Examining the Structural Validity of the My Class Inventory – Short Form for Teachers (TMCI-SF) in Early Elementary School Classrooms

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Dedication

To my undergraduate mentor, Dr. Cheryl McNeil, who guided me to the field of school psychology and inspired me to get my doctorate. Her support and encouragement stayed with me throughout this journey.

And to my parents, whose unconditional love and support sustained me through the whole ordeal.

Abstract

There has been an increased interest among researchers, policymakers, and educators in climate as an indicator of the health and functioning of a school. Climate is a complex, multidimensional construct that can be examined at the school, classroom, and individual levels. There are currently few open-access, brief measures of classroom climate, and previous research focused predominantly on upper elementary and secondary school settings. The primary purpose of the current study was to conduct a confirmatory factor analysis (CFA) of the My Class Inventory – Short Form for Teachers (TMCI-SF), which is a 30-item, five factor measure of classroom climate, when used with early elementary school teachers. Results of the CFA indicated that a revised 14-item, three factor TMCI-SF best fit the data. The revised TMCI-SF was used to examine the relationship between classroom climate and students' social, emotional, and behavioral wellbeing, as measured by the Devereux Student Strengths Assessment – *Second Step*® Edition (DESSA-SSE), the Strengths and Difficulties Questionnaire (SDQ), and the two direct observation variables (academic engagement and disruptive behavior). Results of hierarchical linear regression (HLR) analyses indicated that there were statistically significant relationships between the revised scales of the TMCI-SF and the DESSA-SSE scales, SDQ scales, and DBO variables. Finally, classroom climate was treated as an outcome to examine whether it changed as a function of the implementation of social-emotional learning (SEL) curriculum. Results indicated no significant changes as a result of the function of SEL implementation. Implications of the results, limitations of the study, and future directions are discussed.

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Chapter 1: Introduction

There has been an increased interest among researchers, policymakers, and educators in climate as an indicator of the health and functioning of a school. For example, the Every Student Succeeds Act (ESSA; 2015) requires one nonacademic indicator of student performance in addition to academic achievement and specifically cites "school climate and safety" as a potential criteria to be measured. Broadly, climate refers to the quality and character of life for all individuals within a school setting (National School Climate Center [NSCC], 2018), and it can be measured at the individual, classroom, and school level. Healthy climate has been linked to several positive outcomes related to student performance, such as academic achievement (e.g., Brookover et al., 1978; Brown & Medway, 2007; Ma, Phelps, Lerner, & Lerner, 2009; Wang & Holcombe, 2010), social-emotional competence (e.g., Buyse, Verschueren, Verachtert, & Van Damme, 2009; Stormshak et al., 1999), and behavior (e.g., McNeely, Nonnemaker, & Blum, 2002; Way, Reddy, & Rhodes, 2007). Given the significant amount of time early elementary students spend in the classroom, it is especially important to examine classroom climate specifically. The purpose of the current study was to analyze the structural validity of a brief measure of classroom climate (My Class Inventory – Short Form for Teachers) and examine whether classroom climate changes as a function of the adoption of a social-emotional learning curriculum (*Second Step*®).

Background

There is growing interest in and emphasis on assessing staff and student perceptions of climate as both an outcome of intentional change efforts and as a predictor

of student outcomes. Although there is a long history of interest in climate (e.g., Brookover et al., 1978; Walberg, 1968; Walberg & Anderson, 1968), recent federal (e.g., ESSA, 2015; Academic, Social, and Emotional Learning Act, 2015; Mental Health in School Act, 2015; Safe Schools Improvement Act, 2015) and state legislation (e.g., Minnesota's Safe and Supportive Schools Act, 2014) has rejuvenated efforts to improve school climate and safety. Similarly, professional organizations that promote an expanded view of efforts to improve student performance, learning experiences, and educational outcomes (e.g., National Association of School Psychologists [NASP]; National Association of Secondary School Principals [NASSP]) have also emphasized the importance of climate in regard to measuring and improving school success.

Current interest among policymakers, educators, and researchers in climate is predicated on a literature base that continues to emphasize the importance of climate in efforts to improve equitable student outcomes and improve overall quality of experiences in school. Some research has focused on school climate specifically (e.g., McNeely, Nonnemaker, & Blum, 2002; Thapa, Cohen, Guffey, & Higgins-D'Alessandro, 2013). Other research has focused on individual factors that comprise the broader concept of climate, such as student attendance (e.g., Epstein & Sheldon, 2002; Gottfried, 2010; Roby, 2003), engagement (e.g., Appleton, Christenson, Kim, & Reschly, 2006; Klem & Connell, 2004), social-emotional competence (e.g., Bird & Ladd, 1998; Jones, Crowley, & Greenberg, 2017; Jones, Greenberg, & Crowley, 2015), and mental health (e.g., Bond et al., 2007; Fergusson & Woodward, 2002). There are fewer studies available that focus on climate at the classroom-level, which is the most proximal environment within which

the learning process occurs and, therefore, likely has the most direct impact on student academic engagement and performance.

Classroom Climate. Climate is a multi-level construct that can be examined at the school, classroom, and individual levels. Broadly, climate refers to the quality and character of life for all individuals within a school setting (NSCC, 2018). School climate has been defined as the "beliefs, values, and attitudes that shape interactions between students, teachers, and administrators and set the parameters of acceptable behavior and norms for the school" (Mitchell & Bradshaw, 2013, p. 600). When applied to the classroom level, climate can be defined as the perceptions of students and teachers in response to their shared experiences *within individual classrooms*. In other words, it reflects how students and teachers describe and feel towards the individual classroom environments in which they share social and academic experiences (Dunn & Harris, 1998).

Although much of the established research on climate has focused on school climate (e.g., Anderson, 1982, Koth, Bradshaw, & Leaf, 2008; Thapa et al., 2013), there is a significant need for research that focuses on climate at the classroom level. Baker and colleagues (2003) noted that "schools are important contexts for children's development because of the time children spend there, the degree to which they influence children's experiences and self-perceptions, and their potential to affect children's life courses" (p. 207). Yet, both ecological systems theory (Bronfenbrenner, 1978) and social cognitive theory (Bandura, 1986, 1989) propose that what happens in the most proximal environment has the strongest influence on individual behavior and development. While

the broader school context may impact student academic engagement and performance indirectly, explicit learning takes place in the classroom. Therefore, classroom environment likely has the most direct impact on student academic engagement and performance. This is especially true in elementary school when children spend the majority of the school day in the same classroom with the same teacher and group of peers.

Classroom environments play a critical role in children's development (e.g., Masten & Coatsworth, 1998; Wilson, Pianta, & Stuhlman, 2007), as children spend more time interfacing with educators during the week than they do interacting with their parents (Hofferth & Sandberg, 2001). A healthy classroom climate supports children's optimal social, emotional, behavioral, and academic development by creating environmental conditions in which students have positive experiences and feelings that lead to increased engagement in instruction and cooperation with teachers (Greenberg et al., 2003). Healthy classroom climates are characterized by positive teacher-student interactions, respectful interactions among peers, and supportive yet challenging learning experiences. In turn, teachers' and students' perceptions of classroom climate have been linked to students' social competence (e.g., Kiuru et al., 2012; Turner et al., 2002; Wilson et al., 2007), emotional wellbeing (e.g., Frenzel, Pekrun, & Goetz, 2007; Peters, 2012), behavioral regulation (e.g., Mitchell & Bradshaw, 2013; Montague & Rinaldi, 2001; Neitzel & Connor, 2017), and academic achievement (e.g., Hamre & Pianta, 2005; LaRocque, 2008; Reyes et al., 2012; Turner et al., 2002).

While much of the research has focused on secondary school students' perceptions of climate, assessment of classroom climate in early elementary school is largely dependent on teacher perception. First, developmental factors (e.g., age, intellectual functioning, sociolinguistic development, etc.) may interfere with the psychometric accuracy of early elementary students' self-reports, resulting in less reliable and valid self-reports from early elementary students (e.g., Durbin, 2010; Jaaniste, Noel, & von Baeyer, 2016; Ladd & Mars, 1986; Stanford, Chambers, & Craig, 2006). Additionally, early elementary students are still developing their basic reading and reading comprehension skills, which may necessitate alternative methods for measuring their perceptions of classroom climate that may be less efficient (e.g., Boosman, van der Meulen, van Geert, & Jackson, 2002; Ladd & Mars, 1986). Finally, measuring teacher perceptions of classroom climate is likely to provide a better idea of how the classroom functions as a whole rather than children's individual experiences within the classroom and their individual interactions with the teacher and their peers. For these reasons, teachers are the optimal informants when providing reports of the climate of a classroom, particularly when the reports are not gathered under conditions involving performance evaluation (Colby, Bradshaw, & Joyner, 2002; Levin, 1979). However, there are currently few feasible and valid measures that capture teachers' perceptions of classroom climate.

Classroom Climate and Social-Emotional Learning

Classroom climate can serve as both a predictor and mediator. As a predictor, classroom climate can predict relevant student (e.g., academic engagement, prosocial

interactions) and teacher (e.g., stress/burnout, self-efficacy) outcomes. As a mediator, classroom climate serves as a mechanism through which other variables or factors have an influence on relevant student and teacher outcomes. For example, an approach to improving teacher-student relationships may improve classroom climate (i.e., teacher/student perceptions of the classroom environment), which in turn influences indicators of student academic engagement. One area of educational programming where the above is illustrated is social-emotional learning.

Social-emotional learning involves dedicated efforts to promote the social, emotional, and behavioral wellbeing and functioning of students as foundational to academic and life success (e.g., Bierman et al., 2014; Bond et al., 2007; Greenberg et al., 2003). There is a symbiotic relationship between classroom climate and the social-emotional and behavioral characteristics of students. The behaviors students display are dependent on the social contexts in which they occur, as the environment elicits certain presentations of behaviors. Moreover, "student behavior *evolves* within the context of their educational environment" (O'Brennan, Bradshaw, & Furlong, 2014, p. 3, emphasis added). Whereas a negative classroom climate may elicit or maintain negative behaviors and interactions, a positive classroom climate can promote positive teacher-student interactions and students' emotional well-being (Hutchings et al., 2013; Shim, Kiefer, & Wang, 2013). Therefore, the behaviors exhibited in the classroom shape teacher and student perceptions of the classroom climate (Birch & Ladd, 1998; Koth, Bradshaw, & Leaf, 2008; Reyes et al., 2012; Stormshak et al., 1999).

This bi-directional relationship between classroom climate and students' behavioral characteristics adds support to the notion that classroom climate can be conceptualized as both a predictor of students' social-emotional wellbeing as well as a potential mechanistic variable of intentional change efforts to improve students' social-emotional competence. Given the scarcity of resources available to teachers and schools, especially in terms of time and personnel, schools would benefit if they could implement one intervention that directly and indirectly improves student outcomes by improving social-emotional skills as well as teacher perceptions of classroom climate.

Current research suggests that implementation of a social-emotional learning curriculum may produce a healthy classroom climate that sets the stage for students to be more successful socially, emotionally, behaviorally, and academically (Bierman et al., 2014; Morris, Millenky, Raver, & Jones, 2013; Raver et al., 2011). According to the Collaborative for Academic, Social, and Emotional Learning (CASEL, 2018), social-emotional learning (SEL) is the "process through which children and adults acquire and effectively apply the knowledge, attitudes, and skills necessary to understand and manage emotions, set and achieve positive goals, feel and show empathy for others, establish and maintain positive relationships, and make responsible decisions." Improving students' social-emotional competence decreases the cognitive and emotional demands placed on the teacher, allowing them to allocate those limited resources to more positive and productive processes that facilitate learning, such as building teacher-student and student-student relationships and providing meaningful instructional support to all students (Aloe, Shisler, Norris, Nickerson, & Rinker, 2014; Hoglund, Klingle, & Hosan, 2015; Jennings,

Frank, Snowberg, Coccia, & Greenberg, 2013; Merritt, Wanless, Rimm-Kaufman, Cameron, & Peugh, 2012; Pianta, Downer, & Hamre, 2016). Teachers may be able to take a proactive approach to fostering a healthy classroom climate by building children's prosocial and emotion-regulation behaviors, given that children's mindsets and behaviors are essential markers of a healthy classroom climate (Baker et al., 2003). However, there are gaps in the current literature regarding whether the adoption of an SEL program results in improvements in classroom climate.

Current Gaps in the Research

Currently there are few open-access, brief measures of classroom climate for use in early elementary settings. Many instruments assess classroom climate within the broader construct of school climate (e.g., Anderson, 1982; Jones & Shindler, 2009; Voight & Hanson, 2012). And not only do many of the available classroom climate assessment tools cost money, many were developed for use in upper elementary and secondary school settings and rely predominantly on student-report, such as the Classroom Climate Assessment Instrument (Alliance for the Study of School Climate, 2004), the Classroom Climate Measurement Model (Sriklaub, Wongwanich, & Wiratchai, 2014), the Panorama Student Survey (Panorama Education, 2014), and the Tripod student surveys (Tripod, 2017). The classroom climate assessment tools that are available for early elementary settings are often time-consuming and/or require additional personnel to conduct observations or interviews, such as the Classroom Assessment Scoring System (CLASS; Pianta, La Paro, & Hamre, 2008) and the Classroom Observation Assessment Tool (Leff et al., 2011), which limits their feasibility.

Because the majority of assessment instruments were designed for upper elementary and secondary school settings and many of the available instruments for early elementary settings are time-consuming and expensive in terms of resources (e.g., personnel, training, etc.), previous research predominantly focused on the relationship between classroom climate and student outcomes for older students (e.g., Gasser, Grütter, Buholzer, Wettstein, 2017; Mitchell & Bradshaw, 2013; National Institute of Child Health and Human Development [NICHD], 2005; Pierce, 1994; Reyes et al., 2012; Turner et al., 2002; Walberg, 1968; Walberg & Anderson, 1968). Available research on the relationship between classroom climate and student outcomes in early elementary settings shows promise (e.g., Broekhuizen, Mokrova, Burchinal, & Garrett-Peters, 2016; Buyse et al., 2009; Kiuru et al., 2012) but more research is needed. This is especially important given that students' early education experiences lay the foundation and set the trajectory for future educational outcomes (Burchinal, Peisner-Feinberg, Pianta, & Howes, 2002; Campbell et al., 2002; Davison, Seo, Davenport, Butterbaugh, & Davison, 2004; Hamre & Pianta, 2005; Pianta et al., 2008).

Finally, the link between teachers' perceptions of classroom climate and early elementary students' social-emotional outcomes is unclear because there is limited research examining the relationship at the early elementary level. Similarly, within the broader social-emotional learning (SEL) movement, it is unclear whether undertaking the implementation of a social-emotional learning curriculum results in improved perceptions of classroom climate of teachers because there is limited research. Together, these gaps in the current literature necessitate research that explores the creation or adaptation of

classroom climate measures to the early elementary context, as well as examines classroom climate as both a predictor of student outcomes and an outcome of specific school-wide implementation efforts (e.g., adopting and delivering an SEL curriculum).

Purpose of the Study

The overarching purpose of this study was to examine the structural validity of an open access, relatively brief teacher-completed classroom climate measure. To accomplish this, a confirmatory factor analysis of the My Class Inventory – Short Form for Teachers (TMCI-SF) measure of classroom climate was conducted to examine the structural validity of the measure when used with early elementary teachers. The TMCI-SF is a 30-item Likert-scale questionnaire that measures teachers' perceptions of five dimensions of the classroom environment: Satisfaction, Friction, Competitiveness, Difficulty, and Cohesiveness. Previous research on the MCI-SF and TMCI-SF indicated adequate evidence of psychometric properties and practical utility (Fraser, 1998; Fraser, Anderson, & Walberg, 1982; Sink & Spencer, 2005; Sink & Spencer, 2007). The secondary aim of this study was to examine evidence of the convergent validity of the TMCI-SF by investigating the relationship between the revised TMCI-SF scales and measures of students' social, emotional, and behavioral wellbeing. Last, this study treated classroom climate as an outcome to examine whether it improved as a result of adopting and delivering an SEL curriculum (i.e., the *Second Step*®; Committee for Children).

Based on the purpose of this study, the following research questions and hypotheses were examined:

Research Question #1. To what extent is the My Class Inventory – Short Form for Teachers (TMCI-SF) a structurally valid measure of teachers' perceptions of classroom climate?

Hypothesis #1. The revised My Class Inventory – Short Form for Teachers (TMCI-SF) used in the current study will demonstrate similar structural validity to previous forms of the My Class Inventory – Short Form (MCI-SF; Fraser et al., 1982; Mariani et al., 2015; Sink & Spencer, 2005) and My Class Inventory – Short Form for Teachers (TMCI-SF; Sink & Spencer, 2007; Villares et al., 2016).

Research Question #2. To what extent do teacher responses on the My Class Inventory – Short Form for Teachers (TMCI-SF) predict students' strengths and weaknesses, as measured by the Devereaux Student Strengths Assessment (DESSA), Strengths and Difficulties Questionnaire (SDQ), and direct observations by trained personnel?

Hypothesis #2. Teacher responses on the My Class Inventory – Short Form for Teachers (TMCI-SF) will adequately predict students' strengths and weaknesses.

Research Question #3. To what extent does the implementation of a social-emotional learning curriculum (*Second Step*®) impact teacher report of classroom climate?

Hypothesis #3. Implementation of the *Second Step*® social-emotional learning curriculum will have a statistically significantly impact on teacher report of classroom climate.

Chapter 2: Literature Review

There is a long history of interest in climate as an indicator of the health and functioning of a school (Anderson, 1982; Thapa, Cohen, Guffey, & Higgins-D'Alessandro, 2013; Wang & Degol, 2016). However, recent federal and state law, such as the Every Student Succeeds Act (ESSA; 2015) and Minnesota's Safe and Supportive Schools Act (2014), have increased focus and placed positive climate at the forefront of intentional efforts to improve students' and teachers' educational experiences and outcomes. Whereas some researchers and educators focus more broadly on school-level climate (e.g., McNeely, Nonnemaker, & Blum, 2002; Thapa, Cohen, Guffey, & Higgins-D'Alessandro, 2013), others recognize the importance of classroom-level climate and its symbiotic relationship with students' social, emotional, and behavioral, and academic wellbeing. The purpose of this chapter is to provide an overview of the current literature base that builds the significance for this dissertation study. Specifically, the literature review will focus on school climate research and the call to evaluate climate as an important nonacademic indicator of student performance. Then, the importance of evaluating classroom-level climate is discussed, including an overview of current measures of classroom climate and the challenges they present to sustainable use by educators. Finally, there is a brief discussion about social-emotional learning and the potential to improve early elementary school teachers' perceptions of classroom climate through intentional efforts to improve early elementary students' social, emotional, and behavioral competence.

School Climate

Despite its long history (Anderson, 1982; Thapa et al., 2013), school climate research is constantly evolving. School climate is a complex, multidimensional construct (Cohen, McCabe, Michellie, & Pickeral, 2009; Gage, Larson, Sugai, & Chafouleas, 2016) that can be examined at the school, classroom, and individual levels, and there is no widely accepted operational definition, essential assessment elements, or most effective improvement process among researchers, educators, or policymakers (Thapa, 2013). Despite its multi-level nature and the lack of unified consensus on the construct of school climate, there is considerable evidence to indicate a positive relationship between indicators of school climate and school improvement efforts (Anderson, 1982; Thapa et al., 2013).

Generally speaking, climate refers to the perceptions of members of a given organization or setting regarding how they attach meaning to the events, policies, practices, and procedures they experience and the behaviors they see being rewarded, supported, and expected (Ehrhart, Schneider, & Macey, 2014). Extending this construct to education, school climate has been defined as the "beliefs, values, and attitudes that shape interactions between students, teachers, and administrators and set the parameters of acceptable behavior and norms for the school" (Mitchell & Bradshaw, 2013, p. 600). Broadly, school climate represents staff and students' perceptions of the overall quality and character of life within the school setting (Anderson, 1982; National School Climate Center [NSCC], 2018), and it represents the meaning students and school personnel attach to their individual and shared experiences in school (Thapa et al., 2013). While

there is variability in the specific indicators articulated in research and measures of school climate (e.g., Anderson, 1982; NSCC, 2018; Thapa et al., 2013; Wang & Degol, 2016), four common dimensions are typically assessed when measuring school climate: sense of safety, interpersonal relationships (e.g., connection and belonging), teaching and learning, and physical aspects of the environment (Cohen et al., 2009; NSCC, 2018; Thapa et al., 2013).

Cohen and colleagues (2009), as well as the National School Climate Center (2018), characterize sense of safety as both physical safety and social-emotional safety and emphasize the importance of consistent rules and norms that are clearly communicated to students, families, and school personnel. The interpersonal relationships domain, which measures the extent to which students and school personnel feel a sense of connection and belonging, include perceptions of respect for diversity and the level of social support students receive from both adults and peers in the school setting, as well as school personnel's feelings of collegiality and administrative support. The teaching and learning domain of school climate is comprised of the quality of instruction, support for learning, and the extent to which social-emotional and civic learning are valued along with academic learning, and the physical aspects of the environment include the cleanliness and aesthetic quality of the school setting, as well as adequate access to appropriate resources and materials (e.g., school and class size, curricula, etc.). Although individual indicators may vary across measures, most tools evaluate perceptions of these four domains in order to evaluate overall perceptions of school climate (Anderson, 1982; Cohen et al., 2009; NSCC, 2018; Thapa et al., 2013; Wang & Degol, 2016).

No Child Left Behind's (NCLB; 2001) emphasis on accountability systems and quantifying school's adequate yearly progress (AYP) motivated policymakers, researchers, and educators to examine new ways to improve students' academic achievement, including an increased focus on improving school climate (Cohen et al., 2009). Consequently, the Every Student Succeeds Act (ESSA; 2015), which required at least one nonacademic indicator of student performance in addition to academic achievement, explicitly included school climate as a potential criteria to be measured. A healthy school climate is an essential factor for effective school reform because context matters (Baker, Dilly, Aupperlee, & Patil, 2003; Masten & Coatsworth, 1998; Wilson, Pianta, & Stuhlman, 2007). Given the flaws in using standardized test scores alone to evaluate teacher effectiveness and students' educational outcomes (Elias, White, & Stepney, 2014), it makes intuitive sense for schools to adopt a data-driven process to promote prosocial educational practices that create an environment where students and school personnel can be most effective and successful.

Intentional efforts to improve school climate have been adopted as a means to "increase student learning and achievement, enhance school connectedness, reduce high school dropout rates, prevent bullying and other forms of violence, and enhance teacher retention rates" (Thapa, 2013, p. 1). For example, School-Wide Positive Behavior Interventions and Supports (SWPBIS), which has been implemented in over 25,000 schools nationwide (U.S. Office of Special Education Program [OSEP], 2018), is associated with improved teacher perceptions of organizational health and resource allocation, as well as improved school connectedness, prosocial behavior, social-

emotional functioning, and academic engagement for students (Bradshaw, Koth, Bevans, Ialongo, & Leaf, 2008; Bradshaw, Koth, Thornton, & Leaf, 2009; Bradshaw, Waasdorp, & Leaf, 2015; Waasdorp, Bradshaw, & Leaf, 2012). Moreover, efforts to reduce exclusionary discipline within schools has resulted in improvements in school climate indicators such as sense of belonging to school (Cook et al., 2018). The results of decades of research indicate that there is a strong positive relationship between the school climate and student and teacher outcomes (Anderson, 1982; Berg & Cornell, 2016; Brookover et al., 1978; Cohen et al., 2009; Gage et al., 2016; Koth, Bradshaw, & Leaf, 2008; Kuperminc et al., 1997; Thapa, 2013; Thapa et al., 2013; Wang & Degol, 2016).

School Climate and Student Outcomes

Research consistently links school climate to a number of meaningful student outcomes. For example, in both elementary (Berkowitz, Moore, Astor, & Benbenishty, 2017; Brookover et al., 1978; Goddard, Sweetland, & Hoy, 2000; Lee & Shute, 2010) and secondary school settings (Berkowitz et al., 2017; Hoy, Tarter, & Hoy, 2006; Lee & Shute, 2010; Ma & Wilkins, 2002), positive school climate has been linked to higher academic achievement, and negative school climate has been associated with lower GPA scores (Wang et al., 2014). In addition, school climate has been linked to the racial achievement gap that continues to plague the United States (Voight, Hanson, O'Malley, & Adekanye, 2015), as well as mediates the effects of socioeconomic status (SES) on academic achievement (Berkowitz et al., 2017; Brookover et al., 1978). Berkowitz and colleagues noted the importance of academic support, greater school engagement, and more positive teacher-student relationships when examining the relationship between

school climate and academic achievement and suggested that "[positive] climates provide an additive value to academic achievement beyond the negative contribution of poor SES background" (p. 28).

School climate has also been linked to student behavior. In a healthy school climate, upper elementary students are likely to demonstrate fewer problem behaviors (McEvoy & Welker, 2000; O'Brennan, Bradshaw, & Furlong, 2014) and secondary students are likely to demonstrate less disruptive behavior (Wang, 2009) and less school aggression (Kuperminc, Leadbeater, Emmons, & Blatt, 1997; Reis, Trockel, & Mulhall, 2007). Similarly, both elementary and secondary schools with perceived healthy school climate report fewer office discipline referrals (Gage et al., 2016), and secondary schools report lower suspension rates (Gregory, Cornell, & Fan, 2011). In secondary school settings, school climate has also been linked to bullying and peer victimization (Cornell, Shukla, & Konold, 2015; Gage, Prykanowski, & Larson, 2014; Gower, McMorris, & Eisenberg, 2015), as well as overall school violence (Berg & Cornell, 2016; Cohen et al., 2009). Importantly, intentional efforts to improve school climate have been associated with less bullying and peer victimization (Bosworth & Judkins, 2014).

Positive school climate has also been associated with higher levels of reported psychosocial wellbeing for both elementary (Lester & Cross, 2015) and secondary school students (Kuperminc, Leadbeater, & Blatt, 2001; Lester & Cross, 2015) and may be a protective factor that promotes healthy development and optimal learning (Haynes, 1998; Kuperminc et al., 1997). Secondary school students report improved self-esteem and self-concept (Roeser, Midgley, & Urdan, 1996; Wang & Eccles, 2013). There is also a

positive relationship between school climate and secondary school student engagement and motivation (Patrick, Ryan, & Kaplan, 2007; Pellerin, 2005; Ryan & Patrick, 2001; Wang & Eccles, 2013), as well as reported school satisfaction and connectedness (Baker et al., 2003). Moreover, lower levels of student-reported risky behaviors (e.g., drug use, violence, suicidal thoughts and behaviors, etc.) have been linked to secondary students' positive perceptions of school climate (Cornell & Huang, 2016).

Measuring School Climate

Most researchers agree that school climate should be measured using a multi-perspective approach that includes self-reports gathered from students, school personnel, and families in order to evaluate their perceptions about different aspects of their school experience (Berkowitz et al., 2017). Similarly, school climate can be evaluated at the school-wide, classroom, and individual level. A multi-perspective, multi-level approach to evaluating school climate provides researchers, educators, and policymakers with a significant amount of data that can be used for a multitude of purposes, including data-driven continuous improvement efforts, program evaluation, and accountability decisions. In fact, systematically and continually measuring perceptions of school climate can be a powerful tool as educators continue to seek a better understanding of the myriad factors that influence student performance and overall educational outcomes (Cohen et al., 2009).

The current literature base indicates that school climate is an important factor for efforts to promote equitable student outcomes and overall quality of experiences in schools (Berg & Cornell, 2016; Berkowitz et al., 2017; Brookover et al., 1978; Cohen et

al., 2009; Gage et al., 2016; Gregory, Cornell, & Fan, 2011). However, it is also important to measure and examine climate at the classroom-level to capture teachers' and students' perceptions of experiences in the classroom setting that are linked to student performance. This is especially true given that the classroom is the most proximal environment within which instructional and learning processes occur.

Classroom Climate

Like school climate (Cohen et al., 2009; Gage et al., 2016), classroom climate is a complex, multidimensional construct that has been conceptualized and measured a number of different ways (Evans, Harvey, Buckley, & Yan, 2009; Fraser, 1989; Fraser, 1998). With more than five decades of research (e.g., Fraser, 1989; MacAuley, 1990; Walberg, 1968; Walberg & Anderson, 1968), there is a significant amount of literature to support the existence of a relationship between teachers' and students' perceptions of classroom climate and students' educational outcomes (e.g., Frenzel, Pekrun, & Goetz, 2007; Hamre & Pianta, 2005; Kiuru et al., 2012; Neitzel & Connor, 2017). However, there is no widely established measure of classroom climate nor one that is free, brief, and psychometrically sound for use as part of everyday practice in schools. Given the absence of a widely established tool, researchers have used a number of different tools to measure classroom climate, most of which have limited practical use because they are often expensive and/or burdensome with regard to time, which impacts their likely adoption and sustained use over time (Fisher & Fraser, 1985; Fraser, 1989, 1998). Without a measure of classroom climate that is both feasible (free, brief, and easy to use) and psychometrically sound, it is unlikely that educators will systematically gather data

on classroom climate to inform data-driven continuous improvement efforts to enhance classroom experiences that promote better outcomes.

Broadly, classroom climate refers to the perceptions of different aspects of the learning environment, including interactions among students, engagement in learning, and teacher-student relationships. It is fundamentally dependent on the patterns of teachers' and students' experiences within the classroom and their feelings toward those experiences (Adelman & Taylor, 2005; Barr, 2016; Evans et al., 2009). The degree to which students feel connected to, engaged by, and supported within the learning environment is often considered an essential component of the quality of the classroom climate (Barr, 2016; Brand et al., 2003; Matsumura, Slater, & Crosson, 2008).

Theoretical Foundations

Although it is important for policymakers, researchers, and educators to consider the implications of school climate on educational outcomes (Anderson, 1982; Koth, Bradshaw, & Leaf, 2008; Thapa et al., 2013), it is also important to consider the implications of classroom climate on educational outcomes because the classroom is the most proximal environment within which children learn and develop at school. Both Bronfenbrenner's (1977) ecological systems theory and Bandura's (1986, 1989) social cognitive theory emphasize the role that the immediate environment plays in human development and the various ways in which behaviors manifest and evolve. More specifically, both theories emphasize the ways in which interpersonal relationships and interactions influence an individual's development and sense of personal agency. Furthermore, attribution theory (Kelley & Michela, 1980) emphasizes the importance of

the meanings students and teachers attach to their experiences in the classroom and how those experiences can be influenced by social structures (Cialdini & Goldstein, 2004). From a developmental perspective, classroom climate may be particularly important for elementary students who spend most of their time in the same classroom with the same teacher and group of peers. The classroom climate likely has a more direct impact on students' engagement in the learning process as well as their social, emotional, behavioral, and academic performance compared to the broader school climate.

Outcomes Associated with Classroom Climate

Healthy classroom climates are characterized by positive teacher-student interactions, respectful interactions among peers, and supportive yet challenging learning experiences, whereas unhealthy classroom climates are typically characterized by social conflict and a sense of disorganization (Anderson, Hamilton, & Hattie, 2003; Wilson, Pianta, & Stuhlman, 2007). Teachers' and students' perceptions of classroom climate have been linked to a number of positive social outcomes. For example, perceptions of a healthy classroom climate are associated with higher-quality teacher-student relationships in both elementary (Gasser, Grütter, Buholzer, & Wettstein, 2017; Hamre & Pianta, 2005; Michell & Bradshaw, 2013; Montague & Rinaldi, 2001) and secondary (Allen et al., 2013;) school settings, as well as prosocial peer relationships in elementary (Broekhuizen et al., 2013; Hoglund & Leadbeater, 2004; Werthamer-Larsson, Kellam, & Wheeler, 1991) and secondary (Matsumura et al., 2008) school settings. In addition, classroom climate can act as a protective factor against bullying, peer rejection, and victimization in elementary schools (Kiuru et al., 2012; Leff et al., 2011)

Classroom climate has also been linked to students' emotional wellbeing. For example, students' perceptions of a healthy classroom climate have been associated with increases in positive emotions (e.g., enjoyment) and reductions in negative emotions (e.g., anxiety, depression, anger, etc.) for both elementary (Gazelle, 2006) and secondary school students (Frenzel et al., 2007). Secondary students also experience increased motivation and engagement in healthy classroom climates (Anderson et al., 2003; Danielsen, Wiium, Wilhelmsen, & Wold, 2010; Reyes et al., 2012; Ruzek et al., 2016; Shim, Kiefer, & Wang, 2013; Turner et al., 2002). Similarly, elementary (Ladd, Birch, & Buhs, 1999; Montague & Rinaldi, 2001) and secondary (Danielsen et al., 2010; Matsumura et al., 2008; Pierce, 1994) school students exhibit increased participation and classroom connectedness and experience improved self-efficacy in healthy classroom climates.

Students in healthier classroom climates also demonstrate better behavioral regulation. For example, secondary school students exhibit fewer avoidant behaviors when presented with difficult academic tasks (Shim et al., 2013; Turner et al., 2002). In elementary school settings, there are fewer reported disruptive and aggressive behaviors in healthy classroom climates (Broekhuizen et al., 2016; Hoglund, Klingle, & Hosan, 2015; Hoglund & Leadbeater, 2004; Koth et al., 2008; Werthamer-Larsson et al., 1991; Wilson et al., 2007), as well as improved self-regulation (Neitzel & Connor, 2017).

In addition to student outcomes, there are several teacher outcomes associated with positive perceptions of classroom climate. For example, positive classroom climates are associated with reduced stress and teacher burnout (Aloe et al., 2014; Berg & Cornell,

2016; Hoglund, Klingle, & Hosan, 2015). Similarly, teachers experience greater job satisfaction and self-efficacy in positive classroom climates (Collie, Shapka, & Perry, 2012), as well as improved teacher-student relationships (Holzberger, Philip, & Kunter, 2014). Additionally, there appears to be a significant relationship between teacher self-efficacy, classroom climate, and student outcomes (Zee & Koomen, 2016). Overall, positive perceptions of classroom climate benefit both students and teachers across multiple educational and professional outcomes.

Classroom Climate in Early Elementary School

Early elementary school classrooms present a vital opportunity for educators to provide students with a strong foundation from which to build their social, emotional, behavioral, and academic wellbeing. Developmental science has identified birth to age eight as a critical period for development and learning (Kauerz, 2013; Kauerz & Coffman, 2013). As a result, there has been increased interest among researchers, policymakers, and educators to provide children with high-quality educational experiences in prekindergarten through third grade in order to put them on a positive trajectory for later educational success (Alexander, Entwisle, Blyth, & McAdoo, 1988; Burchinal, Peisner-Feinberg, Pianta, & Howes, 2002; Campbell et al., 2002; Davison, Seo, Davenport, Butterbaugh, & Davison, 2004; McClelland, Acock, & Morrison, 2006; Pianta, Belsky, Vandergrift, Houts, & Morrison, 2008). In fact, Alexander and colleagues (1988) acknowledged that “the early grades may be precisely the time that schools have their strongest effects” (p. 144), especially considering education is a cumulative process (Pianta, Downer, & Hamre, 2016). Therefore, it is especially important to examine

children's experiences in early elementary school classrooms in order to create conditions for all students to form a positive attitude toward and perception of the learning process. However, measurement of climate during the early childhood years, including early elementary school, is challenging because young children are not as accurate reporters of their internal thoughts and feelings in response to their environments as older children are (Durbin, 2010; Jaaniste, Noel, & von Baeyer, 2016; Ladd & Mars, 1986; Stanford, Chambers, & Craig, 2006).

Measurement of Classroom Climate

Because of the increased interest in climate and its relationship to students' educational outcomes, researchers have developed a number of instruments to assess classroom climate. However, the complex, multidimensional nature of the classroom climate construct can present challenges to researchers and educators who want to systematically and sustainably measure perceptions of classroom climate. Many of the measurement tools are intended for use in secondary school settings, are too time-consuming because they have too many items or require additional trained personnel, and/or cost money to use or score, all of which can present barriers to their systematic and sustainable use in educational settings.

Questionnaires. Arter (1987) and Fraser (1998) reviewed several questionnaires intended to measure teacher and student perceptions of the classroom climate. Of the eleven questionnaires reviewed by Arter and Fraser, only two were developed for use at the primary school level (My Class Inventory and Questionnaire on Teacher Interaction) whereas the other nine were intended for secondary school or higher education settings.

Four of the eleven questionnaires had fewer than 40 items, whereas the other seven questionnaires range from 48 items to 300 items. Two of the questionnaires were developed for very specific classroom environments. Specifically, the Science Laboratory Environment Inventory was developed for use in science laboratories and the Constructive Learning Environment Survey was developed for use in classroom settings that adopt and use constructivist learning strategies.

More recently, additional questionnaires have been developed to measure perceptions of classroom climate, but most are time-consuming and expensive or intended for use in secondary schools exclusively. For example, the Classroom Climate Assessment Instrument (Alliance for the Study of School Climate, 2004), which has 39 items, and the Tripod student survey (Tripod, 2017), which has more than 40 items, both cost money for schools to use and to score. Similarly, the Panorama Student Survey (Panorama Education, 2014), which includes 101 items about the classroom for students in secondary school and 88 items for students in upper elementary school in addition to 26 open-ended questions about the classroom and 14 open-ended questions about the school, costs for educators and schools to use and to score. The Responsive Environmental Assessment for Classroom Teaching (REACT; Nelson, Demers, & Christ, 2014) has 39 items but costs money as it is embedded in the Formative Assessment System for Teachers (FAST). And the Social and Emotional Health Survey for Secondary Students (Furlong, You, Renshaw, Smith, & O'Malley, 2014), which includes 36 items, is exclusively intended for use in secondary schools with adolescents.

As previously mentioned, most of the questionnaires currently available are intended for use in secondary schools. More importantly, the two questionnaires intended for use in primary schools have only been validated for use with upper elementary school students (Fraser, 1998; Sink & Spencer, 2005, 2007; Villares, Mariani, Sink, & Colvin, 2016). Considering the importance of children's early education experiences (Alexandar et al. 1988; Kauerz, 2013; Kauerz & Coffman, 2013), it is important to establish psychometrically sound options for use in early elementary school settings that are both time- and cost-efficient.

Observation tools. Most of the available classroom observation tools are intended for use in elementary school settings (Leff et al., 2011; Pianta, La Paro, & Hamre, 2008; Tapp & Fiel, 1991; Tapp, Wehby, & Ellis, 1995). Specifically, the Multi-Option Observation System for Experimental Studies (MOOSES; Tapp et al., 1995), which is completed by trained observers to code the specific classroom behaviors and activities of a target child, is intended for use with early elementary school students. The Classroom Assessment Scoring System (CLASS; Pianta et al., 2008), which focuses on three domains of behavior (emotional support, classroom organization, and instructional support), is intended for use in early childhood education settings, elementary school settings, and secondary school settings; however, trainings are expensive and observations are considerably time-consuming (Teachstone Training, 2018). Finally, the Classroom Observation Assessment Tool (Leff et al., 2011) is intended for use in upper elementary school classrooms.

Direct observation tools are often considered to be an objective way to evaluate children's behaviors in the classroom. However, one significant drawback of observation techniques is that they require additional training of personnel, which can be both time-consuming and costly for schools to invest in. Another drawback of observation techniques is that the outside observer may misinterpret unimportant interactions or events as important or, conversely, may miss an important interaction or event (Fraser, 1998). Because they are capturing in-the-moment events, objective observers may not accurately capture the overall patterns of teachers' and students' experiences within the classroom and their feelings toward those experiences. Students' and teachers' perceptions of the patterns of interactions and events are essential because how they make meaning of and feel about experiences can impact students' classroom performance and the relationships that are formed among students and between students and teachers.

My Class Inventory. The My Class Inventory (MCI; Fisher & Fraser, 1981; Fraser, Anderson, & Walberg, 1982; Fraser & O'Brien, 1985) is a simplified version of the Learning Environment Inventory (Fraser et al., 1982; Walberg & Anderson, 1968). The MCI has consistently demonstrated adequate psychometric properties when used to evaluate the classroom climates in upper elementary and secondary school settings with both teacher- and student-responses (Arter, 1987; Fisher & Fraser, 1985; Fraser et al., 1982; Mariani, Villares, Sink, Colvin, & Kuba, 2015; Sink & Spencer, 2005, 2007; Villares et al., 2016). Research on the My Class Inventory – Short Form for Teachers (TMCI-SF) indicates that it is a psychometrically appropriate accountability tool for use in upper elementary school settings with school counselors (Sink & Spencer, 2005,

2007). However, there is minimal research on the use of the TMCI-SF in early elementary school settings (i.e., kindergarten through second grade) and its psychometric properties when used with teachers exclusively, as opposed to examining the impact of the school counselor on perceptions of the classroom climate.

Social-Emotional Learning

An increasingly growing literature base consistently emphasizes the importance of age-appropriate social-emotional competence for all students to be successful in school and beyond (Agostin & Bain, 1997; Durlak, Weissberg, Dymnicki, Taylor, & Schellinger, 2011; Greenberg et al., 2003; Jones, Greenberg, & Crowley, 2017; Payton et al., 2008; Zins, Bloodworth, Weissberg, & Walberg, 2007). Early education teachers also reinforce the importance of students' social-emotional competence and often cite social-emotional skills as more important than academic mastery in early childhood education and early elementary school education (Lara-Cinisomo, Fuligni, Ritchie, Howes, & Karoly, 2008; Lewit & Baker, 1995; Lin, Lawrence, & Gorrell, 2003; Rimm-Kaufmann, Pianta, & Cox, 2001). As a result, there has been growing interest in developing, implementing, and measuring the results of social-emotional learning programs that explicitly teach and reinforce students' social, emotional, and behavioral development (e.g., Collaborative for Academic, Social, and Emotional Learning [CASEL], 2013).

CASEL (2018) defines social-emotional learning (SEL) as the "process through which children and adults acquire and effectively apply the knowledge, attitudes, and skills necessary to understand and manage emotions, set and achieve positive goals, feel and show empathy for others, establish and maintain positive relationships, and make

responsible decisions." Early elementary students' mastery of important social-emotional skills, such as emotion-regulation, behavioral control, and interpersonal skills, facilitate the development of learning-related behaviors that are necessary for students to be successful in the classroom (Denham, 2006; Hemmeter, Ostrosky, & Fox, 2006; McClelland, Morrison, & Holmes, 2000; Morgan, Farkas, Hillemeir, & Maczuga, 2009; Zins & Elias, 2007). These essential social-emotional skills have been linked to a number of educational outcomes, including academic achievement (Becker & Luther, 2002; Greenberg et al., 2003; Jones et al., 2015; McClelland et al., 2000; McClelland et al., 2006; McClelland et al., 2007; Payton et al., 2008; Wentzel & Caldwell, 1997), grade promotion and retention (Agostin & Bain, 1997; Jones et al., 2015), psychosocial wellbeing (Gower et al., 2015; Greenberg et al., 2003; Jones et al., 2015; Mainhard, Oudman, Hornstra, Bosker, & Goetz, 2017; Payton et al., 2008; Wentzel & Caldwell, 1997), and disciplinary experiences (Gasser et al., 2017; Payton et al., 2008). Importantly, these social-emotional skills are also essential to cultivate a healthy classroom climate.

Social-Emotional Competence and Classroom Climate

Although the link between teachers' perceptions of classroom climate and early elementary students' social-emotional outcomes is unclear, it is reasonable to expect that undertaking the implementation of a SEL curriculum may result in teachers' improved perceptions of classroom climate due to increased capacity to meet the needs of students and improved classroom behavior and functioning among students. There is a symbiotic relationship between students' social-emotional and behavioral characteristics and the

classroom climate because children's mindsets and behaviors are essential markers of a healthy classroom climate (Baker et al., 2003; Evans et al., 2009). Furthermore, learning is a relational process that requires children to engage appropriately with their teacher as well as their classmates (Thompson & Happold, 2002; Zins et al., 2007). Therefore, it is likely that as early elementary students develop social-emotional competence, teachers will experience and perceive a healthier classroom climate overall.

Not only does implementation of an SEL program reduce students' disruptive behaviors (Morris, Millenky, Raver, & Jones, 2013), it provides teachers with the necessary knowledge, skills, and resources to reinforce students' prosocial behaviors and manage disruptive behaviors when they occur (Morris et al., 2013; Pianta et al., 2016; Raver et al., 2011). Successful implementation of an SEL program ensures that teachers can focus on whole-classroom dynamics rather than allocating excessive cognitive and emotional resources to individual students who are struggling to meet classroom norms and expectations. With less time spent responding to and correcting disruptive behaviors, teachers are able to spend more time providing additional and/or individualized instruction to their students (Pianta et al., 2008).

Second Step® is a widely adopted social-emotional curriculum developed by the Committee for Children that emphasizes explicit instruction to help children develop the social and emotional skills they need to be successful both in and out of the classroom. Specifically, the *Second Step*® curriculum focuses on teaching children how to "understand and manage their emotions, control their reactions, be aware of others' feelings, problem-solve, and make responsible decisions" (Committee for Children,

2015). Additionally, the program provides students with opportunities to practice newly acquired skills using fun and engaging activities, as well as opportunities to receive appropriate reinforcement when they exhibit those skills in the classroom setting.

Studies indicate that the *Second Step*® social-emotional learning curriculum increases children's social skills and emotion regulation so they are better able to respond to and interact with both adults and peers alike. Many of the behaviors emphasized by the *Second Step*® curriculum are associated with improved perceptions of classroom climate, such as increases in cooperative behavior (Cooke et al., 2007; Edwards, Hunt, Meyers, Grogg, & Jarrett, 2005; Frey, Nolen, Edstrom, & Hirschstein, 2005) and decreases in disruptive and problematic behavior (Frey, Hirschstein, & Guzzo, 2000; Grossman et al., 1997; Neace & Munoz, 2012). Moreover, there appears to be a positive relationship between increases in social-emotional competence and perceptions of classroom climate (Frey & Sylvester, 1997).

Gaps in Current Research

Currently, there is limited research on classroom climate at the early elementary level. This is due in large part to the dearth of instruments available for use in early elementary school that are both psychometrically sound and feasible (i.e., cost- and time-efficient). Furthermore, the link between teachers' perceptions of classroom climate and early elementary students' social-emotional outcomes is unclear, as well as whether undertaking the implementation of a social-emotional learning curriculum results in improved teacher perceptions of classroom climate. These gaps in the current literature indicate a need for research on psychometrically sound and feasible measures of

classroom climate in early elementary school, as well as research that contributes to the literature base on social-emotional learning as a way to promote positive perceptions of classroom climate.

Purpose of the Study

The primary goal of this study is to confirm the structural validity of the My Class Inventory – Short Form for Teachers (TMCI-SF) when used with elementary teachers. Contingent on the demonstrated structural validity of the TMCI-SF, the secondary goal of this study aims to examine evidence of the predictive power of the TMCI-SF. The third purpose of this study aims to treat classroom climate as an outcome influenced by the adoption and delivery of a social-emotional learning curriculum (*Second Step*®). Based on the three purposes of this study, the following research questions will be examined: (1) To what extent is the TMCI-SF a structurally valid measure of teachers' perceptions of classroom climate? (2) To what extent do teacher responses on the TMCI-SF predict students' strengths and weaknesses, as measured by the Devereaux Student Strengths Assessment – *Second Step*® Edition (DESSA-SSE), Strengths and Difficulties Questionnaire (SDQ), and direct behavior observations? and (3) To what extent does the implementation of a social-emotional learning curriculum (*Second Step*®) impact teacher report of classroom climate?

Chapter 3: Method

The proposed study represents secondary data analysis using data from a large-scale 61 school randomized controlled trial of a social-emotional learning curriculum. The purpose of this study is to examine the structural and predictive validity of the My Class Inventory – Short Form for Teachers (TMCI-SF) and examine whether classroom climate improves as a result of adopting and delivering the *Second Step*® social-emotional learning curriculum. This section describes the larger study and dataset, including participant recruitment and demographics, research design and procedures, and data collection process and measures used. In addition, the proposed statistical analyses for each research question are explained.

Setting and Participants

The current study included students in kindergarten through second grade enrolled in six school districts in both Arizona (one district) and Washington state (five districts). School districts ranged from rural to urban settings and were recruited in spring 2012 after approval from the Institutional Review Board (IRB). Participating school districts, teachers, and parents of students provided passive consent to participate in accordance with IRB procedures and district policies.

Recruitment and retention. The Washington state site recruited and retained the participation of 41 schools across the five school districts. An average of six classrooms per school were randomly selected to participate in data collection. A total of 224 teachers agreed to participate and passive parental consent was obtained for 4,891 students. The Arizona site recruited and retained participation of 20 schools from the Mesa School District. An

average of five classrooms per school were randomly selected to participate in data collection. A total of 97 teachers agreed to participate and passive parental consent was obtained for 2,409 students. Approximately one percent (1%) of parents declined across both sites.

Table 1

Child-level sample descriptive information at Time 1 (T1)

Variable	Control n (%)	Treatment n (%)	Total Sample (%)
Total students	3692	3727	7419
Grade			
Kindergarten	1482 (40.1)	1653 (44.4)	3135 (42.3)
First grade	1991 (53.9)	1863 (50.0)	3854 (51.9)
Second grade	219 (5.9)	211 (5.7)	430 (5.8)
Sex			
Male	1772 (48.0)	1788 (48.0)	3560 (48.0)
Female	1657 (44.9)	1704 (45.7)	3361 (45.3)
Missing	263 (7.1)	235 (6.3)	498 (6.7)
Race			
Caucasian/White, non-Hispanic	1137 (30.8)	1542 (41.4)	2679 (36.1)
Asian	368 (10.0)	333 (8.9)	701 (9.4)
Black or African American	232 (6.3)	212 (5.7)	444 (6.0)
Hispanic or Latino/a	908 (24.6)	761 (20.4)	1669 (22.5)
Native American	86 (2.3)	123 (3.3)	209 (2.8)
Native Hawaiian or Pacific Islander	25 (0.7)	46 (1.2)	71 (1.0)
More than one race	196 (5.3)	183 (4.9)	379 (5.1)
Missing	740 (20.8)	527 (14.1)	1267 (17.1)
Student Special Education Status			
Not in special education	2418 (65.5)	2524 (67.7)	4942 (66.6)
Special education	321 (8.7)	309 (8.3)	630 (8.5)
Missing	740 (20.8)	527 (14.1)	1267 (17.1)
Student English Language Learner Status			
Not an ELL	2075 (56.2)	2221 (59.6)	4296 (57.9)
ELL student	829 (22.5)	716 (19.2)	1545 (20.8)
Missing	788 (21.3)	790 (21.2)	1578 (21.3)
	Control *M* (*SD*)	Treatment *M* (*SD*)	Total Sample *M* (*SD*)
Age	6.2 (0.7)	6.2 (0.8)	6.2 (0.8)
Number of school days missed	9.0 (7.7)	9.2 (7.7)	9.2 (7.8)

All schools continued in the study from baseline through spring 2013 and only two teachers suspended participation due to health or personal reasons. Specifically, the Washington site maintained the participation of 223 teachers and 4,232 students from fall to spring data collection for an overall student attrition rate of 13%. The Arizona site

maintained the participation of 96 teachers and 2,326 students from fall to spring data collection for an overall student attrition rate of three percent (3%). Attrition primarily resulted from students who transferred out of district or to a non-participating school.

Table 2

Teacher-level sample descriptive information at Time 1 (T1)

Variable	Control n (%)	Treatment n (%)	Total Sample (%)
Total teachers	151	159	310
Site			
Arizona	48 (31.8)	48 (30.2)	96 (31.0)
Washington State	103 (68.2)	111 (69.8)	214 (69.0)
Sex			
Male	9 (6.0)	3 (1.9)	12 (3.9)
Female	142 (94.0)	156 (98.1)	298 (96.1)
Hispanic or Latino/a			
No	142 (94.0)	149 (94.3)	291 (93.9)
Yes	9 (6.0)	9 (5.7)	18 (5.8)
Missing	0	1 (0.7)	1 (0.3)
Race			
Caucasian/White, non-Hispanic	128 (84.8)	143 (92.3)	271 (87.4)
Asian	6 (4.0)	3 (1.9)	9 (2.9)
Black or African American	0	2 (1.3)	2 (0.6)
Native American	1 (0.7)	1 (0.6)	2 (0.6)
Native Hawaiian or Pacific Islander	0	3 (1.9)	3 (1.0)
More than one race	10 (6.6)	3 (1.9)	13 (4.2)
Other	6 (4.0)	0	6 (1.9)
Missing	0	4 (2.6)	4 (1.3)
Highest degree received			
Bachelor's degree	48 (33.8)	64 (42.1)	115 (37.1)
Master's degree	87 (61.3)	85 (55.9)	185 (59.7)
Professional degree	6 (4.2)	3 (2.0)	9 (2.9)
Doctorate degree	1 (0.7)	0	1 (0.3)
Grade(s) taught			
Kindergarten	61 (40.4)	70 (44.0)	131 (42.3)
Kindergarten/First grade split	4 (2.6)	1 (0.6)	5 (1.6)
First grade	75 (49.7)	79 (49.7)	154 (49.7)
First grade/Second grade split	4 (2.8)	2 (1.3)	6 (1.9)
Second grade	7 (4.6)	7 (4.4)	14 (4.5)
	Control *M* (*SD*)	Treatment *M* (*SD*)	Total Sample *M* (*SD*)
Age	42.9 (11.9)	44.3 (12.8)	43.67 (12.38)
Missing	2	5	7
Numbers of years teaching	14.4 (9.4)	15.9 (10.5)	15.19 (10.0)

Student- and teacher-level demographics and descriptive information are displayed in Tables 1 and 2 comparing teachers in the *Second Step*® condition with

teachers in the control condition. The total child sample was N = 7,419 with n = 3,727 students in the *Second Step*® condition and n = 3,692 students in the control condition. There were more kindergarten students and fewer first grade students in the *Second Step*® condition. As a measure of socioeconomic status, 50% of participating students in Washington and 78% of participating students in Arizona received free or reduced-price lunch. The racial and ethnic breakdown of the students was as follows: 45.8% (WA) and 40.1% (AZ) Caucasian, 18.2% (WA) and 0.3% (AZ) Asian, 8.1% (WA) and 5.9% (AZ) African American, 14.7% (WA) and 47.1% (AZ) Latino/a, 1.6% (WA) and 6.3% (AZ) Native American, 1.7% (WA) and 0.3% (AZ) Native Hawaiian or Pacific Islander, 9.9% (WA) and 0% (AZ) reported more than one race, and 20.4% (WA) and 10.1% (AZ) were unknown. According to the U.S. Census Bureau (2011), this sample of students was relatively representative of the racial and ethnic distribution of school-aged children in the United States.

The total teacher sample was N = 310, with n = 159 teachers in the early start (treatment) condition and n = 151 teacher in the delayed start (control) condition. Teachers' average age was 43.78 (*SD* = 12.33) and years of teaching experience was 15.24 (*SD* = 9.97). In regard to racial and ethnic background, 88% identified as Caucasian, 0.6% Black or African American, 2.8% Asian, 0.9% Native Hawaiian or Pacific Islander, 0.6% American Indian or Alaska Native, 4.3% more than one race, and 2.2% other. In addition, 6% of teachers reported that they identified as Hispanic or Latino/a.

Procedures and Design

The study used a large-scale, matched, randomized controlled design with 61 elementary schools randomly assigned within their district to either the early start (treatment; n = 31) or delayed start (control; n = 30) conditions. The delayed start condition did not receive *Second Step*® during the time period of this study. Schools within Washington and Arizona were matched on free and reduced-price lunch and percent of non-White students for design purposes (Murray, 1998). Results from the matching process indicated that there were no significant differences between treatment and control groups on baseline measures (see Low, Cook, Smolkowski, & Buntain-Ricklefs, 2015). The present study included data from the fall (T1) and spring (T2) assessments gathered in Year 1.

Training participation. Two separate brief trainings were provided to participating early start (treatment) schools: the *Second Step*® curriculum (1-hour session) and Proactive Classroom Management (PCM; 3-hour session). The *Second Step*® training, which was consistent with standard support operations provided by Community for Children, intended to increase motivation to implement the program, allow teachers to become familiar with the content, and provide specific examples of how to deliver the program with fidelity. All early start (treatment) schools participated in the training and all kindergarten, first- and second-grade teachers involved in data collection participated in the webinar, as determined by attendance sheets collected by school personnel.

The PCM training is not standard practice in *Second Step*® implementation but was a response to district needs at the time of recruitment. A very brief overview of classroom strategies was presented to meet the needs of schools without providing a sufficiently strong dosage that one would anticipate having a strong impact on classroom behaviors. Specifically, PCM strategies were delivered via DVD or in-person and focused on skills that would help support, reinforce, and facilitate engagement in lessons and use of skills covered in *Second Step*®. In particular, the PCM training focused on reviewing and modeling five strategies: (a) offering positive greetings at the door to pre-correct problem behavior, (b) providing opportunities to respond, (c) employing an effective cueing system to regain attention, (d) strategically and intentionally establishing relationships with all students, and (e) teaching, modeling, and reinforcing expected behaviors. These strategies were selected based on prior research demonstrating their efficacy to improve classroom behavior and student engagement (Simonsen, Fairbanks, Briesch, Myers, & Sugai, 2008; Sutherland & Wehby, 2001). For additional detail of the PCM training, see Low et al. (2015).

Program implementation. Teachers completed weekly self-report ratings of implementation via computer survey on Datstat to record adherence to the curriculum, engagement, and dosage. Adherence had two components: adherence to key lesson components (5 items; yes/no) and adaptations/modifications (4 items on a 4-point scale; 0 = *Never* to 3 = *Always*; e.g., “to what extend did you leave out parts of the lesson”). Engagement had two components: ratings of the degree of student engagement (3 items on a 4-point scale; 0 = *Not at All* to 3 = *A Lot*; e.g., “to what extent were students

following along with the lesson") and estimated percentage of students who were engaged in the lesson (0-100%). The self-report of implementation was predicated on recommendations from Sanetti and Kratochwill (2011), who have demonstrated that it is possible to develop valid self-report measures of implementation. As an indicator of dosage, teachers were asked how many lessons they completed at the end of the year by school liaisons. Of all the indicators of implementation, dosage varied the most within schools. The average number of lessons completed across sites was 17 out of 25 (*SD* = 3.72, range = 7-25). For more information about dosage and fidelity of implementation, see Low et al. (2015).

Supporting implementation. To support the integrity of implementation of the *Second Step*® curriculum and PCM strategies, monthly tips and reminders were developed and disseminated to teachers. Two tips and reminders were sent per month: one for the *Second Step*® curriculum and one for the PCM strategies. This process began at the beginning of December 2012 and continued through May 2013 for a total of 12 tips and reminders. The tips and reminders were distributed to early start/treatment teachers in two ways: via email with an attachment and via school liaisons putting printed copies of tips and reminders in teachers' mailboxes.

Compensation. Participating schools were given a financial stipend for their involvement in the study and school liaisons were given $250 a year for their support in communicating with teachers, distributing materials, coordinating data collection times, and tracking implementation. Liaisons served as the point person within each school to coordinate research activities and monitor implementation but did not directly implement

the *Second Step*® curriculum. Teachers were compensated $5 per student per online survey with a $25 bonus for completing the survey on all students within a three-week window of time. Teachers were also compensated $75 for completion of implementation logs. Early start (treatment) schools were provided the curricula at no cost and delayed start (control) schools were scheduled to receive the free curricula at the end of the data collection period.

Measures

Data were collected at two time points during the academic year. Fall data collection (T1) occurred between October 10 and November 6, 2012. Reports indicated that 93% of all teachers across sites completed the online surveys within the allotted timeframe. Spring data collection (T2) occurred between April 22 and May 31, 2013. Reports indicated that 93% of teachers completed the online surveys.

School demographic and archival data. School-level data was collected from publicly available online sources (e.g., NCES website and school district websites) on the type of school (e.g., public vs. private), number of students, racial/ethnic composition of students, and percentage of students receiving free or reduced-price lunch. Administrative data, such as student mobility, disciplinary actions, suspensions, and absenteeism were also collected from participating schools.

Teacher assessment of student behavior and functioning. Teachers completed a number of online surveys about student behavior via the DatStat Illume System (DatStat Inc., Seattle, WA). The first was the teacher version of the Devereux Student Strengths Assessment – *Second Step*® Edition (DESSA-SSE; Devereux Center for

Resilient Children, 2012). The DESSA-SSE is a 36-item standardized, norm-referenced behavior rating scale that assesses the social-emotional competencies that serve as protective factors for children in kindergarten through eighth grade and map onto the *Second Step*® program: (a) skills for learning (α = .95), (b) empathy (α = .95), (c) emotion management (α = .91), (d) problem solving (α = .94), and (e) social-emotional composite (α = .94). The Skills for Learning scale measures a child's ability to use the skills of listening, focusing attention, self-talk, and assertiveness. The Empathy scale assesses a child's ability to identify and label emotions in him/herself and others to take on others' perspectives. The Emotion Management scale measures a child's ability to cope with strong emotions and express in them in socially acceptable ways. The Problem Solving scale examines a child's ability to effectively handle personal and interpersonal challenges in prosocial ways. The overall Social-Emotional Composite score, which combines the four previously described scales, indicates the overall strength of a student's social-emotional competence. Item scores range from 0 (*Never*) to 4 (*Very frequently*) on a 4-point Likert scale. Scores on the individual scales range from 0 to 36 points and scores on the Social-Emotional Composite range from 0 to 144 points. The DESSA scale, from which the DESSA-SSE was derived, has been shown to have acceptable reliability and validity evidence (Nickerson & Fishman, 2009).

Teachers also completed the Strengths and Difficulties Questionnaire (SDQ; Goodman, 1997), a brief, 25-item behavior rating scale for children age 3- to 16-years old that assesses functioning in five domains: (a) peer problems (α = .63), (b) hyperactivity (α = .90), (c) conduct problems (α = .77), (d) prosocial (α = .83), and (e) emotional

symptoms (α = .80). Scores for the SDQ range from 0 (*Not true*) to 2 (*Certainly true*) on a 3-point Likert scale. The SDQ has demonstrated acceptable internal consistency and stability and validity (Goodman, 2001) and has been shown to accurately detect conduct and emotional problems as good as broadband rating scales (Goodman & Scott, 1999).

Direct behavior observations. To record classwide student behavior, a behavioral observation system was developed based on the Behavioral Observation of Students in Schools (BOSS; Shapiro & Krotochwill, 2000). The BOSS has demonstrated acceptable interobserver agreement (IOA) and concurrent and predictive validity with other measures (Volpe, Diperna, Hintze, & Shapiro, 2005). The three behavioral coding categories consist of academic engagement (i.e., on-task behavior), off-task behavior, and disruptive behavior. Academic engagement (on-task behavior) is defined as behaviors that are consistent with the current learning task or instructional directive (e.g., listening to instruction, talking to peers about academic topic, reading, writing, raising hand, etc.). Disruptive behavior is defined as behaviors not pertinent to the assigned activity/task that negatively impact the learning environment (e.g., blurting, leaving one's seat, distracting peers, making noises with objects, etc.). Off-task behavior was not included because it represents the inverse of academic engagement (on-task behavior).

Observations were conducted in all classrooms (early and delayed start) across both sites by trained graduate students during core academic instruction time in the fall, winter, and spring. Each student was observed for 2-minutes total, divided into 10-second intervals. To obtain classwide estimates of academic engagement (on-task behavior), observers began with an identified student in the front or back of the classroom and

systematically moved to the next student to the left after each interval. After the observers completed observations on all students in the class, they repeated the same process until the observation time elapsed. A minimum of 12 intervals of data per student and approximately 300 total intervals per class per data collection period were obtained.

Prior to conducting the observations, graduate students were trained on the observation system. Before beginning baseline data collection, each student was required to reach at least 90% agreement during practice trials with an identified observer who served as the anchor measure. IOA data consisting of two observers conducting the observation at the same time on the same students were collected during approximately 20% of the observation sessions. IOA was calculated using the point-by-point method, which consists of calculating agreement for each and every interval. This method has been shown to be a more accurate estimate of the agreement between raters for direct observation systems with interval recording formats (Shapiro & Kratochwill, 2000). The results revealed that IOA averaged 88% (minimum 72% and maximum 100%), which was associated with a Kappa value of .71 and is considered to be an acceptable level of interrater reliability (Bailey & Burch, 2002; Viera & Garrett, 2005).

Teacher perception of classroom climate. Teachers completed the My Class Inventory – Short Form for Teachers (TMCI-SF; Sink, 2003), a 30-item rating scale that assesses teachers' perceptions of the classroom climate in five domains: (a) satisfaction (6 items), (b) friction (6 items), (c) competitiveness (6 items), (d) cohesiveness (7 items), and (e) difficulty (6 items; Sink & Spencer, 2007). The Satisfaction scale measures the extent to which students feel satisfied with or like their class and the Friction scale

assesses the extent of tension and conflict in the learning environment. The Competitiveness scale measures the level of perceived rivalry and competition and the Cohesiveness scale measures the degree to which there is a sense of collaboration and congeniality in the classroom. Finally, the Difficulty scale assesses the level of educational challenge presented to the students. Two additional scales were also calculated: a Total Positive Climate scale, which combines the Satisfaction and Cohesiveness scales, and a Total Negative Climate scale, which combines the Friction, Competitiveness, and Difficulty scales. Scores for the TMCI-SF range from 1 (*Strongly disagree*) to 5 (*Strongly agree*) on a 5-point Likert scale, with a 3 response representing a *Neutral* perception.

The TMCI-SF used in the current study was adapted from the TMCI-SF used by Sink and Spencer (2007), which included a School Counselor Impact (SCI) scale with questions specifically related to teachers' perceptions of the school counselor's impact on students' satisfaction, friction, competitiveness, cohesiveness, and difficulty. Sink and Spencer's preliminary alpha coefficients for each scale indicated low to moderate internal consistency: Satisfaction (α = .83); Friction (α = .73); Competitiveness (α = .74); Cohesiveness (α = .79); Difficulty (α = .74); and SCI (α = .88). The five items included in the SCI scale were adapted to fit into one of the other five core domains (see Table 3).

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consistency: Satisfaction (α = .83); Friction (α = .73); Competitiveness (α = .74); Cohesiveness (α = .79); Difficulty (α = .74); and SCI (α = .88). The five items included in the SCI scale were adapted to fit into one of the other five core domains (see Table 3).

Table 3

My Class Inventory – Short Form for Teachers (TMCI-SF)

TMCI-SF Items	Scales
1. The students enjoy their schoolwork in their class.	Satisfaction
2. Students never fight with each other.	Friction (RC)
3. Students often race to see who can finish their work first.	Competitiveness
4. In the class the work is hard to complete.	Difficulty
5. In the class everyone is friends.	Cohesiveness
6. Students seem to feel good about learning in my classroom.*	Satisfaction
7. Students are happy with the class.	Satisfaction
8. Some students in the class are mean.	Friction
9. Most students want their work to be better than their friend's work.	Competitiveness
10. Most students cannot complete their assignments without a lot of help.	Difficulty
11. There appears to be classroom cohesion between the students and me.*	Cohesiveness
12. Students in the class have good buddies.	Cohesiveness
13. Students seem to like the class.	Satisfaction
14. Many students in the class provoke tension.	Friction
15. Some students feel bad when they don't do as well as others.	Competitiveness
16. Only the brightest students can do all the work.	Difficulty
17. The students tend to work cooperatively.*	Cohesiveness
18. All students in my class get along well with each other.	Cohesiveness
19. Most students appreciate their learning experiences in the class.	Satisfaction
20. Certain students always want to have their own way.	Friction
21. Some students always try to outperform their peers.	Competitiveness
22. The schoolwork is too complicated for the students.	Difficulty
23. In my class, learning seems less difficult for students.*	Difficulty (RC)
24. All students in the class are fond of one another.	Cohesiveness
25. The students see the class as fun.	Satisfaction
26. Students in the class don't quarrel much with each other.	Friction (RC)
27. Only a few students in the class want to be the top scorers.	Competitiveness (RC)
28. Most students in the class don't know how to do their work very well.	Difficulty
29. There is unity among the students in my class.*	Cohesiveness
30. Students in the class care for each other as friends.	Friction (RC)

* = Items adapted from the School Counselor Impact (SCI) scale.
RC = reverse coded.

Proposed Data Analyses

Research Question 1. The primary goal of this study was to examine the structural validity of the My Class Inventory – Short Form for Teachers (TMCI-SF) when used with early elementary teachers. Confirmatory factor analyses (CFA) using weighted least squares means and variances (WLSMV) estimation was used. The fit of each model was determined across several indices (e.g., chi-square statistic, comparative fit index [CFI], the Tucker-Lewis index [TLI], and root mean square error of approximation [RMSEA]) with values of the CFI and TLI greater than .90 and values of the RMSEA less than or equal to .05 as indicative of good model fit to the data (Hu & Bentler, 1999). Standardized factor loadings (*ß*) less than .50 were used to identify poorly performing items that required further examination. Models were adjusted by excluding poorly performing items and re-examined to assess model fit with the data. Internal consistency reliabilities (Cronbach alpha coefficients) were computed for each of the scales derived from the CFA. For CFA, researchers have indicated that power is sufficient when there are at least 20 cases per item or at least 200 participants (MacCallum, Widaman, Zhang, & Hong, 1999; Mundfrom, Shaw, & Ke, 2005). Given the sample in this study is over 300 teachers, the CFA operated with sufficient power to obtain a model that converges and fits the data. The final revised model was used to address Research Questions 2 and 3.

Research Question 2. The second research question sought to examine evidence of the convergent validity of the TMCI-SF. First, a correlation matrix was constructed to represent the associations between the revised TMCI-SF scales derived from RQ 1 and the DESSA-SSE, SDQ, and DBO variables using Cohen's standard (1988) for interpretation

of the coefficients. Hierarchical linear regression (HLR) models were computed to examine the extent to which teachers' responses on the TMCI-SF predicted classroom-level student strengths and weaknesses, as measured by the DESSA-SSE, SDQ, and direct behavior observations. Individual scores for all students within a classroom were aggregated through use of means to create classroom-level scores for the DESSA-SSE, SDQ, and direction behavior observation variables (e.g., Skills for Learning scale on the DESSA-SSE). HLR models were used to examine the extent to which the revised subscales derived from the CFA (Satisfaction, Friction, and Cohesiveness) predicted teacher perceptions of classroom-level social, emotional, and behavioral functioning. Teacher-level (e.g., years of employment) and school-level factors (e.g., district site) were included as covariates. Bonferroni correction was conducted to account for the number of simultaneous tests being performed in order to reduce the chance of committing a Type I error.

Research Question 3. The third purpose of this study treated classroom climate as an outcome influenced by the adoption and delivery of a social-emotional learning curriculum. Therefore, an independent samples *t*-test analysis was computed to examine the extent to which teachers' perceptions of classroom climate improved as a result of adopting and delivering the *Second Step*® curriculum. Because assumptions of normality and homogeneity of variance were not met, a non-parametric alternative Mann-Whitney U test was conducted as an alternative to the independent samples *t*-test. In addition, an analysis of covariance (ANCOVA) was also conducted in order to include teacher- and school-level factors as covariates. Statistical significance for all inferential analyses was assessed at the conventional level (α = .05).

Chapter 4: Results

Research Question 1

To examine the structural validity of the My Class Inventory – Short Form for Teachers (TMCI-SF) when used with early elementary school teachers, a confirmatory analysis was performed. Prior to conducting confirmatory analyses, Cronbach alpha coefficients were calculated to examine internal consistency reliability estimates for the original five factor scales (Table 4). With the original 30-item TMCI-SF, the Satisfaction ($\alpha = .82$) and Cohesiveness ($\alpha = .80$) scales demonstrated good reliability, the Friction scale ($\alpha = .75$) demonstrated acceptable reliability, the Difficulty scale ($\alpha = .63$) demonstrated questionable reliability, and the Competitiveness scale ($\alpha = .46$) demonstrated unacceptable reliability.

Table 4

Reliability table for the original latent variables

Scale	No. of Items	α
Satisfaction	6	0.82
Friction	6	0.75
Difficulty	6	0.63
Cohesiveness	7	0.80
Competitiveness	5	0.47

Note: $\alpha > .9$ excellent, $> .8$ good, $> .7$ acceptable, $> .6$ questionable, $> .5$ poor, and $\leq .5$ unacceptable.

To investigate the fit of the proposed TMCI-SF, a confirmatory factor analysis (CFA) was conducted to determine whether the five factors adequately described the data (see Figure 1). The fit of each model was determined across several indices (Chi-square statistic, comparative fit index [CFI], the Tucker-Lewis index [TLI], and root mean square error of approximation [RMSEA]) with values of the CFI and TLI greater than .90 and values of

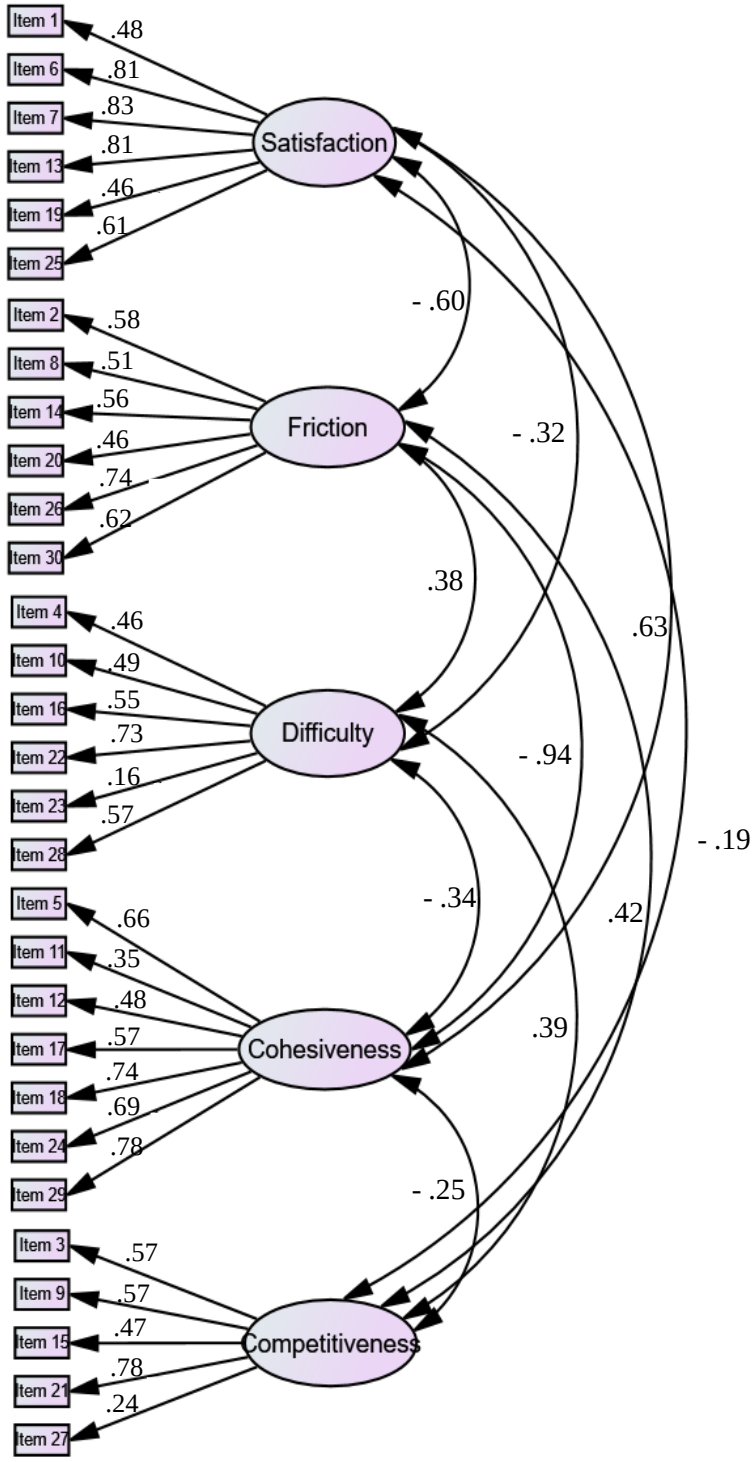

Figure 1. Diagram of the five-factor model.

the RMSEA less than or equal to .05 as indicative of good model fit to the data (Hu & Bentler, 1999). The results of the Chi-square goodness of fit test were significant, $\chi^2(395) = 867.30$, $p < .001$, suggesting that the model did not adequately fit the data. However, the Chi-square goodness of fit test is sensitive to sample size and almost always indicates a poor model fit when the sample size is large (Hooper, Coughlan, & Mullen, 2008). Additional fit indices were assessed and indicated poor model fit based on the proposed criteria (see Table 5). Specifically, the CFI (.84) and TLI (.82) indices were less than the proposed .90

Table 5

Fit indices for the initial CFA model

TLI	CFI	RMSEA
0.82	0.84	0.06

Note: RMSEA 90%CI = [0.06, 0.07]

threshold, and the RMSEA (.06) was greater than the proposed .05 thresholds. To inform adjustments to the model and improve model fit, poorly performing items were identified and removed. This resulted in the identification and removal of 10 poorly performing items, including two items from the Satisfaction scale, one from the Friction scale, three from the Difficulty scale, one from the Cohesiveness scale, and two from the Competitiveness scale.

Table 6

Reliability table for the 20-item TMCI-SF

Scale	No. of Items	α
Satisfaction	4	0.85
Friction	5	0.73
Difficulty	3	0.61
Cohesiveness	5	0.82
Competitiveness	3	0.67

Note: α > .9 excellent, > .8 good, > .7 acceptable, > .6 questionable, > .5 poor, and ≤ .5 unacceptable.

Cronbach alpha coefficients were calculated for the 20-item, five-factor TMCI-SF with the following results: The Satisfaction (α = .85) and Cohesiveness (α = .82) scales demonstrated good reliability, the Friction scale (α = .73) demonstrated acceptable reliability, and the Difficulty (α = .61) and Competitiveness (α = .67) scales demonstrated questionable reliability (see Table 6). Another CFA was conducted to determine whether the revised five factors adequately described the data when the poorly performing items were excluded (see Table 7). The results of the Chi-square goodness of fit test were still

Table 7

Fit indices for the 20-item CFA model

TLI	CFI	RMSEA
0.89	0.91	0.06

Note: RMSEA 90% CI = [0.05, 0.07]

significant, $\chi^2(160) = 353.61$, $p < .001$, because of the large sample size, suggesting that the model did not adequately fit the data. Similarly, the TLI (.89) and RMSEA (.06) indices still did not meet the proposed thresholds (.90 and .05, respectively), suggesting that the model did not adequately fit the data. However, the CFI (.91) index was greater than the proposed threshold of .90, which is indicative of an acceptable model fit. Based on the low reliability estimates, the Difficulty and Competitiveness scales were deleted.

Another CFA was conducted to determine whether a three-factor model (Satisfaction, Friction, and Cohesiveness) adequately described the data after excluding the two scales with questionable reliability (Difficulty and Competitiveness; see Figure 2).

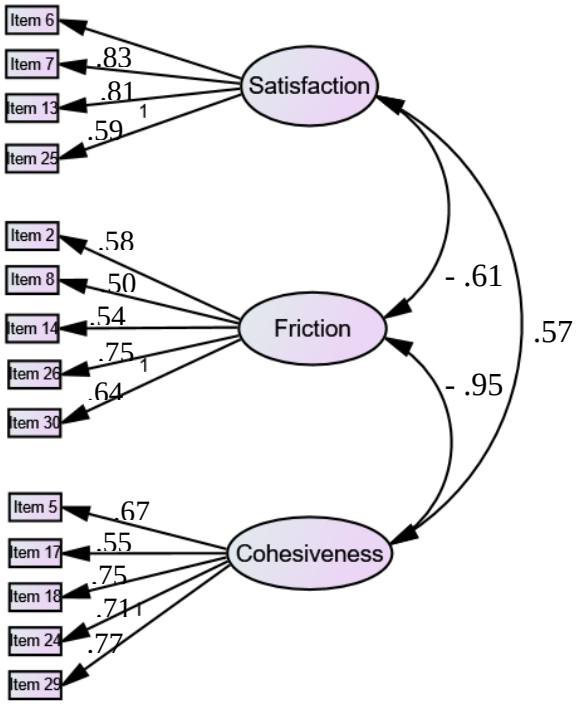

Figure 2. Diagram of the three-factor model.

Again, the results of the Chi-square goodness of fit test were significant, $\chi^2(74) = 226.10$, $p < .001$, because of the large sample size. However, in the three-factor model, the TLI (.90) and CFI (.92) indices met the proposed threshold of .90 and the RMSEA index approached the acceptable threshold (.08). Given the conceptual clarity and the relative convergence among three of the four fit indices, the three factor model was determined to be the most conceptually clear and best fitting model. The fit indices are presented in Table 8.

Table 8

Fit indices for the 14-item CFA model

TLI	CFI	RMSEA
0.90	0.92	0.08

Note: RMSEA 90% CI = [0.07, 0.09]

Research Question 2

Correlation matrix. The secondary goal of this study was to examine evidence of the convergent validity of the TMCI-SF. First, a correlation matrix was constructed to represent the associations between the three-factor TMCI-SF and the five scales of the Devereux Student Strengths Assessment – *Second Step*® Edition (DESSA-SSE; Devereux Center for Resilient Children, 2012), the five scales of the Strengths and Difficulties Questionnaire (SDQ; Goodman, 1997), and the two direct observation variables using Cohen's (1988) standards for interpretation. A significant positive correlation was observed between the Satisfaction factor on the TMCI-SF and all five DESSA-SSE scales, and all of the correlation coefficients indicated moderate effect sizes ranging from .31 to .39 (see Table 9). A significant negative correlation was observed between the Friction factor on the TMCI-SF and all five DESSA-SSE scales. The

Table 9

Sperman correlation matrix among TMCI-SF and DESSA-SSE factors

Variable	1	2	3	4	5	6	7	8
1. TMCI Satisfaction	-							
2. TMCI Friction	-0.46	-						
3. TMCI Cohesiveness	0.39	-0.64	-					
4. DESSA Social Emotional Composite	0.36	-0.29	0.18	-				
5. DESSA Skills for Learning	0.36	-0.33	0.19	0.91	-			
6. DESSA Empathy	0.31	-0.23	0.20	0.93	0.78	-		
7. DESSA Emotional Management	0.34	-0.23	0.13	0.93	0.79	0.84	-	
8. DESSA Problem Solving	0.37	-0.33	0.19	0.97	0.92	0.87	0.88	-

correlation coefficients between Friction and the Social Emotional Composite (r_s = -0.29, $p < .001$), Empathy scale (r_s = -0.23, $p < .001$), and Emotional Management scale (r_s = -0.23, $p < .001$) indicated small effect sizes. The correlation coefficients between Friction and

the Skills for Learning scale (r_s = -0.33, p < .001) and Problem Solving scale (r_s = -0.33, p < .001) indicated moderate effect sizes. A significant positive correlation was observed between the Cohesiveness factor on the TMCI-SF and all five DESSA-SSE scales, and all of the correlation coefficients indicate small effect sizes ranging from .13 to .20.

A significant negative correlation was observed between the Satisfaction factor on the TMCI-SF and the Emotional Symptoms, Conduct Problems, Hyperactivity, and Peer Problems scales on the SDQ, and a significant positive correlation was observed between the Satisfaction factor and the Prosocial scale. All of the correlation coefficients indicated small effect sizes ranging from .03 to .29. A significant positive correlation was observed between the Friction factor on the TMCI-SF and the Emotional Symptoms, Conduct Problems, Hyperactivity, and Peer Problems on the SDQ, and a significant negative correlation was observed between the Friction factor and the Prosocial scale. The correlation coefficients between Friction and the Conduct Problems (r_s = 0.46, p < .001) and Hyperactivity (r_s = 0.32, p < .001) scales indicated moderate effect sizes, whereas the correlation coefficients between Friction and the Emotional Symptoms (r_s = 0.07, p < .001), Peer Problems (r_s = 0.19, p < .001), and Prosocial (r_s = -0.19, p < .001) scales

Table 10

Spearman correlation matrix among TMCI-SF and SDQ factors

Variable	1	2	3	4	5	6	7	8
1. TMCI Satisfaction	-							
2. TMCI Friction	-0.47	-						
3. TMCI Cohesiveness	0.38	-0.64	-					
4. SDQ Emotional Symptoms	-0.03	0.07	-0.04	-				
5. SDQ Conduct Problems	-0.27	0.46	-0.22	0.43	-			
6. SDQ Hyperactivity	-0.21	0.32	-0.18	0.44	0.64	-		
7. SDQ Peer Problems	-0.16	0.19	-0.12	0.46	0.52	0.45	-	
8. SDQ Prosocial	0.29	-0.19	0.15	-0.14	-0.44	-0.49	-0.56	-

indicated small effect sizes. A significant negative correlation was observed between the Cohesiveness factor on the TMCI-SF and the Emotional Symptoms, Conduct Problems, Hyperactivity, and Peer Problems on the SDQ, and a significant positive correlation was observed between the Cohesiveness factor and the Prosocial scale. All of the correlation coefficients indicated small effect sizes ranging from .04 to .22 (see Table 10).

A significant positive correlation was observed between the Satisfaction factor on the TMCI-SF and both Direct Behavior Observation variables, and the correlation coefficients indicated small effect sizes ranging from .02 to .05. A significant negative correlation was observed between the Friction factor on the TMCI-SF and the Academic Engagement variable, and a significant positive correlation was observed between the Friction factor and the Disruptive Behavior variable. Both of the correlation coefficients indicated small effect sizes ranging from .02 to .05. A significant positive correlation was observed between the Cohesiveness factor on the TMCI-SF and the Academic Engagement variable, and a significant negative correlation was observed between the Cohesiveness factor and the Disruptive Behavior variable. Both of the correlation coefficients indicated small effect sizes ranging from .11 to .16 (see Table 11).

Table 11

Spearman correlation matrix among TMCI-SF factors and DBO variables

Variable	1	2	3	4	5
1. TMCI Satisfaction	-				
2. TMCI Friction	-0.46	-			
3. TMCI Cohesiveness	0.38	-0.64	-		
4. DBO Academic Engagement	0.05	-0.20	0.16	-	
5. DBO Disruptive Behavior	0.02	0.16	-0.11	-0.53	-

Hierarchical linear regression. Two-step hierarchical linear regression (HLR) analyses were conducted in order to include teacher-level (teacher age, years teaching, and education level) and school-level (district site) factors as covariates when examining the extent to which teachers' responses on the revised three-factor TMCI-SF were associated with classroom-level student strengths and weaknesses. First, a two-step HLR was conducted with each of the five DESSA-SSE scales as the dependent variable. For Step 1, district site, teacher age, years teaching, and education level were added as independent variables. For Step 2, the three revised TMCI-SF factors identified in RQ1 (Satisfaction, Friction, and Cohesiveness) were added. The *F*-test for Step 1 for each model was not significant, which indicates that adding district site, teacher age, years teaching, and education level did not account for a significant amount of additional variation in any of the five DESSA-SSE scales. On the other hand, the *F*-test for Step 2 for each model was significant, which indicates that adding Satisfaction, Friction, and

Table 12

Model comparisons for variables predicting DESSA-SSE scales

Scale	Model	R^2	df_{mod}	df_{res}	F	p	ΔR^2
Social Emotional Composite	Step 1	0.01	4	296	0.76	.549	0.01
	Step 2	0.17	3	293	19.44	< .001	0.16
Skills for Learning	Step 1	0.01	4	297	0.86	.488	0.01
	Step 2	0.20	3	294	23.66	< .001	0.19
Empathy	Step 1	0.01	4	297	1.06	.379	0.01
	Step 2	0.11	3	294	10.97	< .001	0.10
Emotional Management	Step 1	0.01	4	296	0.37	.829	0.01
	Step 2	0.14	3	293	15.01	< .001	0.13
Problem Solving	Step 1	0.02	4	297	1.20	.309	0.02
	Step 2	0.20	3	294	22.78	< .001	0.19

Cohesiveness explained a statistically significant additional percentage of the variation in the DESSA-SSE scales, ranging from an additional 10 to 19 percent. The results of the model comparisons for the DESSA-SSE are in Table 12.

A two-step HLR was then conducted with each of the five SDQ scales as the dependent variable. District site, teacher age, years teaching, and education level were again added as independent variables for Step 1 and the three TMCI-SF factors were added at Step 2. The *F*-test for Step 1 for each model was not significant, which indicates that adding district site, teacher age, years teaching, and education level did not account for a significant amount of additional variation in any of the five SDQ scales. The *F*-test for Step 2 for Emotional Symptoms was also not significant, which indicates that adding Satisfaction, Friction, and Cohesiveness did not account for a significant amount of additional variation for the Emotional Symptoms scale. On the other hand, the *F*-test for Step 2 for the other four scales (Conduct Problems, Hyperactivity, Peer Problems, and Prosocial) was significant, which indicates that adding Satisfaction, Friction, and

Table 13

Model comparisons for variables predicting SDQ scales

Scale	Model	R^2	df_{mod}	df_{res}	F	p	ΔR^2
Emotional Symptoms	Step 1	0.01	4	298	0.92	.450	0.01
	Step 2	0.03	3	295	1.56	.198	0.02
Conduct Problems	Step 1	0.03	4	298	2.15	.074	0.03
	Step 2	0.28	3	295	34.57	< .001	0.25
Hyperactivity	Step 1	0.01	4	298	0.40	.808	0.01
	Step 2	0.16	3	295	17.65	< .001	0.15
Peer Problems	Step 1	0.01	4	298	0.96	.430	0.01
	Step 2	0.08	3	295	6.94	< .001	0.07
Prosocial	Step 1	0.01	4	297	1.09	.360	0.01
	Step 2	0.11	3	294	10.61	< .001	0.10

Cohesiveness explained a statistically significant additional percentage of the variation in those scales, ranging from an additional 7 to 25 percent. The results of the model comparisons for the SDQ are in Table 13.

Finally, a two-step HLR was conducted with the two DBO variables as the dependent variable. District site, teacher age, years teaching, and education level were added as independent variables for Step 1 and the three TMCI-SF factors were added at Step 2. The *F*-test for Step 1 for Academic Engagement was significant, which indicates that adding district site, teacher age, years teaching, and education level explained an additional percentage of the variation in Academic Engagement. On the other hand, the *F*-test for Step 1 for Disruptive Behavior was not significant, which indicates that adding district site, teacher age, years teaching, and education level did not account for a significant amount of additional variation in Disruptive Behavior. The *F*-test for Step 2 for both DBO variables was significant, which indicates that adding Satisfaction, Friction, and Cohesiveness explained a statistically significant additional percentage of the variation in both variables, ranging from 5 to 7 percent. The results of the model comparisons for the SDQ are in Table 14.

Table 14

Model comparisons for variables predicting DBO variables

Scale	Model	R^2	df_{mod}	df_{res}	F	p	ΔR^2
Academic Engagement	Step 1	0.06	4	296	4.39	.002	0.06
	Step 2	0.12	3	293	7.42	< .001	0.07
Disruptive Behavior	Step 1	0.03	4	296	2.25	.064	0.03
	Step 2	0.08	3	293	5.03	.002	0.05

The school-level (district site) and teacher-level (age, years teaching, and education level) variables did not demonstrate a statistically significant relationship with any of the five DESSA-SSE scales. The revised Satisfaction factor on the TMCI-SF demonstrated a significantly positive relationship with all five DESSA-SSE scales. Conversely, the Friction factor demonstrated a significantly negative relationship with all five DESSA-SSE scales. Although the Cohesiveness factor demonstrated a significantly negative relationship with the Social Emotional Composite, Skills for Learning, Emotional

Table 15

Summary of HLR analyses for TMCI-SF variables predicting DESSA-SSE scales

Variable	Social Emotional Composite *B (SE)*	Skills for Learning *B (SE)*	Empathy *B (SE)*	Emotional Management *B (SE)*	Problem Solving *B (SE)*
Step 1					
(Intercept)	100.35***	25.17***	25.84***	24.64***	24.73***
	(4.37)	(1.02)	(1.34)	(1.15)	(1.13)
Site (ASU)	-1.59	-0.50	-0.15	-0.23	-0.77
	(1.82)	(0.42)	(0.56)	(0.48)	(0.47)
Teacher age	-0.06	-0.00	-0.04	-0.01	-0.01
	(0.11)	(0.02)	(0.03)	(0.03)	(0.03)
Years teaching	0.09	0.02	0.03	0.02	0.03
	(0.13)	(0.03)	(0.04)	(0.03)	(0.03)
Education level	-2.18	-0.42	-0.82	-0.40	-0.52
	(1.52)	(0.35)	(0.46)	(0.40)	(0.39)
Step 2					
(Intercept)	92.61***	25.55***	21.08***	22.07***	24.03***
	(14.27)	(3.26)	(4.54)	(3.82)	(3.64)
Site (ASU)	0.67	0.05	0.32	0.39	-0.15
	(1.73)	(0.40)	(0.55)	(0.46)	(0.44)
Teacher age	0.00	0.01	-0.02	0.00	0.00
	(0.10)	(0.02)	(0.03)	(0.03)	(0.03)
Years teaching	-0.10	-0.02	-0.02	-0.02	-0.02
	(0.12)	(0.03)	(0.04)	(0.03)	(0.03)
Education level	-1.57	-0.28	-0.72	-0.23	-0.36
	(1.40)	(0.32)	(0.45)	(0.38)	(0.36)
Satisfaction	8.86***	1.84***	2.23***	2.46***	2.22***
	(2.10)	(0.48)	(0.67)	(0.56)	(0.53)
Friction	-7.01***	-2.01***	-1.35*	-1.51**	-2.09***
	(1.74)	(0.40)	(0.55)	(0.47)	(0.44)
Cohesiveness	-4.16*	-1.05*	-0.49	-1.35*	-1.17*
	(2.05)	(0.47)	(0.65)	(0.55)	(0.52)

* = $p < .05$; ** = $p < .01$; *** = $p < .001$

Management, and Problem Solving, using Bonferroni correction to account for the number of simultaneous tests being performed, Cohesiveness no longer demonstrated a significant relationship with those four scales. The results for each regression are shown in Table 15.

For the SDQ, the teacher-level factors did not demonstrate a significant relationship with any of the five SDQ scales. The Satisfaction factor demonstrated a significantly positive relationship with the Prosocial scale and the Friction factor demonstrated a significantly positive relationship with the Conduct Problems and Hyperactivity scales.

Table 16

Summary of HLR analyses for TMCI-SF variables predicting SDQ scales

Variable	Emotional Symptoms *B (SE)*	Conduct Problems *B (SE)*	Hyper-activity *B (SE)*	Peer Problems *B (SE)*	Prosocial *B (SE)*
Step 1					
(Intercept)	1.05***	.98***	3.12***	1.50***	7.89***
	(0.24)	(0.18)	(0.35)	(0.24)	(0.40)
Site (ASU)	-0.15	0.20**	0.08	-0.18	-0.05
	(0.10)	(0.08)	(0.14)	(0.10)	(0.17)
Teacher age	0.00	-0.00	0.01	-0.00	-0.01
	(0.01)	(0.00)	(0.01)	(0.01)	(0.01)
Years teaching	0.00	-0.00	-0.01	0.01	0.01
	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)
Education level	0.08	0.08	0.11	0.02	-0.21
	(0.08)	(0.06)	(0.12)	(0.08)	(0.14)
Step 2					
(Intercept)	0.33	-0.79	1.74	1.25	5.87***
	(0.86)	(0.57)	(1.14)	(0.84)	(1.37)
Site (ASU)	-0.18	0.11	-0.04	-0.25*	0.10
	(0.10)	(0.07	(0.14)	(0.10)	(0.16)
Teacher age	-0.00	-0.00	0.00	-0.00	-0.01
	(0.01)	(0.00)	(0.01)	(0.01)	(0.01)
Years teaching	0.00	0.01	0.00	0.01	-0.00
	(0.01)	(0.00)	(0.01)	(0.01)	(0.01)
Education level	0.07	0.05	0.07	0.00	-0.18
	(0.08)	(0.06)	(0.11)	(0.08)	(0.13)
Satisfaction	-0.02	-0.08	-0.25	-0.22	0.78***
	(0.12)	(0.08)	(0.17)	(0.12)	(0.20)
Friction	0.20	0.57***	0.72***	0.30**	-0.31
	(0.10)	(0.07)	(0.14)	(0.10)	(0.17)
Cohesiveness	0.11	0.22**	0.21	0.14	-0.19
	(0.12)	(0.08)	(0.16)	(0.12)	(0.19)

* = $p < .05$; ** = $p < .01$; *** = $p < .001$

Although district site demonstrated a significantly positive relationship with the Peer Problems scale, the Friction factor demonstrated a significantly positive relationship with the Peer Problems scale, and the Cohesiveness factor demonstrated a significantly positive relationship with the Conduct Problems scale, Bonferroni correction indicated that district site and Friction factor no longer demonstrated a significant relationship with Peer Problems and the Cohesiveness factor no longer demonstrated a significant relationship with the Conduct Problems scale. The results for each regression are shown in Table 16.

Table 17

Summary of HLR analyses for TMCI-SF variables predicting DBO variables

	Academic Engagement	Disruptive Behavior
Variable	*B (SE)*	*B (SE)*
Step 1		
(Intercept)	0.83***	0.09***
	(0.03)	(0.02)
Site (ASU)	0.05***	-0.03**
	(0.01)	(0.01)
Teacher age	-0.00	0.00
	(0.00)	(0.00)
Years teaching	0.00	-0.00
	(0.00)	(0.00)
Education level	-0.00	0.00
	(0.01)	(0.01)
Step 2		
(Intercept)	1.01***	-0.09
	(0.10)	(0.08)
Site (ASU)	0.05***	-0.03**
	(0.01)	(0.01)
Teacher age	-0.00	0.00
	(0.00)	(0.00)
Years teaching	0.00	-0.00
	(0.00)	(0.00)
Education level	-0.00	-0.00
	(0.01)	(0.01)
Satisfaction	0.00	0.01
	(0.01)	(0.01)
Friction	-0.05***	0.03**
	(0.01)	(0.01)
Cohesiveness	-0.02	0.01
	(0.01)	(0.01)

* = $p < .05$; ** = $p < .01$; *** = $p < .001$

For the two DBO variables, district site demonstrated a significantly positive relationship with Academic Engagement and a significantly negative relationship with Disruptive Behavior, whereas the teacher-level factors did not significantly relate to any of the scales. The Friction factor demonstrated a significantly negative relationship with Academic Engagement and a significantly positive relationship with Disruptive Behavior. The results for each regression are shown in Table 17.

Research Question 3

The last research question pertained to whether teachers' perceptions of classroom climate changed as a function of delivering a social-emotional learning curriculum. First, a two-tailed independent samples *t*-test was conducted to examine whether there was a significant difference between the early start (treatment) and delayed start (control) conditions on the revised three-factor TMCI-SF. Assumptions of normality were not met using the Shapiro-Wilk test; therefore, a two-tailed Mann-Whitney two-sample rank-sum test was conducted as an alternative to the independent samples *t*-test. The results of the Mann-Whitney *U* test were not significant for any of the three revised TMCI-SF factors, indicating that there was no statistically significant difference between the early start and delayed start conditions. Thus, teachers' perceptions of classroom climate were not impacted by the adoption and delivery of the *Second Step*® social-emotional curriculum.

An analysis of covariance (ANCOVA) was conducted to determine whether there were significant differences in the three revised TMCI-SF factors by condition while controlling for school- and teacher-level factors. The main effect was not significant at the 95% confidence level for Satisfaction [$F(1, 298) = 2.58$, $p = .109$], Friction [$F(1, 298)$

= 2.61, p = .108], or Cohesiveness [F(1, 298) = 1.60, p = .207], indicating there were no significant differences in the three TMCI-SF factors by condition (early start versus delayed start). In other words, there were no significant differences in teachers' perceptions of Satisfaction, Friction, and Cohesiveness by condition while controlling for district site, teacher age, years teaching, and education level.

Chapter 5: Discussion

Currently there are few open-access, brief measures of classroom climate for use in early elementary school settings (e.g., Anderson, 1982; NICHD, 2005; Pianta, La Paro, & Hamre, 2008; Voight, & Hanson, 2012). Given the increased focus among researchers, policymakers, and educators on climate as an indicator of the health and functioning of a school (e.g., Brookover et al., 1978; ESSA, 2015; Mariani et al., 2015) and the importance of early educational experiences in setting the trajectory for future educational outcomes (e.g., Burchinal et al., 2002; Campbell et al., 2002; Davison et al., 2004; Hamre & Pianta, 2005; Pianta et al., 2008), it is necessary to explore the creation or adaptation of classroom climate measures to the early elementary school context. The primary purpose of this study was to examine the structural validity of the My Classroom Inventory – Short Form for Teachers (TMCI-SF) when used by early elementary school teachers to rate the climate of their classrooms.

Initial reliability estimates of the original five scales indicated that Difficulty and Competiveness subscales demonstrated low internal consistency, indicating these constructs are not as reliable and, therefore, valid in the early elementary context as later grades. A series of three confirmatory factor analyses were performed resulting in the removal of poorly performing items and the deletion of the Difficulty and Competitiveness scales. The model that provided the best fit was a 14-item, three-factor model that included the Satisfaction, Friction, and Cohesiveness factors. The three factor solution was conceptually clear from a developmental perspective, as a main goal in early elementary settings is whether students enjoy and are satisfied with their experiences

(Satisfaction), get along with one another (Friction), and work together collaboratively (Cohesiveness; Farbman & Novoryta, 2016; National Association for the Education of Young Children [NAEYC], 2009).

It is important to consider why the current study supported a model that was so different from the models supported by previous research on the MCI-SF and TMCI-SF (Mariani et al., 2015; Sink & Spencer, 2005, 2007; Villares et al., 2016). It is possible that the classroom expectations and interpersonal dynamics in early elementary school classrooms are meaningfully different from the expectations and dynamics observed in upper elementary and secondary school classrooms (Farbman & Novoryta, 2016; NAEYC, 2009). In fact, from a developmental perspective, the interpersonal relationships and distinct academic demands and goals of classroom learning in early elementary school classrooms (e.g., learning through play, learning to read versus reading to learn, developing appropriate learning-related behaviors, etc.) may preclude many of the indicators of academic difficulty and competitiveness captured by the original TMCI-SF (e.g., "students often race to see who can finish their work first"). As a result, the Difficulty and Competitiveness constructs in the original scale were less relevant and reliable for younger students than older students.

Furthermore, young children develop and learn at various rates within early childhood, which is often conceptualized as the critical period of development and learning from birth to age eight (Kauerz, 2013; Kauerz & Coffman, 2013). Children in early elementary school may benefit from classroom environments that are more similar to early childhood environments (i.e., preschool classroom environments) as opposed to

upper elementary school settings. For example, early elementary school students may benefit from a more targeted focus on emotional support, similar to one of the domains included in the preschool Classroom Assessment Scoring System (CLASS; Pianta, La Paro, & Hamre, 2008), as opposed to the difficulty of the classwork or the competitiveness of their classmates. Therefore, the TMCI-SF may need to be adapted to better fit the needs of early elementary school teachers so they are better able to capture the unique transition period between early childhood and upper elementary school.

The revised TMCI-SF included two positive indicators and one negative indicator. It was expected that positive indicators would be positively associated with social, emotional, and behavioral strengths, and the negative indicators would be negatively associated with strength-based outcomes. Conversely, it was expected that negative indicators would be positively associated with students' social, emotional, and behavioral difficulties, and that positive indicators would be negatively associated with students' social, emotional and behavioral difficulties. Although analyses examining the convergent validity of the revised TMCI-SF were largely consistent with the above and prior research examining climate indicators and their relationship to student social, emotional, and behavioral outcomes (e.g., Gasser et al., 2017; Hamre & Pianta, 2005; Leff et al., 2011; Lester & Cross, 2015; McEvoy & Welker, 2000), it is important to note that the large sample size in this study resulted in strong power to detect small effects, and most of the significant associations were small in magnitude.

In addition to the expected positive and negative relationships between the TMCI-SF scales and the DESSA-SSE scales, SDQ scales, and DBO variables, the TMCI-SF

scales also accounted for a statistically significant additional percentage of variance in all of the DESSA-SSE scales, all of the SDQ scales except Emotional Symptoms, and both of the DBO variables. Although the effect sizes were again small to moderate, findings from this study are in line with previous research that suggested there may be a relationship between indicators of classroom climate and students' social, emotional, and behavioral functioning (e.g., Hutchings et al., 2013; O'Brennan, Bradshaw, & Furlong, 2014; Shim, Kiefer, & Wang, 2013). Furthermore, although it is impossible to determine directionality based on the results of this study, there is likely a bi-directional, symbiotic relationship between classroom climate and students' social-emotional wellbeing and behavioral performance considering that the environment can influence patterns of behavior and patterns of behavior can, in turn, impact perceptions of the environment (Birch & Ladd, 1998; Hutchings et al., 2013; Koth, Bradshaw, & Leaf, 2008; Reyes et al., 2012; Shim, Kiefer, & Wang, 2013; Stormshak et al., 1999).

Finally, given that this study occurred in the context of a large-scale randomized controlled trial of the *Second Step*® social-emotional learning (SEL) curriculum, there was an opportunity to examine whether classroom climate changed as a function of the adoption and delivery of an SEL curriculum. The literature on SEL and prior empirical findings suggest that SEL results in not only improvements in students' social-emotional competencies, but also may lead to changes in perceptions of climate (Cooke et al., 2007; Edwards, Hunt, Meyers, Grogg, & Jarrett, 2005; Frey, Hirschstein, & Guzzo, 2000; Frey, Nolen, Edstrom, & Hirschstein, 2005; Frey & Sylvester, 1997; Grossman et al., 1997; Neace & Munoz, 2012). Therefore, it was expected that the *Second Step*® program

would have a significant impact on teachers' perceptions of classroom climate. However, the results of the current study did not support that hypothesis. In fact, there was no statistically significant difference between the early start (treatment) and delayed start (control) groups, indicating that implementation of the *Second Step*® curriculum did not influence teachers' perceptions of classroom climate as measured by the revised TMCI-SF. It is possible that the revised TMCI-SF was not sensitive nor robust enough to detect the impact the *Second Step*® curriculum had on the classroom climate. It is also possible that there were other confounding variables that mediated or moderated the relationship between teachers' perception of classroom climate and implementation of the *Second Step*® curriculum that were not captured by the school- and teacher-level variables included in the current study.

Limitations and Future Directions

It is important to consider several research limitations and recommendations for future studies. For example, it is possible that response bias impacted the results of the current study. Specifically, as with all perceptual instruments, teachers may have responded in a more favorable manner on the TMCI-SF in order to provide a more socially acceptable representation of their classroom (social desirability bias). Similarly, they may have rated their students more favorably on the DESSA-SSE and SDQ. In order to cross validate findings from the teacher-reported instruments, direct behavior observations (academic engagement and disruptive behavior) were included to provide an additional measure of student behavior and functioning that was not completed by the teacher. However, it is important to remember that climate is, by definition, a measure of

people's perceptions of their shared experiences. An objective observer may not experience the classroom environment in the same way students and teachers experience the classroom climate on a daily basis. Therefore, future studies may consider having multiple raters complete the TMCI-SF, as well as the DESSA-SSE and SDQ, in order to calculate interrater reliability and examine the potential impact of response bias on analyses and results. Moreover, although the RCT from which the data for this study was pulled did not include additional measures of classroom climate, from a cross validation standpoint, inclusion of another climate measure would have enabled closer inspection of convergent validity by examining associations with other reliable and valid measures of climate. Therefore, future studies should consider including additional measures of climate and include multiple raters in order to further examine convergent validity of the TMCI-SF.

Although large samples are preferred for group-based studies, there are some limitations when it comes to significance testing. Namely, small effects are easily detected as significant but it is unknown whether those effects are meaningful (Winter, Abt, & Nevill, 2014). Conversely, outcomes that are not statistically significant may, in fact, be meaningful in practice (Winter, Abt, & Nevill). Future research should continue to examine indices of classroom climate, the effect sizes of the different indices, and whether or not they are meaningful with regard to student experiences and outcomes in early elementary classrooms.

Future studies may also want to consider adapting the original TMCI-SF and/or the revised TMCI-SF proposed by the current study to better fit the needs of early

elementary school teachers. Poorly performing items from the original TMCI-SF could be re-examined and revised, or new items could be developed to more accurately capture the classroom expectations and interpersonal dynamics specific to early elementary school classrooms. Although brevity is a plus with regard to feasibility of administration and likely use as a formative measure, it is important to consider that the final 14-item TMCI-SF may be missing critical, meaningful constructs. If that is the case, the 14-item TMCI-SF may not be robust enough to fully capture the early elementary classroom climate, which may have influenced the results of Research Question 3 and impeded the ability to fully capture the impact of the *Second Step*® curriculum on teachers' perceptions of classroom climate in the current study. Therefore, future studies may also consider examining evidence of content validity for the TMCI-SF proposed in the current study, as well as any new TMCI-SF developed with new or revised items, by comparing it to other measures of classroom climate that are costlier and/or less feasible or practitioner-friendly, such as the Classroom Assessment Scoring System (CLASS; Pianta, La Paro, & Hamre, 2008) and the Classroom Observation Assessment Tool (Leff et al., 2011). There are potentially other classroom climate constructs at the early elementary level, such as emotional support (e.g., Pianta et al., 2008) or approaches to learning (Farbman & Novoryta, 2016; NAEYC, 2009) that could be included to provide greater coverage and additional target areas for improvement. Future studies may consider including follow-up teacher interviews to provide deeper insight into teachers' interpretations of individual items that did not perform well and further establish the construct and content validity of the TMCI-SF.

Educational Implications

The revised 14-item, three factor TMCI-SF identified in the current study is a psychometrically sound tool that can be used to measure classroom climate in early elementary school settings. The TMCI-SF provides both researchers and educators with an open-access, brief measure that is practitioner-friendly and cost effective, which facilitates its sustainable use as both a research tool and accountability tool when examining classroom climate in early elementary school classrooms. Moreover, the feasibility of the TMCI-SF makes it a useful formative assessment tool that can be repeatedly administered to track improvements in classroom climate over time as educators engage in intentional efforts to improve classroom climate. In addition, the significant relationship between the TMCI-SF and indicators of students' behavioral functioning (i.e., DESSA-SSE, SDQ, and DBO) suggests that the TMCI-SF may be used as an additional formative measure of the impact of intentional efforts to improve students' social, emotional, and behavioral wellbeing. Considering the significant time and effort needed to complete individual questionnaires such as the DESSA-SSE and SDQ, the TMCI-SF may provide a more appropriate alternative for monitoring progress throughout the school year.

Finally, the TMCI-SF provides districts and schools with an open-access, brief measure of classroom climate that can be used as part of the broader data-driven decision-making process. Considering that climate is a complex, multidimensional construct that can be measured at the school, classroom, and individual levels, the TMCI-SF can be used to inform decisions at the early elementary classroom level, but also

within the broader school- or district-level decision-making process. Identifying classroom- and grade-level patterns may facilitate intentional efforts to enhance student and staff perceptions of climate, which can lead to improved engagement in school (Berkowitz et al., 2017; Greenberg et al., 2003; Patrick, Ryan, & Kaplan, 2007; Wang & Eccles, 2013). Additionally, the TMCI-SF can be used as a formative assessment throughout the data-based decision-making process in conjunction with broader summative assessments. Overall, the feasibility of the TMCI-SF facilitates its sustainable use within the data-driven decision-making process that schools, districts, and states are increasingly using to improve educational experiences and student outcomes.

Conclusion

Currently there are few open-access, brief measures of classroom climate that can be used in early elementary school settings. The results of the current study indicate that the revised three-factor TMCI-SF is a brief, cost-efficient tool for measuring dimensions of the classroom climate in the early elementary school classroom. Moreover, the current study added to the research indicating there is a significant relationship between classroom climate and students' social, emotional, and behavioral wellbeing. The revised TMCI-SF offers a way for educators to monitor the progress of intentional implementation efforts that target improving students' social-emotional and behavioral functioning. As researchers, policymakers, and educators continue to examine climate as an indicator of the health and functioning of a school, researchers should continue to examine the psychometric properties and utility of the revised TMCI-SF for use in early elementary school classrooms, where early educational experiences set the trajectory for future educational outcomes.

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