stressed that participation was voluntary. The Minor Consent Form gave parents' permission for participating students to be excused from regular classroom schedules in order to participate in group facilitation of the CAIMI. It also gave permission for data collected from the CAIMI to

be used anonymously in the study, indicated participation was voluntary, and that students could terminate participation at any time throughout the study.

The CAIMI was completed in one sitting by all students participants at each site. The time required by children to complete the CAIMI was approximately 20 minutes. In total, 12 school sites participated in the study. However, teachers at two of the participating schools returned no SPS's so their students' data was not included in analysis. Thus, only 10 schools were included in the final analysis.

The first return visit and administration of the CAIMI took place on November 13th, 2008 and the last took place on February 17th, 2009. During administration of the CAIMI, I recited the administration script along with the CAIMI instructions provided in the manual. Students then completed the instrument and were able to ask clarifying questions, which I answered. Administration of the CAIMI took place in various school settings: libraries, empty classrooms and Challenge classrooms.

The classroom teacher of each child participant was asked to complete the SPS and children were asked to complete the Children's Academic Intrinsic Motivation Inventory (Gottfried, 1986). Teachers rated from one to seven gifted students using the SPS depending how many were enrolled in their classroom/homeroom.

The SPS and teacher consent forms were distributed to and collected from individual classroom teachers by the gifted coordinators in each school. Many school sites required a third visit to collect these forms, as classroom teachers filled them out at their convenience.

CHAPTER FOUR

RESULTS

This study used a correlational design to investigate variations in academic intrinsic motivation and classroom productivity in a sample of gifted students within an academic classroom setting. The research question being investigated is "Is there a relationship between academic intrinsic motivation and classroom productivity among gifted students?"

To begin analysis of any relationships, each variable must first be analyzed separately. When all data was gathered, sorted, and tabulated, descriptive statistics were completed for all five CAIMI subscales, four individual SPS items, total SPS rating as well as sample characteristics such as age, grade and gender, using SPSS Statistics 17. These descriptive statistics included minimum and maximum ratings/responses, mean rating/response and standard deviation.

Frequencies were tabulated on all five CAIMI subscales, four individual SPS items, total SPS rating as well as sample characteristics such as age and gender, using SPSS Statistics 17. Pearson *r* correlations were done on all five CAIMI subscales, four individual SPS items, total SPS rating as well as population characteristics such as age, grade and gender, using SPSS Statistics 17.

First, sample characteristics were analyzed. Second, participant levels of academic intrinsic motivation were analyzed. Next, participant levels of classroom productivity, as reported by classroom teachers, were analyzed. Finally, both variables (academic intrinsic motivation and classroom productivity) were correlated to investigate possible relationships.

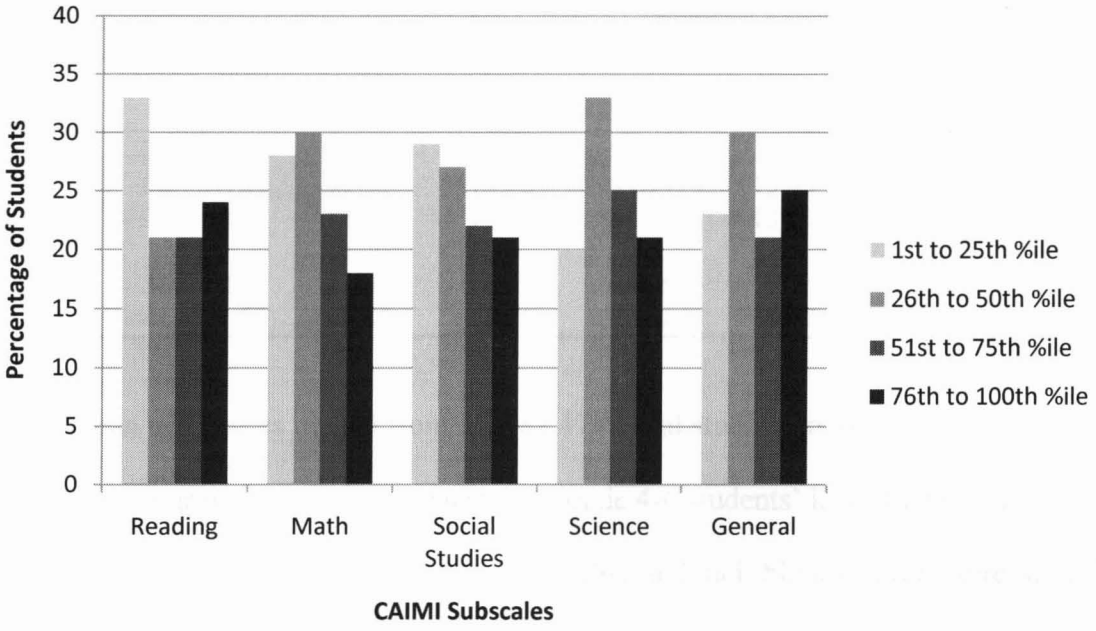
Data Analysis

Sample Characteristics. A total of 196 consent forms were given out to eligible students and 133 (67.9%) were returned signed by parents or guardians. Return rates for student consent forms ranged from 20% (School E) to 100% (Schools D, F, H, I, J and L). Among all 12 schools, 54 teacher consent forms and SPS checklists were distributed and 41 (75.9%) were returned complete. Ninety-nine student participants were included in the final data analysis. Thirty-four students were not included in the dataset because their teacher did not consent to participate.

As in the CAIMI standardization sample, participants in the present study were assigned to one of two groups, Grades 4 to 6 (n=77) or Grades 7 and 8 (n=22). In the Grade 4 to 6 group, 40 participants were girls and 37 were boys. In the Grade 7 and 8 group, 9 participants were girls and 13 were boys.

As shown in Figure 1, the distribution of percentile scores obtained by students in the sample, calculated in relation to the CAIMI standardization sample was evenly distributed across all subscales.

Figure 1. Distribution of CAIMI Scores by Quartile



Descriptive Analysis of Children's Academic Intrinsic Motivation Inventory (CAIMI). Descriptive statistics (minimum/maximum scores, mean score and standard deviation) were run on each of the five CAIMI subscales.

Table 1 provides the descriptive statistics (means and standard deviations) for the entire sample and the two grade groups (4-6 and 7-8). The estimate of skewness and kurtosis for raw scores on each subscale was highly positive: reading (S = -.70, K = .080); math (S = -.48, K = -.15); social studies (S = -.58, K = .26); science (S = -.80, K = 1.00); and general (S = -.57, K = 1.16); suggesting that the distribution of scores was negatively distributed about the mean. The majority of the students in the sample scored above the mean. Thus, according to the CAIMI the majority of the students in this sample are above average in their intrinsic motivation.

Table 1 Sample Descriptive Statistics (CAIMI)

			Full Sample N = 99		Grades 4-6 *n* = 77		Grades 7 – 8 *n* = 22	
	Min.	Max.	$\bar{x}$ Raw Score	Raw Score sd	$\bar{x}$ Raw Score	Raw Score sd	$\bar{x}$ Raw Score	Raw Score sd
Reading	36	124	89.49	18.97	90.56	18.35	85.77	20.99
Math	56	124	97.31	14.36	97.99	13.43	94.95	17.39
Social Studies	38	124	88.54	17.98	87.47	18.51	92.27	15.82
Science	36	124	94.68	16.01	94.36	16.35	95.77	15.06
General	41	86	70.40	7.81	70.31	8.07	70.73	6.96

Mean raw scores ranged from $M = 87.47$ (social studies) to $M = 97.99$ (math) in the Grades 4-6 grouping. This indicates that Grade 4-6 students' lowest levels of academic intrinsic motivation were in social studies and their highest levels were in math. Mean raw scores ranged from $M = 85.77$ (reading) to $M = 95.77$ (science) in the Grades 7-8 grouping. This indicates that Grade 7-8 students have the lowest levels of academic intrinsic motivation in reading and the highest levels of academic intrinsic motivation in science.

In order to compare the CAIMI results of the current sample with results yielded from Gottfried's (1985) research, effect sizes (Cohen's d) were calculated. Table 2 indicates effect sizes computed between the ratings of students in current study compared with ratings of students in samples used in Study 2 and 3 (Gottfried, 1985). To compare findings from previous Gottfried studies with those from the present study, effect sizes (Cohen's d) were calculated on the CAIMI subscales. This step was important in order to analyze whether the present sample was similar to Gottfried's (1985) sample. The formula for Cohen's *d* using the means and standard deviations of two groups (the current sample and Gottfried's samples) is as follows: Cohen's $d = M_1 - M_2 / \sigma_{pooled}$, where $\sigma_{pooled} = \sqrt{[(\sigma_1^2 + \sigma_2^2) / 2]}$.

When comparing mean raw scores between the two grade groupings on average, levels of academic intrinsic motivation are slightly higher in the Grade 4-6 grouping than the Grade 7-8 grouping for the reading (d =.24) and math (d = .20) subscales, but slightly lower in the social studies (d= -.28), science (d = -.09) and general (d = -.06) subscales.

T-tests were conducted to compare differences in grade group average ratings on the CAIMI subscales. No statistically detectable group difference in mean raw scores were found on the CAIMI subscales; t (97) = -1.11 (social studies); -.36 (science), -.22 (general), .87 (math) and 1.04 (reading), p = .27 to .83 (two-tailed). Thus, results indicate that, on average, the grade of participants does not mediate the magnitude of intrinsic motivation as measured by the CAIMI.

Table 2 Comparison with Gottfried's (1985) CAIMI Results

CAIMI Subscales	Current Study	Gottfried Study 2	Effect Size	Gottfried Study 3	Effect Size
Reading					
M	89.5	96.6	-0.42	84.6	0.28
SD	19.0	14.6		15.5	
Math					
M	97.3	101.3	-0.28	94.8	0.15
SD	14.4	14.2		17.7	
Social Studies					
M	88.5	94.5	-0.35	86.2	0.13
SD	18.0	15.9		17.7	
Science					
M	94.7	96.9	-0.14	91.4	0.21
SD	16.0	15.5		15.1	
General					
M	70.4	72.6	-0.28	66.7	0.46
SD	7.8	7.8		8.2	

Note. Present study n=99; Gottfried Study 2 n=240; Gottfried Study 3 n=166

According to Cohen (1988), an effect size of .20-.40 is small, .40-.60 is moderate and above .60 is large. The effect sizes obtained in this analysis show that on average, the magnitude of group differences in CAIMI ratings between this study and Gottfried's (1985) studies was generally small. On average, gifted students in the present study rated themselves as having similar levels of intrinsic motivation to students in the Gottfried studies.

The small effect sizes obtained may be related to the finding that samples in Gottfried's studies and mine are more similar than different. In all studies, participants lived in middle class homes and represented a predominantly white ethnicity. Academic achievement was on average, high in all groups. According to Gottfried (1985), the average achievement of groups of students in the CAIMI studies 2 and 3 was well above average. In Study 2, the sample mean percentile on the Total Battery of the Comprehensive Tests of Basic Skills (CTBS) was 64 ($SD = 27$). In Study 3, the sample mean percentile on the CTBS was 77 ($SD = 19$). The students identified as gifted in the current sample scored at or above the 95th percentile on the CTCS, which assesses academic aptitude of the abilities important to learning, such as reasoning, problem solving, evaluating, discovering relationships and remembering (Coquitlam School District, 2009).

Table 3 provides the intercorrelations among raw scores on the CAIMI subscales. The correlation, $r = .23$ between reading and math, was significant at the $p < 0.05$ level. All other correlations were significant at the $p < 0.01$ level and ranged from $r = .33$ between the general subscale and reading, to $r = .61$ between the general subscale and math. All correlations between scales on the CAIMI were positive, ranging in magnitude

from small between math and reading (r = .23) to moderate between general and math (r = .61). These findings suggest that the subscales of the CAIMI share common variance but also measure unique variance in student intrinsic motivation.

Table 3 Correlations Between the Five CAIMI Subscales

	Reading	Math	Social Studies	Science	General
Reading	1.00				
Math	.23*	1.00			
Social Studies	.37**	.24**	1.00		
Science	.41**	.45**	.42**	1.00	
General	.33**	.61**	.48**	.57**	1.00

*Correlation is significant at the 0.05 level (2-tailed)
**Correlation is significant at the 0.01 level (2-tailed)

Calculations of the coefficient of determination (R^2) were used to determine the meaningfulness of the relationships. The coefficient of determination (R^2), indicated the percentage of variance accounted for between reading and math to be five percent. Calculations of the coefficient of determination (R^2) for the other correlations ranged from .11 to .40, meaning that the percent of variance in the scores of one subscale explained by another subscale ranged from about 11 to 40 percent.

Table 4 displays the correlations between the sample characteristics (age, gender) and scores on the CAIMI subscales.

Table 4 Correlations Between Sample Characteristics and CAIMI Subscales

	Gender	Age
Gender	1.00	
Age	-.09	1.00
Reading	.21*	-.13
Math	-.17	-.16
Social Studies	.07	.08
Science	-.05	-.06
General	-.01	.02

* Correlation is significant at the 0.05 level (2-tailed)
* Correlation is significant at the 0.01 level (2-tailed)

No significant correlations were found between age and any of the five CAIMI subscales. These findings are inconsistent with previous findings that indicate the relationship between intrinsic motivation and achievement increases with age (Gottfried, 1985; Goldman & Cornell, 1998; Linnenbrink & Pintrich, 2002; and Gilman & Anderman, 2006). However, the correlation may be attenuated by restricted range of productivity within the selected sample. The only statistically significant relationship was between gender and self-reported motivation for reading. Participants gender was coded "0" for boys and "1" for girls. The correlation was positive which means that both boys and girls are intrinsically motivated in reading, with girls ("1") having generally higher levels of intrinsic motivation than boys ("0"). Thus, in this sample, girls are more likely to have high levels of academic intrinsic motivation in reading than boys. However, because the correlation is weak, the association is not strong. The coefficient of determination (R^2), indicates that gender accounts for about 5 percent of the variance of academic intrinsic motivation in reading.

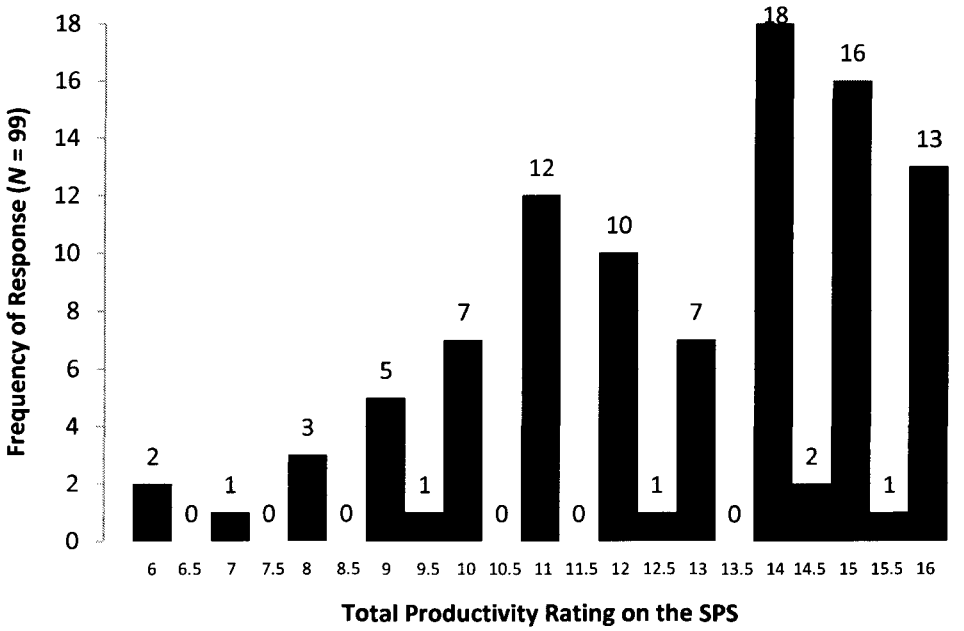
Descriptive Analysis of the Student Productivity Scale (SPS). Table 5 shows descriptive statistics for raw scores for the four individual productivity items and a composite total. Total student productivity rating was calculated by adding the ratings of the 4 individual items; each had a possible rating of one to four ("never", "sometimes", "often", "always"). Total productivity rating on the SPS had a minimum possible total of four and a maximum possible total of 16.

Table 5 Sample Descriptive Statistics (SPS)

	Item Wording	N	Min.	Max.	$\bar{x}$	*sd*
Item #1	Student Goes above and beyond assignment criteria.	99	1.0	4.0	2.44	.88
Item #2	Level of production/completion is consistent across subject areas.	99	2.0	4.0	3.47	.68
Item #3	Student completes assignments in accordance to criteria.	99	2.0	4.0	3.49	.70
Item #4	Student completes assignments according to criteria without needing special assistance or reminders.	99	1.0	4.0	3.40	.77
Total		99	6.0	16.0	12.80	2.53

The total productivity ratings of gifted student participants by their classroom teachers indicate a general trend towards high productivity (see Figure 2). Eighty-seven point nine percent of student participants received a rating of 10 or more (out of a possible 16). The mode of the distribution of productivity ratings was 14, with 18% of the student participants receiving this rating. The lowest rating that any student received was a 6, with 2 students receiving this rating. The highest total rating that any student received was 16, with 13 student participants receiving this rating.

Figure 2. Frequency of Total Productivity Ratings



A preliminary analysis of inter-item correlations was undertaken in order to determine the amount of common variance among items. Results are shown in Table 6. The results from Pearson *r* inter-item correlations ranged from moderate (r = .49) to large (r = .88). All of the inter-item correlations were significant at the $p < 0.01$ level which means that all four items shared common variance. This provides evidence that the measure of productivity, the SPS has a high degree of internal consistency. In essence, total productivity ratings can be used as a variable because the inter-item correlations were strong.

Table 6 Student Productivity Scale (SPS) Inter-Item Correlations

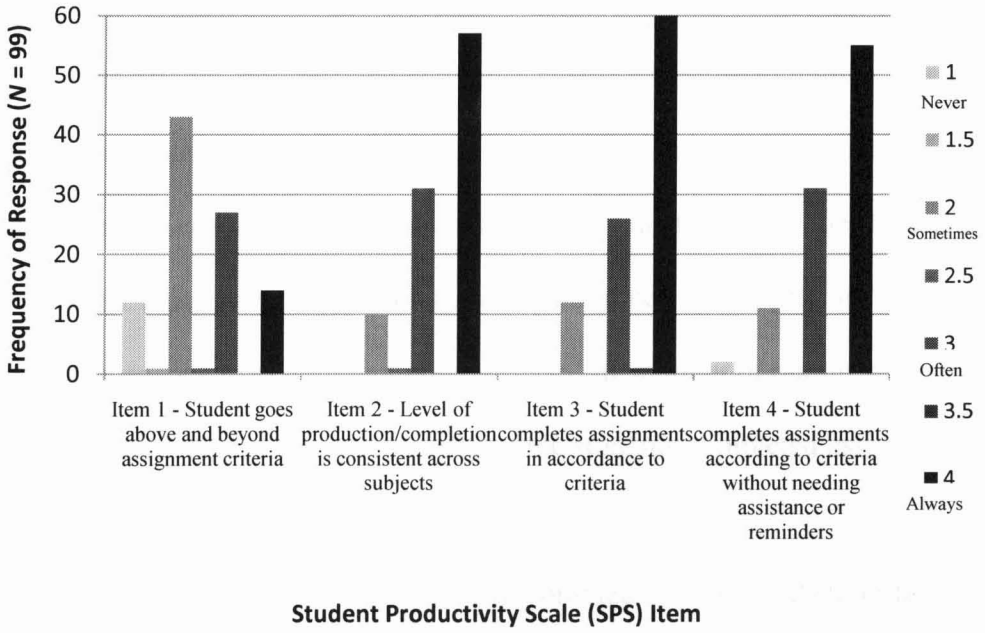
	Item 1	Item 2	Item 3	Item 4	Total
Item 1	1.00				
Item 2	.49**	1.00			
Item 3	.50**	.76**	1.00		
Item 4	.56**	.70**	.75**	1.00	
Total	.79**	.85**	.86**	.88**	1.00

** Correlation is significant at the 0.01 level (2-tailed)

A Cronbach alpha coefficient was calculated for the SPS in order to determine whether the scale was internally consistent. The Cronbach alpha coefficient was .86. This indicates the items on the checklist were measuring student productivity at an acceptable level.

Figure 3 illustrates the rating frequencies of each item on the Student Productivity Scale. The first item on the Student Productivity Scale (SPS), stated "Student goes above and beyond assignment criteria (i.e., 2 page report instead of 1, a picture to illustrate a story, completing extra math problems previously unassigned, etc.)" Forty one percent of students in the sample "usually" or "always" went above and beyond assignment criteria and 45.6% of students "sometimes" produced work above the assignment criteria. Overall, this item had the greatest range in responses. These findings suggest that students in this sample are quite diverse in their level of producing more (quantity) than expected. Overall, a large proportion of the students in this sample were described by their teachers as going above and beyond assignment criteria, while only a small proportion of the students were described as not going above and beyond assignment criteria.

Figure 3. Frequency of SPS Item Responses.



The level of production (item 2) of 57% of students in the sample was reported by their teachers to be "Always" consistent across subject areas. An additional 31% of the students were rated as "Usually" consistent across subject areas. No "Never" ratings were given for this item and only 11% of teacher participants responded that their students were "Sometimes" consistent across subject areas. This finding suggests that within this sample, a large majority (93.9%) of the students were producing consistently across subject areas while only a small percentage (6.1%) were not producing consistently across subject areas. This finding differs from the results of Item 1 which had students going above and beyond assignment criteria at varying levels. In comparison, Item 2 shows skewed findings, with the highest percentages of students being rated as "Often" or "Always" consistent across subject areas.

The third item on the SPS stated "Student completes assignments in accordance to assignment criteria regarding amount of output (i.e., length of writing, quantity of word,

paragraph or page output, number of questions answered etc.)". Sixty percent of teachers responded that their students "Always" completed assignments in accordance with criteria, while an additional 26% responded with "Usually". Similar to Item 2, Item 3 had zero "Never" responses and only 12% claimed that their students "Sometimes" completed assignments according to assignment criteria. This finding echoes findings using the total SPS ratings where 93.9% of students were rated as completing assignments in accordance to assignment criteria regarding amount of output while only 6.1% were rated as not. Again, a large majority of the students completed assignments in accordance with assignment criteria.

The fourth item on the SPS stated "Student completes assignments to criteria specifications without needing special reminders or constant teacher assistance." Fifty five percent of teacher participants indicated that their students "Always" completed assignments without special reminders or assistance, while an additional 31% responded with "Usually". A small proportion of students "Never" produced without needing special reminders (2%) or "Sometimes" produced without needing special reminders (13%). Again, similar to Item 2 and 3, this item echoes total SPS rating findings in that the vast majority (93.9%) of gifted students in our sample were producing at high levels, without prompting.

Some interesting trends emerged in exploratory correlational analysis between sample characteristics and productivity ratings. These *post hoc* analyses were planned after discussion with the senior supervisor and committee member regarding interesting findings within the data. The data that was collected did reveal patterns and relationships among intrinsic motivational characteristics in gifted students. Thus, Pearson *r*

correlations were run between age, gender, and productivity ratings (individual items as well as total productivity rating).

Table 7 indicates gender trends found in the data. There is a weak correlation between gender and total productivity, which is significant at the $p < 0.01$ level with a Pearson r of .33. There are weak significant correlations between gender and items 2, 3 and 4 and total productivity. All of these correlations are significant at the $p < 0.01$ level and range from $r = .32$ to $r = .33$. Coefficients of determination were calculated to measure the meaningfulness of these relationships. The coefficient of determination (R^2), indicating percentage of variance of productivity accounted for by gender in Items 2, 3, and 4 ranges from 10 to 11. These findings indicate that girls are likely to be rated as more productive than boys on Items 2, 3, and 4.

Table 7 Correlations Between Sample Characteristics and Productivity Items and Totals

	Gender	Age
Gender	1.00	
Age	-.092	1.00
Item 1	.172	.184
Item 2	.328**	-.030
Item 3	.332**	-.090
Item 4	.323**	-.010
Total	.330**	.023

*Correlation is significant at the 0.05 level (2-tailed)
**Correlation is significant at the 0.01 level (2-tailed)

Age is not significantly correlated with total productivity rating.

Productivity and the CAIMI. Pearson r correlations were computed between total productivity and all five of the CAIMI subscales. The only statistically significant correlations were between total productivity and levels of academic intrinsic motivation in reading ($r = .22, p = .05$) and social studies ($r = .20, p = .05$). Both of these

correlations are significant, but low. Thus, responses from students in this study indicate a relationship between academic intrinsic motivation and classroom productivity in reading and social studies.

Coefficients of determination were calculated to measure the meaningfulness of these relationships. The coefficient of determination (R^2), indicates that academic intrinsic motivation in reading accounted for about 5 percent of the variance in classroom productivity. The coefficient of determination (R^2), indicates that academic intrinsic motivation in social studies accounted for about 4 percent of the variance of classroom productivity. These calculations indicate low percentages of variance in productivity were accounted for by academic intrinsic motivation. Thus, there might be other factors influencing the classroom productivity of the gifted students within this sample.

Since significant correlations were found in two of the five CAIMI subscales, further analyses were done to investigate whether specific productivity items were driving those relationships. Correlations were done between reading and math (the two subscales that reached significance when correlated with total productivity) and each of the four individual productivity items. Pearson r correlations indicated that levels of academic intrinsic motivation in reading (r =.23, p = .05) was significantly correlated with productivity Item 4 ("Student completes assignments to criteria specifications without needing special reminders or constant teacher assistance"). The R^2 of 0.05 means academic intrinsic motivation in reading accounted for about 5 percent of completing assignments to criteria specifications without special assistance or reminders.

The correlation between level of academic intrinsic motivation in social studies and productivity Item 2 ("Level of production/completion is consistent across subjects")

is statistically detectable (r =.24, p = 0.05). The coefficient of determination (R^2), was 0.06. This translates to academic intrinsic motivation in social studies accounting for about 6 percent of the variance of consistency in level of production across subjects. These findings indicate that academic intrinsic motivation in reading and social studies is correlated with only one aspect of productivity (Item 4 and Item 2).

In summary, the present study produced the following important findings. First, relative to samples of students in the Gottfried studies, students in the present study were on average, rated by their teachers as having average rankings of intrinsic motivation. The distribution of CAIMI scores by quartile (Figure 1) was evenly distributed. Also, the magnitude of effect sizes that showed distribution of teacher ratings on the CAIMI in the present study is similar to the distributions found in the Gottfried studies. Second, the productivity of students in the study was consistently high. Few students were rated by their teachers as non-productive. Third, the relationship between intrinsic motivation and productivity was generally weak; however, the correlation could be attenuated due to a restricted range of scores on level of productivity. These findings will be discussed in greater detail in the upcoming discussion chapter.

CHAPTER FIVE

DISCUSSION

The purpose of this study has been to investigate the relationship between academic intrinsic motivation and classroom productivity in a sample of gifted students. The magnitude of effect sizes shows the distribution of teacher ratings on the CAIMI in the present study is similar to the distributions found in the Gottfried (1985) studies. Also, the level of productivity of students in the study was consistently high. Few students were rated by their teachers as having low levels of productivity. Finally, low, but statistically significant, positive correlations were found between two of the five CAIMI subscales, reading and social studies, and levels of student productivity.

The results provide mixed support for past research claiming that students with high levels of intrinsic motivation have higher levels of commitment to schoolwork (Hoekman, McCormick & Barnett, 2005). Current findings indicate that high levels of academic intrinsic motivation in the subject areas of reading and social studies are positively correlated with high levels of classroom productivity. At the same time, current findings indicate that there was no relationship between academic intrinsic motivation in the subject areas of math and science or in general and classroom productivity. Instead, current findings are similar to those of Goldberg and Cornell (1998 who found that intrinsic motivation, as measured by either mastery motivation or autonomous judgement, did not directly influence achievement. The current findings are similar, as it was found that academic intrinsic motivation and classroom productivity were not statistically significant in their correlations.

One possible explanation of my results differing from the majority of past research is that participants in the present study were placed in regular classroom settings with pull-out sessions and extra teacher support, whereas Hoekman, McCormick and Barnett's (2005) sample included only students were in a full time ability grouped structure of selective high schools, designed to specifically meet the needs of academically gifted students. Thus, perhaps lack of full time ability grouping in the present sample was a factor in relationships only being found in two of the five subscales. Full time ability grouping of gifted students may provide learning opportunities geared more towards the individual curiosities and need for challenge of the students. Similar to pull-out programs where activities and assignments are created to meet the specific needs of gifted learners, full time ability programs may be similar by providing challenge and meeting individual interests. Thus, full time ability grouping may increase academic intrinsic motivation as measured by the CAIMI. In a similar way, full time ability grouping may increase SPS ratings, as students may be more willing to produce classroom work if the topics, themes and assignments are geared towards their own individual needs.

This finding provides limited support for past research claiming that as academic intrinsic motivation increases, so does the level of classroom production (Gottfried, 1985; Linnenbrink & Pintrich, 2002; and Gilman & Anderman, 2006). However, the magnitude of the correlation between the measure of productivity and intrinsic motivation may be constrained due to the skewed distribution (restricted variation) in productivity ratings reported earlier.

Despite the fact that there were very few students in this study who were rated as having low levels of classroom production, intrinsic motivation has been correlated with a need to master or learn information for personal fulfillment rather than external rewards such as grades or verbal praise (Deci & Ryan, 2000; Gottfried, 1983; Bates, 1979; Woolfolk, 2008). The majority of students in the current sample were highly productive, therefore, given findings of past research, one might expect this sample to have high levels of academic intrinsic motivation. However, the magnitude of the correlations found in this study were weak, suggesting other mediating factors. One explanation might be that the students in the present sample were extrinsically, instead of intrinsically, motivated to produce in the classroom. It is possible that participants may have been producing at high levels because they were eager to receive external rewards such as good grades, teacher recognition or high marks on assignments. With this in mind, one must recall the multiple criteria processes used by the school district to identify "gifted" students. Although there are specific references within the school district documents to look beyond those students who are "teacher pleasers", it is still possible that the identification of a student as "gifted" may be based on their high levels of production and achievement. Since the relationship between academic intrinsic motivation and classroom productivity was weak, there is still a possibility that extrinsic motivation may be associated with classroom productivity. In relation to the present study, it may be possible that some of the students identified as "gifted" are perhaps more extrinsically motivated, however no measurement of extrinsic motivation was undertaken.

Gifted students have been found to have higher levels of academic intrinsic motivation than non-gifted students (Gottfried, Gottfried, Bathurst & Guerin, 1994). However, the results of my study do not support this finding. When CAIMI scores from participants in this research were translated into percentiles according to Gottfried's (1985) findings, it was discovered the majority of participants in the current study scored in the bottom two quartiles on each subscales was as follows: reading 54.5%, math 58.6%, social studies 55.5%, science 53.5% and general 53.5%. One possible explanation for this finding may be the difference in age groups studied. This sample of gifted students ranged from age 9 to age 13 and participants in the Fullerton Longitudinal Study (Gottfried, Gottfried, Bathurst & Guerin, 1994) were measured at ages 7 and 8. It seems as though as age increases, gifted students levels of academic intrinsic motivation decrease to similar levels of same-aged peers. Evidence of this is found in the CAIMI administration manual (Gottfried, 1986) where raw scores are converted to percentiles. For example, a student in Grade 4-6 who scored a 100 out of 124 on the CAIMI reading subscale would fall into the 57th percentile whereas a student in Grade 7-8 who scored the same 100 out of 124 on the CAIMI reading subscale would fall into the 83rd percentile. This indicates that fewer students in higher grades had high scores in academic intrinsic motivation in reading, thus what seemed to be a mid-ranged score for a student in Grade 4-6 was a high score for a student in Grade 7-8. The only set of scores that is not distributed in this way is the scores on the CAIMI social studies subscale, which suggests that social studies is the only subject area where older students have higher levels of academic intrinsic motivation than younger students, thus providing evidence to disprove past findings. This finding might be due to a difference in the way that younger and older

students define or understand the term 'social studies'. Often, in lower grades (4-6), social studies is inherently combined with reading, science and history. However, in higher grades (7-8) social studies is taught as an entirely separate subject, with its own content, methods and assignments. Keeping this in mind, it may be that younger students were unable to decipher what exactly social studies referred to, while older students were able to attribute unique characteristics to social studies. Perhaps this influenced the reversed pattern in age based CAIMI scores for social studies in comparison to the other three subject areas.

There is a fairly strong consensus across theoretical traditions that academic intrinsic motivation (Gottfried, Fleming & Gottfried, 2001) and intrinsic motivation (Eccles, Wigfield, & Schiefele, 1998) tend to decline with age. Lepper et al., (2005) found higher levels of intrinsic motivation among younger as compared to older students. Corpus et al., (2009) revealed even within the academic year (September to June) levels of intrinsic motivation among both elementary and middle school students decline. Data for the current study was collected in the late fall and winter of the school year, over a 5 month span. This may influence the results, as students who participated in October, were placed in the same sample grouping as students who participated in February, perhaps having already had a decline in their levels of intrinsic motivation.

Past research findings suggest a variety of variables account for the decrease in motivation over time. First, schools appear to tighten controls and reduce choices just as students' need for autonomy begin to increase (Eccles, 2005). This may specifically affect gifted students, as Gentry and Springer (2002) suggest choice in school assignments and tasks influence motivation. Furthermore, it may also be that learning

becomes increasingly decontextualized, such that students find less and less that seems directly relevant or useful in their daily lives (Brown & Campione, 1998), echoing Gentry and Springer's (2002) finding that meaningfulness is another central influence in students' motivation to learn. Students' ability beliefs (Nicholls, 1984) and goal orientations (Dweck, 1999) shift from being positive and task focused to more pessimistic and performance focused. These forces and others may contribute to the troubling trend that the more time gifted children spend in schools, the less pleasure they seem to take in classroom learning and achievement.

However, fortunately, for the sample selected in this study, the trend of intrinsic motivation decreasing with age was not found. This could be due to the current sample participating in specific gifted programming within their school district. Specialized programming may decrease or delay the decline of intrinsic motivation in gifted learners. Another explanation may be that all participation was voluntary and those students with higher levels of intrinsic motivation were more likely to volunteer to participate. In this case voluntary participation may have been enticing because they found the opportunity to participate in research interesting, challenging, meaningful, enjoyable or they liked that they had the choice to participate. Students' participation in some sort of modified programming (SHARP or challenge programming) may affect levels of classroom productivity and/or academic intrinsic motivation. Thus, having participants who were all involved in some sort of modified programming created a sampling bias within this study. Because all of the research participants were also participants in modified programming within the school district they may have experienced specialized programming aimed at meeting individual demands for challenge, choice,

meaningfulness, interest and enjoyment (Gentry & Springer, 2002). This may have increased their levels of classroom productivity in comparison to a gifted student who did not participate in modified programming.

This trend was supported in the current research, as a statistically significant relationship was found between gender and self-reported motivation for reading. Results revealed that both boys and girls are intrinsically motivated in reading, with girls having generally higher levels of intrinsic motivation than boys. Thus, in this sample, girls are more likely to have high levels of academic intrinsic motivation in reading than boys. Furthermore, it was found that there is a statistically significant, but weak correlation between gender and total productivity rating and specifically gender and item 2, item 3 and item 4 on the SPS. These findings indicate that girls are more likely to be rated as more productive than boys.

Past research involving gifted students examined motivational variables in relation to gender difference in achievement. Dweck (1986) suggested that the motivational patterns of bright girls and boys are different (Ames, 1984; Dweck, 1986). She described a recurrent pattern noted in girls, particularly in bright girls, found in many studies which involved a tendency toward low expectancies, challenge avoidance, ability attribution for failure and debilitation under failure. Dweck (1986) claimed that this maladaptive motivational pattern might impair their achievement and constrict their future choices. She further suggests that bright females, compared to bright males, are not thriving. Further gender differences include the finding that subjective task value is the strongest mediator of gender difference in achievement-related behaviours and choices (Eccles, Adler & Meece, 1984). Tang and Neber (2008) compared motivation

and self-regulation in gifted students and found that both Chinese and American girls scored higher (versus boys) for intrinsic value. Thus, indicating relationships between characteristics of gifted students (gender) and motivational characteristics.

Since levels of academic intrinsic motivation in reading and social studies were found to be correlated with levels of classroom productivity, it seems logical that this behaviour – productivity – is influenced by an individual students' academic intrinsic motivation or vice versa (productivity influencing levels of academic intrinsic motivation), as correlations are bidirectional. However, the relationships were weak, with coefficients of determination indicating that academic intrinsic motivation only accounted for 4.8% (reading) and 4.1% (social studies) of the variance of classroom productivity.

I speculate that the finding of academic intrinsic motivation in only two of the four subject areas having a statistically significant association with classroom productivity is due to characteristic differences among the subjects. While math and science are technical subject areas with clear cut content, reading and social studies are more "fuzzy" in the sense that they are subjects that often require deep analysis which may or may not provide multiple responses. During completion of the CAIMI, participating gifted students may have thought of reading and social studies differently than math and reading, and perhaps responded based on the differences they saw between the two sets of subjects.

Another possible reason for only two of the subject areas being associated with classroom productivity may be due to what classroom or school they were in. Variation in classroom and school placement may have influenced participants' views on certain

subject areas. For example, a student who was from a classroom with a focus on reading as a regimented and repetitive activity may have rated themselves as having low intrinsic motivation in reading. Whereas a student who was from a classroom with a focus on reading as an enjoyable, challenging and interest-driven activity may have rated themselves as having high intrinsic motivation in reading.

A final speculated reason for only reading and social studies (and not math or science) being found to have a statistically significant relationship with classroom productivity may be the instrumentation used. There is a possibility that the SPS measures classroom productivity as it pertains to reading and social studies and not math and science (or vice versa). For example, the SPS items focus on written output and assignment completion, which are common characteristics of reading and social studies assignments. In contrast common characteristics of math and science are problem solving, which is not often measured through written output or assignments, but instead with practice questions and experiments. With this in mind, the SPS may have measured productivity as defined by written output and assignment completion, which may be associated with reading and social studies and not math or science, thus no relationship was found with academic intrinsic motivation the latter two subject areas.

By viewing these findings through the lens of each theory, I am able to more clearly understand how certain elements of each relate to my research variables (academic intrinsic motivation and classroom productivity. Achievement Goal Theory (Ames, 1992; Nicholls, 1984; Dweck, 1986) could be used in the current study to interpret gifted students' classroom productivity as indication of a performance goal or a mastery goal orientation depending on the strength of a student's academic intrinsic

motivation. Students who were rated as having high academic intrinsic motivation and high classroom productivity and students who had low academic intrinsic motivation and low classroom productivity would likely see classroom tasks and assignments as a mastery goal – eager to complete the goal for self satisfaction, curiosity and to improve their level of competence. Whereas students who had high academic intrinsic motivation and low classroom productivity and students who had low academic intrinsic motivation and high classroom productivity would likely see classroom tasks and assignments as a performance goal – eager to reach the goal, to outperform others in competition, surpass others grades or to receive public recognition for their performance.

Similarly, Deci and Ryan's (2000) Self-Determination theory could be used to understand the classroom productivity of the gifted students in this sample by describing their behaviours (production) as either intrinsically, extrinsically or amotivationally motivated. Based on the results of this study, Deci and Ryan might explain the trend towards high levels of classroom productivity by the sample of gifted students as influenced by extrinsic motivation, involving teacher pleasing behaviours, competitive completion of assignments and need for public recognition. Self-Determination Theory might also explain the association between academic intrinsic motivation in reading and social studies (and not math of science) as any individual student having the ability to be both intrinsically and extrinsically motivated at the same time, perhaps towards different tasks. In this case, perhaps the gifted students in this sample were intrinsically motivated towards certain subject areas and extrinsically motivated towards the others, leading to associations between productivity and one set of subject areas but not the other.

Finally, the three dimensions that characterize success or failure according to Linnenbrink and Pintrich's (2002) Attribution Theory (locus, stability and controllability) can be seen as contributing to the success or failure of daily classroom tasks (classroom productivity). Aligning these findings with attribution theory may explain forces which contribute to changing motivation characteristics in gifted students as well as classroom productivity. Specifically, attribution theory indicates locus of control, stability and controllability as the three factors influencing motivation. In this sense, changes in schooling as students' progress through the education system (curriculum emphasis, pedagogical practices, teacher temperament) may affect any of the three factors of attribution theory (locus of control, lack of stability, controllability). For example, lack of stability (how motives change over time) can be seen in schools tightening control as students get older. Similarly, controllability (causes an individual can control) can be seen in reduction in assignment and classroom choices.

Linnenbrink and Pintrich would view data from this study through the lens of these three dimensions. First, students found to have high levels of academic intrinsic motivation would be viewed as having either an internal or external locus of control, depending on the reasoning behind the student's completion of the task (to gain internal or external rewards). Next, the assignments, tasks and homework required in a classroom environment would be viewed as influencing stability in that the cause of motivation, in this case the production required, may or may not change over time, having high or low stability. Finally, Linnebrink and Pintrich would view classroom assignments, tasks and homework as a factor low in student controllability, as they are decided on by the teacher rather than the students. However, through the same lens, student levels of classroom

productivity would be seen having high controllability, as it is the student who decides whether or not to produce.

Finally, in relation to the original understanding of academic intrinsic motivation in chapter 2 as described by Gottfried (1986), the results of this study may be viewed differently. In the past Gottfried (1985) found that gifted and non-gifted students with higher academic intrinsic motivation also had higher achievement, the findings of this study do not align. Although this study did not address achievement as Gottfried may have used it, this study examined production as a characteristic of overall academic achievement. This study found that only in the subject areas of reading and social studies was there an association between gifted students academic intrinsic motivation and classroom productivity. Recalling Gottfried and Gottfried's (2004) definition of gifted motivation as describing the possibility of an individual being motivationally gifted instead of intellectually gifted. In this same sense, it seems possible that an individual may be motivationally gifted in one specific subject area and not the rest. This may help describe the results from the present study where relationships between academic intrinsic motivation and classroom productivity were found in only two of the four subject areas. For example, it seems possible that a student may be motivationally gifted in reading and social studies but not math or science, perhaps accounting for the unique results of this study.

Limitations of the Study

The first, and perhaps most controversial, limitation of this study lies within the identification of the participants as gifted students. Results of this study can only be generalized to gifted students who have been identified using the same criteria and who

receive similar programming. The multiple-criteria identification process outlined in chapter 3 involved standardized test scores and behaviour screening forms.

The negative skew in productivity suggests a connection between giftedness and productivity. This may be due to the emphasis on productivity in the identification process. Using the current multiple-criteria identification process, students who are productive and "teacher pleasers" may be more likely to be identified as gifted than student who think outside the box, question authority and perhaps produce less than expected. This sample, which was comprised of only students who had been designated as gifted, had limited generalizability due to its constricted sample.

This sample was strictly drawn from schools that already had gifted programming in place. However, the data analysis did not consider whether the student was placed in a SHARP classroom or attended regular Challenge programming. Although the research was conducted with students from schools who had this programming in place, no data was collected as to whether or not individual student's were actually placed in cluster groups within SHARP classrooms or whether elementary participants attended Challenge classes either at the own school or the district challenge centre. If information on programming placement had been collected it would have been possible to investigate whether there was a relationship between programming placement and 1) academic intrinsic motivation or 2) classroom productivity. In the present study, since no information on programming placement was collected, it is not possible to state whether programming placement is a factor related to either academic intrinsic motivation or classroom productivity.

Within this sample, there were fewer participants from the upper grades (Grade 7 and 8). The Grade 4-6 group had 77 participants, while the Grade 7-8 group had only 22 participants, indicating that there was lower statistical power in the Grade 7-8 group because of its limited sample size. Similarly, it would be valuable to focus on one age/grade grouping and find a larger sample. My sample was large enough to generate significant correlations; however, this was not the case for all CAIMI subscales. Instead, significance was found in only two of the five subscales when correlated with student productivity. Possible reasons for this lack of significance may include variability among ages, grades and gender. If participants in my sample had all been the same age, grade and gender, there would have been less variability among participants, providing evidence of relationships between academic intrinsic motivation and classroom productivity in a more specific, although less generalizable, sample.

Participation rates in this study were low compared to the eligible population within the school district that was used in this study. Individual school participation was sought from a fairly large school district, with many gifted students', however, only a few schools volunteered to participate and within those potential student and teacher participants, only a small portion actually did participate. Thus, it might be suggested that parents whose children are doing well in school (high grades) were more willing to allow their child to participate.

Similarly, teachers with high achieving students may have been more willing to complete the SPS as they may have thought it reflected their teaching abilities or style. The instrument underwent no pilot testing, yet proved to be internally valid. However, limitations of the SPS include a small range of possible answers ("never", "sometimes",

"often", and "always"), social desirability, respondent bias and misinterpretation of wording. In this study, teachers may have also indicated socially desirable responses, as they were reporting on students with whom they teach every day – essentially reporting on productivity levels based upon their teaching styles and strategies. This bias, also known as the halo effect, is a threat to the accuracy and validity of the SPS as a teacher-report instrument.

Further evidence of a possible halo effect during this study is evident in the instrumentation. The CAIMI is a self-report measure, which imposes limitations on the accuracy or validity of the data collected on its respondents. Students may feel that they know which is the "correct" answer to choose and which one will please or impress the teacher or the researcher and may indicate that response instead of a truthful one which indicates their true beliefs. All self-report measures like the CAIMI have the limitation of participants responding with answers that they believe to be socially desirable instead of personally accurate. This research bias is commonly called the halo effect and occurs when participants provide desired responses instead of accurate ones.

During administration of the CAIMI, students had specific questions regarding the reading subject area. Statements such as "I like to learn new things in reading" were particularly troublesome for some participants, as they viewed reading as a task, a skill or a pastime rather than a subject or opportunity for learning. Future instruments or studies may benefit from referring to the reading subject area as "language arts" or "English" which may be more relatable to participants. Similarly difficulties with ambiguous wording of items occurred for participants with terms such as "new ideas", "hard

assignments", "work", "answers to questions" and "school work" as they are all vague terms and their meaning may vary between respondents.

Another concern with the CAIMI was its negative reversal of items. Although this technique serves the purpose of avoiding respondent acquiescence, it caused problems with understanding for some participants. Negatively phrased items caused confusion due to the negative stance of the statement. Negative statements changed the meaning of Likert scale responses like "strongly disagree". Disagreeing with a statement including "do not" meant that students did in fact feel good inside when they learned something new. This was a difficult concept for some of the younger respondents to grasp.

Posey (1989) notes that one major problem in the development of the CAIMI scale is the size and representativeness of the normative sample. The samples were adequate for the development of a research scale, but a commercially marketed scale should have national stratified norms – which the CAIMI does not. Creation of the CAIMI involved a total of only 567 students within 3 separate studies ($n = 141$, $n = 260$ and $n = 166$). Furthermore, student participants in these three samples were, on average, high achievers with mean percentiles ranging from 64 to 77 on standardized achievement tests. Lack of diversity in achievement within the sample population is a weakness of the CAIMI, as its norms are based on only high achieving students. Posey (1989) suggested that the author conduct a more extensive normative study. It would be in the interest of the author to include low achieving students in a normative sample.

A final instrumentation limitation involves the SPS's lack of range in productivity within this study. A large majority of the sample was rated as highly productive and few

participants were rated as non-productive. Thus, this lack of range may have attenuated any correlations between productivity and academic intrinsic motivation (as measured by the CAIMI). This could be due to the fact that the participants in the sample were highly productive, as results were skewed towards high productivity. However, because this instrument requires further testing of validity and reliability, lack of range may also be due to the fact that perhaps the SPS does not pick up actual variance of participants. Further validity and reliability studies should be done in order to improve the SPS.

This study only investigated intrinsic motivation, with no measurement of participants' extrinsic motivation. Due to this procedural decision, no information was obtained regarding extrinsic motivation in this sample of gifted students. Although this study was designed only to investigate academic intrinsic motivation, extrinsic motivation cannot be ruled out as a factor which may have a relationship with classroom productivity. This neglect of extrinsic motivation may have caused an oversight in the investigation of relationships between motivation and classroom productivity.

Future Research

Future research should focus on characteristics which may affect factors of intrinsic motivation such as challenge, choice, curiosity, meaningfulness, interest and enjoyment in academic assignments (Gentry & Springer, 2002). Investigation into these assignment characteristics could lead to the development of differentiated curriculum and pedagogy. Future research would benefit from further investigating environmental and teacher characteristics which may influence intrinsic motivation and classroom productivity. The current study focused only on whether or not there is a relationship between academic intrinsic motivation and classroom productivity; however, future

research should focus on details and characteristics of the relationship, looking at how students differ and factors related to both academic intrinsic motivation and classroom productivity (i.e., type of assignment, classroom context, pedagogical techniques etc.).

Furthermore, it would be beneficial to investigate inter-individual differences in both intrinsic motivation and productivity. Students who scored as being highly intrinsically motivated in one subject area, but who scored low on other subscales may be of interest to researchers, as they may provide further insight into the variations within an individual's intrinsic motivation. Also, investigation of inter-group variations of intrinsic motivation may prove beneficial as they may provide a more detailed explanation of the variations between participants in a given sample.

Future research should also focus on adding more items to the SPS and to creating subscales that tease out separate factors that contributing to knowledge about how the productivity of gifted children may vary. Although the four item SPS was valuable in encouraging teacher participation through a brief time commitment, more items would provide a more descriptive picture of student productivity. Also, the SPS should make clear what is considered an "assignment" and ask for qualitative teacher responses as to what constitutes an assignment. Teachers may have differing ideas as to what constitutes an assignment. Definition of an assignment could include anything from a set of daily homework questions to an in class activity and from a short term task to a long term project. This may have caused variance in teacher responses to the term "assignment" and thus, influenced responses regarding student productivity levels. Finally, the SPS should be made subject specific, just as the CAIMI is. By measuring student productivity

in various subject areas, researchers will be able to have a more specific view of this variable.

Supplementing this quantitative research with qualitative data may be useful in exploring the question of "why" students either a) have varying intrinsic motivation or b) choose to produce or not produce in the classroom. Suggestions for further research methods include qualitative interviews with a random sample of the participants. This interview data may provide explanations or steer researchers into a more specific line of research surrounding intrinsic motivation and student productivity. Interviews with both student and teacher participants would provide two differing views of intrinsic motivation and productivity. For example, asking "what does 'output' mean to you" or "what are some features of an assignment that are common in your classroom" may yield different responses from teachers than from students.

The school district in this study was suburban and results may differ if the study was replicated using a sample of gifted students from an urban or rural geographic area. Thus, future research should be undertaken using gifted student participants from diverse cultural, socio-economic backgrounds and geographic areas. A larger sample would increase validity and reliability. Also, a larger sample may provide the opportunity to include other socio-economic and geographic areas from which student participants are enrolled.

Investigation of individual diversity in motivation and/or productivity based on programming is another line of future research that should be undertaken. It would be valuable to investigate relationships between classroom placement (e.g. regular classroom with pull-out sessions, SHARP, Challenge sessions, full time ability grouping)

and levels of intrinsic motivation and/or productivity. This line of research may lead to the discovery of a mediating factor in the study of student motivation and productivity.

Finally, future studies should include a measure of extrinsic motivation of student participants. By including measurements of both intrinsic and extrinsic motivation, researchers may find alternate relationships between motivation and classroom productivity, above and beyond those discovered in this study. Inclusion of extrinsic motivation within a similar study may provide a clearer picture of whether there are relationships between gifted students' motivational characteristics and classroom productivity.

Conclusions

Reflecting back on the personal anecdote from the chapter 1, the present study may serve to educate students, who may be curious about why they seem "different" from their peers, despite supposed similar intellect. This study reveals that gifted students vary in their levels of academic intrinsic motivation. The sample of gifted students in this study has a wide range of scores on the CAIMI. The students in this study were scattered across all 4 quartiles in all five of the CAIMI subscales, in comparison to an unspecified sample, which may or may not have included gifted students, used in previous research (Gottfried, 1986). Ultimately, just because a student has been designated gifted according to school district criteria, does not mean they will be similar to other gifted students in terms of their academic intrinsic motivation. As a student, growing up and pondering why I seemed to vary in my classroom production compared to similarly identified peers, I would have benefited from knowing that gifted student have a large range of levels of academic intrinsic motivation.

There is a trend for gifted students to be rated as very productive by their teachers. Productivity of gifted students in this sample was negatively distributed. This study found that gifted students with varying levels of academic intrinsic motivation showed a trend to be rated as highly productive. Within a classroom setting, most gifted students will be highly productive, but there may be a few exceptions. Gifted students should not be expected to be highly productive by teachers or parents. As a student, my curiosity may have been put to rest upon being informed that although many gifted students are very productive others are not, despite their "gifted" label.

There were statistically significant relationships between intrinsic motivation in two subject areas (reading and social sciences) and classroom productivity. However, academic intrinsic motivation and classroom productivity in the other three subscales (math, science and general) were not associated. This means that gifted students who are intrinsically motivated may or may not be productive. Even in reading and social sciences where relationships were found to achieve significance, indicating that students high on one measure might be expected to be high on the other measure. However, the correlations were weak and the relationship was not strong, indicating that students who measure high on academic intrinsic motivation may not measure high on classroom productivity and vice versa. Calculations of the coefficient of determination (R^2) were used to determine the meaningfulness of the relationships, and it was discovered that only four to five percent of the variance in classroom productivity to be accounted for by academic intrinsic motivation – or vice versa.

With so much of the variance (95% and 96%) unexplained, we need to continue looking for other factors influencing both variables, which might include characteristics

of student learning experiences. Comparisons of these results with published literature revealed a number of plausible explanations including teaching style, assignment type (including the amount of challenge, choice and control the student has over the assignment) (McCoach & Siegle, 2001; Kanevsky & Keighley, 1996; Gentry & Springer, 2002). Further explanations for the unexplained variance in academic intrinsic motivation might include a students' peer relationships or school culture including administration attitude towards productivity and giftedness, classroom teacher's level of knowledge about and efforts towards curriculum differentiation or overall environment that encourages various learning styles.

This findings of this study provide some support for the belief that motivational characteristics of gifted students may differentiate their classroom productivity. However, the results of this study do not support strong claims of academic intrinsic motivation influencing a students' level of classroom productivity. As a young student this information may have piqued my interest even more, and perhaps even spawned another line curiosity regarding what *are* some of the factors that mediate productivity, if not solely motivation.

In the opening narrative, I described a younger version of myself wondering why her peers who were supposed to have high levels of academic aptitude and even achievement were not producing the amount of work teachers were expecting like I was. Using information gained through this study, teachers may be able to better answer students' questions regarding individual variation in motivation and classroom production. However, there are still many avenues to explore when investigating variations in the motivation characteristics and productivity levels of gifted students. I

remain optimistic that future research may lead to more concrete answers to the questions my younger self was posing during her "gifted" adolescence.

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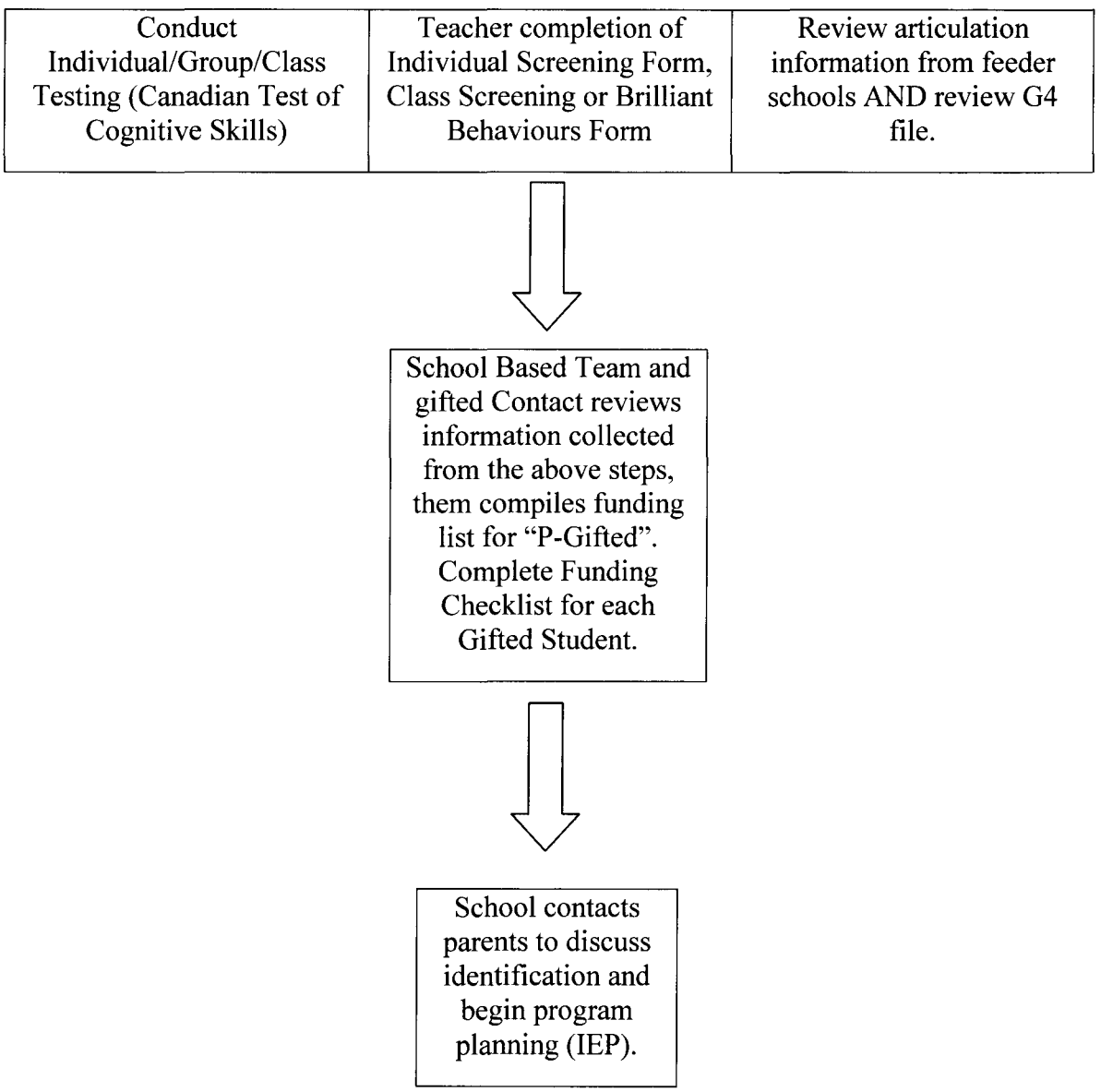
APPENDICES

Appendix A – Coquitlam School District Identification Process for Gifted Students

As no single instrument measures giftedness, no single criterion should be established for entry into or exclusion from services..." (S.D. #43 Superintendent's Circular, 1994).

Important: we cannot identify a student for gifted education simply on the basis of a single test score!

Flowchart of basic process of identification:



Elementary Schools (in April or May)

- Test all the students in Grade 2
- Talk with your staff about the plan and purpose of the testing
- After you have your testing results, note students who have a Non-Verbal Total or Total score in the 95th percentile or higher. For each student:
    - Obtain a completed teacher checklist (Individual Screening Form or "Brilliant Behaviours" form)
        - Encourage teachers to notice the specific wordings of the behavioural descriptors, each of which is an indicator of giftedness.
        - It is strongly recommended that the Gifted Ed. Contact meet with teachers to explain that the goal is identifying gifted students, not students who are necessarily "high achieving", "teacher pleasers", or even "bright".
        - Teachers may wish to complete a checklist for a student who did not score highly on the CTCS. These students require further investigation.
    - Students whose teacher checklist indicates gifted behaviours can then be formally identified as "P-Gifted". Insert documentation (CTCS results & checklists) into G4 file.

Middle Schools (in April or May)

- All teachers complete a Class Screening Form. Encourage teachers to notice the specific wordings of the behavioural descriptors, each of which is an indicator of giftedness. Remind teachers that the goal is identifying gifted students, not students who are necessarily "high achieving", "teacher pleasers", or even "bright".
- Each student whose name appears 3 or more times will be tested (except those students who have already been identified as "gifted").
    - After you have your testing results, note students who have a Non-Verbal Total or Total score in the 95th percentile or higher. These students can then be formally identified as "P-Gifted".
    - Ensure that each identified student has a copy of the CTCS results and the Class Screening Form (with other students' names deleted) in their G4 file.

Appendix B – Individual Screening Form

Individual Screening Form (*Gifted Education)*

Student:_____ Grade:___ Teacher:_____ Date:_____

Please carefully consider which of the following statements describes the behaviours of the student named above. Specify if the behaviours checked refer to positive statements, or statements in parentheses (), or both. Please return this sheet to _____. Thank you.

1. Has vocabulary or knowledge that is unusually advanced for age or grade	
2. Grasps concepts quickly, easily, without much repetition (*Bored with routine tasks, may refuse to do rote homework)*	
3. Recognizes complex relationships and comprehends difficult meanings	
4. Has unusual insights into values and relationships (*may perceive injustices and assertively oppose them)*	
5. Asks more provocative questions about the causes and reasons for things. (*may be non-conforming and refuse to accept authority)*	
6. Evaluates facts, arguments and persons critically (*may be self-critical, impatient or critical of self and others because of abilities)*	
7. Enthusiastically generates ideas or solutions to problems and questions (*may dominate others because of abilities)*	
8. Has intense, often diverse, self-directed interests (*may be difficult to get involved in topics he/she is not interested in)*	
9. Prefers to work independently (*may be highly individualistic and seem stubborn)*	
10. Produces many and varied solutions to problems	
11. Is highly flexible (*has high tolerance of disorder and ambiguity. May be impatient with details and restrictions)*	
12. Is highly original, playful, imaginative (*capable of fantasy that is often sustained, daydreams)*	
13. Has a large capacity for task commitment in areas of interest (*may resist working on projects he/she is not interested in. Bored with routine or repetitive tasks)*	
14. Uses imagination and fantasy in solving personal and universal problems, i.e., an imaginary playmate, inventing cures for poverty, disease, energy crises, etc. (*may be considered wild or silly by peers or teachers)*	
15. Has a keen or unusual sense of humour and often perceives humour in situations others are unaware of (*may joke inappropriately)*	
16. Takes intellectual and emotional risks in expressing or trying out original ideas. Does not fear being different. (*may be viewed as unrealistic, "crazy", or too aggressive)*	
17. Has intense feelings and opinions that he/she may be uninhibited in expressing (*intense feeling that he/she may be very unwilling to express)*	
18. Is intensely curious about may things (*may interrupt or ignore class activities to pursue interests)*	
19. Shows emotional and aesthetic sensitivity	

From Richert, E. S., with Alvino, J. J., & McDonnel, R. C. (1982). *National report on identification: Assessment and recommendations for comprehensive identification of gifted and talented youth.* Sewell, NJ: Educational Improvement Center-South *Modified by Langley School District (#35). Adapted for us in Coquitlam School District (#43), February 2005.*

Appendix C – Class Screening Form

Class Screening Form

Consider all the pupils in your class. Indicate the two or three students in your class who most often exhibit the behaviour described. In some instances, negative characteristics are listed in ( ). Students may display only the positive characteristics, the negative characteristics or in some instances, both.

Indicate the pupils who:

1. Has vocabulary or knowledge that is unusually advanced for age or grade _____ _____ _____
2. Grasps concepts quickly, easily, without much repetition (*bored with routine tasks, may refuse to do rote homework)* _____ _____ _____
3. Recognizes relationships and comprehends meanings _____ _____ _____
4. Has unusual insight into values and relationships (*may perceive injustices and assertively oppose them)* _____ _____ _____
5. Asks more provocative questions about the causes and reasons for things (*may refuse to accept authority and be non-conforming)* _____ _____ _____
6. Evaluates facts, arguments and persons critically (*may be self-critical, impatient or critical of self and others because of abilities)* _____ _____ _____
7. Enthusiastically generates ideas or solutions to problems and questions (*may dominate others because of abilities)* _____ _____ _____

8. Has intense, often diverse, self-directed interests (*may be difficult to get involved in topics he/she is not interested in)* _____ _____ _____

9. Prefers to work independently (*may be highly individualistic and seem stubborn)* _____ _____ _____

10. Produces many and varied solutions to problems _____ _____ _____

11. Is flexible (*has high tolerance of disorder or ambiguity; may be impatient with details or restrictions* _____ _____ _____

12. Is highly original, playful, imaginative (*capable of fantasy that is often sustained, daydreams)* _____ _____ _____

13. Has a capacity for task commitment in areas of interest (*may resist working on projects he/she is not interested in; bored with routine or repetitive tasks)* _____ _____ _____

14. Uses imagination and fantasy in solving personal and universal problems, i.e. an imaginary playmate, inventing cures for disease, poverty, solving energy crisis, etc. (*may be considered wild or silly by peers or teachers)* _____ _____ _____

15. Has a keen sense of humour and often perceives humour in situations others are unaware of (*may make jokes at inappropriate times)* _____ _____ _____

16. Takes intellectual and emotional risks in expressing or trying out original ideas; does not fear being different (*may be viewed unrealistic, "crazy" or too aggressive)* _____ _____ _____

17. Has intense feelings and opinions that he/she may be uninhibited in expressing *(intense feeling that he/she may be very unwilling to express)* _____ _____ _____

18. Is intensely curious about many things (*may interrupt or ignore class activities to pursue interests)* _____ _____ _____

19. Shows emotional and aesthetic sensitivity _____ _____ _____

Circle the names of students who appear three or more times. These students will be nominated for further assessment.

Modified by Langley School District (#35), from National Report on Identification by Dr. E.S. Richert.

Gifted Education Handbook. Schou Education Centre, Burnaby S.D. #41, 1997.

Appendix D – Brilliant Behaviours Form

Brilliant Behaviours

Student _____ Date _____

Strength _____

Directions: Offer the student an enjoyable but challenging activity (group or individual) that requires planning and thinking. Watch the student working and check off those behaviours you see demonstrated more frequently, intensely and for a longer time than you would expect of a student that age, gender, temperament and cultural background.

Check (4)	Behaviours
	Humour: Exceptionally keen sense of the comical the bizarre, absurd.
	Motivation: Intense desire to know, do, feel, create, or understand.
	Interests: Ardent, sometimes unusual, passionate, sometimes fleeting.
	Communication/Expressiveness: Extraordinary ability to convey meaning or emotion through words, actions, symbols, sounds, or media.
	Inquiry: Probing exploration, observation or experimentation with events, objects, ideas, feelings, sounds, symbols, or media.
	Problem-solving: Outstanding ability to bring order to chaos through the invention and monitoring of paths to a goal; enjoyment of a challenge
	Sensitivity: Unusually open, perceptive, or responsive to experiences, feelings and to others.
	Intuition: Sudden recognition of connections or deeper meanings without conscious awareness of reasoning or thought.
	Reasoning: Outstanding ability to think things through and consider the implications or alternatives; rich, highly conscious, goal-oriented though.
	Imagination/Creativity: Extraordinary capacity for ingenious, flexible use of ideas, processes, or materials.
	Memory/Knowledge/Understanding: Unusual capacity to acquire, integrate, retain, and retrieve information or skills.
	Learning: Ability to acquire sophisticated understandings with amazing speed and apparent ease.

Appendix E – Permission to Use CAIMI Inventory Items

PAR
Creating Connections. Changing Lives.

16204 N. FLORIDA AVENUE • LUTZ, FLORIDA 3354
Telephone: 813.968.3003 • Fax: 813.968.2598 • Web: www.parinc.cor

Sent Via Email: leanmcg@hotmail.com

June 30, 2009

Leanne McGrimmond
Simon Fraser University
1002-488 Helmcken Street
Vancouver, BC V6B 6E4
Canada

Dear Ms. McGrimmond:

In response to your recent request, permission is hereby granted to you to include up to a total of three (3) sample items from the Children's Academic Intrinsic Motivation Inventory (CAIMI) Test Booklet in the text of your thesis titled, *Intrinsic Motivation in Gifted Students: Producers versus Non-Producers.* If additional material is needed, it will be necessary to write to PAR for further permission.

This Agreement is subject to the following restrictions:

(1) The following credit line will be placed at the bottom of the verso title or similar front page on any and all material used:

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Telephone: 813.968.3003 • Fax: 813.968.2598 • Web: www.parinc.cor

TWO COPIES of this Permission Agreement should be signed and returned to me to indicate your agreement with the above restrictions. I will then sign it for PAR and return a fully executed copy to you for your records.

Sincerely,

Vicki M. Mark
Permissions Specialist
vmark@parinc.com
1-800-331-8378 (phone)
1-800-727-9329 (fax)

ACCEPTED AND AGREED:

BY: [redacted]
LEANNE MCGRIMMOND

DATE: July 3rd, 2009

ACCEPTED AND AGREED:

BY: [redacted]
VICKI MARK

DATE: July 16, 2009

Appendix F – The Student Productivity Scale (SPS)

Instructions: For each student, please read each of the 4 statements and indicate, with an "X", how often the statement applies to the student.

			Student goes above and beyond assignment criteria (i.e., 2 page report instead of 1, a picture to illustrate a story, completing extra math problems previously unassigned, etc.)				Level of production/completion is consistent across subjects				Student completes assignments in accordance to assignment criteria regarding amount of output (i.e., length of writing, quantity of word, paragraph or page output, number of questions answered etc.)				Student completes assignments to criteria specifications without needing special reminders or constant teacher assistance			
Student Name	Grade	Age	Never	Sometimes	Often	Always	Never	Sometimes	Often	Always	Never	Sometimes	Often	Always	Never	Sometimes	Often	Always
Example: Jane Doe	5	10	X					X				X				X		

Appendix G – Simon Fraser University Ethics Approval

OFFICE OF
RESEARCH ETHICS

August 28, 2008

street address
Simon Fraser University
Multi-Tenant Facility
Room 230, 8900 Nelson Way
Burnaby, B.C. Canada
V5A 4W9

mailing address
8888 University Drive
Multi-Tenant Facility
Burnaby, B.C. Canada
V4A 1S6

Ms. Leanne McGrimmond
Graduate Student
Faculty of Education
Simon Fraser University

Dear Ms. McGrimmond:

Re: Intrinsic Motivation in Gifted Learners: Producers versus Nonproducers - Appl. #: 39087

I am pleased to inform you that the above referenced Request for Ethical Approval of Research has been approved on behalf of the Research Ethics Board. This approval is in effect until the end date August 25, 2011, or only during the period in which you are a registered SFU student.

The Office of Research Ethics must be notified of any changes in the approved protocol. Request for amendments to the protocol may be requested by email to dore@sfu.ca. In all correspondence relating to this application, please reference the application number shown on this letter and all email.

Your application has been categorized as "minimal risk" and approved by the Director, Office of Research Ethics, on behalf of the Research Ethics Board in accordance with University policy R20.01, http://www.sfu.ca/policies/research/r20-01.htm. The Board reviews and may amend decisions or subsequent amendments made independently by the Director, Chair or Deputy Chair at its regular monthly meetings.

.../2

SFU

OFFICE OF
RESEARCH ETHICS

Page 2

"Minimal risk" occurs when potential participants can reasonably be expected to regard the probability and magnitude of possible harms incurred by participating in the research to be no greater than those encountered by the participant in those aspects of his or her everyday life that relate to the research.

Please note that it is the responsibility of the researcher, or the responsibility of the Student Supervisor if the researcher is a graduate student or undergraduate student, to maintain written or other forms of documented consent for a period of 1 year after the research has been completed.

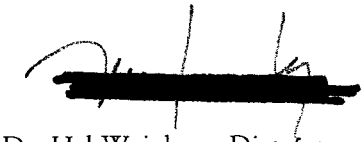
If there is an adverse event, the principal investigator must notify the Office of Research Ethics within five (5) days. An Adverse Events form is available electronically by contacting dore@sfu.ca.

All correspondence with regards to this application will be sent to your SFU email address.

Please notify the Office of Research Ethics at dore@sfu.ca once you have completed the data collection portion of your project so that we can close this file.

Best wishes for success in this research.

Sincerely,



Dr. Hal Weinberg, Director
Office of Research Ethics

c: Dr. Lannie Kanevsky, Supervisor

/jmy

Appendix H – Coquitlam School District Research Approval

SCHOOL DISTRICT 43 Coquitlam
Learning for a Lifetime

550 Poirier Street, Coquitlam, BC, Canada V3J 6A7 • Phone: 604-939-9201 • Fax: 604-939-7828

September 23, 2008

Leanne McGrimmond
1002-488 Helmcken Street
Vancouver, BC V6B 6E4

Dear Ms. McGrimmond:

This is to acknowledge receipt of your research application *"Investigating the Intrinsic Motivation in Gifted Learners"*.

Please be advised that you have permission to conduct this study in our district, with the consent of the principal. Students may participate on a voluntary basis with parental consent.

I wish you much success in your research.

Sincerely,

Dan Derpak
Assistant Superintendent

DD/rc

Appendix I - Email Sent October 7, 2008 From Louise Malfesi Coquitlam School District Gifted Coordinator to SHARP Contacts

Hi SHARP teachers,

As you all have gifted clusters, you came to mind when Leanne McGrimmond, a graduate student at SFU, asked for help in locating gifted students and their teachers for her research. She will be contacting the principals of your schools in the near future to ask for their assistance in conducting her surveys. She will also be looking to some of you to help collect the date she needs.

The purpose of her research is as follows:

"PURPOSE OF STUDY

Within educational research, there is an escalating challenge of keeping students motivated to learn. There is a wealth of research that focuses on individual motivational characteristics such as perceptions of ability, intrinsic motivation, valuing of academic tasks and perceptions of belonging, that has shown that motivation impacts achievement and achievement-related cognitive variables (Walker, Greene & Mansell, 2006). However, the research field surrounding motivation seems to be lacking a clear picture of how gifted learners differ from one and other in terms of motivation. This study is designed to investigate differences in intrinsic motivational characteristics in a sample of gifted students. The main research question at hand is "Do gifted students differ in their levels of intrinsic motivation?" Overall, the goal of collecting this data will be to investigate if and how gifted students differ in their levels of intrinsic motivation.

Upon completion of this study, the investigator intends to share any new understandings about the relationship between gifted students' intrinsic motivation and academic productivity."

She has already received District approval and will follow our district guidelines for conducting research studies. I hope that she is able to gain your support! Perhaps we can convince her to share her results at one of our meetings, too!

Thanks for giving some of your valuable time to this endeavour!

Louise Malfesi

Student Services Dept

Gifted Education Coordinator

Coquitlam School District 43

Appendix J - Sent October 16, 2008 to all SHARP school gifted contacts.

Good Afternoon Coquitlam District Principals,

My name is Leanne McGrimmond and I am a Faculty of Education Graduate Student at Simon Fraser University. I am currently in the process of gathering data for my thesis regarding the topic of intrinsic motivation in gifted learners. For this research I will be administering a survey to Grade 4-8 gifted students and asking their classroom teachers to rate them on academic productivity.

Louise Malfesi has kindly sent out an email introduction on my behalf further outlining my research plans. She has also provided me with contact information for SHARP schools, their principals and gifted contacts. As a first step, I am contacting yourselves, school principals in hopes of arranging a meeting (either in person or by phone) to discuss opportunities to collect data in your schools using your teachers and students. This past week I have attempted to contact each of you by phone, but was unsuccessful, either due to unreturned messages or other circumstances (ie, power outages, illness etc). Therefore, I have chosen to email each of you in hopes of receiving responses.

My research proposal has been approved by the SFU Ethics Board as well as Mr. Dan Derpak at the SD43 head office. Administering the survey should be a short (less than 1 hour) process with one short meeting in advance to speak to eligible students and provide them with a parental consent form in order to participate. I understand that students' classroom time is precious and am willing to be very flexible and non-intrusive in my efforts to collect data.

I am willing to discuss research opportunities at your convenience by email at lmcgrimm@sfu.ca or by phone at (604) 842-4746.

Hope to hear from you soon,
Leanne McGrimmond

Appendix K - Email sent November 12, 2008 to all Middle School Principals and Vice-Principals

Dear Middle School Principals and Vice-Principals,

My name is Leanne McGrimmond and I am currently an MA student in the Faculty of Education at Simon Fraser University. I am currently collecting data for my final thesis and am looking for help gaining access to eligible teachers and students to provide that data. Essentially, my research requires gifted students to complete a 44 item questionnaire which takes about 1 period/block (45-60 minutes) to complete. Also, classroom teachers would be completing a 4 statement productivity checklist for each student involved (This element is quite quick and takes about 2 minutes per student involved).

The purpose of my research is as follows:
"Within educational research, there is an escalating challenge of keeping students motivated to learn. There is a wealth of research that focuses on individual motivational characteristics such as perceptions of ability, intrinsic motivation, valuing of academic tasks and perceptions of belonging, that has shown that motivation impacts achievement and achievement-related cognitive variables (Walker, Greene & Mansell, 2006). However, the research field surrounding motivation seems to be lacking a clear picture of how gifted learners differ from one and other in terms of motivation. This study is designed to investigate differences in intrinsic motivational characteristics in a sample of gifted students. The main research question at hand is "Do gifted students differ in their levels of intrinsic motivation?" Overall, the goal of collecting this data will be to investigate if and how gifted students differ in their levels of intrinsic motivation. Upon completion of this study, the investigator intends to share any new understandings about the relationship between gifted students' intrinsic motivation and academic productivity.

I have already received District approval and will follow district guidelines for conducting research studies.

I am eager to discuss research opportunities at your schools and can be reached by email or phone anytime. I realize that class time is very valuable and schedules are strict and am willing to be entirely flexible in my data collection. I hope that I am able to gain your support!

Thanks for giving some of your valuable time to this endeavour!
Leanne McGrimmond
SFU Graduate Student
lmcgrimm@sfu.ca
(604) 842-4746

Appendix L – Email Sent November 27th, 2008 to all Elementary Principals and Vice Principals

Dear Elementary Principals and Vice-Principals,

I am currently an MA student in the Faculty of Education at Simon Fraser University. I am currently collecting data for my final thesis and am looking for help gaining access to eligible teachers and students to provide that data. Essentially, my research requires gifted students to complete a 44 item questionnaire which takes about 1 period/block (45minutes) to complete. Also, classroom teachers would be completing a 4 statement productivity checklist for each student involved (This element is quite quick and takes about 2 minutes per student involved).

I have attached a copy of the research proposal that was approved by the District as well as a copy of the Student Productivity Scale that teachers would be required to fill out for each participating student.

Initially, I would set up a date and time to meet with students and hand out consent forms (about a 2 minute meeting). Following that, I would return in a week or so to administer the survey. I am also flexible as to whether all participating student complete the survey at one time or in smaller groups (as I understand that coordinating students from multiple classrooms is difficult).

I have already received District approval and will follow district guidelines for conducting research studies.

I am eager to discuss research opportunities at your schools and can be reached by email or phone anytime. I realize that class time is very valuable and schedules are strict and am willing to be entirely flexible in my data collection. I hope that I am able to gain your support!

Thanks for giving some of your valuable time to this endeavour!

Leanne McGrimmond
SFU Graduate Student
lmcgrimm@sfu.ca
(604) 842-4746

Appendix M – Minor Consent

Dear Parent or Guardian,

I am a Graduate Student in the Faculty of Education at Simon Fraser University and I will be studying students' motivation at your child's school during September and October 2008. This research has been approved by the School District and the School Principal. Your child is eligible and I hope you will allow her or him to participate.

Participation in the study will involve completing a 44 item questionnaire about learning preferences. Your child will be asked to rate statements describing learning by rating them on a scale ranging from "strongly agree" to "strongly disagree."

Here are a few sample items:

1. **I like to review work I already know.**

Strongly Agree	Agree	Don't Agree or Disagree	Disagree	Strongly Disagree

2. **I give up easily when I don't understand an assignment in...**

Reading	Strongly Agree	Agree	Don't Agree or Disagree	Disagree	Strongly Disagree
Math	Strongly Agree	Agree	Don't Agree or Disagree	Disagree	Strongly Disagree
Social Studies	Strongly Agree	Agree	Don't Agree or Disagree	Disagree	Strongly Disagree
Science	Strongly Agree	Agree	Don't Agree or Disagree	Disagree	Strongly Disagree

Your child will leave the classroom for one hour to complete the questionnaire. She or he will be led through the process of filling in their opinions on the form. During this time, your child may choose to quit the study at any time. Items on the questionnaire address academic intrinsic motivation (motivation to engage in an activity for its own sake). The goal of collecting this data will be to investigate if and how gifted students differ in their levels of intrinsic motivation. Upon completion of this study, the investigator intends to share any new understandings about the relationship between gifted students' intrinsic motivation and academic productivity. You will be able to obtain a copy of the results of this study, upon its completion [specify date] by contacting the School Office or Ms. McGrimmond.

Your child's responses to the items on the survey will be used for analysis in this research only. Neither your child nor the school will be identified by name in any reports of the results. This work will not interfere with your child's regular progress in school as the research task requires a one time participation of less than one hour. Your child may be withdrawn from the study at any time if you, she or he tells me or the teacher that this is their wish. Participation in and/or withdrawal from the study will not influence your child's grades.

Before your child can be involved, you must sign and return the attached form to the teacher. Please read this letter and contact me if you have any questions (604-842-4746). Then, I hope you will sign the form and return it to the teacher by _____.

Please accept my thanks in advance for allowing your child to participate in this effort to improve our understanding of motivation in students.

Gratefully,

Leanne McGrimmond, Graduate Student

Your signature on this form will signify that you have received a document which describes the procedures, possible risks and benefits of this research study, that you have received an adequate opportunity to consider the information in the document, and that you voluntarily agree to allow the child named below to participate in the study.

Please return this form to your child's teacher by _____

Name of Parent, Guardian or other (PRINT): _____

I certify that I understand the procedures to be used and have fully explained them to the minor participant. He or she knows that myself, or he or she has the right to withdraw from the study at any time.

I may obtain copies of the results of this study, upon its completion [specify date] by contacting the School Office or Ms. McGrimmond.

Signature: _____

Date: _____

Relationship to Child: _____

First Name of Child: _____ Last Name of Child: _____

Child's Gender (PLEASE CIRCLE ONE): Female Male

Child's Birthday: Month _____ Day _____ Year _____

The University and those conducting this study subscribe to the ethical conduct of research and to the protection at all times of the interests, comfort, and safety of participants. This form and the information it contains are given to you for your own protection and to ensure your full understanding of the procedures, risks, and benefits as described in the preceding letter.

Any complaints about the study can be brought to Dr. Hal Weinberg,
Director, Office of Research Ethics at hal_weinberg@sfu.ca or 778-782-6593.

Appendix N – Introductory Script

Initial Meeting to hand out Consent form

Chief Researcher:

"Hi everyone. My name is Leanne and I am a student at Simon Fraser University. The reason that you've been pulled aside today is because you are eligible to participate in a research study that I will be conducting. The study will involve filling out a survey like this one (show the CAIMI and flip through the booklet), which asks questions about how you like to learn. This survey asks 44 different questions and should take less than one hour to complete. The information that you provide by filling out this survey will tell me about how you like to learn and that will allow teachers to begin to understand how different groups of students like to learn.

Do you have any questions so far?

Taking this survey will not affect your classroom grades in any way. Also, if you do not want to participate, and do not want to complete the survey, it will not affect your classroom grades. If you would like to participate in this research study, I will need to have your parents' or guardians' permission to include you. I am going to give each of you this permission form which also has a letter to your parents telling them the information I've just told you. If you would like to participate in the study, and complete the survey, you will need to have your parents read these pages, sign the permission form and return it to your classroom teacher by _____. I will be returning to your school on _____ to do the survey with the students who want to participate and have returned these forms. Are there any more questions about the research, the survey, or the letter that you will be taking home? (Chief researcher allows time for questions)"

Appendix O – Administration Script

Day of Data Collection – Introduction to Survey

Chief Researcher:

"Good afternoon/morning. Today you are all going to be participating in completing a survey which will ask you questions about how you like to learn. The information that you provide will tell me about how you like to learn and that will allow us to begin to understand how to create a learning environment that best suits the likes and dislikes of different groups of students. You are volunteering to provide me with some information about how you like to learn. You are not required to be here and if for any reason you do not want to fill out this survey you can leave now, or at any time during this session. If you choose not to participate, or if you want to stop at any time, it will not affect your classroom marks. Do you have any questions before we begin?"

Note: The following paragraph is a summary of the script used to administer the CAIMI. Exact wording that will be used for the administration of the CAIMI is listed on page 2 and 3 of the CAIMI booklet.

Chief Researcher:

"This is a booklet that asks you your opinions about school. You will be reading sentences and will be asked whether you agree or disagree with them, this is not a test and there are no right or wrong answers. It is important that you answer on your own, and answer the way that you really think and feel. Read each sentence separately. Think about your answer. Mark an X in the circle of your choice. Mark only on answer for each sentence. For sentences with the subjects of reading, math, social studies and science, think about your answer for each subject separately, and mark your choice for each subject separately. Ask for help if you need it."

Appendix P – Teacher Consent

Dear Teacher,

I am a Graduate Student in the Faculty of Education at Simon Fraser University and I will be studying the academic motivation of gifted students in your school during September and October 2008. As a classroom teacher of gifted students, you and your students are eligible to participate. This research has been approved by the School District and the School Principal. Before you can be included, you must sign and return the attached form to me, the Chief Researcher. Please read this letter and contact me if you have any questions (604-842-4746). Then, I hope you will agree to participate, sign and return the form.

Each student's participation will involve completing the Children's Academic Intrinsic Motivation Inventory (CAIMI), a 44 statement questionnaire about their learning preferences, by rating their preferences on a scale ranging from "strongly agree" to "strongly disagree."

Your participation in the study will involve:

- Rating each of your district-identified gifted students on 4 aspects of their willingness to do class work and complete it on time on a scale of "never", "sometimes", "often", and "always". For example, one item asks you to rate each student on the following characteristic:

  Student completes assignments in accordance to assignment criteria regarding amount of output (i.e., length of writing, quantity of word, paragraph or page output, number of questions answered etc.)

  Never Sometimes Often Always

- Your rating of each student's productivity will be used for analysis in this research only.

- Meeting with me to set a date and time for an initial meeting with student participants in order to introduce myself, explain the study and distribute consent forms, as well date and time to administer the survey to student participants that will not disrupt their learning.

In addition, I would greatly appreciate your assistance in reminding students to return consent forms as well as collecting the forms. Neither you, the student participants, nor the school will be identified by name in any reports of the results. This work will not interfere with the students' learning or progress as the students' survey requires less than one hour to complete and this session will be scheduled at your convenience. There are no risks involved to you, the student participants, or the school. You may withdraw from the study at any time if this is your wish.

The goal of collecting this data will be to investigate if and how gifted students differ in their levels of intrinsic motivation. Upon completion of this study, the investigator intends to share any new understandings about the relationship between gifted students' intrinsic motivation and academic productivity.

You may obtain a copy of the results of this study, upon its completion from the School Office or Ms. McGrimmond. Please accept my thanks in advance for participating in this effort to improve our understanding of the academic motivation of gifted students.

Gratefully,

Leanne McGrimmond

Graduate Student

Your signature on this form will signify that you have received a document which describes the procedures, possible risks and benefits of this research study, that you have received an adequate opportunity to consider the information in the document, and that you voluntarily agree to participate in the study.

Please return this form to the Chief Researcher.

Name of Teacher (PRINT): _____

I certify that I understand the procedures to be used and that I have been able to receive clarification of any aspects of this study about which I have had questions. I know that I have the right to withdraw from the study at any time.

I may obtain a copy of the results of this study, upon its completion from the School Office or Ms. McGrimmond.

Signature: _____

Date: _____

The University and those conducting this study subscribe to the ethical conduct of research and to the protection at all times of the interests, comfort, and safety of participants. This form and the information it contains are given to you for your own protection and to ensure your full understanding of the procedures, risks, and benefits as described in the preceding letter.

Any complaints about the study can be brought to Dr. Hal Weinberg,
Director, Office of Research Ethics at hal_weinberg@sfu.ca or 778-782-6593.