THEORY OF MIND, AFFECTIVE EMPATHY, AND ACADEMIC ACHIEVEMENT:

A CORRELATIVE STUDY OF

CHILDREN IN GRADES 4 TO 6

by

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ABSTRACT

Scholars have posited that in order to educate the "whole child," educators need to focus on teaching social emotional learning (SEL) in addition to teaching academics. Previous studies have found that there may be a positive relationship between SEL competencies and academic achievement. However, the literature suggests that members of the public and some educational stakeholders continue to maintain that teaching SEL may detract from academic learning. This current study is in context of the redesigned curriculum in the province of British Columbia, Canada, and the new emphasis on SEL in the curriculum. This study analyzed the relationship between two constructs of the social awareness SEL competency, theory of mind (ToM) and affective empathy, with academic achievement. Thirty-six participants (16 females and 20 males) in grades 4 to 6 from a public elementary school in British Columbia completed assessments of ToM and affective empathy. Results from these measures were compared with academic achievement, which was determined by grade point average (GPA). Forced entry multiple regression analysis revealed that neither ToM, nor affective empathy correlated with academic achievement in the total sample. In females, academic achievement positively correlated with ToM, $B = .05$, $p = .04$, as measured by *Social Ambiguous Stories* (Bosacki, 1998). In males, academic achievement positively correlated with ToM, $B = .06$, $p = .02$, as measured by the *Reading the Mind in the Eyes Test* (Baron-Cohen, Wheelright, Spong, Scahill, & Larson, 2001). Lastly, both measures of ToM were found to positively correlate with affective empathy. Implications for future research are provided.

Keywords: social emotional learning, BC curriculum, theory of mind, affective empathy, academic achievement

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CHAPTER 1: INTRODUCTION

Importance of Problem

Social emotional learning (SEL), sometimes referred to as the "missing piece" in education (Elias et al., 1997), is defined as "the ability to understand, manage, and express the social and emotional aspects of ones' life in ways that enable successful management of life tasks" (Elias et al., 1997, p. 2). SEL includes setting and achieving positive goals, feeling and showing empathy, establishing and maintaining positive relationships, and making responsible decisions (Collaborative for Academic, Social, and Emotional Learning [CASEL], 2015). A 2011 meta-analysis (Durlak, Weissberg, Dymnicki, Taylor, & Schellinger) suggested that teaching SEL enhances students' connection to school, positive behaviour, and academic achievement. Some scholars (Elias, 2014; Malecki & Elliott, 2002) have argued that skepticism has existed and may continue to exist among some educational stakeholders and members of the public, who were concerned that SEL may be detracting from academics and that SEL teaching should remain a duty of the home. However, the perception that academics are hindered by teaching SEL has been criticized by other researchers (Durlak et al. 2011; Elias et al., 1997; Zins, Weissberg, Wang, & Walberg, 2004). In addition, educators who do believe SEL is important have been reported to struggle because of the academic demands in the classroom (Buchanan, Gueldner, Tran, & Merrell, 2009). Elias et al. (1997) argue that true academic success is not possible without addressing SEL skills: "Time devoted to SEL programs may in fact reinforce and enhance academic learning, and therefore should not be perceived as detracting from academic attention and focus" (Elias et al., 1997, p. 85).

Among the five core competencies of SEL (CASEL, 2015), described more fully later, is *social awareness*, the ability for students to take perspective of and empathize with their peers (CASEL, 2015). This study focuses on the social awareness SEL competency. Both *theory of mind (ToM)*, the ability to reason about other people's thoughts, beliefs, and desires, (Baron-Cohen, 2001) and *affective empathy*, the active response of feeling what another person feels, (Hoffman, 2000), which will both be defined more in depth later, are related to interpersonal skills as they contribute to accurately understanding and appropriately responding to how another person thinks and feels (Bosacki, 1998; Davis, 1996; Miller, 2012). The social awareness SEL competency includes taking the perspective of others (related to ToM) and empathizing with others (related to affective empathy). Therefore, both ToM and affective empathy are arguably embedded within the SEL competencies. As of the 2016-2017 school year, the British Columbia (BC) Ministry of Education (2015a) implemented a redesigned curriculum for kindergarten to grade 9 students that includes an increased emphasis of SEL competencies. Therefore, it is believed that this study, which centres on areas of social awareness in children, is current and relevant to the educational climate in BC. As the redesigned curriculum focuses on SEL competencies, it may be of importance to identify further understanding of the social awareness competency and how it relates to students' academic achievement.

Rationale and Context of Current Study

Social emotional learning (SEL), a term that was first introduced in 1994 (Cherniss, Extein, Goleman, & Weissberg, 2006), has five core competencies according to the CASEL (2015): (1) self-awareness, the ability for people to identify their own emotions and thoughts; (2) self-management, the ability for people to regulate their emotions, thoughts, and behaviours; (3) social awareness, the ability for people to take the perspective of and empathize with others—the

focus of this study; (4) relationship skills, the ability for people to develop and maintain positive and healthy relationships with others; and (5) responsible decision making, the ability for people to make wise, insightful choices that affect personal behaviour and social interactions (CASEL, 2015).

It has been suggested that students will be most successful in their education when they are taught social and emotional skills (Elias et al., 1997; Zins et al., 2004). A growing body of research has suggested that social and emotional development in children positively impacts academic growth, students' connection to school, and classroom behaviour (Durlak et al., 2011; Oberle, Schonert-Reichl, & Hertzman, 2014; Zins et al. 2004). Furthermore, a meta-analysis posits that SEL intervention programs are successful at all levels for all ages, can be implemented by classroom teachers, and do not require outside personnel to teach SEL competencies (Durlak et al., 2011).

In addition, the importance of SEL competencies has been increasingly recognized in Canada. The Conference Board of Canada identified SEL-related skills to be fundamental for employment in the twenty-first century (The Conference Board of Canada, n.d.). These include skills that are needed to work with others such as the ability to recognize individual differences and perspectives. As of the 2016-2017 school year, the redesigned curriculum is the official curriculum within the province of BC used from kindergarten to grade 9 (BC Ministry of Education, 2015b). Embedded throughout this curriculum are three core competencies: communication, thinking, and personal and social (BC Ministry of Education, 2015a). Although these core competencies are interwoven and are not discrete entities (BC Ministry of Education, 2015a), SEL aligns primarily with the personal and social competency (BC Ministry of Education, n.d.). This study may be relevant to areas of SEL with limited research and connect

with the current curriculum changes in BC and the personal and social core competencies woven into the redesigned curriculum.

Theory of mind (ToM). Traditionally, ToM has been researched in preschool-aged children (see meta-analysis: Wellman, Cross, & Watson, 2001) and in people with Autism Spectrum Disorder (ASD; Baron-Cohen, 2001, Baron-Cohen, Leslie, & Frith, 1985; Happé, 1994). Recently, more ToM literature has been expanding to populations of older children (Devine & Hughes, 2013; Lecce, Bianco, Devine, Hughes, & Banerjee, 2014; Miller, 2012) and into adulthood (Apperly, 2011; Dumontheil, Apperly, & Blakemore, 2010). ToM has been increasingly researched as a part of developmental psychology and studied for the past three decades (Hughes & Devine, 2015). Furthermore, recent studies have suggested that ToM improves with age (Apperly, 2011; Devine & Hughes, 2013; Dumontheil et al., 2010). ToM may have relevance to social awareness in school-aged children given that it pertains to how one child understands the way another child thinks and feels.

Empathy. Empathy is a multidimensional construct including cognitive and affective (or emotional) components (Davis, 1996; Hoffman, 2000). According to Shamay-Tsooray (2011), evidence has supported that there is a distinction between emotional and cognitive empathic responses as different neuro-chemical systems are used for each process: "although the 2 systems may work together, they may be behaviorally, developmentally, neurochemically, and neuroanatomically dissociable" (p. 19). Although researchers disagree about how to define empathy (Decety & Jackon, 2004), this distinction between cognitive and affective empathy may give relevance to investigating specific facets of empathy. Cognitive empathy is similar to the perspective taking process, mentalizing, and emotion recognition and is closely related to ToM (Davis, 1983; Decety, 2010). In order to find unique interpersonal skills related to the social

awareness SEL competency, this research will focus on the affective form of empathy, which is defined as the active response of feeling what another person feels (Hoffman, 2000).

Gender. A review of the literature suggests that there may be some variation between genders in performance of ToM (Bosacki & Astington, 1999; Devine & Hughes, 2013) and affective empathy (Michalska, Kinzler, & Decety, 2013). However, there is some disagreement among researchers (Eisenberg, Fabes, & Spinrad, 2006) in regard to how ToM and affective empathy vary with gender, which will be discussed later. ToM, affective empathy, and gender will be discussed in greater detail in chapter 2.

Purpose of Study

Through the lens of social awareness, this study examines correlations with this SEL competency and academic achievement. There is substantial evidence to suggest that SEL and academic achievement are linked (Durlak et al., 2011; Oberle et al., 2014; Zins et al. 2004), yet less is known about how theory of mind and affective empathy, as a part of SEL, interact with academic achievement. By understanding more about how these constructs relate to one another, educators may be more prepared for targeted intervention in effort to educate the whole child. Furthermore, in context of the recent changes in curriculum in BC, and the increased attention that will be given to SEL, this research could be relevant to the current climate of teaching in BC. Moreover, this research may have implications for those stakeholders who continue to hold to the perception that SEL could detract from academics (Elias, 2014; Malecki & Elliot, 2002). Subsequently, this research will add to a wider body of literature regarding gender, ToM, and affective empathy, while providing suggestions for future research of SEL and academic achievement.

This study investigates if ToM and affective empathy correlate with academic achievement, and if there are any differences in these correlations between males and females. Therefore, the research questions are: (1) Do ToM and affective empathy correlate with academic achievement in children from grades 4 to 6?, (2) Is there any variation between ToM and affective empathy and the degree to which they each correlate individually with academic achievement?, and (3) Is there a difference between the correlations of both ToM and affective empathy with academic achievement in males compared to females?

Deficiencies in Existing Knowledge

There have been several studies that have included a wide range of SEL competencies and SEL intervention programs related to academic success (see Durlak et al., 2011 for meta-analysis), but fewer studies were found that focus on the relationship between social awareness and academic achievement. Although ToM studies have increased in children older than age 6, only one study has been found to date, which connected academic achievement and ToM in students grades 4 to 6 (Boor-Klip, Cillessen, & van Hell, 2014). Furthermore, this research adds to a growing body of literature investigating ToM and older children (e.g., Devine & Hughes, 2013; Hayward, 2011). Moreover, while some researchers have identified that promoting ToM may improve academic performance in typically developing children (Kloo & Perner, 2008; Lecce, Caputi, & Pagnin, 2014), few studies have investigated the direct relationship of ToM and affective empathy with academic achievement in older children.

Definition of Terms

Many of the terms that are embedded throughout this study have been previously defined. Some words are used interchangeably in order to be congruent with some of the language of scholars. For example, one synonym to ToM that scholars have used is *mentalizing* (Frith &

Frith, 2003; White, Hill, Happé, & Frith, 2009). Mentalizing, as defined by White et al. (2009) is the ability to "understand other people's mental states" (p. 1097). *First-order belief* is one of the first ways that ToM is identified and is measured by false belief tasks (Wellman et al., 2001). If people have first-order false belief, they can identify when others' understanding contradicts reality (Wellman et al., 2001). When a person has a more advanced understanding of others' mental states, the phrase that is used is *higher-order understanding* (Miller, 2012). Higher-order understanding is used to describe the ToM that is needed for tasks that are more complex in nature (e.g., recursive thinking) than first-order belief. This is more typically measured in older children and adults (Miller, 2012).

Furthermore, when discussing the sample population, the phrase *older children* is used, meaning children ages 8 to 13. Although the primary focus of this research is with older children, ages of *adolescents* referred to in this study are people ages 13 to 18. In addition, children who are *atypically developing* include those who have a designated exceptional learning need including: Autism Spectrum Disorder (ASD), learning disability, deaf and hard of hearing, cognitive impairment, and physical disability. Contrarily, a child who is *typically developing* would not have a designated exceptional learning need. When referring to a child with Autism, the term ASD (Autism Spectrum Disorder) was selected for this study.

CHAPTER 2: LITERATURE REVIEW

SEL and Academics

As noted above, a number of empirical studies have linked SEL with academic

performance. Students from kindergarten to grade 12 who demonstrate SEL competencies may

also perform well academically (Zins et al., 2004). Results from a 2011 meta-analysis (Durlak et

al.) revealed that SEL programs that were implemented in schools improved student attitudes,

developed prosocial behaviour, decreased problem behaviours and emotional distress, and

improved academic performance. Student academic performance improved by a total of 11

percentile points in academic achievement when measured by test scores, mean ES = 0.27, $p <$

.05, and by grades, mean ES = 0.33, $p <$ .05. Given that the subset sample of 135,396 students

were included in the meta-analysis, a strong case is presented that academic performance may be

linked with SEL competencies. Furthermore, a recent study from 20 Western Canadian schools

showed similar results with early adolescents in grade 6, $N = 461$, $M_{age} = 12.02$, (Oberle et al.,

2014). Researchers found that when previous academic scores were controlled for, teacher-

reported and student-reported SEL competencies predicted higher scores on standardized reading

tests in grade 7, accounting for 4% of the variability ($p <$ .001). Moreover, male students' self-

reported scores of social responsibility predicted higher scores in reading achievement, $b = .30$, t

$= 3.38$, $p <$ .001. This was not true for the female sample. In addition, teacher-reported SEL

competency scores in grade 6 also predicted grade 7 reading and math scores with the whole

sample (Oberle et al., 2014).

Although there are several studies that suggest the positive impact of SEL on academic

outcomes there are some contrasting studies that posit this may not be the case. A meta-analysis

that analyzed data across six, large-scale, longitudinal studies found that social emotional

abilities (i.e., social skills, externalizing problems, and internalizing problems) in children entering kindergarten did not significantly predict later academic success (Duncan et al., 2007). Although this may suggest that there could be some possible discrepancy in academic correlations with SEL, the predictive relationship between SEL and academic achievement tends to be well-established in most studies.

Cognitive Development

This research is related to both developmental and educational psychology; therefore, this study is rooted in Piagetian and Vygotskian cognitive developmental theories. Piaget sought to identify how children processed and understood information. He suggested that children were egocentric until at least age seven or eight (Piaget, 2001). However, by age 11 or 12, Piaget argued that the child is capable of reflexive thought. As children move from the egocentric thinking to reflexive thought, it is possible that they may be more socially aware as such reflexive thought is included in advanced ToM and empathic understanding (Bosacki, 1998).

Much of Piaget's work asserts that cognition develops through the physical world, yet less from social influence (Gauvain, 2001). However, Vygotsky (1978) contributed to the notion of cognitive development through social constructs and language. Social awareness as a SEL competency may be rooted in Vygotsky's notion of cognitive development. It is possible that social interactions through language support children's ability to taking perspective of and empathizing with others. Although Piaget's and Vygotsky's ideas did not agree with one another, these foundational writings suggest that cognition continues to grow both from outside influences and throughout childhood into adolescence.

Theory of Mind (ToM)

Theory of Mind (ToM), also known as "mindreading" (Apperly, 2011) is defined as the ability to infer, represent, conceptualize and reason about mental states, such as beliefs, desires, intentions, imagination, and emotions (Baron-Cohen, 2001; Malle, 2002). It is argued to underlie "the conscious and unconscious cognition of human behaviour" (Malle, 2002, p. 267) and give the ability to "reflect on one's own and the others' mind" (Baron-Cohen, 2001, p. 169). The concept of ToM is rooted in the Piagetian notion of perspective taking (Imuta, Henry, Slaughter, Selcuk, Ruffman, 2016). Premack and Woodruff (1978) were the first to use the term "theory of mind" in their study of a chimpanzee. These researchers argued that chimpanzees did in fact "impute mental states to themselves and to others" (Premack & Woodruff, 1978, p. 515). Neuropsychologists, who often term ToM as the mentalizing system, have posited that ToM tasks engage areas in the brain including the bilateral temporal-parietal junctions, precuneus, superior temporal sulcus, and medial prefrontal cortex (Frith & Frith, 2003; Gweon, Dodell-Feder, Bedny, & Saxe, 2012). Results from these functional magnetic resonance imaging (fMRI) studies have suggested that because the ToM system may take place in these specific regions in the brain, ToM may be a special form of cognition and thus independent from other cognitive abilities (Miller, 2012).

First-order belief. A person with ToM has an understanding of mental states of another person (Baron-Cohen, 2001). One way that mental states in a person have been measured is through first-order false belief tasks. False belief is defined as an understanding that contradicts reality (Wellman et al., 2001). When person A can identify that person B's understanding contradicts reality, then person A has first-order false belief understanding. Wimmer and Perner (1983) first performed a false-belief task which involved an unexpected transfer of an object. In

this study, one character, Maxi, leaves a chocolate bar in one cupboard. He then goes to the

playground and his mother moves it to another cupboard. When Maxi returns, the participant is

asked where Maxi would look for the chocolate. Because Maxi was away when his mother

moved it, the correct answer would be that Maxi would look in the original cupboard where he

left the chocolate bar. A participant who does not accurately exercise first-order false belief,

would state that Maxi thinks the chocolate bar is in the cupboard where his mother had moved it.

This is a failure to identify Maxi's false belief.

Results of a meta-analysis in 2001 (Wellman et al.) proposed that the development of

false-belief understanding typically takes place between ages 3 and 4. First-order false belief

tasks have been argued (Miller, 2012) to be the most popular measure and the most commonly

used in ToM studies for people of all ages (e.g., Apperly, Back, Samson, & France, 2008;

Keysar, Lin, & Barr, 2003; Lecce, Caputi, & Hughes, 2011; Wellman et al., 2001). However,

variation in scores may be difficult to detect in older populations due to ceiling effects (Devine &

Hughes, 2013); therefore, false-belief tasks may have limited use beyond these early childhood

years.

Higher-order understanding and measures. Second-order understanding is the belief

about someone else's belief about something in the world (Miller, 2009), or in other words "A

thinks that B thinks that" (p. 750). Miller (2009) uses Wimmer and Perner's (1983) example of

Maxi and the chocolate bar that was moved to describe second-order understanding. A

participant who can accurately exercise second-order understanding can identify where the

mother believes that Maxi thinks the chocolate bar is located. Second-order belief is considered

to be a measure of higher-order thinking for populations of children ages 6 to 9 (Miller, 2012).

The accuracy of children's second-order belief may be positively associated with children's

social behaviour (Miller, 2009), peer coordination (Grueneisen, Wyman, Tomasello, 2015), executive functioning (Benson, Sabbagh, Carlson, & Zelazo, 2013; Guajardo & Cartwright, 2016; Kloo & Perner; 2008) and language (Astington & Jenkins, 1999; Bosacki, 2000, Hayward, 2011; Hughes & Devine, 2015).

Much of the earlier ToM research was initially developed for younger children, and then extended to samples with ASD (Miller, 2012). These early studies indicate that although first- and second-order reasoning were delayed in preschool-aged children with ASD (Baron-Cohen, Leslie, Frith, 1985; Baron-Cohen, 1989), some children with ASD may still in fact develop these first- and second-order false beliefs at a later age (Hughes & Leekam, 2004; Ozonoff, Rogers, & Pennington, 1991). Miller (2012) states that although there are some exceptions (e.g., Bosacki, 1998), the majority of higher-order understanding research was developed for purposes of studying populations with ASD and compared with typically developing populations (Baron-Cohen, O'Riordan, Stone, Jones, & Plaisted, 1999; Baron-Cohen, Wheelwright, Hill, Raste, & Plumb, 2001; Happé, 1994).

The first task that was created to investigate more complex levels of ToM in populations with ASD was called the *Strange Stories* test (Happé, 1994). This test was intended to cause participants, who succeeded on first- and second-order simplified tasks, to stumble by using simple stories of events concerning "different motivations that can lie behind everyday utterances that are not literally true" (Happé, 1994, p. 131). There were 12 types of vignettes used: lie, white lie, joke, pretending, misunderstanding, persuade, appearance/reality, figure of speech, sarcasm, forget, double bluff, and contrary emotions. The tasks were shown to be sensitive to both people with ASD who have varying competence in first- and second-order understanding, and typically developing populations. This test was later revised to be even more

complicated (White et al., 2009); the results provided new evidence congruent with the previous research that people with ASD have deficits in the process of mentalizing.

It is argued that the revised Strange Stories test maintains a high level of validity because measures have consistently distinguished between typically and atypically developing populations (Devine & Hughes, 2013). However, Hayward (2011) suggests that this argument "makes little case for the validity of [this task] for use with typically developing children" (p. 95). Furthermore, it is possible that the revised Strange Stories test may have a ceiling effect with typically developing adolescent populations (Miller, 2012), or at least that there is some discrepancy about how the ceiling does interact with older children in a typically developing population (Hayward, 2011). A modest ceiling effect was reported in a recent study that investigated ToM with typically developing children ages 8 to 13 (Devine & Hughes, 2013). Nonetheless, the revised Strange Stories test has been used with typically developing samples (Devine & Hughes, 2013; Lecce, Zocchi, Pagnin, & Palladino, 2010). Similar to the Strange Stories test, the *Faux Pas Recognition* test was developed to assess when a social "blunder" had occurred (Baron-Cohen et al., 1999). This test was also developed by comparing typically developing populations with children with ASD. The developers suggest that people with a less-accurate ToM have more difficulty detecting these faux pas, or violations of social norms, that are presented in the vignettes (Baron-Cohen et al., 1999). Although this test has been used to measure ToM in older children (Banerjee et al., 2011), it may be narrower in scope than the Strange Stories tasks (Miller, 2012).

Another measure to check for advanced ToM is the child version of the *Reading the Mind in the Eyes Test* (Baron-Cohen, Wheelright, Spong, Scahill, & Lawson, 2001). This measure was adapted from the revised adult version of the same test (Baron-Cohen, Wheelwright, Hill, et

al., 2001). Initially used to compare ToM in people with and without ASD, both child and adult versions of the eyes tests were developed to evaluate more complex mental states with beliefs and intentions of participants (Baron-Cohen, Wheelwright, Hill, et al., 2001; Baron-Cohen, Wheelright, Spong, et al., 2001). The child version of the Reading the Mind in the Eyes Test (henceforth referred to as RMET) consists of 28 photographs of sets of eyes showing a variety of expressions. Children are to choose one of four words that best describes the mental state of the person. The RMET has been used in recent research and is recommended as an advanced ToM measure for older children (Goldstein & Winner, 2012; Lagattuta, Kramer, Kennedy, Hjortsvang, Goldfarb, & Tashjian, 2015; Miller, 2012).

The previously mentioned measures (strange stories, eyes test, and faux pas) were developed for populations with ASD. Bosacki (1998) developed a measure called Social Understanding Stories, later referred to as the *Social Ambiguous Stories* (Bosacki, 2013), to assess complex ToM. The measure was first used on a Canadian, typically developing population (Bosacki, 1998). It consists of two vignettes that have nothing particularly "strange" about them, but rather, have an ambiguous understanding that can be interpreted in a variety of ways (Miller, 2012). Scoring is based on recursive thinking and mental states that are referenced in the answers (Bosacki, 1998). This test measures four abilities that are included as a part of ToM which will be discussed fully in Chapter 3.

ToM and SEL. A number of studies suggest that ToM may have implications on children's social and emotional experiences. ToM has been used, in part, to measure older children's social understanding (Boor-Klip et al., 2014; Bosacki & Astington, 1999), peer relations (Banerjee, Watling, Caputi, 2011), peer acceptance, (Boor-Klip et al., 2014), loneliness, and peer rejection (Devine & Hughes, 2013). Bosacki and Astington (1999) found that ToM

linked to peer-ratings of children's ability to solve problems as rated by peers; interestingly, this study did not find correlations between ToM and children's popularity or peer likability ratings. Another study assessed children ages 6 to 11 over the course of 24 months to determine the relationships between their level of faux pas understanding (i.e., social blunder) and peer relationships (Banerjee et al., 2011). It was found that negative peer relations predicted poorer faux pas understanding in children ages 7 to 8, $r = -0.26$, $p < .01$, and ages 9 to 10, $r = -0.17$, $p < .05$. Lower faux pas understanding in children ages 9 to 10, was associated with those children's negative peer relations when they reached ages 10 to 11, $r = -0.12$, $p < .05$. Furthermore, children in higher-ability classrooms (i.e., IQ of 130 or higher) in grades 4 to 6 were compared with their grade equivalent peers in regular classrooms (Boor-Klip et al., 2014). There was no difference in scores of ToM between regular classrooms and higher-ability classrooms, but there was a positive correlation with peer acceptance and ToM ($r = .22$, p < .01) in children from grades 4 to 6. Most recently, a meta-analysis of 76 studies, including 6,432 children ages 2 to 12, revealed a significant positive correlation between ToM and prosocial behaviour (i.e., helping, comforting, and cooperating with others; Imuta et al., 2016). The researchers suggest that although the effect of this relationship is weak, mean ES = .19, $p < .05$, ToM as a part of social cognition may be a predictor for prosocial behaviours (Imuta et al., 2016). It should be mentioned that some researchers (Hughes & Leekham, 2004) have suggested that higher ToM may not in fact have positive influences on social relations; however, other researchers (Lecce, Caputi, & Pagnin, 2014) have connected ToM as an integral part of SEL.

ToM and age. Recently, there have been more articles published discussing ToM in later childhood and adolescence (Apperly, 2011; Cantin, Gnaedinger, Gallaway, Hesson-McInnis, & Hund, 2016; Devine & Hughes, 2013; Dumontheil et al., 2010; Miller, 2012). It is

commonly posited that ToM in typically developing populations continues to improve into later adolescent years and adulthood (Cantin et al., 2016; Dumontheil et al., 2010; Miller, 2012). Contrarily, Hayward's dissertation (2011) that used six different ToM measures, suggested that age was not found to be a predictor of advanced ToM with children ages 7 to 13, but rather, ToM was associated with language development. Some research has suggested that although adults may possess higher ability to mentalize, they may not reliably apply ToM to the level of sophistication of which they are capable (Keysar et al., 2003). Neuroscientists using fMRI scans have argued that in order to develop a mature, adult-like ToM, understanding of other people's desires and beliefs are both required (Liu, Meltzoff, Wellman, 2009).

Devine and Hughes (2013) examined the relationship between age and ToM by using Silent Films, modeled after the Strange Stories task (Happé, 1994), on a sample of children ages 8 to 13. The results of this study showed that ToM latent factor scores increased with age, $\beta =$ .37, $z = 3.48$, $p < .01$. In addition, Lecce, Bianco et al. (2014) developed a ToM training program of four sessions for Italian children ages 9 to 10. In the four intervention sessions, they had conversations with the children about mentalization through the framework of stories and language exercises. Compared to the control group, the intervention group showed that conversations improved ToM over the two-month intervention. This study (Lecce, Bianco et al., 2014) promotes the notion that children's ToM may improve in the later years of childhood.

ToM and cognitive functions. In addition to age, there are some other variables that may predict ToM in children. Correlations between executive functioning and ToM may be linked in both preschool-aged children (Benson et al., 2013; Guajardo & Cartwright, 2016; Kloo & Perner, 2008) and older children (Bock, Gallaway, & Hund, 2015; Hughes & Devine, 2015). Specifically, it is possible that areas of executive functioning may predict ToM in population of

older children (Bock et al., 2015). However, there is still much research needed to fully understand the relationship between executive functioning and ToM in older children (Bock et al., 2015; Cantin et al., 2016).

It is commonly accepted by many researchers that language ability can impact a child's ToM (Miller, 2012). Longitudinal studies in preschool-aged children have shown that language development may be fundamental for ToM (Astington & Jenkins, 1999). The same relationship has been found in older children (Bosacki, 2000). Children with language disabilities (Botting & Conti-Ramsden, 2008) and with hearing loss (O'Reilly, Peterson, Wellman, 2014; Peterson, Wellman, & Slaughter, 2012) have both performed lower in studies than their matched control samples. This may be further proof that language can affect performance scores of ToM (Miller, 2012). However, given that many tasks for advanced ToM are language-centred, children's ToM scores may be a reflection, not only of their social understanding and ability to mentalize, but also of their language ability (Hayward, 2011; Hughes & Devine, 2015; Miller, 2012). Although executive functioning and language development could be linked with ToM, it is beyond the scope of this study to investigate these relationships further.

ToM and gender. Gender and ToM development, although limited in research (Calero, Salles, Semelman, & Sigman, 2013), may have implications in future studies for older children. Miller (2012) noted that many first-order belief studies in preschool-aged children have either determined no difference between females and males, or they are silent on the issue. However, some variation has been found in children beyond the age of 5. When there is a difference recorded, females have scored higher in ToM (Baron-Cohen, Wheelright, Spong, et al., 2001; Boor-Klip et al., 2014; Bosacki, 2000; Bosacki & Astington, 1999; Calero et al. 2013; Devine & Hughes, 2013). In one study, when age, verbal ability, and socioeconomic status were matched

in females and males, females scored higher on the ToM latent factor, 0.39 *SD*, z = 2.46, p < .05, (Devine & Hughes, 2013). In addition, results in another study showed that girls in grades 4 to 6 outperformed boys their male, grade-equivalent peers (Boor-Klip et al., 2014). Similarly, females had stronger ToM scores than males in a study from Bosacki (2000). Bosacki (2000) posits that differences in gender may be due to society's expectation for females to understand social norms and behave accordingly. Devine and Hughes (2013) suggest that strengths with females' ToM may manifest in the most complex scenarios of the Strange Stories test and the Silent Films task.

ToM and academic achievement. A few studies investigated the nature of the relationships between ToM and academic-related performance. These studies primarily investigated the relationship between reading and math with ToM. A longitudinal study measured students moving from preschool into kindergarten (Blair & Razza, 2007). False-belief understanding was found to be significantly related and predicted letter knowledge, β = .18, *p* < .05, and marginally predicted mathematic scores, β = .16, *p* < .10, and phonemic awareness, β = .16, *p* < .10. Another longitudinal study found that first-order false belief contributed to phrase and sentence comprehension, β = .57, *p* < .01, and second-order false belief contributed to reading awareness, β = .49, *p* < .05, of children in preschool (Guajardo & Cartwright, 2016). Furthermore, it was found that second-order false belief correlated with reading comprehension, *r* = .55, *p* < .05, in children ages 6 to 9 (Guajardo & Cartwright, 2016). Moreover, Boor-Klip et al. (2014) found that cognitive ability, as measured by abstract reasoning scores and academic achievement scores on standardized tests, was positively associated with ToM in regular classrooms, *b* = 3.20, *p* < .001, as well as in higher ability classrooms, *b* = 1.08, *p* < .02. Lastly, a five-year longitudinal study of 49 children showed that sensitivity to criticism (i.e., the

children's understanding of someone's negative comments and ability to consider and apply this feedback) was a mediator between initial ToM scores at age 5 and school achievement assessed at age 10 (Lecce, Caputi, & Pagnin, 2014). The researchers suggest that these results are reflective of the study from Durlak et al. (2011) that suggests that SEL programs may positively impact academic achievement. Lecce, Caputi, and Pagnin (2014) also argue that children's ToM may have an indirect effect on their school achievement. Some scholars (Kloo & Perner, 2008; Lecce, Caputi, & Pagnin, 2014) believe that ToM training programs may serve to benefit academic achievement in school-aged children.

Empathy

Empathy is a very broad and multi-faceted concept (Batson, 2009; Davis, 1996; Decety & Jackson, 2004; Hoffman, 2000). The original word was first applied in psychology by Lipp in 1903, and was derived from the German word "einfühlung" (Davis, 1996). Although there is disagreement among scholars regarding definitions of empathy (Decety & Jackson, 2004), there is agreement on the broad notion that empathy consists of both a cognitive component and an affective component (Davis, 1996; Decety, 2010; Hoffman, 2000; Shamay-Tsoory, 2011; Singer, 2006). Neuroscientists have argued that although the affective and cognitive processes interact, they do not completely overlap (Decety, 2010; Shamay-Tsoory, 2011).

Cognitive empathy is defined very similarly to ToM and has been argued to have similar characteristics with ToM (Decety, 2010). Primarily, cognitive components of empathy can include mindreading, which is called empathic inference (Ickes, 2009) or perceptual role-taking, the ability to understand another's thoughts and motives (Eisenberg, 1986). Ickes' (2009) notion of empathic inference is the same as what other researchers term "ToM" or "mentalizing". Yet, the affective components of empathy are argued by some researchers to be distinct from ToM

(Davis, 1996; Hoffman, 2000; Singer, 2006). Neuroscience suggests that ToM relies on the temporal lobe and pre-frontal cortex (Shamay-Tsoory, 2011; Singer, 2006), whereas the components of empathy that include sharing and responding to emotions of others uses the sensorimotor cortices and limbic and para-limbic structures (Singer, 2006). Given the similarities between the ToM and cognitive empathy constructs, this research will focus on the affective components of empathy.

Affective Empathy

Affective empathy, broadly speaking, is when "one feels what the other feels" (Hoffman, 2000, p. 30). However, the definition is more complex. A person with affective empathy possesses feelings more congruent for another's situation than with their own situation (Hoffman, 2000). Affective empathy has also been described as "an affective reaction that results from the apprehension or comprehension of another's emotional state or condition, and that is identical or similar to what the other person is feeling or would expect to feel" (Eisenberg & Fabes, 1998, p. 702). The empathic response of a person can include, but is not limited to, emotional contagion, which is when the emotions of another are simply "caught" (Eisenberg, Huerta, Edwards, 2012). Emotional contagion involves the mimicry of facial expressions, vocal utterances, and postures and movements (Hatfield, Rapson, & Le, 2009). The essential piece to this affective component is that there is a feeling that is evoked from another and it holds significance in the observer's situation.

There are two interpersonal affective outcomes that can take place when empathizing with another person: parallel and reactive (Davis, 1996). A parallel outcome is closer to the emotional contagion by definition, as it includes motor mimicry; it more similar to a replication of the observed emotion (Davis, 1996). Reactive outcomes may result from a sophisticated

cognitive process such as feelings of compassion and empathic concern (Davis, 1996). These reactions tend to be more others-oriented, whereas the parallel reactions are more self-centred (Davis, 1996). This study focuses on the affective, reactive outcomes of empathy.

Affective empathy and age. Due to the multidimensional nature of empathy, and the focus on affective components of empathy, Hoffman's approach (2000) to empathy and age will be used. Hoffman tends to focus primarily on affective components, and thus, his approach to empathic development is similar to the approach to empathy in this study. Furthermore, Hoffman has also been acknowledged as one of the first among those studying empathy to offer a theoretical model of the development of empathic distress from newborns through childhood and adolescence (Schonert-Reichl, 2011).

Hoffman (2000) suggests that humans first experience empathy through a reactionary cry to another infant crying. By the age of 1, children enter the egocentric empathic stage, where they can begin to identify that it is not distress in themselves, but rather, in another person (Hoffman, 1984). In toddler- and preschool-aged children, there is a development of the understanding of different causes and correlates of emotions and that the same event can cause different feelings for different people (Hoffman, 2000). From ages 3 to 8, children can empathize for another's feelings, while also being able to identify that these feelings may be different from their own (Hoffman, 1984). When children enter late childhood and adolescence (age 12 or 13), they are able to empathize with another's condition as their awareness for others increases (Hoffman, 1984). This theory of maturation of cognitive and affective empathy throughout childhood and adolescence is congruent with other researchers' theories (e.g., Decety, 2010). It is also possible that affective components, which are initially developed in

infancy, may in fact inform emotional understanding and ToM (Decety, 2010), which in turn support higher levels of prosocial behaviour (Schonert-Reichl, 2011).

Empathy and prosocial behaviour. Prosocial behaviour, defined as "voluntary behaviour intended to benefit another" (Eisenberg et al., 2006, p. 646) has been found to positively associate with empathy (Eisenberg et al., 2006; Eisenberg & Miller, 1987). Empathy has also been described as a "driving force" for prosocial behaviour (Christov-Moore, Simpson, Coudé, Grigaityte, Iacoboni, & Ferrari, 2014). The link between empathy and prosocial behaviour has been also argued to be a key element of human development critical for social functioning (Schonert-Reichl, 2011). However, it should be noted that the relationship between prosocial behaviour and empathy varies, depending on the method by which it is measured (Eisenberg & Miller, 1987).

Empathy, SEL, and academics. Empathy has also been considered an integral part of the SEL literature and SEL training programs (Durlak et al., 2011; Zins et al., 2004). Children who have high empathy, sympathy, or a combination of the two, often have been reported to demonstrate socially appropriate behaviour and maintain higher quality friendships (Eisenberg et al., 2012). Another recent study in Western Canada (Schonert-Reichl, Oberle, Lawlor, Abbott, Thomson, Oberlander, & Diamond, 2015) found that children in grades 4 and 5 who participated in a SEL program intervention, significantly improved in many SEL competencies including empathy, $F(1, 97) = 4.42$, $p = .03$, $d = .42$, compared to the group without the SEL intervention. There are a few studies that include empathy as a part of the SEL program, but there is only one evidenced-based program that specifically focuses on empathy throughout all of the curriculum (Schonert-Reichl, 2011); this program is called "Roots of Empathy" (Roots of Empathy, n.d.). This specific program has shown that teaching children empathy may increase peer nominations

of prosocial behaviour and decrease aggression as rated by teachers (Schonert-Reichl et al., 2012).

       After a review of the literature, no specific studies were found that directly connected to empathy and academics, but some studies have included empathy and academics in the context of SEL (e.g., Durlak et al., 2011). As previously mentioned, SEL, which includes empathy as a part of social awareness, has been hypothesized to link with higher academic achievement (Zins et al., 2004).

       Empathy and gender. It may be stereotypically believed that females have higher levels of empathy than males (Michalska et al., 2013). A recent review of the gender differences and empathy (Christov-Moore et al., 2014) suggests there are some key differences that may exist between males and females. Christov-Moore et al. (2014) asked about the depth of gender differences and investigated the "core biological and neural underpinnings" (p. 607) of empathy. The authors concluded that there is an evolutionary difference in empathic behaviour between genders that stems from maternal care (Christov-Moore et al., 2014). In addition, they also posit that in developmental psychology, females tend to demonstrate higher levels of empathy than males in all ages, and the differences between genders tend to grow with age as children approach adolescence (Christov-Moore et al., 2014). The argument is also made that these differences could be a product of culture and socialization or possibly originate from hereditary differences (Christov-Moore et al., 2014). The conclusion is drawn that there are in fact some differences between males and females, but the exact causes for these differences are still uncertain (Christov-Moore et al., 2014).

       In addition, empathy scores in females tend to be particularly higher when empathy is self-reported compared to when other measures are used (Eisenberg & Lennon, 1983; Michalska

et al., 2013). For example, Michalska et al. (2013) compared scores in children ages 4 to 17 and found that when males self-reported, they were less empathic as age increased, $r(28) = −0.44$, $p < 0.01$, whereas female results showed the opposite trend, $r(28) = 0.37$, $p < 0.05$. However, when using neurophysiological measures, no gender differences were found. These results could be due to a level of self-presentation (Davis, 1996) as females may be more willing to report empathic behaviour than males due to appearance or to social norms (Eisenberg & Lennon, 1983; Michalska et al., 2013).

Despite the previously mentioned studies that suggest that females may demonstrate higher levels of empathy, the separation between males and females is not always supported by empirical evidence and often is a misconception (Eisenberg et al., 2006). Consequently, it is difficult to fully understand how affective empathy and gender in older children interact.

Empathy measures. There are a variety of measures used to assess empathy including: self-report, facial, and physiological (Zhou, Valiente, Eisenberg, 2003). The method of self-report was chosen as the ideal method for this study because it is least interruptive for adults, compared with parent or teacher reports, and by nature much simpler than facial and physiological measures (e.g., no equipment needed). Three different self-report measures have been recommended to assess empathy in children (Davis, 1996).

First of all, Feshbach and Roe's (1968) Affective Situations Test of Empathy tells participants a story while being shown a picture. Following this sequence, children are asked how they feel and are expected to self-report their own emotional states. Although this measure was commonly used in the past, some scholars have expressed concerns with the psychometric properties (Eisenberg & Miller, 1987). In addition, it was developed for children ages 6 and 7

and has primarily been used on young children (Zhou et al., 2003). Therefore, it is not appropriate for the sample of this study.

Second, Interpersonal Reactive Index (Davis, 1980) is a self-report questionnaire of 28 items on a 5-point Likert scale (ranging from "does not describe me well" to "describes me very well"). There are four subscales (i.e., perspective taking, fantasy, empathic concern, and personal distress) which each contain seven questions. Furthermore, standardized alpha coefficients ranged from .70 to .78 suggesting that it maintains higher levels of internal consistency (Davis, 1980). It was initially developed for adults, but has been adapted for children (Schonert-Reichl et al., 2015; Schonert-Reichl et al., 2012). However, in studies in which this had been done, researchers attributed confusing results to the possibility that the test was not sufficiently sensitive to detect developmental changes in children's empathy in middle childhood (Schonert-Reichl et al., 2012).

The third self-report measure is Bryant's (1982) Index of Empathy for Children and adolescents (IECA). This measure was adapted from the Questionnaire Measure of Emotional Empathy (Mehrabian & Epstein, 1972), which was developed for measuring emotional empathy in adults. The IECA is a self-report questionnaire of 22 items and is read aloud to the participants. It can be administered without any special equipment (Bryant, 1982). The measure was first tested on children in grades 1, 4, and 7 (Bryant, 1982). Concerns with this measure have been built around the internal structure including multidimensional parts of empathy and the measure may have multiple factors. One study found two factors (empathic sadness and attitudes; de Wied et al., 2007) while another found three factors (feelings of sadness, understanding feelings, and tearful reaction; Del Barrio, Aluja, & García, 2004). Further explanation about this measure will be given in Chapter 3.

Chapter Summary

In this chapter, areas of the literature for both ToM and affective empathy were discussed in context of developmental psychology and as a part of SEL. A growing body of literature has investigated ToM in older children (Banerjee et al., 2011; Bosacki, 2000; Devine & Hughes, 2013; Miller, 2012). Although a majority of the measures used to assess ToM in older children have been used on populations with ASD (Baron-Cohen et al., 1999; Baron-Cohen, Wheelwright et al, 2001; Happé, 1994) some measures have been developed for typically developing samples (Bosacki, 1998). In addition, previous ToM studies have found a relationship between ToM and age (Cantin et al., 2016; Dumontheil et al., 2010; Miller, 2012) as well as with other cognitive functions such as executive functioning (Bock, Gallaway, & Hund, 2015; Hughes & Devine, 2015), language (Hayward, 2011; Hughes & Devine, 2015; Miller, 2012), and academic achievement (Boor-Klip et al., 2014).

Affective empathy, which is a reactive response to others (Davis, 1996), has been argued to be important for SEL and prosocial behaviour. Although there are three common methods used to measure empathy (self-report, facial, and physiological), it was decided that a self-report was best suited for this study as it was least interruptive for adults and children, and much simpler to implement. Finally, previous research studies have not determined if one gender tends to exhibit higher levels of either ToM or affective empathy than the other. However, when a difference has been reported, both ToM and affective empathy have favoured females (e.g., Boor-Klip et al., 2014; Bosacki & Astington, 1999; Christov-Moore et al., 2014; Devine & Hughes 2013).

CHAPTER 3: METHODOLOGY

Researcher

Research took place in a public elementary school in a suburban area proximate to Vancouver, BC. This school educates over 400 students that range from kindergarten to grade 7. The researcher worked as a resource and learning assistance teacher at the elementary school four days per week during the 2015-2016 school year. As part of his job, the researcher worked with students identified under one of the BC Ministry of Education's (2016) special education categories. The researcher had a teacher-student relationship with all the participants before the study took place. All data were collected on the researcher's days off.

Participants

Children who participated in this study ($N = 36$), ranged in age from 9 to 11 years old ($M_{age} = 10.23$). The grades 4 to 6 students that participated in this study were from six different classrooms. Table 1 shows the distribution of participants across these classrooms. Table 2 shows the distribution of participants from each grade. Of these 36 participants, there were 28 Caucasians, four Asian-Canadians, one African-Canadian, one Latino-Canadian, one Indo-Canadian, and one Aboriginal-Canadian (Métis). There were 20 male participants and 16 female participants. Furthermore, 33 of these participants were born in Canada, and 31 spoke English as their first language. Of the remaining five who spoke English as a second language, two of them

Table 1

Distribution of Grade of Participants

Grade	n	Percent
4	15	41.7
5	14	38.9
6	7	19.4

Table 2

Number of Students from Each Classroom

Classroom	n	Percent
1	1	2.8
2	6	16.7
3	7	19.4
4	5	13.9
5	7	19.4
6	10	27.8

were considered English Language Learners (ELL) by the province of BC and were receiving support from the ELL teacher. Half of the participants ($n = 18$) were enrolled in French.

All participants were randomly selected from the six general education classrooms (process of randomization will be explained in detail later in this chapter). Therefore, participants who were identified with special needs were included in this study. Eight participants were coded under one of the BC Ministry of Education (2016) special education categories; Table 3 shows the distribution of participants in each category. The number of children with special needs in this sample ($n = 8$; 22%) was not representative of the school population and was higher than expected in a sample of this size. However, the researcher's teaching job at the school was to work to support students with special needs. As a result, it is likely that parents who were more familiar with the researcher as a teacher, were more willing to consent to this study due to the rapport that had been established with the researcher.

Procedures

This study was designed in the fall of 2015 by the researcher in consultation with the advising committee. After the committee approved the study's design, an application was made

Table 3

Distribution of Students in Special Education Categories

Special Education Category	*n*	Percent
Physical Disability/Chronic Health Impairment	2	5.6
Deaf and Hard of Hearing	1	2.8
Autism Spectrum Disorder	1	2.8
Learning Disability	4	11.1
No Category	28	77.8

Note. All special education categories are determined as per the BC Ministry of Education (2016).

to the Research Ethics Board at Trinity Western University at the beginning of November 2015, and approval was granted on November 22, 2015. A few days later, research and ethics approval was granted from the assistant superintendent of the school district as well as by the principal of the school where research was conducted.

After approval for the study was granted, teachers at the school were individually consulted and asked permission to seek consent from parents and students in their classes (see Appendix A for script read to teachers). All teachers consented and were then asked about a time that was best for the researcher to come into the class and speak about the study. In December of 2015, the researcher spoke in all six classrooms presenting the same information to one class at a time (see Appendix B for script read to students). After the researcher had explained the study to the whole class, parental consent forms (Appendix C) were sent home with all students and were due two weeks from the date they were distributed. There were 149 students between grades 4 to 6 in attendance on the day parental consent forms went home. Five students did not receive parental consent forms due to their absence on the day forms were handed out. This was realized by the researcher after the two-week deadline to return forms had passed. Through consultation with the advising committee, it was decided not to seek out these

five students as it could have introduced a new error of passage of time into the study. Of the 48 forms that were returned, 40 parents consented to their child being in the study, six did not consent, and two were disqualified because the forms were uninterpretable. This reduced the sample to 40 students. In early January of 2016, teachers were asked at the beginning of the school day to confirm a time when the researcher could seek verbal assent from each child of a consenting parent. The researcher asked for verbal assent from students individually (see Appendix D for script read to students) during the time that was agreed upon with the teacher. Of these students, one had moved away in January and one more did not verbally assent to the study. This reduced the sample to 38 students.

The research committee agreed that this study needed to finish in a two-month period in order to avoid any issues with maturation of students. Because data collection could only be conducted one day per week, the study was under time constraints. Therefore, it was originally decided by the researcher in consultation with the committee to conduct the study with 30 students. If more than 30 students consented to the study, the intention was to randomly reduce the sample to 30. However, since there were 38 students for whom parental consent was received, the committee agreed not to remove any of the students, but to include all 38. At the time of implementing the research, one more student had been struggling with school attendance for several weeks. The student's teacher was consulted and the teacher felt strongly that it would be unfair to ask the student to do the research given the student's current emotional state. Therefore, at the teacher's request, this child was removed from the study.

There were two criteria for exclusion. The first of these was grade; only students in grade 4 to 6 were invited to participate in this study. The second criterion was based on language ability. Students who were receiving ELL support in the school were excluded if they

were below level 4. These levels are based on the amount of years of ELL support they have

received (e.g., Level 1 is a student's first year of English support). The ELL teacher advised that

children at a level 4 could understand and appropriately respond to the measures used in this

study. Both participants receiving language support met this level 4 criterion; therefore, no

students were excluded due to language ability.

   After initial analysis and checks for outliers (e.g., scatterplot graphs and DFbeta value

checks), and examination of independent residuals, one participant who severely skewed the data

was identified as an anomalous case. After consultation with all members of the committee, it

was agreed that this participant was an outlier; therefore, this participant was removed from the

study. The process by which the participant was determined to be an outlier will be explained in

greater detail in Chapter 4. With the removal of this outlier, the final sample size was 36.

   Sample power. The researcher and advising committee agreed that a minimum of 20

participants were needed in order to conduct this quantitative study. According to Field (2013),

it is generally agreed upon that when using regression analysis, the fewer the predictors, the

smaller the sample can be. Given that there were only four predictors that were used in

preliminary analysis, this sample size ($N = 36$) was determined to be sufficient for this study.

However, as a relatively small sample size, results should not be generalized and must be

cautiously interpreted. Further discussion on the limitations of this study can be found in

Chapter 6.

Data Collection

   All data were collected in January and February of 2016 over six separate days. Teachers

were consulted each morning to find the most appropriate time for students to be taken from the

classroom to participate in the study. School subjects that tended to be participants' favourite

(e.g., physical education, library, computers) were avoided to ensure students were not distracted or disappointed to leave their class. When the researcher went to the classroom during the time scheduled with the teacher, the participant was asked if it was a "good time" for them to join the researcher, or if a different time in the day was desired. This was done to further ensure that participants were not missing preferred subjects. Although all participants came out when first asked by the researcher, data collection was paused for three different participants after the interviews and measures had started due to preferred activities beginning while the participant was out of the classroom. As a result, a time later in the same day was agreed upon by the participant, teacher, and researcher to complete the measures.

All testing took place in the "bookroom" of the school. This was a frequent location for school assessments because it is often available, well-lit, quiet, and comfortable for testing. This bookroom did present some challenges as there was science and math equipment which was the cause of some visual distraction for participants. Yet, due to the lack of other space available, it remained the best location for testing in the building. The total test time ranged from 21-45 minutes ($M_{time} = 27.8$). A majority of participants finished the measures within one sitting. A few participants who did not finish before a scheduled school break (e.g., recess and lunch) were asked to finish later in the day during a time agreed upon by the participant, teacher, and researcher. If a session was not completed by the end of the school day, the measures were completed the following week. All debriefing was done individually with students immediately following the completion of the measures (see Appendix E for script).

Measures

When the study was designed, it was determined by the researcher and advising committee that measures should be simple while also minimizing the time length of each child's

session. Therefore, criteria for choosing measures was based on the validity from the literature review, as well as the feasibility to complete the measures in an efficient manner. Each of the measures selected were practiced by the researcher before administering to the participants in effort to practice maintaining the same expression and intonation.

Initial interview. Participants were asked five interview questions (see Appendix F). These questions were intended to acquire more information about the participants' backgrounds. Following these questions, the participants were given brief instructions to introduce the process (see Appendix G).

Reading the mind in the eyes test (child version; RMET). Participants began the series of measures with the RMET (Baron-Cohen, Wheelright, Spong, et al., 2001). As previously mentioned, this test consists of 28 photos of sets of eyes that represent complex mental states. Participants were shown a picture of a person's eyes and were given four different words that described mental states (e.g., jealous, scared, relaxed, hate) from which they chose the best descriptor. Correct answers were given a score of 1, and incorrect answers were given a score of 0. The RMET score was totalled out of a possible 28 points. The test was retrieved online from the University of Cambridge Autism Research Centre (2015).

Advantages to using an eyes test measure is its simplicity and efficiency to administer (Baron-Cohen, Wheelright, Spong, et al., 2001). As previously mentioned, efficiency was one criterion used to select measures, and the RMET met this requirement. Another advantage of this measure is that it may lack a ceiling effect across age range (Lagattuta et al., 2015). Lastly, due to the interaction that has been shown in some previous research with ToM and language (Hayward, 2011; Hughes & Devine, 2015), the RMET is particularly useful as it is less language intensive compared to some of the story-based tasks used for ToM. The RMET was selected as

the first measure used in the sessions with participants because of its visual and simplistic nature. It was presumed that the RMET would be interesting to participants, and thus allow them to feel increasingly comfortable during the testing. Anecdotally, participants tended to smile and appeared to genuinely enjoy this measure. The researcher read aloud the four choices of words that could describe the set of eyes in the photo, and participants' answers were recorded on a scoring sheet. This measure originated from the United Kingdom, and therefore, some participants were less familiar with the mental state "cross", which was one option for both question number one and two in the RMET. When participants asked the researcher what "cross" meant, the word "upset" was given as a synonym. If a participant was not sure about which answer to select, they were encouraged to choose the best answer. Time for completion of the RMET ranged between 5-10 minutes ($M_{time} = 7.44$, $SD = 1.16$).

The developers of this measure have been criticized (Peterson & Slaughter, 2009) for publishing little information about the internal consistency. Baron-Cohen, Wheelright, Spong, et al. (2001) did not report psychometric data, but they did report a strong inverse correlation with another measure of ToM in the ASD sample, $r = -0.63$, $p = .001$. Although no one clear coefficient of the RMET child version was found through a review of the literature, the adult version has had sufficient reliability in some studies (e.g., Cronbach's alpha coefficient of .70; Dehning, Girma, Gasperi, Meyer, Tesfaye, Siebeck, 2012), and lower in other studies (e.g., Cronbach's alpha coefficient of .58; Harkness, Jacobson, Duong, & Sabbagh, 2010). In 2013, a study reviewed psychometric data of the Italian version of the adult version of the RMET measure (Vellante, Baron-Cohen, Melis, Marrone, Petretto, Masala, & Preti). Confirmatory factor analysis revealed that the measure was unidimensional with maximal weighted internal

consistency reliability of .72. Based on this, the authors suggest that the eyes test (adult version) was suitable for research.

Index of empathy for children and adolescents (IECA). As previously mentioned, this index (Bryant, 1982) was adapted from a measure of emotional empathy in adults (Mehrabian & Epstein, 1972). The IECA, which was used to measure affective empathy, is a self-report questionnaire of 22 items. Each of these questions was scored as 0 for an incorrect answer or 1 for a correct answer. To receive a score of 1 for empathic tendencies, some questions must be answered with an affirmative response. One example of this from the test is: "It makes me sad to see a girl who can't find anyone to play with" (p. 416). Other questions must be answered with a negative response to be coded as correct. An example of this from the test is: "Boys who cry because they are happy are silly" (p. 416).

Participants were given two practice questions to ensure they understood directions. Each participant was given a sheet of paper with the questions from the test. The researcher read these questions to the participant one at a time. After each question, the participants circled *yes* if they agreed with the statement, or *no* if they did not agree with the statement. If the participant did not understand a question, then it was read a second time. If they were unsure about whether or not they agreed with the statement, they were encouraged to choose the best answer. Time for completion of the IECA ranged between 4-9 minutes (M_{time} = 5.22, SD = 1.15).

Bryant (1982) reported in her original study that Cronbach's alpha coefficients ranged from .68 (grade 4), to .79 (grade 7), while two-week test-retest reliability coefficients ranged from .74 to .83 in the same respective grades. As previously mentioned, concerns have been raised towards the multidimensional nature of this measure (de Wied et al., 2007; Del Barrio et al., 2004). However, recent studies have continued to use the measure as a complete 22-question

test as originally designed (Goldstein & Winner, 2012; Rabinowitch, Cross, & Burnard, 2013). The nature of this study was not to assess the measure itself; therefore, the index was analyzed as a total score out of 22. Yet, results will need to be cautiously interpreted given the aforementioned reports on the IECA's validity.

     Social ambiguous stories (SAS). The SAS measure was arguably the most challenging for participants to complete. Therefore, it was selected to be used as the final measure to allow for participants to have time to settle into the session. This measure, which was originally used with a population of grade 6 students, consists of two brief vignettes intended to measure higher-order understanding (Bosacki, 1998). Each short story consists of three children (i.e., one with three girls and the other with three boys) where nothing unusual occurs, but participants are required to interpret the social situation. In the first vignette, two girls, Nancy and Margie, are watching a "new girl" from the school play on the swingset. They both nod and smile to nonverbally communicate with one another, and then walk over towards the new girl who wonders what they want. The second story is about two boys, Kenny and Mark, who are co-captains choosing players to be on their soccer team. The two boys also use nonverbal communication, which in this case was winking and smiling, and choose the boy, Tom, who usually gets picked last. In both of these stories, there is a high degree of ambiguity, allowing for multiple interpretations based on participants' ability to mentalize the intentions, beliefs, and feelings of the characters.

     After the researcher finished reading the stories to the participants, two simple comprehension questions (yes/no answers) were asked to ensure that the participants understood the story. If the participant answered either question incorrectly, the story was re-read. If the questions were incorrectly answered a second time, then the follow-up questions were not asked.

Following the comprehension questions, the participants were asked a series of open-ended

questions that assess participants' social understanding and how children understand the

"psychological world of the other" (Bosacki & Astington, 1999, p. 241). For example,

participants were asked "What do you think Tom feels?" or "Choose a character in the story and

describe her" (Bosacki, 1998, p. 59), and then were prompted to explain their thinking.

Depending on the answers that participants gave, specific follow-up questions were asked for

clarification or more detail (e.g., "Does he feel anything else? Why?" [p. 59]).

According to Bosacki and Astington (1999) abilities of ToM were categorized into four

groups: (a) conceptual role-taking, ability to understand a variety of perspectives, (b) empathetic

sensitivity, ability to identify and understand emotional states, (c) person perception, the ability

to identify that a person is a psychological being with "stable personality perspectives," (p. 240),

and (d) alternative explanations, the ability to consider other perspectives. Bosacki (1998)

originally analyzed the four categories and how each score interacted with another as well as

collected a composite score for both vignettes. In this study, categories were not analyzed

separately, but rather, used as a complete score to represent ToM. The SAS was given a

composite score out of 42 (21 for each story). The time for completion of both SAS vignettes

ranged between 9-22 minutes ($M_{time} = 13.81$, $SD = 2.90$).

The researcher typed participants' verbal responses to the SAS questions onto a laptop

computer during the interview. This method of data recording was selected for a few reasons.

There were concerns expressed by the committee in regards to sound recording of the children.

Specifically, some parents might consider sound recording a violation of privacy and sound

recording was not mentioned in the consent form. Had it been in the consent form, the concern

was that parents would not allow their children to be in the study, and the minimum number of

20 participants needed to perform this research may not have been attained. The option of voice-to-text typing through a variety of platforms was considered and tested, but decided against as they were less accurate than typing. During the interviews, careful steps were exercised by the researcher to immediately re-read the answers that were typed to ensure accuracy. Furthermore, prior to data collection, the researcher practiced typing responses in real time with a volunteer adult and it was found that accuracy was maintained.

Bosacki (1998) recorded that Cronbach's alpha coefficients were .67 for the story about the girls and .69 for the story about the boys. In addition, the measure has been used with students from grades 4 to 6 (Boor-Klip et al., 2014), which also produced a similar internal reliability for SAS total ($\alpha = .65$). The SAS measure has been suggested as an appropriate assessment of typically developing children (Miller, 2012).

Coding responses for SAS. Careful consideration was taken to follow the instructions given in Bosacki's dissertation (1998) to ensure that consistent delivery and appropriate follow-up questions were given by the researcher. Data were scored based on the criteria provided in Bosacki's dissertation. There were nine different questions that were coded for each vignette. Participants who responded "I don't know" had the question repeated to them. If they responded a second time in this manner, then they were given a score of 0. The first three questions were given the score of 1 if answers referenced a mental state or communicative intent, and 0 if no references to mental states were given. For example, in answer to the question: "Why did Nancy smile at Margie?" (Bosacki, 1998, p. 57), participants scored 1 for answers such as: "Cause they wanted to go over and talk to the person" or "Cause they wanted to be friends with the girl". In these responses, intent and a mental state (i.e., want) was communicated. The remainder of the questions were all scored out of 3. Although the criteria varied for each of the categories of the

measure, there were similarities for how each was coded. This was based on the participants' ability to mentalize or understand the characters' psychological worlds, and the depth to which participants' integrated different perspectives and beliefs. For example, a score of 0 was given for "I don't know" or for a tangential response. A score of 1 was received for responses that focused on descriptions of the behaviour or situation (e.g., "Because he's usually last" or "Cause she didn't hear anything from them"). Participants scored 2 points for answers that referenced mental states (e.g., "Cause he was thinking in his head: 'Why did they choose me?'"), acts of communication, or perception (e.g., "Because she didn't really understand when they nodded and why they nodded"). Responses that integrated two or more mental states and coherently connected them with one another (e.g., recursive thinking or moral judgements; Bosacki, 1998) scored 3 points. For example, one participant responded: "Because when someone tries to go towards another new student it usually means they want to make friends with them not to be mean to them and everything." Participants were given a score for their best answer. For example, if initial response included a behavioural description (score of 1), and then later in their response included mental states, a score of 2 was awarded. Although all scoring was completed by the researcher, one example SAS transcript was presented to the chair of the committee to ensure that scoring from the researcher was reliable. Both researcher and this advisor individually arrived at the same score. In order to ensure that consistency was maintained for the wide breadth of responses, the researcher recorded answers in a "scoring bank" for each response to be referenced if needed. When there was any uncertainty in scoring, the researcher looked at previous examples that had been already marked and recorded, and then gave a score to ensure consistency.

Academic achievement. Academic scores were measured by participants' first term (i.e., September to December) report card grades. Teachers were each asked for a copy of this report card and the researcher recorded all the grades for each subject in term 1. The standard 4-point grade point average (GPA) scale was used to quantify the letter grades (A = 4.0; B = 3.0; C+ = 2.33; C = 2.0; C- = 1.67; Incomplete (I) = missing data). The overall GPA was calculated for the participants. In this study, with the exception of the outlier that was removed, there were no participants who had an incomplete in any of their subjects.

There was some variation between the school subjects that each participant was taught. This was because of the different grades and classrooms that the participants were from. For example, in the school, students are not enrolled in French until grade 5; therefore, no grade 4 participants had marks for French. Similarly, there was only one classroom that had marks for drama. It was decided to included French as a part of GPA because half of the participants (n = 18) were enrolled in this school subject, but drama was removed as there were only six participants' who received drama grades in term 1. Consequently, GPA included an average of all subjects, with the exception of drama.

Consideration was given to separating math and language arts for analysis as separate outcome variables. However, in elementary grading, there are no "in-between" grades for both B and A. For example, there is no such grade as a B-, B+, A- or A+; yet there is a C+ and C-. Therefore, a score for math could be any of the following: 1.67 (C-), 2.0 (C+), 2.33 (C+), 3.0 (B) or 4.0 (A). When those scores were averaged over a group of subjects (i.e., GPA), the distribution was found to be normal. However, due to the nature of the GPA scale in intermediate grades, the distribution of single subjects was observed to be non-normal.

Therefore, on the advice from the statistical advisors, analysis by separation of school subjects was not performed.

Missing data

One male participant did not accurately answer the comprehension questions two times consecutively for the first vignette on the SAS. In accordance to the measure's rules, no further questions were asked about this particular vignette; therefore, the result was coded as a missing datum. The participant did, however, answer the comprehension questions accurately for the second vignette, and thus, the ToM follow-up questions were asked. Another participant with ASD appeared distracted when answering questions for the second vignette on the SAS. This participant began recreating a brand new story and adding in another character; the child also moved around the room and perseverated on certain imaginative pieces that were not from the story. It was clear that this participant was distracted and no longer responding directly to the questions being asked by the researcher. Due to the random nature of the responses and the participant being very preoccupied by creating new stories, and after careful consideration from the advising committee, it was agreed that this datum was "contaminated." As a result, this score was also coded as missing datum. However, when this same child answered questions from the first vignette, he was much more focused and remained on topic, and thus, this story was determined to be appropriate to score.

After a review of studies that had used the SAS measure, there were no suggestions for how to calculate the SAS composite score when one story was coded as missing. The advising committee agreed that it would be appropriate to impute the score from the story that was completed to replace the missing datum score. The two scores were then summed to get a total

score for the SAS measures. For example, if a score of 8 was received on the first vignette, then the imputed score for the second vignette would also be 8 for a total score of 16.

Research Design

It was determined that a two-tailed model would be most appropriate due to the exploratory nature of the research questions. In other words, both negative and positive correlations were considered as possibilities in this study. After all of the data had been scored and coded, data were entered into IBM Statistical Package for the Social Sciences (version 23). Initial bivariate correlations were analyzed between variables and forced entry multiple regression was selected in order to assess correlations between predictors and the outcome variable as per the research questions. According to Field (2013) regression analysis finds a linear model to fit the data that are predicting the outcome variables. In this study, initial analysis was run with genders combined to answer question 1, and then with males and females separated to investigate research question 3. Hierarchical regression was also used to determine if gender was a predictor of the outcome variable. Differences were analyzed between the regression models and the impact that each predictor had on GPA in order to answer research question 2. Furthermore, correlations for both RMET and SAS were looked at individually (RMET vs. GPA; SAS vs. GPA). Significance level for this study was found at $p < .10$. Although the significance level commonly used in social sciences research is $p < .05$, the recommendation to use a relaxed p-value was given by the research advisors due to the exploratory nature of this study.

Chapter Summary

Methodologies and procedures that were used in the study were described in this chapter. Although the study included a relatively small sample size ($N = 36$), students were represented

for each of the three separate grades (grade 4, 5, 6) and each of the 6 different classrooms, while maintaining relatively balanced gender samples. Two separate measures were used to assess ToM. The first of these was an eyes test measure (Baron-Cohen, Wheelright, Spong, et al., 2001), and the other was an ambiguous stories measure (Bosacki, 1998). In addition, a self-report questionnaire was used to measure affective empathy (Bryant, 1982). Finally, academic achievement was measured by calculating the overall GPA from all school subjects that students were taught. All these scores were recorded and analyzed through bivariate correlations and forced entry multiple regression.

CHAPTER 4: RESULTS

Preliminary Analysis

Preliminary data analysis was completed with all 37 participants together and by two separate sub-groups divided by gender. The data were initially checked for violation of assumptions. First, linearity was tested through observation of scatterplots. Some potential outliers were detected as a few participants appeared to be substantially influencing the regression model when examining correlations between outcome and predictor variables.

After initial forced entry multiple regression was completed, further examination of casewise diagnostics including Mahalanobis distance, Cook's distance, central leverage values, and DFBeta values suggested that there were three participants that were observed to be influencing the data to a greater degree than the other participants. Table 4 shows the DFBeta values of these three participants. Of the three participants that were found to be influential, DFBeta values revealed that participant 27 had the most influence on the models.

After further consultation with the advising committee, it was agreed to complete a sensitivity test to identify how much the regression model changed when each of the three participants were removed. Forced entry multiple regression analysis revealed that all three participants influenced the results in the total sample and in their own gender samples. Similar to the DFBeta values, participant 27 had the most influence on the regression model. This was particularly apparent when analyzing the female sub-group. When participant 27 was included in the model, there was less variance, $R^2 = .06$, $F(3,13) = 0.29$, $p = .83$, compared to when participant 27 was removed, $R^2 = .37$, $F(3,12) = 2.30$, $p = .13$.

Table 4

DFBeta Values for Potential Outliers Divided by Gender Samples

Measure	RMET	IECA	SAS
Total sample			
Participant 15	0.57	-0.16	-0.38
Participant 27	0.23	0.34	-0.96
Participant 34	-0.56	0.41	0.52
Females			
Participant 27	0.68	0.35	-2.02
Participant 34	-0.51	0.44	0.64
Males			
Participant 15	-0.51	0.12	0.36

Note. DFBeta values that are an absolute value greater than 1 are considered to be influential (Field, 2013). This is the standard that was used to check. In both the total sample and females only groups, participant 27's score on the SAS measure was near or above an absolute value of 1.

Regression analysis was also run with participants 15 and 34 removed individually. Results were compared to determine how much each participant changed the regression model. There was less variance with the removal of participants 15 and 34 in comparison to when participant 27 was removed.

In addition, participant 27 was the only student in the study to have received an incomplete for some academic subjects. These grades were coded by the researcher as missing data which impacted her GPA. For this reason, and because of the results from the described sensitivity tests, the statistical advisors and the committee agreed that there was sufficient reason to remove this participant from the study. Therefore, all analysis was continued with the reduced sample ($N = 36$). Analysis showed that participants 15 and 34 had less substantial influence than participant 27. The committee agreed that removing the remaining two influential participants was not required as the sample size was too small, and there was not sufficient evidence to determine if these cases would be outliers in a larger sample.

After participant 27 was removed from the data, violation of assumptions was rechecked. These tests were analyzed both as a total sample, and within the female and male sub-groups. First, observation of Q-Q plots, P-P plots, histograms, and boxplots suggested that predictor variables were not significantly different from a normal sample. After checks for normality of the outcome variable using Shapiro-Wilk (S-W) test, S-W = .98, df = 36, p = .64, skewness of -0.08 (SE = .39) and kurtosis of -0.29 (SE = .77), it was asserted that the outcome variable was not significantly different than a normal sample. Similar results were found for GPA in the females sub-group, S-W = .98, df = 20, p = .85, skewness of 0.37 (SE = .51) and kurtosis of -0.06 (SE = .99), and in the males sub-group, S-W = .92, df = 16, p = .18, skewness of -0.69 (SE = .56) and kurtosis of 0.86 (SE = 1.09).

Scatterplots that compared standardized predicted values of the outcome variable with the standardized residuals were observed. No areas of concern with homoscedasticity and independence of errors were found. When Durbin-Watson statistics were checked, results provided further evidence that the independence of errors assumption had been met. In addition, variance inflation factors and tolerance revealed that problems with multicollinearity had not occurred.

Descriptive Statistics and Correlations

Table 5 presents the means and standard deviations of the predictor and outcome variables both as a total sample and as groups separated by gender. Bivariate correlations were run between all predictors using Pearson's correlation coefficients. Correlations were analyzed using a two-tailed model in order to check for both positive and negative relationships. Results from this analysis are displayed in Table 6.

Table 5

Mean Score and Standard Deviations of Predictor and Output Variables

Variable	Total sample (n= 36)		Males (n = 16)		Females (n = 20)	
	M	SD	M	SD	M	SD
RMET	18.19	3.49	17.70	3.69	18.81	3.23
IECA	14.86	3.24	15.10	3.39	14.56	3.14
SAS	22.78	5.64	22.55	5.98	23.06	5.36
GPA	2.98	0.41	2.90	0.39	3.09	0.43

Table 6

Pearson's Correlation Coefficient for Predictor and Output Variables

Measure	Age	RMET	IECA	SAS
		Total Sample		
Age				
RMET	0.23			
IECA	0.24	0.29*		
SAS	0.30*	0.43***	0.43***	
GPA	0.28*	0.14	-0.09	0.10
		Females		
Age				
RMET	0.08			
IECA	0.42	0.20		
SAS	0.27	0.42	0.31	
GPA	0.33	-0.20	0.17	0.43*
		Males		
Age				
RMET	0.33			
IECA	0.12	0.37		
SAS	0.33	0.44*	0.52**	
GPA	0.25	0.34	-0.27	-0.17

*p < .10
**p < .05
***p < .01

When analyzing the total sample, both ToM measures, RMET and SAS, positively correlated, $r = .43$, $p = .008$. Similar results were found between SAS and IECA, $r = .43$, $p = .008$. Likewise, significance was found between IECA and RMET, $r = .29$, $p = .09$. Correlation coefficients were analyzed by gender. For males, SAS and RMET, and SAS and IECA positively correlated. For females, there was no significant correlation between measures; however, IECA and SAS were near to a level of significance, $r = .43$, $p = .101$. Furthermore, there were no significant correlations between GPA and the predictor variables in the total sample. However, with females, there was a positive correlation found between GPA and SAS, $r = .43$, $p = .098$. Correlations in the total sample were found between age and SAS, $r = .30$, $p = .07$, and age and GPA, $r = .28$, $p = .09$. There were no other significant correlations between age and any other variables when gender was split.

Regression Analysis

Regression analysis was performed beginning with forced entry multiple regression. Results from the three different regression models are displayed in Table 7. First, RMET, IECA, and SAS were entered as predictors for the GPA outcome variable. All three predictors entered into the regression model simultaneously did not predict GPA, $R^2 = .22$, $F(3, 32) = .54$, $p = .66$. All beta values for predictor variables were not significant. Forced entry multiple regression was also analyzed by gender. There was a significant prediction for males, $R^2 = .335$, $F(3, 16) = 2.68$, $p = .08$. Predictor variables' beta values revealed that RMET positively related to the outcome, whereas IECA and SAS were not significantly related. Unlike with males, the forced entry multiple regression model for females was not significant, $R^2 = .37$, $F(3, 12) = 2.30$, $p = .13$. Beta values from predictor variables showed that RMET was negatively related and SAS was positively related. However, IECA was not related.

Table 7

Forced Regression Results of ToM and Affective Empathy as Predictors of Academic Achievement

Variable	*B*	*SE B*	*β*	*p*	*R²*	*F*	*p*
Total Sample							
					0.05	0.54	.66
RMET	0.16	0.02	0.14	.48			
IECA	-0.02	0.03	-0.18	.36			
SAS	0.01	0.02	0.12	.56			
Females							
					0.37	2.30	.13
RMET	-0.06	0.03	-0.47	.09			
IECA	0.01	0.03	0.08	.75			
SAS	0.05	0.02	0.60	.04			
Males							
					0.34	2.68	.08
RMET	0.06	0.02	0.58	.02			
IECA	-0.04	0.03	-0.36	.15			
SAS	-0.02	0.02	-0.23	.38			

Because of the substantial change of statistical significance from the total sample compared to when gender was separated, gender was analyzed through hierarchical regression analysis to determine if gender was a predictor of GPA. Gender was coded as a "dummy" variable to identify how ToM and affective empathy measures were predicting GPA compared with gender. Age was also included in the second block of the regression analysis. Results of this hierarchical regression model are shown in Table 8.

Table 8

Three Block Hierarchical Regression Results of Gender, Age, ToM, and Affective Empathy as Predictors of Academic Achievement

Variable	*B*	*SE B*	*β*	*p*	R^2	*ΔF*	*p*
Step 1					0.06	2.02	.17
Gender	-0.19	0.10	-0.24	.17			
Step 2					0.13	2.97	.09
Gender	-0.19	0.13	-0.23	.16			
Age	0.01	0.007	0.28	.09			
Step 3					0.16	0.33	.81
Gender	-0.17	0.14	-0.20	.25			
Age	0.01	0.008	0.29	.11			
RMET	0.01	0.02	0.07	.72			
IECA	-0.02	0.02	-0.18	.34			
SAS	0.00	0.004	0.06	.78			

Note: "Dummy coding" was used to enter gender as a predictor (females = 0, males = 1). The negative values in gender in the regression analysis shows that females had a higher GPA.

Chapter Summary

Results from preliminary analysis, bivariate correlations, and multiple regression were discussed in this chapter. Initial checks of the data revealed one female participant whose influence on the regression models was far greater than any other participant. Therefore, she was determined to be an outlier. After removal of this participant, data analysis was continued and Pearson's correlations suggested that theory of mind and affective empathy were moderately related, and academic achievement was found to correlate with the ambiguous stories measure of ToM in the female sample. Furthermore, forced entry multiple regression analysis revealed that there was no statistically significant relationship between ToM, affective empathy, and academic achievement. However, when the samples were split by gender, there were some conflicting

results. Results in the male sample revealed that ToM and affective empathy accounted for a

34% variance in academic achievement, yet individual beta values suggested that the only

measure that positively related to the outcome variable in this regression model was the eyes test

measure. Finally, in the female sample, although the regression model was not statistically

significant, the ambiguous stories measure of ToM positively correlated, whereas the eyes test

measure negatively correlated.

CHAPTER 5: DISCUSSION

This study focused on the SEL competency of social awareness in older children. The primary research question was to investigate the relationship of ToM and affective empathy with academic achievement in children from grades 4 to 6. There were three questions that guided this research.

Research Question 1

First, relationships between the predictor variables, ToM and affective empathy, were examined with academic achievement. No statistically significant relationship was found between individual predictor variables and academic achievement in the total sample. This was true in bivariate correlations and regression analysis. These results are not congruent with some previous studies (Boor-Klip et al., 2014) where cognitive scores have related positively to ToM. Although a wide range of studies suggest SEL competencies positively relate to academic achievement (as shown in the meta-analysis from Durlak et al., 2011), ToM and affective empathy, used as a measure of social awareness, did not positively relate to academic achievement in students from grades 4 to 6.

There are a few explanations that are hypothesized for these results. ToM and affective empathy were both assessed through the SEL competency lens of social awareness. It is possible that these specific social awareness skills did not have enough direct relationship with academic achievement to have a statistically significant impact on the results. In previous studies where SEL competencies have been positively linked to academic success (Durlak et al., 2011; Oberle et al., 2014), the effect size was reported to be relatively small with large sample sizes. It is possible that with a larger sample size, this study may have had different results as small effect sizes would be more difficult to detect with a small sample size.

Furthermore, GPA as a measure of academic achievement may have been problematic. First, GPA, although a continuous measure of academic achievement, does not increase in equal increments with academic grades. For example, students cannot receive either B- or B+, yet they can receive C- and C+. Letter grades were given a number on the 4-point scale for each subject which were then averaged to determine a GPA for each participant. This method of averaging non-equal incremental numbers may have been a problem for the reliability of GPA.

In addition, using letter grades in elementary school could have compromised the reliability of GPA because different teachers could have different methods of assessment to determine a grade for each subject. The interpretation of what qualifies as an "A" or "B" could vary among teachers. It is also plausible that the differentiation between letter grades in elementary school was not sensitive enough to detect subtle variation between academic scores compared to other standardized academic and cognitive measures used in previous studies (Boor-Klip et al., 2014; Lecce, Caputi, & Pagnin, 2014; Oberle et al., 2014).

In addition, one area that was not anticipated that may have complicated the results was the academic evaluation of students in special education. According to the BC Ministry of Education (2009), students who are identified with a special need, can have their work adapted and be evaluated at a lower grade level than their same-grade peers. For example, a grade 5 student with a learning disability who scores a "B" in math, may be working on grade 2 level math, and therefore, can be evaluated accordingly. As a result, teachers may not have evaluated all students' grades equally in order to follow the most appropriate assessment practices according to standards in BC. Given the high percentage of students with special needs within the sample (22%), the reliability of GPA as a measure of academic achievement may have been compromised.

Research Question 2

The second research question investigated the variation between ToM and affective empathy and if they interacted differently with academic achievement. Neither affective empathy or ToM, as predictor variables, were statistically significant in the total sample. Therefore, it could not be determined whether or not ToM and affective empathy interacted differently with academic achievement with the total sample. However, there was a variation detected when analyzing the samples divided by gender. Although one of the ToM measures was found to predict academic achievement in males, and both measures predicted academic achievement in females (discussed more fully later), affective empathy was not found to be a predictor of academic achievement in gender groups. This result may support the argument that ToM and affective empathy have different, yet related, purposes for understanding others (Decety, 2010; Shamay-Tsoory, 2011) as they interacted differently with academic achievement. In addition, this variation may emphasize the relationships between the cognitive nature of both ToM and academic achievement, compared to affective empathy, which is an emotionally-related response.

Both ToM and affective empathy were moderately related with one another. The positive correlations between ToM and affective empathy may suggest that when a person has more social understanding of people and understanding of what others are thinking and feeling, this person may also have a more active response of empathy towards others. That is to say, children in the study who could identify what another person is feeling or thinking (i.e., ToM), may be more likely to respond with a prosocial level of empathy (i.e., affective empathy). Results also add to a wider body of literature that has analyzed empathy and its multidimensional nature (Davis, 1996; Decety, 2010; Hoffman, 2000; Shamay-Tsoory, 2011).

Research Question 3

The third research question investigated if there was a difference between how both ToM and affective empathy correlate with academic achievement in males compared with females. In females, although the results of the regression model were not significant, both ToM measures did correlate with academic achievement. Surprisingly, both these measures appeared to be interacting differently as the RMET measure showed a negative relationship, whereas the SAS measure revealed a positive relationship. Because this interaction between each of the ToM measures with academic achievement was opposing, it is difficult to conclude that ToM, as a construct, did predict academic achievement. Furthermore, bivariate correlation results revealed that there was a statistically significant positive correlation between the interpretation of ambiguous stories as a measure of ToM and academic achievement in females. It is possible that females who have a stronger understanding of interpreting social situations, may tend to score higher academically. Another reason for this result may have been a result of the listening and verbal abilities that are needed to understand and respond to the SAS measure. Females who were able to listen, understand, and then orally respond, may have a higher cognitive ability which could have been reflected in their academic achievement.

For males, ToM and affective empathy accounted for 34% of the variance ($p = .08$) in academic achievement. However, the nature of this variance is complicated. Opposite to females, the RMET measure was found to positively relate to academic achievement, and SAS scores did not correlate. Because the RMET was the only measure of the three that significantly predicted academic achievement, there was not enough evidence to suggest that ToM predicted academic achievement in males.

Due to the changes that were observed in the regression models when samples were divided by gender, it is possible that gender does have some effect on ToM as a predictor of academic achievement. Females' ToM, as measured by RMET, negatively correlated with academic achievement, yet positively correlated in the male sample. This suggests that gender could possibly moderate the effect of ToM on academic achievement. This observed gender effect adds to a small, but growing body of literature that suggests that gender may correlate with ToM (e.g., Baron-Cohen, Wheelright, Spong, et al., 2001; Boor-Klip et al., 2014; Bosacki, 2000; Bosacki & Astington, 1999; Calero et al. 2013; Devine & Hughes, 2013).

ToM Construct

Although the original design of the study was not inclusive of providing feedback on the measures themselves, data analysis revealed some interesting results. After a review of the literature, no previous studies were found that have ever used both an eyes test (adult or child version) and the SAS to measure ToM. As previously mentioned, when the total sample was analyzed, the ToM measures did moderately correlate ($r = .43$). Given that these measures are intended to assess the same construct, this effect size seems surprisingly low. The measures are different from one another by procedure, and ostensibly, the results suggest that they highlight different parts of the ToM construct. In addition, bivariate correlations revealed that both ToM measures positively correlated with one another in the total sample and in males, and there was a strong indication of this positive relationship in females as well. However, conflicting results between how these measures predicted academic achievement when regression models were separated by gender suggests that both measures assess different components of ToM. These results may support Hayward's (2011) recommendations for ToM research in middle childhood populations (ages 7 to 13): "If it is to be believed that advanced theory of mind is a developing

phenomenon, there is a marked need for more sensitive measures that capture these developmental changes" (p. 106).

Age

There were some interesting results related to age found both with the bivariate correlations and regression analysis. First of all, age positively correlated with the SAS measure of ToM, although it did not significantly correlate with the RMET measure of ToM or with affective empathy. The SAS measure requires deeper levels of understanding of others and more social awareness which may increase with age. This measure was also developed for students in grade 6 (Bosacki, 1998), and thus, may have been more challenging for some of the younger students who were in grade 4 and 5. This trend in the data adds to a growing body of literature that has argued that there is a positive trend between age and ToM (Cantin et al., 2016; Devine & Hughes, 2013; Dumontheil et al., 2010; Miller, 2012).

Chapter Summary

In this chapter, results from the data analysis were interpreted and reasons for these results were hypothesized. In answer to the first research question, results revealed that there was no statistically significant relationship between ToM, affective empathy, and academic achievement. This may have been due to the small sample size, the nature of the measures used, or complexity of assessing students in special education. The answer to the second research question, which analyzed the variation between ToM and affective empathy and how they each individual correlated with academic achievement was complex. A variation between ToM and affective empathy could not have been analyzed in the total sample, as there was no statistical significance in the regression model.. However, there was variation when samples were analyzed by gender as both ToM measures correlated with academic achievement in females,

and the eyes test measure correlated with academic achievement in males. This result may support the notion that ToM and affective empathy are both related, yet have different purposes for social understanding in older children. The third question regarding gender differences suggested that gender might have moderated the effect of ToM on academic achievement. Lastly, after exploratory analysis, it was argued that there continues to be a need for a stronger measure of ToM for older children.

CHAPTER 6: CONCLUSIONS, LIMITATIONS, AND RECOMMENDATIONS

This study analyzed the relationship between ToM and affective empathy with academic achievement in children from grades 4 to 6. It was determined that in a sample of 36 students at a public elementary school in BC, neither ToM or affective empathy predicted academic achievement as measured by overall GPA. Additionally, there was no statistically significant variance between ToM and affective empathy and the interaction with academic achievement in the total sample; however, a variance was found when samples were divided by gender. When females' ToM was measured by interpretation of ambiguous stories, and when males' ToM was measured by the eyes test, a positive correlation with academic achievement was observed. This may indicate that gender could have moderated the effect of ToM, as a measure of social awareness, on academic achievement. However, due to conflicting results in directionality of correlations there was not enough evidence to verify that the ToM or affective empathy constructs predicted academic achievement in males or females. Finally, positive bivariate correlations were found between ToM and affective empathy suggesting that there was a relationship between how people think and understand others' thoughts, feelings, and mental states with the emotional response that the people have towards others.

Limitations

This study had several limitations. First of all, because of the small sample size and the correlative framework of the study, these results cannot, and should not be generalized to any other populations of children. A sample of convenience was used from one school which does not necessarily reflect the results that may have been found with a different population of same-grade peers. Likewise, the sample sizes when males and females were separated were even smaller, and statistical sample power was very weak as a result. In addition, the ratio of students

identified with special needs to typically developing students was not representative of the

greater school population. Therefore, the results from the sample may not fully exemplify the

relationship between social awareness and academic achievement of the entire school's

population. Furthermore, potential confounding variables such as language and executive

functioning skills were not explored and could have impacted the results. Lastly, the reliability

of all three of the measures used was between the marginal to moderate range, which could have

had an effect on the outcome of the research.

Implications for future research

This study examined ToM and affective empathy through the SEL competency of social

awareness. Children's social understanding and interpersonal skills have been included in the

wider framework of SEL. Previous research has strongly suggested that there is a positive

relationship between SEL competencies and academic achievement. By focusing on one

competency of social awareness through ToM and affective empathy, more information can be

found about the nature of this relationship between SEL and academics. Through a more

complete understanding of this relationship, educators and policy makers can make increasingly

informed decisions as to how to approach teaching SEL. A larger sample with a more diverse

population is needed to determine if ToM and affective empathy correlate with academic

achievement. In addition, more studies are needed that separate analysis of typically developing

populations and atypically developing populations to determine how students with special needs

impact social awareness as a predictor of academic achievement. Furthermore, a longitudinal

study that examines the relationships between an intervention of ToM and affective empathy and

the subsequent impacts on academic achievement could help to further understand how all these

constructs relate. Additional studies that investigate the relationship between ToM and affective

empathy are needed to provide greater insight into how these constructs interact with one another. Moreover, by investigating the relationship between ToM, which is cognitive in nature, and affective empathy, which is responsive in nature, more can be learned "to contribute to a complete model of interpersonal sensitivity" (Decety, 2010, p. 266). Hughes and Leekam (2004) suggested that higher ToM may have some negative implications on social relations. From this context, additional studies should investigate if affective empathy may support or mediate using ToM for prosocial behaviour.

In addition, in order to effectively measure ToM in a population of older children, a unified construct is needed as many ToM measures used in research are not necessarily empirically related (Hayward, 2011). A better measure for advanced ToM in older children is also needed to assess the entire ToM construct. Moreover, another area that needs to be investigated in greater depth is the relationship between language acquisition and ToM in older children. Hayward (2011) argues that language may have a greater impact on ToM than age. More studies are needed to compare how age and language interact with ToM. Similarly, further investigation of how other cognitive skills (i.e., executive functioning) interact with ToM as a predictor of academic achievement in older children is needed. Furthermore, although GPA was included as a measure of academic achievement for SEL in previous studies (Durlak et al., 2011) it may have been problematic as a measure for elementary students. For larger studies in the future, a standardized test may be a more appropriate measure in order to quantify overall academic achievement.   Finally, results from this study suggest that more research is needed to investigate the relationship between how gender impacts ToM and affective empathy as predictors of academic achievement. Specifically, moderating effects of gender on ToM and affective empathy as predictors of academic achievement should be further examined.

Concluding Thoughts

It is hoped that this study will add to a greater body of research that has investigated the relationship between SEL competencies and academic achievement for students from kindergarten to grade 12. Few studies have investigated how ToM and affective empathy, as a part of the social awareness SEL competency, interact with academics in older children. This study is also important as it may add to a wider body of literature pertaining to gender and social awareness. As educators in BC begin to implement the redesigned curriculum this 2016-2017 school year, the core competencies, which include SEL, will be a greater focus in the curriculum. Therefore, further understanding of the relationship between social awareness and academic achievement may be important in effort to educate the "whole child" (Elias et al., 1997).

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APPENDIX A: Script for Consulting Teachers About Study

Dear Teacher,

I am working on a study as a part of my Masters of Arts program that I am taking through Trinity Western University. The study is looking at how students think, feel, and understand perspectives of others. The study will look at whether or not there is a relationship between these social and emotional characteristics and how they perform academically. This study will include 30 students in grades 4 to 6. If more than 30 parents consent for their children to participate, and more than 30 children assent to the study, then 30 will be randomly selected. The study is done on a one-to-one basis and takes about 20 to 25 minutes in total. It will be in one or two short sessions.

Students and parents will be informed that they can stop the study at any time and there will be no consequences for stopping. In addition, all personal information of students and families will be kept completely confidential. Likewise, no information will be reported that will expose this school, your classroom, or your identity.

This research will be conducted on Wednesdays during the early months (January, February, and March) of 2016, as it is my day off work. You will be consulted to ensure that the time of day is not disruptive for you or your class each day that research is being conducted.

I am wondering if you would be willing to allow me to use some of your students to participate in this study?

If so, I will be coming in to read a script to your students about the consent letters that will be going home to their parents or guardians. Is there a time that would work best for you?

APPENDIX B: Script to be Read to Students Before Handing Out Consent Forms

Hi,

I am Mr. Knowlson. Most of you know me already, but most of you do not know that I am doing a Masters degree at Trinity Western University. One of the things that I am doing as a part of my master's degree is a research project. The goal of this research project is to see if there is any relationship between the way children between ages 9 to 11 understand how other people think and feel, and the grades they get in school. For this research project, there will be 30 students who can participate. In order to participate, both you and your parent will have to agree. If more than 30 students between grades 4 to 6 want to participate, then the students will be selected randomly.

This letter that is going home today will explain more of the details of what I am doing. It is for your parents to read through carefully. Please be sure they take their time to read and understand the form. They can decide if they would like you to participate and then your job is to return the forms to me. If your parents do not understand something in the form, then they can contact me for further explanation.

You are getting two copies of this form. If you want to participate, then one copy has to be signed by a parent or guardian and brought back. The other copy stays at home with your parents or guardian for their records.

Here are the forms.

APPENDIX C: Parental Consent Form

Parental Consent Form for Research Study

Research Study Title: Theory of Mind, Affective Empathy, and Academic Achivement: A Correlative Study of Children in Grades 4 to 6

Principal Investigator: Adam Knowlson, M.A. Student in Educational Studies, Trinity Western University. Contact number: XXX-XXX-XXXX. Contact email address:___(email)._

Supervisor: Dr._____, Sessional Instructor of Educational Studies, Trinity Western University. Contact number: xxx-xxx-xxxx. Contact email address:_____(email)_____.

Purpose:
There are many studies that suggest that when social and emotional skills are taught to students, their academic achievement improves. In B.C., the new curriculum will introduce more of a focus on teaching this social and emotional learning (SEL) to students. This research may be important in light of these upcoming changes. **The research will be looking at theory of mind and affective empathy and if these relate to academic achievement in students from grades 4 to 6.** Theory of mind is the way that people identify thoughts, desires, and perspectives of others. Affective empathy is the emotional response that is made towards the emotions of other people. This study will also look to see if there are any differences between girls' and boys' abilities in theory of mind and affective empathy.

Procedures:
If you choose to consent and allow your child to participate in this research study, your child will also be asked for verbal consent if they would like to participate. If there are more than 30 students between grades 4 to 6 who agree to participate, there will be 30 students that will be randomly selected. For those who are selected, there will be three assessments given. The first includes two brief short stories that your child will read and answer questions about. The second is a series of pictures showing different facial expressions. Your child will be will be asked to identify the expressions. Finally, the third is a self-report questionnaire about affective empathy. These three assessments will take approximately 20-25 minutes total in a one-on-one basis. Assessments will be given by Mr. Adam Knowlson (the researcher). Consideration will be given to ensure that children will not miss critical portions of the school day. After data is collected, your child's term one report card scores will be looked at to determine if there is a relationship between theory of mind, affective empathy, and academic achievement.

Potential Risks and Discomforts:
Due to the nature of the study, there are few risks or discomforts that your child will face. However, it is possible that students may feel embarrassed due to the uncertainty about the "correct" answers for the assessments. Your child will be assured that they can stop at any time if they feel uncomfortable, and reminded that there are no consequences for doing so. Your child will also be told that there is no reason to worry about "right" or "wrong" answers.

Potential Benefits to Participants and/or to Society:
There will be no direct benefit to your child for participating in this study. The benefit will pertain more directly towards the scholarly community, as it could be relevant to current literature in social emotional learning (SEL). Results of the study could be connected with current changes in the B.C. curriculum, which includes more of a focus on SEL. As such, there may be some implications on teacher practice in relation to SEL and academics.

Confidentiality: *Any information that is obtained in connection with this study and that can be identified with you will remain confidential and will be disclosed only with your permission or as required by law.* Any data that could identify your child with answers given will be kept under lock and key at the school, or on the researcher's personal possession. In addition, any data stored on the computer will be kept in a password-protected file on the researcher's computer. The final paper will not contain any personal identifiers. Upon the completion of the thesis (anticipated August 2016), all data will be destroyed and deleted from the computer permanently.

Compensation: There will be no compensation for participation in this study. Also, there is no academic mark attached to participation in this research. Participation is voluntary and children will be thanked if they choose to participate.

Contact for information about the study: If you have any questions or desire further information with respect to this study, you may contact Adam Knowlson or his research supervisor at Dr. _____, at: xxx-xxx-xxxx or _____(email)_____.

Contact for concerns about the rights of research participants: If you have any concerns about your child's treatment or rights as a research participant, you may contact Ms. _____ in the Office of Research, Trinity Western University at xxx-xxx-xxxx or _____(email)_____.

Consent: The participation of your child in this study is entirely voluntary and you or your child may refuse to participate or withdraw from the study at any time without any consequences. If you would like to withdraw your child, a simple email or phone call will be sufficient, and no further explanation will be expected or required. After names have been removed from the data, your child will no longer be identifiable in the data, and it will no longer be possible to withdraw your child's results.

Signatures

Your signature below indicates that you have had your and your child's questions about the study answered to your satisfaction and have received a copy of this parental consent form for your own records.

Your signature indicates that you consent to have your child participate in this study.

Please check one of the following:

I consent to my child's participation in this study. ☐

I do not consent to my child's participation in this study. ☐

_____   _____
Parent or Guardian Signature   Date

_____
Printed Name of the Parent or Guardian

_____
Printed Name of Child Participating in Research

APPENDIX D: Script Read to Students for Verbal Assent

Dear students,

I am working on a research study as a part of my Masters of Arts program that I am taking through Trinity Western University. The study is looking at how students think, feel, and understand perspectives of others. The study will look whether or not there is a relationship between these social and emotional characteristics and how students perform academically. This study will include 30 students in grades 4 to 6. If more than 30 sets of parents and students agree to participate, and you also agree to participate, then 30 students will be randomly selected. The study is done on a one-to-one basis and will take about 20 - 25 minutes in total.

If your parents agree, and you agree, and you become part of the study your name will be confidential - all results are entirely private. Even if you become part of the study (meaning that your parents have agreed and you also have agreed) you can at any time stop the study—you do not have to provide any reasons—you can just say you want to stop and it will stop and there will be no consequences. Remember there is no expectation for you to be in the study. Again, all your personal information (for example your name and address) are completely confidential so that when the study is completed and the results written, no one will know anything personal about you.

If you have any questions about this, you can talk to your parents before you make a decision and they can contact the university. Does that make sense to you? *(If student answers yes, continue on with questions. If student answers no, then proceed to ask if I can clarify. If confused still, re-direct to asking questions to parents first before giving assent)*

1) Do you understand that if you are part of the study you can stop at any time and for any reason (or even no reason at all) - you just have to tell me you want to stop?

2) Do you understand that if you decide to stop there are absolutely no consequences of any kind?

3) Would you like to volunteer to be a part of this study?

APPENDIX E: Script to be Read to Students for Debriefing

Thank you very much for your participation. You have done very well. If you have any questions or concerns about this research, you are welcome to ask me. Also, if you feel uncomfortable or are curious about the different activities we have done, you can tell your parents and they can talk to me as well. Thanks again and have a great day!

APPENDIX F: Initial Interview Questions

a. Age – When is your birthday?

b. ELL – Is English your first language?
 i. If not, what is your first language?
 ii. Do you speak any other languages?
  1. Which ones?

c. Were you born in Canada or did you immigrate to Canada?
 i. Where were you born?

d. Were your parents born in Canada?
 i. If not, where are they from?

e. Enrolled in French
 i. Are you taking French this year?

APPENDIX G: Script Read to Students Before Beginning Measures

This interview will have 3 sections. First, you will look at some pictures and you will tell me what you see in them. Second, you will answer some questions and you will answer if they describe you or not. Third, I will read you two short stories, and you will respond to some questions about the stories.

Remember, I am only interested in your opinions. There are no right or wrong answers. If at any time, you would like to stop the interview, you just let me know. We can stop whenever you wish. If you have any questions during the interview, you can feel free to ask.