UNIVERSAL SCREENING FOR SOCIAL EMOTIONAL COMPETENCIES: IS DIBELS AN OPTION?

by

CATHERINE M. LORENZ

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We accept this thesis as conforming to the required standard

……..
Dr. Kenneth Pudlas, Ed.D., Thesis Supervisor

……..
Dr. Dave Carter, Ed.D., Second Reader

……..
Dr. Christina Belcher, Ph.D., External Examiner

TRINITY WESTERN UNIVERSITY

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ABSTRACT

To be successful in school and in life students need to possess academic as well as social emotional competencies (Bridgeland, Bruce, & Hariharan, 2013; Durlak, Weissberg, Dymnicki, Taylor, & Schellinger, 2011; Zins & Elias, 2007). Academic skills include the ability to read, write and count whereas social and emotional competencies refer to skills that allow an individual to get along with others by being in control of their own behaviors (Zins & Elias, 2007). For social emotional and academic programming to be effective, schools need to have a data-driven system to facilitate and monitor student progress. A screening and progress monitoring system allows educators to pinpoint students who require targeted social emotional and/or academic learning opportunities and would inform on the effectiveness of intercessory programming. Such a system would ensure that students' learning opportunities are optimally effective. Whereas academic assessments are plentiful, a stumbling block has been the lack of measurement tools for social emotional competencies, necessary for the identification of students in need of intervention (Maras, Thompson, Lewis, Thornburg, & Hawks, 2014; Nese et al., 2012). This study investigates the viability of utilizing an established measure of literacy skill, which is widely used in school systems, to provide insight into students' social emotional competence. The author suggests that a reading fluency assessment may lend itself to inform on social emotional competence because both domains are processed in a similar area of the brain.

The statistically significant results of the hierarchical regression analysis used in this study suggest that further research into measures of affective skills should explore the correlation between academic skills and social emotional competency.

Key-words: social emotional competence; social emotional competency assessment

TABLE OF CONTENTS

LIST OF TABLES

LIST OF FIGURES

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CHAPTER 1: INTRODUCTION

In order for students to be able to succeed in school and in life they need to possess academic as well as social emotional competencies. The concept of social emotional competence refers to the ability to interact or get along with others through self-management and control of one's behaviors (Zins & Elias, 2007). Social emotional competence has been widely researched throughout professional literature and is considered a key to lifelong success (Bridgeland, Bruce, & Hariharan, 2013; Durlak, Weissberg, Dymnicki, Taylor, & Schellinger, 2011; Zins & Elias, 2007). Social emotional learning refers to programming that enables students to acquire the core social emotional competency skills. Such programming trains students to become personally responsible for and in control of their own learning and behavior (Riggs, Greenberg, Kusché, & Pentz, 2006).

Proponents of social emotional learning claim that social competence and academic success are inextricably linked (Durlak et al., 2011; Liew, 2011; Zins, Bloodsworth, Weissberg, & Walberg, 2004). Students who have control of themselves tend to fare better in school academically because they are better able to attend to tasks at hand.

For the purpose of this research, the definition of social and emotional competence "is the capacity to recognize and manage emotions, solve problems effectively, and establish positive relationships with others" (Zins & Elias, 2007, p. 234). Social and emotional skill deficits that surface in early childhood may be predictors of troubling long-term outcomes such as maladjustment, unemployment, failed relationships, substance abuse, and violence (Zins & Elias, 2007; Zins et al., 2004). As children develop through early childhood, they learn skills that help them to be able to self-regulate their social and emotional needs, rather than relying on an external caregiver, as in infancy (Riggs et al., 2006). If in the developmental years children do

not acquire sound self-control and regulation skills they may be at risk for developing future socially unacceptable behavior (Riggs et al., 2006). Consequently, there are numerous investigations into effective strategies for increasing social emotional competence in children which seem not only to increase positive life outcomes but academic outcomes as well (Bridgeland et al., 2013; Zins et al., 2004). As a result, many schools have begun implementing either independent social and emotional student learning standards, or are choosing to teach social and emotional skills through integration with academic subject areas (Bridgeland et al., 2013; Zins et al., 2004).

There is much empirical evidence suggesting that social emotional competence and academics are related, but the causality and direction of the relationship is still undefined (Bridgeland et al., 2013; Durlak et al., 2011; Zins & Elias, 2007; Zins et al., 2004). In classrooms, teachers are finding that many students with behavioral difficulties also appear to have difficulty succeeding academically. It is not known whether self-regulatory compromises make it difficult for students to learn, or if learning difficulties eventually manifest into student loss of self-regulation (Zins et al., 2004). Simply put, students who can listen attentively and free themselves from distractions tend to fare better in school academically (Durlak et al., 2011; Zins & Elias, 2007; Zins et al., 2004). Alternatively, there is research that is just as convincing which proposes that academic competence leads to social competence. These studies suggest that students with basic academic competencies demonstrate fewer social and behavioral problems in part due to their established cognitive skills facilitating the acquisition of social skills (Welsh, Parke, & Widaman, 2001; Hawkins, Farrington, & Catalano as cited in Zins et al., 2004). It still has not been conclusively determined whether academic achievement problems cause social and emotional difficulties or whether the affective and behavioral problems are a precursor to

challenges in academic achievement. Some researchers are beginning to conclude that social emotional competence and academic achievement may not have a causative relationship but may in fact be interwoven (Mueller, 2011; Pourtois, Notebaert, & Verguts, 2012).

Social emotional and academic competences help to facilitate student success in British Columbia's inclusive educational system. Inclusion describes the principle that all students are entitled to equitable access to learning which is achieved through integration (British Columbia Ministry of Education; 2016). Integration is a strategy that enables all students to be successful within their educational settings through individualized accommodations as determined by observation and assessment (Sailor, 2009; Tilly, 2008).

To ensure student success in academics, core subject areas commonly taught in schools have evidence- based curricula, well-developed assessments, and if necessary, intervention programs and strategies. Similarly, social emotional competency is beginning to be taught explicitly in a growing number of schools and social emotional learning curricula are becoming more readily available (Maras, Thompson, Lewis, Thornburg, & Hawks, 2014). Some examples of evidence-based social emotional learning programs with potential for broad dissemination in elementary schools are: MindUp, PATHS (Promoting Alternative Thinking Strategies) and the RULER Approach (Collaborative for Academic, Social, and Emotional Learning [CASEL], 2012). These curricula, however, are in advance of valid, reliable and easily accessible social and emotional competency assessment measures (Maras et al., 2014; Nese et al., 2012). Such measures are necessary to facilitate the identification of students in need of support and for the progress monitoring of interventions.

One model that is used in schools to provide a framework for the systematic identification and instruction of students in need of academic and/or behavioral support is response to in-

tervention (RTI) (Brown-Chidsey & Steege, 2011). The RTI model can be easily implemented into classrooms to facilitate the inclusion of all students. Within the RTI model, educators make decisions about all students' instructional needs based on assessments which are commonly used as both screening and progress monitoring tools (Sailor, 2009). The RTI framework is a three tier model in which Tier 1 consists of instruction for all students within a general education classroom. At this level, assessments are used as universal screens to identify students who may not be responding to instruction within the general classroom as would be expected, which typically would be about 10-20% of the classroom population (Tilly, 2008). Tier 2 and 3 are intervention based and address students with needs through increasingly intensified (i.e., duration, frequency) academic or behavioral instruction. These latter two tiers provide instruction to identified students, in small groups or individually through a skilled service provider (Danielson, Doolittle, & Bradley, 2007). As well as providing a screen for students in need of service, student assessment data are also used to monitor the progress that students are making in response to intervention which helps to inform interventionists whether students may be better served within another tier

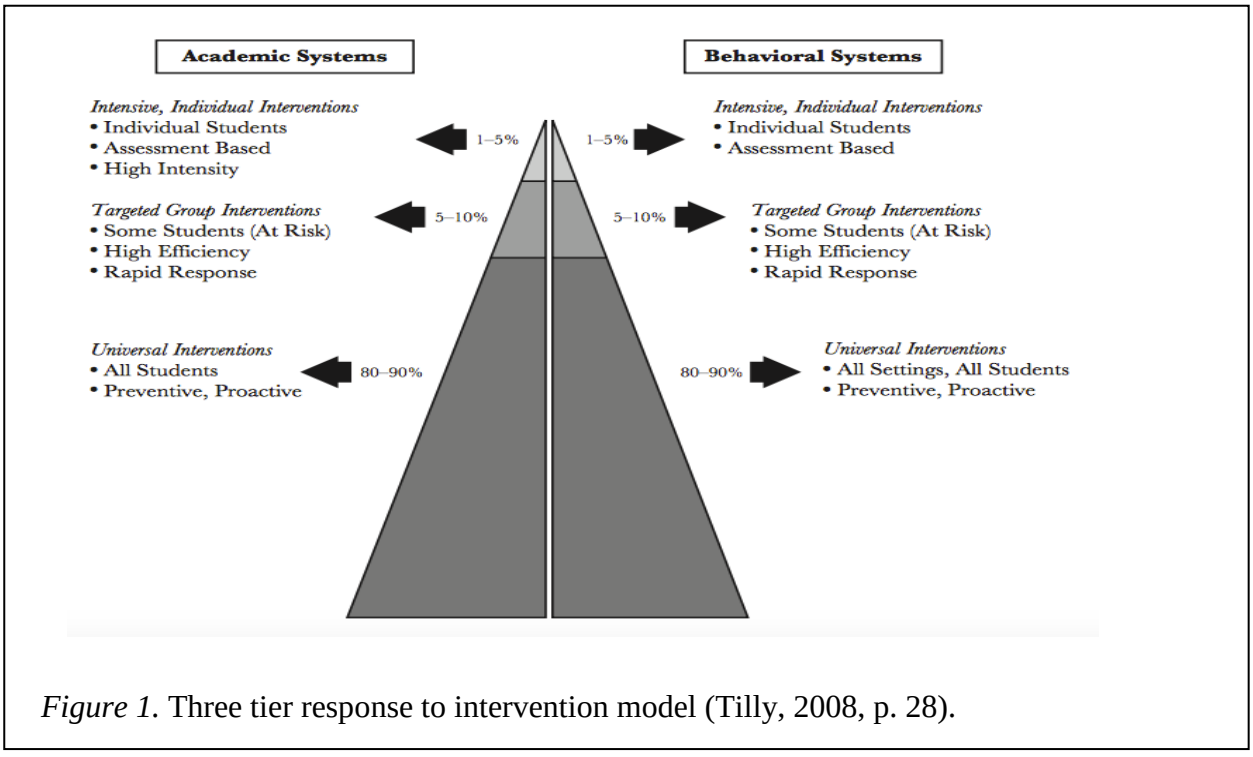

Figure 1. Three tier response to intervention model (Tilly, 2008, p. 28).

(Sailor, 2009). As shown in Figure 1, The RTI model is often graphically represented by a three level pyramid which illustrates the three levels of intervention intensity.

Social emotional competence and academic skill appear to be inextricably linked. In the next chapter, a search of related literature suggests that the association between social emotional competence and academic skill may be rooted in both being processed in the same area of the brain (Elliott, 2003; Greenberg, 2006; Kovelman et al., 2012; Riggs et al., 2006). Due to neuroanatomical processing similarities, this study reasons that there may be evidence of a correlation between social emotional competence and academic achievement in literacy (reading fluency). The purpose of this study is to explore whether reading fluency may have a relationship with teacher-reported social emotional competency scores which may suggest that social emotional competence could be assessed using an academic measure. Such a finding would have a two-fold value. First, such an assessment would add to the small number of assessments currently available to measure social emotional competence. Second, it may prove to be a consistent and objective measure that can be used to screen and progress monitor students' social emotional competence. This would enable educators to not only pinpoint which students will require targeted social emotional learning opportunities, but also would inform of the effectiveness of intercessory programming.

CHAPTER 2: LITERATURE REVIEW

Social Emotional Competence

Social and emotional competence involves a variety of skills including self-control, emotional awareness, communication, and problem-solving. Social emotional learning can be enhanced through specialized programming. Such programming allows individuals to acquire and apply "knowledge, attitudes, and skills necessary to recognize and manage emotions; develop care and concern for others; make responsible decisions; establish positive relationships; and handle challenging situations capably" (CASEL as cited in Zins & Elias, 2007, p. 234). The CASEL conceptual framework of social emotional competence was adopted for this research as it is a comprehensive research-based social emotional competence model that covers the most critical aspects of social and emotional competence (CASEL, 2003).

In British Columbia schools, as of 2000, the development of social and emotional competencies has been included within the framework of British Columbia's Ministry of Education Social Responsibility Performance Standards for Kindergarten through Grade 10 (http://www.bced.gov.bc.ca). These performance standards have been developed for voluntary use in BC schools. Some schools are choosing to implement free-standing social emotional learning curricula, while others have emphasized the teaching of social and emotional skills through integration within academic subject areas. The focus of most social emotional learning programs is universal promotion and instruction of social and emotional competencies (Zins & Elias, 2007). Durlak et al. (2011) conducted a meta-analysis which reviewed universally-implemented social emotional learning programs. In reviewing the 213 studies which included over 250,000 students it was concluded that well implemented programs had positive effects on social emotional competencies (ES = 0.69, $p < .05$) and academic success (ES = 0.27, $p = < .05$)

(Durlak et al., 2011). There are five core competencies that are reinforced through social emotional learning programming (CASEL as cited in Zins & Elias, 2007):

- Self-awareness: The ability to recognize one's emotions and understand one's strengths and limitations.
- Self-management: The ability to control one's own emotions, thoughts, and behaviors. This includes stress management, impulse control, motivation, and goal setting.
- Social awareness: The ability to think from others' perspectives and to be able to empathize with others.
- Relationship skills: The ability to communicate effectively so that one can establish and maintain healthy relationships.
- Responsible decision making: The ability to make constructive and respectful choices about personal behavior and social interactions.

As social and emotional competency and academic success appear to be mutually reinforcing, it is imperative that time is made in the curricula for students and teachers to learn, work, and practice social emotional competencies (Zins et al., 2004). Social emotional learning can occur organically in schools as social and emotional skills can be practiced and developed whenever a student interacts with members of the student body (Zins et al., 2004). Even though schools are a natural environment in which to enhance the development of students' social and emotional competencies not all students flourish in universally implemented programs, hindering classrooms from being inclusive environments which successfully support all learners.

In a recent United States national survey titled "How Social and Emotional Learning Can Empower Children and Transform Schools" nearly half of the 605 preschool through 12th grade public school teachers (49%) indicated that there is not enough time in the day to implement

social emotional learning effectively (Bridgeland et al., 2013). Lack of time not only impacts the ability to implement a social emotional learning program within a daily schedule but also has ramifications on other factors that are imperative to student success, such as a data driven decision making system to facilitate and monitor student progress within universal and individualized programs (Maras et al., 2014; Nese et al., 2012). To be effective, schools need to implement best-practices as part of a data-driven system to facilitate and monitor student progress, such as those described within the three tiers if using RTI.

With common core subjects such as math and reading, schools can have procedures and measures in place, such as standardized achievement tests, for universal assessment as essential precursors to instruction and intervention. There are many academic assessments available to educators which can be used to gather information regarding students and their ability to meet academic expectations, of which the Canadian Achievement Test and Developmental Reading Assessment are two examples. The assessment data can then be used to inform educational interventions (Tilly, 2008). Commonly, academic ability is tracked as a grade point average (GPA). These measures of core academic ability address schools' service delivery needs as they are easy to administer, enable many students to be assessed quickly and efficiently and are easy to score (Nese et al., 2012; Naglieri, LeBuffe, & Shapiro, 2011). Efficient measures, such as these, help in the early identification and implementation of support for specific students, ensuring that all students are able to meet their learning goals. Similar measures also need to be in place to help schools facilitate educational service to students who may require support in the development of social emotional competencies. Given the posited link between social emotional and academic competencies, a further exploration of theoretical models which underlie these skills is warranted.

Theoretical Model of Social Emotional Competence

Before considering effective and efficient measures of social emotional competence, one should be aware of neurological mechanisms which facilitate social emotional competence. It is often beneficial to apply a conceptual model to provide insight into the complex neurocognitive pathways that are involved in promoting social competence (Riggs et al., 2006). One such model is the Affective-Behavioral-Cognitive-Dynamic (ABCD) model of development which emphasizes the importance of developmental integration of cognition, affect, and emotion in the promotion of social competence (Greenberg, 2006).

Neurological functioning affects the regulation of strong emotions as well as social and behavioral performance (Greenberg, 2006). Children who demonstrate age appropriate mastery of their emotions and behavior are considered to be socially and emotionally competent (Blair, 2002; Riggs et al., 2006). Components of the skill set that facilitates such competence are part of a suite of subskills involved with executive control (Blankson et al., 2013; Riggs et al., 2006). Executive control is an umbrella term for associated skills involved in executing purposeful goal directed activities (Liew, 2011). For example, impulse control, which is the ability to override a strong impulse or response (Rhoades, Greenberg, & Domitrovich, 2009), is foundational to some core social emotional competencies, and requires the intercession of associated neuroanatomical areas in the prefrontal cortex (Riggs et al., 2006).

The frontal lobes are the region of the brain considered to be important in the management and organization of neurocognitive capacities associated with executive control and thus, social competence (Riggs et al., 2006). For the most part, executive control mechanisms are thought to innervate the frontal cortex (Garon, Bryson, & Smith, 2008; Elliott, 2003). However, attempts to link specific subskills of executive control to discrete areas within the

frontal cortex have been inconclusive (Bell, 1998; Blankson et al., 2013). Emerging research seems to suggest that executive control processes involve integrated systems of circuitry within the frontal cortex and subcortical regions rather than specific loci within the cortex (Elliott, 2003; Greenberg, 2006). For example, the self-management required for social emotional competence is facilitated through the neurological interactions between the subcortical limbic and outer prefrontal structures of the brain (Blair, 2002; Riggs et al., 2006). Self-management refers to the self-regulation of emotions and to the regulation of cognitive skills that underlie self-regulated learning such as working memory, attention, inhibitory control, planning, and goal setting (Ferrier, Bassett, & Denham, 2014). Self-management involves the neurocognitive concept of *vertical control* which helps to explain the dynamic interaction between the neural structures of the limbic system and the prefrontal cortex (Tucker, Derryberry, & Luu, 2000). The functional link between the cortex and the limbic system allows the prefrontal cortex to serve a regulatory role in interpreting emotional information and responding with subsequent actions (Riggs et al., 2006). More specifically, vertical control refers to higher order cognitive processes within the prefrontal cortex which exert control over the lower level limbic system, the emotion centre of the brain (Riggs et al., 2006). In adults, emotional information is perceived through the limbic system and is sent via ascending neurons to the frontal cortex for higher order processing and then, in turn, impulses are returned to the limbic system to alter emotional signals (Blair, 2002; Riggs et al., 2006). Clinical studies have suggested that emotional processes which predominantly occur within the limbic system have a substantial effect on cortical activation which is responsible for higher order cognitive self-regulation skills (Derryberry & Tucker as cited in Blair, 2002). The brain's limbic system which is responsible for automatic, instinctual emotion processing develops early in life (Blair, 2002). A fundamental tenet of the ABCD

model is that as children mature, emotional development precedes and is a precursor for most cognitive development (Riggs et al., 2006). The vertical control, which is necessary for regulated social emotional competency, slowly evolves as the neural connections between the limbic system and frontal cortex, which is responsible for secondary emotion processing and cognitive control, takes time to develop (Casey, Galvan, & Hare, 2005; Riggs et al., 2006). Therefore, young children often lack effortful regulation and react impulsively to socially or emotionally challenging stimuli as the response is formulated without facilitation from higher order processing skills (Blair, 2002). The neurocognitive pathways that enable self-regulation and promote social emotional competence should develop over time enabling a gradual departure from caregiver initiated and supported control to an increasingly internalized locus of control and regulation (Shonkoff & Phillips, 2000; Greenberg et al. as cited in Riggs et al., 2006). This occurs as a child matures because the prefrontal cortex becomes increasingly developed, enabling higher order cognitive processes and facilitating the overriding of the automatic limbic system if necessary (Riggs et al., 2006). Additional information regarding approaches to explaining brain development is worthy of further exploration as background to the content study.

The *selectionist* approach to brain development provides a neuro-physiological explanation for the developmental growth in self-regulation. The *selectionist* theory suggests that neurologically, as a child develops, the interconnectivity between regions of the brain is refined via a gradual pruning of overabundant neural connections or synapses which are present early in life (Greenough & Black, 1992). Over time, inactive connections are eliminated and remaining active connections become strengthened (Greenough & Black, 1992). Hence, the emergence and development of cognitive processes related to frontal function appear in response

to neuronal maturation and selective innervation between the cerebral frontal cortex and other areas of the brain, such as the limbic system. Simply, automatic and volitional forms of social emotional competence occur in a hierarchically interrelated manner. Early forms of self-regulation are primarily automatic in nature and set the stage for the development of higher order cognitive regulation abilities, such as executive control (Riggs et al., 2006; Shonkoff & Phillips, 2000).

Executive control processes not only emerge developmentally but also in response to environmental influences that are non-routine (Zelazo & Muller as cited in Fuster & Tan, 2009). Executive control processes which are primarily caregiver (environmentally) driven in infancy, gradually become child initiated and maintained (Fuster & Tan, 2009). Increased child initiated self-regulated control coincides with the gradual neuroanatomical development of the frontal cortex (Fuster & Tan, 2009; Riggs et al., 2006), with individual differences in processing of environmental stimuli often influencing patterns of development of the prefrontal cortex. Environmental influence may have been an influential variable in this study's sample population and its effect will be further elaborated in the discussion section.

Phonological Awareness, Reading Fluency and the Brain

An academic function of primary importance is the ability to read, as reading is utilized in every academic subject area, primarily because content information is predominantly presented through print media (Cimmiyotti, 2013). Reading is a relatively recent cultural development and acquiring the skill requires years of instruction and effort (Kovelman et al., 2012).

An individual's phonological awareness, "the concept that words are composed of discrete sounds (phonemes) that can be mapped onto letters or syllables (graphemes)", precedes

and predicts successful reading acquisition (Kovelman et al., 2012, p. 754). Phonological awareness is the foundational skill of bottom-up theories of reading instruction, such as the Theory of Automatic Information Processing by LaBerge and Samuels (1974). Once phonological awareness has been established, readers proceed upon a continuum of skill development until reading proficiency is established. Proficient readers are able to translate written language (letters) into sounds, by blending sounds together to form words, lastly words are pieced together to facilitate an understanding of an author's message (LaBerge & Samuels, 1974). Learning to read initially requires readers to think about the connections between letters and sounds as they decode words sequentially. With repeated exposure to print, readers begin to automatically recognize words without having to pay attention to individual letter-sound associations. With the automatic recognition of words the reader is able to think about what is being read instead of using mental executive function resources such as working memory and attention to decode words (Gough, 1972; LaBerge & Samuels, 1974).

Kovelman et al. (2012) conducted a neuroimaging study to discover the neural correlates of phonological awareness for the auditory modality, which is a precursory skill for reading. By studying anomalies within the brains of children with dyslexia, Kovelman et al's (2012), study was able to conclude that during phonemic awareness tasks for neurotypical children, neuronal activation occurred within the dorsolateral prefrontal cortex (DLPFC), which developmentally is a late maturing area of the brain (Casey et al., 2005). These results suggest that neural processes involved in facilitating social emotional competence (Riggs et al., 2006) activate similar areas within the prefrontal cortex as those that facilitate reading fluency (Kovelman et al., 2012).

Mastery of phonemic awareness enables the emergence of fluent reading (LaBerge & Samuels, 1974). Reading fluency is the ability to read quickly, effortlessly, and efficiently

(Mahone, 2011). LaBerge and Samuels (1974) indicate that the execution of a complex skill such as reading requires the coordination of many processes within a short time frame. If each literacy skill required for successful reading (such as print concept, phonemic awareness, and vocabulary) placed significant cognitive demands on the reader, the performance of such a complex skill could exceed mental capacity, such as that of working memory because individuals only have a predetermined cognitive load of information that can be processed at any one time (Van Merrienboer & Sweller, 2005). Success with such cognitively taxing demands becomes attainable if some of the elements can be executed with automaticity. In this way, automaticity or fluency is a requirement for successful reading ability. According to Posner and Snyder (as cited by Stanovich, 1980) fluency in reading frees up mental capacity for the conscious higher order comprehension processing of text (Mahone, 2011).

As with social emotional competence, components of phonological awareness (Fox, 2015) and reading fluency (Mahone, 2011) involve the utilization of executive control skills such as processing speed and working memory which are thought to innervate regions of the prefrontal cortex (Bell, 1998; Elliott, 2003). Both are part of a large interconnected self-regulatory network with volitional social emotional competency skills preceding executive control development (Ferrier, 2015).

Executive Control and the Brain

Executive control consists of complex cognitive processing which requires the involvement of several sub-processes to initiate and attain a goal while overriding thoughts and responses which may be more automatic in nature (Elliott, 2003; Fuster & Tan, 2008). Executive control facilitates the successful execution of purposeful goal oriented behavior which is a hallmark of reading fluency (Li et al., 2009) and social emotional competence (Riggs et al.,

2006). Individuals are not born with executive control skills, they develop over time (Blair, 2002). Well-developed executive control skills allow individuals to be effective in both their social emotional and cognitive endeavours (Phillips & Shonkoff, 2000).

There are several key skills involved in executive control. Executive skills include (Morin, 2014):

- Impulse control: The ability to stop and think before acting.
- Emotional control: The ability to manage feelings by focusing on the end result or goal.
- Flexibility: The ability to come up with new ideas when a plan fails or when required to change course.
- Working memory: The ability to hold information in mind and use it to complete a task.
- Self-monitoring: The ability to keep track of and evaluate performance on regular tasks.
- Planning and prioritizing: The ability come up with steps needed to reach a goal and to decide on an order of importance.
- Task initiation: The ability to get started on something.
- Organization: The ability to keep track of information and things.

Effectively executed social emotional competencies (Ferrier et al., 2014) and cognitive processes such as those that would be activated during fluent reading (Li et al., 2009) usually require networking among several executive function skills.

Following is an example of how executive function sub skills network to facilitate the execution of an activity that requires both social emotional competence and reading fluency: choral reading. In a classroom choral reading occurs when specific groups of children are asked to read certain passages aloud in class. *Working memory* would allow students to keep rules in mind when they have urges to violate those rules (for example, the teacher requires that there be

no talking when another group is reading aloud). The students need to be able to *inhibit* action when those rules are applied (for example, avoid speaking or partaking in an activity in place of tracking the text and reading aloud when prompted). Thirdly, *task initiation* would facilitate the students' ability to bring themselves to attend to a passage that needs to be read aloud. Various components of executive function once again come into play to allow the student to vocalize what he or she is seeing written on the page, from maintaining focus on the text to using working memory to hold onto bits of information as reading progresses.

ABCD Model of Development and Social Emotional Competency Assessment

In the past, cognition and emotion, have been seen as separate domains that are independent at best and in competition at worst (Pourtois, 2012). Social emotional competence and oral reading fluency were considered to have non-overlapping brain structures (Bush, Luu, & Posner, 2000). Over the last century, however, psychologists and neuroscientists are beginning to replace the traditional competitive view with one of interdependence between cognition and emotion (Garon et al., 2008; Pourtois et al., 2012;). Pourtois et al.'s (2012) review of current research reveals that neuroanatomically, there appears to be overlap between emotional and cognitive processes. Fuster and Tan (2008) suggest that the commonalities may be rooted in executive control mechanisms which mediate both functions, however, the precise nature of the relationship remains unresolved.

By considering comprehensive models of neurocognitive function and development, such as the ABCD model, anatomically common neural substrates of the often disassociated emotional and cognitive processes can be identified. Such models can have significant practical implications in education as they can be utilized in the development of measures for social and emotional competence because they take into account the mechanisms or neurological functions

that affect the regulation of emotions in addition to social competence and cognition. Pourtois et al.'s (2012) findings of overlapping brain mechanisms for social emotional and academic processes supports the argument for translating research proven programming for social emotional development to programming for academic subject areas or vice versa.

Thus as noted at the end of Chapter One, the purpose of this study is to explore the possibility of using a research proven assessment for an academic skill (reading fluency) as a viable assessment of social emotional competency, a measure that is currently in demand (Maras et al., 2014). The application of a common tool to assess multiple outcomes would be particularly useful for schools that may be overburdened and lacking in sufficient human and economic resources as it would enable teachers quickly and easily to act within the RTI framework and assess academic progress as well as social emotional competence (Riggs et al., 2006). Such easy and efficient assessments would allow educators to be informed of students' individual needs and would facilitate instructional decisions to be made that would give all students equitable access to learning.

Since social emotional competency and reading fluency have neurological commonalities, it is hypothesized that an assessment of reading fluency will provide insight into measures of social emotional competence. To explore this hypothesis, this study addresses three questions: 1) Is there a correlation between individuals' social emotional competencies and reading fluency, 2) If there is a relationship between social emotional competence and reading fluency does it have a relatively large effect size? and 3) Could measures of individuals' reading fluency be used to inform their social emotional competencies?

Question 1. Since the prefrontal cortex has roles in processing information involved in both social emotional competence and in academic achievement such as reading fluency, is there

a correlation between measures of an individual's social emotional competence and reading fluency? A meta-analysis conducted by Durlak et al. (2011), found that students who received social emotional competency instruction made gains in social emotional competence and demonstrated academic achievement scores an average of 11 percentile points higher than students who did not participate in social emotional learning programs, $p < .05$. Scaffolded upon a neurocognitive model of development, this study proposes that Durlak et al.'s (2011) findings could be due to increased activation of similar areas within the brain.

Question 2. If there is a significant correlation between social emotional competency and reading fluency measures, does the relationship between the two variables have a larger effect size than other available predictors such as age, gender and academic achievement?

Question 3. Could the Dynamic Indicators of Basic Early Literacy Skills (DIBELS) assessment potentially be used as an instrument to provide insight into students' social emotional competence?

If a significant correlation between social emotional competence and reading fluency emerges, it could suggest that readily available academic reading assessments may be used to measure social emotional competence in addition to reading capacity. A multipurpose assessment tool would not only be a valuable addition to the few social emotional competency assessments currently available, but would also be a practical way to save schools time and money as one measure could inform multiple domains. The next chapter explores the statistical evidence that suggests that such a multipurpose measure may be viable. In addition to a correlation analysis, a hierarchical regression analysis will inform to what degree an academic assessment, specifically the DIBELS Next oral reading fluency (ORF) assessment can be used to predict measures of social emotional competence.

Given the purpose of the research and the three questions addressed, the methods by which those questions were answered are described in the next chapter.

CHAPTER 3: METHOD

Participants

Participants were a sample of convenience from an independent elementary school in a suburban area proximate to Vancouver, British Columbia. The school has a population of approximately 250 students, and 87 of the 88 students enrolled in grades 1-3 participated in this study. Simultaneous ratings of students' social emotional competence and reading fluency were gathered by the students' classroom teacher midway through the school year. Formal parental consent was not required as the assessments are part of a repertoire of measures which would have been administered even if the study had not taken place.

The sample included 87 of the 88 students enrolled in grades one through three in the 2015-16 school year. One male student that is categorically designated by the British Columbia Ministry of Education as category G (Autism Spectrum Disorder) was excluded from the study as he is non-verbal and the DIBELS Next ORF assessment would not be administered to him. There was one other categorically designated special needs student (D- Chronic Health) and she was included in the study because her special needs do not preclude her from being assessed with the DIBELS Next ORF by normal school practice. Demographic information such as age (in months), gender, and academic achievement (as documented in report cards), was collected on all 87 eligible participants and was used in the regression analyses to determine the amount of variability shared by the dependent and independent variables. The sample consisted of 47 boys (54%) and 40 girls (46%). Grade 1 consisted of 30 students with a 1:1 ratio of boys to girls. Grade 2 accounted for 28 of the students (46% boys and 54% girls) and Grade 3 was comprised of 29 students (66% boys and 34% girls). The number of males to females in Grade 3 are disproportionate, but that was the composition of this particular class in this sample of

convenience. Participants ranged in age from 71 months to 110 months (mean and standard deviation of age was 93.01 and 10.33 respectively). The preceding data are summarized in Table 1.

Table 1

Demographics of the Study Participants

	n	*%*
Grade 1 (*n* = 30)		
Male	15	(50%)
Female	15	(50%)
Grade 2 (*n* = 28)		
Male	13	(46%)
Female	15	(54%)
Grade 3 (*n* = 29)		
Male	19	(66%)
Female	10	(34%)

Ethics Approval

Consent was obtained for the study, consistent with TWU's Research Ethics Review Board and the Catholic Independent Schools of Vancouver Archdiocese (CISVA). The concern for human subjects, in this case children, is very low as the study analyzed existing data that were collected as part of a normal course of events for the students, using instruments and data collection processes which posed minimal risk to the children.

Instrumentation

The dependent or outcome variable was students' social emotional competence. The predictor or independent variable was the students' oral reading fluency.

The students' oral reading fluency was assessed using the 7th Edition of DIBELS, referred to as the DIBELS Next ORF (Good & Kaminski, 2011), and their social emotional

competence was assessed using the Devereaux Emotional Strengths Assessment-mini (DESSA-mini; Naglieri, Lebuffe, & Shapiro, 2014).

Social Emotional Competence Measure.

Progress is being made into operationalizing social emotional competencies into practical measurement instruments. It is imperative that tools which are developed and used are efficient, effective, and practical within school environments which are often subject to time and personnel constraints (Naglieri et al., 2011). The Collaborative for Academic, Social and Emotional Learning (Denham, Ji, & Hamre, 2010) and the Raikes Foundation (Haggerty, Elgin, & Woolley, 2011) have published reviews of social and emotional assessments that are appropriate for use in schools. The DESSA-mini for universal assessment of social emotional strengths is one such measure and was used in this study to measure social emotional competency (Naglieri et al., 2011). The instrument is part of a suite of scales developed by researchers at the Devereux Center for Resilient Children. This measure was suitable for this study as it is designed to be used with children from kindergarten through eighth grade and it measures all five social and emotional competencies that align with the pillars of the CASEL framework. Also, the DESSA-mini is a teacher rated scale, rather than a self-report, which is common to social emotional competency assessments, and can introduce measurement error.

The DESSA-mini was completed by the classroom teacher at each grade level. The DESSA-mini has four brief, 8-item parallel forms that are standardized and norm-referenced to assess social awareness, relationship skills, optimistic thinking, goal-directed behavior, personal responsibility, decision making, self-awareness, and self-management (Naglieri et al., 2011). The DESSA-mini yields a single score, the SET score, of the social emotional competence of a child.

Reading Fluency Measure.

The DIBELS assessment was developed by researchers at the University of Oregon in the late 1980s as a predictive tool of future reading proficiency. They are a set of individually administered measures for assessing the development of early literacy and early reading skills from kindergarten through sixth grade (Carlson et al., 2010). DIBELS Next was released in 2010 and represents the 7th edition of DIBELS (Good & Kaminsky, 2011). The DIBELS Next version is comprised of eight subtests that evaluate phonemic awareness, alphabetic principle, reading accuracy, and fluency with connected text, reading comprehension, and vocabulary. In 2012, in response to user feedback and based on research findings, a DIBELS Next user update was issued. The update indicated that a composite DIBELS Next score is no longer required to obtain a reliable prediction of students' reading proficiency. This user update was based on a study conducted by the University of Oregon Center on Teaching and Learning (2012), and suggests that the subtest Oral Reading Fluency (ORF) alone is a very strong predictor of reading proficiency in Grades 1-6 and that this single score in itself is a sufficient predictor of reading proficiency. The DIBELS Next ORF assessment was specifically chosen because it assesses a very specific skill set. Some of the other available academic measures assess across a range of mathematical and literacy domains, which could introduce moderators, or variables, that affect the relationship between other variables (Field, 2013).

Reliability and Validity

Below is a summary of reliability and validity scores for the DESSA-mini and the DIBELS Next ORF assessments. In summary the DESSA-mini has sufficient internal consistency (α = .92), parallel form reliability (α = .90 - .93), test-retest reliability (α = .88 - .94), and inter-rater reliability (α = .70 - .81; Naglieri et al., 2011). The DIBELS Next ORF

assessment has: alternate form reliability (α > .93 - .95), test-retest reliability for Words Correct (α = .91 - .97) and inter-rater reliability (α = .99; Dewey, Powell-Smith, Good, & Kaminski, 2014).

The validity of the DESSA-mini was estimated by examining its correlation with the DESSA Social Emotional Composite score, (r = .87, p < .01). The DIBELS Next predictive validity was measured in correlation to the Group Reading Assessment and Diagnostic Evaluation (GRADE; r = .64 - .76, p < .001), and concurrent validity was measured in correlation to the Standard 4th Grade Reading Passage used in the NAEP 2002 Special Study of Oral Reading (r = .66 - .75, p < .001; Dewey et al., 2014).

Procedure

This study explored the statistical correlation between social emotional competency scores and reading fluency scores and investigated, through hierarchical regression analysis, factors which may have a relationship with social emotional competence.

In February 2016, all 87 students were assessed for oral reading fluency using the DIBELS Next ORF assessment and for social emotional competence using the DESSA-mini assessment. The following background information was also collected for all participants: age (in months), gender, and academic achievement. Academic achievement was tabulated from students' Spring report cards which were scored in the following way: all grades were reported on a 5-point scale ranging from *does not meet expectation* to *exceeds expectation*. Each scale was coded a score of 1 to 5, with *does not meet expectation* scoring a "1" and *exceeds expectation* scoring a "5". Lastly, the mean of each student's report card was calculated. All assessments took place within a 3-week period. For all grades, the DIBELS Next ORF

assessment was administered prior to the administration of the DESSA-mini. The school principal authorized analysis of the data.

Measures

Emotional Competence: DESSA-mini.

The DESSA-mini required school personnel, in this case the classroom teacher, to complete a series of 8 scales for each student. The eight scale scores were compiled into one composite total score of social emotional competence, the DESSA-mini SET score. For consistency in communicating results, percentile scores were used when communicating and analyzing the results. The total DESSA-mini SET score suggests whether additional social emotional skill development will be required to prevent future deficits in social emotional competencies (Naglieri et al., 2011). Higher scores suggest higher levels of social emotional competence. Students with a SET score at or above the 84th percentile would be categorized as having a *Strength* in social emotional competence. Approximately 16% of children in the standardization sample received scores in this range (Naglieri et al., 2014) and 56% of children in the study sample. Those with percentile scores between 16-84 would be categorized as *Typical* students (68% of standardization sample and 41% of study sample) and those with scores below the 16th percentile would be classified as having a *Need for Instruction* (16% of standardization sample and 3% of study sample). A complete list of participants' SET scores is reported in Appendix A.

Oral Reading Fluency: DIBELS Next ORF.

The oral reading fluency subtest of the DIBELS Next assessment can be used from the middle of grade 1 to the end of grade 6. Students were asked to orally read three different, unfamiliar grade level texts for 1 minute. Substitutions, omissions, and hesitations for more than

three seconds were recorded as errors. Oral reading fluency is based on the median number of words read correctly across the three passages. To facilitate a comparison of DIBELS Next ORF scores across grades the raw scores were converted to percentile scores (Cummings, Kennedy, Otterstedt, Baker, & Kame'enui, 2011). Percentile ranks pose a disadvantage in that scores have non-equal intervals across the 1-99 scale. For example, a five point difference between a score of 94-99 is far greater than that between 50 and 55 across the width of a normal curve (Naglieri et al., 2014)

The DIBELS Next ORF score can be further categorized as *At or Above Benchmark, Below Benchmark or Well Below Benchmark* (Giaquinto, 2015). *At or Above* benchmark means that the assessed student is making adequate progress in reading and has approximately an 80-90% chance of achieving subsequent early literacy goals. A score categorized as being *Below Benchmark* gives the student a 40–60% chance of achieving subsequent early literacy goals. Such a student will typically require instructional support to ensure that reading benchmarks are met in the future. A student who is identified as *Well Below Benchmark* has a low chance (10–20%) of achieving subsequent early literacy goals and will require intensive intervention (DIBELS Next Assessment Manual, 2011, p. 25). A complete list of students' DIBELS Next ORF scores can be found in Appendix A.

All measured and collected data were statistically analyzed using IBM's Statistical Package for the Social Sciences (SPSS) 23, a statistical software program. The results of the correlation, regression and hierarchical analyses are outlined in the subsequent chapter.

CHAPTER 4: RESULTS

First, the data were run graphically to create a scatterplot before being analyzed in any other way. Figure 2 shows the linear relationship between the participants' DIBELS Next ORF score (percentile) and the DESSA-mini SET score (percentile).

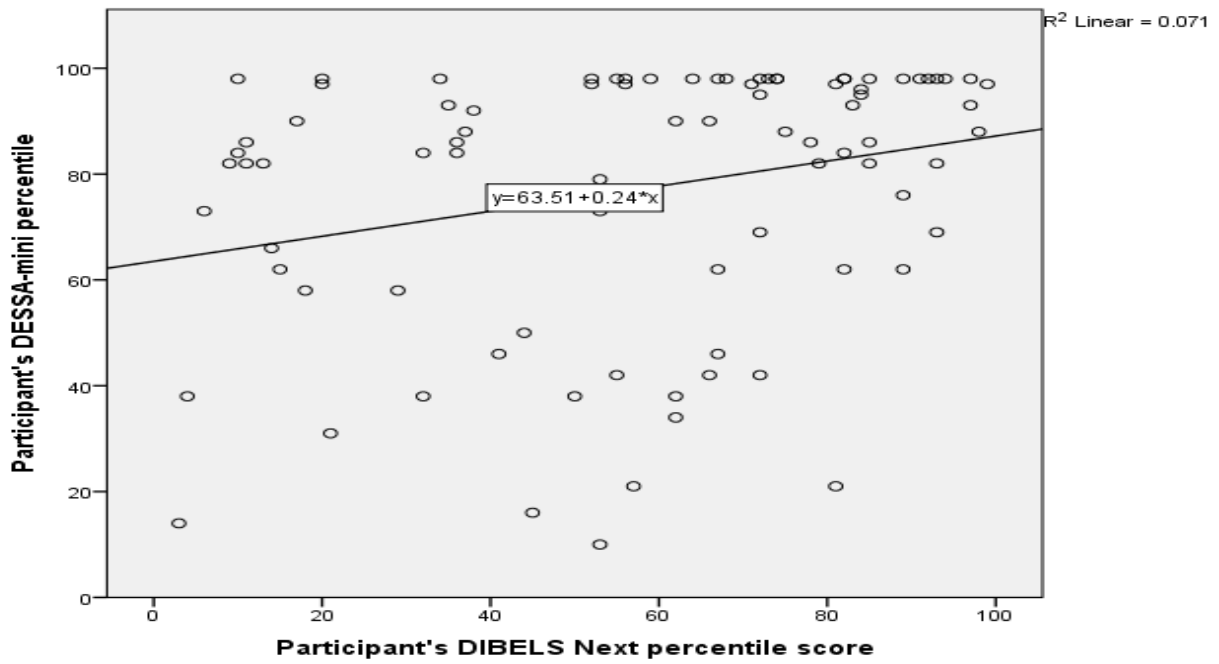

Figure 2. Scatter plot of participants' DIBELS Next ORF score (percentile) and DESSA-mini SET score (percentile), with regression line fitted.

Correlation Analysis

A correlation analysis was carried out to determine if the DIBELS Next measure of oral reading fluency was significantly correlated to the DESSA-mini measure of social emotional competence. The correlation analysis revealed that the students' oral reading fluency scores and social emotional competence scores correlate significantly, $r = .267$, 95% BCa CI[.096, .428], $p = .012$. For all analyses, a significance level of $p < .05$ was selected.

Hierarchical Regression Analyses

Strength and directionality between available independent variables (DIBELS Next ORF scores, academic ability/report card scores, age, and gender) and social emotional competence scores were analyzed in a hierarchical regression to assess the amount of variance in DESSA-mini SET score predicted by each of the independent variables.

The independent variables were entered into the model based on Pearson's correlation coefficients: DIBELS Next ORF (r = .267, p = .006), gender (r = .214, p = .023) and age (r = .165, p = .063). As explained earlier, research has indicated (Durlak et al., 2011; Zins et al., 2004) that there is a statistically significant correlation between academic ability and social emotional competence and this finding was supported by analysis within this study (r = .655, p < .001).

The outcomes of the hierarchical regression analyses are summarized in Table 2. Table 2 outlines the amount of variance in DESSA-mini SET scores predicted by each independent variable. Model 1 shows the amount of variance predicted by academics scores, Model 2 shows the amount of variance predicted by the addition of the DIBELS Next ORF score, Model 3 includes age and Model 4 shows the amount of variance predicted by the addition of the final variable, gender. Academic score was the only variable found to predict a significant amount of variance in the DESSA-mini SET scores, R^2 = .43. The R^2 value, the correlation coefficient squared, is a measure of how much variability in the DESSA-mini SET score (independent variable) is accounted for by the academic score (dependent variable). It is often easier to think of this value as a percent, therefore it can be stated that 43% of the DESSA-mini SET score is accounted for by the academic score. The remaining predictors, including the DIBELS Next

ORF fluency score, did not contribute significantly to the model after the academic score was accounted for.

Table 2

Hierarchical Regression Analyses Predicting Social Emotional Competence

Model	Order of Entry Into Regression Equation	R^2	R^2 Change	F
1	Academic Score	0.43	0.43	63.91***
2	Academic Score + DIBELS Next ORF	0.43	0	0.02
3	Academic Score + DIBELS Next ORF+ age	0.43	0	0.35
4	Academic Score + DIBELS Next ORF+ age + gender	0.43	0	0.04

**Note.* $p < .05$. ** $p < .01$. *** $p < .001$.

The regression results suggest a reduced effect of the DIBELS Next ORF score on the DESSA-mini SET score when academic score is included in the model. This suggests that the relationship between the DIBELS Next ORF score and the DESSA-mini SET score is possibly mediated by the academic score.

Mediation Analysis

In a simple regression model, in the absence of academic score, the DIBELS Next ORF score significantly predicts the DESSA-mini SET score, $b = .236$, $t = 2.55$, $p = .013$. However, when academic score is included in the regression model the direct effect of the DIBELS Next ORF score on the DESSA-mini SET score is reduced, $b = -.012$, $t = -.152$, $p = .879$. These results suggest that the academic score may be acting as a mediator between the DIBELS Next ORF score and the DESSA-mini SET score. A statistical mediation is when the relationship between an independent variable and dependent variable operates via another variable, a mediator (Field, 2013). A mediation analysis was performed to explore the effect of academic score on the relationship between the DIBELS Next ORF score and the DESSA-mini SET score.

The results of the mediation analysis are summarized in Figure 3. The figure shows that the DIBELS Next ORF score significantly predicts the academic score (b = 0.05, t = 4.32, p < .001), and the academic score significantly predicts the DESSA-mini SET score (b = 5.31, t = 7.26, p < .001). For a statistical mediation to be in effect, the strength of the relationship between the DIBELS Next ORF score (independent variable) and the DESSA-mini SET score (dependent variable) should be significantly weakened when the academic score (mediator variable) is included in the model (Field, 2013). The results of the analysis suggest that the academic score does act as a mediator because the DIBELS Next ORF score does not significantly directly predict the DESSA-mini SET score when the academic score is included in the model, b = -0.01, t = -0.15, p = .879. The indirect effect, the effect of the DIBELS Next ORF score on the DESSA-mini SET score via the academic score becomes significant, b = .249, 95% BCa CI [0.076, 0.451].

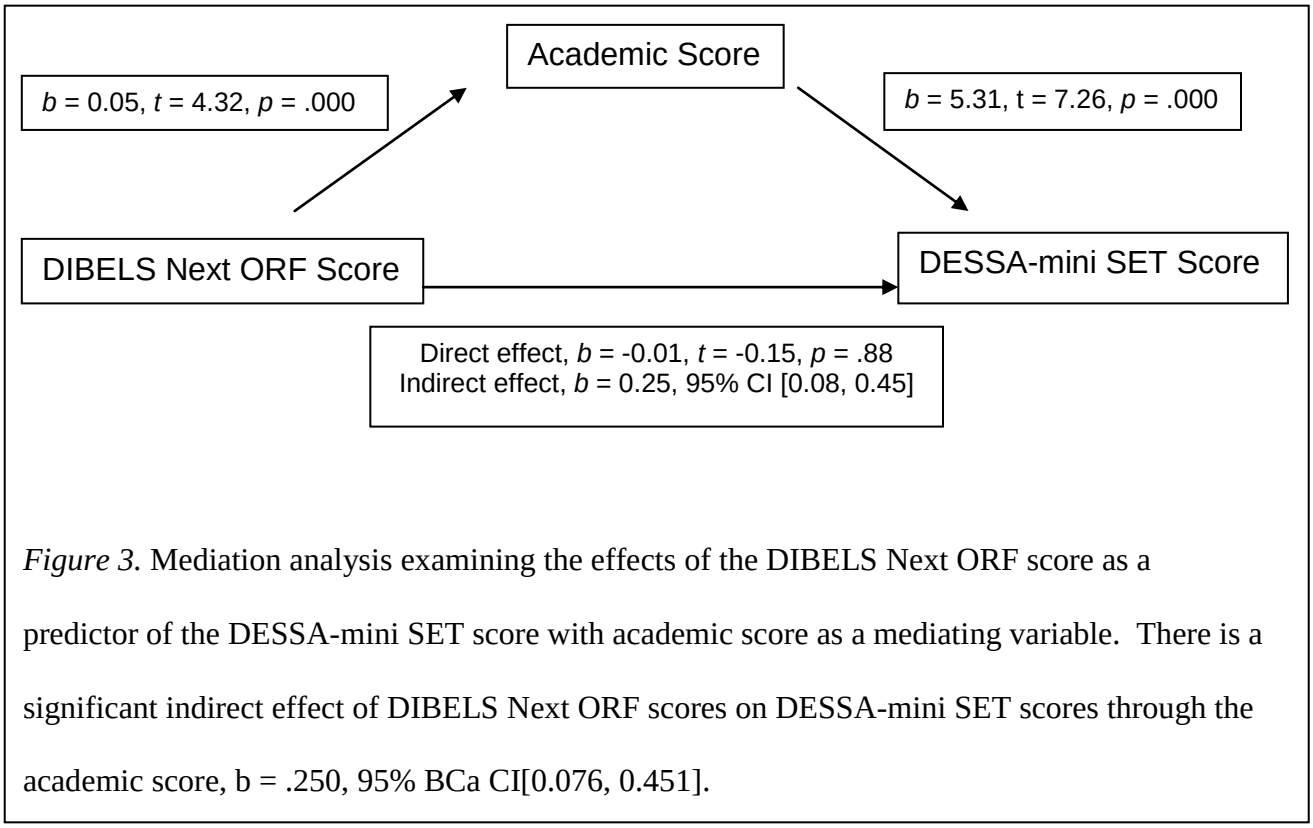

Figure 3. Mediation analysis examining the effects of the DIBELS Next ORF score as a predictor of the DESSA-mini SET score with academic score as a mediating variable. There is a significant indirect effect of DIBELS Next ORF scores on DESSA-mini SET scores through the academic score, b = .250, 95% BCa CI[0.076, 0.451].

The indirect relationship has a significantly large effect size, $\kappa^2 = .292$, 95% BCa CI [0.102, 0.488] (Field, 2013), indicating that the relationship which the DIBELS Next ORF score and the DESSA-mini SET score have is strongly (29.2%) mediated by the academic score. These results indicate that there is a relationship between the dependent and independent variable and reason for further future research into a common screen of social emotional competence and an academic skill.

CHAPTER 5: DISCUSSION

Quantitative research methodology was used to analyze data related to finding a universal screening measure for social emotional competence and oral reading fluency. Data were collected from an independent school in a suburb of Vancouver, British Columbia. The positive correlation between the DIBELS Next ORF score and DESSA-mini SET score suggests that there may be a possibility that a universally administered screening tool for early literacy skills could be implemented as a dual screen by applying it to social emotional competency. Such a measure, which could be used across multiple curricular domains, would prove valuable in saving schools the amount of time spent assessing. This would allow schools the opportunity to redirect the resource into instructional time, increasing the chances that all students will be fully integrated.

The DIBELS Next ORF score does indeed provide a variance on the DESSA-mini SET score ($r = .236$, $p = .013$). Even though the correlation between the ORF and SET scores is moderate in its significance it suggests that there is room for future research in exploring the possibility of utilizing universal screening measures across curricular domains. Of special interest may be social emotional competency assessments which are not solely quantitative in nature. The moderate quantitative correlation may suggest that social emotional competency may also need to be explored through a qualitative lens. A mixed methods study may be better able to inform educators of student social emotional competency.

The hierarchical analysis and subsequent mediation analysis revealed that even though there is a statistical correlation between the predictor and outcome variables, the relationship can be affected by a mediating variable such as academic ability as measured by report card grades. The mediation analysis revealed that as reading skill increased so did academic ability as

indicated by report card marks, which in turn resulted in a positive relationship with social emotional competence. Students' higher academic scores were reflected in higher social emotional competency scores. To return to the ABCD model of development (Greenburg & Kusche, 1993), the positive relationships may be due to the neuroanatomical associations between academic and social emotional capacities within the brain. Specifically, the association may be due to the involvement of executive control skills and their related activation of the limbic system and prefrontal cortex (Riggs et al., 2006). This is not surprising as Elliott (2003) suggests that neuroanatomically it could be entire systems of circuitry orchestrating diverse cognitive demands, rather than discrete regions (Duncan & Owen, 2000). Therefore, executive control related frontal lobe functions such as working memory, inhibitory control, and task initiation, which are utilized in both academic tasks (reading) and affective functions (social emotional), could be affected by the ability of the circuitry to transmit information (Elliott, 2003). Elliott (2003) suggests that the effectiveness of the circuitry to transmit information may be content and load dependent. This could explain why even though the DIBELS Next score (academic measure) and the DESSA-mini SET score (affective measure) correlate to a moderate degree, in the presence of a multifaceted academic assessment (report card), the predictive effect of the DIBELS Next ORF score on the DESSA-mini SET score diminishes. Even though many of the academic areas that reports cards grade are rooted in literary ability (science, social studies, and even math) the report card's mediating effect could be due to the report card being a more suitable representation of students' reading ability as its content and load are much more diverse than that of the DIBELS Next ORF assessment. For example, a student that scores *"typical"* on the DIBELS Next ORF assessment may in fact score more strongly in his or her report card. This may occur because the report card is a cumulative score which has been tallied

over many subject areas and via many modalities. The varied content and load through which a student's academic scores are calculated are far less rigid than the prescriptive DIBELS Next ORF assessment. The varied content and load of report card assessments may allow for more effective transmission of affective and academic stimuli through related circuitry. Such a system would help to not only explain the stronger predictive power of academic scores over the DIBELS Next ORF score on the DESSA-mini SET score, but can also account for the strong positive relationship between the academic score and the DESSA-mini SET score.

Limitations of the Study

There are a number of limitations to this study. These limitations primarily involve the sample of convenience which was not stratified nor randomly selected. As indicated earlier, the sample appears to have been skewed in relation to social emotional competency. The sample had 56% of the participants score at or above the 84th percentile in social emotional competency and would be considered as having a strength in the domain. The participants' scores varied considerably from that of the children in the standardization sample of which 16% scored at or above the 84th percentile. Since the sample scores were obtained from students attending an independent school where parents are required to pay tuition, the sample scores may have been influenced by socio-economics. Factors such as family income and parental educational qualifications have been found to have an effect on social emotional competence (Hartas, 2011). There is compelling evidence that there is a positive effect on the social emotional competence of children from families that are not at-risk financially (Dearing, McCartney, & Taylor, 2001). Therefore, the findings in this study are not generalizable to the general population.

Non-experimental research has value in education, but it contains inherent limitations. Some threats to internal validity in this study, as identified by Campbell and Stanley (1963),

include maturation, instrumentation, and statistical regression as many of the scores for the DESSA-mini SET score in this sample were very high. In addition, the small sample size at each grade level created ecological validity concerns and restricted the ability to generalize results beyond the school in this study (Giaquinto, 2015).

Future Research

Social emotional competence assessment continues to be an area in need of further development. A similar study can be undertaken that utilizes a randomized and stratified sample to address some of the limitations associated with this study such as the disproportionate number of males and the large number of students with a strength in social emotional competence.

In this research, only a limited number of predictors of social emotional competence were analyzed: oral reading fluency, age, gender, and academic achievement. Two of these factors are limited in that they were assessed using a relatively gross measure of neurocognitive functioning. Future studies should determine whether tasks presumed to tap neurocognitive functioning are paralleled by activation within specific neuroanatomical structures. Such neural activity, although beyond the scope of this study could be determined via neural imaging techniques such as functional magnetic resonance imaging (fMRI). Studies like these could better determine the specific neurological correlates of mechanisms related to social emotional competence and oral reading fluency.

In this study the DIBELS Next ORF assessment did not prove to be a viable assessment of social emotional competency. The results suggest that future empirical studies could explore alternative minimally invasive and practical tools for assessing social emotional competency in students. Of particular interest would be investigations that attempt to uncover whether data or assessments which are routinely collected may reflect social emotional competence. Assessments

that target common mediators to multiple outcomes would be particularly useful for overburdened schools as they would allow teachers to simultaneously address a variety of areas, optimizing classroom time while achieving concurrent success in multiple areas.

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APPENDIX A

Middle of the Year DIBELS Next Oral Reading Fluency Scores (ORF) and Devereux Student Strengths Assessment-mini (DESSA-mini)

Grade	Gender	ORF	ORF Proficiency Level	DESSA-mini Proficiency Level
1	**F**	**111**	At or Above Benchmark	Strength
1	**F**	**66**	At or Above Benchmark	Strength
1	**M**	**79**	At or Above Benchmark	Typical
1	**M**	**64**	At or Above Benchmark	Typical
1	**M**	**10**	Well Below Benchmark	Strength
1	**F**	**40**	At or Above Benchmark	Typical
1	**M**	**35**	At or Above Benchmark	Strength
1	**M**	**57**	At or Above Benchmark	Typical
1	**F**	**84**	At or Above Benchmark	Strength
1	**M**	**23**	Below Benchmark	Typical
1	**M**	**13**	Well Below Benchmark	Strength
1	**M**	**15**	Well Below Benchmark	Typical
1	**F**	**54**	At or Above Benchmark	Strength
1	**M**	**70**	At or Above Benchmark	Typical
1	**F**	**12**	Well Below Benchmark	Typical
1	**F**	**80**	At or Above Benchmark	Typical
1	**F**	**11**	Well Below Benchmark	Typical
1	**F**	**71**	At or Above Benchmark	Strength
1	**F**	**21**	Below Benchmark	Strength

1	**F**	**39**	At or Above Benchmark	Strength
1	**F**	**9**	Well Below Benchmark	Typical
1	**F**	**91**	At or Above Benchmark	Typical
1	**M**	**111**	At or Above Benchmark	Strength
1	**F**	**10**	Well Below Benchmark	Typical
1	**M**	**91**	At or Above Benchmark	Typical
1	**M**	**29**	Below Benchmark	Need
1	**M**	**5**	Well Below Benchmark	Need
1	**M**	**30**	Below Benchmark	Typical
1	**F**	**31**	Below Benchmark	Typical
1	**M**	**46**	At or Above Benchmark	Typical
2	**M**	**91**	Below Benchmark	Strength
2	**M**	**102**	At or Above Benchmark	Strength
2	**F**	**103**	At or Above Benchmark	Typical
2	**F**	**132**	At or Above Benchmark	Strength
2	**F**	**49**	Well Below Benchmark	Strength
2	**M**	**93**	Below Benchmark	Typical
2	**M**	**70**	Well Below Benchmark	Strength
2	**M**	**33**	Well Below Benchmark	Strength
2	**F**	**65**	Well Below Benchmark	Typical
2	**F**	**163**	At or Above Benchmark	Strength
2	**F**	**138**	At or Above Benchmark	Strength
2	**F**	**201**	At or Above Benchmark	Strength

2	**F**	**84**	Below Benchmark	Typical
2	**M**	**86**	Below Benchmark	Strength
2	**F**	**103**	At or Above Benchmark	Strength
2	**F**	**106**	At or Above Benchmark	Strength
2	**F**	**65**	Well Below Benchmark	Strength
2	**M**	**113**	At or Above Benchmark	Strength
2	**M**	**84**	Below Benchmark	Typical
2	**F**	**25**	Well Below Benchmark	Typical
2	**F**	**19**	Well Below Benchmark	Typical
2	**F**	**62**	Well Below Benchmark	Typical
2	**M**	**114**	At or Above Benchmark	Strength
2	**M**	**41**	Well Below Benchmark	Typical
2	**M**	**72**	Well Below Benchmark	Strength
2	**M**	**126**	At or Above Benchmark	Strength
2	**M**	**117**	At or Above Benchmark	Strength
2	**F**	**118**	At or Above Benchmark	Strength
3	**F**	**111**	Below Benchmark	Strength
3	**M**	**130**	At or Above Benchmark	Strength
3	**M**	**95**	Below Benchmark	Typical
3	**F**	**129**	At or Above Benchmark	Strength
3	**M**	**133**	At or Above Benchmark	Strength
3	**F**	**83**	Well Below Benchmark	Strength
3	**M**	**96**	Below Benchmark	Strength

3	**M**	**105**	Below Benchmark	Typical
3	**F**	**117**	At or Above Benchmark	Strength
3	**F**	**116**	At or Above Benchmark	Strength
3	**M**	**107**	Below Benchmark	Strength
3	**M**	**88**	Below Benchmark	Strength
3	**M**	**100**	Below Benchmark	Strength
3	**M**	**90**	Below Benchmark	Typical
3	**F**	**119**	At or Above Benchmark	Strength
3	**M**	**100**	Below Benchmark	Strength
3	**M**	**110**	Below Benchmark	Strength
3	**F**	**65**	Well Below Benchmark	Strength
3	**F**	**152**	At or Above Benchmark	Strength
3	**F**	**85**	Well Below Benchmark	Strength
3	**F**	**96**	Below Benchmark	Strength
3	**M**	**82**	Well Below Benchmark	Strength
3	**M**	**48**	Well Below Benchmark	Strength
3	**M**	**110**	Below Benchmark	Typical
3	**M**	**91**	Below Benchmark	Need
3	**M**	**118**	At or Above Benchmark	Strength
3	**M**	**62**	Well Below Benchmark	Typical
3	**M**	**128**	At or Above Benchmark	Typical
3	**M**	**109**	Below Benchmark	Typical