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Exploring the Connections between Streaming and Students' Self-Theories in an Ontario Elementary and Secondary Setting

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an Ontario Elementary and Secondary Setting**

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Abstract

The purpose of the study was to explore the nature of the intersection between streaming and two self-theories or self-beliefs, namely Bandura's (1997) concept of self-efficacy and Dweck's (2006) theory of growth mindset. A sample of 178 elementary (Grade 6 to 8) students and 166 secondary students in both the academic and applied course pathways from the same Ontario community were selected to participate. Self-theories of participants were measured using Mindsetworks.com mindset survey and the Self-Efficacy Questionnaire for Children (SEQ-C) survey which was subdivided into measures of academic, social, emotional self-efficacy. SPSS software was used to analyze the results using both deferential and inferential statistics. The data analysis demonstrated secondary school academic students have significantly more positive self-theories compared to their applied pathway peers. Further analysis comparing elementary to their secondary peers with the same gender and course pathway indicated that academic boys have no significant differences, academic girls demonstrated lower mindset and emotional self-efficacy, applied girls showed a large effect size drop in emotional self-efficacy and applied boys demonstrated a drop in all self-theories except for social self-efficacy. The findings of this study demonstrate the importance that educational stakeholders consider how streaming, gender, and other environmental influences shape the development of students' self-theories.

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Dedication

This thesis is dedicated to Dallas, Jacobi, and Maida. They are my everyday inspiration.

Acknowledgements

I would like to acknowledge Geri Salinitri my advisor who supported my journey back to University. Her commitment, patience, and belief in my success were key to the completion of this work. To professors Andrew Allen and Pierre Boulos, thank you for your guidance and feedback on this work. To my research assistant, this work would not be possible without your help. I also would like to extend my gratitude to the numerous educators and administrators that work in the school board that participated in this study. These important people helped conduct this study, reviewed my proposals, and guided me towards the completion of this work.

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List of Abbreviations

ASE- Academic Self-Efficacy

CTE- Collective Teacher Efficacy

ESE- Emotional Self-Efficacy

ESL- English as a Second Language

IQ- Intelligence Quotient

SCT- Social Cognitive Theory

SEB- Socioeconomic background

SES- Socioeconomic status

SSE- Social Self-Efficacy

SeMS- Self-efficacy Mindset Survey

SEQ-C- Self-efficacy Questionnaire for Children

SPSS- Statistical Package for the Social Sciences

TESA- Teacher Expectation Self-efficacy Achievement model

OECD- Organization for Economic Cooperation and Development

Chapter 1: Introduction

The belief that education is the grand equalizer is often romanticized by new educators. When new teachers enter the profession, they are often filled with inspiration and are at their most hopeful for students – to provide meaning, hope, and a path towards meaningful change. In his book *Pedagogy of the Oppressed*, Paulo Freire (1993) paints a dark picture of the eventual fate of teachers in the traditional educational environment. He suggests that well-intentioned teachers eventually discover that the educational failures of their students are not the fault of the inferiority of their students, but of their own oppression of their students. Freire called this the 'banking model' of education. In his view, students are reduced to a vessel (a bank) that is meant to receive and store information from the teacher. For this model to work, teachers must project an absolute ignorance onto their students; this is a primary characteristic of oppression (Freire, 1993). Practically, this oppression finds its way into the "banking" classroom in various ways. In the classroom, teachers create a challenging environment where information is quickly disseminated to students and then quickly assessed. The teachers' primary function is reduced to sorting students into groups of those who are successful at tasks and those who are not. Only the fastest learners with the best memories can master concepts before the next topic starts. Consequently, the pace of natural learning and the pressure to complete curriculum are at odds. As time passes students' abilities diverge and create achievement gaps. The worst-case scenario is that students consistently fail, falling further and further behind. These students begin to avoid learning and exhibit learned helplessness. Students begin to attribute failure to their innate ability instead of effort and strategy (Dweck, 1986).

In Ontario, students are sorted (streamed) when course pathways diverge, and students choose between applied (less rigorous but more application) and academic courses (more rigorous and less application) in grade 9. Limited research has been conducted comparing the intersection between streaming and students' self-beliefs. Carol Dweck suggests that these beliefs she calls "meaning systems" or "self-theories" lead to different outcomes for students (Dweck, 2000). This study focuses on comparing the self-theories (self-efficacy and mindset) of elementary (primary) students (grade 6 to grade 8) with secondary students (grade 9 to 12) in applied and academic course pathways from the same community.

Background of Study

People for Education, an Ontario research, policy and public engagement organization released a report in 2015 calling for the end of streaming in the province of Ontario. In Ontario, students must choose between academic (more rigorous) and applied (less rigorous) streams or pathways as they enter high school. By grade 11, the academic pathway leads to university preparation classes and the college pathway leads to college designated courses. These pathway selections largely determine students' educational future and influence post-secondary and career opportunities. Students who are placed in the applied stream cannot apply to university courses and have less post-secondary opportunities compared to their peers in the academic stream. Additionally, the report suggests that Ontario schools with higher percentages of students from low-income families also have higher proportions of students in applied mathematics (People for Education, 2015). There is also evidence that the current system of streaming may be increasing the achievement gaps in secondary school. The recommendations were based

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on information gathered from an Ontario Principals' survey, Ontario's standardized test results, and from People for Educations' review of recent literature (People for Education, 2015).

In staff room conversations, when the topic of streaming arises, I often hear my colleagues in secondary school assert that eliminating streams would have a significant negative impact on the best and the brightest students. The rationale unfolds that quicker learners need to be allowed to develop without being hindered by the weaker slower students. Many educators, however, have a concern that our current practice of separating students into perceived 'ability groups' may potentially be harming the majority of students in ways we don't fully understand. Teachers have an excellent vantage point to observe youth develop strong self-beliefs that in turn can shape a student's future. Carol Dweck (2000), suggests that these beliefs which she calls "meaning systems" or "self-theories" lead to different outcomes with students. The impact that streaming has on students' intrinsic beliefs is still largely unstudied and the potential negative impact could be detrimental to students' futures and thus it merits further study.

Dweck coined the term *growth mindset* and eventually popularized the concept with her 2006 book, *Mindset*. Her work was based on her quantitative and qualitative research into motivation and implicit theories of intelligence (Blackwell, Trzesniewski & Dweck, 2007). Dweck suggests that people, in general, have an incremental theory of intelligence (intelligence is malleable which is known as a growth mindset), demonstrate an entity theory of intelligence (intelligence is static, which is referred to as a fixed mindset) or they lie on a continuum between the two. Accordingly, with a growth

mindset, motivation is increased as a result of the belief that you can significantly improve your basic qualities through effort and practice. A fixed mindset is the opposite, as your basic qualities have a limit, once that limit is reached it cannot be surpassed (Dweck, 2006). Research has suggested that a students' mindset can successfully predict achievement across socioeconomic strata (Claro, Paunesku, & Dweck, 2016). Subsequently, growth mindset has also been suggested as a powerful social-psychological intervention to support student achievement (Yeager & Walton, 2011).

Self-efficacy is the belief that is central to Bandura's social cognitive theory (SCT). The SCT is based on the idea that behaviour, personal factors, and the external environment reciprocally influence each other to cultivate peoples' beliefs in their cognitive, social and behavioural competencies (Wood & Bandura, 1989). A person's perceived self-efficacy is the most important self-regulating mechanism in the SCT and it is defined as individuals' beliefs in their capabilities to mobilize the motivation, cognitive resources, and courses of actions to exercise control over challenges in their lives (Wood and Bandura, 1989). As a result, self-efficacy beliefs play a key role in generating human competence (Bandura, 1997). Furthermore, self-efficacy beliefs have a statistically significant positive relationship with academic performance and persistence during learning (Multon, Brown, & Lent, 1991).

Wood and Bandura's (1989b) study provided some of the first supporting evidence that viewing ability as being acquirable (incremental theory of intelligence) fosters a highly resilient sense of self-efficacy. The study was conducted in business and demonstrated that mangers who believe that ability was acquirable achieve superior results. Managers with the personal belief that ability is innate foster a lower sense of

self-efficacy in their sub-ordinates over time. This suggests that mindset and self-efficacy are closely related and are interacting intrinsic beliefs. Potentially more important for educators is the idea that self-efficacy and mindset are influenced by authority figures like teachers. However, at this point, there are relatively few studies that examine the interaction of self-efficacy and growth mindset. There are even fewer studies looking into the impact that streaming students has on students' intrinsic beliefs (self-efficacy and mindset beliefs); thus, this necessitates the purpose of this study.

Statement of Problem

Far removed from our teenage years', adults forget to appreciate the challenges associated with being a teenager.   There are many important developmental goals that young adults try to accomplish before they can be successful well-functioning adults. Young people are in constant motion between being themselves and becoming something else (Tilleczek et al., 2010). Teenagers are performing the difficult work of evaluating and forming a new sense of self. During this time, teens must develop the social and emotional skills that allow them to function in new difficult social situations. These social situations are often intensified and inescapable in our era of social media. Additionally, teens try to manage the stress of their academic future and make goals for a career path. This is happening in an increasingly competitive job market that requires high skills to be successful. Most students manage this transition, but others falter in their teen years and experience difficulties functioning as an adult (Schulenberg, Bryant, & O'Malley, 2004). Right at the beginning of this difficult and sometimes awkward transition, society begins to ask children to make important life-altering decisions about their future.

Applied and academic courses were introduced in 1999 by the Ontario Ministry of Education with the hopes of providing different options for students to accommodate different types of learners. In grades 9 and 10, students are placed into applied and academic courses, which are prerequisite courses from a range of College and University "destination-based" courses in grade 11 and grade 12 (People for Education, 2015). Over ten years later, with the same pathways in place, People for Education have assessed students are not on pathways, but instead, are separated by ability and in effect are still being streamed.   The consequence of this separation is that students of lower socioeconomic status (SES) end up in higher numbers in the applied level classes (People for Education, 2015). As of 2013, the Organization of Economic Cooperation and Development concluded that tracking (streaming) should be delayed until the senior years of high school as it has a negative impact on students in the lower track. According to the OECD, streaming doesn't raise the overall academic performance of a school and instead exacerbates the inequalities that already exist for students of disadvantaged backgrounds (OECD, 2012). Other research suggests that students who attend schools with greater amounts of streaming demonstrate a lower self-concept on average (Ireson & Hallam, 2009). Hypothesizing why inequalities are exacerbated and why streamed students think less of themselves (lower self-concept) is a complicated but important task for education stakeholders to undertake. Educators cannot just accept the status quo if they wish to achieve greater equality in education.

Freire's banking model predicts that the oppressed feel inferior as a result of internalizing the opinion of the oppressor (Friere, 1993). Streaming may be a source of oppression that leaves some students feeling inferior. This inferiority would be reflected

in student self-beliefs and the differences between students' self-beliefs may result from the varied expectations that teachers and society have of students. Teachers, peers, parents and the "educational environment" surrounding the students all play an important role in influencing what students think about themselves. Rosenthal and Jacobson (1968) demonstrated such an influence with their "Pygmalion effect" or teacher-expectancy effect. The effect manifested in students who were identified to their teacher as "likely to bloom". As the study progressed these select students produced greater gains in achievement. Unknowingly, to the teacher, the selected students were chosen at random and were not superior to their peers. The results suggested that the teachers' expectations were being conveyed to students, thus producing the effect on achievement. Dweck (2000) later commented that Rosenthal and Jacobson's suggestion to teachers that students were "likely to bloom", was, in essence, conveying to teachers, that these students were ready to learn and grow and could profit from teaching. In other words, high teacher expectations were directly influencing students' and their achievement.

Follow up studies looking into the teacher expectation effect have not produced consistent effects especially across different demographics. For example, several studies reviewed by Jussim and Harbour (2005) demonstrate that teacher-expectancy has produced varying effect sizes, sometimes small and meaningless, and sometimes large and significant. Research with middle SES from non-stigmatized groups has produced a near-zero effect size. In contrast, students stigmatized groups in addition to low SES students produced significant effect sizes ($r = .2$ to $.6$) (Jussim & Harber, 2005). Consequently, it has been suggested that high expectations create differential treatment that may be enhancing or undermining student motivation (Jussim, 2013). However, as

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Jussim (2013) has noted it has proven to be "extraordinarily difficult for research to empirically demonstrate that student motivation does mediate very much of the effect of teacher expectations on student achievement (Jussim, Robustelli & Cain, 2009).
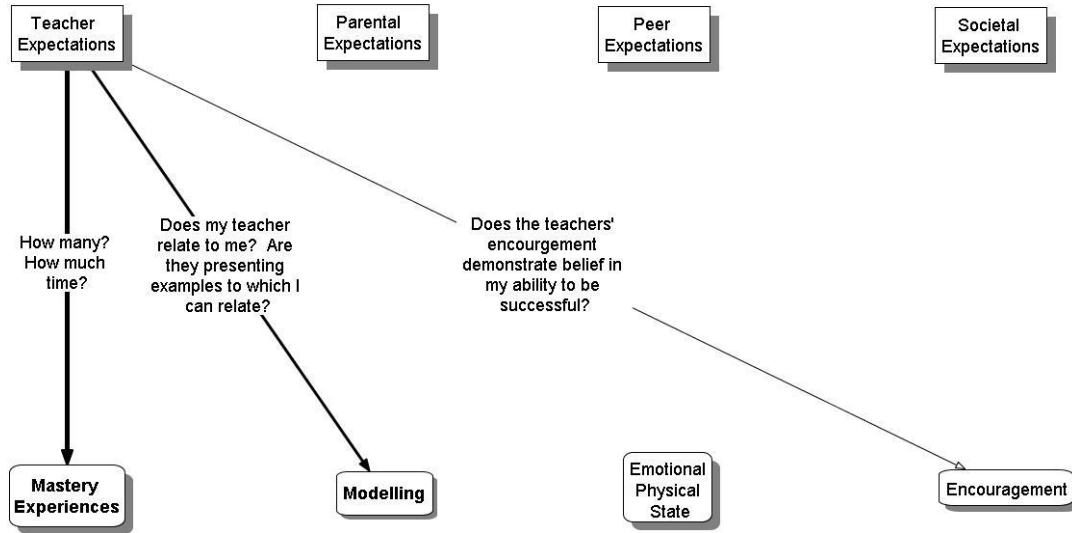
Figure 1*:* A representation of how teachers' expectations can impact the four main sources of self-efficacy. Other expectations are present as well and the connections are represented in figure 2.

The teacher expectation effect size may vary because of the nexus of input expectations from the environment, mainly teachers, peers, parents, and society. In addition to teacher expectations (see figure 1), these other expectations (see figure 2), sometimes disguised as biases and stereotypes also influence students' self-efficacy by assigning students with inferior labels that imply limited competence (Bandura, 1997). When students have low self-efficacy, students be especially sensitive to these environmental expectations. The TESA model (see figure 3) illustrates how teachers and the environment (parents, teachers, peers & society) expectations collectively impact the four main sources of self-efficacy, which influence perceived self-efficacy; alter

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motivation and goals; lead to academic achievement or failure; result in attributions; and, finally reciprocally influence self-concept or self-efficacy. The following literature review endeavors to strengthen the connections laid out in the TESA model; to help connect teacher expectations to the sound and substantial research of self-efficacy.
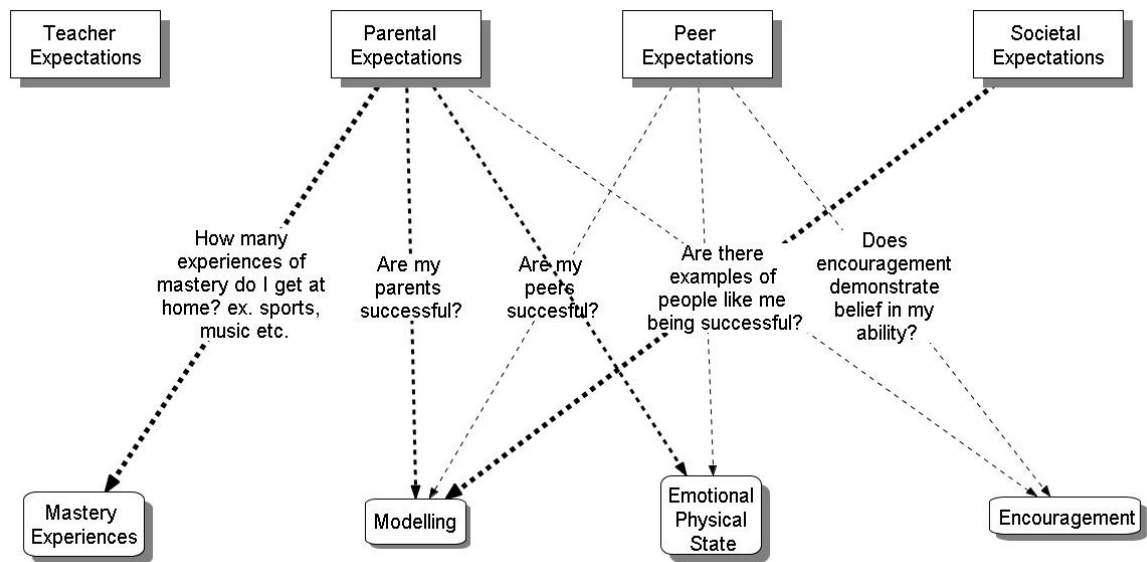
Figure 2: A representation of how parent, peer and society's expectations can impact the four main sources of self-efficacy.

According to Bandura (1997), perceived self-efficacy results from four main sources or inputs: (a) mastery experiences, (b) vicarious experiences, (c) encouragement, (d) emotional and physical state. Of these four, the primary source of self-efficacy is mastery experiences, while the second most important influence is vicarious experiences or modelling. Mastery experiences are defined as the strongest source of self-efficacy because it provides people with authentic evidence that they can muster whatever it takes to succeed (Bandura, 1997). Therefore, teachers primarily influence the self-efficacy of students by the way they convey and illicit mastery experiences. Teachers control the pace of learning and create activities that allow mastery for students. Ideally, at the end

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of the learning cycle, all students have mastered concepts. If students fail to master

concepts, the teacher can slow down the pace to help them. Teachers also feel an

opposing pressure to complete the curriculum in a school year, so they might not slow

down for students. If a student falls behind, a teacher's beliefs and expectations

determine if that student receives more time and help to master concepts. Hypothetically,

a teacher would slow down and change strategy if a student who is perceived as innately

intelligent is struggling to master concepts. Authority figures' (parents and teachers)

expectations help mediate how students experience mastery, influence goals, and the

attributions of students' successes and failures. In the TESA model, faster learners with

higher expectations from their environment demonstrate more positive self-beliefs as a

result of greater amounts of mastery and more positive attributions about their mastery.

Slower learners, with lower expectations (maybe a result of bias) from the environment,

demonstrate the opposite as a result of their experience in society and in the classroom.

These varying expectations are expressed within the classroom by the teacher on an

individual student basis and they are expressed by the school in processes of streaming or

tracking. Freire's (1993) banking theory of education predicts that over time education

can lead to the oppression of minorities and the disadvantaged. This study seeks

evidence that streaming is a form of "banking" education that is unequally impacting and

oppressing students' self-theories.

 In Fig. 3, the TESA (Teacher Expectation Self-Efficacy Achievement) model

represents a comprehensive summary of the sources of self-efficacy. The bolded solid

lines (adaptive behaviour) represent the pathway that is strengthened by a growth

mindset. The dotted lines represent (maladaptive) pathways that are strengthened by a

fixed mindset. Teachers play a significant role in setting up mastery experiences, helping

to set goals and influencing attributions and influence the formation or degradation of

self-efficacy.
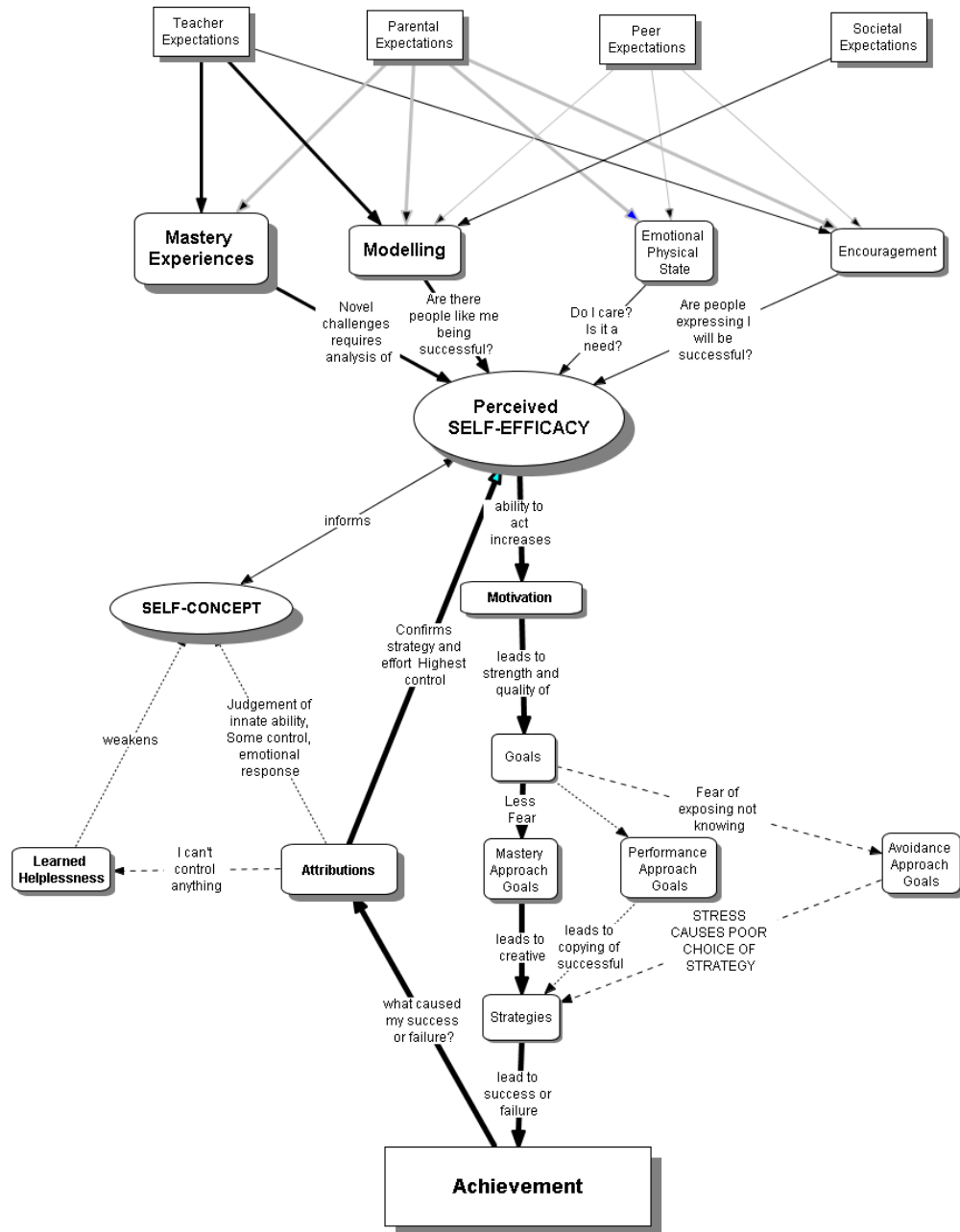
Figure 3: Teacher Expectation Self-Efficacy Achievement model (TESA) (Driedger,

2019)

Purpose of the Study

The purpose of this study is to examine the relationship between streaming and self-theories (used interchangeably with self-beliefs) of students at a southwestern Ontario high school and its elementary feeder schools. Pre-streamed (elementary students) be compared to post-streamed (secondary) students in the applied and academic streams to examine if there is a difference in their level of self-efficacy and growth mindset. Gender and other demographic information also be considered in the study. Student results be used to examine the impact that streaming has on students' self-theories.

Efficacy beliefs operate as key factors in the development of human competence. People perform poorly, adequately, or extraordinarily, depending on the fluctuations in their beliefs of personal efficacy (Bandura, 1997). A growth mindset is also suggested to influence and mediate beliefs about self-efficacy. Bandura (1997) has suggested that appraisal of personal efficacy is a combination of many factors or sources that are weighted and not just success or failure during performance, including the preconceptions of their ability, the difficulty of the tasks, how much help is received and many other factors (p. 81). One of those factors may be the person's theory of intelligence, as implicit theories of ability (either incremental or fixed) could be a source of bias that can alter the ways in which people assess an attribution about their own self-efficacy (Chen & Tutwiler, 2017). As self-efficacy and growth mindset interact, they both play an important role in developing the competency of our students. Consequently, any variation of these interacting self-beliefs between groups of students would suggest that

inequality exists within our educational system as Freire's (1993) banking theory predicts.

As of 2019, there has been very little change to address the recommendation by the OECD (2012) to postpone streaming (ability grouping) until the end of high school. Additionally, there is little research in education that addresses the impact of streaming, and almost no research in the Ontario setting that relates to streaming and self-beliefs. Consequently, I believe that this study and the results of this study provide a meaningful framework and groundwork for further study. Eventually, my hope is this research lead to the necessary political to make public education more equitable for all students by postponing streaming.

Research Questions and Hypothesis

The following research questions are framed in this study:

1) To what degree are streamed schools developing students' self-theories (self-efficacy (emotional, social and academic) and level of mindset (growth or fixed) in academic and applied students?

Hypothesis:

H_O: There is no statistical difference between self-theories of applied and academic students;

2) Is there a significant variation in self-theories between secondary academic, secondary applied and elementary students?

Hypothesis:

H_O: There is no statistical difference between self-theories of secondary students and elementary students who identify as pursuing the same course pathway in high school.

This study helps to define if there is any variation in students' self-theories as they progress from an unstreamed elementary school to a secondary school that separates students into ability groups students in grade 9.

Rationale

Ability grouping was selected as a potential independent casual variable, as it is suspected that streaming students at the age of 14 could be one such source of inequality as suggested by the OECD (2012). A study was conducted on a rural high school, with a diverse population of Canadians offering a wide range of course pathways. Applied and academic pathways at the high school were compared to the five feeder elementary schools that identified themselves as planning on attending either the academic or applied course pathway.

In this study, students participated in a voluntary survey evaluating emotional self-efficacy (ESE), social self-efficacy (SSE), academic self-efficacy (SSE), and mindset. To generate results to determine the potential impact of streaming, academic high school students were compared with applied students. High school students in each stream were then compared to pooled elementary school results who identified as planning on attending that stream (ex. high school academic students were compared with elementary students who planned on taking applied).

Chapter 2: Literature Review

This chapter is a summary of the existing literature that supports the connections and relationships in the proposed mechanism in the TESA model (figure 3). Theories connecting environmental expectations with student achievement through self-efficacy be analyzed. These theories include expectations, self-efficacy, mindset, goal theory, achievement motivation, attribution theory, and self-concept. Finally, relevant studies focused on the impact of streaming (tracking) and the relationship between streaming and self-theories (self-concept, self-efficacy, and mindset) be discussed.

Expectations

Hattie (2009) suggests improving educational outcomes requires improving teaching quality ─ having high expectations of all students and challenging students regardless of their stream. In the review of the relevant literature, an emphasis was placed on the connections between expectations and the two main sources of self-efficacy: mastery and modelling.

The "Pygmalion" effect was first demonstrated in 1968 by Rosenthal and Jacobson (Dweck, 2000). Since then a vast amount of research on teacher expectations also known more generally outside of education as self-fulfilling prophecies has been conducted with varying results and conclusions regarding the validity and effect size (Jussim & Harbour, 2005). Jussim and Harbour's analysis of the totality of the research suggested that although some of the studies suffered enough flaws rendering their conclusions invalid, most naturalistic and experimental evidence demonstrate that teacher expectations do exist but with a small effect size.

Despite the small effect size in most studies, there are some very interesting trends to note. One study suggested that streaming (tracking) does moderate self-fulfilling prophecies but the effect size was not large (Smith et al., 1998). Jussim, Eccles, and Madon (1996) demonstrated that students from higher socioeconomic backgrounds (SEB) exhibited no consistent evidence of any effect. However, Jussim and Harbour's (2005) results demonstrate that while the effect on white or middle SES was near zero, the effects were higher for low SES, African American, and low achieving SES students (r = .2 to .6). It has been suggested that the larger effect sizes on these former groups are consistent with the social-psychological emphasis that expectancy effects may have potential power and may play a role in continued social problems (Jussim, Eces & Madon, 1996).

Teacher expectations are typically accurate (justified when labelling a student) but they are rarely perfectly accurate (Jussim et al., 2009*)*. Expectations are prejudice to social stereotypes, unjustified diagnostic labels, and genuine student changes which can cause them to be inaccurate. A Dutch study suggested that students who experienced negative teacher expectation bias (implicit prejudice about ethnicity) were, after 5 years, in lower education streams, whereas positive teacher expectation bias caused students to move into higher educational streams (Van den Bergh, Denessen, Hornstra, & Holland, 2010). Jussim et al. (2009) suggest that self-fulfilling prophecies occur because teachers hold high expectancy students (highly capable) to higher standards of performance. The TESA model supports that high expectancy students experience more mastery opportunities which leads to this higher level of performance. Furthermore, there may be

differential treatment resulting from varying expectations that may indirectly be impacting achievement, by enhancing or undermining motivation (Jussim, 2013).

The teacher expectation effect is mediated by high teacher self-efficacy that is consequently impacting student motivation and academic achievement (Caprara, Barbaranelli, Steca, & Malone, 2006). Depending on the level of expectation, students receive differential treatment specifically in the way they experience mastery opportunities in the classroom, set goals and make attributions when learning. Furthermore, when teachers' positive expectations are in sharp contrast to the rest of their environmental expectations (parents, peers, and society), teachers' expectations generate a bigger "Pygmalion" effect on students. This is supported in the data where lower social class students are demonstrating a significantly larger effect size compared to students who are not marginalized (Jusim et al., 1996; Jussem & Harbour, 2005). Student achievement follows when teachers at a school collectively believe they can help all students including those disadvantaged and disengaged individuals (Donohoo, 2017). According to Hattie (2012), this collective teacher efficacy (CTE) is three times more predictive of student achievement than SES. Achievement increases follow when disadvantaged students experience high collective teacher expectations that are in sharp contrast to the lower expectations from their environment. The main leveraging tool that increases academic achievement is greater mastery opportunities for students.

Parents play an equally important and probably more pivotal role than teachers, especially in early life. They present mastery experiences to their children that convey intrinsically rewarding experiences through decontextualized educational activities like games involving reading and writing or sports that build mastery and confidence. These

activities can build self-efficacy before students even attend school and enrich the learning environment throughout their time at school (Gniewosz & Eccles, 2013).

Aside from mastery experiences, another important source of self-efficacy is modelling or vicarious experiences. People are looking at the successes of others who are like them, and through social comparative inferences make a judgment if they be successful like the people that serve as their model (Bandura, 1997). Furthermore, models can be based on similarities in age, sex, educational and socioeconomic level, race, and ethnicity level, even though these groups have a high degree of variability in abilities (Bandura, 1997). In this way, societal models are providing expectations of performance for students. These models can take the form of stereotypes and generalizations that people use to assess their own self-efficacy. This may be best described through the well-studied but somewhat controversial phenomenon of "stereotype" threat. Originally defined as a situation where a negative stereotype about a group to which one belongs, in situations where the stereotype is applicable, one is at risk of conforming it as a self-characterization (Steele & Aronson, 1995). Stereotypes can serve as models and provide a model for children to assess their own self-efficacy. Furthermore, it stands to reason when teachers, parents, and peers confirm stereotypes in children's' minds it would reinforce their influence on that child.

Most importantly teachers provide mastery opportunities for students, but they also serve as models for students. Models of similar race and gender are viewed as more credible and can instill stronger self-efficacy beliefs in students compared to models that are of different race and gender (Bandura, 1997). Beyond appearance, if students share values and relate to teachers, it stands to reason that teachers serve as better models for

students. Research has suggested that in the American context, many White teachers experience deep ambivalence toward minority and immigrant students because of the difference in cultural identity (Hollins & Torres-Guzman, 2005). Teachers who have been socialized into the Western ethic of ability and hard work sometimes unconsciously promote individualism, capitalism, and egocentric ways of thinking (Shewder, 1991). Some students relate to these values and others not; this serves as a barrier for some students and can prevent those students from viewing their teacher as a role model during learning.

Peers and parents can serve a role as models for students as well. With parents, social learning is an important mediator that impacts the transmission of values between generations. For example, parents consciously or unconsciously communicate the importance of completing homework and learning in general. If parents behave consistently with their values, they serve as a role model and the social learning process can result in the intergenerational transfer of academic values (Gniewosz & Eccles, 2013).   Peer pressure influences are potentially high early in adolescence, as students learn important study habits through observing and modeling the behaviour of their friends (Carroll, Houghton & Lynn, 2013). Research has suggested this powerful influence can decrease achievement when students have friends with higher levels of delinquency (Carroll et al., 2009). Furthermore, peers who make friends with more academically engaged students tend to become more actively engaged in education over time (Kindermann, 2007). Clearly, peers and parents are playing a big role in influencing self-efficacy through modelling.

When considering teacher expectations, sometimes large effect (with lower SES, and lower social class), but generally low effect on academic achievement, it is important to consider the differential treatment of students may receive as a result of the varied expectations placed on them by the environment. In summary, differential treatment impacts self-efficacy in the following ways: (a) teachers and parents provide different amounts and quality of mastery opportunities; (b) teachers, parents, peers, and society serve as models which individually may send confirmative or conflicting messages about a student's self-efficacy (evidence: stereotype threat); (c) If a teacher's high expectations about a student conflict with other lower environmental expectations (other teachers, parents, peers, and society) larger effects sizes in self-efficacy and achievement be demonstrated.

Social Cognitive Theory and Self-Efficacy

Social Cognitive Theory is a model that suggests that behaviour, cognitive personal factors, and the environment influence each other, which results in people being both a product and an influencer of their environment (Wood & Bandura, 1989). Furthermore, personal factors, behaviour, and the environment act holistically together and influence the other bidirectionally to different degrees depending on the activity and under different circumstances (Bandura, 1997). Bandura further suggests that SCT extends attribute as a result of human agency to a collective agency that includes larger groups of people. People have shared beliefs that are not simply a sum of all the individuals' self-efficacies combined but is an emergent group-level coordinative and interactive dynamics (Bandura, 1997). Self-efficacy theory according to Bandura is a comprehensive explanation of personal causation in a unified framework that explains the

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origins of efficacy beliefs, their structure, and their function, the processes through which they produce diverse effects, and their modifiability, at both a personal and a collective level (Bandura, 1997).

Self-efficacy is not self-concept, as self-concept is a global self-conception that does not do justice to the complexity of self-efficacy beliefs, which vary across different domains or activities and under different circumstances. Similarly, self-efficacy is not self-esteem as there is no fixed relationship between one's capabilities and if one likes oneself or not. Instead, self-efficacy (sometimes referred to as perceived self-efficacy) is the belief that one can produce certain actions and is not the same as beliefs that actions affect outcomes (locus of control) (Bandura, 1997).

Along with mastery opportunities and modelling, social (verbal) persuasion is the third source of self-efficacy. It is effective in promoting self-efficacy when people receive realistic encouragements that invite them to exert greater effort and become successful compared to those who are troubled by self-doubts (Wood and Bandura, 1989). Additionally, it is effective if the verbal persuasion is coming from someone who is significant in their life. Another caveat should be mentioned; if encouragements raise unrealistic beliefs of capabilities, they can discredit the encourager, and end up undermining a person's belief in their capabilities. Finally, verbal persuasion is often given in the form of performance feedback during the mastery learning process which heavily influences attribution of the success or failure of the attempt at mastery (Bandura, 1997).

Physiological and affective states can influence a person's perceived self-efficacy. During stressful situations, people read their level of psychological activation and

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interpret it as a vulnerability or even disfunction (Bandura, 1997). Bandura (1992) suggests that mere thoughts of one's lack of coping efficacy can increase autonomic stress reactions. For students who have low self-efficacy in this domain, educators need to provide support by helping students learn how to master the self-regulation of their ongoing stress if they wish to improve their achievement (Ministry of Education, 2016).

Efficacy beliefs affect the vigilance towards how challenges and threats are perceived. People with low self-efficacy believe they have no control over their lives and view the world with fear as the challenges it presents are unmanageable (Bandura, 1997). This can be particularly dangerous when a person has low self-efficacy. Young peoples' beliefs in their efficacy to resist peer-pressure directly impacts if they engage in violent behaviour (Caprara, Regalia, & Bandura, 2002).

Emotional self-efficacy (ESE) is defined as one's ability to cope with negative emotions (Muris, 2001). Muris' (2002) research has suggested that individuals with high ESE also experience lower levels of depression and anxiety. Furthermore, it is considered an important factor in mental health and resiliency when coping with emotionally stressful events during the teenage years. Low self-efficacy has appeared as an intermediator in reoccurring depression and stressful life events, particularly with women who are significantly more likely to have prior depression and have lower levels of self-efficacy (Maciejewski, Prigerson, & Mazure, 2000). A weak sense of efficacy can also impact experiences by creating negative biases when those experiences are cognized, organized and recalled (Bandura, 1997). Like ESE, social self-efficacy (SSE), which is defined as a person's ability to deal with social challenge (Muris, 2001), can be an

indicator of mental health as it has been negatively correlated to depression (Anderson & Bets, 2001, Hermann & Betz, 2006, Smith & Betz, 2002).

Several studies from various countries and contexts present conflicting evidence regarding the impact of gender on self-efficacy. Studies have suggested there was no significant difference in ESE and SSE in males and females (Armum & Chellappan, 2016, Isekander, 2009). Conversely, Vera et al. (2004) found evidence that there is a significant difference between gender and self-efficacy, particularly suggesting that female SSE is significantly higher than males. Furthermore, Muris (2002) supported that females have lower ESE than males. Anmum & Chellappan (2016) suggested that the level of social equality had reached a point in Singapore that could have contributed to the equality in self-efficacy results. A different explanation for the experimental data is that the studies cannot be compared directly, as other variables like age, culture, and SSE are not consistent over all studies.

Academic self-efficacy (ASE) is highly correlated to academic achievement and the associated behaviours and attitudes that are necessary for achievement. Turner, Chanfler, and Heffer (2009) suggest that ASE is significantly correlated to grade point average (GPA) of students and supports the idea that if students believe they are more capable in their academic studies, they are more likely to succeed at them. The connection with GPA was confirmed in the development of the additive risk model for youth developed by Lucio, Rapp-Pagglicci, and Rowe (2011). In addition, their risk model suggests that ASE is positively correlated to educational outcome expectations, and negatively correlated to grade-level retention. ASE has proven to be an important indicator of academic success at all academic levels and ages. A consensus of several

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studies confirmed that self-efficacy provides a facilitative role in academic self-regulation and achievement (Affuso, Bacchini & Miranda, 2017; Lee, Lee & Bong, 2014; Phan, 2012). At the university level, students with high GPA correlate with a high level of ASE and a high level of class participation (Galyon, Blondin, Yaw, Nalls, & iams, 2012). For young children learning to read, increasing ASE has a sustainable strong positive effect on academic achievement for children at risk of failing (Lee & Jonson-Reid, 2016). Due to domain-specific effects, meta-analysis research has suggested that academic self-efficacy varies according to the subject and varies according to age and gender (Huang, 2016).

Mindset Theory

Dweck coined the term *growth mindset* and eventually popularized the concept with her 2006 book, *Mindset*. Her work was based on her quantitative and qualitative research into motivation and implicit theories of intelligence (Blackwell, Trzesniewski & Dweck, 2007). Dweck suggests that people, in general, have an incremental theory of intelligence (intelligence is malleable), demonstrate an entity theory of intelligence (intelligence is fixed) or lie on a continuum between the two. Accordingly, with a growth mindset, you can significantly improve your basic qualities through effort and practice. A fixed mindset is the opposite of growth mindset, as your basic qualities have a limit, once that limit is reached it cannot be surpassed. In the worst-case scenario, a student with a fixed mindset who continually fails especially after trying hard eventually consider their failure as a perceived lack of intelligence (Dweck, 2006).

When analyzing relevant research, there were substantial studies looking at the relationship between mindset and academic performance. Students who demonstrate

more of a growth mindset (incremental theory) endorse stronger learning goals, have greater positive beliefs about their effort and make fewer ability-based helpless attributions (Blackwell et al, 2007). In other words, students who feel motivated to try harder and are more likely to make changes to improve their academic life. When they make mistakes, they are more likely to focus on how they can improve and grow during learning (Schroder et al, 2017). Consequently, when students are more orientated towards growth psychologically there is a positive association with both academic engagement and achievement, even after accounting for relevant background factors (Bostwick et al., 2017). A growth mindset can even decrease some of the negative impacts that poverty has on student performance. Using a national data set from Chile and standardized tests, research showed that at every socioeconomic level, those students who demonstrated a growth mindset consistently outperformed students with a fixed mindset (Claro et al., 2016).

Due to the findings and the benefits of students holding a growth mindset, mindset social-psychological intervention studies were executed. This included a significant study by Blackwell, Trzesniewski & Dweck (2007) which demonstrated teaching incremental beliefs about intelligence produced a significant increase in motivation for students and a subsequent increase in academic math grades compared to a control. In the intervention, students were taught about the importance of setting learning goals, holding positive beliefs about effort, and creating causal attributions. Yeager and Walton (2011) included this study in their analysis of socio-psychological interventions, where they suggested that interventions can unleash the potential of students and of the educational environments in which they learn. Blackwell, Trezesniewski, and Dweck's

work in mindset interventions helped spawn a company in 2006 called Mindset Works, whose goal is to help students from grade 4 to 9 develop a growth mindset through a program called 'Brainology'. On their website, they present several case studies where their programs successfully changed teacher practices to improve standardized math scores, improved reading scores of at-risk minorities, and improved growth mindset attributes in students with fixed mindsets (Mindsetworks.com, 2019).

At this point, there are a limited number of peer-reviewed studies and no meta-analysis of the impact the mindset interventions. One such study that looked at the Brainology intervention produced an increase in motivation but no increase in reading self-efficacy of elementary students (Rhew, Piro, Goolkasian, & Cosentino, 2018). Additionally, research demonstrated the intervention had a large effect size increase in mindset for gifted and talented students (Esparza & Shumow, 2014). Another study by Donohoe, Topping, and Hannah (2012) showed a large increase in mindset initially, but mindset scores dropped over time in addition to no change in mastery or resiliency. Clearly, more studies are needed to look at the impact of such programs.

The impact that growth mindset has on student performance is not without controversy. Two studies called the previous findings into question. The first study was large (n=5653) and found no connection between university entrance examinations and mindset (Bahník & Vranka, 2017). The second study using MTurk (online crowdsourcing where subjects get compensated for filling out surveys) showed that there was no connection between the level of education obtained and their level of growth mindset (Macnamara & Rupani, 2017). Both studies acknowledged limitations with sampling. To add to this limitation, I would suggest that both university students and

MTurk subjects are a limited sample and may not represent people across the full spectrum of growth to a fixed mindset, which may in turn limit correlational studies. Furthermore, I would suggest that growth mindset and its contribution to academic achievement are less likely to be measured by one academic data point. Rather, it is more important to measure improvement over time to see the growth in a student's performance.

In the context of this study as represented in the TESA model (Figure 3), a student's mindset (continuum from growth mindset to fixed mindset) influences perceived self-efficacy by strengthening some attributions and goals while simultaneously weakening others. Furthermore, I am suggesting that increased levels of growth mindset increase the amount of modelling available to people. This is supported by Bandura's (1997) suggestion that symbolic modelling has increased as a result of television media, as there are now more people that can be observed and modelled. By extension, I am suggesting if students view intelligence and ability as malleable (incremental theory) they are more likely to view the success of others as a possibility themselves. In this way, other peoples' talents and abilities no longer appear as innate and instead are acquirable.

Goal Theory and Achievement Motivation

The two major constructs in achievement motivation are self-efficacy and achievement goals (Huang, 2016). According to Bandura's self-efficacy, motivation is directly tied to setting goals. Bandura (1997) suggests that evidence from numerous laboratory and field studies show that explicitly, challenging goals enhances motivation. Motivation does not come directly from setting goals themselves but instead comes from

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the self-evaluation (attribution) that is made conditionally upon their fulfillment (Bandura, 1999). Self-efficacy is one of the important self-influences in which goals create powerful motivation effects (Bandura, 1997). Furthermore, motivation involves the cognitive comparison of your perceived performance against an adopted personal standard. To complete this comparison, individuals must know their true level of performance. Forming goals without doing this comparison to a standard or failing to understand one's true level of performance leads to no lasting motivation impact (Bandura & Cervone, 1983). As a person moves towards competence or mastery, they are experiencing frequent goal attainment which increases self-efficacy. Subsequently, the increase in self-efficacy results in setting more challenging goals and increased motivation to achieve those goals (Morisano & Locke, 2013).

The second, goal construct, is called the achievement goal theory of motivation, which suggests that goals are determined based on people's definition of competence (Huang, 2016). People form mastery goals (aka learning goals) and performance goals (ego-involved, competitive, self-enhancing goals) depend on their definition of success or competency. Mastery goals focus on the new acquisition of knowledge or skills. On the other hand, performance goals have had multiple definitions depending on the research. Generally, performance goals may serve to relieve self-doubt or gain rewards (Covington, 2000). This suggests students with performance goals are more about achieving marks then they are about authentic learning (mastery). Both goal constructs relate to competency and as a result, researchers have ventured to combine them into one construct.

Ames (1992) suggested that because mastery goals focus on absolute or interpersonal standards and effort leads to success and mastery, they both tend to correlate to high self-efficacy. Dweck and Leggett (1998) suggested individuals with an incremental theory of intelligence tend to adopt mastery goals and set interpersonal goals regardless of ability. Oppositely, people with a fixed theory of intelligence tend to adopt performance goals, which focus on social comparison and success versus others as the standard. At about the same time Elliot (1999) had already established some research surrounding approach and avoidance goals. In approach motivation, behaviours are directed at desirable outcomes and are enjoyable learning experiences. Avoidance motivation is about avoiding appearing deficient at a task and it has been related to low self-efficacy. Elliot (1999) proposed a three-factor achievement goal model (mastery, performance, and performance-avoidance goals) with self-efficacy. The research suggested that students with high competence perceptions tend to adopt approach goals; either mastery and performance-approach goals. On the opposite end of the spectrum, students with low competency perception tend to select performance-avoidance goals. Dweck and Leggett (1998) merged the concept of mastery and performance goals with approach and avoidance to create the Social Cognitive Theory of Motivation. They suggested that mastery goals are adaptive behaviours while performance goals are maladaptive behaviours. As a result, over the long term, mastery goals should lead to high-self efficacy and performance goals should lead to low self-efficacy.

Research surrounding performance goals have produced varied results partly because of how performance goals are defined by researchers. Grant and Dweck (2003) suggest that some performance goals should be separated into those having a comparison

component and those performance goals that have an achieving content component. A meta-analysis (Payne, Youngcourt, & Beaubien, 2007; Utman, 1997) results found no compelling link between performance approach goals and achievement. While performance-avoidance goals consistently show a negative correlation with performance (Payne et al., 2007); performance-approach goals did sometimes demonstrate a positive correlation with achievement when students had high self-efficacy and when students already set high mastery goals (Midgley, Kaplan & Middleton, 2001). In his summary of goal orientation research, Martin (2013) suggested teachers should expect the following; when promoting mastery, we should expect gains in motivation and engagement as being more feasible than expecting gains achievement. Martin further suggested that students need a combination of both performance and mastery approach goals to be successful.

In the context of this study, it is important to understand that the types of goals' students set (either mastery or performance) are influenced by teachers and subsequently can influence self-theories. As suggested in their meta-analysis, Payne et al. (2007) found that people with high general self-efficacy are likely to have a strong mastery goal orientation and are not likely to use the avoidance approach performance goals. Students in a classroom that promotes mastery goals are more likely to express interest in the curriculum because it is useful and interesting to them. On the other hand, classrooms that promote performance goals (test performance) leads students to increase the use of surface learning strategies, and cheating (Meece, E. M. Andermann & L. Andermann, 2006). Payne et al. (2007) confirmed Dweck's (1986) theory that a fixed mindset was positively correlated with performance goals and negatively correlated with learning goals. Tabernero and Wood (1999) suggested that employees with a growth mindset

suffer from motivational problems and focus on personal deficiencies when an authority figure with a fixed mindset criticizes their ability. Similarly, a teacher can promote these maladaptive learning habits and entity-based (fixed mindset) thinking through the promotion of performance goals. Conversely, they can foster a growth mindset through the promotion of mastery.   Moreover, when teachers promote mastery goals, it is one of the strongest instructional practices that foster creativity. Hong, Hartzell, and Greene (2009) suggested that teachers who promote mastery goals, use more experiential learning for students, increasingly stress the importance of understanding over test performance, and were more likely to enjoy their work. In this study, I am suggesting that all teachers strike their own equilibrium or blend of mastery (teaching understanding) and performance goals in the classroom. Teachers' epistemological beliefs directly impact their day to day practice influence this equilibrium one way or the other. Furthermore, as this equilibrium shifts away from mastery towards performance, lower numbers of students experience mastery and they suffer as evidenced in their self-efficacy. An extreme example of this is in the many Asian countries where the curriculum is packed, time is limited, competition is fierce, and tests structure every aspect of the curriculum. The high stakes nature of their environment forces teachers and students to shift away from mastery and focus instead on performance through rote memorization and cramming for tests (Xiong, Cao & Zhang, 2016). This environment consequently reduces students to passive objects; they become vessels to be filled just as Freire predicted (Freire, 1993).

Attribution Theory

Encouragement is often given to students in the form of evaluative feedback. This feedback can be conveyed in ways that can boost or undermine self-efficacy (Bandura, 1997). Specifically, this feedback influences student's attributions about success or failure. Weiner (1985) was the first to argue that the attributions people use determines the impact of failures or success. According to Weiner (1985), people like to explain their failures either as a result of a variable factor (ex. luck or effort) or they like to explain failure as a result of a stable factor (ex. difficulty or ability). Dweck (1975) used the attribution theory to develop her theory of learned helplessness. Following failure, some students not respond in a way required to succeed, even though they are fully capable of success. Children who exhibit this learned helplessness took less responsibility for their attributions and were more likely to consider their failure as a result of their ability not their effort (Dweck, 1975). Individuals who struggle with strong doubts about their capabilities, not improve with success feedback and achieving new skills alone. They are more likely to improve if skill development emphasizes the personal power to produce results (Bandura, 1997). In the TESA model (fig. 3), I have represented learned helplessness as the worst form of attribution to symbolize that it is an extremely harsh negative view of the self. It is a condition that is the most maladaptive behavior in the learning process as students have lost the belief that they have any locus of control.

Along with her colleagues (Hong, Chiu, & Dweck, 1999) Dweck unified attribution theory to include the concepts of implicit theories (entity and incremental beliefs about ability). Furthermore, in her book "self-theories", Dweck (1999) suggests

that attributions are fundamental motivational variables and critical motivators of persistence. When forming attributions, people with stronger entity theories (fixed mindset) put an emphasis on a stable variable like ability. In the TESA model (fig. 3), this fixed mindset connection is represented as a line between attribution and self-concept, as this attribution is a self-evaluation about innate ability indexed versus others. People who demonstrate a fixed mindset can still increase self-efficacy with success but the attributions they make are more likely to contain an affirmative confirmation of innate ability (self). Those same people who are indexed by their level of performance interpret mistakes and setbacks as substandard performance and produce a strong self-evaluative focus, along with a negative emotional response which can limit future strategic thinking necessary for complex tasks (Tabernero & Wood, 1999). This creates the maladaptive lack of resiliency demonstrated in some of our students.

Conversely, people with stronger incremental theory (growth mindset) create more attributions that put an emphasis on dynamic attributions like effort and are more likely to take remedial actions than their fixed mindset counterparts (Hong et al., 1999). When people attribute a lack of ability as the cause of their failure, they remain optimistic because they believe they can still improve their ability (Dweck, 2000). This is represented in the TESA model by the solid line between attribution and self-efficacy. It represents the attribution that is strengthened by a growth mindset, the idea that strategy and effort are responsible for success or failure. Schunk suggests that feedback from evaluative (strategies) or effort can enhance self-efficacy (Schunk 1984). It enhances self-efficacy because people are attributing their success or failure to their strategy and (or) of effort. Students who evaluate failure through a growth mindset framework are

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less likely to have a negative emotional response that could interfere with future cognitive processes necessary for success (Tabarino & Wood, 1999). If they fail, strategies can be changed, or effort can be increased, and this explains the increase in resiliency. Goal setting, selecting strategies and interpreting feedback all require a calm emotional state and a clear mind to demonstrate this adaptive behaviour.

Based on the research and in the context of this study, the TESA model implies that students do not form one type of attribution after success or failure. Instead, they form many attributions that overall lie on a continuum between learned helplessness, fixed mindset judgement of self and growth mindset judgement of strategy and effort. These attributions be influenced by the environment (teacher, parents, etc.) and vary depending on the domain (math, sports, etc). Generally, self-efficacious people view attainments as personally controllable (Bandura, 1997); therefore, attributions where the individuals feel they do not have control be the most detrimental to self-efficacy (ex. fixed mindset failure and learned helplessness attributions). Teachers significantly influence academic attributions through their verbal and non-verbal responses to attempts at achievement.

Self-Concept and Academic Achievement

According to Bandura (1997), self-concept is a composite view of oneself that is presumed to form through direct experience and evaluations adopted from significant others. Hattie (2009) describes self-concept like a rope; individual strands are varied but come together to make up the strength of the whole. Self-concept, as described by Marsh and Craven (2006), is a multidimensional, hierarchical model that is an important mediating variable influencing desirable outcomes including academic achievement. The

term academic self-concept, which is used commonly in literature and is defined as how one perceives oneself in an academic or learning context (Bong & Skaalvik, 2003). Marsh suggests that a positive academic self-concept is linearly related to students' academic effort, behavior, and achievement (Marsh, 1990ab; 1991; 1993). Research by Ireson and Hallman (2009) suggests that when students have a positive academic self-concept it affects their intention to continue studying after compulsory education. Marsh and Craven (2006) published research also confirming that academic achievement is significantly correlated to academic self-concept. Both academic achievement and academic self-concept positively strengthen one another through the reciprocal-effects model (REM). The REM hypothesizes that a student's previous self-concept and achievement have positive effects on their future self-concept and achievement. It is intuitive, but our academic success does indeed reinforce a positive self-concept and vice-versa and this is supported by research (Marsh & Craven, 2006).

Bandura (1997) is critical of self-concept as he suggests it is too general of a global self-conception. He states that self-concept doesn't do justice to the complexity of efficacy beliefs, which change according to the domain and under different circumstances. Self-concept loses most, if not all, its predictive power once perceived self-efficacy is factored out (Bandura, 1997). Conversely, Hattie's (2009) meta-analysis suggests that self-concept has a significant effect size (.43), but like Bandura, Hattie is skeptical of what is exactly being measured by the construct of student self-concepts. For the purposes of this study, I am agreeing with Bandura's conception of self-concept and additionally suggesting that it is influenced through the attributions that are made after success or failure through self-judgement as shown in the TESA model (figure 3).

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Self-Efficacy, Mindset, and Streaming

In his book '*Self-Efficacy'*, Bandura (1997) discusses the attributes of efficacious schools in detail. He provides a philosophical vision and ideas that deeply resonate with the change that I wish to see in all schools. In these schools, he suggests that high expectations and standards permeate the environment and apply for all students not just a select few. Teachers regard all students as capable of high scholastic attainments, they set challenges and academic standards for them and set up rewards that are conducive to intellectual development. High standards can be demoralizing if they are not followed by learning activities that are structured and conducted in ways that allow all students to *master* the lessons they learn. Teachers take their fair share of responsibility for students' academic progress. Most importantly, poor academic performances are not excused as a result of students' background or a lower level of innate ability (Bandura, 1997).

With his vision, Bandura is indirectly condemning the notion of the banking theory of education. Bandura goes on to discuss what schools should not be and the associated danger of tracking (streaming) to students. In highly efficacious schools, when students fall behind other students in an academic subject, subgroups are used to accelerate learning, so students can return to regular school instruction. In low efficacious schools, Bandura states that students who have difficulty with their schoolwork, as many from disadvantaged backgrounds do, are set apart by placement in slow-learner tracks where little is expected of them academically. They remain permanently segregated in a socially stigmatized status as they continue to fall further behind. Whatever praise they receive is unlikely to do any good academically because they are awarded for sub-standard performances or merely effort, without much

reinstruction of poorly done assignments (p.245). This would seem to suggest that stigmatized learners are already behind before they are streamed (elementary school) due to lack of appropriate guidance, time, and "mastery aids". When these learners get put into slower-learning streams in secondary they should get more time to master topics to catch up (certainly some do) but paradoxically students spend less time mastering topics as they are subject to lower expectations.

There is a limited amount of research studying the connection between streaming and self-efficacy. One study (Matheson, 2015) was found comparing the interaction that streaming may have on self-regulatory self-efficacy and reading mindset in an Ontario setting. The study compared stream, achievement, learning disability status and gender. The conclusions presented suggest that students who have higher grades have significantly (moderate to high effect size) higher mindset and regulatory self-efficacy. Similarly, he concluded that students in university-level courses (academic) had significantly higher regulatory self-efficacy and mindset (moderate effect size) than students in college-level (applied) courses. There was no difference in mindset for gender. To my knowledge, there are no studies comparing streaming with self-efficacy (academic, emotional and social sub-domains) and mindset.

Self-Concept and Streaming

The Big Fish Little Pond Effect (BFLPE) suggests that academic self-concept should decrease when students are comparing themselves to other students of similar ability specifically for students in the more rigorous academic stream compared to the applied stream (Belfi, Goos, De Fraine, & Van Damme, 2012). This finding was supported by several studies (Liu, Wang & Parkins, 2005; Wong &Watkins, 2001;

Wouters, De Fraine, Colpin, Van Damme, & Verschueren, 2012). Students' self-concept improves when they do well relative to their peers. Students who are in an academic stream have greater competition compared to a lower applied stream; the reference group they are comparing themselves to has a greater aptitude and therefore students feel discouraged when they do not do better than those around them (Johnston &Wildy, 2016). As a result, when students change from academic to applied courses an increase in academic self-concept results (Wouters et al., 2012). In contrast, students who have entered "gifted" classes are predicted to have a decrease in academic self-concept at the beginning of the school year. Lower self-concept results when students have to transition into a new environment with a new peer group and they don't know where they fit into the hierarchy of the class (Marsh, Chessor, Craven, & Roche, 1995). Indeed, the BFLPE seems to be a robust enough framework on how people form their own self-concepts and it is influenced by the level of streaming.

Streaming is detrimental overall for students

At present, there is some research relating self-concept to streaming. While streaming helps some students and harms others, an argument can be made that streaming is detrimental for the overall population of students. This is supported by research, as students who attend schools with a greater amount of ability grouping (streaming) demonstrate a lower self-concept on average (Ireson & Hallam, 2000). A Caribbean study found a positive correlation between streaming and depression, with the higher streams being less depressed than the lower streamed peers (Lipps et al., 2010). Additionally, international results demonstrate that the more stratified students are in

their grouping, the lower the motivation, and the negative impact of SES on academic performance becomes stronger (OECD, 2013).

Although self-concept is distinctly different than self-efficacy and mindset, they are all self-theories or beliefs about oneself. Therefore, it is not a stretch to hypothesize that self-efficacy and mindset are also lowered when students enter a more stratified school (many streams). The positive connection between growth mindset and academic achievement along with self-efficacy and academic achievement is clear (Claro et al., 2016). Consequently, anything that decreases these self-theories needs to be a concern for policymakers and educators. Just as educators and policymakers are concerned with grades and graduation rates, they need to be equally concerned about how students view their own self-efficacy and potential in general when they graduate.

Research demonstrated that in Toronto, students living in a higher income neighbourhood were 1.4 times more likely to attend university than those living in poorer neighbourhoods (Sweet & Higher Education Quality Council of Ontario, 2010). The pathway to university starts in Grade 9 and students from lower socio-economic backgrounds may have already closed the door to higher education. It is a significant problem in Ontario as there is a higher proportion of lower socioeconomic students in applied level courses (People for Education, 2015). A large Canadian study by Krahn and Taylor (2000), compared four provinces (Alberta, British Columbia, Ontario and Saskatchewan) on the degree of streaming they use in schools, and the post-secondary options available to students. The researchers found that students from Saskatchewan which utilizes less streaming in grade 10 were much more likely to have post-secondary options open compared to students from British Columbia, Ontario or Alberta.

Furthermore, the OECD released a report in 2012, suggesting that streaming is not an effective tool for increasing equality in secondary schools (OECD, 2012). As education stakeholders, we need to start viewing education as an opportunity for all students to learn and master the material. All students have potential, not just the upper SES students and all students deserve the opportunity to improve their life outcomes.

Streaming is Entity Based

When teachers argue for the merits of streaming, I believe that it is often based on a concern of de-streaming. If academic and applied streams were eliminated, these teachers suggest the academic students' performance would be harmed or brought down by the applied students. There is a preference for streaming by teachers because they feel it facilitates the appropriate targeting of their instruction (Ansalone & Biafora, 2004). Additionally, it is important to remember that there is a historical-cultural understanding that intelligence is considered static and measurable (Ireson & Hallman, 2001). This belief about intelligence suggests that some students are naturally more capable than others and this may lead us to treat them differently. Students in higher more academic streams tend to have more homework, expected to work faster, feel more positive about their education, are given more difficult work, and have higher academic and behavioural expectation from their teachers (Hallman & Ireson, 2001). Educators need to have high expectations for all students not just students in academic courses.

There is an insidious thought that sneaks into educators' minds and creates this varied conceptualization of students. It is the idea that some students are innately capable, and others are not. It is more than just the students' environment it is their very genetics that is making them less than. Some have suggested this occurred as the Intelligence

Quotient (IQ) test became normalized and it came with the belief that students had varying degrees of intellectual ability that was static and calculable (Ireson & Hallman, 2001). I am arguing that streaming is based on our perception of students' innate abilities, instead of allowing students to grow and develop. In this system, the teacher views students as unchangeable and fixed entities. An educator's purpose is reduced to placing students into a hierarchy of perceived ability, while the true purpose of an educator, effecting change in students' lives is obscured.

In 2012, German researchers published an article attempting to answer the question "Do academic-track schools make students smarter?". Controlling for as many variables as possible the researchers measured general psychometric intelligence of students before and after they were streamed. The results of his research suggest that students' intelligence increased significantly when they were in the more demanding academic environment as compared to the vocational track. In their conclusion, they suggest that all agents in education should understand that intellectual capacity can be improved by participating in demanding and stimulating educational instruction (Becker, Lüdtke, Trautwein, Köller, & Baumert, 2012). If we want to improve Ontario students' academic achievement, we don't need to create a level for everyone's ability, instead, we need to work at creating educational structures that are demanding and stimulating for all students.

Chapter 3: Methodology

In this chapter, a detailed description of the methods used in the study is presented. This includes the purpose of the study, research questions, research design, information on recruitment of participants and distribution of surveys, history, and selection of instruments, assumptions and ethical considerations.

Purpose

The purpose of this quantitative study is to measure and look for the relationship between streaming and self-theories of students at a Southwestern Ontario High School and its elementary feeder schools. Pre-streamed (elementary students) be compared to post-streamed (secondary) students in the applied and academic streams to examine if there is a difference in their level of self-efficacy and mindset. Student results be used to examine the impact that streaming has on students.

Research Questions

This study aims to address the following research questions:

1. To what degree are streamed secondary schools developing students' self-theories (total self-efficacy (emotional, social and academic) and level of mindset) in students in academic and applied streams?

   Hypothesis:

   H_O: There is no statistical difference between self-theories of applied and academic students in high school.

2. Is there a significant variation in self-theories between secondary academic, secondary applied and elementary students?

   Hypothesis:

H_O: There is no statistical difference between self-theories of secondary students and elementary students who identify as pursuing the same academic pathway in high school.

Research Design

The research design employed in this study was quantitative, causal and comparative. This method was chosen because it was impossible to experimentally control extraneous variables and generate a randomized sample (Salkind, 2010). The research generated quantitative results through surveys by measuring students' mindset and self-efficacy (academic, emotional, social and total) collected through a multiple choice and Likert scale questions survey at a southwestern Ontario public high school and five elementary feeder schools.

Selecting Participants

Students were selected through the purposeful sampling of the elementary and secondary populations from the same Ontario town. An important assumption to note is that sampled students in secondary or elementary would have a similar demographic background (income level, religion, race, type of homelife, etc).   After I received Research and Ethics Board (REB) approval for research on March 5th, 2019, I began the survey portion of my project at the secondary level.   I started visiting classes in the high school over the next two months. My research assistant at the elementary level completed all the elementary school surveys over the same period. Teachers invited the researchers into their classroom when it was convenient, and all teachers chose to participate.   Students were briefed by the researcher and the benefits and risks were

explained. The researcher briefly explained the research to students and a consent form (see Appendix A) was distributed to students and sent home to parents.

The students and parents were given a few days to a week to decide if they wanted to participate in the research. Once parents gave students signed consent to participate in the research, they brought it back on the specified date requested by the researcher. I welcomed all questions and concerns regarding the research and contact information was provided but did not receive any contact from parents. Students who chose to participate in the survey received a series of questions (Appendix B) which was left blank and a zip grade (similar scantron) form where they anonymously filled in answers regarding demographics, mindset, and self-efficacy. The zipgrade sheets were then collected, recorded and results were aggregated according to grade and course pathway (applied or academic). Surveys were conducted over the next two months and data was analyzed starting on May 3rd, 2019. The raffle for the iPad was drawn on June 19th and given to the winning student on June 26, 2019.

Thirty-two percent (178 out of 557) of the elementary school population chose to participate in the quantitative research. In secondary school, twenty percent (166 out of ~800 students) of the students chose to participate. The secondary school population is larger than 800 (967 total) due to the numerous out of school learning programs such as cooperative education and education work programs. The secondary school also contains approximately fifty English as a second language (ESL) students, from which three students responded. These three students were removed from analysis when comparing applied versus academic course pathways.

Instrumentation

The quantitative survey, titled "Self-Efficacy and Mindset Survey" (SeMS) was used in this study. The survey is made up of three sections: Demographics, Mindset Assessment, Self-Efficacy Assessment (Appendix B).

Demographics

The demographic section was comprised of four questions, relating to gender, grade, course pathway and "who was the biggest influence for you selecting your course pathway". For gender, the options were male, female or "in another way not listed". Students were able to select their grade between grade six through grade twelve. Additionally, students were able to select their course pathway (academic, applied, mostly academic, mostly applied, locally developed, ESL). Some younger students in elementary didn't understand initially what a course pathway meant, so they were instructed by the researcher that the academic pathway allowed for university and college acceptance, while college acceptance only requires courses from the applied pathway. Finally, the fourth and final question in the demographic section asked, 'who is the biggest influence on pathway choice', students could select 'parents', 'teachers', 'guidance counsellor', 'you', or 'I don't know' (see Appendix B).

Measuring Mindset with the Mindset Assessment Profile tool

Originally, when I was in the planning stages of this project, I had wanted to measure just the theory of intelligence mindset using the scales originally proposed by Dweck (1999) that demonstrate consistent internal reliability. Unfortunately, I did not receive a response from Carol Dweck after reaching out to her in various ways to use her survey. Consequently, I reached out to Mindsetworks.com and requested the use of their

survey. Their survey presented a wider range of motivational variables along with the

theory of intelligence including the motivational factors; learning goals and efforts and

beliefs. The survey is based on Blackwell et al., (2007) study that examined the

mechanisms that relate the theory of intelligence through motivational factors to

influence academic achievement. Furthermore, self-efficacy was not a motivational

variable that was included in the survey or presented in the research (Blackwell et al.,

2007). This led me to postulate the connection between mindset and self-efficacy and

how they may be influenced by streaming.

I was given permission on Nov 7, 2018, to use the "Mindset Assessment Profile

Tool" as part of this thesis. It is used online (mindsetworks.com) presently and was

created by Mindset Works, Inc. as a quick online survey to measure mindset about

intelligence, learning goals, and beliefs about effort. They deliver personalized feedback

on how to improve your mindset after you submit your assessment online. Up to this

point, it has not been used in rigorous research by itself but instead comes from several

different research-validated tools that have demonstrated internal reliability and

predictive value with respect to one another and achievement outcomes. The survey tests

for mindset or theory of intelligence using two questions taken from Dweck (1999)

complete scale. The Cronbach alpha coefficient showed internal reliability ($\alpha= .78$) in

two samples (N= 373 and N=99) but it contained six items instead of just the two used in

the mindset assessment I chose to use. The first mindset question is positively coded and

the second is reverse coded. The next four items taken for Midgley et al., (1998)

measures task orientation (mastery and performance) learning goals. These four items

were alternately coded and are taken from the PALS survey (Pattern of Adaptive

Learning Survey). The PALS previously demonstrated an internal reliability of α= .73

and α= .77 in two samples (N= 373 and N=99) but consisted of many more items.

Finally, the last two questions were alternatively coded testing 'Effort Beliefs' which was

based on a previous survey produced by Blackwell's unpublished dissertation (2002) and

later published work with her advisor Dweck (Blackwell et al, 2007). This survey

produced an α= .79 and α= .60 in two samples ((N= 373 and N=99). The questionnaire

consists of the previously mentioned subscales and contained the items on a 6-point

Likert-type scale ranging from 1 ('Agree Strongly') to 6 ('Disagree Strongly'). After

completing the survey, I measured the internal reliability of α= .647 with a sample size of

N = 344, which is considered a questionable result just short of reliability (0.7). This

may be due to the limited number of questions and the three different motivational

variables considered within the survey, due to the questionable reliability in our study,

mindset values are used to simply compare mindset between groups.

Measuring Self-Efficacy with the Self-Efficacy Questionnaire for Children (SEQ-C)

Bandura, Pastorelli, Barbaranelli, and Caprara (1999) developed a scale useful for

measuring a general level of self-efficacy of children by measuring three separate

domains: academic self-efficacy (ASE); referring to a child's ability to master academic

challenges; social self-efficacy (SSE) that pertains to a child's ability to master social

challenges; and self-regulatory self-efficacy which refers to a child's ability to overcome

peer pressure. Multiple studies have linked low self-efficacy to affective disorders such

as social disorder and depression (Bandura et al., 1999; Muris, 2002). Furthermore, ESE

has been an especially strong predictor of generalized anxiety (Muris, 2002).

Consequently, Bandura's survey was modified by Muris (2001) to include ESE to

measure for affect regulation instead of self-regulatory self-efficacy and was renamed the Self-Efficacy Questionnaire for Children (SEQ-C) (see Appendix B).

The scale created by Muris (2001) consists of 24 items and is comprised of 8 items for the three sub-domains (ESE, SSE, ASE). Participants choose how much they agree with alternating statements (SSE, ESE, ASE) on a Likert scale, ranging from 'Not at all' to 'Very Well' (See Appendix C). Collectively, the scales are added together to produce a total self-efficacy (TSE) score. The TSE was not used in this study to simplify results.

The SEQ-C has been validated using Belgium students (N=596) ages 12- 19 and the internal reliability from these studies produced Cronbach alphas of .82 for SSE, .84 for ASE and .86 for ESE (Muris, 2002).   The SEQ-C was further tested on students (N= 697) in grades 7 through 12 from the United States with slight word modifications produced a Cronbach alpha of .73 for SSE, .82 for ASE, and .79 for ESE (Suldo & Shaffer, 2007). A more recent analysis produced a Cronbach alpha's ranging from .84 to .86 for ASE and .77 to .86 SSE demonstrating some differences in different ethnic groups (Minter & Pritzker, 2017). The current study produced Cronbach's alpha of .73 for SSE, .82 for ASE, .82 for ESE and .88 for TSE on our Canadian sample of N=344 students from grade 6 through 12. The internal reliability of the SEQ-C part of the survey is valid and produced values that were similar to the results in previous studies.

Ethical Considerations

Research and Ethics Board (REB) approved this study, and there several ethical considerations that needed to be considered when working with students. After REB approval, the school board approved the research after reviewing both the REB approval

and my research proposal. I had to gain the approval of all the principals and all the

teachers before students could be approached. Care was taken to ensure students did not

feel any pressure to participate in the study, especially from their teacher or peers. The

research was presented in class and weeks later the researcher (or assistant) returned after

parental consent was established. Students who completed the parental consent where

put in a draw for an iPad and the ballots were collected separately from the surveys.

After the draw, ballots were destroyed. Students who assented to research submitted

their consent form to the researcher (or assistant) on a specified date and time and

completed the survey apart from their classroom teacher. There was also the concern that

the survey may elicit a negative emotional response, and as a result, the students were

told that they could choose to quit the survey at any time or submit their survey

incomplete (see Appendix B). Additionally, the survey was confidential and analyzed in

aggregate form with no way to identify individual student responses.

In this chapter, I describe my methods of data collection, and my thought process in analyzing the data to address my two research questions. Raw data from the zipgrade sheets were transferred to Statistical Package for the Social Sciences (SPSS), it was analyzed and presented in the following charts and figures.

Demographics

As mentioned previously the SeMSurvey consisted of demographic, mindset and self-efficacy sections. Of the 344 surveys collected, 178 primary and 166 secondary students responded (Table 1).

Table 1: Participation Frequency in Primary and Secondary

	Frequency	Percent
Elementary	178	51.7
Secondary	166	48.3
Total	344	100.0

Table 2 summarizes student participation by gender and school. All five elementary feeder schools chose to participate. Primary school 5 had one student who identified gender 'as another way not listed' and this represents the one missing value in the chart. Approximately, an equal number of males and females chose to participate in the survey.

Table 3 shows a summary of the course pathways students chose in the demographic section of the survey. Students had several different options when selecting their course pathway: 'academic', 'applied', 'mostly academic', 'mostly applied', 'locally developed', and 'ESL'. As mentioned in the method, students in secondary selected their pathway while elementary school selected their course pathway that they intended on

pursuing. At the time of the survey, it should be noted that IB (International

Baccalaureate) students were participating in enriched academic courses in grades 9 and

10 but in further analysis, these students were grouped with academic. ESL students were

excluded from the analysis involving academic and applied groups. No students selected

the locally developed option and it was removed from the chart.

Table 2: Participation Frequency by Gender and School

	Male	Female	Total
Elementary 1	31	30	61
Elementary 2	16	20	36
Elementary 3	8	14	22
Elementary 4	15	14	29
Elementary 5	15	14	30
Secondary	76	90	166
Total	161	182	344

Table 3: Participation Frequency by School and Course Pathway

	Academic	Applied	Mostly Academic	Mostly Applied	ESL	IB	Total
Elementary 1	28	24	5	1	3	0	61
Elementary 2	24	12	0	0	0	0	36
Elementary 3	17	5	0	0	0	0	22
Elementary 4	13	13	3	0	0	0	29
Elementary 5	15	12	0	3	0	0	30
Secondary	74	41	14	21	0	16	166
Total	171	107	22	25	3	16	344

In Table 4, students are grouped by gender, course pathway, and grade. To

prepare for further analysis and ensure large enough sample sizes for inferential statistics

groups were consolidated. For this purpose, 'mostly applied' was combined with

'applied numbers' and 'mostly academic' along with IB numbers were combined with

'academic'. It should be stated that senior students (Grade 11 and 12) were asked to select the "mostly" option if they switched into a different pathway during their more senior grades (ex. students who completed grade 9 and 10 in the academic courses but switch to the college (applied) stream in a more senior grade). There was a significant number of students (21) that choose the 'mostly applied' option. As shown in Table 4, students in grade 9 and 10 applied level classes were much less likely to participate in the survey. Of the high school population, academic course pathway (academic and university courses) students (104 students) participated more frequently than applied pathway (applied and college courses) students (62) in the survey despite representing approximately 40% of the population of the school. Numbers were especially low in grade 9 applied courses with only 8 responding compared to 37 academic students in grade 9.

Table 4: Participation Frequency by Gender, Grade and Course Pathway

| Course Pathway and Gender | Grade | | | | | | | |
	6	7	8	9	10	11	12	Total
Applied Elementary Male	13	10	20	-	-	-	-	43
Applied Elementary Female	12	7	8	-	-	-	-	27
Academic Elementary Male	15	12	13	-	-	-	-	40
Academic Elementary Female	25	24	15	-	-	-	-	64
Applied Secondary Male	-	-	-	3	13	13	5	34
Applied Secondary Female	-	-	-	5	4	7	11	27
Academic Secondary Male	-	-	-	14	15	4	9	42
Academic Secondary Female	-	-	-	23	20	10	10	63
Total	65	53	56	45	52	34	35	340

Table 5 shows the result of the demographic question 4 on the survey (see Appendix B). In this section, students were asked to see 'who is the biggest influence' on their course pathway selection. Interestingly, most students in elementary don't know who is influencing them the most. Half of each elementary group said they didn't know who was responsible for selecting their stream, except for academic boys who were significantly lower at 28%. The elementary academic boys were also much more likely to select that they were responsible for selecting their stream (38%) compared to their elementary peers (applied males (14%), applied females (4%), academic females 14%).

Table 5: Influence by Gender, Grade and Course pathway (Stream)

	Left Blank	Your Parents	Your Teachers	Guidance Counsellor	You	Don't know
Applied Elementary Male	0%	33%	7%	0%	14%	47%
Applied Elementary Female	4%	26%	19%	0%	4%	48%
Academic Elementary Male	0%	28%	8%	0%	38%	28%
Academic Elementary Female	0%	27%	8%	0%	14%	52%
Applied Secondary Male	3%	18%	18%	0%	41%	21%
Applied Secondary Female	0%	11%	19%	4%	52%	15%
Academic Secondary Male	0%	29%	10%	2%	57%	2%
Academic Secondary Female	0%	19%	17%	2%	59%	3%

After corresponding with Peter Muris through email, I followed his suggestion to use percentiles as an effective way of representing self-efficacy results and trends. The percentiles are calculated from all 344 surveys that were analyzed. Of the 344 surveys most students were academic (131 applied, 210 academic and 3 ESL). Due to the higher number of academic students the percentiles tend to skew a bit higher. For example, a 50th percentile score is a very good result for an applied group as they tended to score a bit lower on the surveys. The percentile table (Table 6) was used for each mean result be rounding it to the closest mean on the chart and then recording the corresponding

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percentile. Mindset survey means were not scored in terms of growth mindset and a fixed mindset, which was primarily due to the questionable reliability of the survey ($\alpha =$ .647). Instead used were used for comparative purposes between student groups.

Table 6: Percentile Table for Self-efficacy and Mindset Assessment

Percentiles (N=344)

Percentiles	Mindset Assessment	Academic self-efficacy	Social self-efficacy	Emotional self-efficacy
	M	M	M	M
5	21.13[a]	19.49[a]	20.23[a]	15.68[a]
10	23.75	22.25	23.11	18.99
15	25.77	24.29	24.77	20.34
20	26.99	25.90	25.79	21.79
25	27.83	26.86	26.71	23.23
30	28.60	27.67	27.43	24.09
35	29.43	28.43	28.04	24.95
40	30.38	29.16	28.56	25.64
45	31.30	29.85	29.09	26.27
50	32.09	30.53	29.63	26.84
55	32.73	31.18	30.20	27.54
60	33.37	31.79	30.85	28.31
65	34.00	32.42	31.49	29.09
70	34.79	33.08	32.13	29.86
75	35.66	33.86	32.71	30.74
80	36.69	34.58	33.36	31.81
85	37.86	35.37	34.07	33.03
90	39.15	36.35	34.98	34.19
95	41.09	37.50	36.27	35.68

a. Percentiles are calculated from grouped data.

Analysis of Secondary Academic and Applied Self-Theories

The first step in the analysis was to test the normality of all data sets and then perform the appropriate independent sample t-tests. A Shapiro-Wilk test for normality was run on applied and academic data sets and it was determined that some groups did not demonstrate gaussian distributions according to SPSS. Figures 4 through 7 demonstrates that the histograms pass the visual test of normality, except for some potential outliers in SSE and ASE. The independent t-test is quite robust to issues of

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normality due to the Central Limit Theorem (CLT), with most researchers suggesting

sizes of 25 or 30 are sufficiently large (Howle, 2010). With sample sizes being

sufficiently large enough I needed to determine if outliers were impacting the means in
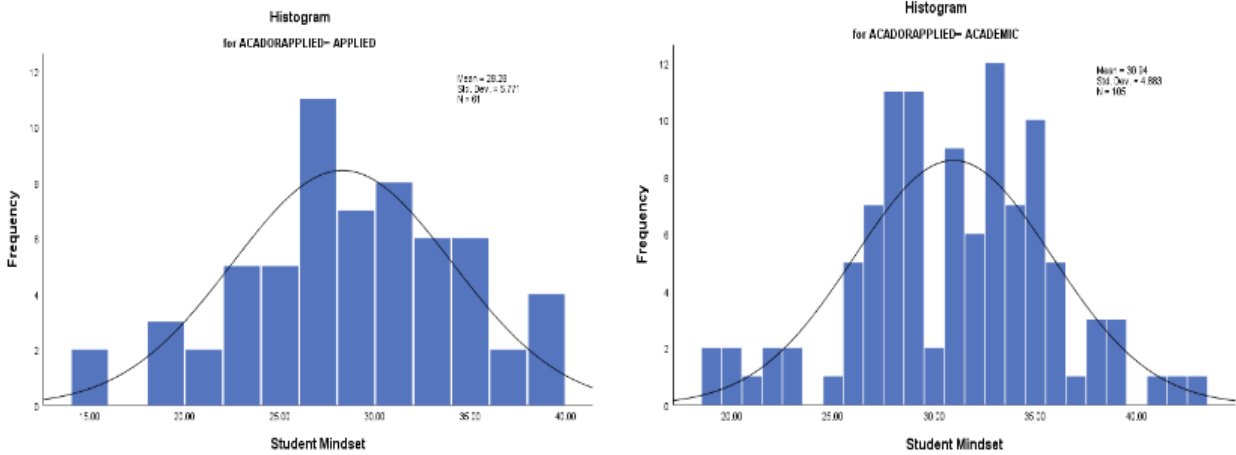
the data sets.

Figure 4. Histograms representing mindsets for secondary applied and academic students

compared to the normal curve. Both demonstrate normality according to the Shapiro-
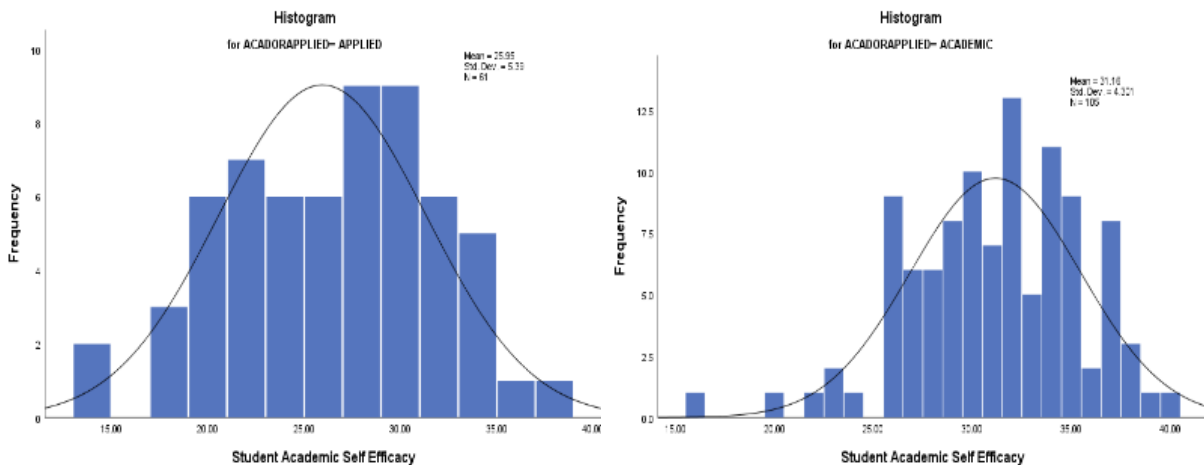
Wilk test.

Figure 5. Histograms representing academic self-efficacy for secondary applied and

academic students compared to the normal curve.
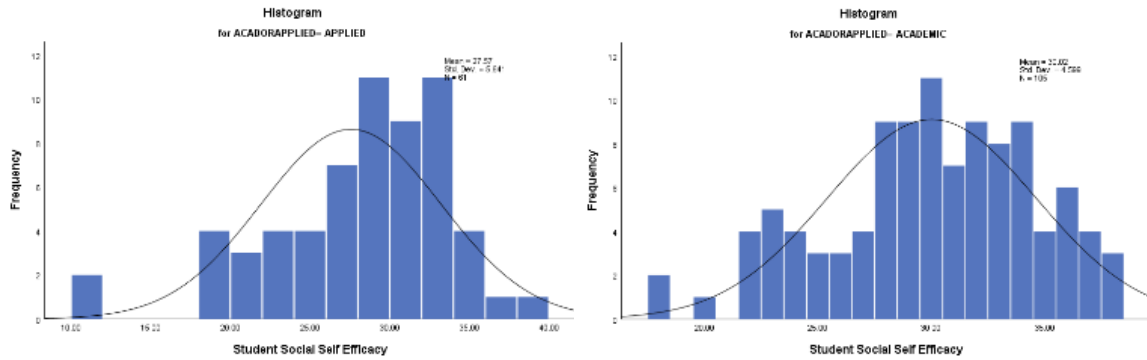
Figure 6. Histograms representing social self-efficacy for secondary applied and academic students compared to the normal curve. Outliers appear to be present in Academic and Applied data sets.
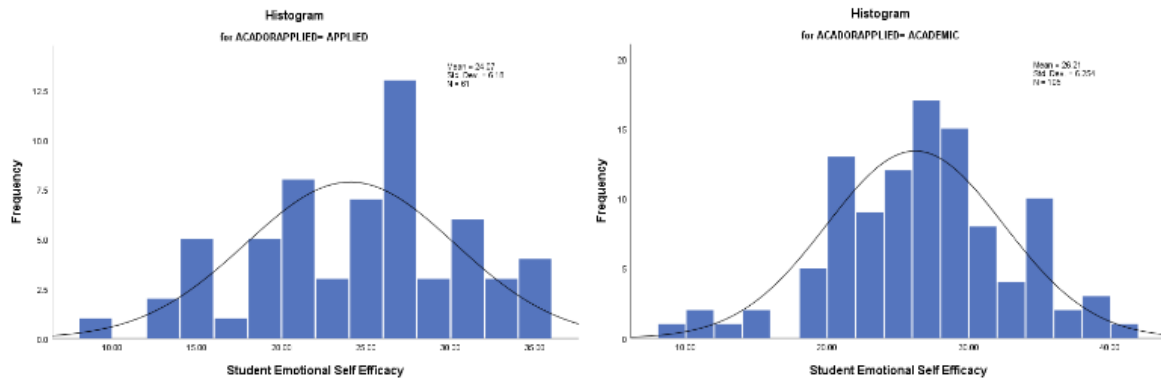
Figure 7. Histograms representing emotional self-efficacy for secondary applied and academic students compared to the normal curve. Outliers do not appear to be obvious.

To look for outliers within data sets, box and whisker plots (Figures 8 and 9) were created. While several data points were outside of the 1.5 Interquartile range (IQR), none of them were outside 3 IQR according to the SPSS. An outlier is defined by Hoaglin and Iglewicz (1987) as falling outside the 2.2 IQR. No data points were larger than 3 IQR in Box and Whisker plots produced by SPSS. It also appears that SSE produced the greatest number of outliers with the farthest deviation from the mean (see Figure 6). In addition, there appears to be one extreme data point ASE shown in Figure 5.
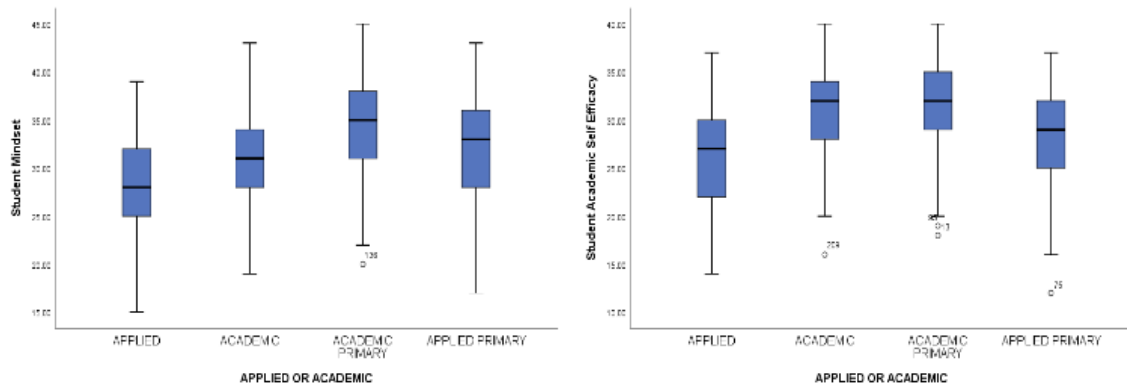
Figure 8. Box and whisker plots for student mindset and academic self-efficacy. Dots represent outliers that are greater than 1.5 IQR but smaller than 3 IQR which is considered an extreme outlier in SPSS.
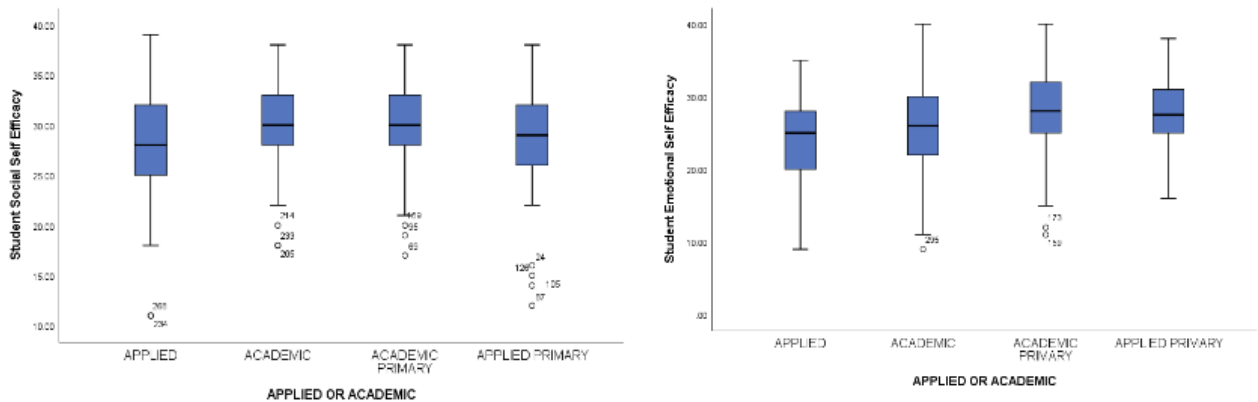
Figure 9. Box and whisker plots for Applied and Applied Primary (elementary) data sets. No data points were outside the 3 IQR but there are more extreme data points in the left plot.

As a result, of the analysis of outliers, six data point outliers were removed from the SSE data set. Two secondary applied data points (case 234 and 268) and four elementary (case 24, 87, 105 and 126) data points were removed as they were the most extreme outliers. In addition, one outlier from a female elementary ASE (case 69) was removed that skewed far outside the normal curve. Table 7 shows the resulting Shapiro-

Wilk test after all outliers have been removed. Table 8 demonstrates the difference

between academic and applied course pathways in secondary school. Secondary

academic students demonstrate higher means in mindset, ASE, SSE, and ESE.

Table 7: Normality of Self-Efficacy and Mindset for Secondary Students

| | Course Pathway | Shapiro-Wilk | | |
		Statistic	df	Sig.
Student Mindset	Secondary Applied	.983	61	.544
	Secondary Academic	.981	105	.148
	Elementary Applied	.971	70	.098
	Elementary Academic	.984	105	.225
ASE	Secondary Applied	.979	61	.379
	*Secondary Academic	.975	105	.041
	*Elementary Applied	.963	70	.036
	Elementary Academic	.960	105	.003
SSE	Secondary Applied	.970	59	.159
	Secondary Academic	.972	105	.024
	Elementary Applied	.973	66	.156
	*Elementary Academic	.967	105	.010
ESE	Secondary Applied	.977	61	.294
	Secondary Academic	.982	105	.175
	Elementary Applied	.986	70	.622
	Elementary Academic	.970	105	.017

*Data does not demonstrate normality

Table 8: Descriptive Statistics for Secondary Applied and Academic students

	Pathway	n	M	SD	Percentile
Mindset assessment	APPLIED	61	28.28	5.77	30th
	ACADEMIC	105	30.94	4.88	45th
ASE	APPLIED	61	25.95	5.39	20th
	ACADEMIC	105	31.16	4.30	55th
SSE	APPLIED	59	28.13	4.80	35th
	ACADEMIC	105	30.02	4.60	55th
ESE	APPLIED	61	24.07	6.18	30th
	ACADEMIC	105	26.21	6.25	40th

An independent t-test and Hedge's g calculations were performed to determine the significance and effect size of all self-efficacy and mindset drops between academic and applied course pathways. Hedge's g calculations account for differences in sample sizes when calculating effect size and it is interpreted similarly to Cohen's d (Howle, 2010). As a result, all Hedge's calculations are recorded with the d variable in the following charts. To Cohen a large effect size is determined as a Cohen's d value over .8, a medium effect size is over .5 and a small effect size is .3 (Cohen, 1988). Table 9 confirms the significance at 95% confidence in the drop in self-theories when comparing academic to applied students. Furthermore, mindset assessment, (p= .0018), ASE (p= 3.5 x 10^{-9}) and SSE (0.0028) are all significant differences at 99% confidence. Effect sizes are substantial with a medium effect size (.51) drop for mindset, large effect size (1.1) drop for ASE, medium effect size (.39) for SSE and a small effect size (.34) drop in ESE. It is noted that in Table 7, that secondary academic ASE and secondary applied SSE do not demonstrate normality. However, they have sufficiently large sample sizes, do not contain extreme outliers and this allows the independent t-test. It should also be noted

that the variances were different for the ASE test and this explains the smaller degrees of

freedom (df) as variances were not assumed equally in the calculation.

Table 9: Independent t-tests and Effect Size Results Comparing Secondary Applied and

Academic Course Pathways

Secondary Scale	Applied Mean ± SD	Academic Mean ± SD	df	F	p	d	95% CI Upper	Lower
Mindset	28.28 ± 5.77	30.94 ± 4.88	164	1.99	*.0018	.51	-4.33	-1.00
ASE	25.95 ± 5.39	31.16 ± 4.30	104	6.32	*4 x 10^{-9}	1.1	-6.81	-3.61
SSE	28.13 ± 4.80	30.02 ± 4.60	162	.054	.014	.39	-3.39	-.381
ESE	24.07 ± 6.18	26.21 ± 6.25	164	.076	.034	.34	-4.12	-.16

*are also significant at p <0.01

As demonstrated in Table 9, there is indeed a significant difference in self-

theories of academic and applied students in secondary. I tested to see if a similar

difference exists in the same student groups in elementary. If it is similar difference that

would imply that factors are not influencing kids disproportionately. Table *10* shows the

differences between students in elementary school who plan on pursuing the applied and

the students who plan on pursuing academic in high school. Several data sets did not

demonstrate normality, but again the sample sizes were sufficiently large (105 and 70)

enough to run the independent t-test with confidence.

Table 10: Descriptive Statistics for Elementary Applied and Academic students

	Elementary	n	M	SD	Percentile
Mindset	ACADEMIC	105	34.26	5.37	65th
	APPLIED	70	31.70	6.31	50th
ASE	ACADEMIC	104	32.02	4.52	45th
	APPLIED	70	28.27	5.54	35th
SSE	ACADEMIC	105	30.05	3.91	55th
	APPLIED	66	29.56	3.89	45th
ESE	ACADEMIC	105	27.96	5.38	60th
	APPLIED	70	27.77	5.16	55th

Table 11: Independent t-tests and Effect Size Results Comparing Elementary Applied

and Academic Course Pathways

Primary Scale	Academic Mean ± SD	Applied Mean ± SD	df	F	p	d	95% CI Upper	95% CI Lower
Mindset	34.26±5.37	31.70±6.31	173	1.35	*.0045	.44	0.24	4.87
ASE	32.02±4.52	28.27±5.54	173	3.03	*2 x 10^-6	.83	2.24	5.53
SSE	30.05±2.91	29.56 ± 3.89	169	.311	.43	-	-0.72	1.70
ESE	27.96±5.38	27.77±5.16	173	.015	.82	-	-1.94	2.32

*are also significant at p <0.01

Table 11 suggests that differences already exist between academic and applied

student groups in elementary. A significant difference between mindset (.44) exists

between students who identify as planning on taking different pathways that are very

similar to the difference in secondary (.51). This suggests that the transition to secondary

may not be influencing the mindsets of students. Conversely, there are new trends

between the elementary groups. The effect size difference in ASE in elementary (.83) is

slightly smaller than the effect size difference in secondary (1.1). Additionally,

secondary student groups exhibit small differences in ESE (.34) and medium effect size

in SSE (.49) in secondary. In contrast, elementary students who plan on taking different

course pathways show no significant differences in SSE and ESE. While differences

already exist in elementary students it appears the gap between applied and academic

students widens in secondary to include larger ASE, SSE, ESE differences.

Analysis of Primary and Secondary Students' Self-Theories

After demonstrating the significant difference in mindset and self-efficacy within

secondary school, I sought to answer my second research question. I was wondering how

I could analyze my data to look for any significant differences in self-theories as a result

of streaming. In other words, I wanted to determine how groups any unequal changes in

student groups to explain the increasing gap in secondary students' self-theories.   I had

collected data before students had been streamed (elementary) and after they have been

streamed (secondary) from the same community. A limitation of this study, aside from

the regular problems (sample size, representative samples, etc.) is the age difference

between elementary and secondary students. Student groups could be potentially

changing their self-theories naturally as they get older and become adults. To test this

idea further, I decided to compare students in elementary who planned on pursuing a

pathway (ex. applied) with their secondary counterparts (secondary applied students).

In figures 10 through figure 12 secondary data sets are on the left and elementary

(Primary) data sets are on the right for the purpose of comparing the groups that undergo

independent t-test. All histograms show the distribution before the outliers were

removed. Aside from the outliers in SSE and the one case in ASE, the data sets again
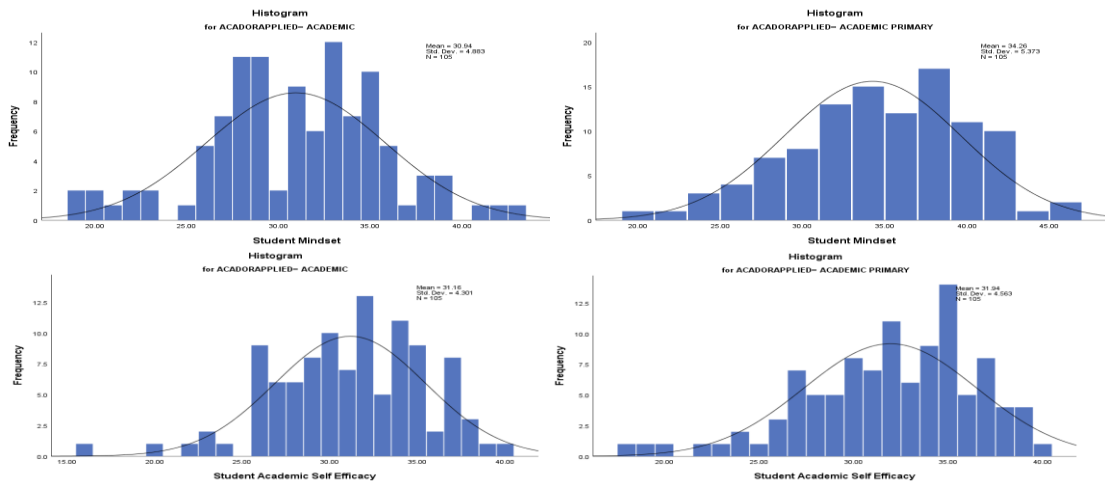
appear to pass the "eye test" for normality.

Figure 10. Normal distributions of mindset and academic self-efficacy for secondary and

elementary students who identified as academic.
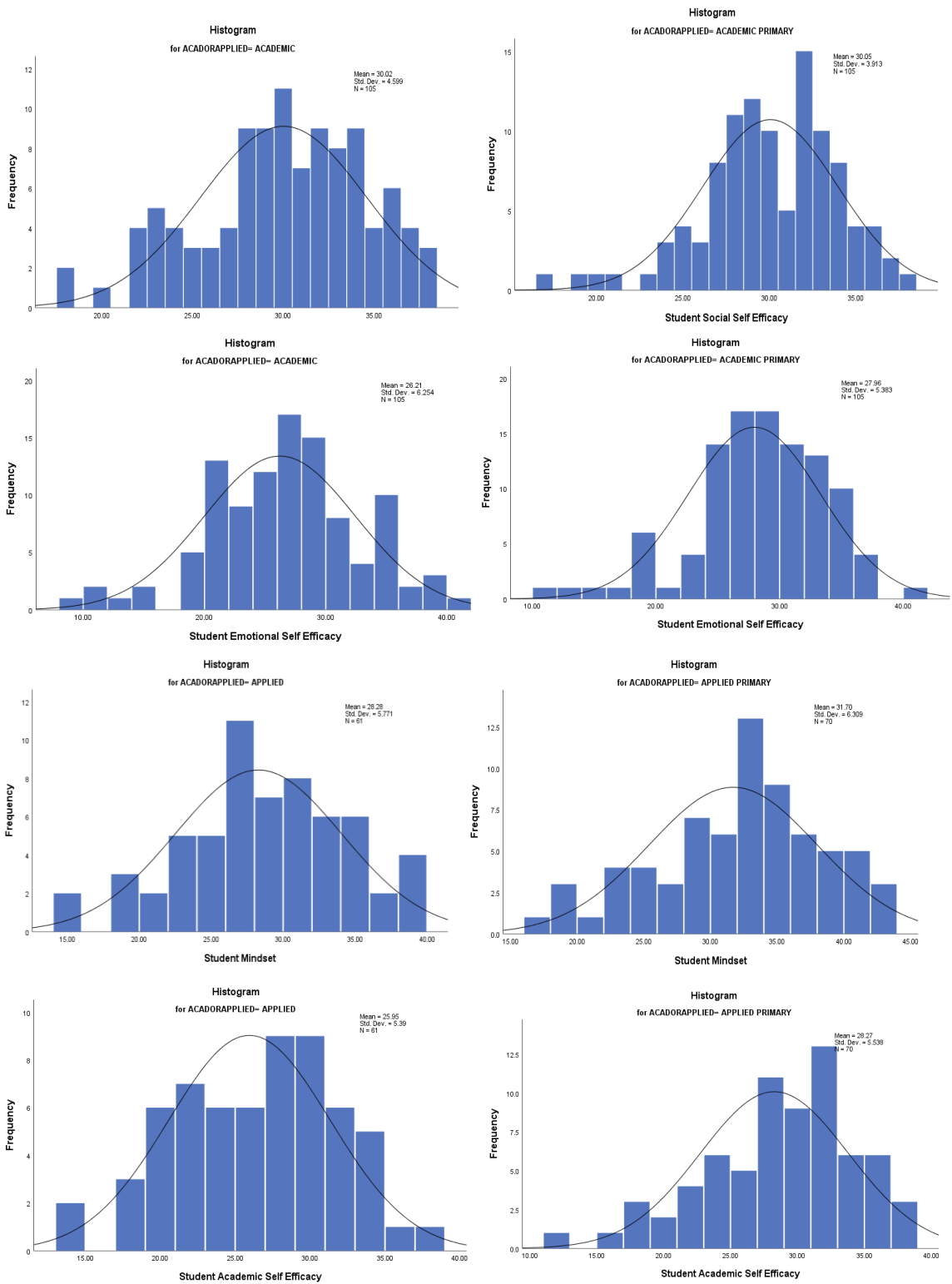
Figure 11. Normal distributions of mindset and social, emotional and academic self-efficacy for both various secondary and elementary student groups.
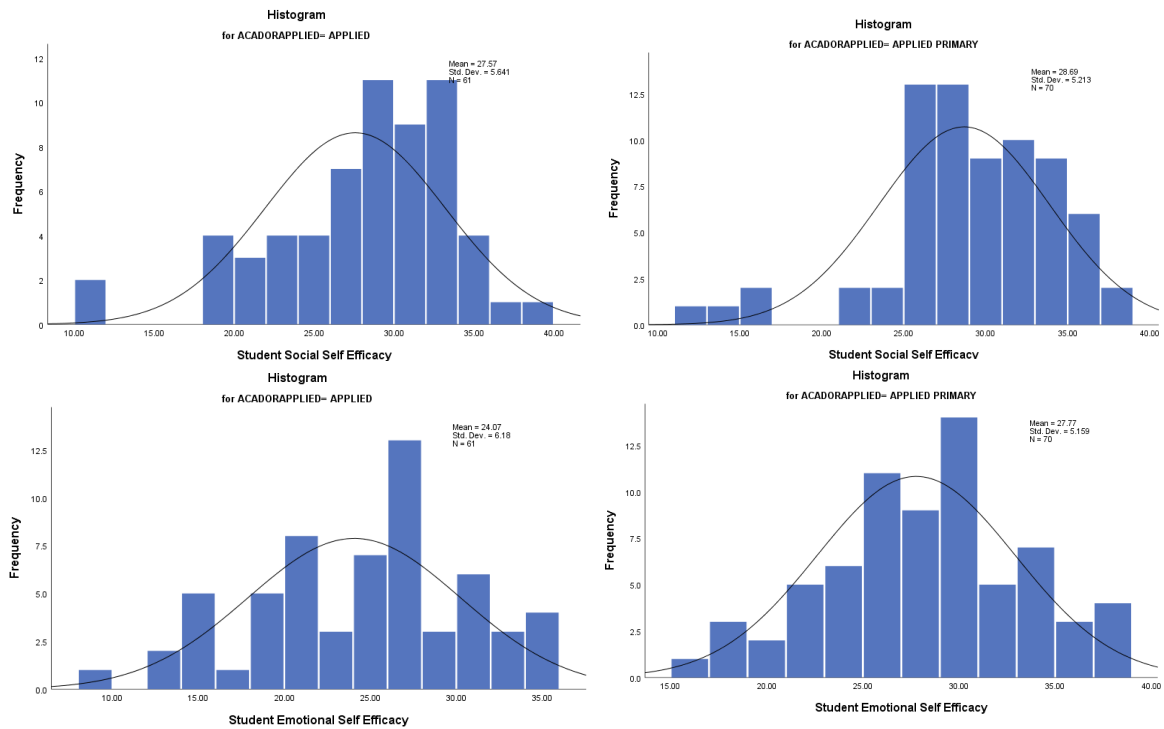
Figure 12. Normal distributions of social and emotional self-efficacy for secondary and elementary students who identified as applied. Outliers in social self-efficacy were removed before independent t-test analysis.

There were 105 students who identified as academic students in elementary and exactly 105 students who identified as academic pathway students in secondary. Tabale 12 summarizes that secondary academic students scored lower in mindset (45th percentile) and ESE (40th) compared to their elementary school peers (mindset 65th percentile and ESE 60th percentile). ASE and SSE appear to demonstrate very little difference.

Table 12: Descriptive Statistics for Secondary and Elementary Academic students

	Pathway	n	M	SD	Percentile
Mindset assessment	ACADEMIC SECONDARY	105	30.94	4.88	45th
	ACADEMIC ELEMENTARY	105	34.26	5.37	65th
Academic self-efficacy	ACADEMIC SECONDARY	105	31.16	4.30	55th
	ACADEMIC ELEMENTARY	104	32.02	4.52	60th
Social self-efficacy	ACADEMIC SECONDARY	105	30.02	4.60	55th
	ACADEMIC ELEMENTARY	105	30.048	3.91	55th
Emotional self-efficacy	ACADEMIC SECONDARY	105	26.21	6.25	45th
	ACADEMIC ELEMENTARY	105	27.96	5.38	60th

Table 13 compares academic students in secondary school and a corresponding group of students in elementary school. It confirms a significant mindset decrease from elementary (65th percentile) to secondary (45th percentile) as medium effect size (.65) drop. ESE demonstrates a small effect size drop (.30) between elementary (60th percentile) to secondary (45th percentile) for academically streamed students. This is not a large effect size change and is considered almost unobservable in practice (Cohen, 1988). Additionally, there was no significant difference in ASE and SSE when comparing these academic students in primary and secondary.

Table 13: Independent t-tests and Effect Size Results Comparing Academic Secondary with Elementary Students

Scale	Academic Secondary Mean ± SD	Academic Elementary Mean ± SD	df	F	p	d	95% CI Upper	95% CI Lower
Mindset	30.94 ± 4.88	34.26 ± 5.37	208	1.41	*5 x 10^{-7}	.65	-4.71	-1.92
ASE	31.16 ± 4.30	32.02±4.52	207	.144	.161	-	-2.06	.35
SSE	30.02 ± 4.60	30.05 ± 3.91	208	2.78	.961	-	-1.19	1.13
ESE	26.21 ± 6.25	27.96 ± 5.38	208	1.56	.031	.30	-3.34	-.165

*emotional self-efficacy is significant at p < .001

Compared to academic students applied students appear to demonstrate larger

decreases in self-theories as they enter secondary school. Table 14 demonstrates

elementary applied students have higher levels of mindset (45th to 30th percentile), ASE

(35th to 20th percentile) and ESE (55th to 30th percentile) compared to their secondary

applied peers. Like the academic groups discussed previously, there is no significant

difference between SSE as students enter secondary school as confirmed by the

independent t-test in Table 14. Table 15 confirms the larger decreases in applied students

as significant with larger effect size: mindset assessment (medium effect size d=.56),

ASE (small/ medium effect size d= .42) and ESE (medium effect size d= .60).

Table 14: Descriptive Statistics for Secondary and Elementary Applied Students

	Pathway	n	M	SD	Percentile
Mindset	APPLIED SECONDARY	61	28.28	5.77	30th
	APPLIED ELEMENTARY	70	31.7	6.31	45th
ASE	APPLIED SECONDARY	61	25.95	5.39	20th
	APPLIED ELEMENTARY	70	28.27	5.54	35th
SSE	APPLIED SECONDARY	59	28.13	4.80	35th
	APPLIED ELEMENTARY	66	29.56	3.89	50th
ESE	APPLIED SECONDARY	61	24.07	6.18	30th
	APPLIED ELEMENTARY	70	27.77	5.16	55th

Table 15: Independent t-tests and Effect Size Results Comparing Applied Secondary and

Elementary Students.

	Applied Secondary	Applied Elementary	df	F	p	d	95% CI	
Scale	Mean $\pm$ SD	Mean $\pm$ SD					Upper	Lower
Mindset	28.28 $\pm$ 5.77	31.7 $\pm$ 6.31	129	4.64	*.0016	.56	-5.52	-1.31
ASE	25.95 $\pm$ 5.39	28.27 $\pm$ 5.54	129	4.47	.017	.42	-4.21	-.429
SSE	28.13 $\pm$ 4.80	29.56 $\pm$ 3.89	123	1.239	.070	-	-2.97	.116
ESE	24.07 $\pm$ 6.18	27.77 $\pm$ 5.16	129	1.54	*.00028	.60	-5.67	-1.75

Note. *significant at $< .01$

When comparing secondary students with their corresponding (applied or academic) elementary students, both academic and applied groups demonstrated a similar medium effect size drop on the mindset assessment (.65 academic groups versus .56 for applied groups) and no significant difference in SSE. In contrast, applied students demonstrate larger decreases in secondary school compared to their academic peers (see figure 13 through 16). In summary, applied students demonstrate a medium effect size drop in ASE (.42) and ESE (.60) while academic students showed no significant difference ASE, and small effect size drop of ESE (.30). While inequalities in self-theories exist in primary school, the transition to secondary school impacts applied students proportionally more negatively than their academic peers.
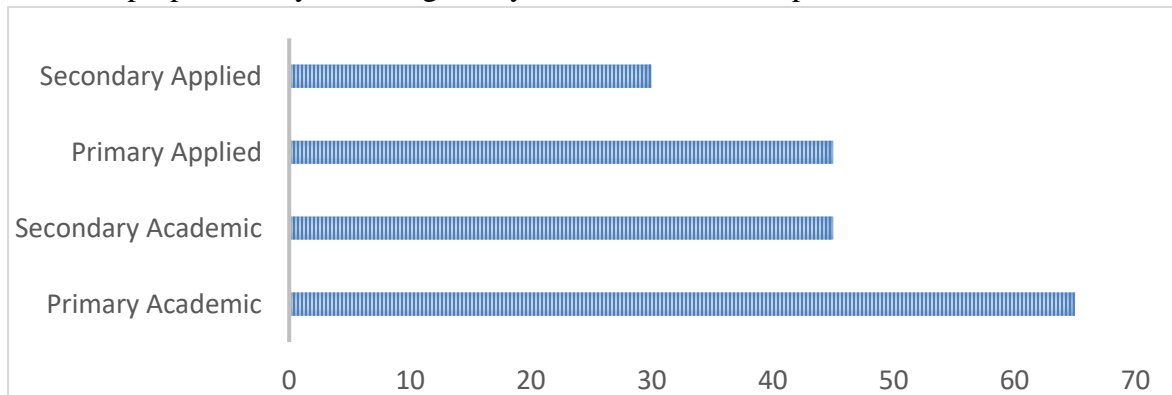

Figure 13. Mindset percentiles of secondary and elementary students. Notice the more significant drop for applied students.
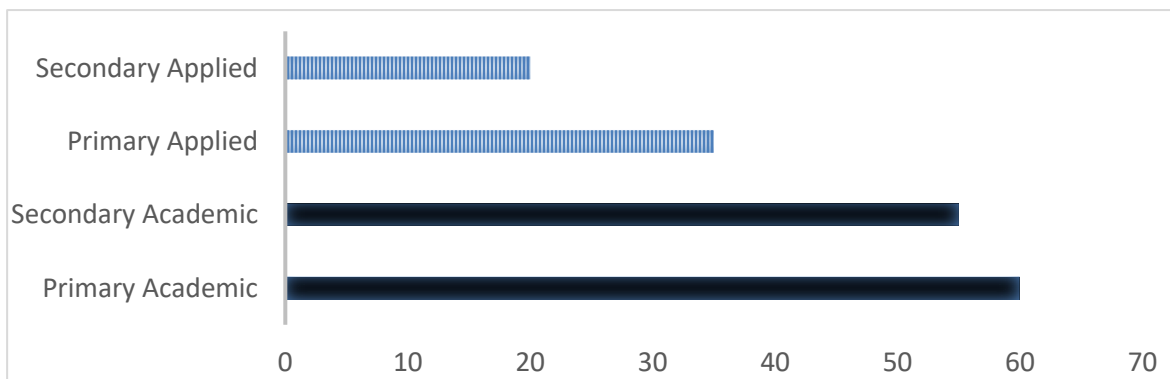

Figure 14. Academic self-efficacy percentiles of secondary and elementary students. Notice the large drop in applied students.

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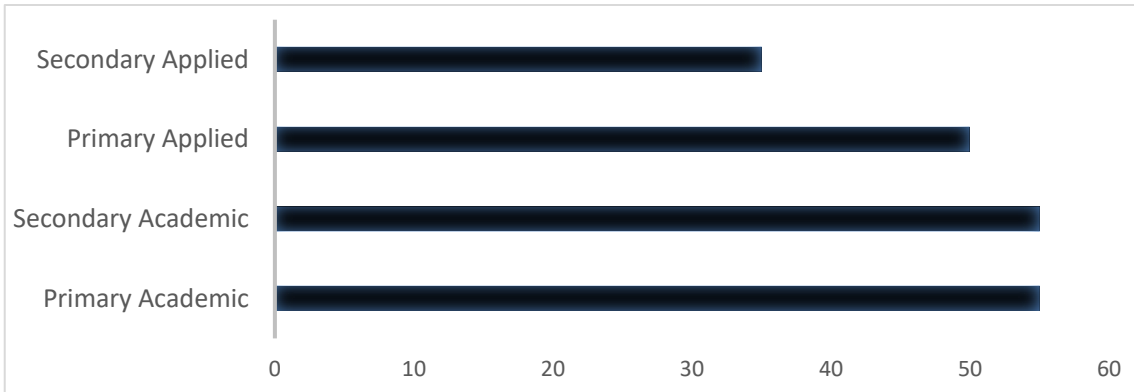
Figure 15. Social self-efficacy percentiles of secondary and elementary students showing consistent results within applied and academic groups as the applied difference is not significant.
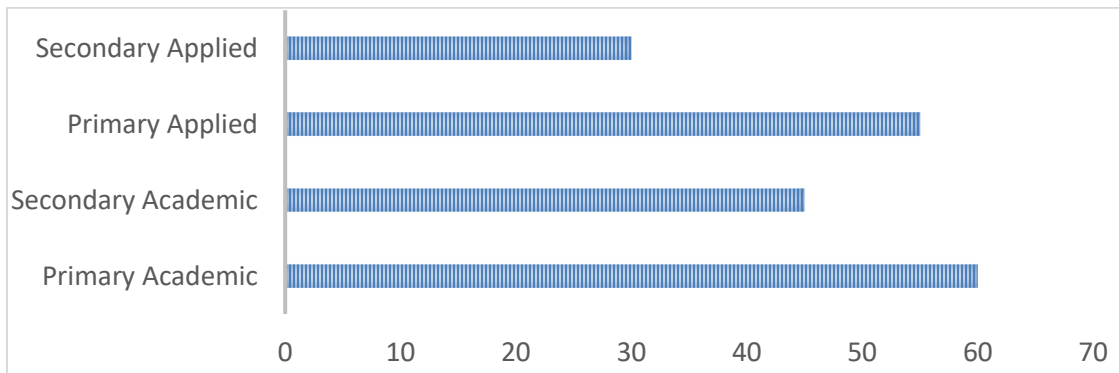
Figure 16. Emotional self-efficacy percentiles of secondary and elementary students. Notice the more significant drop for applied students.

Considering Gender along with Course Pathway in Elementary and Secondary

To further establish how groups are changing and increasing the gap in self-theories, groups were divided by gender in addition to their course pathway and compared to their elementary peers.   Gender differences can contribute to differences in self-efficacy as established by previous research (Muris, 2002; Vera et al., 2004). The dataset (N=344) was divided up into 8 different groups with elementary (pre-streamed) subgroups being compared with their secondary (post-streamed) counterparts. Elementary and Secondary groups each contained students who identified as Academic

Girls, Academic Boys, Applied Girls, and Applied Boys. Dividing the data (M=344) into 8 smaller groups (see Table 16) meant some data sets were as small as n= 27, which in turn suggested that the CLT still apply to the data (Howle, 2010). The histograms shown in Figure 21 through 24 show the different groups analyzed according to gender, course pathway, and elementary or secondary. The Box and whisker plots are shown in Figure 17 through 20 showing the data before any outliers were removed from data sets.
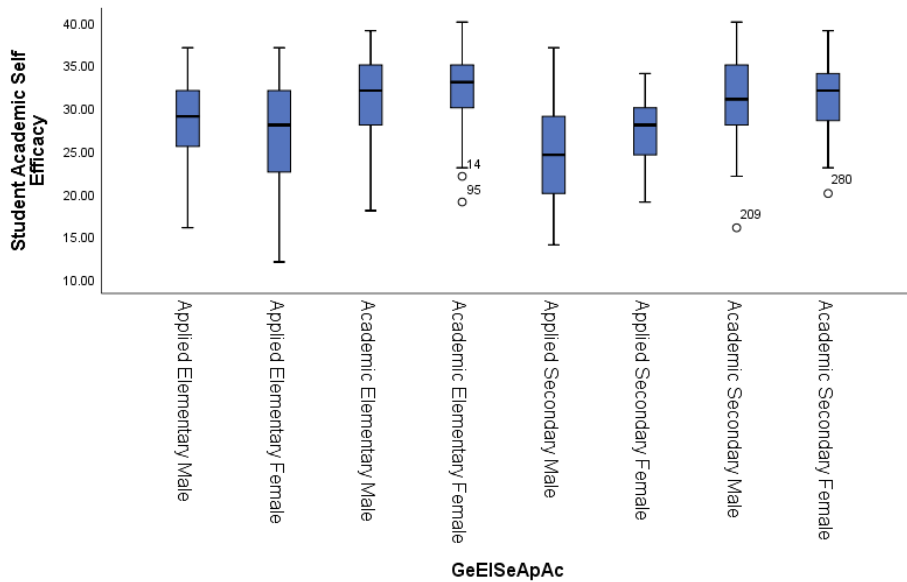
Figure 17. Box and whisker of Mindset comparing elementary and secondary groups.
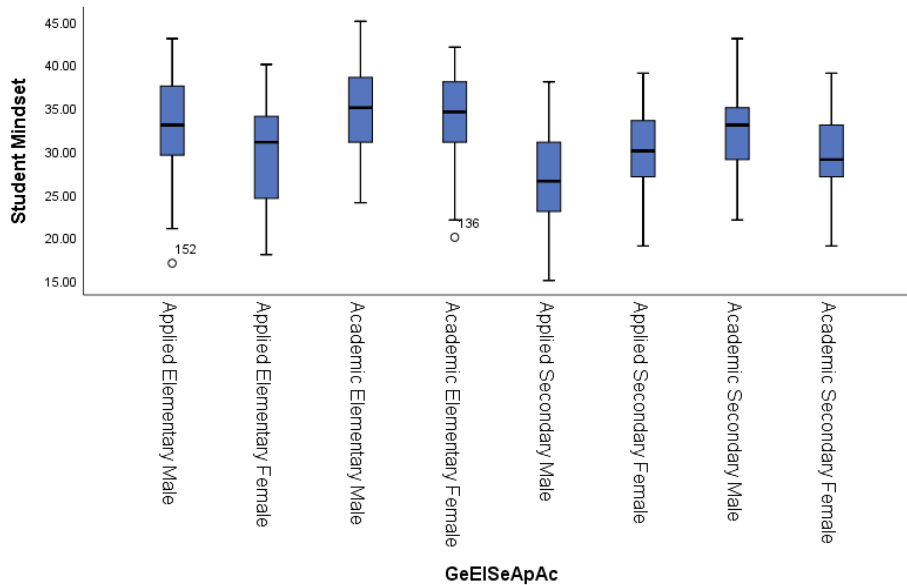
Figure 18. Box and whisker of ASE comparing elementary and secondary groups.
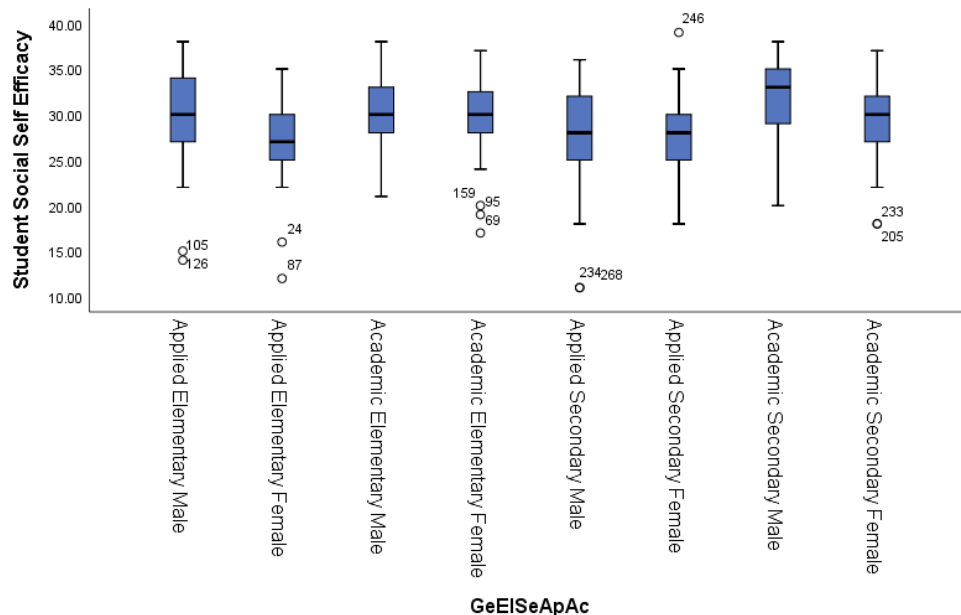
Figure 19. Box and whisker of SSE comparing elementary and secondary groups. Data points 87, 105, 87, 126, 234, 268 were removed as they were considered more extreme outliers.

Figure 20. Box and whisker of ESE comparing elementary and secondary groups

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Figure 21. Histograms showing the relationships of Mindset comparing elementary and

secondary gender groups.

Figure 22. Histograms showing the relationships of ASE comparing elementary and

secondary gender groups

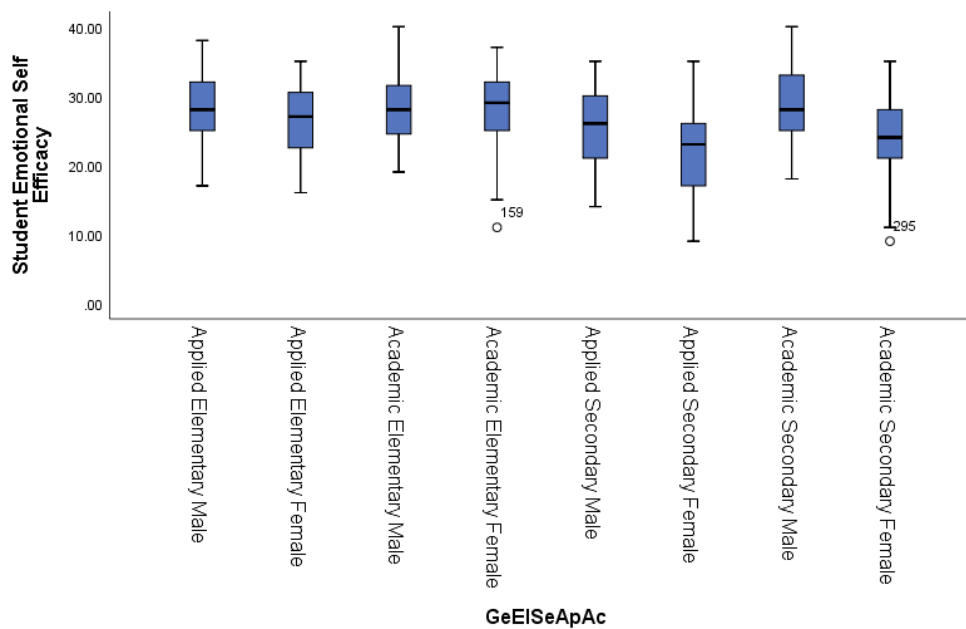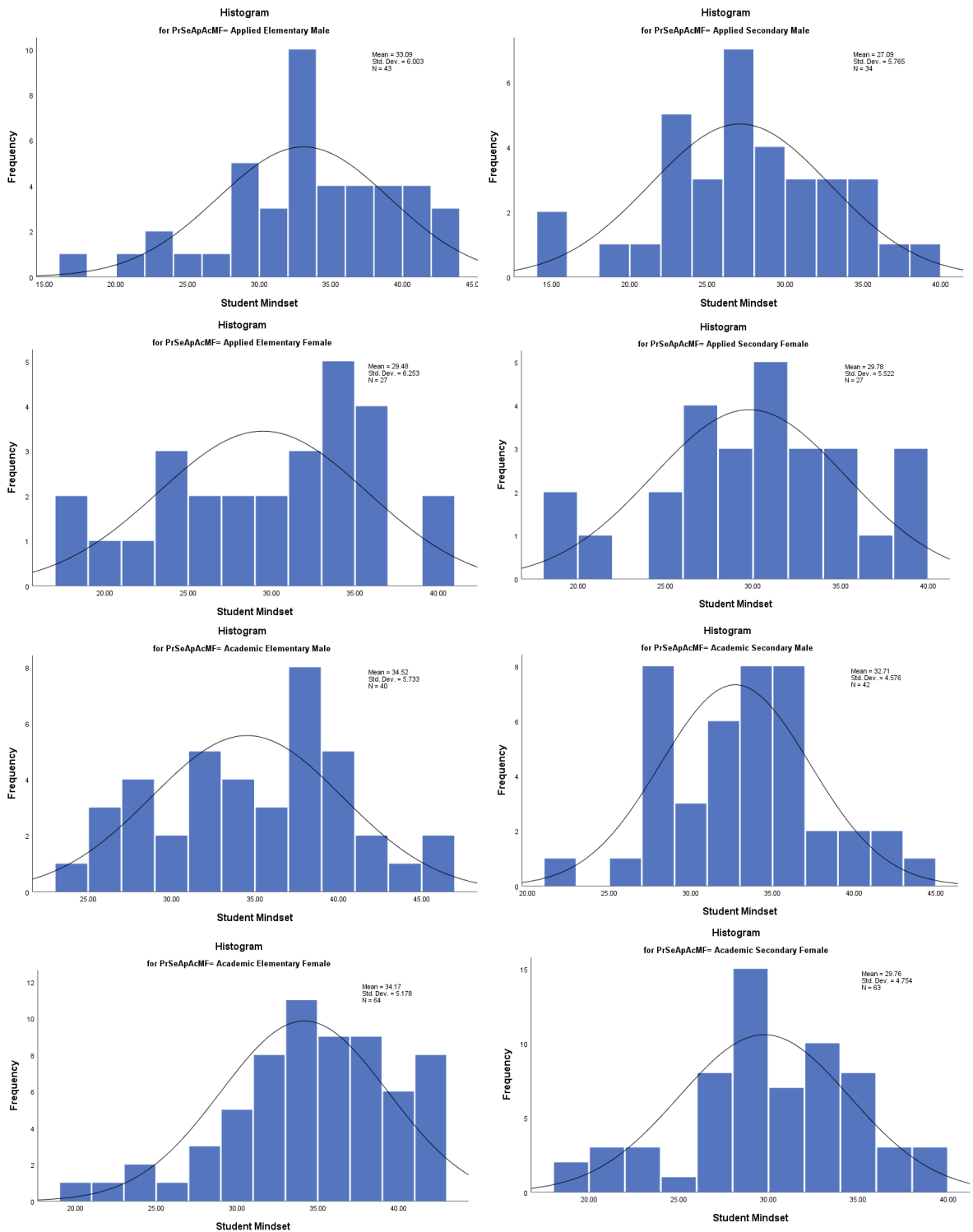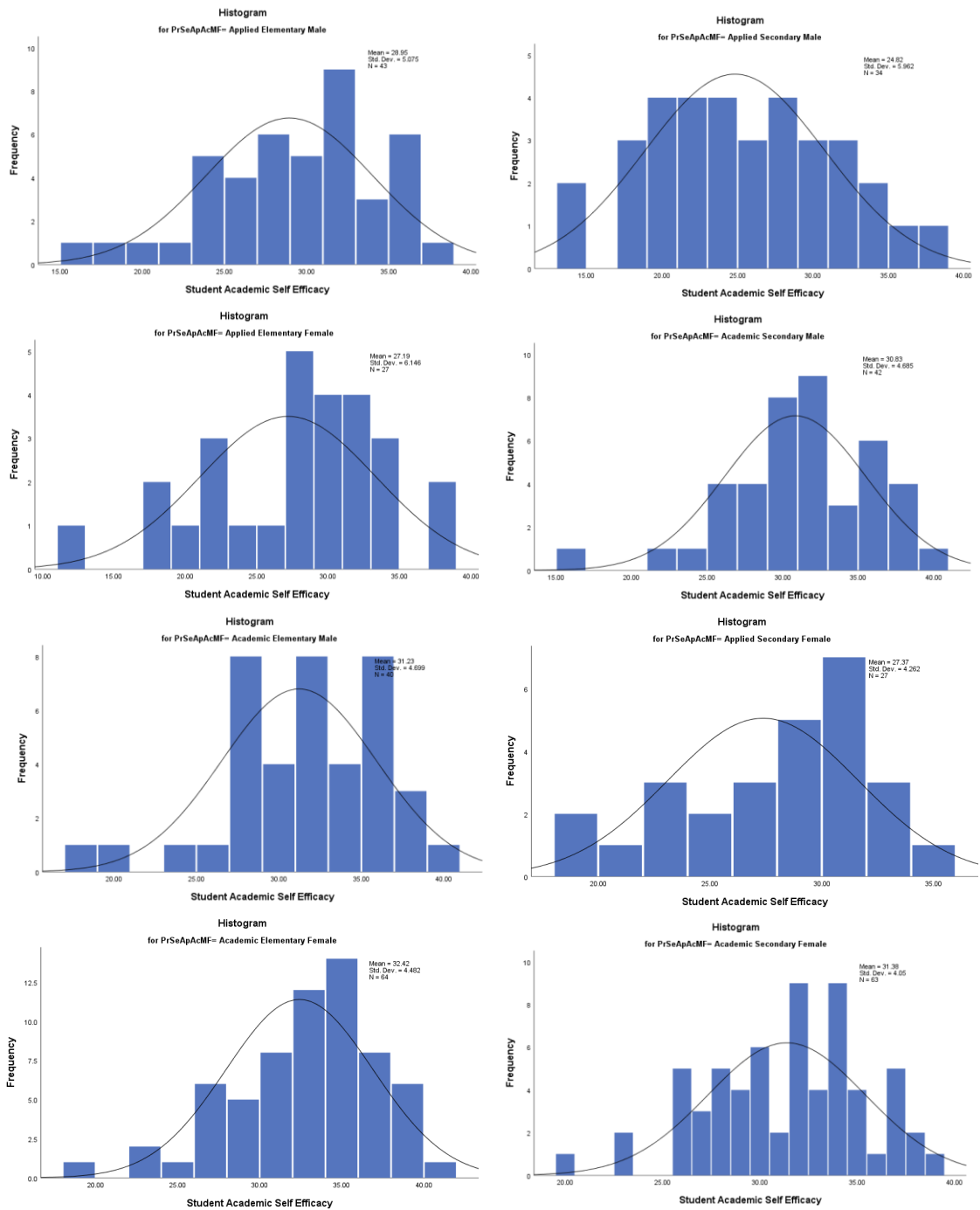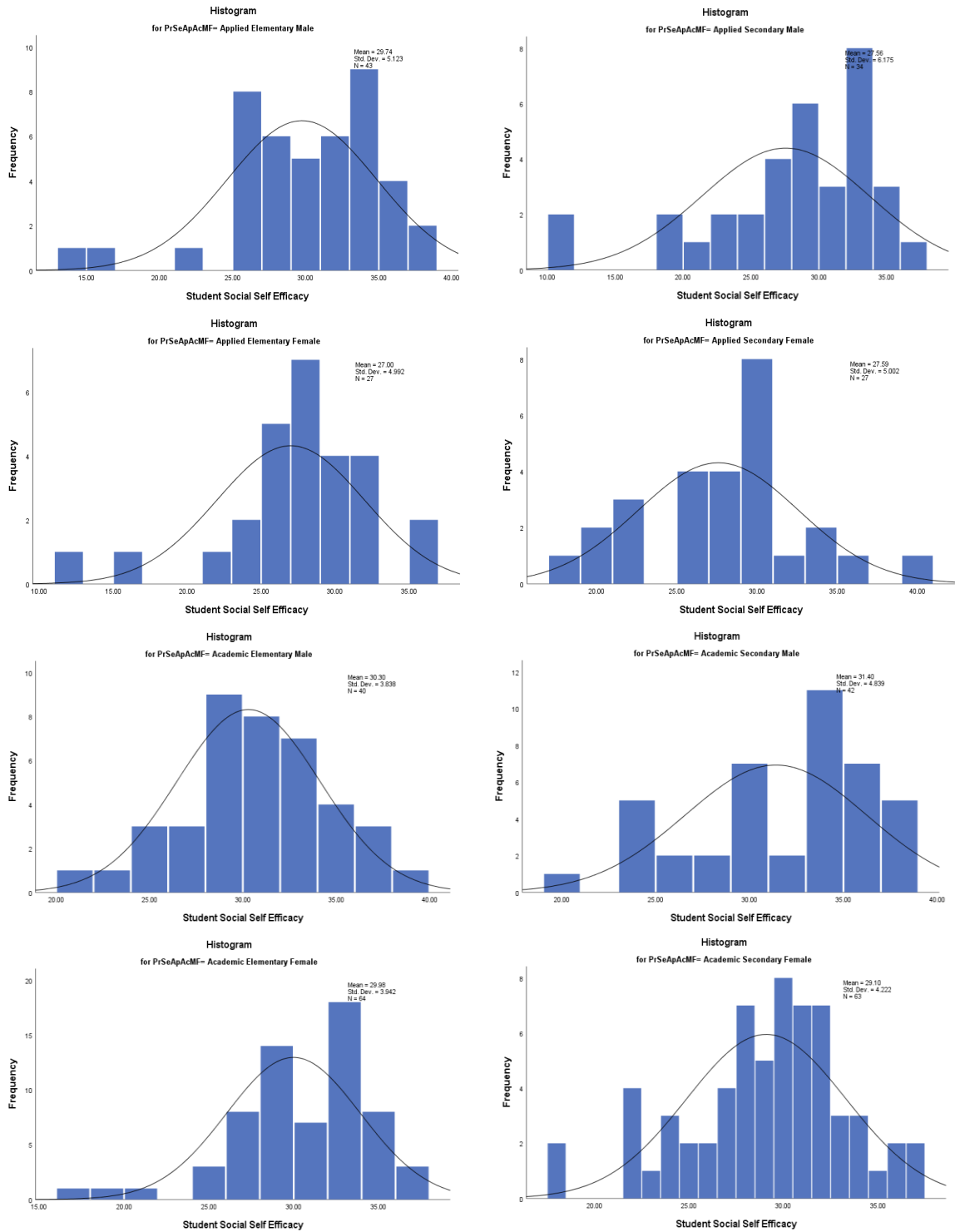Figure 23. Histograms showing the relationships of SSE comparing elementary and

secondary gender groups. Notice the increase in outliers.
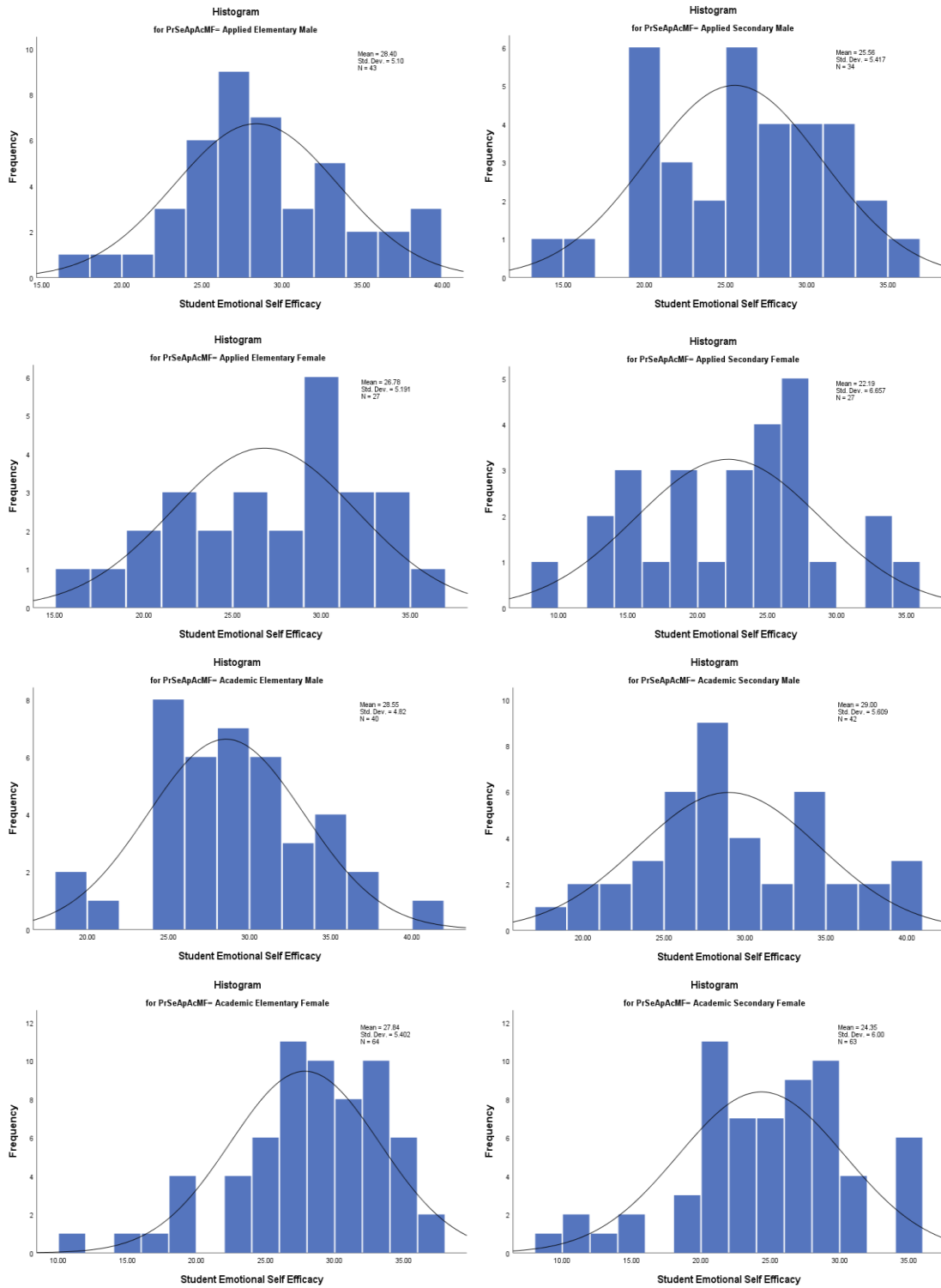
Figure 24. Histograms showing the relationships of ESE comparing elementary and

secondary groups. Notice the increase in outliers.

Table 16: Gender, School and Course Pathway Tests of Normality

	Group	Shapiro-Wilk		
		Statistic	df	Sig.
Mindset Survey	Applied Elementary Male	.967	43	.241
	Applied Elementary Female	.956	27	.300
	Academic Elementary Male	.968	40	.301
	Academic Elementary Female	.963	64	.053
	Applied Secondary Male	.977	34	.678
	Applied Secondary Female	.962	27	.408
	Academic Secondary Male	.980	42	.655
	Academic Secondary Female	.968	63	.101
ASE	Applied Elementary Male	.964	43	.196
	Applied Elementary Female	.958	27	.340
	Academic Elementary Male	.951	40	.083
	Academic Elementary Female	.959	63	.034
	Applied Secondary Male	.977	34	.687
	Applied Secondary Female	.946	27	.174
	Academic Secondary Male	.967	42	.255
	Academic Secondary Female	.975	63	.238
SSE	Applied Elementary Male	.968	41	.299
	Applied Elementary Female	.968	25	.600
	Academic Elementary Male	.984	40	.839
	Academic Elementary Female	.958	63	.032
	Applied Secondary Male	.952	32	.162
	Applied Secondary Female	.968	27	.549
	Academic Secondary Male	.925	42	.009
	Academic Secondary Female	.967	63	.092
ESE	Applied Elementary Male	.973	43	.388
	Applied Elementary Female	.955	27	.277
	Academic Elementary Male	.981	40	.715
	Academic Elementary Female	.957	64	.027
	Applied Secondary Male	.966	34	.357
	Applied Secondary Female	.973	27	.695
	Academic Secondary Male	.977	42	.538
	Academic Secondary Female	.964	63	.064
	Applied Secondary Female	.967	43	.241

Note. All groups are over 25, so the CLT applies even though some groups don't demonstrate normality.

After normality of all the data sets was established (see Table 16) groups in elementary of the same gender and course pathway were compared. The data in Table 17, suggests that applied males in the elementary schools are quite average: 55th percentile for the mindset assessment, 40th percentile for ASE, and 50th percentile for both SSE and ESE. In contrast, the secondary school applied males were significantly lower in mindset (20th percentile), ASE (15th percentile) and ESE (25th percentile). SSE did drop as well but was not deemed significant by the independent t-test (Table 18).

Table 17: Descriptive Statistics for Secondary and Elementary Applied Male Students

	Male Pathway	n	M	SD	Percentile
Mindset	APPLIED SECONDARY	34	27.09	5.76	20th
	APPLIED PRIMARY	43	33.09	6.00	55th
ASE	APPLIED SECONDARY	34	24.82	5.96	15th
	APPLIED PRIMARY	43	28.95	5.08	40th
SSE	APPLIED SECONDARY	32	28.59	4.67	40th
	APPLIED PRIMARY	41	30.49	3.92	55th
ESE	APPLIED SECONDARY	34	25.56	5.42	40th
	APPLIED PRIMARY	43	28.40	5.10	60th

Table 18 shows the secondary applied boys have a significant (significant for $p <$ .01) and large effect size decrease in the mindset assessment (1.0) as the transition to high school. Additionally, the applied secondary boys show a medium effect size decrease in ESE (.56) and ASE (.75) compared to elementary boys who identified as applied. Consistent with previous t-tests in this study there was no significant difference in SSE. Applied males are transitioning poorly between elementary and secondary school and SSE is the only self-theory that is resilient for this group.

Table 18: Independent t-tests and Effect Size Results for Applied Boys in Secondary and Elementary

Scale	Applied Boys Secondary Mean ± SD	Applied Boys Elementary Mean ± SD	df	F	p	d	95% CI Upper	Lower
Mindset	27.09 ± 5.76	33.09 ± 6.00	75	.005	*.000031	1.0	3.31	8.70
ASE	24.82 ± 5.96	28.95 ± 5.08	75	1.33	*.0016	.75	1.62	6.64
SSE	28.59 ± 4.67	30.49 ± 3.92	71	.546	.064	-	-.11	3.90
ESE	25.56 ± 5.42	28.40 ± 5.10	75	.315	.021	.56	.440	5.23

* are significant at p < .01

The descriptive statistics in Table 19, suggests that elementary females who identify as pursuing applied courses in secondary have lower levels of ASE (30th percentile), SSE (30th percentile), and mindset (35th percentile) than all other groups (applied boys, academic boys, and girls). These low levels remain secondary for applied girls but in addition, they start to demonstrate low ESE (20th percentile). Elementary applied girls had average ESE (50th percentile) but Table 20 shows a significant (significant at p < .01) moderately large effect size (.77) decrease of ESE. Relative to their peers this group is already experiencing lower self-theories in elementary except for ESE. By the time this group transitions to high school ESE has decreased to the lowest level (20th percentile) of all groups.

Table 19: Descriptive Statistics for Secondary and Elementary Applied Female Students

	Female Course Pathway	n	M	SD	Percentile
Mindset	APPLIED SECONDARY	27	29.78	5.52	35th
	APPLIED ELEMENTARY	27	29.48	6.25	35th
ASE	APPLIED SECONDARY	27	27.37	4.26	30th
	APPLIED PRIMARY	27	27.19	6.15	30th
SSE	APPLIED SECONDARY	27	27.59	5.00	30th
	APPLIED PRIMARY	25	28.04	3.38	35th
ESE	APPLIED SECONDARY	27	22.19	6.66	20th
	APPLIED PRIMARY	27	26.78	5.19	50th

Table 20*:* Independent t-tests and Effect Size Results for Applied Girls in Secondary and Elementary.

Scale	Applied Girls Secondary Mean ± SD	Applied Girls Primary Mean ± SD	df	F	p	d	95% CI Upper	Lower
Mindset	29.78 ± 5.52	29.48 ± 6.25	52	1.20	.85	-	-3.52	2.92
ASE	27.37 ± 4.26	27.19 ± 6.15	52	2.56	.90	-	-3.07	2.70
SSE	28.04 ± 3.38	27.00 ± 4.99	50	2.79	.71	-	-1.95	2.84
ESE	22.19 ± 6.66	26.78 ± 5.19	52	1.49	*.007	.77	1.33	7.86

ESE is significant at p < .01

Table 21 presents the descriptive statistics for academic males. There is a decrease in the mindset assessment (70th percentile in elementary to 55th percentile in secondary) but this was considered an insignificant difference by the independent t-test (p= .117) in Table 22. Additionally, all differences were calculated as insignificant between academic boys in elementary and secondary (see Table 22). It appears that academic boys in elementary and secondary groups do not demonstrate any significant difference in their self-theories.

Table 21*:* Descriptive Statistics for Secondary and Elementary Academic Male Students

	Male Course Pathway	n	M	SD	Percentile
Mindset	APPLIED SECONDARY	42	32.71	4.58	55th
	APPLIED ELEMENTARY	40	34.53	5.73	70th
ASE	APPLIED SECONDARY	42	30.83	4.68	50th
	APPLIED PRIMARY	40	31.23	4.70	55th
SSE	APPLIED SECONDARY	42	31.40	4.84	65th
	APPLIED PRIMARY	40	30.30	3.84	55th
ESE	APPLIED SECONDARY	42	29.00	5.61	60th
	APPLIED PRIMARY	40	28.550	4.82	65th

Table 22: Independent t-tests and Effect Size Results for Academic Boys in Secondary and Elementary

	Academic Boys Secondary	Academic Boys Elementary	df	F	p	d	95% CI	
Scale	Mean ± SD	Mean ± SD					Upper	Lower
Mindset	32.71 ± 4.58	34.53 ± 5.73	80	.081	.117	-	-.46	4.08
ASE	30.83 ± 4.68	31.23 ± 4.70	80	.816	.707	-	-1.67	2.45
SSE	31.40 ± 4.84	30.30 ± 3.84	80	.073	.257	-	-3.03	.82
ESE	29.00 ± 5.61	28.55 ± 4.82	80	.269	.698	-	-2.75	1.85

Note. All p values are greater than .10

Table 23 presents the descriptive statistics for academic girls in secondary and girls that identify as academic in elementary. The chart demonstrates significant decreases in mindset (65th percentile to 35th percentile) and ESE (55th percentile to 30th percentile) as these girls transition to secondary. In addition, there appears to be a slight decrease in ASE and SSE, but these were calculated to be insignificant decreases by the independent t-test (see Table 24). Table 24 also confirms that there is a large effect size (.89) in the Mindset Assessment and a medium effect size (.60) decrease in ESE in secondary applied girls.

Table 23: Descriptive Statistics for Secondary and Elementary Academic Female Students

	Female Course Pathway	n	M	SD	Percentile
Mindset	Academic Secondary	63	29.76	4.75	35th
	Academic Elementary	64	34.17	5.18	65th
ASE	Academic Secondary	63	31.38	4.05	55th
	Academic Elementary	63	32.56	4.39	65th
SSE	Academic Secondary	63	29.10	4.22	45th
	Academic Elementary	64	29.98	3.94	55th
ESE	Academic Secondary	63	24.40	6.00	30th
	Academic Elementary	64	27.84	5.40	55th

Table 24: Independent t-tests and Effect Size Results for Academic Females

Scale	Academic Girls Secondary Mean ± SD	Academic Girls Elementary Mean ± SD	df	F	p	d	95% CI Upper	Lower
Mindset	29.76 ± 4.75	34.17 ± 5.18	125	.367	*.000002	.89	2.66	6.16
ASE	31.38 ± 4.05	32.56 ± 4.39	124	.121	.121	-	-.31	2.66
SSE	29.10 ± 4.22	29.98 ± 3.94	125	.293	.222	-	-.55	2.32
ESE	24.40 ± 6.00	27.84 ± 5.40	125	.410	*.00076	.60	1.49	5.50
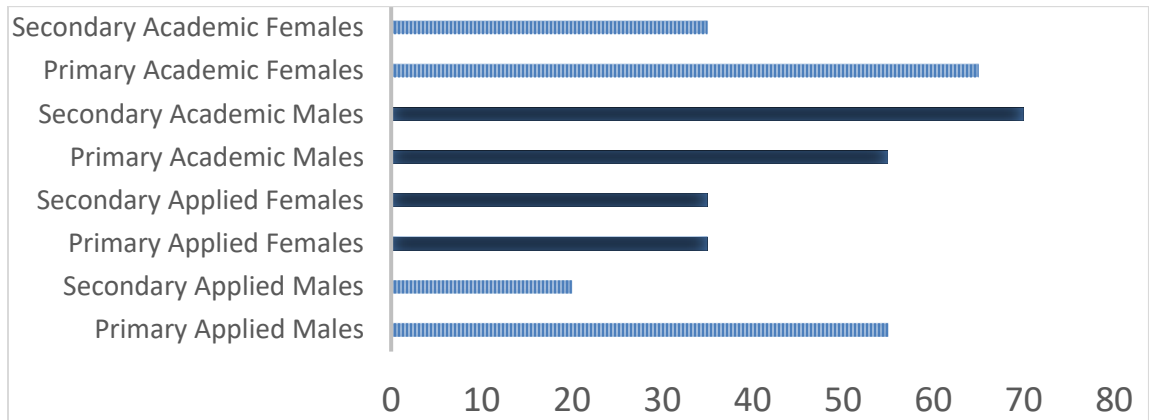
Figure 25. Mindset assessment percentiles of secondary and elementary that include gender.
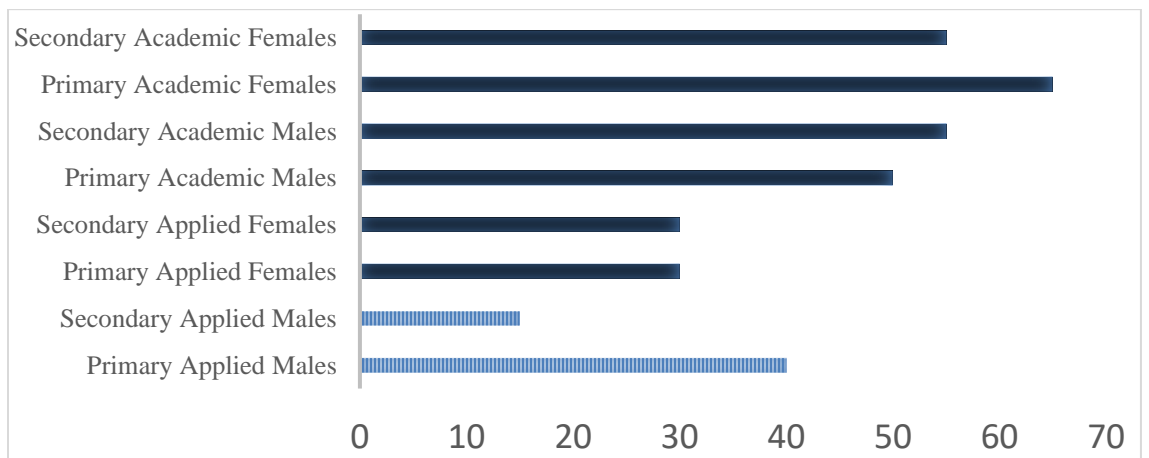
Figure 26. Academic self-efficacy percentiles of secondary and elementary that include gender. Black lines represent no significant difference between the secondary and elementary groups.
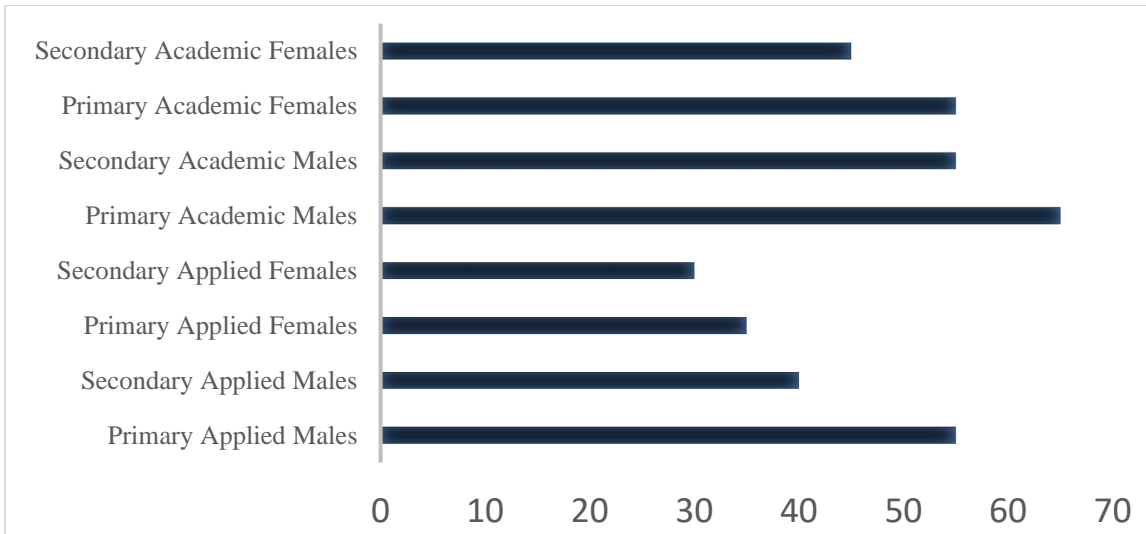
Figure 27. Social self-efficacy percentiles of secondary and elementary that include gender. Black lines represent no significant difference between the secondary and elementary groups.
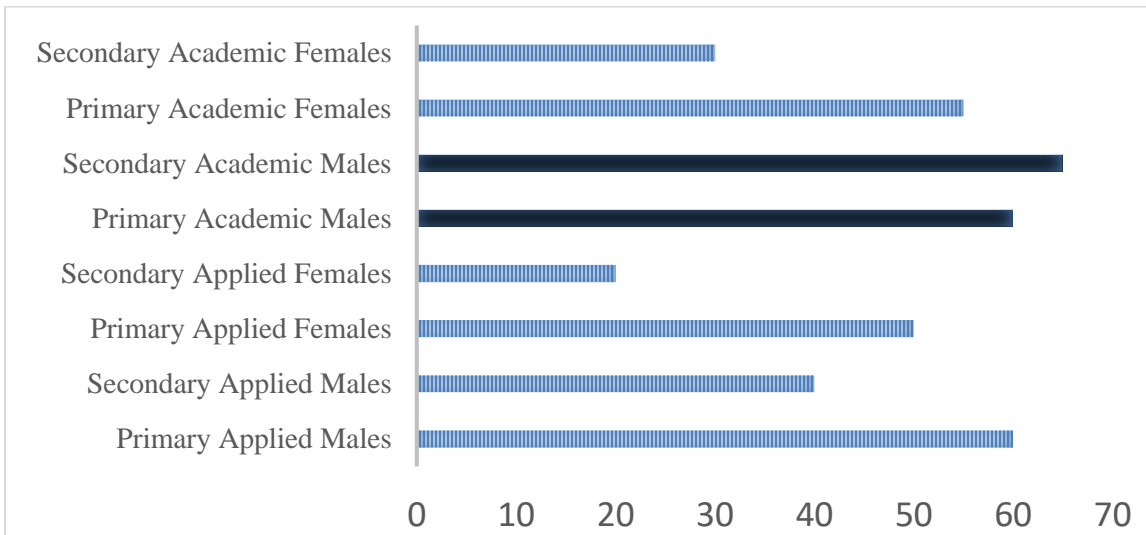
Figure 28. Emotional self-efficacy percentiles of secondary and elementary that include gender. Black lines represent no significant difference between the secondary and elementary groups.

In summary, when students transition to secondary academic girls and applied boys appear to experience a large effect size decrease in mindset while the other groups

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did not demonstrate a change in mindset. In addition, academic girls (.60), applied females (.77), and applied males (.75) are all showing a similar effect size drop in ESE. This would seem to suggest that because gender and course pathway are not directly contributing factors; it is not gender or course pathway that are impacting the ESE effect. Instead, other more nuanced external factors like SES or some unknown factors are influencing these groups. Interestingly, academic boys are entirely insulated from changes to self-theories in their transition to high school. The transition into secondary is the most damaging for applied boys as they endure significant decreases in all their self-theories. Applied girls have low levels of self-theories in elementary and they remain consistently low in secondary in addition to experiencing a large decrease in ESE. Finally, the ASE decrease in the transition to secondary is demonstrated in applied male students and no other groups.

Chapter 5: Discussion

Freire's banking theory of education is predicated on the idea that education can be oppressive to certain groups of students. The educational practice of streaming (tracking) was chosen as it is a possible manifestation of this oppression. To test this theory, self-efficacy and mindset were selected as the student variables that would be impacted by oppressive educational practices. Next, a theoretical framework was constructed (TESA in figure 3) to explain the environmental variables influencing the formation of student self-efficacy which include expectations, growth mindset, goal setting, and attributions. In chapter 2 the literature review buttressed the TESA model by providing research evidence for such a framework. To test for structural oppressive forces, self-theories (self-efficacy and growth mindset) of elementary (pre-streamed) and secondary (post-streaming) students were surveyed. If streaming was oppressive, different groups would show significant variation to their self-theories as they transition into secondary school.

In this chapter, I interpret the quantitative results that were organized and presented in chapter 4. With respect to my first research question, students who have chosen to pursue the academic stream in secondary clearly and significantly demonstrate higher levels of all their self-theories relative to their applied course pathway peers. If this is a result of environmental factors or genetic factors is up for debate. To support the argument that the environment has contributed to the significant difference that is established in applied and academic and secondary, I have added a second research question. With respect to this question, the result of this study provides evidence that applied students' self-theories are suffering significantly more than their academic peers

as they transition into secondary school. When considering gender, some more interesting trends appear; academic boys appear to be insulated from the factors that lead to a decrease in self-theories. This would confirm and add to previous research suggesting girls have lower ESE than boys (Muris, 2002). Conversely, most self-theories of applied males (mindset, ASE, ESE) appear to be sensitive to the secondary transition. Due to the variation in changes of self-theories, it would seem to indicate that the course pathway is playing a role in the development of self-efficacy and potentially self-theories in general.

 Furthermore, academic females seem to be sensitive to developing lower levels of mindset and along with other groups (applied males and females) are in danger of developing lower levels of ESE. Finally, all students no matter what group, appear to demonstrate a resiliency to any change in SSE which is in line with previous research (Armum & Chellappan, 2016, Isekander, 2009). In this chapter, I venture to further explain the results using the TESA framework constructed from the literature review.

Gaps in Self-Efficacy

Differences in self-theories already exist in elementary school before students are streamed (Tables 9 and 10). Elementary students who plan on going into the academic pathway, already demonstrate a higher level of mindset (.44) and ASE (.83) but do not vary in their SSE and ESE compared to their elementary peers. In secondary school, the gap between applied and academic students increases in ASE, SSE, and ESE. Secondary applied students have significant effect sizes in lower levels of mindset (.51), ASE (1.1), SSE (.39) and ESE (.34). This research suggests the transition to high school does not treat all students equally. Students who pursue applied in secondary experience bigger drops in their levels of mindset, ASE, and ESE compared to their academic peers.

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Research suggests that this can lead to lower academic success and can put students in danger of developing depression and affective disorders (Anderson & Bets, 2001; Bacchini & Magliulo, 2003; Hermann & Betz, 2006; Maciejewski, Prigerson, & Mazure, 2000; Muris, 2002) The results of this study have confirmed past Italian research that indeed adolescent boys do report slightly higher emotional self-efficacy on the SEQ-C relative to adolescent girls.

Applied Students Experience Less Mastery

Surprisingly, applied males are the only group that has a large decrease in ASE in secondary (see Figure 15). Applied girls, on the other hand, appear unchanged by this transition and instead remain consistently low in ASE (35th in elementary to 30th percentile in secondary). A credible explanation for the lower self-efficacy is to consider the varied amount and quality of mastery experiences. Mastery experiences are the most authentic way a person gains self-efficacy (Bandura, 1997). Therefore, if students have lower self-efficacy, we can conclude that students who identify as applied are generally accomplishing fewer mastery experiences. Using the TESA model it would appear that applied boys may be dealing with the social stigmatization of being devalued and are failing to master academic material as a result of changing environmental expectations. Bandura believes that social stigmatization comes with lower expectations from teachers (Bandura, 1997). Applied boys have the lowest percentile of ASE (15th percentile) in secondary and are in danger of falling into learned helplessness. When asked who chose their academic pathway, 21% of these secondary students answered they "don't know" (see *Table 5*). Applied boys appear to believe they do not have control over the choices they have made regarding their course pathway. As outlined in the TESA model, learned

helplessness represents the attribution where students do not have control over their outcomes. Applied boys seem to be the group most impacted by streaming as they have shown the greatest negative change as they transition to secondary.

Finally, lack of mastery experience, and lack of role models isn't exclusively a result of streaming, as it starts in elementary school for some girls. Applied girls already demonstrate low self-efficacy (35th percentile) in elementary school. The TESA model predicts these girls are experiencing less mastery, do not have quality models available to them and have externalized their locus of control. It is possible that the females are experiencing developmental change earlier than males that are causing feelings of questioning and self-doubt and this impacts mastery experiences. When people have low self-efficacy, they are vulnerable to feelings and thoughts that can lead to negative biases about themselves (Bandura, 1997).

Teachers Influence Self-Efficacy

It is also possible that the authority figures like teachers and parents are influencing the development of self-efficacy in various ways, as they help set goals, influence attributions, and set up mastery experiences. When students have more of a fixed mindset they reinforce maladaptive ways (dotted lines) as outlined in *figure 3* and this can lead to learned helplessness. Teachers can reinforce the maladaptive pathway by focusing on sorting students by innate ability, and thus shift learning goals towards performance and away from mastery. In response, students shift their focus to surface learning and memorization to prepare for tests (Rotberg, 2006). If students are the worst performing students in their group, it can damage their self-concept. The TESA model predicts that fixed mindsets strengthen attributions that are judgments of innate ability.

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Those same people who are indexed by the level of performance can produce a strong self-evaluative focus, along with a negative emotional response which can limit future strategic thinking necessary for learning (Tabernero & Wood, 1999). Applied girls according to their low ASE starting earliest out of all groups in elementary school are at the bottom rung of academic social comparison. It is difficult for them to improve if they believe they simply lack innate talent and intelligence. Teachers can reinforce this attribution through their interaction with students. They control the length of the learning cycle, if students fall behind, teachers may rationalize that the student is simply not capable of mastering the topic and the lessons continue. Over time, students can fall further and further behind as new topics need to build on previous topics that should've been mastered. Teachers who focus on banking theory, believe they must fill students with as much information as possible as fast as possible. Slower learners get left further and further behind. In this study, self-efficacy is decreasing or staying stagnant in all groups studied.

Social Self-Efficacy is Resilient

Interestingly, SSE appears to be unaffected by the transition to a streamed secondary school. Despite the apparent gap between SSE in academic and applied in secondary, my analysis was unable to determine which groups were responsible for the significant difference. SSE is different than ASE because it is separate from the teachers' and parents' judgements. There is no report card for social ability and there is no high stakes competition to see who can make the best quality relationships. Regardless of the reason, there appears to be no significant change in SSE for every student group as they transition to secondary school. SSE data sets produced the most histograms with outliers

(see box and whisker figures) and seemed to produce the most variable data, as a result, it was the most difficult self-efficacy trend to look for specific trends in gender and course pathway.

Equality in Modelling

Teachers do not openly set out to oppress students, but the educational does just that and has a history of doing so. In the Toronto District School Board, it has been noted that a greater number of lower SES students and minorities end up in applied mathematics (Sweet & Higher Education Quality Council of Ontario, 2010). Similarly, provinces that stream more in grade 10 graduate more students with less post-secondary options available to them (Krahn & Taylor, 2000). Johnston and Wildly's (2016) literature review of streaming concluded that streaming increases academic disadvantage of students in lower streams and can segregate students according to race and class. Bandura stated that the second biggest influence of self-efficacy was modelling (Bandura, 1997). Students who are in the lower streams have less opportunity to observe and interact with highly motivated and higher achieving students (Hallinan, 1996). When lower ability students are separated, they have less opportunity to work and interact with students who value education as a form of self-improvement. It can be postulated that the increasing gap in self-theories that has been demonstrated in this study is influenced by the removal of peer models from the classroom, resulting in the self-theory decrease of applied students.

Teacher Expectations

When teachers have high expectations for all students, they change the environment to provide more feedback, use higher-order questioning, and manage

behaviour more positively (Rubie-Davies, 2007). These self-fulfilling prophecies are likely to occur when teachers have high expectations for the whole class (Rubie-Davies, 2010). Once teachers lower their expectations for a whole stream or vary their expectations depending on the individual student, problems arise. Society's stereotypes and biases have an insidious way of creeping into how people think about themselves and others. Stereotype threat can influence student behaviour even when they don't consciously believe the stereotype (Steele and Aronson, 1995). Similarly, these biases and stereotypes can decrease teachers' expectations of minority students (Van den Berg et al., 2010). Future research is needed to confirm that the interaction between teacher expectation effect and society's expectations. The TESA model supports that the teacher expectation effect is more pronounced in the lower SES, and disadvantaged students because it is in opposition to negative biases and stereotypes. High expectancy is promoting a more affirmative self-belief in these students. This explanation is supported in Jussim & Harbor (2005) research which demonstrates lower achievement response to high teacher expectations in students who are not from disadvantaged backgrounds. Society does not demonstrate negative biases and stereotypes of advantaged students and this minimizes the impact of high teacher expectation has on these groups.

Academic Boys are Resilient

It is interesting that the group in this study with the most resilient self-efficacy was academic males and not academic females. This group potentially would be subject to the least amount of negative bias and stereotype. In elementary, the academic boys' group was much more likely (38%) to select that they were the ones responsible for selecting their course pathway compared to academic girls (14%), applied boys (14%)

and applied girls (4%). It is just one data point, but it suggests that academic females

may believe they less control compared to their male counterparts. When authority

figures remind students, they were exercising better control over academic tasks by using

strategies well they substantially enhance student self-efficacy and achievement (Schunk

& Rice, 1987). It is possible that society is sending the message to academic males that

they have control over their lives and these beliefs allow them to transition to high school

with resilience. Academic girls and applied boys on the other hand transition to high

school and demonstrate drops in mindset and ESE despite demonstrating equal or higher

levels of self-theories in elementary.

Academic females drop in mindset (towards fixed) in secondary puts them on par

with applied females who are consistently low in most self-theories. As represented in

the TESA model, a fixed mindset supports the maladaptive pathway (dotted lines), social

comparison and eventually to attributions that begin to lean towards the belief that they

have no control (learned helplessness). When success is not achieved, students who are

focused on performance are more likely to attribute it to a self-deficit they cannot change.

They have less control over their future. Future research may confirm that the drop in

ESE could be caused by the harsh self-analysis that creates a negative emotional

response. Students who are indexed versus others are interpreting their mistakes and

setbacks as substandard performance that produces a strong self-evaluative focus, along

with a negative emotional response (Tabernero & Wood, 1999). ESE isn't directly

connected to the educational environment but, females potentially are lacking in

modelling of ESE and mastery opportunities missing for resiliency to develop. Bacchini

and Maliulo's (2003) suggest that as students get older, their ESE weakens as a result of

greater self-reflexive capacity and stress that accumulate with cumulative failures over time. Research has already suggested that school mental health programming can lead to improved educational outcomes (Collaborative for Academic, Social, and Emotional Learning [CASEL], 2008).   For educators, this data serves as a call to educational stakeholders to support mental health programs and training in our schools for all students but particularly to support groups that are suffering like female students.

Chapter 6: Conclusion

In this chapter, I include a summary of the overall study, finding and implications, limitations and research recommendations.

Study Summary

The purpose of the study was to explore the nature of the intersection between streaming (course pathways) and two self-theories or self-beliefs, namely Bandura's concept of self-efficacy (1997) and Dweck's theory of growth mindset (2006). To this end a Southwestern Ontario High School and its elementary feeder schools were selected to voluntarily participate in the study Pre-streamed (elementary students) were compared to post-streamed (secondary) students in the applied (lower track) and academic streams (higher track) to examine if there is a difference in their level of self-efficacy and growth mindset.

Starting in March 2019, parental consent was obtained, and participating students completed surveys assessing both mindset and self-efficacy (ASE, SSE, and ESE). Of the 800 or so regularly attending 166 secondary students participated which consisted of 105 academic/university and 61 applied/college course pathway students. Out of the 5 elementary schools with a total population of 557 elementary students (grades 6 through 8), 178 students participated, which consisted of 3 ESL students, 105 students planning on academic and 70 planning on applied in secondary.

The quantitative survey, titled "Self-Efficacy and Mindset Survey" (SeMS) was used in this study. The survey is made up of three sections: Demographics, Mindset Assessment, Self-Efficacy Assessment (Appendix B). The mindset assessment (mindsetworks.com) was not used in rigorous research itself but was comprised of

several different questions assessing theory of intelligence, learning goals and beliefs about effort were taken from other research-validated measures. The resulting internal reliability of the mindset survey ($\alpha= .647$) determined through SPSS was considered questionable and the survey results were used for comparative purposes only. The self-efficacy assessment was the SEQ-C (Muris, 2001) which is made of three sub-measures: ASE, SSE, and ESE. The current study produced Cronbach's alpha of .73 for SSE, .82 for ASE, .82 for ESE on our Canadian sample of N=344 students from grade 6 through 12. The resultant internal reliability is very similar to Suldo and Shaffer study completed in 2007 (.73 for SSE, .82 for ASE, and .79 for ESE). The surveys were conducted with student groups in elementary (pre-streamed) and were compared with similar demographic student groups in secondary (post-streamed). This comparison allows us to understand if student groups are faring equitably in their transition into secondary's different course pathways.

Findings and Implications

The SeMSurvey SEQ-C section produced ASE, SSE, ESE values that were close to previously published research. SSE and ESE produced some higher and lower results depending on the stream or gender compared to Armum and Chellappan's (2016) scores. ASE results were higher than the results suggested by Muris (2002) but were close to the results produced by Minter and Pritzker (2017).

The effect size gap between secondary applied and academic students is large for all self-theories (Mindset (.51), ASE (1.1), SSE (.39) and ESE (.34)). Furthermore, this gap was not as big in elementary school. Comparing academic and applied students in elementary prior to streaming produces effect sizes that are about the same for mindset

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(.44), slightly smaller for ASE (.83) and no significant difference for SSE and ESE.
Therefore, it can be concluded with limitations, students that transition into a streamed
secondary environment demonstrate an increasing separation between applied and
academic self-theories.

To determine how groups are changing over time, students in secondary were
compared with elementary students who planned on a certain course pathway. Academic
students in secondary demonstrated medium effect size drop in mindset levels (.65), and
a small effect size drop of ESE (.30) compared to academic elementary students. Applied
students in secondary appear to experience a similar medium effect size drop in mindset
(.56), but in contrast to the academic groups applied students are additionally
experiencing a medium effect size drop in ASE (.42) and ESE (.60) as they transition to
secondary. Regardless of their course pathway students appear to be demonstrating a
similar decrease in mindset, but the decreases in ASE and ESE are significantly larger in
applied students.

Once students are divided into groups by gender in addition to their course
pathway some more significant trends were established when comparing pre-streamed
and post-streamed groups. Applied girls demonstrated significantly lower self-theories
than their peers already in elementary (30th percentile ASE, 35th percentile mindset and
SES) but they additionally experience a medium/large (.77) effect size drop of ESE (50th
to 20th percentile drop) post-streaming. Applied boys are average in most self-theories in
elementary (55th percentile mindset, 40th percentile ASE, 60th percentile) but demonstrate
a larger effect size drop in mindset (1.0), medium decrease in ASE (.75) and ESE (.56) in
secondary. Academic girls demonstrate high self-theories throughout elementary but

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experience a large drop in mindset (.89) and a medium decrease in ESE (.60). All groups did not demonstrate any significant difference in SSE. Most interestingly, academic boys are resilient in their self-theories during the transition to a streamed secondary school.

The implications of this study are speculative and wide-ranging, however excusing the limitations of this study, a specific conclusion can be deduced. Streaming effects are variable with respect to different student groups as decreases in the level of mindset, ASE and ESE are present in some groups and not others. Furthermore, it is highly probable that lower ASE is a result of less mastery experience for applied groups in the educational environment. We can make this assumption based on Bandura's (1997) research that states mastery experiences are the primary source of self-efficacy. It, therefore, stands to reason, that certain groups in our education system are experiencing varying experiences that lead to inequality in self-efficacy development as early as elementary school (ex. applied girls).

Limitations

A significant limitation in this study is a lack of a control; students from participating elementary schools were unable to attend a de-streamed secondary school, and all students must choose a course pathway as they enter high school. Therefore, an assumption of generalizability is necessary when comparing elementary groups with secondary groups. In addition, it could be that some groups were naturally changing their self-theories (ex. applied boys) while others are not (ex. academic boys) as they get older and become adults. Without a control, it is impossible to claim with causality that the use of streaming is responsible for the change in self-theories.

Another limitation is the generalizability of my samples to their corresponding populations. Over 20% of the elementary and secondary population participated in this study. However, most of the students who participated were in the academic pathway. Applied pathway students represent over 60% of the students in secondary school but they participated less in the survey. Furthermore, a big majority of the students in the applied group selected 'mostly applied' in the demographic section of the survey. This suggests there are generalizability issues particularly for comparison analysis involving applied student groups. It is possible that applied students with higher levels of self-efficacy chose not to participate in the study and this created the difference in self-efficacy. It is also possible elementary students who chose applied on the survey choose to pursue academic in secondary and this is artificially inflating the elementary applied results in this study.

The mindset survey (mindsetworks.com) was a limitation as it has not been used in academic research and it produced questionable internal reliability. In this study, it was used as a scale to measure relative comparisons of mindset and was not used as assigning the growth or fixed mindset level. Consequently, student mindset results from this study could not be compared with previous research or future research.

It is possible that the researcher and teachers increased awareness of self-efficacy and mindset variability in different student groups. After the researcher left the classroom it is possible that students asked for further information from their teacher on self-efficacy and mindset, and this would have increased the desirability of demonstrating those positive traits on the survey. Finally, some groups are more likely to answer the survey to inflate their self-theories while other groups may be more accurate.

Recommendations for Further Studies

Future research is needed to confirm and elaborate on the connections presented in TESA (Teacher expectation Self-efficacy achievement) presented in this study. Specifically, research should be conducted to understand the interaction between the teacher expectation effect and society's expectations. Further research should be conducted to understand how a growth mindset interacts with the formation of self-efficacy and finally how do different attribution influence self-concept versus self-efficacy. Finally, does CTE impact the development of students' self-theories over time? The following questions serve as starting points.

1. Do teacher expectations and beliefs indeed have a larger effect size on student achievement when they are in opposition to society's expectations (biases and stereotypes)?

2. Does mindset level mediate and strengthen some connections and weaken others in the TESA model as proposed?

3. Does the growth mindset of students increase self-efficacy as proposed in this study through increased vicarious experiences as students have more models to emulate?

4. How is CTE impacting the development of student self-theories?

A longitudinal study should be conducted to confirm that individuals' self-theories are indeed changing over time and the cause is streaming. An educational environment that has both streamed and unstreamed secondary options would be an ideal location for such a study. To determine causality, it is necessary to include a control to see the real impact on students' self-theories. Furthermore, SES should be included as a

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factor analyzed as there may be correlations between the applied stream as suggested in previous studies (People for Education, 2015).

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Appendix A. Letter of Information for Parental Consent to Participate in Research

PARENTAL CONSENT FOR CHILD TO PARTICIPATE IN RESEARCH

Title of Study: Exploring the Connection between Streaming and Students' Self Efficacy and Mindset in Secondary and Elementary Schools

You are child is being asked to participate in a thesis research study conducted by **Gregory Driedger**, at the University of Windsor **under the direction of Dr. Geri Salinitri.** It is approved by the Board and the University.

If you have any questions or concerns about the research, please feel to contact   Gregory Driedger: driedg16@uwindsor.ca or Dr. Geri Salinitri: gsalinitri@uwindsor.ca at the University of Windsor *Faculty of Education*

PURPOSE OF THE STUDY

The purpose of this research is to look for the relationship between student course pathways or choices and what they think about themselves (self-theories).   Positive self-theories have been linked by research to academic achievement and well-being. As a researcher, I believe it's important to understand if there is a connection between what types of courses students chose and their self-theories. Potential participating schools include a secondary school and it's elementary feeder schools.

PROCEDURES

If your child volunteers to participate in this study, your child be asked to:

Complete a short (10 min) anonymous survey representing students' self-theories which includes self-efficacy and growth mindset. Important self-theories include self-efficacy and a growth mindset. Self-efficacy is the belief that you possess the ability and behaviours to achieve your goals. A growth mindset, on the other hand, is the belief intelligence can be developed through practice and effort. Research suggests a positive sense of self-efficacy and mindset is linked to academic performance. Self-Efficacy is a person's belief in their own ability to change their own world. This survey measures three types of self-efficacy, academic, social and emotional. Together these types of self-efficacy provide a good indicator of academic success and well-being. The survey also measures your child's level of mindset. A growth mindset is a belief that you can change your level of intelligence while a fixed mindset is a belief that intelligence is fixed and can't be changed much over time.   Most people are not one or the other but instead, have both fixed and growth mindset characteristics. All students who have their parents read, complete and submit this informed consent be eligible for an iPad draw. Participation is voluntary, and you can withdraw at any time.
Approximately ten students be asked to participate in individual interviews on the impact of mindset, self-efficacy, and streaming. Students be able to discuss how they feel their self-efficacy and mindset is influenced by the world. This part is confidential, and your child may be contacted to see if they would like to participate. All participation is voluntary, and they can withdraw at any time. If participants wish to withdraw from the study after audio recording of the conversation is complete, they may excuse themselves at any point. There is no consequence for students if they chose not to participate.

POTENTIAL RISKS AND DISCOMFORTS

By choosing to participate there is a chance your child may feel uncomfortable with some of the questions relating to their perceived ability to change their world (academically, socially or emotionally). If your child feels uncomfortable for any reason you can quit any time throughout this survey. If your child choses to participate during the small group discussion portion they can also quit at any time. If you chose to participate your child's individual data be anonymous and be unidentifiable.

BENEFITS TO PARTICIPANTS AND/OR TO SOCIETY

By choosing to participate in this research your child gains a greater understanding of their own self-efficacy and mindset. At the end of the survey, the teachers at our community schools know if students' self-theories (self-efficacy and mindset) are different in elementary and secondary schools and different in applied or academic courses in secondary school. This is valuable because it could change how teachers develop students' self-theories and approach teaching in general.

COMPENSATION FOR PARTICIPATION
Your child not be paid for your participation in this study, but you be put into a raffle with all participants (between 600 to 1000 students) for an iPad.

CONFIDENTIALITY

The survey is anonymous and there is no way to track student individual results. If students chose to participate in the optional small group discussion. any information that is obtained in connection with this study and that can be identified with you remain confidential and be disclosed only with your permission. All surveys and data be stored in a locked cabinet and be destroyed on September 1st, 2019. No information will be traceable to individual students and the Principal and Teachers will not have access to any individual data.

PARTICIPATION AND WITHDRAWAL

Survey: In order to participate in the survey, you must get your parents to sign the consent form. You can withdraw from the survey at any time even after your parents sign this form. Once you submit your completed survey, there is no way to remove your data from the study.

FEEDBACK OF THE RESULTS OF THIS STUDY TO THE PARTICIPANTS

The data from this research be made available to the school, the school board and to you at the completion of this study.

Web address: http://www.uwindsor.ca/research-ethics-board/
Date when results are available: September 2019
SUBSEQUENT USE OF DATA

These data may be used in subsequent studies, in publications, and in presentations.

RIGHTS OF RESEARCH PARTICIPANTS

If you have questions regarding your rights as a research participant, contact: Research Ethics Coordinator, University of Windsor, Windsor, Ontario, N9B 3P4; Telephone: 519-253-3000, ext. 3948; e-mail: ethics@uwindsor.ca
SIGNATURE OF RESEARCH PARTICIPANT/LEGAL REPRESENTATIVE

I understand the information provided for the study Exploring the Connection between Streaming and Students' Self Efficacy and Mindset in Secondary and Elementary Students in Public Schools
as described herein. My questions have been answered to my satisfaction, and I agree to participate in this study. I have been given a copy of this form.

_____
Name of Participant

_____   _____
Signature of Parent/Guardian   Date

SIGNATURE OF INVESTIGATOR

These are the terms under which I conduct research.

_____   _____
Signature of Investigator   Date

Appendix B. SeMSurvey

Self-Efficacy and Mindset Survey

<u>Introduction</u>

Answering the questions below provide insight into the level of self-efficacy and growth

mindset in students possess at varying ages throughout their time in school (grade 6 to

high school). This survey is anonymous, and your answers remain confidential. Your

identity and your responses remain confidential throughout the process. This research

has been cleared by the University of Windsor Research Ethics Board and the School

Board. Please note that you can exit the survey at any point if you no longer wish to

participate.

By filling out this survey, I am agreeing to participate and allow my anonymous data to

be used in Greg Driedger's Master's thesis to fulfill the requirements toward a Master's

degree in Education at the University of Windsor under the supervision of Dr. Salinitri.

Demographics (ANSWER All Questions on attached ZipGrade Bubble Sheet)

*1. Gender: **A-**Male   **B-**Female   **C-**in another way not listed

*2. Select your grade: **A-** 6th **B-** 7th **C-** 8th **D-** 9th **E-** 10th **F-** 11th **G-** 12th

*3. Select <u>your COURSE pathway</u> or if you are in elementary the CLASSES you plan on

going in to:

A- Academic   **B-** Applied   **C-** Mostly Academic **D-** Mostly Applied **E-** Locally

Developed **F-** ESL

*4. Who was the biggest influence in selecting your classes (academic or applied class)?

   A- Your Parents **B-** Your Teachers **C-** A Guidance Counsellor **D-** You **E-** Don't

   know

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Mindset Assessment Profile Tool

Please choose the letter **on ZIPGRADE** that best suits your agreement with each of the statements in this survey.

*5. No matter how much intelligence you have, you can always change it a good deal.

A- Disagree A Lot   **B-** Disagree   **C-** Disagree A Little   **D-** Agree A Little   **E-** Agree

F- Agree A Lot

* 6. You can learn new things, but you cannot really change your basic level of intelligence.

A- Disagree A Lot   **B-** Disagree   **C-** Disagree A Little   **D-** Agree A Little   **E-** Agree

F- Agree A Lot

* 7. I like my work best when it makes me think hard.

A- Disagree A Lot   **B-** Disagree   **C-** Disagree A Little   **D-** Agree A Little   **E-** Agree

F- Agree A Lot

* 8. I like my work best when I can do it really well without too much trouble.

A- Disagree A Lot   **B-** Disagree   **C-** Disagree A Little   **D-** Agree A Little   **E-** Agree

F- Agree A Lot

* 9. I like work that I'll learn from even if I make a lot of mistakes.

A- Disagree A Lot   **B-** Disagree   **C-** Disagree A Little   **D-** Agree A Little   **E-** Agree

F- Agree A Lot

* 10. I like my work best when I can do it perfectly without making any mistakes

A- Disagree A Lot   **B-** Disagree   **C-** Disagree A Little   **D-** Agree A Little   **E-** Agree

F- Agree A Lot

* 11. When something is hard, it just makes me want to work more on it, not less.

A- Disagree A Lot   **B-** Disagree   **C-** Disagree A Little   **D-** Agree A Little   **E-** Agree

F- Agree A Lot

* 12. To tell the truth, when I work hard, it makes me feel as though I'm not very smart.

A- Disagree A Lot   **B-** Disagree   **C-** Disagree A Little   **D-** Agree A Little   **E-** Agree

F- Agree A Lot

Self-Efficacy Assessment

Please choose the letter **on ZIPGRADE** that best suits your agreement with each of the

statements in this survey.

---

*13. How well can you get teachers to help you when you get stuck on schoolwork?
a- Not at all   **b-** Not well   **c-** a little bit   **d-** Well   **e-** Very Well

*14. How well can you express your opinions when other classmates disagree with you?
a- Not at all   **b-** Not well   **c-** a little bit   **d-** Well   **e-** Very Well

*15. How well do you succeed in cheering yourself up when an unpleasant event has happened?
a- Not at all   **b-** Not well   **c-** a little bit   **d-** Well   **e-** Very Well

*16. How well can you study when there are other interesting things to do?
a- Not at all   **b-** Not well   **c-** a little bit   **d-** Well   **e-** Very Well

*17. How well do you succeed in becoming calm again when you are very scared?
a- Not at all   **b-** Not well   **c-** a little bit   **d-** Well   **e-** Very Well

*18. How well can you become friends with other children?
a- Not at all   **b-** Not well   **c-** a little bit   **d-** Well   **e-** Very Well

*19. How well can you study a chapter for a test?
a- Not at all   **b-** Not well   **c-** a little bit   **d-** Well   **e-** Very Well

*20. How well can you have a chat with an unfamiliar person?
a- Not at all   **b-** Not well   **c-** a little bit   **d-** Well   **e-** Very Well

*21. How well can you prevent to become nervous?
a- Not at all   **b-** Not well   **c-** a little bit   **d-** Well   **e-** Very Well

*22. How well do you succeed in finishing all your homework every day?
a- Not at all   **b-** Not well   **c-** a little bit   **d-** Well   **e-** Very Well

*23. How well can you work in harmony (together) with your classmates?
a- Not at all   **b-** Not well   **c-** a little bit   **d-** Well   **e-** Very Well

*24. How well can you control your feelings?
a- Not at all   **b-** Not well   **c-** a little bit   **d-** Well   **e-** Very Well

*25. How well can you pay attention during every class?
a- Not at all   **b-** Not well   **c-** a little bit   **d-** Well   **e-** Very Well

*26. How well can you tell other <u>students</u> (children) that they are doing something that you don't like?
a- Not at all   **b-** Not well   **c-** a little bit   **d-** Well   **e-** Very Well

*27. How well can you give yourself a pep-talk when you feel low?
a- Not at all   **b-** Not well   **c-** a little bit   **d-** Well   **e-** Very Well

*28. How well do you succeed in understanding all subjects in school?
a- Not at all   **b-** Not well   **c-** a little bit   **d-** Well   **e-** Very Well

*29. How well can you tell a funny event (<u>joke</u>) to a group of children?
a- Not at all   **b-** Not well   **c-** a little bit   **d-** Well   **e-** Very Well

*30. How well can you tell a friend that you don't feel well?
a- Not at all   **b-** Not well   **c-** a little bit   **d-** Well   **e-** Very Well

31. How well do you succeed in satisfying your parents with your schoolwork?
a- Not at all   **b-** Not well   **c-** a little bit   **d-** Well   **e-** Very Well

32. How well do you succeed in staying friends with other children?
a- Not at all   **b-** Not well   **c-** a little bit   **d-** Well   **e-** Very Well

33. How well do you succeed in suppressing unpleasant thoughts?
a- Not at all   **b-** Not well   **c-** a little bit   **d-** Well   **e-** Very Well

34. How well do you succeed in passing a test?
a- Not at all   **b-** Not well   **c-** a little bit   **d-** Well   **e-** Very Well

35. How well do you succeed in preventing quarrels with other <u>students</u> (children)?
a- Not at all   **b-** Not well   **c-** a little bit   **d-** Well   **e-** Very Well

36. How well do you succeed in not worrying about things that might happen?
a- Not at all   **b-** Not well   **c-** a little bit   **d-** Well   **e-** Very Well

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Appendix C. Copyright Permission

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Walnut, CA 91789

Permission for use of copyright material

To whom it may concern:

We grant Gregory Driedger (Student at University Windsor - Ontario Canada) permission to use this **"Mindset Assessment Profile Tool** *in print*

form for the sole purpose of his thesis research project,   under the following conditions:

- **Content must be used in english. No language translations are permitted.**
- **The questions can be used only as they read in the link above. The questions are not to be altered.**
- **The *feedback* on our scoring guide is our IP and cannot be utilized on any online platform or coded onto a spreadsheet.**
- **Claims of this assessment being research validated should not be made.**
- **Data will be collected in anonymous aggregate form. ● Our copyright will be displayed and remain in-tact.**

Important notes:

Validity/reliability information:

The short survey "Mindset Assessment" has not been used in rigorous research by itself. Rather, it contains a sampling of questions from several research-validated scales measuring mindsets about intelligence, learning goals, and beliefs about effort. These scales are too long and redundant for a quick online survey. See full scales here.

"Mindset Assessment Profile" is based on more extensive measures and is intended as a reflection and discussion tool rather than as an assessment to use with others. Users can see their own individual scores, and someone in a leadership position could see *anonymous* results of the whole group (if you have a way of facilitating that) but a leader should not be able to see the individual scores of teachers/students.

Scoring/interpretation information:
If the goal is to examine program impact in a research study, we recommend some or all of the measures Here. These were used in other research studies and have demonstrated internal reliability and predictive value with respect to one another and achievement outcomes. (E.g., see here.)

If the training is focused on mindset, be sure to include the theories of intelligence scale as a first priority. Other scales could also be incorporated based on the outcomes of most interest. See scales Here

In the case you plan to measure impact on teachers directly, rather than on students, part 1 Here may be a better option. (Part 2 addresses classroom goal structures, and was developed by different researchers.)"

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Support and Operations Team

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