

**STUDENTS' BELIEFS ABOUT LEARNING AND INTELLIGENCE:
AN EXAMINATION OF ACADEMIC STREAM, GENDER, LD
STATUS, AND ACHIEVEMENT**

by

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Abstract

In the present study, the researcher examined the motivational variables of students within the Ontario Secondary School system, where groups based on course stream, LD status, gender, and achievement level were compared. This research was partially exploratory, where the researcher aimed to validate existing research on gender, LD status, and achievement, as well as to examine how motivational variables relate to course stream. Past research has shown that endorsing an entity theory of intelligence, having a preference for performance goals, attributing success to ability rather than effort, and having low confidence in one's ability to self-regulate are all associated with lower achievement, and with the presence of a learning disability (e.g., Baird, Scott, Dearing & Hamill, 2009).

A total of 243 secondary school students (127 male, 116 female) from one rural school in Ontario participated in this study. The participants completed a 28-item questionnaire made up of several subscales, including the *Implicit Theories of Intelligence Scale* (Dweck, 1999), the *Learning vs. Performance Goal Preference Scale* (Dweck, 1999), the *Effort Attribution Scale* (Dweck & Leggett, 1988), and the *Self-Efficacy for Self-Regulated Learning* (Zimmerman et al., 1992). Regarding stream, an independent *t*-test revealed that students in the university English course had significantly more confidence in their ability to self-regulate than their peers in the college English course. A MANOVA revealed that individuals who had received a mid-term English grade of A (80-100%), regardless of stream, had significantly more confidence their ability to self-regulate than students who received lower grades. Finally, an independent *t*-test revealed that participants with a learning disability were more concerned with their personal growth than their performance when compared to participants without a learning disability. No differences in motivational variables were found between males and females. These findings suggest that educators and parents should place more emphasis on helping students to develop confidence in their self-regulatory abilities, as this appears to be an important variable in students' achievement, as well as related to the academic stream in which they are enrolled.

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Chapter 1

Introduction

In quantitative research, comparisons are often made between members of one group and members of another. For example, researchers may design a study to determine whether males or females drink more coffee in a year. While we sometimes seek out a group membership, perhaps to be a part of a club or a team, other times we are born into a group or develop a group membership. Though we may not all like to see it this way, we are all members of various groups that exist in our society. Groups of race, of religion, of health; all have been used to study individuals and all will continue to be used in research.

Consider the school system as a micro-representation of a diverse country. Just as a country may have a range of individuals who vary on an infinite number of qualities, many schools are populated by a wide variety of learners who come to school from different backgrounds and with different abilities. Some students come in as members of a group (a student with a learning disability or one without), while many more leave as members of a group (college or workplace bound). Some students are high-achievers and others are consistently at risk of not passing a course. Some get involved in extra-curricular activities while others may not join a single club, group, or team in their entire school careers.

In the Ontario secondary school system, school subjects are often divided into various streams designed partially to address students' needs as learners (Ontario Ministry of Education, 2007). To use English as an example, students in Grades nine and ten can choose between taking the "Academic," "Applied," or "Essential" level streams, while students in Grades 11 and 12 can choose between "University," "College," or "Workplace" streams (Ontario Ministry of Education, 2007). As can be seen from the title of each stream, they are also designed to lead students in various directions upon completion of their secondary school career. In the interest of

considering group membership, one could think of students in each stream as belonging to one of three groups.

In my time working in the Ontario secondary school system, I have had the opportunity to work with students from each stream in English, and specifically to work individually with students to develop their literacy skills. As I reflected on the experiences I had with students, I started to realize that many viewed their own abilities as readers and writers in vastly different ways. As I spent more and more time with my students, it seemed that these differences were part of a much larger framework, where students seemed to be conceptualizing knowledge and the learning process in different ways. While some students were excited at the prospect of receiving individual attention and enhancing their skills as a reader and writer, others saw the literacy sessions as a waste of time and felt that growth was not possible.

I have had many conversations with educators at the secondary school level, and most seemed to agree that their experiences with students in the various streams were similar to my own. Many agreed that students in each stream seemed to think about qualities such as intelligence, potential for growth, abilities to stay focused and motivated, among other concepts, in radically different ways.

While group membership may not necessarily cause an individual to think a certain way, my observations, as well as the observations of many of my colleagues in education, have caused me to wonder whether or not group membership is associated with understanding knowledge and learning-related qualities in different ways.

Definition of Terms

This section defines the key terms of self-efficacy, self-regulatory efficacy, mindset, and motivation that are used throughout the thesis.

Self-Efficacy

Bandura (1994) described self-efficacy as a belief in one's abilities to succeed in specific situations.

Self-Regulatory Efficacy

Zimmerman, Bandura and Martinez-Pons (1992) defined self-regulatory efficacy as perceived capability to employ a variety of self-regulated learning strategies, including resisting distractions, motivating oneself to complete school work, and arranging a work environment that promotes study, and other self-regulation related behaviours.

Mindset

Dweck (2006) defines mindset as a framework of implicit beliefs we may have about the nature of human qualities. For the purpose of the present study, the implicit beliefs that are probed are specific to the nature of qualities such as intelligence and capacity to learn.

Motivation

Motivation can be understood as effort, persistence, and drive that is directed towards a particular goal (Pintrich & Schunk, 2002). The present study involves a number of variables that are believed to help determine one's drive toward a particular goal, and to mediate the effort and persistence one uses to work at achieving the goal (Baird, Scott, Dearing and Hamill, 2009).

Background

Tracking, phasing, streaming—all of these terms have been used interchangeably to refer to the practice of separating pupils by their academic abilities into groups for various subjects (Oakes, 1987). This practice has been around for at least a century, and exists in various forms in different countries, including Canada, the United States, and Germany (Ontario Ministry of Education, 2007; Oakes, 1987). In school systems that separate students based on their academic abilities, it is possible that over time students will start to view their abilities as better or worse than those of a peer in another stream.

Another type of group that students may belong to is “students with exceptionalities.” Exceptional learners in Canada are students who have been recognized as needing support systems in addition to what is already provided to most students (Hutchinson, 2009). Amongst a wide variety of exceptionalities, learning disabilities are a type of exceptionality that can affect a student’s ability to process information, such as reading or writing, and these students are often characterized by a discrepancy between ability and achievement despite average intelligence (Hutchinson, 2009). Compared to their non-learning disabled peers, it is possible that these students may feel that their abilities are limited simply by the fact that an extra obstacle to their learning has been identified (Baird et al., 2009). As one can see, group membership is prevalent within the school system, and belonging to different types of groups may be associated with holding certain types of beliefs about learning and intelligence.

In Ontario, individuals spend a considerable amount of their youth in schools where they develop socially, intellectually, and emotionally. As they progress through the school system, each year brings new challenges and adversity to encourage growth. Upon graduation from secondary school, the goal is that all students will have developed into responsible citizens and will have realized their full potential (Ontario Ministry of Education, 2011). While each student receives a similar educational experience to their peers, some can become afraid of challenges while others embrace them as they reach an age where self-evaluation begins to occur (Dweck, 2006). Naturally, one could expect to find that individuals react to adversity in different ways given the differences in students’ subjective educational experiences in addition to the differences in the socialization that occurs outside of school.

As educators recognize that students come to them with different backgrounds and with varying abilities, they work to differentiate their teaching to accommodate all types of learners, and to create inclusive classrooms (Hutchinson, 2009). Sometimes the supports are in place for students’ learning, but individual differences in how students think about themselves and their

abilities can limit personal growth and development (Yeager & Dweck, 2012). Individuals may hold beliefs about how malleable human qualities are as well as about the potential for growth and change to occur. These implicit beliefs are sometimes referred to as mindset, and can include beliefs about social characteristics as well as intellectual abilities (Dweck, 2006). In the case of students within a classroom, mindset may have an influence on how students respond to adversity that they face and may allow some individuals to thrive while others flounder.

An individual who believes that they do not have the capacity to grow or change may be less likely to be motivated to put in effort to try to change. In this way, mindset influences motivation and can be considered a motivational variable. Even if a student is receiving support and learning adaptive strategies in the classroom, their behaviour and performance may never improve unless they truly believe that change is possible. Dr. Carol Dweck has been one of the instrumental theorists in developing the social-cognitive theory of motivation that places an emphasis on mindset, and on how it relates to individuals' lives (Dweck, 2006; Yeager & Dweck, 2012).

Besides the beliefs we endorse about the nature of learning and intelligence, our experiences in life lead us to develop varying levels of confidence in our own abilities as learners within our environment (Blackwell, Trzesniewski, & Dweck, 2007; Klassen, 2010). In addition to these beliefs helping to influence the way we view ourselves and our world, they also can be considered motivational variables as they may help to regulate the amount of effort we put into various tasks and activities (e.g., Baird et al., 2009; Blackwell et al., 2007).

Theoretical Background

It has been suggested that students may learn to view knowledge from the same perspective as those around them, sometimes known as the enculturation process (Jehng, Johnson, & Anderson, 1993). While knowledge is a broad term, one can focus specifically on social cognitive theories

of motivation that include concepts such as self-regulatory efficacy and mindset as aspects of how students view knowledge and the learning process.

Psychologist Albert Bandura proposed a social-cognitive theory of human functioning where self-regulation and related factors were key pieces at the forefront (1986). Bandura's model later included the concept of self-regulatory efficacy, or one's perceived ability to self-regulate when learning. Where self-regulation involves cognitive activities such as goal-setting, metacognition, and judgmental processes, self-regulatory efficacy is comprised of one's confidence in their own ability to engage in self-regulation (Zimmerman et al., 1992). Given that self-regulatory efficacy is based on the outcome of past events, this concept can help to determine a student's motivation on future tasks (Usher & Pajares, 2008).

Additionally, mindset can be understood as a set of beliefs, and the frame of mind that an individual has coming into an experience. For example, two individuals may view the experience of a game of 21 in basketball in completely different ways. One of the surprising things about mindset is that individuals do not necessarily realize that they hold a specific mindset until they are probed about it (Ravenscroft, Waymire & West, 2012). When considering academics, while mindset is not simply based on one's implicit beliefs about the nature of learning and intelligence, this may be where it starts. Implicit theories of intelligence may set up a mental framework for an individual's judgements of, and actions within, their world. These implicit theories may lead to attributions and may even influence an individual's preference for certain types of experiences, which all together can be thought of as a mindset. A change in this mindset could therefore promote a change in motivation. Researchers who conducted a study involving 978 students in Grades three to eight reported that the students' beliefs about intelligence were the source of longer term trajectories of intrinsic motivation (Haimovitz, Wormington, & Corpus, 2011).

To better understand implicit beliefs about intelligence, one could consider that these beliefs can fall along a continuum. Dweck (2006) explained that an individual with a "fixed"

theory of intelligence believes one's intellectual qualities are set in stone, and effort will not make any difference. An individual who endorses a fixed mindset will therefore view any adversity as an opportunity for their ability to be measured, and they may in turn seek easier tasks and avoid challenges that they believe require them to prove themselves. To reconsider that game of 21, our "fixed mindset theorist" would likely only want to play if they believed that they were a naturally gifted basketball player and would surely win. On the opposite end of the continuum, an individual with a "growth" theory of intelligence believes that effort and perseverance make all the difference, where one's true potential is both unknown and unknowable; individuals with a growth mindset believe that one's intelligence is not "fixed." An individual who endorses a growth mindset views adversity as an opportunity to grow and develop, and will continue to work at something even if it is not going well because they have recognized the importance of the process. The "growth mindset theorist" would view the game of 21 as an opportunity to improve their skills and to become a better basketball player.

If this mental framework is set up by one's beliefs about the nature of qualities as fixed or malleable, it will likely influence the types of goals an individual sets for themselves, as well as what they attribute their success and failure to. An individual with a fixed mindset is more concerned with their appearance to their peers than with how much they are actually learning. An individual with a fixed mindset would also likely believe that effort will not make a difference as they have set abilities, and when failure at a task is experienced, they come to the conclusion that they simply do not have ability in that area. An individual with a growth mindset would believe that one's ability comes from the effort they put into its development, and would attribute their failure at a task as a sign that they need to continue to work at it, or perhaps adjust their approach or strategy (Dweck, 2006). Just as mindset can vary in different subject areas (Dweck, 2006), some research suggests that the way individuals conceptualize learning and intelligence may vary between learning environments (e.g., Trautwein & Ludtke, 2007a).

Past research concerning how achievement relates to the motivational variables that are being examined in the present study suggests that a positive relationship exists between achievement and all motivational variables, meaning that higher scores in measures of achievement are typically associated with a growth mindset and higher scores in self-regulatory efficacy (Blackwell et al., 2007; Usher & Pajares, 2008).

There is a considerable amount of support for the gender gap in literacy, where females typically outperform males in reading and writing in North America (Williams, 2006). One study found that when making attributions for their success and failures, males make more ability attributions, whereas females make more effort attributions (Siegle, Rubenstein, Pollard, & Romey, 2010). When considering one's own abilities within a literacy-related setting, it is likely that females would have more confidence in their abilities and their potential for growth.

Students with LD are a group that has been identified in research as having lower scores of academic self-efficacy, including self-regulatory efficacy, when compared to their non-LD peers (Klassen, 2010). Additionally, students with LD have been found to be more likely to endorse a fixed mindset when compared to their non-LD peers (Baird et al., 2009).

Statement of the Problem

While there is research that examines motivational variables as they relate to groups based on gender, LD status, and achievement, none currently exists that examines differences by stream in the Ontario secondary school system. In addition, there is a need for research to determine whether or not the same associations that have been previously found between motivational variables and gender, LD status, and achievement, are also found within the Ontario secondary school system.

Purpose of the Study

In the present study, the researcher examined the motivational variables of students within the Ontario Secondary School system, where groups including stream, LD status, gender, and achievement level were explored. This research was partially exploratory, where the researcher both looked to validate existing research on gender, LD status, and achievement, as well as to examine how motivational variables relate to stream.

Research Questions

In order to address the purpose of the study, the main research questions include:

- 1) What is the difference between students in different streams on motivational variables?
- 2) What is the difference between students with four levels of student achievement on motivational variables?
- 3) Is there a difference in motivational variables based on students' gender?
- 4) Is there a difference in motivational variables based on students' LD status?

Research Hypotheses

As streaming historically has had a basis in students' abilities (Oakes, 1987), which likely comes from their past achievement, it is hypothesized that students in the university stream will have higher scores in motivational variables when compared to their peers in the college and workplace streams.

Firstly, it is hypothesized that students in the College stream will have higher scores in motivational variables when compared to their peers in the workplace stream. Secondly, it is hypothesized that students within the highest level of achievement group will report higher scores in motivational variables, and that scores will decrease as achievement level also decreases. Thirdly, it is hypothesized that females will report higher scores in motivational variables when

compared to males. Lastly, it is hypothesized that students who self-report as having LD will report lower scores on motivational variables than their non-LD peers.

Significance of the Study

One of the reasons this type of research is so essential in education is that research seems to support the idea that once an individual acknowledges their mindset, it is possible to change it. Given the support for a growth mindset being considered adaptive, this suggests that all students can benefit from knowledge of what constitutes a growth mindset. This research should provide a better sense of which groups (achievement, LD status, stream, and gender) endorse which types of mindset. This research is also important for education as it can give us a better understanding of the characteristics of students who are in the various academic streams in the Ontario secondary school system. With a better understanding of the populations that exist within each stream, educators can more easily tailor lessons and instruction to their students. While individual differences within each group likely exist, a goal of this research is to determine whether or not there is a pattern in the way students in each group think that differs between streams. There is no research published to date that examines motivational variables within the various school streams in the Ontario Secondary School system. Past research has connected cognitive self-regulatory strategies, sometimes described as motivational variables, to achievement (Baird et al., 2009; Klassen & Lynch, 2007), though a review of the literature did not reveal any research that examines differences in motivational variables by secondary school stream. Additionally, mindset has yet to be examined specifically with self-regulatory efficacy.

Assumptions

For the purpose of the present study, it is assumed that the marks students have received in their mid-term reports are valid measures of their achievement in the course up to that point. It is possible that factors such as the nature of assessments used to generate the mid-term mark, external issues, and other factors could contribute to a higher or lower score than the student

typically receives and may finish the course with, though the researcher is assuming that the mid-term grade is a valid indication of the students' performance up to that point. It is also assumed that students are providing accurate information concerning motivational variables, their grades, their gender, their achievement, and their status with or without LD.

Organization of Thesis

This thesis is comprised of five chapters. Chapter 1 introduces the thesis, including a description of the purpose and the rationale, as well as the definitions of key terms used throughout. Chapter 2 reviews the research related to motivational variables including mindset and self-regulatory efficacy, as well as how these variables have been found to associate with achievement, learning disabilities, learning environments, and gender. Chapter 3 describes the research methodology used in the study, including information on the participants, the procedures used in the study, and the measures used to collect data. Chapter 4 presents the quantitative findings of the study, and the thesis concludes with Chapter 5, which is made up of a discussion of the quantitative findings. Chapter 5 will also discuss the research questions of the study, the overall implications of the findings, the limitations of the study, and the directions for future research.

Chapter 2

Literature Review

The purpose of this study was to examine the motivational variables of students within the Ontario Secondary School system, where groups including stream, LD status, gender, and grades were explored. Broken into five sections, this chapter reviews the previous literature on the relationships among motivational variables, achievement, learning disabilities, learning environment, and gender. The first section reviews past research about motivational variables, specifically with a focus on self-regulatory efficacy and mindset. The second section examines past research related to motivational variables and achievement, and the third section reports past research related to motivational variables and learning disabilities. The fourth section examines past research related to motivational variables and learning environment, and the final section reviews past research related to motivational variables and gender.

Motivational Variables: A Mental Framework

In the interest of better understanding motivation, or the effort, persistence, and drive, that is directed towards a particular goal (Pintrich & Schunk, 2002), one must examine the variables that contribute to it. The present study involves a variety of variables that are believed to contribute to motivation (Baird et al., 2009), though this section will first address past research about motivational variables as a mental framework that informs and contributes to motivation.

In her work related to motivation and mindset, Dweck (2006) proposed that implicit theories of intelligence may set up a system of beliefs, or a mental framework, that involves how we think about our experiences. When Dweck's social cognitive model for motivation was in the early developmental stages, she published a paper (1986) introducing a research-based model that accounted for major patterns of behaviour. While this model had aspects of the one she presently uses, such as implicit theories of intelligence and learning vs. performance goals, the purpose of

this paper was to examine the generality of the model and to explore its broader implications for motivation. She explained that individuals who responded to adversity in a mastery-oriented way with a focus on growth had a preference for learning goals, while their peers who responded to adversity in a helpless way with a concern for the measurement of their ability had a preference for performance goals. Dweck proposed that the goal an individual is pursuing can create a system of beliefs through which events are interpreted and responded to, and that implicit theories of intelligence are consistent predictors of the types of goals that individuals prefer.

Hong and his colleagues later conducted three studies to understand the role that implicit theories of intelligence play in our learning experiences (Hong, Dweck, Chiu, Lin, & Wan, 1999). In three studies, the researchers were testing a model linking implicit theories to effort vs. ability attributions, which then relate to the likelihood of an individual taking a remedial course following a poor performance. In the first study, the researchers focused on examining the relationship between implicit theories of intelligence and effort attributions versus ability attributions. Using a sample of 97 undergraduate students from a university in the United States, researchers first asked participants to fill out a questionnaire assessing their implicit theories of intelligence and their general confidence in their intelligence. In the second part of what participants believed were two separate studies, students completed a test measuring conceptual ability. Each participant completed the test in a room with one other participant, and eventually had the opportunity to view results of both their own test and the test of the other participant who wrote the test in the same room with them. In all cases, results were fabricated to make every participant believe that they had not done very well, while the other participant who wrote the test at the same time had been notably more successful. Following the presentation of the results, participants completed a follow-up questionnaire to probe individuals about the attributions they made for their poor results. The researchers found that those individuals who were classified as entity theorists made significantly more ability attributions when compared to their incremental-

theorist peers. The results of this study support a link between incremental theories of intelligence and attributing failure to lack of effort rather than ability, as well as entity theories of intelligence and attributing failure to lack of ability rather than effort. The findings also suggest that implicit theories of intelligence set up a system of beliefs, or a mindset, that an individual has about learning and intelligence, though it should be noted that this study was not specific to a school subject. According to Dweck (2006), it is possible for an individual to have a different mindset in various subject areas, such as mathematics and science.

In the second study (Hong et al., 1999), undergraduate students within the social sciences department in a university in Hong Kong were approached on campus and asked to fill out a questionnaire. Those who agreed were told that English proficiency is very important for academic success, specifically in the social science disciplines at the school. The questionnaire asked students how likely they were to take a remedial course in English proficiency that had been shown to be effective, and then asked them to provide a list of subjects they had taken previously in school and in which they had received a grade of A or B. Participants were then asked to fill out one more “unrelated” survey, which measured their implicit theories of intelligence. The results showed that incremental theorists were more likely to want to take the remedial course when they realized that their skills were insufficient, where insufficiency was considered if a student did not include English as a subject in which they had received a grade of A or B. Despite this finding, little information was provided about the remedial course, and it is possible that individuals who did not receive an A or B may not have considered their English skills to be insufficient.

The purpose of the final study (Hong et al., 1999) was to test the causal relationship between implicit theories of intelligence and responses to setbacks, where the researchers manipulated participants’ implicit theories of intelligence. Again, using undergraduate students from a university in Hong Kong, the 60 participants included in the study were presented with an

English comprehension task. The accompanying reading passage was one that either promoted an entity or an incremental theory of intelligence. It is important to note that there was no measure to test the implicit theories of intelligence of each individual to assess whether or not they now endorsed the belief that was presented to them. Participants were next told that they would shortly be completing an unrelated intelligence test, and that they would be given 12 practice problems to prepare them for the test. Randomly, half of the participants were told that they had performed at a satisfactory level, while the other half were told they had performed at an unsatisfactory level. Next, participants were given the choice of completing a tutorial that had been shown to improve scores on the intelligence test, or to complete an unrelated task. After participants had made their choice, they completed a questionnaire measuring the attributions they made for their results on the practice problems, as well as whether or not they prefer to face difficult and challenging tasks or tasks that are simple and easy. Finally, students were asked to respond to a hypothetical situation where they were required to judge which of two students was more intelligent, while the students they judged differed in performance and effort. The researchers found that participants who had read the incremental reading passage were more likely to take the tutorial and practice problems, and that they were more likely to make attributions to lack of effort when they received negative feedback when compared to their peers who had received the entity theory passage. Worth noting is that individuals were given a choice between completing practice problems or the unrelated task; it is possible that some of the students who chose the practice problems may have chosen not to complete anything if this was a possibility, but opted for the practice problems to maintain consistency of focus. As a result, the researchers may have received inflated numbers of individuals choosing the practice problems for the purpose of consistency, rather than an expectation that they were capable of improving. The results of the hypothetical situation suggest that an entity theory, compared to an incremental theory, fosters inferences that exerting higher levels of effort reflect a lower level of ability. These findings may support that implicit theories of

intelligence can be manipulated; however the researchers did not actually assess individuals' beliefs about intelligence.

In two more recent studies of Chinese secondary school students, Wang and Ng (2012) looked to determine whether implicit theory of intelligence and implicit theory of school performance were distinguishable, as well as how each predicted a helpless approach to schoolwork. The first study included 10th grade students and the second included 7th grade students, where in each case students reported on their implicit theories of intelligence using a questionnaire. The 361 10th grade students that participated reported on their helpless approach to schoolwork in the fall and again six months later, and the 457 7th grade participants had reports on the same issue completed by teachers at the same times as the grade 10 students. An initial exploratory factor analysis, followed up in the second study by a confirmatory factor analysis, revealed that participants generally viewed intelligence as being less malleable than school performance, suggesting that these students generally believe that how well they perform in school is more within their control than how intelligent they are. Students with a stronger belief that intelligence or school performance cannot be changed were more likely to approach schoolwork in a helpless manner over time. In contrast to the view that intelligence is central to achievement and learning which is typical of western cultures (Tweed & Lehman, 2002), Chinese students seem to view intelligence as distinct from school performance, and place a higher value on effort, which is often the case in eastern culture (Wang & Ng, 2012). This study did not make distinctions between the gender of students or the school subject being considered, which some research suggests may influence students' beliefs about learning and intelligence (e.g., Siegle, Rubenstein, Pollard, & Romey, 2010).

Chen and Pajares (2010) pointed out the need for more research examining variables related to self-efficacy, as well as other motivational variables, within Dweck's social-cognitive model. The construct concerned with an individual's perceived capability to use a variety of self-

regulated learning strategies, better known as self-regulatory efficacy, came into prominence with a study by Zimmerman, Bandura, and Martinez-Pons (1992). The purpose was to test the hypothesis that individuals' self-regulatory efficacy would influence their perceived self-efficacy for academic achievement. The researchers collected data from two high schools in a large city in the eastern United States, using 102 students in Grades nine and ten with approximately equal gender representation. Participants were from a lower-middle class neighbourhood and were from relatively diverse ethnic backgrounds. Data were collected in the classroom setting using a questionnaire for the students, as well as a take-home portion for parents to complete. On the questionnaire, students were asked about their self-regulatory efficacy, their perceived capability to achieve in nine subject specific domains (e.g., mathematics, English), also known as self-efficacy for academic achievement, and finally their grade goals which consisted of their expected grade and minimally satisfying grade in the social studies class in which they completed the questionnaire. Parents were asked to report the grade they expected their child to receive in the social studies course, as well as the minimal grade they would be satisfied with. The researchers also had access to previous and final grades for each participant using the schools' student records. A path analysis revealed that students who perceived themselves as capable of regulating their own activities in a strategic way were more confident that they could master academic subjects, and in turn attain a higher level of performance academically.

In a 2008 study, Usher and Pajares tested the construct validity of the items commonly used to assess self-regulatory efficacy (Zimmerman et al., 1992). The researchers' aims were to assess the factor structure of self-regulatory efficacy by determining whether a single factor underlay the items, to determine whether the measurement model was invariant across school-level and gender, and to test for latent mean differences in self-regulatory efficacy between genders and across school levels. Finally, the researchers tested the construct validity through an examination between scores on the self-regulatory efficacy scale and scores that assess other

motivation and achievement constructs, including self-efficacy, self-concept, anxiety, task-goal orientation, and grade-point average. A total of 3670 students in Grades 3-12 participated in the study, and came from schools in suburban northern and southern United States. Participants were predominantly white and were classified as middle class. The instruments used for data collection were administered in classroom settings, though elementary school students provided their data as the researcher guided them through each question orally compared to the students in Grades 6-12 who completed the questions independently. Seven of the original 11 items used to assess self-regulatory efficacy (Zimmerman et al., 1992) were included in the study based on the items that teachers felt most accurately assessed the self-regulatory strategies their students used across subjects. The instruments also included a measure for writing skills self-efficacy, grade self-efficacy, self-concept using items adapted from the Academic Self Description Questionnaire, writing apprehension, science anxiety, task goal orientation, optimism, and finally inauthenticity which measured students concerns with others' interpretations of their abilities. The researchers conducted a confirmatory factor analysis to test the measurement model of the seven self-regulatory efficacy items as well as a series of tests for multigroup variance, and used a structured means approach to allow them to make inferences about latent mean differences. They found that the items used to measure self-regulatory efficacy provide a valid measure that researchers can continue to use when assessing students' beliefs about their capabilities as self-regulated learners.

Schommer (1990) suggested that epistemological beliefs, concerning the simplicity, certainty, and source of knowledge, play a prominent role in influencing one's performance. In a 2010 study, Chen and Pajares examined the role of epistemological beliefs in the context of science instruction, where epistemological beliefs can roughly be defined as individuals' beliefs about the certainty, simplicity, source, and justification of knowledge. The researchers examined the associations of incremental theories of ability and epistemological beliefs, and their effects on the motivation and achievement of students. Additionally, they examined how implicit theories of

science ability, epistemological beliefs about the nature of science, and related motivational constructs differ as a result of gender and ethnicity. A total of 508 grade six science students from a large suburban public middle-school in the south-eastern United States participated in the study. At the time of data collection, students were in their first of three years at the school, and they were a diverse group in terms of gender, ethnicity, and socio-economic status. Data were collected using a 73-item self-report survey that was given to students in a group setting, as well as using school records to obtain students' grades. The survey was made up of a number of subscales in order to measure implicit theories of science ability using Dweck's (1999) scale for general abilities with a substitution to focus on science, epistemological beliefs using a 26-item instrument adapted from previous work with elementary science students, science self-efficacy, science achievement goal orientations adapted from the Patterns of Adapted Learning Survey, and self-regulatory efficacy using a 7-item version (Usher & Pajares, 2008) of Zimmerman et al.'s original 11-item scale (1992).

Using path analysis, the researchers were able to determine that an incremental view of science ability was directly related to more sophisticated epistemological beliefs about the nature of scientific knowledge, and a fixed view of science ability was directly related to more naive epistemological beliefs about the nature of scientific knowledge. More sophisticated beliefs about the nature of scientific knowledge were also directly positively related to science achievement, self-efficacy, and task-goal orientation, leading the researchers to suggest that implicit theories of ability may be precursors to epistemological beliefs, which may set up a network of other beliefs and values related to motivation. Interestingly, self-regulatory efficacy was significantly related to all motivational variables, including implicit theories of ability, though was only significantly related to two out of the four domains of epistemological beliefs. While epistemological beliefs may play a role in motivation and achievement, this research gives evidence for the inclusion of self-regulatory efficacy as a motivational variable related to aspects

of Dweck's social cognitive model of motivation. The researchers found that males endorsed a slightly more incremental view of science than females, and that there were some differences with only epistemological beliefs as a function of ethnicity, though it was highlighted that different cultures may have different understanding of what constitutes a sophisticated or naive view of knowledge. More research is needed to examine how motivational variables may differ as a function of gender beyond the Grade six level.

Though some support exists for a mental framework or mindset, the lack of consistency in results across cultures as well as the diversity of variables that could be considered motivational suggest that more research is required to better understand how all of these variables fit together, and how they can influence our lives. Mindset may not necessarily form based on implicit theories of intelligence alone, as it has been suggested that effort may contribute to performance regardless of implicit theory of intelligence (e.g., Tweed & Lehman, 2002). Though mindset and other motivational variables may be no more than a set of beliefs, this does not mean that these beliefs are not powerful influences on behaviour and decisions.

Motivational Variables and Achievement

Motivational variables can influence individuals' lives in different ways, though many researchers have focussed on how they relate to achievement. Intrinsic motivation, or learning for the sake of learning, has been found to be related to strong academic performance, as well as other adaptive classroom behaviours (Haimovitz, Wormington, & Corpus, 2011). Learning for the sake of learning sounds like the growth mindset, and Haimovitz et al. (2011) also found that intrinsic motivation declines as students progress through school. Another study showed that the natural decline in grades slowed for incremental theorists compared to their entity theorist counterparts during the Grade 8 transition (Yeager & Dweck, 2012).

In a 2012 study, 206 senior and graduate level accounting students from a North American University took part in a study to explore the relationships among mindset, calibration

error, and exam performance (Ravenscroft, Waymire & West). Participants completed a mindset questionnaire early in each semester, and were also required to complete a total of 3 exams, with each exam successively being worth more. Prior to each exam, participants provided a guess as to how they expected to do on the exam that would follow. The researchers found a strong inverse relationship between calibration error and exam performance, as well as some evidence to suggest that a growth mindset is associated with decreasing calibration error and improved performance.

Two studies conducted in 2007 were designed to further explore the relationship between implicit theories of intelligence and performance (Cury, Da Fonseca, Zahn, & Elliot). The first study was correlational, and was specifically designed to validate the direct relationship between implicit theories of intelligence and performance attainment. Participants were 47 students in France with an average age of approximately 13 years. Each participant was brought in individually, and was informed that they would be completing a test that was commonly used to assess the IQ of teenagers. They were then given 2 minutes to complete the test, and upon completion they were sent away without any feedback. On the following day, participants were informed that they would be taking the same test again after a few other measures were completed. Each participant first filled out a measure assessing their implicit theories of intelligence, after which they were given a set of practice problems to help them prepare for the test and they were informed that they would have five minutes to work through them. As participants were given the opportunity to practice, researchers used a stopwatch to time the number of seconds participants spent solving the practice problems with the timer placed in a location hidden to the participant. Following the practice time, participants completed a questionnaire assessing the amount of worry they had about their performance on the test that would follow. Researchers found that implicit theory of intelligence predicted test performance, where endorsement of an entity theory of intelligence was associated with lower test scores. Endorsing an entity theory of intelligence was also associated with greater worry. Lastly, worry

was a negative predictor of practice time, and practice time was a positive predictor of IQ performance. Researchers concluded that worry and time invested in practice jointly account for the relationship between implicit theory and performance.

In the second study reported in the same paper (Cury et al., 2007), the researchers used an experimental design where implicit theories of intelligence were manipulated, rather than assessed, using reading passages given to participants. The researchers tested the hypothesis that endorsement of an entity theory of intelligence is particularly detrimental for performance following an experience of failure. Eighty-six students from France with an average age of approximately 14 years were randomly assigned to one of four groups, including both types of implicit theory of intelligence (entity and incremental) as well as two types of feedback. Each participant was again brought in individually, and was informed that they would be completing a test that was commonly used to assess the IQ of teenagers. After completion of the test, each participant was either given positive (90th percentile) or negative (10th percentile) feedback about their performance. Each participant was then provided with a form that included the implicit theory manipulation, where each group received a message that gave an explanation to support the particular theory, as well as a figure. Participants were then told they would complete the test again, though first they were given an implicit theory summary message based on their group, and then required to fill out a questionnaire assessing these beliefs, as well as the degree of worry they had about their upcoming performance. Upon completion of the questionnaire, each participant was again given a total of five minutes to practice for the upcoming test on questions should they choose to do so, and again researchers timed this session without the participants' knowledge. Researchers scored the results following the completion of the test, and went on to provide positive feedback to all participants. In this case, implicit theories of intelligence were manipulated rather than measured, and the researchers found evidence to support that entity theorists had lower performance than their incremental theorist counterparts.

Dweck, Blackwell and Trzesniewski (2007) designed a study to determine whether students' theories of intelligence were related to their achievement trajectory, and why theory of intelligence has been found to be related to grades. Using 373 students in this longitudinal study, researchers drew participants from four successive classes entering the 7th grade. The sample of participants was 55% African American, 27% South Asian, 15% Hispanic, and 3% East Asian or European American. Participants were asked to fill out a questionnaire at the beginning of Grade 7 measuring implicit theories of intelligence, learning goals, beliefs about effort and ability, as well as responses to setbacks including attributions made to setbacks and strategies used upon experiencing a setback. Participants' baseline math scores were also assessed at the beginning of the fall term in Grade 7, and term grades were included in the study for the following spring and fall terms. Results showed that students' initial theories of intelligence were significant predictors of mathematics achievement, and that an incremental theory of intelligence was significantly correlated with learning goals, beliefs about effort and ability, as well as attributions and strategies for handling setbacks. The longitudinal nature of the study allowed the researchers to conclude that students with an incremental theory of intelligence pulled away from their entity theorist peers over time in terms of math achievement, where they increasingly outperformed them in math term grades over time. While these results suggest a clear relationship between theories of intelligence and achievement in mathematics, the baseline test at the beginning of the first fall term was a standardized test, and the term grades that followed were determined by the teachers of the students. Though this does not necessarily take away from the value of these findings, the decisions about what grades teachers are assigning to students could have been influenced by teachers' knowledge of the students' reported intelligence and other related factors.

Although many studies support a clear relationship between mindset and achievement, other research provides no evidence of any relationship existing between mindset and achievement. In a study by Dupeyrat and Marine (2005) that tested and extended Dweck's social-

cognitive theory of motivation using adults returning to school, the researchers found that implicit theories of intelligence were not significantly related to the types of goals individuals endorsed, or their achievement. While this result is inconsistent with other empirical findings reviewed earlier in this chapter, this group represents a different population compared to other studies reviewed in this chapter as these individuals are in a different age category with an average age of 31 years. A different study designed to explore the relationships among implicit theories of intelligence, goal orientations, perceived competence, and school achievement, provides another look at the inconsistency of results (Leondari & Gialamas, 2002). Participants included 451 elementary and junior high school students from Greece, made up of an ethnically and economically homogenous group. Using questionnaires distributed in class, the researchers collected data for each variable, with school achievement coming from students' records. The researchers found evidence to suggest that implicit theories of intelligence were not related to academic achievement, and that goal orientations had an indirect effect on achievement. Further investigation is needed to better understand the relationship between mindset and performance, as the inconsistency of the results seems to suggest that other related variables may need to be considered. Also worth considering is the homogeneity of the sample in the Leondari and Gialamas study, where limited variability may be due in part to the lack of diversity of the sample that the researchers collected data from.

Despite the mixed results, researchers in motivation typically agree that an entity view of intelligence, the endorsement of performance goals, and a belief that ability is more important than effort all should be considered maladaptive given the strength of their negative relationship with performance (Baird et al., 2009; Blackwell et al., 2007; Hong et al., 1999). Though mixed evidence exists concerning the relationship between mindset and achievement, the relationship between self-regulatory efficacy and achievement seems to be clearer. Students' self-regulatory efficacy has been found to be positively related to achievement and motivation in diverse

academic areas and at all levels of schooling (Pajares, 2007). The adaptive forms of these variables can be understood as making up the typical “growth mindset,” where their maladaptive counterparts would make up the “fixed mindset” (Dweck, 2006). After establishing what research suggests about motivational variables, it is important to examine how these variables may differ by group status.

Motivational Variables and Learning Disabilities

Research has emerged concerning the differences between the academic achievement of students with and students without learning disabilities (LD), though less attention has been directed at differences between these groups specifically in self-regulatory efficacy and motivational variables (Baird et al., 2009; Klassen, 2010). This section reviews the most relevant literature relating to motivational variables and LD.

Baird et al. (2009) examined the cognitive self-regulation of youth with LD. The purpose of this research was to report whether or not these youth exhibited a maladaptive cognitive pattern in this domain, consisting of low academic and self-regulatory efficacy, an entity view of intelligence, a preference for performance goals, and a tendency to make attributions tied to ability rather than effort. The data came from 1,518 students in Grades 6-12 in two separate rural school districts in the United States. Of these students, 107 were identified as having LD and were receiving special education services. Data were collected using a survey that was completed in a classroom setting. The survey was made up of four separate scales. The first scale used the Academic Self-Efficacy Survey to capture how well students felt they could perform on academic tasks, while the Implicit Theories of Intelligence Scale for Children gave an indication of whether students believed their intelligence was fixed or malleable. The Learning vs. Performance Goal Preference scale assessed the types of goals students were more likely to employ and the Effort Attribution Scale assessed to what students attributed their successes and failures. After generating correlation coefficients for the variables included in the study, the researchers used

ordinary least-squares regression and maximum-likelihood logit estimation to further examine the quantitative and dichotomous outcome variables respectively. Included in the findings was that youth with LD were more likely to possess a maladaptive cognitive self-regulation pattern in each of the four areas.

In a 2010 study, Klassen examined youth with LD with a specific focus on their confidence to manage their own learning. The main purpose of this research was to determine whether students with LD had different ratings of self-regulatory efficacy than their peers without LD. The research also examined whether or not self-regulatory efficacy contributed to end-of-term English grades for both groups, and if students with LD and high self-regulatory efficacy received higher grades than those with LD and low scores in self-regulatory efficacy. Included in the findings was that students with LD had a lower self-regulatory efficacy rating than their peers without LD, as well as that for both groups, self-regulatory efficacy significantly contributed to the prediction of end of term English grades. Finally, and consistent with previous findings concerning self-regulatory efficacy and gender (Usher & Pajares, 2008), females reported higher ratings of self-regulatory efficacy than males.

This research helps to both identify and give explanations for the differences between students with LD and their non-LD peers in terms of motivational variables including self-efficacy and self-regulation. From this research, we can see that students with LD often have low self-regulatory efficacy and that self-regulatory efficacy is related to final grades in English for both students with and without LD (Baird et al., 2009; Klassen, 2010). Including measures of other motivational variables along with self-regulatory efficacy in the same study can provide a clearer picture of the relationship between these variables, and using LD status as a group allows the differences between these two populations to be better understood. It is also important to include in the examination of students' motivational variables a measure for their perceived utility of effort, as this can provide information about whether or not they feel there is value to

trying harder and putting in the effort on various academic tasks. These studies also help to establish a possible relationship between aspects of self-efficacy and mindset, which should be further explored together in future research with students with LD.

Motivational Variables and Learning Environment

Dweck (2006) suggested that mindset can vary in different subject areas, though little research has been conducted to test this claim, and some evidence exists that it may not differ between subjects (Stipek & Gralinski, 1996). Similarly, the way individuals conceptualize learning and intelligence may vary between learning environments (e.g., Trautwein & Ludtke, 2007a). It has been suggested that students may learn to view knowledge from the same perspective as those around them, sometimes known as the enculturation process (Jehng, Johnson, & Anderson, 1993). One study demonstrated that motivational variables may vary across types of academic institutions, where two schools had different academic environments as a result of their different fields of subject focus (Trautwein & Ludtke, 2007a). It is important to examine the literature surrounding motivational variables within specific contexts (Hammer & Elby, 2002). While culture has been mentioned as a variable that may influence an individual's mindset and motivation, it is possible that everything from the subject studied in a classroom to the general climate within the classroom could also influence mindset.

In a study conducted by Braten and Stromso (2005), the focus was to examine the contribution of personal epistemology and implicit theories of intelligence to students' self-regulated learning, including self-efficacy beliefs, learning goals, personal interest, and self-regulatory strategy use. Specifically, the researchers were looking to see if these contributions varied by academic context, where the two-post secondary contexts included were a teacher education program and a business administration program. Using data from a questionnaire distributed in a lecture setting, regression equations were calculated to determine the contributions made by theories of intelligence and epistemological beliefs. Results indicated that

while epistemological beliefs were stronger predictors of self-regulated learning than implicit theories, the types of predictions varied across the two contexts. For students in the teacher education program, beliefs about knowledge construction and modification were better predictors of self-regulated learning. For students in the business administration program, beliefs about the certainty of knowledge were better predictors of self-regulated learning. These findings suggest that there is value in examining motivational variables across contexts, as the academic environment may have an influence on the types of beliefs that an individual has about learning and intelligence.

In another study by Ommundsen (2006), the purpose was to examine whether motivation climates relate to learning strategies and self-handicapping. Self-handicapping was defined as making excuses for poor performance and attributing the performance to external, uncontrollable factors. The researchers used a sample of students from the 10th grade in physical education classes in Norway, where they were looking to find motivational climates within the classrooms that were performance-focused or mastery-focused. Participants were asked on a questionnaire what types of learning goals they were more likely to endorse, and then to indicate what types of learning goals their class environment seemed to promote. Participants were also asked to report on their use of self-regulatory strategies, as well as their self-handicapping behaviours. Results showed that when students perceived a mastery climate, self-regulation practices including effort regulation, metacognitive strategy use, and help-seeking behaviours positively increased. When students perceived a performance-oriented climate, self-handicapping was positively influenced. This suggests that mastery and performance-oriented climates may send students different messages, that is, mastery-oriented climates may send the message to students that their individual improvement is what matters, and performance-oriented climates may send the message to students that social comparison is important. When students receive these messages from their classroom climates, their beliefs about learning and intelligence may be influenced

towards entity or incremental theories (Baird et al., 2009). The results in this study may only be generalizable to physical education classrooms, and more information is needed about the diversity of the sample of students. If students in this study chose to take physical education as an elective course, one could argue that they were likely to be more engaged in the course and more interested than their peers who may have been forced to take the course as a requirement to graduate. The level of engagement or interest in a course may affect how influenced a student is by the motivation climate; for example, students who are forced to take a course and are less interested in it may be less influenced by the motivational climate when compared to their peers who are interested in the course.

Davis, Burnette, Allison, and Stone (2011) conducted a study to examine implicit theories of intelligence and underdog status. The researchers hypothesized that incremental theorists would feel greater self-efficacy than their entity-theorist peers when put in an underdog position as competing against students who had performed at very high levels in standardized tests. To make a distinction for underdog status, the researchers put participants in either a situation where they were told that they were competing against students that had achieved very high standardized test scores or had achieved very low scores. The participants were either instructed that the students who had achieved high test scores were attending a post-secondary institution with a strong academic reputation, or that the students with low scores were attending a post-secondary institution with a weak academic reputation. After the participants were told which group they were competing against, they were instructed to fill out a questionnaire. The questionnaire was composed of three subtests, measuring implicit theories of mathematical ability, feelings of helplessness coming into the test, and mathematical self-efficacy. The researchers found that participants in the underdog group (those that were told they were competing against highly gifted individuals) who possessed an incremental theory of math intelligence had higher scores of math self-efficacy. While efficacy and performance are two

different things, and this study did not measure actual performance, results suggest that when the context is considered, theory of intelligence seems to have an important relationship with self-efficacy in math. This study was conducted using undergraduate students as the participants, and had a specific focus on mathematics, and so cannot necessarily be generalized to other populations or school subjects.

In a study designed to examine theories of intelligence and responses to stereotypes, 79 undergraduate students from Stanford University were split into one of three groups (Aronson, Fried & Good, 2002). The first two groups participated in separate interventions, one designed to make individuals believe that intelligence is malleable, while the other intervention's message had aspects of both the fixed mindset and multiple intelligences. The third group did not receive any intervention, and only participated along with everyone else in the measures that followed the interventions. All participants agreed to sign release forms, making their transcripts and SAT scores available to the researchers. Both intervention groups were required to send pen pal letters to fictional middle school students that were meant to be encouraging in nature, and were supposed to express the theme of their intervention group. After sending two letters to different students on the first two days of the study, both groups were then required to rework one of their letters into a speech that was to be audio-recorded in the hope that this would further their endorsement of this belief about intelligence. Upon completion of the interventions, participants from all three groups were required to fill out a 2-item measure assessing their implicit beliefs about intelligence. After several weeks, participants' implicit beliefs of intelligence were again reassessed, this time along with ratings of their enjoyment of academics, how much they identified performance in academics with their self-worth, and their experiences with stereotype threat. Upon completion of the intervention, African American individuals were found to be more likely to endorse an incremental theory of intelligence, and it was suggested that this could perhaps be in response to the tendency of African Americans to underperform academically

compared to their non-African American peers. African American participants reported enjoying academics less, and they were less likely to base their own self-worth on academics. Finally, both White and African-American students who advocated for an incremental theory of intelligence to their pen pals demonstrated an increase in their academic achievement over the course of the study. The results of this study suggest that individuals may be affected by stereotypes about their ability based on a group that they belong to. One might consider other types of groups to further examine this idea, including grouping students by achievement level, LD status, stream, and gender.

Finally, Rattan, Good, and Dweck (2012) published a paper with four studies aimed at examining whether implicit theories of math intelligence lead individuals in teaching roles to focus on feedback and strategies that could lead students into long-term low achievement. The first study specifically examine whether individuals holding an entity theory of math intelligence would be more likely to diagnose a student's math ability based on the first test result compared to their fellow teachers with an incremental theory of math intelligence. A total of 41 undergraduate students from a competitive private university in the western United States participated, and the sample was made up of a somewhat diverse group ethnically, though the majority were females. Participants completed an online survey about math education including measures of implicit theories of math intelligence, general math attitudes, sense of belongingness to the math community, enjoyment of math, and the belief in the usefulness of math. Participants were also given a situation where they were to imagine themselves as a 7th grade math teacher who was about to meet with an individual who had received a 65% on the first math test. Participants were required to answer questions assessing whether this mark means that the individual lacks intelligence in math, and whether effort or ability contributed more to the mark. A regression analysis revealed that participants who endorsed entity theories of math intelligence

attributed the math score to a lack of ability and intelligence in math significantly more than participants who endorsed an incremental theory of math performance.

In the second study (Rattan et al., 2012), the researchers looked to determine whether beliefs about the malleability of intelligence led to treating students differently. Ninety-five undergraduate students from a public college in the eastern United States participated, though the sample had a heavy majority of females and was somewhat diverse. Participants began the study by reading an article that was designed to manipulate their implicit theories of math intelligence, followed by the same scenario used in study 1 (Rattan et al., 2012). Participants were required to report on what they attributed the mark to (effort vs. ability), and additionally they were asked about the degree to which they would comfort the student and make pedagogical changes for the student such as providing less homework. After participants completed a manipulation check to ensure that the manipulation was effective, the researchers' analyses revealed that participants who endorsed an entity theory of math intelligence made significantly more ability attributions in response to the scenario they were provided with. Also, entity-theorist participants were much more likely than their incremental theorist peers to report that they would provide the student in the scenario with comfort feedback, and that they would be more likely to use teaching strategies that would reduce the student's engagement, such as providing less homework.

In the third study, Rattan et al. (2012) tested whether participants who are engaged in the actual teaching of math make similar judgements to those examined in studies one and two. Participants included 41 students enrolled in a PhD program in math at a private university in the western United States, all of whom were employed as instructors or teaching assistants at the time of the study. The sample was made up of mostly male students, and was almost exclusively made up of European-American and Asian-American students. Participants completed a questionnaire including a measure of their implicit theories of math intelligence, their attitudes toward teaching, and they were required to read through a scenario similar in nature to the one used in studies one

and two (Rattan et al., 2012), though the student was an undergraduate student and they had failed the first test. Participants indicated their perceptions of the test score as a diagnostic of the student's ability in math, their expectations that the student's performance would change, and the degree to which they would provide the student with comfort-oriented feedback as well as strategies to reduce the student's engagement in the course material. Regression analyses revealed that entity-theorist participants made more ability attributions, reported that they would provide more comfort-oriented feedback and engage in engagement-reducing strategies, and reported lower expectations that the grade would improve over time than their incremental theorist peers.

In the fourth study (Rattan et al., 2012), the researchers examined how students would respond to receiving different types of feedback from instructors. Fifty-four students from a private university in the western United States participated, and formed a diverse group both by gender and ethnicity. In the online study, participants were required to imagine that they were in a calculus course and had just received a 65% on the first math test. They next had to imagine that they met with the professor in a one-on-one setting, and received either comfort-oriented feedback (some people just aren't math people, you are good at other things), strategy-oriented feedback (you should try changing your approach to studying and learning the material), or feedback that stated they should continue to monitor their own progress and stay in touch with the professor. Participants then completed a questionnaire that measured their perceptions of an environmental entity theory, which examined what they perceived their professor thought of their abilities, the degree to which the professor had low expectations of them and little interest in their future progress in the field, their motivation as a result of the feedback, and their expected final grade in the course. Planned contrasts revealed that the group who received comfort-oriented feedback felt the professor had significantly lower expectations of them, reported lower motivation as a result of the feedback, and reported lower expected final grades than the peers who had received the strategy-oriented feedback. Given that all four studies sampled groups from

post-secondary institutions in the United States, this research cannot necessarily be generalized to a more heterogeneous group such as secondary or elementary-aged children. Additionally, although some of the samples were somewhat diverse in their ethnicity and gender, future research should examine the variables of interest with a more balanced group with males and females, as well as in a different context (e.g., eastern perspective). Lastly, the focus of these studies was solely on the field of mathematics and future research should examine how motivational variables may differ in other disciplines and academic environments.

The learning environment may indeed have significant effects on students' motivation and confidence in their abilities. The type of learning environment that exists within a classroom seems to have some influence on students' motivation, and it could be argued that different aspects of motivational variables may even cause students to pursue different subject areas or academic paths (Trautwein & Ludtke, 2007b). Students may receive implicit messages from their instructors, or even the classroom environment and climate, that can have an effect on their motivation (Ommundsen, 2006). It has been suggested that placement into remediation classes has the potential to lead students to conclude that math is a fixed ability (Yeager & Dweck, 2012). Individuals who possess an incremental theory of intelligence may outperform their peers with an entity theory of intelligence when they are aware that they are being compared to other students (Davis et al., 2011). Additionally, stereotypes about the abilities of certain groups may have an effect on the motivation of students who belong to these groups (Aronson et al., 2002). One could argue that certain streams within a subject (e.g., academic vs. applied math) may offer implicit messages to students, and it is possible that students in various streams may feel that people have certain expectations of their performance based on their past performance and the course they are in. Students placed in courses geared to preparing for university may feel that more is expected of them which could influence their mindset, just as students in courses geared toward entering the workplace may feel that less is expected of them and they too could find that

this has an influence on their mindset. While test scores and the courses students are placed in may be indicative of their current achievement, these do not necessarily indicate where they could be (Dweck, 2006). As abilities are often viewed through a different lens for each gender based on stereotypes (Rattan et al., 2012; Williams, 2006), there is value in examining how motivational variables may vary by gender.

Motivational Variables and Gender

In considering various groups and how stereotypes and expectations may influence mindset and motivation, one cannot ignore gender. Some research supports the idea that women take others' opinions of them more seriously (Dweck, 2006). There is also a large amount of support for the gender gap in literacy, where females typically outperform males in reading and writing (Williams, 2006). Given possible differences in performance and how each gender responds to expectations, gender is worth considering when trying to better understand mindset.

One group of researchers examined whether the relationship between perceived importance of ability and perceived importance of effort is mediated by students' implicit theories of intelligence (Siegle, Rubenstein, Pollard, & Romey, 2010). The researchers targeted freshmen enrolled in an honors program at a top ranked public university as their sample group. Using a questionnaire, participants were scored on their theory of intelligence, perceived talent in a total of 15 areas related to various disciplines, their interest in the 15 areas, and the extent to which they believed natural ability and personal effort contribute to achievement in each of the areas. The researchers found that males seemed to report higher perceived ability than females in almost all areas. Males also considered that natural ability is more important for achievement in Language Arts. Finally, males were more likely than females to attribute their successes to ability, where females were more likely to attribute their successes to effort. The population for this study was a high-achieving group, all students who were within the top 4% of their senior class, and so this group may be considered rather homogenous. The students included in this

study would not have had the same levels of success or failure with various school subjects as their lower-achieving peers, and as a result would likely not view the subjects in the same way as these peers. This study seems to suggest that females value effort more than ability, while males may value ability more than effort when it comes to achievement.

Much of the research related to mindset and gender seems to focus on math, and little on literacy (e.g., Blackwell et al., 2007). Dweck found that women who overcame negative stereotypes about lesser math ability by incubating growth mindsets showed positive results on achievement (Dweck 2007). More research is needed on how motivational variables are related to gender, so researchers can better identify which groups to target for interventions to help them view their learning and intelligence in more adaptive ways.

Summary

A review of the literature both revealed important information about motivational variables, as well as highlighted limitations of research that has been conducted in this area. Research suggests that implicit theories of intelligence may be related to self-efficacy and achievement, though this relationship seems to have had a focus in mathematics (Blackwell et al., 2007; Davis et al., 2011; Rattan et al., 2012). It appears that an individual's beliefs about intelligence can be manipulated and that they seem to contribute to a system of other beliefs including attributions individuals make about effort and ability (Hong et al., 1999). Cultural differences are worth considering when conducting research about motivational variables, because certain cultures may value effort more than intelligence (Wang & Ng, 2012). Implicit theories of intelligence may be considered as a part of a larger system, known as epistemological beliefs, and may, as a result, be related to what individuals believe about the nature of knowledge (Schommer-Aikins, 2004).

When considering conducting research about motivational variables and students, it is important to think about the context, as different academic environments may foster different

beliefs (Braten & Stromso, 2005). Individuals may begin to endorse the same types of motivational variables as those around them over time, and so subject areas, as well as academic institutions should be considered when planning research in this area (Jehng et al., 1993; Trautwein & Ludtke, 2009a). At present, there is insufficient research to suggest that certain learning environments promote certain aspects of motivational variables, though it appears that there may be differences. Individuals with LD seem to endorse more maladaptive beliefs than their non-LD peers, and they typically report lower scores in self-efficacy and self-regulation than their peers (Baird et al., 2009; Klassen, 2010). Lastly, while more research is needed regarding gender and motivational variables, males seem to attribute success in academic areas to ability more often, while females seem to make attributions more frequently based on effort (Siegel et al., 2010).

Future research should look to examine motivational variables as they relate to individuals in more heterogeneous groups. While many studies in this area seem to focus on homogenous groups such as undergraduate students and high-achieving students, future studies should target secondary school students in subjects studied by a wide range of students. In some secondary school systems, certain courses, such as English, are compulsory and therefore would likely have a greater diversity of individuals rather than a group that all chose the same subject. Future research could also look at different academic environments such as streams within secondary school to examine whether differences exist in belief systems between these groups. In Ontario, a student's decision to choose the streams they will enter in secondary school may be heavily influenced by their past achievement in each subject. Teachers often recommend a stream to each student and their guardian(s), which may be somewhat based on their achievement. For this reason, the empirical evidence to support a difference in motivational variables based on achievement (e.g. Blackwell et al., 2007; Baird et al., 2009) suggests that there may also be differences in motivational variables between streams. Finally, more research is needed to

examine motivational variables between groups based on LD status and gender, and future research should look to include an achievement component to gain a better understanding of how belief systems relate to academic achievement.

Chapter 3

Methodology

The purpose of this study was to examine the motivational variables of students within the Ontario Secondary School system, where groups including stream, LD status, gender, and grades were explored. The purpose of the study necessitated the use of a quantitative research design.

Data Collection

Participants

A total of 243 secondary school students (127 male, 116 female) from one rural school in south-eastern Ontario, Canada, participated in this study. Each participant was enrolled in either their third or fourth compulsory English credit of the “university,” “college,” or “workplace” stream. Of the 243 participants, 46 indicated that they had been identified at some point as having LD, while the remaining 197 indicated that they had never been identified as having LD. No visible minorities were present in the group of participants included in the present study.

Ethics clearance was received from the General Research Ethics Board of Queen’s University and from the participating district school board. Parental consent (or participant consent for those students that were of age to consent for themselves) was obtained for all participants, and students participated on a voluntary basis.

Procedure

In order to recruit the target number of participants, data were collected in both the fall and spring semesters. Data collection in both semesters took place shortly after the midterm reports had been delivered to students, as this enabled them to report their recently received midterm mark when completing the questionnaire. All participants were recruited by the researcher, who gave a five-minute presentation to each English class to inform students about the purpose and nature of the study. Students were informed that the questionnaire was

anonymous, voluntary, and that it was composed of questions about mindset and motivation, as well as their ability to manage their learning environment. After the presentation had been made and student questions had been answered, the researcher dispersed packages to each student in the class containing both a letter of information (Appendix A), and two copies of a consent form (Appendix B). After two weeks, to allow students time to consider participating in the study, the researcher provided all willing participants who had returned letters of consent with a copy of the questionnaire to be completed during class time in their English class. Those students who had volunteered to be a part of the study completed the questionnaire either at the beginning or end of class, depending on the teacher's preference, while their peers engaged in silent reading until all questionnaires had been collected. On average, students took 10 minutes to complete the questionnaire.

Measures

The Motivational Variables Questionnaire (see appendix C) consisted of 28 items, made up of several scales. Each scale used was a complete version with the only modifications being the number of points on each Likert scale, as well as the addition of an item to the *Self-Efficacy for Self-Regulated Learning* scale. These changes were made to the scales because the researcher anticipated that students with low achievement in reading and students with learning disabilities may have difficulty understanding some of the items:

Implicit Theories of Intelligence Scale for Children-Self Form (ITI, Dweck, 1999). This scale, consisting of three items, assessed the theory of intelligence that participants endorsed using three items. The scale was modified from a 6 to a 5 point Likert scale (1 = strongly agree, 2 = somewhat agree, 3 = neither agree nor disagree, 4 = somewhat disagree, 5 = strongly disagree) to accommodate any difficulties students might have in comprehending instructions, and was designed to determine whether participants viewed their intelligence as fixed or malleable. High

scores on this scale indicate that an incremental theory of intelligence is more highly endorsed. In the present study, the Cronbach alpha was .85.

Learning vs. Performance Goal Preference Scale (Dweck, 1999). This scale, consisting of three items, was used to evaluate goal preferences. The scale was modified from a 6 to a 5 point Likert scale (1 = strongly agree, 2 = somewhat agree, 3 = neither agree nor disagree, 4 = somewhat disagree, 5 = strongly disagree) to accommodate any difficulties students may have in comprehending instructions. The third item was reverse scored to allow for high scores to indicate a preference for learning goals. In the present study, the Cronbach alpha for this three-item scale was .36. The first item included a double-negative “If I knew I wasn’t going to do well at a task, I probably wouldn’t do it even if I might learn a lot from it,” which may have been confusing to some students. When the first item was excluded, the Cronbach alpha for this 2-item scale was .51. Goal preference was also assessed with a fourth item in the form of a dichotomous question, “if I had to choose between getting a good grade and being challenged in class, I would choose . . .” and participants had to circle one of two alternatives: “a good grade” or “being challenged.” When all four items were combined, the Cronbach alpha was .40, and with the first item excluded it improved to .52. For the preliminary and main analyses of the data, the final version of this scale that was used by the researcher excluded the first item, leaving a final three-item scale.

Effort Attribution Scale (Dweck & Leggett, 1988). This scale consists of two items that measured effort attributions of participants. The scale was modified from a 6 to a 5 point Likert scale (1 = strongly agree, 2 = somewhat agree, 3 = neither agree nor disagree, 4 = somewhat disagree, 5 = strongly disagree) to accommodate any difficulties students may have in comprehending instructions, where higher scores indicated effort attributions. In the present study, the Cronbach alpha was .52.

Self-Efficacy for Self-Regulated Learning (Zimmerman et al., 1992). The original scale consists of 11-items. A 7-item version of the same scale was constructed and has been considered to be reliable and valid (Usher & Pajares, 2008). The scale measured how confident students felt in their ability to self-regulate when they are engaging in academic activity. Participants responded on a 5-point Likert scale (1 = never, 2 = rarely, 3 = sometimes, 4 = most of the time, 5 = always). The present study used a modified version of the scale, with a total of eight items. The additional item asked participants “How well can you meet academic deadlines you set for yourself?” Some research has suggested that there may be a difference in an individual’s ability to meet self-imposed deadlines and other-imposed deadlines (e.g., Klassen & Lynch, 2007). The researcher modified the ratings for the Likert scale to accommodate any difficulties students may have in comprehending instructions. Higher scores indicated that students had higher self-regulatory efficacy. With all eight items included, the Cronbach alpha for this scale was .82.

Reading and Writing Mindset. Eight items were used to measure students’ noncontingency, helplessness, and self-regulatory efficacy towards both reading and writing, given the English focus of the study. The noncontingency items measured an individual’s perception of the amount of control they have over whether or not they can improve in the area, while helplessness items measure the belief an individual has about whether or not they are helpless to improve in an area. The noncontingency and helplessness measures are a part of a 20-item scale known as the *Academic Ineffectiveness Scale*, which is used to measure academic self-concept in elementary school-aged children (Berg, 2001). The four self-regulatory efficacy questions measure an individual’s confidence in their ability to self-regulate when engaging in reading or writing. In the present study, the Cronbach alpha for this 8-item scale was .72. For the purposes of the study, two subscales were created, making the distinction between reading mindset and writing mindset. A higher score in reading or writing mindset was considered to be similar to beliefs that were in line with the “growth mindset,” as well as higher scores in self-

regulatory efficacy. When distinctions were made between reading and writing with four-items assessing each, the Cronbach alpha for the reading scale was .65, and the Cronbach alpha for the writing scale was .67.

Demographic Statistics. This subscale, developed by the researcher, consisted of three items designed to allow the researcher to group participants for further analysis. The first item asked participants to indicate their gender. The second item asked participants to indicate whether or not they had been diagnosed with a learning disability. The researcher intentionally did not include a “prefer not to disclose option” for items one and two as this is an anonymous questionnaire, and individuals had been instructed that any question they were not comfortable answering could be skipped. The third item measured participants’ achievement in English class, by having students indicate the numerical grade they had received on the mid-term report they had recently received.

Data Analysis

Data were analyzed using IBM SPSS Statistics 21. The data were screened for missing data before preliminary analyses took place. Both positively and negatively keyed items were present in the questionnaire; therefore negatively worded items were reverse scored.

Missing Data

One participant was dropped from the total sample who did not respond to many of the items, including the items that made up the subscale that measured self-regulatory efficacy, which resulted in $N = 242$. For the remaining participants, approximately 2.5% of the 242 participants had one or more missing data values. Multiple imputation (Rubin, 1987) was performed to produce five independent imputed data sets. The researcher conducted statistical analyses on each of the five data sets, which were then averaged to produce a single set of results. This approach was used to handle missing data as it has been shown that multiple imputation provides valid

estimates of statistical quantities (Fichman & Cummings, 2003), and was used in a recent study that used many of the same variables as the present study (Baird et al., 2009).

Preliminary and Main Analyses

For the preliminary analyses, descriptive statistics were generated and bivariate correlations conducted for the dependent and independent variables for all participants ($N = 242$).

For the main analyses, each of the five research questions was examined. To address possible differences between students in different streams on motivational variables, a multivariate analysis of variance (MANOVA) with planned comparisons for means of the motivational variables for academic streams. Due to the small number of students in the essential English stream ($N = 13$), the researcher opted to drop this group from the main analyses and to instead conduct an independent samples t -test comparing participants in the university and college English streams. The first research question and hypothesis were appropriately adjusted to reflect the change. The researcher removed the students in the essential English stream for the correlation analysis between stream and all other variables, but kept this group of students in the sample for all other correlations, as well as the analyses used to address the remaining research questions. A MANOVA was conducted to compare means of the motivational variables for achievement to examine possible differences between students with four levels of achievement. Students were split into four achievement groups based on their midterm English grades that were 80% and above (A), from 70 to 79% (B), from 60 to 69% (C), and below 60% (D), to reflect the four recognized levels of achievement in the Ontario Secondary School English curriculum (2007). To determine whether or not there were differences in motivational variables based on students' gender, an independent samples t -test was used to determine whether significant differences in motivational variables existed between males and females. To address whether differences exist in motivational variables based on students' LD status, an independent samples t -test was used to determine whether significant differences in motivational variables existed

between individuals who reported that they had been identified with a LD and those that reported they had not.

Chapter 4

Results

The purpose of this study was to examine the motivational variables of students within the Ontario Secondary School system, where groups including stream, LD status, gender, and grades were explored. The focus of this chapter will be to answer the following research questions: (1) Is there a difference between students in the university and college streams on motivational variables? (2) What is the difference between students with four levels of student achievement on motivational variables? (3) Is there a difference in motivational variables based on students' gender? (4) Is there a difference in motivational variables based on students' LD status? Preliminary analyses, including descriptive statistics and correlations between all variables are presented first, followed by main analyses to address each research question.

Preliminary Analyses

Descriptive Statistics

For the 242 participants, percentages, means, and standard deviations for all variables can be seen in Table 1. Table 2 provides correlations between gender, learning disability status, stream, achievement, theories of intelligence, learning vs. performance goal preferences, effort attributions, self-regulatory efficacy, as well as the mindset scores for both reading and writing.

The results presented in Table 1 display that the sample had approximately equal samples of males and females. As for the students with learning disabilities, the sample included almost double the amount of students with LD than the 10% that were expected (Hutchinson, 2010). Worth noting is that students self-reported whether or not they believed that they had been identified as having a learning disability, and no official record of identification was included in

the present study. The majority of participants came from the university English stream, with approximately 10% fewer from the college stream. The distribution of participants by achievement included almost 40% in the A grade range, approximately 30% at the B level as the next highest percentage, followed by just over 20% in the C grade range and less than 10% in the D grade range. Lastly, over 75% of the participants indicated that they would rather do well in a course than learn something from it if they had the choice.

TABLE 1. Descriptive Statistics for all Motivational Variables and Independent Variables

Variable	M (SD)	%
Gender is Male		52.1 (N= 126)
Self-Identified as LD		19.0 (N= 46)
English Stream is University		52.9 (N= 128)
English Stream is College		41.7 (N= 101)
English Stream is Essential		5.4 (N= 13)
Achievement is 80-100% (A)		38.8 (N= 94)
Achievement is 70-79% (B)		29.8 (N= 72)
Achievement is 60-69% (C)		23.6 (N= 57)
Achievement is Below 60% (D)		7.9 (N= 19)
Theories of Intelligence	9.88 (3.22)	
Learning vs. Performance Goal (Quantitative)	5.47 (1.86)	
Learning vs. Performance Goal (Dichotomous: Performance Goal)		76.4 (N= 185)
Effort Attribution	6.98 (1.98)	
Self-Regulatory Efficacy	27.25 (5.95)	
Reading Mindset	9.88 (1.68)	
Writing Mindset	9.71 (1.63)	

Correlational Analyses

As shown in Table 2, English stream was positively associated with LD status ($r = .27, p < .01$), and negatively associated with achievement ($r = -.20, p < .01$), self-regulatory efficacy ($r = -.21, p < .01$), and reading mindset ($r = -.24, p < .01$). When compared to students in the university English stream, students in the college English stream were more likely to report that they had been identified with a learning disability. Students in the university English stream were also more likely than their peers in the college English stream to report higher mid-term grades in English. Finally, students in the university English stream were more likely to have more

confidence in their general ability to self-regulate, as well as specifically while reading, and to view reading as a skill that they have the ability to improve in when they were compared to their peers in the college English stream.

Achievement was positively associated with gender ($r = .23, p < .01$), implicit theories of intelligence ($r = .14, p < .05$), self-regulatory efficacy ($r = .40, p < .01$), reading mindset ($r = .27, p < .01$), and writing mindset ($r = .14, p < .05$), and negatively associated with LD status ($r = -.18, p < .01$). Students who reported higher mid-term grades in English were more likely to be female, to endorse an incremental theory of intelligence, to have more confidence in their general abilities to self-regulate as well as specifically when reading and writing, to view both reading and writing as skills that they could improve. Students who reported higher mid-term English grades were also less likely to report that they had been identified with a learning disability.

Gender was positively associated with self-regulatory efficacy ($r = .14, p < .05$) and learning goal preference ($r = -.16, p < .05$). Females were more likely than males to report more confidence in their ability to self-regulate, and they were more likely to be concerned with their personal growth than their performance. LD status was also positively associated with learning goal preference ($r = .22, p < .01$) and negatively associated with self-regulatory efficacy ($r = -.15, p < .05$). Participants who reported that they had been identified as having a learning disability were more likely to be concerned with their personal growth than their performance, and they were also more likely to report less confidence than their non learning disabled peers in their ability to self-regulate.

Implicit theory of intelligence was positively associated with learning goal preference ($r = .20, p < .01$), effort attributions ($r = .27, p < .01$), and reading mindset ($r = .14, p < .05$).

Participants who endorsed an incremental theory of intelligence were more likely than their peers that endorsed an entity theory of intelligence to attribute their successes and failures to effort rather than ability, to be more concerned with their personal growth rather than their performance,

to have more confidence in their ability to self-regulate during reading, and to believe that reading is a skill that they can improve. Having a preference for learning goals was positively associated with both effort attributions ($r = .19, p < .01$) and reading mindset ($r = .15, p < .05$). Participants who were more concerned with their personal growth than their performance were more likely to attribute their successes and failures to effort rather than ability, to have more confidence in their ability to self-regulate while reading, and to believe that reading is a skill that they can improve than participants who were more concerned with their performance than their personal growth. Effort attributions were positively associated with self-regulatory efficacy ($r = .16, p < .05$) and reading mindset ($r = .24, p < .01$). Making effort attributions was positively associated with having more confidence in one's general ability to self-regulate, as well as specifically while reading. Participants that made more effort attributions also were more likely to view reading as a skill that they could improve than those that made more ability attributions. Self regulatory efficacy was positively associated with reading mindset ($r = .42, p < .01$) and writing mindset ($r = .40, p < .01$). Participants who had more confidence in their general ability to self-regulate also had more confidence in their ability to self-regulate specifically when reading and writing. Participants with high self-regulatory efficacy were also more likely to view both reading and writing as skills that they could improve. Lastly, reading mindset was also positively associated with writing mindset ($r = .37, p < .01$). Participants who had more confidence in their ability to self-regulate while reading were more likely to have more confidence while writing. Participants who viewed reading as a skill that they could improve were more likely to also view writing as a skill that they could improve.

TABLE 2. Relations Among Independent Variables and Motivational Variables

	2.	3.	4.	5.	6.	7.	8.	9.	10.
1. Gender	-.04	.06	.23**	.08	-.16*	.07	.14*	.12	.07
2. LD Status		.27**	-.18**	.09	.22**	-.08	-.15*	-.09	-.01
3. English Stream			-.2**	-.08	.08	-.13	-.21**	-.24**	-.07
4. Achievement				.14*	-.09	.12	.40**	.27**	.14*
5. Theories of Intelligence					.20**	.27**	.00	.14*	.07
6. Learning Goal Preference						.19**	.04	.15*	.08
7. Adaptive Effort Attributions							.16*	.24**	.10
8. Self-Regulatory Efficacy								.42**	.40**
9. Reading Mindset									.37**
10. Writing Mindset									

Note. * $p < .05$ (2-tailed), ** $p < 0.1$ (2-tailed). For all correlations between categorical variables (gender, achievement, LD status, English stream), Spearman's rho was used to calculate the strength of the relationship. For all other variables, the Pearson product moment correlation was used.

Main Analyses

A MANOVA was conducted to examine differences in motivational variables between students with four levels of achievement. Independent samples t -tests were used for research questions one, three, and four, that addressed differences in motivational variables by stream, gender, and LD status, respectively. Based on the analyses of past research in this area (Baird et al., 2009; Blackwell et al., 2007), the alpha level to identify significant group differences was set to $p < .05$. Effect sizes were also calculated for each comparison using Cohen's d index to determine the magnitude of any significant differences. The index specifies that a d of .20 is a small effect, a d of .50 is a moderate effect, and a d above .80 is a large effect (Cohen, 1988).

Using the Bonferroni method for controlling Type I error rates for multiple comparisons, each

ANOVA and *t*-test was tested at the $p < .008$ level. This alpha level was generated based on the initial $p < .05$ level being multiplied by six to account for the six tests that were conducted at the same time for each group type (stream, achievement, gender, LD status).

Motivational Variables and Stream

To test the null hypothesis that no differences exist between students in the university and college streams in English on motivational variables, a series of independent samples *t*-tests were conducted. The tests revealed that there was a significant difference in self-regulatory efficacy between students in the university stream ($M = 28.42, SD = 5.85$) and college stream ($M = 25.93, SD = 5.74$) ($t(227) = 3.23, p = .001, d = .43$). Students in the university stream had more confidence in their general ability to self-regulate than their peers in the college stream. According to the Cohen's *d* index, the difference in self-regulatory efficacy between students in the university and college English streams was small. The tests also revealed that there was a significant difference in reading mindset between students in the university stream ($M = 10.24, SD = 1.58$) and college stream ($M = 9.46, SD = 1.65$) ($t(227) = 3.68, p < .001, d = .48$). Students in the university stream had more confidence in their ability to self-regulate while reading, and were more likely to view reading as a skill that they could improve than students in the college stream. According to the Cohen's *d* index, the difference in reading mindset between students in the university and college English streams was also small (Cohen, 1988). No significant differences were revealed on implicit theories of intelligence ($t(227) = 1.25, p = .21, d = .17$), effort vs. ability attributions ($t(227) = 1.92, p = .06, d = .26$), learning vs. performance goal preference ($t(227) = -1.22, p = .23, d = .16$), and writing mindset ($t(227) = .98, p = .33, d = .13$) between students in the university and college streams. Besides self-regulatory efficacy and reading mindset, students in the two streams did not differ on motivational variables. Effect sizes for non-significant relationships between dependent variables and stream ranged from those that should be considered trivial to small differences between mean scores (Cohen, 1988).

Motivational Variables and Achievement

To test the null hypothesis that no differences exist between students with four levels of student achievement on motivational variables, a MANOVA was conducted. There was a statistically significant difference in motivational variables based on the level of achievement a student falls under, $F(18, 659.51) = 4.04, p < .001$; Wilk's $\Lambda = .744$, partial $\eta^2 = .09$. Univariate analyses of variance (ANOVAs) for each dependent variable were conducted as follow-up tests to the MANOVA.

The ANOVA of the self-regulatory efficacy scores was significant, $F(3, 238) = 15.32, p < .001$, partial $\eta^2 = .16$. A Bonferonni Post-Hoc test revealed that mean scores for self-regulatory efficacy were significantly different between students at the A and B levels ($p = .001, d = .56$), the A and C levels ($p < .001, d = .99$), and the A and D levels ($p < .001, d = 1.36$). According to the Cohen's d index, the difference in self-regulatory efficacy between students in the A and B grade ranges was moderate. The differences in self-regulatory efficacy between students at the A and C levels, as well as the A and D levels were substantial (Cohen, 1988). No significant differences in mean scores of self-regulatory efficacy occurred between students at the B and C levels ($p = .29, d = .35$), the B and D levels ($p = .07, d = .67$), or the C and D levels ($p = 1.0, d = .35$). Participants who had received a mid-term grade in the A range in English had more confidence in their general ability to self-regulate than participants at all other achievement levels. Effect sizes for non-significant relationships between self-regulatory efficacy and achievement level ranged from small to moderate differences between mean scores (Cohen, 1988).

The ANOVA of the reading mindset scores was also significant, $F(3, 238) = 6.41, p < .001$, partial $\eta^2 = .08$. A Bonferonni Post-Hoc test revealed that mean scores for reading mindset were significantly different between students at the A and C levels ($p = .001, d = .67$). According to the Cohen's d index, the difference in reading mindset between students in the A and C grade ranges was moderate (Cohen, 1988). No significant differences in mean scores of reading mindset

occurred between students at the A and B levels ($p = .81, d = .23$), the A and D levels ($p = .03, d = .71$), the B and C levels ($p = .12, d = .42$), the B and D levels ($p = .34, d = .47$), or the C and D levels ($p = .10, d = .07$). Participants who had received a mid-term grade in the A range had more confidence in their ability to self-regulate while reading, and were more likely to view reading as a skill that they could improve than participants who had received a mid-term English grade of C or D. Effect sizes for non-significant relationships between reading mindset and achievement levels ranged from small to moderate differences between mean scores (Cohen, 1988).

The ANOVAs based on the writing mindset score ($F(3, 238) = 1.69, p = .17, \text{partial } \eta^2 = .02$), effort vs. ability attribution score ($F(3, 238) = 3.41, p = .02, \text{partial } \eta^2 = .04$), learning vs. performance goal preference score ($F(3, 238) = 1.18, p = .32, \text{partial } \eta^2 = .02$), and the implicit theories of intelligence score ($F(3, 238) = 3.25, p = .02, \text{partial } \eta^2 = .04$), were all non-significant. Besides self-regulatory efficacy and reading mindset, participants in different achievement groups did not differ on motivational variables.

Motivational Variables and Gender

To test the null hypothesis that no differences exist between males and females on motivational variables, a series of independent samples *t*-tests were conducted. The tests revealed that there were no significant differences between males and females in implicit theories of intelligence ($t(240) = -1.2, p = .23, d = .16$), effort vs. ability attributions ($t(240) = -1.03, p = .30, d = .13$), learning vs. performance goal preference ($t(240) = 2.43, p = .02, d = .31$), self-regulatory efficacy ($t(240) = -2.2, p = .03, d = .28$), reading mindset ($t(240) = -1.88, p = .06, d = .24$), or writing mindset ($t(238.25) = -1.04, p = .30, d = .14$). Males and females did not score differently on any of the motivational variables. Effect sizes for the relationships between all dependent variables and gender ranged from trivial to small differences between mean scores (Cohen, 1988).

Motivational Variables and LD Status

To test the null hypothesis that no differences exist on motivational variables between students who reported that they had been identified with LD and those that had not, a series of independent samples *t*-tests were conducted. The tests revealed that there was a significant difference in preference for learning vs. performance goals between students who reported that they had been identified with a learning disability ($M = 7.65, SD = 2.36$) and those who had not ($M = 6.48, SD = 1.92$) ($t(240) = -3.57, p < .001, d = .54$). Participants who reported they had been identified with a learning disability reported that they were more concerned with their personal growth than their performance when compared to participants who had never been identified with LD. According to the Cohen's *d* index, the difference in goal preference between students with and without LD was moderate (Cohen, 1988). No statistically significant differences were found between LD and non-LD students on implicit theories of intelligence ($t(240) = -1.35, p = .18, d = .22$), effort vs. ability attributions ($t(240) = 1.31, p = .19, d = .22$), self-regulatory efficacy ($t(240) = 2.35, p = .02, d = .37$), reading mindset ($t(240) = 1.44, p = .15, d = .22$), or writing mindset ($t(240) = .15, p = .88, d = .03$). Besides the difference in learning vs. performance goal preference, participants with and without LD did not differ on other motivational variables. Effect sizes for non-significant relationships between dependent variables and LD status ranged from those that should be considered trivial to small differences between mean scores (Cohen, 1988).

Summary of Findings

The preliminary analyses were conducted to ensure that the skew of the data distribution was not unreasonable, and that the data reflected a normal distribution. These analyses showed support for the association of several dependent variables, including implicit theories of intelligence, self-regulatory efficacy, effort attribution, and learning vs. performance goal preference. Having an adaptive reading mindset was positively correlated with an incremental theory of intelligence, a preference for learning goals, effort attributions, higher self-regulatory

efficacy, and having an adaptive writing mindset. Effort attributions were positively associated with incremental theories of intelligence, a preference for learning goals, and higher self-regulatory efficacy. Incremental theories of intelligence were also positively associated with a preference for learning goals, and self-regulatory efficacy was positively associated with having an adaptive writing mindset.

The main analyses were conducted to examine the differences between motivational variables based on stream, achievement, gender, and LD status. These analyses revealed that participants in the university stream had more confidence in their general ability to self-regulate, as well as specifically when they are reading, than their peers in the college stream. Participants in the university stream also viewed reading as a skill that they could improve more than their peers in the college stream. Small effect sizes were calculated for both self-regulatory efficacy and reading mindset by stream. Additionally, analyses revealed that participants who received an A for their mid-term English grade had more confidence in their general ability to self-regulate than participants that received lower grades. A large effect size was calculated for self-regulatory efficacy by achievement. Participants who received an A for their mid-term English grade had more confidence in their ability to self-regulate when reading, and were more likely to view reading as a skill that they could improve when compared to students who had received grades of C or lower. A moderate effect size was calculated for reading mindset by achievement. Lastly, the results revealed that individuals with LD were more concerned than their peers without LD with their own personal growth rather than their performance, while males and females were not different on any motivational variables. A moderate effect size was calculated for learning vs. performance goal preference based on LD status. Findings from both preliminary and main analyses will be discussed in the next chapter.

Chapter 5

Discussion

The purpose of the present study was to examine the motivational variables of students within the Ontario secondary school system by stream, achievement, gender, and LD status. The purpose was addressed by the following research questions:

- 1) Is there a difference between students in the university and college streams on motivational variables?
- 2) What is the difference between students with four levels of student achievement on motivational variables?
- 3) Is there a difference in motivational variables based on students' gender?
- 4) Is there a difference in motivational variables based on students' LD status?

This chapter will build on the results reported in the previous chapter, and examine them more deeply. The chapter begins with a discussion of the results for each research question, making comparisons to past research and existing theoretical models. Next, limitations of the present study are discussed, followed by the implications of the findings. Recommendations for how to use the findings follow, along with suggestions for future research before the researcher provides final thoughts in the conclusion.

English Stream and Motivational Variables

A series of independent samples *t*-tests revealed that participants in the university English stream scored higher on both self-regulatory efficacy and reading mindset than their peers in the college English stream. No differences existed between the two groups on implicit theories of intelligence, effort vs. ability attributions, learning vs. performance goals, or writing mindset.

Limited research currently exists that examines differences on the motivational variables included in the present study between students in different learning environments, let alone

streams, making it difficult to compare the results from the present study to past research. The choice that students in Ontario make about which stream to go into for each subject can be influenced by their past achievement in that subject. With this in mind, one might expect that students who have received higher grades in English would eventually enter the university English stream, while their peers who had lower grades may enter the college English stream. Given that past research has linked higher achievement to the more adaptive ratings of an incremental theory of intelligence, a preference for learning goals, making effort attributions, and more confidence in one's ability to self-regulate (Baird et al., 2009; Blackwell et al., 2007), one might also expect that students in the university English stream would have more adaptive ratings on these motivational variables. This was not the case for implicit theories of intelligence, effort vs. ability attributions, or learning vs. performance goal preferences in the present study. Past research that has supported the relationship between adaptive forms of these motivational variables and achievement has had a focus in mathematics (Blackwell et al., 2007) and science (Usher & Pajares, 2008). It is possible that subjects often considered the "hard sciences" such as mathematics or science may be viewed differently than a subject such as English, where students may conceptualize intelligence and the importance of effort in these different types of subjects in different ways. It may be that these differences account for the findings of the present study that failed to establish the relationship that has been seen in the past (e.g., Blackwell et al., 2007).

The findings that linked higher scores of self-regulatory efficacy and reading mindset to students taking the university English stream are both interesting and novel findings, as no previous research exists that examines these variables by stream. To revisit the discussion linking higher past achievement to students in the university English stream, one might have expected to see the result from the present study about self-regulatory efficacy. As for reading mindset, a deeper examination of this variable is required. This measure was made up of two questions that were similar to the scale used to assess self-regulatory efficacy (Zimmerman et al., 1992), as well

as two questions that addressed individuals' feelings about whether reading was a skill that could be improved and whether or not they felt they could improve. Higher scores on the second two questions are consistent with Dweck's (2006) growth mindset, and the results from the present study concerning reading mindset indicate that participants in the university English stream were more likely than their peers in the college English stream to view reading through the growth mindset lens. It should be noted that because reading mindset consisted of items related to both self-regulatory efficacy and mindset, both with a focus on reading, it is possible that the difference between students in both groups on reading mindset was due to a large difference on the self-regulatory items and a smaller difference on the mindset items. This would in fact be more consistent with the findings in the present study about the significance of self-regulatory efficacy and the lack of a difference in the three scales used to measure mindset by stream.

As for the difference in self-regulatory efficacy between the two groups, the main differences in the university and college streams concern the depth and pace of the content that is covered (Ontario Ministry of Education, 2007), and therefore it makes sense that students with less confidence in their ability to self-regulate are more likely to be in the stream that is less demanding in its depth and pace. Also, it is possible that the university English stream has an environment where students are expected to have stronger self-regulatory abilities than those in the college English stream because they are being prepared to attend university. While many of the students in both groups initially take the same classes together before secondary school, over time and after the separation in streams, differences in self-regulatory efficacy may begin to emerge. Perhaps with their post-secondary goals in mind, students focus on the development of different skills to prepare themselves for life after high school, and self-regulation may be one of the variables that is viewed differently in its importance for these groups.

It should also be noted that students in each stream do not necessarily take classes in this stream for all other subjects, and so they are not necessarily spending all of their time with the

same peers. This makes it hard to consider this sample within the enculturation process theory discussed in a study by Jehng et al. (1993), where one might expect differences to occur based on the amount of time students are spending with each other in each type of class. In comparing the findings from the present study to past research about stereotypes (Aronson et al., 2002) and implicit messages that may be sent to students in certain groups (Ommundsen, 2006; Trautwein & Ludtke, 2007a), one might conclude that students in the university or college streams are either not being sent implicit messages about intelligence and ability, not feeling the effects of stereotypes about students from each stream, or simply not paying attention to them. The lack of difference between these two groups suggests that they are not thinking differently about the nature of intelligence and ability, though this may be limited to the English subject.

Finally, it is difficult to make any judgements on whether or not this research strengthens or alters Dweck's (2006) or Bandura's (1986) theories. As was mentioned earlier, while decisions about stream may be influenced by past achievement, this may be only one factor in the decision that is made. For this reason, it is difficult to say with any confidence that students in the university English stream have outperformed their peers in the college English stream in the past. Information about prior grades in this subject would be required to test this idea, and this information was both unavailable and not sought by the researcher to address the purpose and research questions of the present study. The relationship between motivational variables and achievement is examined more deeply in the next section.

Achievement and Motivational Variables

Multiple MANOVA tests revealed that students who had received a mid-term grade in the A range in English had more confidence in their general ability to self-regulate than their peers with all other grades, and more confidence in their ability to self-regulate when reading than their peers with grades of C or D. The students in the A range also were more likely to view reading as a skill that they could improve than their peers who had received grades of C or D. No

differences between students at each grade level were revealed for implicit theories of intelligence, effort vs. ability attributions, learning vs. performance goal preferences, or writing mindset.

As was outlined in the previous section, past research has found a positive relationship between an incremental theory of intelligence, a preference for learning goals, the tendency to make effort attributions, higher ratings of self-regulatory efficacy, and achievement (Baird et al., 2009; Blackwell et al., 2007; Cury et al., 2007; Klassen, 2010; Usher & Pajares, 2008). Other research has failed to find the same relationship between mindset and achievement with adults (Dupeyrat & Marine, 2005), as well as elementary school-aged students in a western European setting (Leondari & Gialamas, 2002). It was discussed that individuals in different parts of the world may conceptualize the nature of intelligence, ability, and effort in different ways (Wang & Ng, 2012) which could account for some of the differences in findings. In a study involving adults, the researchers sampled a group that had returned to school after having worked for a number of years (Dupeyrat & Marine, 2005), though this sample is not representative of the greater population of adults. As the present study was conducted in North America and with students who had not left school, comparisons would be most easily made with studies that involved similar populations, which seemed to mostly support this positive relationship between adaptive ratings of the included motivational variables and achievement.

Among the findings of the present study was that individuals who had received mid-term grades in the A range had higher ratings of self-regulatory efficacy than individuals at all other grade ranges. When the magnitude of the differences were tested, students in the A range had substantially more confidence in their ability to self-regulate than students who received a mid-term English mark below A. This finding is consistent with past research that examined the relationship between self-regulatory efficacy and achievement (Baird et al., 2009; Klassen, 2010; Usher & Pajares, 2008). This finding is most specifically consistent with a 2010 study by Klassen

that found that self-regulatory efficacy predicted end-of-term English grades. It is also consistent with Bandura's social cognitive theory about self-efficacy and achievement (1986), and therefore this theory is strengthened by the present study.

As for the difference between groups on reading mindset, this finding again may be due to the combination of mindset items and self-regulatory efficacy items in one measure. Nonetheless, it is interesting that a difference was found between groups on this measure, but no difference was found when the focus was on writing. This suggests that students do not necessarily view their reading and writing skills in the same way, when it comes to ability and intelligence in these skills. Students who were higher achievers in English viewed reading in more adaptive ways, and had more confidence in their abilities to self-regulate when engaged in it, but the same was not true for writing. This finding suggests that reading may hold more weight in students' judgements about their abilities and their actual achievement in English than writing.

The findings of the present study concerning the remaining motivational variables are largely inconsistent with past research (Baird et al., 2009; Blackwell et al., 2007; Cury et al., 2007). One would expect that students with higher grades would endorse more incremental theories of intelligence, have a preference for learning goals, and make more effort attributions than their lower achieving peers, but this was not the case in the present study. Comparing the findings to Dweck's (2006) social cognitive theory of motivation, the results of the present study are inconsistent with her model. One possible reason for this disparity could be the sample used in the present study. Participants were from a rural setting and were exclusively Caucasian, compared to the sample used in Blackwell et al.'s (2007) study which was a much more ethnically diverse group from an urban setting. It is possible that the positive relationship between more adaptive ratings of motivational variables and achievement is stronger for non-Caucasian individuals, and individuals from urban settings. Another possible explanation for the findings of the present study is that all of the students included may be receiving the same messages about

the nature of intelligence and ability from teachers and/or guardians. Teachers of the students from past research on motivational variables (Baird et al., 2009; Blackwell et al., 2007; Cury et al., 2007) may have been sending different implicit messages to students that performing at different levels, contributing to the difference found on motivational variables and students who achieve at different levels. Finally, previous studies that have found a positive relationship between these variables (Blackwell et al., 2007; Cury et al., 2007) have mainly included students in lower grades than those sampled in the present study. In a 2009 study by Baird et al. that found a positive relationship between these variables for students from grades six to twelve, the relationship was not broken down by each grade, but instead by the titles of “middle school” and “high school”. It is possible that as students increase in age, this relationship weakens and would then account for the lack of differences on these motivational variables for students in the present study who were in the last two years of secondary school. Additionally, although the study conducted by Dupeyrat and Marine (2005) was previously discussed as possibly having a homogeneous group of adults in its sample group, this theory would be consistent with the finding that no difference exists between these motivational variables for adults in academics.

More research is required to better understand how motivational variables, and specifically mindset, relate to students’ achievement at different ages. The findings from the present study concerning gender and motivational variables are discussed in the next section.

Gender and Motivational Variables

A series of independent samples *t*-tests revealed no differences between males and females on motivational variables. This finding is somewhat inconsistent with past research that has found differences between males and females on self-regulatory efficacy (Klassen, 2010), implicit theories of intelligence (Usher & Pajares, 2008), and effort attributions (Siegle et al., 2010). In North America, females have historically outperformed males in language arts subjects, including English, which has led to the stereotype that females are better than males in courses

that have to do with literacy (Williams, 2006). As the present study had students complete the questionnaire within their English classes, it is more likely that they would have been considering their achievement and abilities in English when responding to the questionnaire. The existence of this stereotype, coupled with past research about the differences between males and females on motivational variables (Klassen, 2010; Siegle et al., 2010; Usher & Pajares, 2008) would lead one to expect to find differences in gender on motivational variables, which was not the case in the present study.

Chen and Pajares (2010) found that an ethnically and socio-economically diverse group of Grade 6 science students differed slightly by gender on implicit theories of intelligence, where males were more likely to endorse an incremental theory of intelligence than females. The present study used a sample that was not ethnically diverse, and socio-economic status was not assessed. The participants in the present study were, however, much older than the sample used in Chen and Pajares' study (2010), and so it is possible that these differences in the way males and females view specific subjects disappear over time.

As for effort vs. ability attributions, a 2010 study (Siegle et al.) found that males viewed natural ability as more important for achievement in language arts subjects, where females were more likely to view effort as more important. This finding came from a sample of students that were enrolled at a top-ranked post secondary institution, and therefore were a highly homogeneous group academically. This sample is more easily compared to the group of students in the present study that were enrolled in the university English stream than the entire group of males and females from the present study as the males and females from the Siegel et al. study would not likely be representative of the general population of males and females at this age. It may be that specific groups within gender (e.g., high-achieving) differ on effort vs. ability attributions, though the groups as a whole do not differ from each other. With more participants, it would be possible to examine the differences between males and females that are in the stream

designed for university bound students, though this was not a focus of the present study. It is also possible that males and females begin to make increasingly different attributions to achievement in various subjects as they increase in age. The sample from the present study were younger than the sample used in the Siegel et al study, perhaps by several years, and therefore perhaps the difference cannot yet be observed.

Lastly, most research about gender and self-regulatory efficacy has found that females seem to score higher than males (Usher & Pajares, 2008). In a study similar to the present study, Klassen (2010) found that females in Grades 8 and 9 had higher ratings of self-regulatory efficacy than males. The sample was ethnically similar to that of the present study, though slightly more diverse. Again, these differences may be related to the age of students, where they become less prominent over time.

The findings from the present study challenge claims that males and females differ on motivational variables (Siegle et al., 2010; Usher & Parjares, 2008). One explanation for the inconsistency in findings between the present study and past research is that students in different schools may be receiving different implicit messages about gender. It is worth noting that students from the present study came from one secondary school in a rural area, and therefore it is possible that this school is unique. Staff of the school that was used in the present study may be making an intentional effort to combat gender stereotypes and to send the message that males and females are capable of accomplishing the same things. This could account for the lack of difference in the way that males and females in the present study were thinking about intelligence, ability and effort. The findings about LD status and motivational variables are discussed in the next section.

LD Status and Motivational Variables

The present study found that individuals who reported that they had been identified with LD were more likely than their non-LD peers to be more concerned with their personal growth

than their performance. There were no differences found between the two groups on all other motivational variables.

While the present study failed to find the same differences as past research concerning LD status and motivational variables, the finding about learning vs. performance goal preferences is the opposite to what has been found in the past (Baird et al., 2009). A 2009 study by Baird and colleagues about motivational variables and LD status found that individuals with LD were more likely than their non-LD peers to report maladaptive ratings of motivational variables, including having a preference for performance rather than learning goals. The findings from the present study about a lack of difference in self-regulatory efficacy between students with and without LD is also inconsistent with past research about students with LD (Klassen, 2010), where a clear difference was found between these groups on this variable. As previously mentioned, the study by Klassen involved students in Grades 8 and 9, while the study by Baird and his colleagues (2009) grouped individuals by the level of institution they were attending rather than separating by grades. The lack of consistency in findings suggests that perhaps differences in motivational variables begin to disappear as individuals reach the latter stages of secondary school and enter into adulthood.

The findings from the present study concerning LD status and motivational variables challenge the existing theory about individuals with LD, suggesting that individuals with LD may over time view their disability as less of a limitation and more as an obstacle that can be overcome with intervention and continuing effort. This explanation suggests that while differences in motivational variables may be present early on in students' lives after a diagnosis or identification has occurred, these differences can disappear and even be reversed over time with a conscious effort to do so. An interesting investigation would be to compare the way individuals with LD view their disability as affecting their learning with the motivational variables included in the present study to better understand this relationship and explain the

disparity in findings. The findings related to the framework that motivational variables make up will be discussed in the next section.

Motivational Variables as a Framework

Group status aside, the present study found associations between the dependent variables through correlation analyses. Individuals with incremental theories of intelligence were more likely to attribute achievement to effort rather than ability, to be more concerned with their personal growth than their performance, and to have more confidence in their ability to self-regulate while reading and view reading ability as something they could improve. Individuals who were more concerned with their personal growth than their performance were also more likely to attribute achievement to effort rather than ability, as well as to have more confidence in their ability to self-regulate while reading and view reading ability as something they could improve. Individuals who were more likely to attribute achievement to effort rather than ability had more confidence in both their general ability to self-regulate as well as specifically when reading, and to view reading ability as something they could improve. Lastly, individuals who were more confident in their general ability to self-regulate were also more confident in these abilities specific to reading and writing, and they were also more likely to view both reading and writing as skills that they could improve.

Carol Dweck's social cognitive theory of motivation (2006) explains how implicit theories of intelligence, learning vs. performance goal preference, and effort vs. ability attributions to achievement are intimately related, and specifically that this mental framework is set up by one's implicit beliefs about intelligence, which in turn influence the types of goals individuals prefer and the types of attributions they make to their performance (Dweck, 2006). The preliminary correlational results of the present study support the mental framework portion of Dweck's model, as they demonstrate that the population examined in the present study endorsed the same cognitive patterns when all participants are considered together.

When self-regulatory efficacy was considered within Dweck's model, as suggested by Chen and Pajares (2010), it was only associated with effort vs. ability attributions with a positive relationship between self-regulatory efficacy and the more adaptive effort attributions. While self-regulatory efficacy may not be directly related to implicit theories of intelligence or learning vs. performance goals, this finding suggests that self-regulatory efficacy could fit as an extension of Dweck's model given its possible indirect relationship with these variables. Future research should examine the possible mediation between variables that make up an individual's mindset and their self-regulatory efficacy.

Lastly, given the nature of the reading and writing mindset variables as being made up of both mindset and self-regulatory efficacy related items, one would expect to have found the positive relationship between these variables and the other motivational variables. It is worth noting that while reading mindset was related to all other motivational variables, writing mindset was only related to reading mindset and self-regulatory efficacy. This suggests that students may value reading more than writing when they evaluate themselves and their beliefs in an English-specific context, and possibly outside of this context and to school subjects in general. Limitations of the present study are discussed in the next section.

Limitations

The present study had a number of limitations that need to be considered with the findings to generate more accurate implications and recommendations to the various stakeholders.

Firstly, data came from one secondary school in a rural area with an ethnically homogenous sample. This makes it difficult to generalize the findings to the general population with any confidence as the data source was limited. With a more diverse sample using a variety of schools, the data could be more easily compared to the general population of students in Ontario.

Secondly, all of the data were collected by self-report, making it difficult to judge whether students were providing accurate information. For example, the item used to determine

participants' LD status asked whether or not they had been identified as having a learning disability. It is possible that students misinterpreted the question and may believe they had been identified when they had not formally been identified. There is also a chance that students did not realize they had been identified as having a learning disability. As access to students' official records was not possible for the present study, it is possible that LD numbers reported in the present study were inaccurate. Although data collection took place within two weeks of the mid-term reports being delivered to students, reports of grades may have been inaccurate. Reportedly, in some consolation, the groups for achievement were broken into letter grade ranges which did not necessarily require a completely accurate grade, but more a grade level from the students.

Lastly, the internal reliabilities for both the Learning vs. Performance Goal Preference scale (Dweck, 1999) and the Effort Attribution scale (Dweck & Leggett, 1988) were poor (.52 for each). One possible influence on the low internal reliability could be the low number of items in each scale. After removing one of the items in the Learning vs. Performance Goal Preference scale, it was left with three items, one of which was dichotomous. The Effort Attribution scale was made up of only two items. Also, Dweck (1999) has suggested that the Learning vs. Performance Goal Preference scale shows stronger associations with implicit theories of intelligence when the participant is first given a task to perform, which was not done in this study. Finally, it is possible that both scales are not as well suited to individuals of the age group sampled in the present study, who were in their upper years in secondary school. In a study that used the same two scales with students from Grades 6-12, low internal consistencies were also found (Baird et al., 2009). It is possible that these scales become less valid measures of learning vs. performance goal preference and effort vs. ability attributions for students in upper years. Regardless of the explanation for the low internal consistencies, these results should be considered with some caution. In the next section, the researcher discusses what the results mean for the various stakeholders, and how the results can be used.

Implications and Recommendations

Key stakeholders for the present study would be students, parents or guardians of students, educators, and individuals who design the school curriculum. Implications and recommendations for each stakeholder are discussed separately.

To begin with students, the results suggest that self-regulatory efficacy, or one's confidence to manage their learning environment, is a key variable that could influence achievement. Students who are more confident that they can remain focused and motivated with a task, avoid distractions, and stay actively involved in the learning will typically perform better in school. These results suggest that students should work to monitor their self-regulatory strategies, and work to identify when and why their learning goes awry. Identifying the obstacles that stand in the way of their learning is the first step to strengthening students' self-regulatory strategies, and will likely lead to an improvement in self-regulation and in turn self-regulatory efficacy. Additionally, students who are bound for university seem to have higher self-regulatory efficacy. While being enrolled in the university English stream does not guarantee that one will go to university, it is an opportunity that is not available to those enrolled in the college English stream. There is no clear reason why developing one's self-regulatory strategies would be a detriment to an individual, but students may want to consider that having more confidence in these abilities could have an influence on the academic path they took through secondary school and beyond. The results of the present study also suggest that students who have a more adaptive reading mindset, made up of more confidence in self-regulatory abilities while reading and a belief that they can improve reading skills, were more likely to be enrolled in the university English stream. In addition, students with a more adaptive reading mindset also had higher grades. As mentioned earlier, this scale is made up of a combination of self-regulatory efficacy and mindset focused items, though the difference between groups suggests that students who are thinking about reading and their reading skills in more adaptive ways are opening up more options for

themselves with better grades and with being in the university stream. This finding speaks to the importance of reading skills and sends the message to students that improving these skills could set them up for more options in the future.

Parents or guardians of students can take away messages from the present study along with students. As self-regulatory efficacy is partially determined by an individual's ability to find a place to work that is free from distractions, parents or guardians can be involved by helping to make these spaces available. Parents should also consider the importance that has emerged from both past and the present research regarding self-regulatory efficacy in regards to achievement and stream. If they want to give their child a better chance of having more success academically and potentially having more options of what to do after secondary school, they need to work to build this confidence in their child. When confidence increases, it typically is the result of an improvement in skills which suggests that parents should work with their children to develop these self-regulatory skills, which in turn will boost self-regulatory efficacy. Children's beliefs can be greatly influence by parents or guardians because of the amount of time spent with them, and so parents should also think about the types of messages they are sending their children about the nature of intelligence, ability, and effort. Achievement was positively associated with an incremental theory of intelligence, and more adaptive ratings of reading mindset, writing mindset, and self-regulatory efficacy. If parents or guardians can be aware of what types of implicit messages they are sending their children, and make a conscious effort to send messages about the malleability of intelligence as well as reading and writing skills, this may better set their child up for academic success in the future.

Educators should pay attention to the same recommendations about implicit messages about the malleability of intelligence as well as of reading and writing skills, and also think about the type of learning environment they are creating. The fact that no differences on motivational variables were evident when gender was considered, and that the only difference between

individuals with and without LD was that those with LD had a greater concern for their personal growth than their performance are suggesting that educators may be helping to eliminate stereotypes and harmful beliefs about students' limits on their abilities based on group status. Recognizing that their efforts may be a part of this result, educators should work to continue to eliminate stereotypes and limiting beliefs that students may have about themselves based on a label they may have about the marks they receive, their learning disability, what stream they are in and what their gender is. Lastly, educators need to recognize the differences that students are reporting in their self-regulatory efficacy and reading mindset between the two English streams. If students' decisions about which stream to enter are at all influenced by the way they feel about their ability to self-regulate and their ability to improve at reading skills, then educators need to ensure that they are providing students with the best opportunities and tools to develop these skills and to make the most informed decision about their academic path. This could mean that educators need to work to design activities that focus on building reading skills and self-regulation skills, and to work individually with students to help them overcome obstacles they have to the development of these skills.

Along the same lines as educators designing activities to build the reading and self-regulation skills of their students, individuals who are in charge of writing curriculum documents that educators must follow can play an important role. These individuals can look for opportunities to write self-regulation skills into all subject areas to encourage educators to help students build these skills in all subject areas. While educators can try to work these skills into activities, it becomes much easier when the documents they are required to follow are suggesting development of these skills. A discussion of the researcher's suggestions for future research follows in the next section.

Suggestions for Future Research

Based on the results of the present study, several avenues for future research have become apparent.

A logical next step to research that identifies and isolates a problem is to better understand what causes the problem, in order to work towards a solution. To frame the focus of present research as a problem, individuals who have lower confidence in their self-regulatory abilities are performing at lower levels in English, and are on an academic path that leaves them with fewer options upon completion of secondary school. To better understand the problem, a future investigation might examine what factors influence self-regulatory efficacy and self-regulatory abilities in order to help individuals with less adaptive ratings improve in these abilities.

As suggested in the limitations section, the sample came from one school that was not ethnically diverse, making it tough to generalize with any confidence to the greater population of students in Ontario. As data was collected during a tough climate for education with job action taking place, it was not possible to include other schools with more ethnically diverse populations and in areas with different demographics. Future research should examine the same motivational variables and group status with a larger and more diverse group of students to give a better representation of students in Ontario. This should include a greater focus on students in the essential streams, which are typically fewer in number and would likely require a more purposeful sampling method.

The present study was the first to examine motivational variables by stream, and more research needs to be conducted to investigate possible differences between students in each stream beyond self-regulatory efficacy. A researcher might examine the process a student goes through when making the decision of which stream to enter, and investigate which variables are involved in making this decision. Additionally, future research could compare actual abilities in

reading and writing to motivational variables within each stream, rather than self-efficacy. This would provide a better understanding of the types of students that are typically found in each stream. Future research should also examine motivational variables and stream with a modification to make each item subject specific, as this would allow researchers to determine if in fact students view subjects such as math or science differently than English in each stream.

Another avenue for future research would be to examine motivational variables by grade or achievement over time to see if there is in fact a trajectory. A longitudinal study would allow researchers to determine if students' mindset and self-efficacy for various skills increase or decrease over time, based on their performance or the types of courses they are taking.

Lastly, given the finding in the present study that individuals with LD are more concerned with their personal growth rather than performance than those without LD, it would be valuable to investigate how this difference relates to their understanding of how LD affects their learning.

Conclusion

Despite the limitations of the present study, the findings and implications still have value to the stakeholders. It seems that the way students feel about their ability to self-regulate is an important variable when it comes to not only how students are performing, but also which academic paths they are on. In addition, students are for the majority not thinking differently about the nature of intelligence, as well as ability and effort in relation to their learning based on their gender, achievement, LD status, and stream when it comes to English class. The value of this study comes in its evidence that for the most part, if stereotypes do exist within schools about the groups examined in the present study, they do not seem to be affecting the way these students were thinking about variables related to motivation which can affect future actions and decisions. Parents, guardians, students, and educators can take away from this research that simply belonging to one of the groups examined in the present study does not necessarily mean that an

individual will start to think about intelligence, ability or effort in a certain way. These findings suggest that educators and parents should place more emphasis on helping students to develop confidence in their self-regulatory abilities, as this appears to be an important variable in students' achievement, as well as related to the academic stream in which they are enrolled.

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Appendix A

Letter of Information

Dear Student,

I, Ian Matheson, a student of the faculty of education at Queen's university invite students in grade 12 at <enter name of school> to be a part of a study for my Masters thesis. In this study, I will be looking at students' beliefs about the nature of learning and intelligence. This research project is titled "Students' beliefs about learning and intelligence: An examination of course type, gender, LD status, and achievement". The goal of this project is to examine how different populations of students think about learning and intelligence, and whether or not there are differences between these groups. The better we understand students' beliefs about learning and intelligence, the more able we are to identify changes that need to be made in how educators approach teaching to support students' school success. This study has been granted clearance according to the recommended principles of Canadian ethics guidelines and Queen's policies.

In this study, you will be asked to complete a questionnaire consisting of 28-items that assess your beliefs about learning and intelligence, your confidence in your ability to self-regulate, and your membership to various groups (Learning Disability status, course type, English grades, and gender). The expected time required for you to complete the questionnaire is 20 minutes, and it will take place during class time. I will work with teachers to ensure that students will lose as little important learning time as possible.

I do not see any risks for you being involved in this study. Your participation is entirely voluntary, and you do not have to complete the questionnaire if you do not want to. You are also free to stop at any time during the completion of the questionnaire and withdraw from the study, though due to the anonymous nature of the questionnaire it is not possible to pull your data after the questionnaire has been submitted. You may choose not to answer any question(s) you find uncomfortable or objectionable. Your decision to participate or not participate will not affect your standing in school. The researcher will maintain confidentiality to the extent possible, and the data will only be accessible to the researcher and supervisor. In keeping with Queens' policy, the data from this study will be kept for five years. After this time, the data will be destroyed.

If the results of this study are published, no information will identify any school or student. Only I and my supervisor will have access to the data. If you decide to participate in this study, please complete the Consent Form attached to this letter. Any questions about study participation may be directed to Ian Matheson at ian.matheson@queensu.ca or my supervisor Dr. Nancy Hutchinson at 613-533-3025 or hutchinn@queensu.ca. Any ethical concerns about the study may be directed to the Chair of the General Ethics Research Board at 613-533-6081 or chair.GREB@queensu.ca.

Sincerely,

Ian A. Matheson, MEd Candidate

Appendix B

Letter of Consent

Students' beliefs about learning and intelligence: An examination of course type, gender, LD status, and achievement

Ian Matheson (MEd Candidate)

Faculty of Education, Queen's University

I have read and kept the letter of information for the study "Students' beliefs about learning and intelligence: An examination of course type, gender, LD status, and achievement", and all questions have been answered to my satisfaction. I understand that the purpose of this study is to examine the beliefs of students about the nature of learning and intelligence. I understand that I will be asked to complete a questionnaire consisting of 28-items that assess my beliefs about learning and intelligence, my confidence in my ability to self-regulate, and my membership to various population groups (Learning Disability status, course type, English grades, and gender). I understand that the total time required to complete the questionnaire should not exceed 20 minutes.

I have been informed that my participation is voluntary and that I may stop at any time during the completion of the questionnaire and withdraw from the study; though due to the anonymous nature of the questionnaire it is not possible to pull my data after the questionnaire has been submitted. I understand that participation in the study will not have any influence upon my performance in school. I have also been informed about the steps that will be taken to ensure anonymity of all information. I have been provided with information to contact the researcher if I have questions, concerns, or complaints about being a part of this study.

Any questions about study participation may be directed to Ian Matheson at ian.matheson@queensu.ca or his supervisor Dr. Nancy Hutchinson at 613-533-3025 or hutchinn@queensu.ca. Any ethical concerns about the study may be directed to the Chair of the General Ethics Research Board at 613-533-6081 or chair.GREB@queensu.ca.

Please sign one copy of this Consent form and return to your teacher. Retain the second copy for your records.

Name: _____

Signature: _____

Today's Date: _____

Appendix C

Motivational Variables Questionnaire

Read each statement below. Circle the one number that shows how much you agree with it. Use the scale below to inform your selections.

1	2	3	4	5
Strongly Agree	Somewhat Agree	Neither Agree nor Disagree	Somewhat Disagree	Strongly Disagree

1. You have a certain amount of intelligence, and you can't really do much to change it.

1 2 3 4 5

2. Your intelligence is something about you that you can't change very much.

1 2 3 4 5

3. You can learn new things, but you can't really change your basic intelligence.

1 2 3 4 5

4. If I knew I wasn't going to do well at a task, I probably wouldn't do it even if I might learn a lot from it.

1 2 3 4 5

5. I sometimes would rather do well in class than learn a lot.

1 2 3 4 5

6. It's much more important for me to learn things in my classes than it is to get the best grades.

1 2 3 4 5

7. If I had to choose between getting a good grade and being challenged in class, I would choose... (Circle one)

“good grade”

“being challenged”

8. If you have to work hard at some problems, you probably are not very good at them.

1 2 3 4 5

9. You only know you are good at something when it comes easy to you.

1 2 3 4 5

Read each statement below. Circle the one number that shows how much you agree with it. Use the scale below to inform your selections.

1	2	3	4	5
Not at all	Not really	Somewhat	Mostly	Exactly
like me	like me	like me	like me	like me

10. I can participate in class discussions

1	2	3	4	5
---	---	---	---	---

11. I can focus on schoolwork when there are other interesting things to do

1	2	3	4	5
---	---	---	---	---

12. I can concentrate on school subjects

1	2	3	4	5
---	---	---	---	---

13. I can remember information for class assignments

1	2	3	4	5
---	---	---	---	---

14. I can arrange a place to study without distractions

1	2	3	4	5
---	---	---	---	---

15. I can motivate myself to do schoolwork

1	2	3	4	5
---	---	---	---	---

16. I can finish homework assignments by deadlines set by teachers

1	2	3	4	5
---	---	---	---	---

17. I can meet academic deadlines I set for myself

1	2	3	4	5
---	---	---	---	---

Circle the answer that applies best to you

18. If I try I will get better at reading.
 If I try I might not get better at reading.
 If I try I won't get better at reading.

19. I can't get better at reading.
 I do not know if I can get better at reading.
 I can get better at reading.

20. I rarely have trouble staying focused when reading
 I sometimes have trouble staying focused when reading
 I usually have trouble staying focused when reading
21. I rarely have trouble staying motivated when reading
 I sometimes have trouble staying motivated when reading
 I usually have trouble staying motivated when reading
22. If I try I will get better at writing.
 If I try I might not get better at writing.
 If I try I won't get better at writing.
23. I can't get better at writing.
 I do not know if I can get better at writing.
 I can get better at writing.
24. I rarely have trouble staying focused when writing
 I sometimes have trouble staying focused when writing
 I usually have trouble staying focused when writing
25. I rarely have trouble staying motivated when writing
 I sometimes have trouble staying motivated when writing
 I usually have trouble staying motivated when writing

Circle or indicate the answer that is most appropriate for you

26. What is your gender?

Male

Female

27. Have you ever been identified as having a learning disability?

Yes

No

28. What grade did you receive for this class as a mid-term mark on the most recent report card?

_____ %