UNIVERSITY OF CALIFORNIA

Santa Barbara

The Effectiveness of a Program for Students with Severe EBD in Restrictive Classroom Settings

A dissertation submitted in partial satisfaction of the requirements for the degree

Doctor of Philosophy in Counseling, Clinical, and School Psychology

By

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September 2017

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ACKNOWLEDGEMENTS

I would like to express my deepest gratitude to my advisor and committee chair, Dr. Shane Jimerson, for his ongoing mentorship and support. His unwavering dedication to bridging the gap between science and practice has been a constant source of inspiration. I could not have had a better advisor and mentor.

I would also like to thank the rest of my committee members, Dr. Erin Dowdy and Dr. Matthew Quirk, for their insightful comments and encouragement, as well as the hard questions that helped me to look more deeply at my research.

Last but not least, I would like to acknowledge my family and friends. To my parents, Hong Mo Yu and Lai Wah Lau, I am so proud to be your son. 致我的父母，余匡武先生和婁麗華女士。常說世上最難報答的就是父母的養育之恩。雖無以為報您們對我的付出與栽培，但我會盡最大的努力來回報、孝順您們。我今天和將來的所有成就都屬於您們的。To my sister, Miriam, I am so proud to be your brother and carry you with me always. To the girl I can't seem to do without, Jenifer, you make me a better person and I can't wait to see what the future has in store for us. And to the rest of my family and friends, you are a blessing and I love you all.

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FIELDS OF STUDY

Programming for students with emotional and behavioral challenges.

ABSTRACT

The Effectiveness of a Program for Students with Severe EBD in Restrictive Classroom Settings

by

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The education of students struggling with emotional and behavioral disorders (EBD) continues to be a serious and challenging problem facing educators and school systems in the 21st century. Legislation has been established by the Individuals Disabilities Act (IDEA) to include the provision of a free and appropriate public education (FAPE) to students identified as emotionally disturbed. However, many schools do not have adequate supports to meet the unique needs of children and adolescents with EBD. Scholars and practitioners have responded with efforts resulting in a collection of intervention strategies found to be helpful for supporting students suffering from emotional and behavioral challenges. However, much remains to be known regarding optimal programming for students with EBD in schools. The present study is a preliminary evaluation of the effectiveness of the Tiers of Intensive Educationally Responsive Services (TIERS) program. TIERS is a treatment package consisting of a combination of evidence-based practices designed to improve the academic, social-emotional, and behavioral outcomes of students with EBD. The purpose of this study was to 1) examine the effectiveness of the TIERS service delivery model for increasing positive classroom behaviors (PCBs) of students with severe EBD, and 2) to identify the degree to which implementation fidelity and grade level moderates the effectiveness of TIERS to affect their PCB. Results suggest that 1) students with severe EBD enrolled in a TIERS program show an increase in PCBs after a period of four months,

2) mean PCB scores are higher for programs implementing TIERS with higher fidelity when compared to programs implementing TIERS with partial fidelity but not programs implementing TIERS with little to no fidelity, and 3) there is no significant three-way interaction between fidelity of implementation of TIERS, grade level (elementary and middle school compared to high school), and time on PCB. Limitations of the study and implications for future research in the area of programming for students with EBD in restrictive school settings are discussed.

Keywords: program effectiveness, emotional and behavioral disorder (EBD), emotional disturbance, children, adolescents, school, repeated measures analysis of variance (RM-ANOVA)

TABLE OF CONTENTS

I. INTRODUCTION TO THE PROBLEM

Approximately half a million students receiving special education services each school year under IDEA are students with emotional and behavioral disorders (EBD) (U.S. Department of Education's National Center for Education Statistics, 2015). The practice of serving students with EBD has been fraught with challenges (Simpson & Mundschenk, 2012). Even under the best of circumstances with the support of highly trained and motivated school professionals, children and adolescents with EBD can be difficult to manage. Moreover, for students with EBD, the behaviors they engage in contribute to learning difficulties in multiple academic and functional areas (Benner, Allor, & Mooney, 2008; Nelson, Benner, Lane, & Smith, 2004). These behaviors are most apparent in the form of disruptive externalizing behaviors that interfere with learning and teaching processes. Externalizing behavior problems commonly observed among this population of students include aggression (verbal and physical) and noncompliance. The trigger for these overt behaviors are emotional difficulties (Hunter-Carsch, 2006), which may also manifest themselves in the form of more covert internalizing behavior problems (i.e., depression, anxiety) that are less disruptive to the classroom environment but more likely to be unintentionally overlooked. A review of the literature addressing students with EBD reveals many likely deleterious outcomes (Wagner, 2014).

Without appropriate intervention, children and adolescents with EBD are at increased risk for school failure, serious mental illness, substance use, and adult crime (Quinn & Poirier, 2004). Longitudinal studies suggest that students with EBD are more likely to experience marital problems, irregular employment, and be institutionalized for crimes or mental health disorders as adults (Dunlap et al., 2006; Quinn & Poirier, 2004). These findings are further compounded by concerns about the effects of ongoing patterns of

EBD that may influence the behavioral trajectory of future generations. In their examination of police and juvenile records for both parents and their offspring, Robins and colleagues (Robins, West, & Herjanic, 1975) found that grandparents with antisocial behavior were more likely to have children who were arrested and grandchildren who were delinquent than those without antisocial behavior.

Contemporary research supports the notion that children and adolescents with EBD that are not appropriately supported will face lifelong challenges (Kendziora, 2004). Building upon recent scholarship and practice pertinent to supporting students with EBD, a number of empirically tested practices aimed at improving the social and academic skills of students with EBD have been identified. Currently, the majority of students with EBD can be adequately served in general education classrooms with the appropriate supplemental supports and accommodations (Forness, Kim, & Walker, 2012). However, a significant portion of students with EBD have been identified to require support services beyond those that can be feasibly provided in general education classrooms (Lane, Wehby, Little, & Cooley, 2005). According to data collected in 2007 from each state regarding the number of students with disabilities served across different educational settings by the U.S. Department of Education's Office of Special Education Programs (OSEP), McLeskey and colleagues (2012) reported that approximately 42 percent of students with EBD were educated in separate classrooms. Despite the substantial number of students with EBD placed in separate classrooms, the effectiveness of EBD programming remains largely unknown (Mattison, 2014).

Recently (2009), the Tiers of Intensive Educationally Responsive Services (TIERS) model was designed in an effort to provide better services to students with EBD who require

placement in alternative, more restrictive, classrooms (Cook & Browning Wright, 2009). TIERS incorporates many critical components that have been revealed in the literature examining risk and protective factors of students with intense emotional and behavioral challenges. The goal of this preliminary study is twofold: 1) to examine the effectiveness of the TIERS service delivery model for increasing positive classroom behaviors (PCBs) of students with severe EBD, and 2) to identify the degree to which implementation fidelity and grade level moderates the effectiveness of TIERS to affect their PCB. Thus, the present study aims to increase our knowledge about the effectiveness of TIERS to promote the PCBs of students with severe emotional and behavioral challenges.

II. REVIEW OF THE LITERATURE

A careful review of the scholarly literature in the area of EBD research was conducted. Prior to discussing the evidence-based supports for students with EBD, it is essential to first learn about and understand who these students are and the types of challenges they present with in educational settings. It is also imperative to examine current interventions and programs for students with EBD to provide the backdrop necessary for understanding the role and evidence-base for implementation of the TIERS program.

This section offers a summary of contemporary knowledge pertaining to: 1) the identification of students with EBD in accordance with IDEA, 2) a summary of characteristics of students with EBD, 3) a description of where students with EBD are current served in schools, 4) a summary of programs available for students with EBD, and 4) a review of the key components and strategies included in the TIERS program. Each of these topics is important in understanding the student population and the context relevant to the present study.

Identification of Students with EBD under IDEA

In order to fully understand the characteristics of students who are identified with EBD, it is important to examine the legal definition that establishes the criteria by which students become eligible. As stated under section 300.8(a)(4)(i) of the Individuals with Disabilities Education Improvement Act (IDEA) amendments of 2004, an emotional disturbance exists when a student exhibits one or more of the following five characteristics over a long period of time and to a marked degree that adversely impacts his or her educational performance:

> (a) an inability to learn that cannot be explained by intellectual, sensory, or health factors, (b) an inability to build or maintain satisfactory interpersonal relationships with peers and teachers, (c) inappropriate types of behavior or feelings under normal circumstances, (d) a general pervasive mood of unhappiness or depression, and (e) a tendency to develop physical symptoms or fears associated with personal or school problems.

Previous versions of IDEA used the term *serious emotional disturbance*, but the 2004 revisions to IDEA uses the term *emotional disturbance* to describe students with EBD. Despite changes in the terms used to refer to students with EBD, the defining characteristics have remained the same. While many students may have experienced moments of interpersonal difficulties, depression, or anxiety during the course of their school history, the law clearly states that one or more behaviors must be exhibited to an extent that significantly impacts educational performance to be considered a true disability in this category. Furthermore, the identified behavior(s) must be considered to have reached a level of significant intensity, with evidence of its occurrence over an extended period of time.

Characteristics of Students with EBD

Research has previously delineated the characteristics that are prevalent among students with EBD. The following provides a brief synthesis of these characteristics, including sociodemographic factors, internalizing and externalizing behaviors, social skills, academic performance, neuropsychological factors, home and school connections, and long-term outcomes.

Sociodemographic Characteristics. There is a large discrepancy between the number of boys and girls with EBD, with nearly 80% being male [U.S. Department of Education's National Center for Education Statistics (NCES), 2015]. The national ethnic makeup of the students with EBD are 52% White, 26% Black, 14% Hispanic, 3% Mixed Race, 1% American Indian/Alaskan Native, and less than 1% Asian or Pacific Islander (NCES, 2015). In California, students with EBD are 38% White, 39% Hispanic, 14% Black, 3% Mixed Race, 3% Asian, and less than 1% Pacific Islander [California Department of Education (CDE), 2017]. As noted by Wagner and colleagues (2005), national data suggest a significant overrepresentation of Black students identified as ED, while Hispanic students are underrepresented relative to their representation in the general population. Current statistics from the CDE (2017) suggest this to be true for California as well.

In comparison with other students in the general population, students with EBD are also more likely to have several demographic characteristics that are associated with poor health, education, and social outcomes. For example, students with EBD are more likely to be economically disadvantaged and live with a single parent, in foster care, or alternative arrangement (Cullinan, Epstein, & Sabornie, 1992; Wagner et al., 2005). Approximately one

third live below the poverty level with a single parent, and one fifth live in households with the primary caregiver being unemployed (Wagner et al., 2005).

Internalizing and Externalizing Behaviors. The behavior patterns of students with EBD are typically described as internalizing, externalizing, or a combination of the two. The central feature of internalizing behaviors is disordered mood, as it refers to behavior problems directed inward toward the self (Kovacs & Devlin, 1998). Students who display signs of withdrawal, anxiety, and depression are typically considered internalizers (Christensen, Young, & Marchant, 2007). Teachers often view these students as merely shy, failing to recognize the negative consequences this behavior can have on their continued development (Marchant et al., 2007). As a result, students who are internalizers may be more likely to go unnoticed, particularly in the presence of students who display more visible acting-out behaviors. Internalizing disorders include anxiety-related disorders, mood disorders, and suicidal ideation (Gresham & Kern, 2004). In contrast, externalizing problems are typically more visible and disruptive to the learning environment. This pattern of behavior is overt and can be described as disruptive, hyperactive, and aggressive (White & Renk, 2012). Conduct disorder, oppositional defiance, and attention problems are related to externalizing behaviors (Hopwood & Grilo, 2010). Whether a student with EBD presents primarily with externalizing behavior problems, internalizing behavior problems, or some combination of the two, without appropriate support services these behaviors often negatively impact the child at school and in society.

Social Skills Deficits. Social skills are defined as context-based, interactive, learned behaviors that are necessary for successful functioning in life (Gresham & Elliott, 2008). Indeed, the ability of a child to establish and maintain positive interpersonal relationships,

gain peer acceptance, and establish and maintain friendships is indicative of long-term psychological and social adjustment (Gresham, Sugai, & Horner, 2001). As children develop, they are likely to encounter settings and situations with various individuals including family members, peers, teachers, and others at an increasing rate. Although many students can perform socially appropriate behaviors and fluently interact with peers and adults, not all have the natural capacity to do so. This statement is particularly true for students with disabilities. Results from the U.S. Department of Education's National Longitudinal Transition Study-2 (NLTS2) found over 70% of youths with disabilities have significant social skills deficits (Wagner, Newman, Cameto, Levine, & Garza, 2006). At the forefront of this statistic are students with EBD, with the difference in social skills particularly striking when compared to typically developing peers.

As highlighted by Gresham and colleagues (2001), students with EBD oftentimes have social skills deficits that lead to inappropriate interactions with peers and adults, social withdrawal, and low academic achievement. Indeed, it can be argued that two of the five criteria established in IDEA for identifying students with EBD (1. an inability to build or maintain satisfactory interpersonal relationships, and 2. the expression of inappropriate behavior or feelings under normal circumstances) involve social skills (Gresham, Van, & Cook, 2006). For students with EBD to increase their social skills, it may not be enough to simply expose them to social situations and hope that they learn. As indicated in their research in the prevention of behavior problems in schools, Sugai and colleagues (Sugai, Sprague, Horner, & Walker, 2000) found that approximately 80 percent of children benefit from general behavior change interventions, but at least 10-15 percent require targeted and explicit social skills lessons in the context of typical classroom routines.

Academic Deficits. As previously mentioned, the behaviors that students with EBD engage in often contribute to learning difficulties. In an examination of 25 studies on the academic performance of students with EBD, Reid and colleagues (Reid, Gonzalez, Nordness, Trout, & Epstein, 2004) found that 75% of students with EBD performed at a significantly lower level compared to their typically developing peers across academic subjects including reading and mathematics. This should be expected, because current criteria for identification of EBD require that students show a deficit in academic achievement. Notably, findings from studies also indicate that students with EBD are more likely to show academic deficits and lack of progress when compared to other students with high-incidence disabilities (e.g., learning disabilities) (Sabornie, Evans, & Cullinan, 2006). For instance, Anderson, Kutashm and Duchnowski (2001) conducted a study that compared the academic progress of K-6 students with EBD and students with learning disabilities (LD) over the course of 5 years. Their findings revealed that students with LD made significant gains in reading scores over time, but the same was not true for students with EBD. The students with EBD showed little change, even though their average scores were significantly higher compared to the students with LD in the early elementary grades. These findings suggest that having EBD may have a more adverse impact on academic progress than LD (Nelson, Benner, & Mooney, 2013).

Although the research has consistently indicated a lack of increase in academic skills of students with EBD, the degree to which students fail to make academic progress has been found to vary significantly across studies (Lane, Barton-Arwood, Nelson., & Wehby, 2008). Specifically, findings differed regarding whether academic deficits in various subject areas (e.g., reading, mathematics, written language) remain stable or worsen over time. For

instance, Mattison, Hooper, and Glassberg (2002) conducted a study examining the test data that existed from the routine 3-year reevaluations conducted by schools for a group of students with EBD between the ages of 6 and 16. In comparing the academic achievement test results from two time points for their sample of students with EBD, no significant difference was found, which supports that deficits remain stable over time. In contrast, Greenbaum and colleagues (Greenbaum et al., 1996) collected descriptive data on children with EBD over a 7-year period that suggests academic deficits worsen over time. In their study, the percentage of students reading below grade level at the time of intake (ages 8-11), 4 years later (ages 12-14), and 7 years later (ages 15-18) was 54%, 83%, and 85%, respectively. In mathematics, the percentage of students performing below grade level at intake, 4 years later, and 7 years later was 93%, 97%, and 94%, respectively.

Neuropsychological Profile. In addition to the general academic deficits observed in students with EBD, a number of studies have provided further insight into the cognitive profile of students with EBD. In a meta-analysis conducted by Sabornie, Cullinan, Osborne, and Brock (2005), a total of 58 studies were examined to compare the intellectual and academic functioning of students with EBD to students with other high incidence disabilities [e.g., LD and mild intellectual disabilities (MID)] and students without disabilities. Participants included students in preschool to the 12th grade across various educational settings including general education, resource, and self-contained classrooms. Results of this synthesis revealed the greatest disparity in performance between students with EBD and students with MID, but little difference was found between the IQ scores of students with EBD and students with LD. The study supports that IQ scores of students with EBD were similar to those with LD; they performed in the average to low-average range.

In the area of language functioning (in both receptive and expressive domains), students with EBD have been found to lag behind typically developing peers (Benner, Allor, & Mooney, 2008). In a cross-sectional study of the extent to which students with EBD in public school settings experience language skill deficits, results indicated that students with EBD experience significant language deficits relative to those of the norm group, as 68% of the sample of students with EBD scored clinically significant for language deficits (Nelson, Benner, and Cheney, 2005). Recent estimates indicate about two-thirds of students with EBD in the public schools have a language deficit, as opposed to previous estimates of 9 out of 10 students with EBD experiencing this challenge (Benner, Nelson, & Epstein, 2002).

Our knowledge about the prevalence of language deficits among students with EBD continues to grow, but less is known about other areas of deficit related to school performance. However, rising interest in the role of processing speed (i.e., rapid automatic naming and academic fluency) in the cognitive processing and social adjustment of students with EBD has recently led researchers to further examine its effects on students with EBD (Benner, Ralston, & Feuerborn, 2012). An investigation into the neuropsychological characteristics of students with EBD was conducted by Mattison, Hooper, and Carlson (2006). In their study, Mattison and colleagues administered a neuropsychology screener to 35 elementary school students with EBD. Results of this study found that nearly two-thirds of these students performed below the 2nd percentile on a subtest designed to measure processing speed. Results from a study conducted by Benner, Allor, and Mooney (2008) also found that 57% of their sample of K-12 students with EBD in public school settings exhibited processing speed deficits. These findings suggest a need for further research to

explore the underlying cognitive processes that contribute to the difficulties experienced by students with EBD in schools.

Disconnect Between Home and School. Findings from large-scale studies using nationally representative samples of students reveal that students with EBD are less likely to have families that are actively involved in their education compared to peers with and without disabilities (Newman, 2005; Wagner et al., 2012; Wagner, Kutash, Duchnowski, Epstein, & Sumi, 2005). While some parents may attend meetings with school staff, these meetings are oftentimes used to discuss disciplinary problems and consequences rather than build positive relations for the benefit of the student (Duchnowski, Kutash, Green, Ferron, Wagner, & Vengrofski, 2012). Additionally, parents of students with EBD are less actively involved in the development of the IEP or plans for academic remediation and transition (Duchnowski , 2012; Wagner et al., 2012). Given these findings, it is not surprising that the literature also identifies that parents of students with EBD report higher levels of dissatisfaction with their children's education (Wagner et al., 2012).

Long-term Consequences. The educational and post-school outcomes for students with EBD have been and continue to be grim. A large body of research exists that show this group of students experience the poorest outcomes compared to any other group (Unruh & Murray, 2014). As reported by the National Longitudinal Transition Study (NLTS), students with EBD earned the lowest grade point averages compared to students in all other disability categories (Sutherland & Wehby, 2001). According to the National adolescent and child treatment study (NACTS) findings that compiled descriptive data on students with EBD over a 7-year period, approximately 40% of students with EBD did not earn a high school diploma (Greenbaum et al., 1996). When looking at dropout rates by disability category,

figures have fluctuated across time but students with EBD have been found to be consistently higher than any other group of students (Reschly & Christenson, 2006). Data from the NLTS2 revealed that over half of students with EBD dropped out of school, a rate that was double that of general education students (Bradley, Doolittle, & Bartolotta, 2008). A recent report about student mobility and graduation rates in Utah public schools (Barrat et al., 2014) presents an example of current statistics consistent with previous findings. The report included statewide administrative data on a 4-year cohort graduation and dropout rates for students with and without disabilities enrolled in the 9th grade during the 2007-2008 school year. Results showed that students with disabilities had a lower four-year graduation rate and higher drop-out rate than general education students. It was indicated that 44 percent of students with EBD in the 2011 cohort dropped out, which is nearly 20 percent higher than the average for all students with disabilities combined. For students with EBD, the graduation rate was actually lower than the dropout rate, making dropping out the most common outcome for this group.

After leaving the K-12 school system, few students with EBD continue on to pursue postsecondary education (Bradley et al., 2008). Employment outcomes are also bleak, as illustrated in several longitudinal studies such as the NLTS and the more recent NLTS2. The initial NLTS showed that merely half of students were employed within 3 years of leaving the school system. This figure has decreased as the NLTS2 reported an employment rate of only 30%. Furthermore, for those who were employed, the majority worked in low paying jobs that did not require a high school diploma and would frequently change jobs (Bradley et al., 2008; Wagner, Newman, Cameto, Garza, & Levine, 2005).

In the social arena, youths with EBD frequently have dysfunctional relationships with family members and those they work with in their place of employment (Greenbaum et al., 1996). While participation in prosocial community activities such as volunteer work and participating in sports teams or recreational clubs have notably increased between the NLTS and NLTS2, so has the arrest rate for young adults with EBD (Wagner, Newman, Cameto, & Levine, 2005). Within 2 years of leaving secondary school, nearly 9 out of 10 youths with EBD have experienced at least one of the following: disciplinary trouble in school, loss of employment, and legal arrest (Wagner et al., 2005).

Where Students with EBD are Currently Served

There has been much debate regarding the ability of public schools to support students with EBD in general education settings. However, exclusionary practices and restrictive school environments have also been questioned (Place, Wilson, Martin, & Hulsmeier, 2000). Since the passing of the Individuals with Disabilities Education Act (IDEA) in 1975, schools have been required to ensure students with EBD a free and appropriate public education (FAPE) in the least restrictive environment (LRE). That is,

> *To the maximum extent appropriate, children with disabilities including children in public or private institutions or care facilities, are educated with children who are nondisabled; and special classes, separate schooling or other removal of children with disabilities from regular educational environment occurs only if the nature or severity of the disability is such that education in regular classes with the use of supplementary aids and services cannot be achieved satisfactorily.* (IDEA 2004, sec. 612(a)(5))

The language addressing LRE has not changed since 1975, and continues to reflect the value IDEA has placed on educating students with disabilities alongside students without disabilities as much as possible. However, if there is recognition that a student with EBD would not receive any meaningful educational benefit from being fully included in a general education program, a more restrictive setting may be warranted given that appropriate attempts to provide services aimed at increasing access to the general education curriculum have not been successful.

For students with EBD, a number of individuals may be involved in the discussion of placement, including but not limited to parents, teachers, school administrators, and other school personnel (e.g., school psychologist, behavior specialist, and speech and language pathologist). This group of individuals comprise the individualized education plan (IEP) team tasked with the important job of matching the student with EBD to a placement that best fits his or her current academic, social-emotional, and behavioral needs. Placement decisions can occur at various times, including: when the student is first considered eligible for special education services under the category of emotionally disturbed, and when the student transitions from one placement to another (e.g., middle school to high school or residential program to juvenile justice facility). A change in placement may also be considered to address a student's academic needs or classroom behaviors (Mathur & Jolivette, 2012).

In the last three decades, there have notable changes in placement practices for students with EBD. For instance, from 1990 to 2007, a 27% decrease was seen in the percentage of students with EBD placed in separate classrooms or separate schools (McLeskey, Landers, Williamson, & Hoppey, 2012). From 1990 to 2007, a 105% increase

was seen in the percentage of students with EBD spending at least 80% of their school day in the general education setting (McLeskey et al., 2012). McLeskey and colleagues' (2012) study of changes in placement trends for students ages 6-17 across the 50 states and the District of Columbia from 1990-1991 through 2007-2008 revealed that both elementary and secondary students with EBD have generally experienced movement toward less restrictive placements. However, their overall findings revealed only 58% of students with EBD spent most of their time in general education classrooms, whereas 42% were placed in separate classrooms or separate schools. One possible explanation for such a high proportion of students with EBD placed in separate settings is that many are in need of specialized supports that are often difficult to provide in the general education setting (Kauffman, Mock, & Simpson, 2007, McLeskey et al., 2012).

Setting Type and School Performance. In considering the range of contexts that students with EBD are served in, research has examined how the performance of students with EBD compares across different educational placements. In a meta-analysis conducted by Reid and colleagues (2004), the academic performance of students with EBD was examined across four different instructional settings: general education classrooms, resource classrooms, self-contained classrooms, and special schools. Their findings revealed that students with EBD exhibited lower performance across academic subjects regardless of their educational setting. The study did not find any significant difference in academic performance across the various instructional settings.

There is other evidence, however, that suggests that the performance of students with EBD varies depending on the instructional setting in which they are placed. For example, Muscott (1997) compared the behavioral characteristics of students with EBD across four

special education placements: resource classrooms, special classrooms, special schools, and residential schools. In this study, a self-report rating scale measuring teachers' perceptions of student behaviors was administered to special education teachers in each of the instructional settings. Results of the study illustrated that elementary students with EBD in residential schools exhibited significantly higher rates of problem behaviors compared to their peers in resource or special classrooms. More recently, Lane, Wehby, Little, and Cooley (2005) compared the academic, social, and behavioral profiles of students with EBD in self-contained classrooms located within general education school sites and students with EBD in self-contained schools. In this study, researchers assessed the progress of 72 students with high-incidence disabilities [i.e., ED, LD, and attention deficit hyperactivity disorder (ADHD)] using a combination of behavior rating scales, curriculum-based measures for reading, and standardized tests of achievement and cognitive abilities. Results indicated that students with EBD placed in self-contained classrooms scored significantly higher in academic skills (e.g., reading fluency, reading comprehension, oral expression, written language, and mathematics) compared to peers placed in self-contained schools. It was also found that students with EBD in self-contained classrooms experienced higher levels of internalizing problems compared to those in self-contained schools.

The Case for More Restrictive Settings. For many students with EBD, the general education setting is simply not adequately equipped to provide the supports necessary to facilitate their school success. Not all students with EBD require placement in restrictive settings, but there continues to be many who are served in restrictive settings. As argued by Landrum, Tankersley, and Kauffman (2003), it seems that many students with EBD benefit

from specialized educational settings taught by highly trained educators that can provide them with the individualized attention needed for academic and behavioral success.

In considering the most appropriate instructional placement for students with EBD, several court cases including *MR v. Lincolnwood Board of Education* and *Clyde K. and Sheila K. v. Puyallup School District* in 1994 have supported the need for placement in more restrictive settings (Jones, Dohrn, & Dunn, 2004; Yell, 1995). For instance, in the case of *MR v. Lincolnwood Board of Education* (1994), parents of a student with EBD sought full inclusion for their child despite the school's recommendation of placement in a therapeutic day school. The court ultimately ruled in favor of the school as findings from the court proceedings indicated that the student's "bizarre" and disruptive behavior did not make clear that his education could be satisfactorily achieved in the mainstream setting; "a more structured program with additional support services" (M.R. R.R., 1994) was deemed most appropriate.

Programs Available for Students with EBD

A review of the literature reveals three popular intervention program models for students with EBD, including (a) positive behavior support; (b) comprehensive classroom management; and (c) re-education (Curtis, Galbreath, & Curtis, 2005). These programs, when implemented in an integrated fashion, support positive school behaviors for students with emotional and behavioral challenges. A brief description of each of these models are presented below.

Positive Behavior Support. Positive behavior support (PBS) refers to the application of behavioral interventions and systems based on the principles of applied behavior analysis to achieve socially significant behavior change (Carr et al., 2002; Sugai,

Sprague, Horner, & Walker, 2001). This particular model emerged from large-scale government and educational research programs (Bradley, 2001; Sugai & Horner, 2001) in response to dramatic incidents of school violence that have increased the public's awareness of school safety and disciplinary practices (Skiba & Peterson, 2000). Similar to that of the ecological view of EBD (Hobbs, 1975), PBS frames the etiological basis of behavior as the interaction between the individual and the environment (Jackson & Panyan, 2002). PBS interventions are designed to prevent problem behaviors by altering the environment, thus reducing the likelihood of their occurrence while concurrently teaching appropriate alternative behaviors (Carr et al., 1999). When applied in school settings, PBS can be organized into three levels of prevention (Horner, Sugai, Todd, & Lewis-Palmer, 2005; Walker et al., 1996) including (a) primary prevention, strategies for all students (e.g., school-wide disciplinary procedures, class-wide behavior management strategies, and effective instructional strategies); (b) secondary prevention, strategies targeting students at risk for developing chronic behavior problems (e.g., problem-solving and anger management training); and (c) tertiary prevention, more intensive supports that are assessment-based and target the individual needs of students with chronic behavior problems (e.g., functional behavior assessments, behavior intervention plans). Given its tiered system of supports that increase in intensity as student's behavioral needs increase, PBS has also been referred to as "RTI for behavior" (Bradley, Doolittle, & Bartolotta, 2008; Gresham, 2005). Successful implementation of PBS programs require a collaborative team of school-based professionals including teachers, administrators, and other service providers to plan and execute the program as well as evaluate effectiveness (Todd, Horner, Sugai, & Sprague, 1999).

Comprehensive Classroom Management. This model emphasizes the fostering of positive relationships between teachers and students as the primary means for managing student behavior. The importance of student relationships and sense of community have long been supported by the research literature (Farmer, Farmer, & Gut, 1999). For example, a study of 1,434 elementary school students from 24 ethnically and socioeconomically diverse schools across the United States found that schools that reported higher "sense-of-community" ratings were associated with significantly lower numbers of delinquent behaviors (Battistich & Hom, 1997). Although Comprehensive Classroom Management includes many elements of PBS (i.e., establishing behavioral expectations, systematic response to behavior problems, and designing individualized behavior plans for students with persistent behavioral challenges), the model primarily emphasizes (a) creating a positive school-wide climate, (b) involving students in establishing classroom behavior norms, (c) promoting problem-solving skills, and (d) involving parents in their children's education (Jones & Jones, 2015). As stated by developers Jones and Jones (2015), the development of a supportive community is essential for supporting the needs of students with EBD.

Re-Education of Emotionally Disturbed Children and Youth. Re-education of Emotionally Disturbed Children and Youth (Re-ED) was initially a National Institute of Mental Health (NIMH) funded project to develop a program for use in residential treatment facilities in the 1960s (Hobbs, 1966; Paternite & Johnston, 2005). Today, it is promoted as a program model with a psychoeducational approach that can also be implemented in schools. Central to the philosophy of Re-ED is the idea that supportive relationships and positive experiences allow children and adolescents to learn healthy ways of dealing with life's

problems. Unlike PBS and Comprehensive Classroom Management, Re-ED does not have a clearly defined set of intervention strategies but endorses four core beliefs to guide the thinking and actions of those serving students with EBD. These core beliefs, in broad terms, are (a) supportive and trusting relationships have restorative value, (b) creating opportunities where students must deal with problems are required for learning, (c) the interactions among those individuals important in the life of a child can have significant impact on their well-being, and (d) students need to experience success (Paternite & Johnston, 2005; Shepard & Freado, 2012). Under this guiding set of beliefs, students are taught a set of principles articulated by Hobbs (1982) that continue to be held by all Re-ED programs today: (a) life is to be lived in the present, (b) trust is essential, (c) competence makes a difference, (d) the group is important, (e) community is important, (f) time is an ally, (g) the body is the armature of the self, (h) intelligence can be taught, (i) self-control can be taught, (j) feelings should be nurtured, (k) ceremony and ritual give order, and (l) children should experience joy each day.

Of the three program models described above, PBS enjoys the greatest amount of support in the research literature. Comprehensive Classroom Management is described by its authors as a model consisting of research-based supports (Jones & Jones, 2015), but no empirical evidence in the research literature is available at this time to support its efficacy with any student population. Re-ED has only garnered slightly more support in the research literature with three studies that have supported its efficacy in residential settings (Fields, Farmer, Apperson, Mustillo, & Simmers, 2006; Lewis, 1988; Weinstein, 1974). PBS, on the other hand, has become widely recognized as a research-based alternative to traditional reactive disciplinary practices. With extensive data supporting its effectiveness in reducing

incidents of student problem behaviors, it continues to be endorsed as a best practice in federal legislation (IDEA). At the school level, multiple studies have found significant reductions in the number of office referrals after implementing a school-wide PBS system (e.g., Taylor-Green et al., 1997; Scott & Barrett, 2004). In a pilot project conducted by Jeffrey, McCurdy, Ewing, and Polis (2009) to develop a process for providing performance feedback to teachers implementing PBS in nine classrooms for students with EBD, initial results demonstrated a significant increase in the active and passive on-task behavior of students (e.g., looking towards the blackboard during teacher-led instruction, raising hand to ask questions, answer questions when asked, reading silently when instructed, etc.) when classwide PBS was implemented with a greater level of integrity. At the individual student level, a recent meta-analysis conducted by Goh and Bambara (2010) reviewed 83 studies and concluded that individualized PBS does yield positive outcomes for students with and without disabilities (i.e., reduction in reports of behavior problems). While these findings are promising, few studies investigating the effectiveness of PBS focus on or even include students with severe EBD. For example, only one of the 83 studies in the meta-analysis conducted by Goh and Bambara (2010) targeted students with EBD; this study had a sample size of one student (Smith & Sugai, 2000). Despite the accomplishments and contributions of PBS, scholars have recently argued for the need to develop more comprehensive intervention program models to address the often multifaceted and complex issues contributing to the struggles of students with EBD (Kern, Hilt-Panahon, & Sokol, 2009; Maggin, Wehby, Farmer, & Brooks, 2016).

The TIERS Program

Critical elements for effective practices in programs serving students with EBD have been well-documented in the extant literature (Lewis, Hudson, Richter, & Johnson, 2004; Simpson, Peterson, & Smith, 2011). These elements include: evidence-based academic instruction, social skills instruction, effective behavior management plans, parent involvement, ongoing data-driven progress monitoring, and transition support. The use of interventions supported by scientific research is often cited as the recommended approach to practice for serving children and adolescents in schools. Although the TIERS model has not been rigorously tested and lacks empirical evidence of the comprehensive model, Cook and Browning Wright (2009) argue that the practices that constitute the TIERS model have been individually found to improve outcomes for students with EBD in the research literature. The TIERS model organizes interventions across a tiered continuum, providing multiple levels of emotional and behavioral support at varying levels of intensity that is matched to the individual students' needs. Embedded within this model is a problem-solving process that educators are continuously engaged in. This dynamic process involves ongoing communications between school staff to identify problems, analyze the problems, develop plans to address the problems, implementing the plans to address the problems, and then evaluating the effectiveness of the plans to address the problems. To guide decisions on whether to maintain or change the intensity of supports, progress monitoring data are used. The issue of implementation fidelity is also a consideration when reviewing student progress and response to intervention. With these key elements in place, the research literature suggests that students with EBD will benefit; it is anticipated that the implementation of

these elements as intended will produce positive changes in observable student behaviors within the classroom context.

In addition to the core elements listed above, TIERS aims to bridge consistent communications between school and home. This means that school staff are in frequent contact with parents, working together when possible to address emotional and behavioral challenges across school and home. And to the extent that it can be accomplished, TIERS supports the collaboration of parents, teachers, and other service providers to support students with EBD across contexts.

Given that a TIERS classroom is designed to offer supports beyond the capabilities of the general education setting, the model provides clear guidelines regarding the set up and format of a TIERS classroom. As indicated by Cook and Browning Wright (2009), a TIERS classroom will consist of a reduced class size of 6 to 12 students. The ratio of staff to students is also reduced to one adult for every five students (1:5). With smaller class sizes and a higher number of support staff, students will be able to receive individualized support and have a higher number of opportunities to engage in teaching interactions that will facilitate their learning. Staff will then also be able to better monitor student behavior and reinforce positive classroom behaviors.

In total, the TIERS program consists of 16 core elements. They are as follows: (a) establish, maintain, and restore positive relationships, (b) establish physiology to learn, (c) positive behavior supports, (d) social skills curricula, (e) social emotional learning curricula, (f) proactive classroom management strategies, (g) good behavior game, (h) points and levels system tied to Honors and Reboot room, (i) PROMPT procedure follows problem behavior, (j) Honors Room and Outings, (k) Reboot room used to encourage better behavior,

(l) effective academic instruction, (m) relentless outreach to parents, (n) daily debrief among staff, (o) self-governance meetings, and (p) problem-solving efforts for students not responding to the program. Each of these elements and the related literature are discussed below.

Establish, Maintain, and Restore Positive Relationships. Positive teacher-student relationships have been linked to positive school outcomes in the literature. Higher quality relationships, as characterized by high degrees of warmth and trust and low conflict and dependence (Birch & Ladd, 1997; Pianta, 1999), have been shown to be associated with increased school engagement and fewer disciplinary referrals (Bergin & Bergin, 2009). For example, a study by Birch and Ladd (1997) found that when the teacher-student relationship is characterized by warmth and open communication, children showed higher levels of overall school adjustment relative to peers who were reported as having lower levels of warmth and open communication in their relationships with their teachers. Teacher-student conflict was found to be positively correlated with school avoidance and negatively correlated with school liking, self-directedness, and cooperative participation. Additionally, higher reports of student dependence on teachers were associated with more school adjustment problems such as negative attitudes towards school and lower level of engagement in the classroom. In another study examining the extent to which the quality of teacher-student relationships affect various school outcomes, Hamre and Pianta (2001) followed a group of 179 children from kindergarten through the eighth grade. Kindergarten teachers rated their students' behavior and the quality of their relationship, and follow-up data was collected on grades, standardized test scores, work-habit ratings, and discipline reports from first through the eighth grade. Results showed that kindergarten teacher ratings

of the quality of the teacher-student relationship predicted grades and standardized test scores through the fourth grade, as well as their work habits and number of disciplinary actions through middle school.

While there may be some evidence to suggest that students feel their relationships with teachers worsen over time (Lynch & Cicchetti, 1997), findings from the National Longitudinal Study on Adolescent Health shows that relationships with teachers are one of the most common resources for adolescents and may function as a protective factor against a range of undesirable outcomes. Specifically, higher quality teacher-student relationships may protect youths against mental health problems like depression (Joyce & Early, 2014) as well as poor school performance associated with the lack of a supportive home environment (Cicchetti & Lynch, 1993). While the majority of studies examining teacher-student relationships were conducted with students in the general education setting, some research on the impact of relationships on the school functioning of students with disabilities have emerged. For instance, Marray and Malmgren (2005) implemented a teacher-student intervention program targeting high school students with EBD for five months. Results of the study found that after controlling for pre-test differences, students who participated in the intervention program earned higher grade point averages (GPAs) than those students who did not. Overall, research findings indicate that teacher-student relationships are important and predictive correlates of students' academic and behavioral adjustment in school.

In the TIERS model, positive relationships with students need to be built, maintained, and restored if it is damaged. To build a relationship, school staff are to (a) spend individual time with the student (i.e., student may lead the activity while teacher

builds rapport with open-ended questions, reflective listening, and validating statements), and (b) keep track of relevant information about the student (e.g., likes/dislikes, special occasions, hobbies, important individuals in their lives) and reference when appropriate. To maintain the relationship, school staff are to (a) have a 5 to 1 ratio of positive to negative interactions with the student, and (b) attending to positive behaviors with a verbal statement, gesture (thumbs up), or physical contact (pat on the shoulder, high five). To restore a relationship after damage, the school staff member is to complete the following steps: (a) communicate to the student that they are starting over, (b) admit to any mistakes that he or she may have made, (c) communicate to the student that he or she still cares for the student, and (d) forgive the student and/or ask for forgiveness.

Establishing Physiology to Learn. The TIERS program model emphasizes the importance of developing and maintaining practices that positively contribute to students' physiological health. This means that students receive instruction on proper diet, engage in physical exercise daily, learn about and report to the teacher about sleep habits, and participate in mindfulness-based activities for stress management. The association between physiological health, learning, and behavior have been well documented in the literature (Dani, Burrill, & Demmig, 2005). A proper diet including protein, iron, and iodine can have potent effects on brain function, which in turn can impact a student's behavior and ability to learn (Dani et al., 2005). Moreover, recent research has identified micronutrients such as essential fatty acids, minerals, and vitamins to ameliorate psychiatric symptoms such as depression, mood swings, and aggression (Kaplan, Fisher, Crawford, Field, & Kolb, 2004). Physical exercise increases blood flow to the brain to promote cognitive functions, and raises levels of norepinephrine and endorphins that may improve mood and reduce stress

(Taras, 2005). In a retrospective analysis conducted to assess trends in indicators in association with the implementation of a program focused on promoting good nutrition and exercise in an elementary school, Nansel and colleagues (2010) examined publicly available school records between 1995 and 2006. Health and educational outcomes were regressed on year, beginning with the year prior to program implementation. Results revealed an increasing trend in standardized test scores and decreasing trend in number of nurse, counseling, and disciplinary referrals beginning in 1999 when the program was first implemented. These findings suggest that promoting good dietary and exercise habits, including instruction on health-related topics, can complement educational needs (Nansel, Huang, Rovner, & Sanders-Butler, 2010). The importance of sleep on learning and memory processes has also been well established in the literature. An examination of studies with experimental manipulations of school-aged youths' sleep length and quality confirmed that poor or fragmented sleep is associated with cognitive and behavioral problems (Curcio, Ferrara, & De Gennaro, 2006). Sleep has also been linked to academic outcomes. In an important study of sleep schedules and the daytime functioning of 3000 high school students, Wolfson and Carskadon (1998) found that students with higher grades reported higher total number of hours of sleep and more consistent bedtimes than students with lower grades. Finally, while the current research base supports the application of mindfulness-based approaches to children and adolescents for stress reduction, there also appears to be a paucity of empirical evidence demonstrating the effectiveness of these interventions for stress inoculation (Burke, 2010). There is, however, some growing evidence of mindfulness-based interventions (MBIs) as a promising practice for reducing problem behaviors. Klingbeil and colleagues (2016) recently conducted a meta-analysis of 10 single-case

studies on the effects of MBIs on decreasing disruptive behaviors. Findings showed that MBIs had a medium effect on students' disruptive behavior.

Positive Behavior Supports. The TIERS program promotes the use of positive behavior supports, which includes establishing behavioral expectations and reinforcing positive student behaviors with behavior-specific praise (Stormont & Reinke, 2009). Behavioral contracting and functional behavior assessment are also used as positive behavior supports. A brief description of each of these positive behavior supports is provided below.

Establishing Behavioral Expectations. In a TIERS program, behavioral expectations are established with clear and positive statements (e.g., be safe, be responsible, and be respectful). In addition to ensuring that expectations are stated positively regarding observable behavior, positive consequences for following rules as well as negative consequences for behavioral violations are clearly communicated. Rules are posted in the classroom, explicitly taught, and regularly reviewed. In an extensive review of the literature on effective classroom management practices, Simonsen and colleagues (2008) reported that posting, teaching, and reviewing behavioral expectations to be associated with decreases in off-task/disruptive behavior and increases in academic engagement, leadership, and successful conflict management.

Use of Praise. The TIERS program also supports the use of teacher praise, which the research indicates to be generally underutilized by teachers of students with EBD (Sutherland, Wehby, & Copeland, 2000). However, there is some evidence that praise can be used as an antecedent-based intervention to increase desirable behaviors of students with EBD. For example, Sutherland and colleagues (2000) found that using behavior-specific

praise with a group of nine fifth grade students with EBD increased on-task behavior. In an ABAB withdrawal design, the rate of praise was increased to a set criterion level during the intervention phases. Results showed that students' on-task behavior increased when the praise increased, and decreased during the withdrawal phases.

Behavior Contracting. Behavior contracting refers to an agreement made between the teacher and student as to what behaviors are considered appropriate and inappropriate, and their related consequences. This support is used in a TIERS program for students who are at risk for developing a chronic behavior problem. As outlined by Ruth (1996), the five key elements for school behavior contracts are the main goal (behavioral objective), target behavior (operationally defined behavior to increase or decrease), recording (progress monitoring), feedback (information regarding performance and future targets), and reward contingency (criteria for success). When implemented as intended, behavior contracting has been shown to be effective for improving student behavior. For example, White-Blackburn, Semb, and Semb (1977) conducted a study on the effects of behavior contracts targeting on-task behavior, disruptive behavior, assignment completion, and weekly grades for 6th grade students. The contracts were presented to students with a list of good behavior goals and a list of disruptive behaviors, each of which corresponded with a specific reward or penalty. Students were allowed to negotiate the terms of the behavioral goals and related contingencies with the teacher. The contracts were then reviewed at specified times and a decision would be made by the teacher regarding whether the students earned a reward or penalty. The overall findings indicated that behavioral contracting helped to increase on-task behavior and work completion while it was in effect. Ruth (1996) found similarly encouraging results with the use of behavior contracts with special education students. The

sample consisted of 43 special education students (31 classified as emotionally disturbed) enrolled in 1st through 6th grade. Contracts targeted the increase of low-frequency prosocial behaviors and the decrease of high-frequency disruptive behaviors. Findings of the study indicated a high rate of success. The attainment percentage of daily, weekly, and total contract goals was 75%, 72%, and 86%, respectively. In TIERS, behavior contracts focus on goals for increasing positive behaviors and include response cost contingencies on an as-needed basis.

Functional Behavior Assessment / Behavior Support Plan. For those students who are displaying severe and maladaptive problem behaviors that are pervasive and seemingly resistant to change, a clear and comprehensive analysis is indicated to help inform the development of individualized behavior plans. To accomplish this, a functional behavior assessment (FBA) is conducted to gather information about the contextual factors surrounding a problem behavior (Crone & Horner, 2003). More specifically, the FBA is conducted to determine the range of behaviors exhibited by a student, the antecedent conditions that precede those behaviors, and the consequences that maintain the behaviors (O'Neill, Albin, Storey, Horner, & Sprague, 2014). This information ultimately informs the development of comprehensive behavior support plans (BSPs) (Crone, Hawken, & Horner, 2015; Ferro & Liaupsin, 2007). A large body of literature supports the general effectiveness of function-based interventions for a range of populations across various settings (Ferro & Liaupsin, 2007). A meta-analysis conducted by Goh and Bambara (2012) examined individualized positive behavior supports developed from FBAs. The analysis included 83 students representing a sample of 145 students with and without disabilities. Results

indicated that FBA-based interventions were moderately effective for increasing appropriate behaviors and reducing problem behaviors.

Social Skills Training. As previously discussed, the majority of students with EBD demonstrate social skills deficits. The TIERS program requires that a portion of every school day (10-30 minutes) be dedicated to explicit social skills instruction. Many investigations of the effects of social skills training have been conducted since the late 1970s showing modest results (Maag, 2006). For example, Gresham (1998) examined three meta-analyses of social skills training outcome studies conducted in the 1990s that resulted in effect sizes ranging from .2 to .47 (Mean = .35). More recently, Maag (2006) examined three meta-analytic reviews of studies involving social skills training for students with EBD. Findings from this review revealed significant variation in the types of results obtained by researchers in this area. For example, one meta-analytic study found the overall effect size of social skills training to be .2 (Quinn, Kavale, Mathur, Rutherford, & Forness, 1999) while another found effect sizes ranging between .48 and .85 (Beelmann, Pfingsten, & Lösel, 1994). Among some of the issues raised in the study by Maag (2006) is the lack of treatment fidelity in many of the past social skills training outcome studies. So while there is reason to be optimistic about the use of social skills training with students with EBD, further research with consideration for implementation fidelity is needed. In a TIERS program, implementation of social skills training is emphasized in conjunction with social-emotional learning curricula to teach broader concepts of emotional regulation and ethical decision-making.

Social Emotional Learning Curricula. Although the research supports the use of individualized social skills instruction, there is also support for various packaged social-

emotional learning curricula (Simonsen et al., 2008). Social-emotional learning programs are intended to help students develop a set of cognitive, affective, and behavioral competencies that provide the foundation for better academic and behavioral adjustment as reflected in improved test scores and grades, more prosocial behaviors, less emotional distress, and fewer conduct problems (Durlak, Weissberg, Dymnicki, Taylor, & Schellinger, 2011). Common goals found in such programs include promoting skill acquisition, improving skills performance, minimizing competing problem behaviors, and facilitating maintenance and generalization of skills (Cook & Browning Wright, 2009). As previously discussed, the TIERS program uses social-emotional learning curricula in conjunction with regular social skills training.

Proactive Classroom Management Strategies. Proactive classroom management refers to an approach to managing the behavior of multiple students at the same time (Cook & Browning Wright, 2009). Teachers' classroom management skills have been found to be positively related to student behavior and achievement in every outcome study to date (Little & Akin-Little, 2008). A considerable body of research highlights the value of using a proactive approach to improve student learning and on-task behavior (Clunies-Ross et al., 2008). A proactive approach to classroom management is described as preventative, meaning teachers will use strategies or alter the environment in ways that will lessen the likelihood of students to exhibit problem behaviors (Clunies-Ross, Little, & Kienhuis, 2008). In a TIERS classroom, proactive strategies are used by teachers to better manage student behaviors and increase academic engagement. These strategies include: organizing the physical space, establishing rules, managing transitions, managing independent seatwork, and communicating effectively with students (Cook & Browning Wright, 2009;

Simonsen, Fairbanks, Briesch, Myers, & Sugai, 2008). Organizing the physical space includes consideration for seating arrangements that allow for effective cooperative learning activities and minimize potential distractions. The rules and procedures adopted by TIERS encompass three main expectations (be *safe*, be *responsible*, and be *respectful*) and are regularly taught, reviewed, reinforced throughout the school year. To increase the likelihood of successful transitions, the expectations for moving from one activity or period to another is also taught, reviewed, and reinforced. During independent seatwork time, the teacher is expected to move around the room to monitor behavior, provide any needed assistance with the academic work, and reinforce appropriate behavior. Throughout the course of the school day, teachers in a TIERS program will engage in competent communication with students to provide corrective feedback and avoid misunderstandings. Competent communication, as described by Cook and Browning Wright (2009) involves structured teaching interactions, delivering effective praise, and deescalating students in an agitated state with a calm and compassionate manner. It has been argued that with the consistent use of these proactive strategies, most problem behaviors will be eliminated and students' engagement with the curriculum content and overall productivity will increase (Wilks, 1996).

PROMPT Procedure is followed in Response to Problem Behavior. Teachers in a TIERS classroom follow what is known as the PROMPT procedure. The PROMPT procedure provides teachers with a progressive system for responding to problem behaviors. This system is consistent with the least-to-most (LTM) prompting method found in the applied behavior analysis literature, which can be described as a hierarchy of environmental cues sequenced from the least amount of help to the most amount of help provided to a student. Procedurally, a teacher will provide a student an opportunity to perform

independently, but will deliver the least intrusive prompt when necessary. The teacher will then deliver increasingly more intrusive prompts as needed for a student to exhibit the desired classroom behavior (Libby, Weiss, Bancroft, & Ahearn, 2008). Specifically, PROMPT stands for the following sequence of prompts (from least to most intrusive): proximity control, redirection, ongoing monitoring to shape behavior, prompt (i.e., direct verbal instruction), and teaching interaction.

Good Behavior Game. The Good Behavior Game is an interdependent group contingency management procedure that can been used in classroom settings to reduce students' problem behaviors (Barrish, Saunders, & Wolf, 1969). Conceptually, the procedure primarily functions to differentially reinforce low rates of behavior. As described by Cook and Browning Wright (2009), the steps to implementing the Good Behavior Game are to divide the class into at least two teams, give each team a point every time one of its members engages in a predefined inappropriate behavior, and then award the teams when either they have outperformed other teams or when they meet a predetermined criterion number of points (i.e., number of behavioral infractions). This procedure, along with its numerous variations described in the literature, have generally been found to be effective for reducing inappropriate behaviors and teaching prosocial skills (Tingstrom, Sterling-Turner, & Wilczynski, 2006). However, the participants in most studies involving the Good Behavior Game have primarily consisted of elementary school-aged children in the general education setting. Studies regarding its effectiveness with adolescents are limited. To date, only one investigation into its effectiveness with adolescents with EBD has been conducted (Salend, Reynolds, & Coyle, 1989). Salend and colleagues used a reversal design to examine the effects of the Good Behavior Game across three special education classrooms

for students with EBD. Results of the study indicated a successful reduction in the variety and frequency of problem behaviors.

Points and Levels System tied to Honors and Reboot Room. The token economy with a points and levels system is a critical aspect of the TIERS program. A token economy is a behavior management program that relies on the principles of operant conditioning (Kazdin, 2012; Kazdin, 1972). Implementing a token economy involves selecting a currency (i.e., the tokens) to be given to students when they exhibit desired behaviors or taken away when they exhibit problem behaviors. The tokens can then be exchanged for access to desired items or activities at a specified time. A review of the literature shows that token economies have been used to successfully increase positive interactions and appropriate classroom behavior, and decrease transition time and inappropriate behavior (Simonsen et al., 2008). It should be noted that this program is only as effective as the motivation system (i.e., the desired items or activities that students can purchase with their earned tokens) behind it. In a TIERS classroom, students earn (and lose) points that serve as tokens throughout the school day based on their behavior. The number of points earned on a daily basis are used to determine whether each student receives access to the Honors Room, which is a designated physical room that is furnished with highly preferred items (e.g., toys and games). If a student earns enough points by demonstrating desirable behaviors, they gain access. If students engage in a behavioral violation (e.g., physical aggression, property damage, elopement, sustained non-compliance or non-responsive to two correction procedures), the Reboot Room is used as a consequence; students' ability to earn points is suspended while in the Reboot Room.

Also embedded within the TIERS token economy system is a levels system, meaning students are able to earn their way through three successive levels (*Daily, Weekly*, and *Natural*) that provide progressively greater access to rewards based on consistent demonstration of prosocial behavior. As described by Cavalier, Ferretti, and Hodges (1997), level systems function as organizational frameworks that allow teachers to systematically shape student behavior. In order to advance through the various levels, students are required to meet certain criteria to evidence their achievement. As students earn their way through these levels, expectations for appropriate behavior increase. Students start at the *Daily* level and are able to earn access to the Honors Room each school day if they earn 80 percent of the day's possible number of points. If a student earns 80 percent of the daily number of possible points for 17 out of 20 days, with the last seven days meeting the 80 percent criterion, then the student advances to the *Weekly* level. Students at the *Weekly* level can earn additional privileges, such as access to scheduled off-campus activities, teacher helper duties (e.g., passing out materials, taking items to the office, etc.), priority seating for certain activities, etc. If a student successfully remains at the Weekly level for four consecutive weeks, he or she is then promoted to the final *Natural* level and has access to all possible reinforcers (e.g., Honors Room, off-campus activities, etc.) and are considered for inclusion in general education activities to further move towards transitioning back to the mainstream setting (Cook & Browning Wright, 2009).

Honors Room / Outings. The use of rewards to motivate students to engage in desirable behaviors is based on the behavioral principle of reinforcement. As the principle states: "behavior is strengthened when followed by positive consequences" (Williams, 1983, p. 64). In a TIERS program, the Honors Room and Outings function as the positive

consequence for positive classroom behavior. As previously noted, Honors Room and Outings are considered rewards within the points and levels system. While Honors Room is a designated space at the school site that is furnished with a variety of highly reinforcing items, Honors Outings are supervised field trips to community settings.

Reboot Room / Reflective Time to encourage better behavior. The TIERS "reboot process" is essentially an isolated timeout procedure that incorporates an overcorrection procedure that aims to decrease undesirable student behaviors. Isolated timeout is a behavior reduction technique that is commonly used in the education of students with EBD. As reported by Zabel (1986), it has been used by over 70 percent of teachers of students with EBD. In general, this procedure involves removing a student from the reinforcing environment thus preventing further opportunities to access rewarding stimuli contingent on the occurrence of specific behavioral responses (Costenbader & Reading-Brown, 1995; Wolf, McLaughlin, & Williams 2006). On the continuum of behavior-reduction strategies, timeout is considered a relatively more aversive procedure as it can function as a form of punishment (Costenbader & Reading-Brown, 1995). However, it is not intended to be used in the absence of a positive behavioral management system that teaches and reinforces desirable behaviors (Bacon, 1990; Costenbader & Reading-Brown, 1995). In the TIERS program, the Positive Behavior Supports and Honors room and Outings (see above) operate as the behavioral management system for teaching and reinforcing desirable behaviors. In order to reeducate the student in the prosocial response after a behavioral offense, the reboot process utilizes overcorrection. Defined as both a punishment procedure to reduce behavior problems and a negative reinforcer to increase appropriate behaviors, overcorrection involves requiring the student who committed the behavioral offense to

correct the effects of the inappropriate behavior (Lenz, Singh, & Hewett, 1991). Thus, overcorrection serves to provide "educative value" as restitution requires the student to practice prosocial behaviors (Foxx, & Azrin, 1972). As attested by MacKenzie-Keating and McDonald (1990) in their review of studies of overcorrection, this procedure has been used to successfully increase desirable behaviors and decrease undesirable behaviors. In the TIERS program, the reboot process is initiated immediately after a behavioral violation that is considered dangerous to the offending student or others, destructive to property, or significantly disruptive and therefore impeding the learning of the student or others. Examples include provoked and unprovoked physical aggression, significant property damage, elopement on and off campus, and sustained non-compliance after two correction procedures (i.e., "teaching interactions). The steps of the TIERS reboot process are as follows: (a) deescalate in a designated area (referred to as the "reboot room"), (b) complete paper-pencil tasks determined by the teacher, (c) debrief with teacher, (d) write apology letter, and (e) deliver apology letter to relevant individual(s). A staff member, oftentimes the teacher or an instructional assistant, will be present in the room but disengaged with the student. It is important to note that while there is some evidence that indicates isolation timeout and overcorrection to be effective behavior change strategies (e.g., MacKenzie-Keating & McDonald, 1990; Yell, 1994), there is a lack of empirical research that supports its use in restrictive classrooms for students with EBD. In fact, there continues to be much controversy regarding the use of isolated timeout procedures (Wolf, McLaughlin, & Williams, 2006). Concerns have been expressed by scholars about the possible use of such procedures without first considering non-punitive behavior management strategies that are more positive (e.g., reinforcement, modeling, and skill training). In a one-year-long study

investigating the use of isolation time out as a behavioral control intervention for 156 students with EBD, researchers found that the average time spent in timeout was 23 hours per student (Costenbader & Reading-Brown, 1995). As discussed by Costenbader and Reading-Brown, this finding was the most striking of the study and raises the question of whether this intervention is truly effective for reducing problem behaviors for this population if students are spending such a high amount of time in timeout.

Effective Academic Instruction. The literature recognizes behavioral and academic issues to be interconnected (Gable, Hendrickson, Tonelson, & Van Acker, 2002; Johnson-Harris & Mundschenk, 2014). Thus, addressing academics through the use of effective instruction may improve behavioral outcomes for students with EBD. Effective instruction for students with EBD requires teachers to consistently deliver, monitor, and adapt instruction beyond what is typically feasible in a general education classroom (Niesyn, 2009). In a TIERS program, academic instruction is tailored to the maximum extent possible to each student's needs. Consistent with the best practice recommendations found in the literature, TIERS supports the following instructional components: (a) direct instruction, (b) scaffolding independent seatwork, and (c) incorporating student interests. A brief description of each of these instructional practices is provided below.

Direct Instruction. The delivery of new information through direct instruction has been described as the most beneficial form of instruction for students (Gunter et al., 2002), and its use with students with EBD has been and continues to be supported in the research literature (Niesyn, 2009). This form of instruction requires teachers to present the curriculum in a clear and unambiguous manner, which is achieved by consistently following a sequence of demonstration (presentation of new information through modeling), guided

practice (assisting students to perform task-guided practice and checking for understanding), and independent practice (students engage in activities directly related to the new material) (Nelson, Johnson, & Marchand-Martella, 1996; Niesyn, 2009). TIERS also includes the additional step of communicating academic expectations and goals to students prior to the teacher's presentation of new material. Using this explicit form of instruction, teachers are better able to encourage active student responding and have the ability to delay independent practice until they are confident the student can accurately perform the skill (CEC, 1987; Niesyn, 2009).

Scaffolding Independent Seatwork. Students spend much of their time during the typical school day engaged in independent seatwork. Some research in this area have reported this to amount to about 70 percent of the time spent in the classroom (Archer & Hughes, 2011). In a TIERS program, recognizing that students with EBD oftentimes struggle with managing their behavior during this time, teachers and instructional assistants frequently move around the room, assist, and interact verbally and physically with students. The research clearly shows that teacher monitoring of student seatwork, which involves roaming around the classroom, being aware of how students are progressing on their assigned tasks, and working with students one-on-one as needed, is associated with better achievement and behavioral outcomes. In a study synthesizing the results of 300 studies on effective teaching, Medley (1977) reported teacher mobility within the classroom and amount of interactions with students during independent seatwork time to be positive correlated with student achievement outcomes. The TIERS classroom also presents materials individually (e.g., giving a student a single worksheet rather than an entire work

packet) during independent seatwork time, which has been associated with reducing student stress levels and increasing desirable classroom behaviors (Gunter, Denny, & Venn, 2000).

Incorporating Student Interests. Students are more likely to become bored and engage in off-task behavior when presented with material that is uninteresting whether they are in whole-group or independent learning situations (Rock & Thead, 2009). In a TIERS program, students' interests are incorporated into curricular activities when possible. This strategy has been found to be effective for increasing on-task time and decreasing the frequency of disruptive behaviors for students with EBD (Gunter et al., 2000; Salend & Sylvestre, 2005). As explained by Niesyn (2009), teachers can incorporate student interests into curricular activities by offering choices to students that are all acceptable to the teacher (e.g., allowing a student to choose a book to read aloud from a selection of five different title or offering several different academic activities during independent seatwork time). Teachers can also use high interest topics to guide reading selections and incorporate into math word problems and creative writing.

Relentless Outreach to Parents. School-home collaboration refers to a relationship in which educators and families communicate and collaboration to support students' academic and social development (Christenson, 1995; Christenson, Rounds, & Franklin, 1992). Studies on school-home collaboration interventions have commonly involved the use school-to-home notes or daily report cards, which sometimes included the application of contingent reinforcement in the home setting. Cox (2005) reviewed eighteen empirical studies of school-home collaboration interventions between 1980 and 2002. These studies were conducted with students between the ages of 4 and 16 (pre-K to 10th grade) experiencing low academic achievement, some of whom exhibited social and behavioral

problems. Results of this review indicated that school-home collaboration is indeed an effective approach for increasing intervention efficacy. One notable study reviewed by Cox (2005) focused on the effectiveness of the Parent-Teacher Action Research (PTAR) prevention program for students at risk for emotional disturbance (Mcconaughy, Kay, & Fitzgerald, 1999). The aim of the PTAR prevention program is to help teachers and parents establish a working relationship by establishing mutual goals and carrying out joint action plans to create consistency between school and home. In this study, parents and teachers worked together in PTAR teams to implement a whole-class social skills intervention to a group of students identified by their teachers as being at risk for emotional disturbance. Results of the study indicated a reduction in externalizing behaviors as reported by both teachers and parents (McConaughy, Kay, and Fitzgerald, 1999). In TIERS, school-home collaboration is initially established with an intake meeting and then maintained with a weekly school-home note system that allows for two-way communication between teachers and parents. Use of the note system is taught to parents during the intake meeting. It is the intention of this note system to actively and continuously identify, monitor, and support appropriate behaviors and reduce inappropriate behaviors at school and home. As described by Cook and Browning Wright (2009), the teacher in a TIERS classroom is to complete a daily progress monitoring form (i.e., the note) that is sent home at the end of each week. After receipt of the progress monitoring form, parents are to review the data, provide feedback, and deliver the appropriate consequence at home (i.e., provide praise and reward for a good week, punish with loss of privileges for a bad week).

Daily Debriefs to Communicate and Coordinate. Daily debriefs in a TIERS program are intended to allow classroom staff to meet regularly to address programmatic

issues. Specifically, daily debriefs support staff in accomplishing three objectives: (a) effectively implementing all components of the TIERS program, (b) responding to individual students' needs, and (c) establishing a culture of collaboration among team members. Daily debriefs are scheduled for approximately 15 to 20 minutes at a time that allows for all members to participate. All of the staff working in the TIERS classroom are expected to participate. During the daily debrief, time is devoted to addressing the following topics: (a) plan for the next day, (b) individual students' progress/needs, and (c) TIERS program area of focus for the week.

Self-governance Meetings. To promote student engagement in a TIERS classroom, self-governance meetings are held approximately every 1 to 2 weeks. This activity imitates the practice of Morning Meetings developed by the Northeast Foundation for Children as part of the Responsive Classroom approach to teaching and learning (Kriete & Bechtel, 2006). It involves all members of a classroom, children and adults, gathering together to listen, speak, and respond to each other. As outlined by Cook and Browning Wright (2009), the specific goals for self-governance meetings in a TIERS classroom are "to help each other, to solve problems, to give compliments, [and] to plan events" (p.A-23). Topics to be discussed during self-governance meetings include items from an agenda that is to be kept by all members of the classroom throughout the week(s). As a result of this activity, students are given many opportunities to practice being aware of others, communicating with others, and working with others to solve problems (Kriete & Bechtel, 2006).

Problem-Solving Efforts for Students Not Responding to the Base Program Supports. Service delivery in a TIERS program occurs within a collaborative problem-solving framework, which has been described by scholars as an effective and efficient

approach to providing services (Allen & Graden, 2002). The steps for this process essentially reflect the scientific method of identifying and describing a problem; generating possible solutions to the problem; and implementing, monitoring, and assessing the effectiveness of the intervention (Canter, 2004). Specifically, the four thematic questions that guide the problem-solving process are as follows: (a) is there a problem and what is it, (b) why is the problem happening, (c) what can be done about the problem, and (d) did the intervention work? As an iterative and self-correcting approach to facing school-based problems, the problem-solving process provides an empirical method for selecting interventions from a range of countless possibilities and permits teachers and parents to objectively assess whether the applied interventions work. According to Tilly (2008), the problem-solving model has given schools the thinking structures needed to approach problems in a logical and systematic way. As a result, educational practice in the United States has improved over time. Currently, the problem-solving approach is considered best practice in all aspects of service delivery in schools, and many school-based practices have implicitly or explicitly adopted a scientific problem-solving approach in its implementation (e.g., behavioral consultation, curriculum-based measurement, functional assessment of behavior, IDEAL problem-solving) (Tilly, 2008). Participants in this process include teacher(s), parent(s), student, and other school personnel (e.g., school psychologist, behavior specialist, school administrator) who are actively involved in the planning and decision-making phases (Allen & Graden, 2002; Deno, 2002).

III. THE CURRENT STUDY

This section presents the rationale for evaluating the effectiveness of TIERS on student behavior, and presents the research questions and hypotheses for the current study.

Rationale for Evaluating the Effectiveness of TIERS on Student Behavior

While it may be reasonable to think that many of the interventions that have been found to be effective for students with other high incidence disabilities will also work for students with EBD, further research is warranted to be clear about the effects on this unique group of students that suffer from ongoing emotional and behavioral challenges. Recent scholarship in the area of EBD has advanced understanding of practices that may help to improve the social and academic skillsets of students with EBD. Various claims have been made about the potential positive effects that various interventions can have on the academic and behavioral outcomes of students with EBD. As indicated by Cook and Browning Wright (2009), this unique population of students require "a reduced staff-to-student ratio to increase monitoring, shaping and praise, ongoing progress monitoring and feedback, social skills training, psychotherapeutic services, constant school-home communication, and academic instruction tailored to deficits" (p. 9). However, we continue to know very little about the effectiveness of EBD programming (Mattison, 2014).

Reddy, Newman, De Thomas, & Chun (2009) conducted the first meta-analytic study of school-based prevention and intervention programs' effectiveness for children and adolescents with EBD. Their analysis included 20 intervention studies, most of which focused on the reduction of externalizing behaviors at school and only a few that focused on positive behaviors such as social or academic skills. Of these 20 intervention studies, 12 used single-subject designs with sample sizes ranging between 2 and 10 children. Results of the analysis found intervention programs to generally yield moderate effects, but much remains to be learned about the effectiveness of EBD programming. With the recent introduction of the Tiers of Intensive Educationally Responsive Services (TIERS) model

designed in an effort to provide better services to students with EBD who require placement in restrictive classrooms (Cook & Browning Wright, 2009), questions remain about the efficacy of such a model in producing positive student outcomes. Although promising, as it is built on a foundation of research in effective practices for students with EBD, the present lack of empirical support for TIERS warrants further research into its value and efficacy for serving this population in restrictive settings.

Implementation Fidelity. As noted previously, a key element of TIERS is the monitoring of implementation fidelity. Implementation fidelity has been used interchangeably with the terms *treatment integrity* and *treatment fidelity*, which refers to the extent an intervention is applied according to its prescribed procedures (Gearing et al., 2011). Implementation fidelity is considered high when an intervention has been delivered with adherence to its original intention and design. In an examination of 5 meta-analyses including 483 quantitative studies conducted by Durlak and Dupre (2008), it was found that the mean effect sizes were 2 to 3 times higher when intervention programs were implemented with greater care to ensure integrity. These findings strongly suggest that the level of implementation is associated with outcomes across a diverse set of interventions, including mental and physical health programs used in school settings. Specifically, higher levels of implementation are associated with better outcomes. Recent meta-analyses identify higher quality implementation of individual interventions as an important factor leading to improved outcomes (Durlak, Weissberg, & Pachan, 2010; Gearing et al., 2011). In contrast, poor implementation fidelity is associated with little to no positive change (Noell, Gresham, & Gansle, 2002). As the saying goes, "Even the most effective program cannot produce good results if it is not implemented properly" (Foster & Bussman, 2008, p. 422).

Consideration of implementation fidelity when evaluating the effectiveness of interventions is a best-practice issue in school psychology (Forman et al., 2013) that has been largely ignored in the research literature (Keller-Margulis, 2012; Lane, Bocian, MacMillan, & Gresham, 2004). In fact, many educational and mental health intervention studies fail to consider fidelity (Power et al., 2005) and a number of studies indicate school-based interventions to demonstrate a low level of implementation (Forman et al., 2013). For instance, a review of school-based behavioral intervention studies conducted by Gresham and colleagues (1993) found that only 14% provided any implementation fidelity data. A more recent study examining academic intervention studies conducted by Gresham, MacMillan, Beebe-Frankenberger, and Bocian (2000) found that less than 19% addressed the issue of implementation fidelity. This is unfortunate as the positive value of addressing implementation fidelity has been well-documented in the research literature (Keller-Margulis, 2012), and neglecting to address it can threaten the validity of research findings. In other words, it is necessary to examine implementation fidelity if researchers and practitioners are to conduct viable assessments of intervention effects on student outcomes. Without such an examination, researchers and practitioners would not be able to determine whether any lack of effect is due to a problem in implementation or the design of an intervention, or if positive effects could be strengthened if there was a lack of implementation fidelity (Carroll et al., 2007; O'Donnell, 2008). Given this, the current study will seek to further our understanding of how the level of implementation of TIERS may be associated with students' positive classroom behavior.

Consideration of Secondary Students. Despite the significant number of adolescents with EBD enrolled in high schools across the nation, most of the EBD research

has previously focused students in elementary school (Cullinan & Sabornie, 2004). This is understandable given the critical importance of establishing a foundation for success in the early elementary years (Conroy, Hendrickson, & Hester, 2004; Wagner, 2014). As described by Kazdin (1993), learning and behavior problems tend to become increasingly stable over time, which further supports the emphasis of early interventions over remedial interventions for students with EBD. However, while problem behaviors are likely to be most prominent and least amenable to intervention in the later years, this does not mean that research should exclusively focus on early elementary school students with EBD. Further research is warranted to identify how to best serve students across the developmental spectrum (Lane, Wehby, & Barton-Arwood, 2005; Walker, Ramsey, & Gresham, 2004), however, little has been done to identify what works for students with EBD at the high school level (Lane, Wehby, & Barton-Arwood, 2005). Regardless of what may have led to the current scarcity of evidence-based interventions for students at the secondary level, it is critical that EBD research expands to identify effective methods for supporting this population of students in schools, particularly in light of the limited time schools have left to make a positive impact on them before their imminent transition into postsecondary life.

Research Questions and Hypotheses

The TIERS model aims and claims to improve the social, behavioral, and academic performance of students with EBD so that they can ultimately be reintegrated back into the general education setting (Cook & Browning Wright, 2009). However, there are no available studies to date supporting the use of the TIERS model within schools. To address this lack of empirical evidence, the following research questions and hypotheses will be

used to guide the current study (see Table 1 for a listing of the questions, hypotheses, and analyses):

Question 1: Is participation in a restrictive classroom implementing TIERS associated with positive classroom behaviors over time?

Hypothesis 1: Yes, there will be an increase in positive classroom behaviors for students in a restrictive classroom implementing TIERS.

Question 2a: Does the effect of being in a restrictive classroom implementing TIERS on positive classroom behavior depend on the level of implementation fidelity (as measured by number of elements that are fully implemented)?

Hypothesis 2a: Yes, students will demonstrate more positive classroom behaviors in restrictive classrooms implementing TIERS with greater fidelity.

Question 2b: Does the effect of being in a restrictive classroom implementing TIERS on positive classroom behavior depend on the level of implementation fidelity (as measured by number of elements that are fully implemented and number of elements that are partially implemented)?

Hypothesis 2b: Yes, students will demonstrate more positive classroom behaviors in restrictive classrooms implementing TIERS with greater fidelity.

Question 3: Does the effect of being in a restrictive classroom implementing TIERS on positive classroom behavior depend on students' grade level?

Hypothesis 3: Yes, students in elementary/middle schools will demonstrate a greater rate of positive classroom behaviors when compared to students in high schools.

IV. METHODS

Participants

The participants in this study include 91 students (N=91) with EBD in restrictive classroom settings implementing TIERS across 13 schools (four elementary schools, two middle schools, and seven high schools) in a county on the central coast of California, during the 2015-2016 school year. In order for a student to be placed into one of these classrooms, strict criteria establishing the need for the supports provided by a TIERS program had to be met. These criteria required that students be eligible for special services with a primary disability of emotional disturbance, and the disability must significantly and negatively impact the student's educational progress despite the provision of multiple support services provided by the local education agency (LEA). These services include, but are not limited to, intensive mental health services and behavior intervention plans based on functional behavior analysis. Furthermore, the LEA must have exhausted all other special education supports available at the local level, including: (a) special education support in a general education setting, (b) special day class level of support (more than 50 percent of the school day), (c) designated instructional services (DIS) in all areas of suspected need, to include DIS counseling, and (d) intensive mental health interventions for a minimum of three to six months. Of the 487 students identified to require special education services under the eligibility category of emotional disturbance across the county, only 95 students met the criteria delineated above and were determined by each of their respective IEP teams to need a more restrictive placement to receive educational benefit. 91 of the 95 students were included in this study; four cases were removed from the analyses conducted due to complete lack of behavior data across all time points.

This student sample includes 51 high school students (n = 51), 17 middle school students (n = 17), and 23 elementary school students (n = 23); out of this sample of 91 students, 80% are male (n = 73) and 20% are female (n = 18). All students in the sample were verified to have qualified for special education services under the primary disability category of emotional disturbance.

School staff participants included each of the 13 teams serving 13 (of 16) restrictive classrooms implementing TIERS. Each of these teams were composed of six professionals including the teacher, administrator, school psychologist, behavior specialist, mental health counselor, and a Special Education Local Plan Area (SELPA) mental health specialist. Three of the 16 programs were excluded from this analysis due to missing survey data. Teachers, administrators, school psychologists, behavioral specialists, and mental health counselors have each attended at least one training on the implementation of TIERS conducted by co-developer Diana Browning-Wright prior to the start of the 2015-2016 school year.

Measures

Implementation Fidelity. Each of the school professionals working with the restricted classroom setting, including teachers, administrators, school psychologists, behavior specialists, mental health counselors and a SELPA mental health specialist completed the TIERS Fidelity of Implementation measure. The measure included 16 items that correspond with each element of the TIERS program to support students with EBD (Cook and Browning-Wright, 2009). These elements are:

1. Establish, maintain, and restore positive relationships (i.e. spending individual time with the student, keeping track of special occasions for individual students and

personalizing it, reference information learned about student strategically during greetings at the door and in conversations, separating the deed from the doer, using 5:1 ratio of positive to negative interactions with students, smiling, etc.)

2. Establishing physiology to learn (i.e. stress inoculation, sleep, exercise, and eating well)
3. Positive Behavior Supports (i.e. teach, model, cue, reinforce desirable behaviors)
4. Social Skills Curriculum (i.e. Boys Town)
5. Social Emotional Learning Curricula (SEL) (i.e. Second Step)
6. Proactive Classroom Management Strategies (i.e. greeting students at the door, classroom rules/expectations are visible and known by every student, teacher proximity, visual schedule of classroom activities, effective cuing system to release and regain attention, etc.)
7. Good Behavior Game (i.e., splitting the class into teams, awarding points for desired behaviors, subtracting points for undesirable and winning team or teams access preferred activity from a menu)
8. Points and Levels System tied to Honors and Reboot Room (previously Boring Room)
9. PROMPT procedure is followed in response to problem behavior (i.e. proximity control, redirection strategy, ongoing monitoring, prompt expected behavior, teaching interaction)
10. Honors Room / Outings (i.e., motivating items/activities are available and provided when earned)
11. Reboot Room (previously Boring Room) / Reflective Time to encourage better behavior (i.e., student receives folders based on zero out behavior, student performs

restitution tasks in order to get out of the boring time, reflection form to identify replacement behaviors and plan for handling the situation better next time, etc.)

12. Effective Academic Instruction (i.e. instruction that is engaging and tailored to the maximum extent possible to each student's needs)
13. Relentless outreach to parents (i.e. on-going parent training and school-home collaboration)
14. Daily debriefs to communicate and coordinate (i.e. between teacher and instruction assistants, involve admin and school psych when needed)
15. Self-governance meetings (i.e. regular meetings that allow students the opportunity to provide input about their classroom)
16. Problem-Solving Efforts for students who are being non-responsive to the base program supports (i.e., identify the problem, analyze the problem, develop a plan to address the problem, implement and evaluate whether the plan worked)

Each professional indicated the degree to which each of the 16 elements listed above was implemented, using on a 3-point scale (1 = *little to no implementation*, 2 = *partial implementation but not at fidelity*, and 3 = *full implementation at fidelity*). The intra-class correlation (ICC) coefficient was calculated for each program to evaluate the level of inter-rater agreement on ratings of level of implementation fidelity across the 16 elements of TIERS. ICCs are commonly used to assess inter-rater agreement and most suitable when there are more than two raters (Hallgren, 2012). The range of the ICC coefficient is 0 to 1. While there is no standard acceptable level of reliability for the ICC, values closer to one represents a greater level of inter-rater agreement and a value of at least .60 is considered acceptable (Chinn, 1991). The ICC for all 13 TIERS programs range from .73 to .96 with a

mean of .88; thus, the six raters within each program show acceptable to high agreement in their ratings on the implementation of the elements of TIERS.

Student Daily Behavior Ratings. The classrooms in this study have access to a web-based software platform designed by Pearson Education, Inc., which is specifically designed to allow users to monitor student behavior over time. Teachers attended a training on how to use the Review360 software early in the school year (September 2015) and had access to continued technical support services provided by the developers of the program. For the purpose of this study, student daily behavior ratings recorded in the Review360 data management system will be used for the measure of PCB. A detailed description of the daily behavior ratings is provided in the next section. A daily behavior rating system is embedded in the TIERS program that focuses on three categories of behavior: 1) safe, 2) respectful, and 3) responsible. Students receive a rating between 0 and 3, which is based on the degree to which they independently demonstrate safe, respectful, and responsible behaviors. A rating of 3 indicates that the student successfully demonstrated expected behaviors with little to no prompting. A rating of 2 is given when a student required verbal prompting to demonstrate expected behaviors. A rating of 1 is given when a teaching interaction was needed to address a student's behavior. And finally, a rating of 0 is given when a student continues to display inappropriate behavior even after a teaching interaction has occurred in attempt to correct the behavior. A behavior rating for each student is recorded in the Review360 software at approximately every one-hour interval throughout each school day. The rating at each interval can be determined by a single staff member who observed the child during the time period leading up to the current rating, or by multiple staff members (e.g., teacher and instructional assistants) that reach a consensus on what rating the student

has earned during the time period leading up to the current rating. At the end of each school day, an overall daily behavior rating score was calculated for each student by dividing the number of points earned by the number of points possible.

Procedures

The TIERS Implementation Fidelity measure, which is a self-report questionnaire, was administered at three different time points during the 2015-2016 school year (fall, winter, and spring). The surveys were completed by school professionals via an online survey software platform.

The daily behavior ratings recorded through the 2015-2016 school year were obtained in the form of individual student reports from the Review360 data management system. Three researcher assistants were recruited and trained to input the daily behavior data from individual student reports into a larger database for analysis. Each research assistant entered data for 31-32 student participants. To ensure accuracy of the data entered into the larger database, the lead investigator checked several entries made by each research assistant for errors. Furthermore, the research assistants were each assigned five of the same Review360 student reports; the three entries for each of the five cases were then compared to identify any discrepancies. Inter-rater agreement, calculated by dividing the number of agreements by the total number of agreements plus disagreement (Barlow, Nock, & Hersen, 2009), was 100 percent between raters. For this study, the daily behavior ratings obtained in the months of September, November, February, and April were used in the analyses. Specifically, a behavior score was calculated for each student by averaging the daily behavior scores for each month with at least eight data points. As argued in the single-subject research design literature, 8 to 10 data points is considered a conservative estimate

of the amount of data needed for establishing a predictable and reliable baseline (Bailey & Burch, 2002).

Data Analysis

This section provides information pertaining to data screening, statistical analyses, management of missing data, and the establishment of the levels of implementation fidelity for use in the analyses. The following information is intended to inform understanding of the data management and analyses in the current study.

Data Screening. Data screening procedures were performed using SPSS software version 23 prior to conducting statistical analyses to ensure the overall accuracy of the data and determine whether assumptions have been met for proceeding with a within-subjects, repeated-measures analysis of variance (RM-ANOVA). Descriptive statistics including the range, mean, and standard deviation of each of the variables were examined; these values were found to fall within plausible ranges for all variables. Implementation fidelity and grade level were both identified as categorical variables. The dependent variable, positive classroom behavior (as measured by daily behavior ratings) across three to four time points (four time points used for question 1, and three time points used for questions 2A, 2B, and 3), is a continuous variable. The distribution of implementation fidelity ratings showed no violations of normality as assessed by skewness and kurtosis values, histograms, and boxplots. The distribution of PCB values, however, were all similarly negatively skewed as indicated by histograms and skewness values less than negative one. In other words, students generally earned PCB scores that fell toward the higher side of the scale.

Examination of boxplots also revealed five cases to each have one outlying PCB value, which were determined to be genuinely unusual data points and not the result of data

entry error or measurement error. These five cases were reviewed and each outlying PCB value was determined to be plausible given the pattern and combination of daily behavior ratings that contributed to the calculation of each of the five outlying PCB values. Given this, the current study kept the five outlying PCB values as they appeared to be genuine data points and there was no plausible reason for rejecting them as invalid. A total of four students were excluded from all analyses conducted in this study due to missing PCB data across all four time points, resulting in a total sample of 91 students. Additional details regarding the characteristics of the data are further discussed in the results section.

Missing Data. The problem of missing data is a pervasive one in empirical social science research. Researchers put forth significant effort to devise sampling procedures that will gather information from a group that represents the population of interest. When all data are present, researchers can feel relatively confident that their results are representative of the larger population. However, when data are missing from observations and perhaps removed from the analyses, researchers may become less confident that their results reflect what is actually happening in the population of interest. Furthermore, removing observations with missing data results in analyses that are conducted on smaller samples than initially planned, thus decreasing statistical power (Allison, 2002; Enders, 2010).

There can be many causes for missing data. For example, sometimes participants may overlook or even refuse to answer survey items. In longitudinal studies where observations are made repeatedly over time, missing data are likely to be a frequent occurrence (Diggle, Heagerty, Liang, & Zeger, 2002; Laird, 1988). Whatever the reason may be for the missing data, loss of data is a concerning issue given that nearly all standard statistical methods presume that information is available for every case on each of the

variables included in the analyses. As a result, a great deal of time, money, and energy have been spent to minimize the occurrence of incomplete data or lack of response from participants (Mason, 1999). But even after using rigorous methods to minimize the amount of missing data, it remains unlikely that researchers will have complete data (Allison, 2002). A total of 26.58 percent of the total daily behavior scores were missing from the dataset. While examination of the pattern of missing values shows that it occurs at random, it does not appear to be completely at random. Thirteen of the 91 students had less than eight data points for at least one entire time period (i.e., one month). This may have been due to various reasons such as students entering the program late, leaving the program early, or even staff's non-use of the Review360 data management system for recording daily behavior scores.

Recent methodological research supports the use of two modern methods for handling missing data: maximum likelihood and multiple imputation. As described by Enders (2010), these approaches are advantageous to traditional methods (e.g., deletion and mean imputation techniques) because they require less stringent assumptions about the cause of missing data and are able to produce parameter estimates with greater power and less bias. Maximum likelihood uses all of the available data to calculate parameter values with the greatest probability of producing the sample data. Multiple imputation, on the other hand, generates multiple sets of parameter estimates that are then combined into a single data set for analysis (Enders, 2010). While the mechanics of maximum likelihood and multiple imputation differs, these two approaches are considered comparable as they have been found to produce similar estimates (Enders, 2010; Baraldi & Enders, 2009). Thus, personal preference may play a large role in the decision of applying one method over the

other when dealing with missing data. The current study used the multiple imputation method approach given its accessibility in standard SPSS software. While the early literature on the use of multiple imputation focused on efficiency and generally recommended three to five iterations, this number has increased. Based on simulations conducted by Graham, Olchowski, and Gilreath (2007) with a tolerance of no more than one percent loss of power, 20 imputations should be generated for datasets with 10 to 30 percent missing information. Following the recommendations set forth by Graham and colleagues, this study will use 20 imputed datasets to produce point estimates.

Establishing Levels of Implementation Fidelity. The study of implementation fidelity is still a young science, and systematic approaches to both the evaluation and reporting of implementation fidelity remains unstandardized (Dhillon, Darrow, & Meyers, 2015). Examination of the literature reveals that only a small portion of studies even employ measures of implementation fidelity (Dane & Schneider, 1998; Dhillon, Darrow, & Meyers, 2015). Of those that do, researchers have dichotomized subjects into high and low implementation fidelity groups (e.g.,Gottfredson, Gottfredson, & Hybl, 1993; Hansen, Graham, & Wolkenstein, 1991; Kovaleski, Gickling, Morrow, & Swank, 1999) or regressed a continuous implementation variable onto outcome measures (e.g., Allen, Philliber, & Hoggson, 1990).

This study follows an approach to measuring and establishing levels of implementation fidelity that shares many similarities with the process researchers used in recent examinations of the Success for All (SFA) program. SFA is a schoolwide intervention used in approximately 1,000 schools across 40 states to increase the reading skills of primary and middle school-aged youths. Recently, researchers developed a rating

scale called the Snapshot that allowed school staff to describe the status of implementation of various elements across schools implementing SFA (Slavin & Madden, 2015). The Snapshot was administered up to four times per year and each item of the scale received a point value of 1 when it was indicated to be "in place" and a point value of 0 when it was reported as "not in place;" a school's implementation score was the sum of these points. These scores were aggregated for each school and the distribution was examined to determine the cutoff score to distinguish between those schools that were adequately implementing the program and those who were not. In the latest study using data gathered from the 2012-2013 school year, a threshold of 50 percent was established for fidelity of implementation. Sixteen of the 19 schools in the sample met "adequate" fidelity, and three schools were considered "inadequate" for not having met the 50 percent criterion (Balue & Quint, 2015; Slavin & Madden, 2015). Like the Snapshot, the TIERS implementation fidelity survey was developed as a rating scale to measure implementation fidelity at multiple time points throughout the school year. Because the TIERS implementation fidelity survey had not previously been used to measure fidelity in a research evaluation, it stands to reason that any pre-specified criterion to distinguish levels of implementation fidelity would have been arbitrary. Following the logic presented by Balue and Quint (2015) to use the data when establishing thresholds for implementation fidelity, this study will use the distribution of fidelity scores to guide this process.

Repeated Measures Analysis of Variance. The current study used a within-subjects, repeated-measures analysis of variance (RM-ANOVA) with interactions. Repeated measures designs have frequently been used across many branches of the social and behavioral sciences as researchers have found its approach to be useful in the observation of

behavior across time. In contrast to a classic ANOVA where individuals may be assigned to different treatment groups, the repeated RM-ANOVA is used with a single treatment group that provide data at multiple time points (Field, 2013; Girden, 1992). There are two clear advantages to using the same group of individuals throughout the study, including the need for fewer participants and unnecessary concern regarding the equivalence of pre-treatment measures. The RM-ANOVA affords the opportunity to use much smaller sample sizes compared to the classic ANOVA, and the differences between measures cannot be attributed to individual differences (e.g., academic ability, motivation) because each participant serves as his or her own control (Field, 2013; Girden, 1992).

To address the first research question (*Is participation in a CTE program implementing TIERS associated with positive classroom behaviors over time?*), the RM-ANOVA examined the difference between behavior scores from four different time points spread across the 2015-2016 school year (September, November, February, and April); each behavior score will be the mean value of their daily behavior ratings for the entire month. To address research question 2 (*Does the effect of being in a CTE TIERS program on positive classroom behavior depend on the level of implementation fidelity?*) and research question 3 (*Does the effect of being in a CTE TIERS program on positive classroom behavior depend on students' grade level?*), a RM-ANOVA was conducted with one time-varying covariate (level of implementation fidelity) and one time-invariant covariate (grade level). Three time points will be examined (November, February, and April) for research questions 2 and 3; implementation fidelity data was only collected in November, February, and April. The main effects and interaction effect of implementation fidelity and grade level on positive classroom behavior are reported in the results section below.

V. RESULTS

The section describes the results pertaining to each of the questions in the current study.

Question 1: Is participation in a restrictive classroom implementing TIERS associated with positive classroom behaviors (PCBs) over time?

A one-way repeated measures ANOVA was conducted to determine whether there were statistically significant differences in positive classroom behavior of students enrolled in the 13 TIERS programs over the course of 2015-2016 school year. Preliminary data screening indicated non-normality of PCB values across all time points as evidenced by skewness values (less than -1.0), kurtosis values (greater than 3.0), histograms, and boxplots; this is further supported by the results of the Shapiro-Wilk test ($p < .05$) (see Table 1). However, the repeated measures ANOVA is "robust" to deviations from normality (Lix, Keselman & Keselman, 1996; Maxwell & Delaney, 2004) and even highly skewed distributions may not be problematic as long as the groups are similarly skewed (Sawilowsky & Blair, 1992) as observed in this study.

Table 1

Tests of Normality

	Kolmogorov-Smirnov[a]			Shapiro-Wilk		
	Statistic	*df*	*P*	Statistic	*df*	*p*
PCB at Time 1	.16	91	<.001	.87	91	<.001
PCB at Time 2	.15	91	<.001	.75	91	<.001
PCB at Time 3	.11	91	.010	.90	91	<.001
PCB at Time 4	.16	91	<.001	.84	91	<.001

a. Lilliefors Significance Correction

In examining the variances of the differences between all possible pairs of within-subject conditions (i.e., PCB across Time 1, 2, 3, and 4), Mauchly's test of sphericity

indicated the assumption of sphericity to be violated, $\chi 2(2) = 65.27$, $p < .001$ (see Table 2). In actual practice, violating the assumption of sphericity is a common issue and considered difficult to avoid when using real data (Weinfurt, 2000). Furthermore, Mauchly's test of sphericity has been criticized as a poor method for detecting violations of sphericity that frequently fails to detect sphericity in smaller samples and over-detecting them in larger samples (Kesselman, Rogan, Mendoza, & Breen, 1980). Instead, Maxwell and Delaney (2004) recommend interpreting the results using a Greenhouse-Geisser correction and ignoring the result of the Mauchly's test. A Greenhouse-Geisser correction is considered most appropriate when the Greenhouse-Geisser estimate of sphericity (ε) less than .75 (Field, 2013; Gray & Kinnear, 2012; Maxwell & Delaney, 2004). Therefore, a Greenhouse-Geisser correction was applied (ε = .66) (see Table 2).

Results of the analysis indicated that the TIERS program elicited statistically significant changes in PCB over time, $F(1.98, 178.20) = 4.41$, $p < .014$, partial $\eta 2 = .047$, with the mean PCB increasing from .78 ± .16 in September (Time 1) to .81 ± .15 in November (Time 2) and to .84 ± .13 in February (Time 3); the mean PCB decreased from February (Time 3) to .82 ± .16 in April (Time 4) (see Table 4). Post hoc analysis with a Bonferroni adjustment (α = .0042) revealed that PCB significantly increased from Time 1 to Time 3 (.06 (95% CI, .02 to .1)) or 6 percent overall PCB, $p = .001$), but was not significant across any other time periods, including Time 1 to Time 4 (.04 (95% CI, -.01 to .09), $p = .17$) (see Table 5).

Table 2

Mauchly's Test of Sphericity for Measure of PCB

				ε

Within Subjects Effect	Mauchly's *W*	Approx. Chi-Square	*df*	*P*	Greenhouse-Geisser	Huynh-Feldt	Lower-bound
Time	.48	65.27	5	<.001	.66	.67	.33

Table 3

Tests of Within-Subjects Effects

Source		Type III Sum of Squares	*df*	MS	*F*	*p*	Partial η^2
Time	Sphericity Assumed	.165	3.00	.06	4.41	.005	.047
	Greenhouse-Geisser	.165	1.98	.08	4.41	.014	.047
	Huynh-Feldt	.165	2.02	.08	4.41	.013	.047
	Lower-bound	.165	1.00	.17	4.41	.038	.047
Error (Time)	Sphericity Assumed	3.36	270.00	.01			
	Greenhouse-Geisser	3.36	178.20	.02			
	Huynh-Feldt	3.36	182.19	.02			
	Lower-bound	3.36	90.00	.04			

Table 4

Descriptive Statistics for PCB Across All Time Points (Sept, Nov, Feb, Apr)

	M	*SD*	*N*
PCB at Time 1	.78	.16	91
PCB at Time 2	.81	.15	91
PCB at Time 3	.84	.13	91
PCB at Time 4	.82	.16	91

Table 5

Pairwise Comparisons of PCB Across Time Points 1, 2, 3, and 4

(I) Time		Mean Difference (I-J)	SE	p^b	95% Confidence Interval for Difference[b]	
					Lower Bound	Upper Bound
1	2	-.03	.01	.27	-.06	.01
	3	-.06*	.01	.001	-.10	-.02
	4	-.04	.02	.17	-.09	.01

2	1	.03	.01	.27	-.01	.06
	3	-.03	.02	.34	-.08	.01
	4	-.02	.02	1.00	-.08	.04
3	1	.06*	.01	.001	.02	.10
	2	.03	.02	.34	-.01	.08
	4	.02	.01	1.00	-.02	.05
4	1	.04	.02	.17	-.01	.09
	2	.02	.02	1.00	-.04	.08
	3	-.02	.01	1.00	-.05	.02

Based on estimated marginal means

*. The mean difference is significant at the .05 level.

b. Adjustment for multiple comparisons: Bonferroni ($\alpha = .0042$).

To answer the question of whether participation in a restrictive classroom implementing TIERS is associated with PCBs over time, the results of the analysis provides evidence that there is a statistically significant increase in reported PCB from September to February of the 2015-2016 school year. However, there is no statistically significant difference in overall PCB between any other two time points.

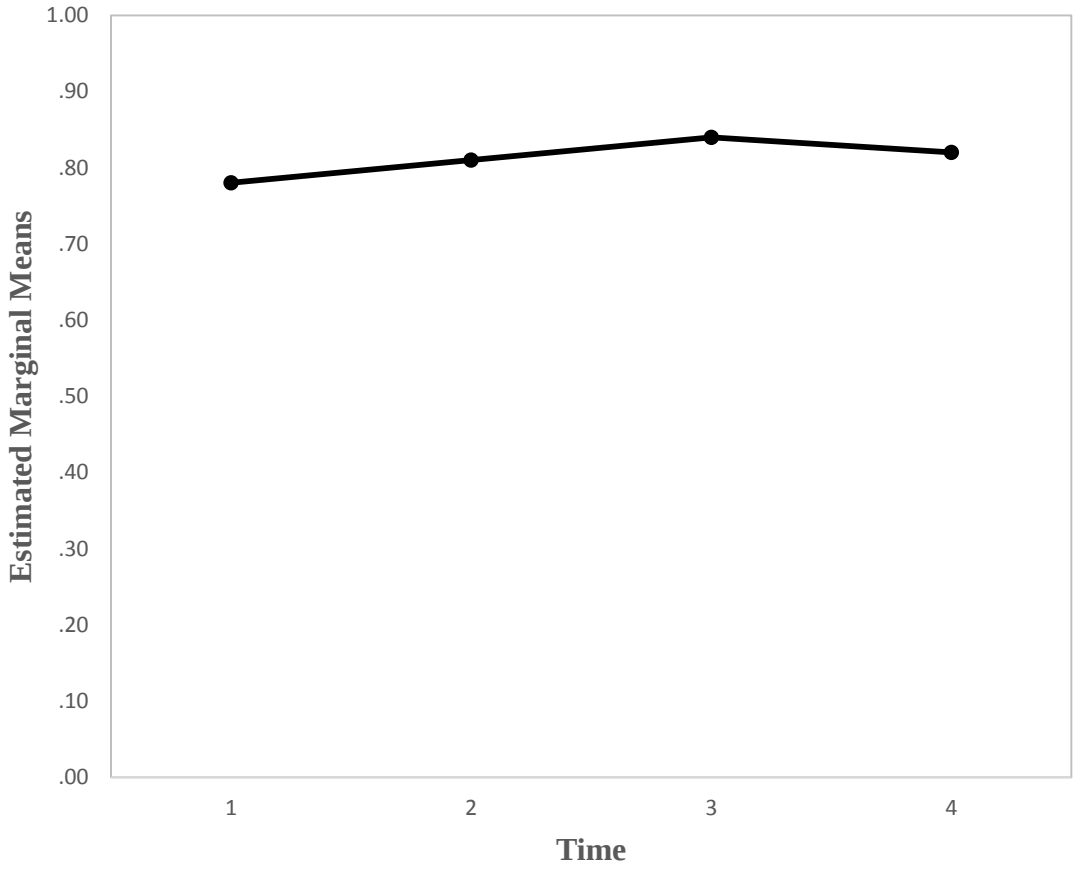

Figure 1. Estimated marginal means of PCB across time 1, 2, 3, and 4.

Question 2a: Does the effect of being in a restrictive classroom implementing TIERS on positive classroom behavior depend on the level of implementation fidelity (as measured by number of elements that are fully implemented)?

A two-way mixed ANOVA with repeated measures was conducted to determine whether the level of implementation fidelity had a statistically significant effect on PCB when only accounting for elements that were reported to be fully implemented by 80 percent of raters. Please note that time 1 now refers to November, time 2 to February, and time 3 to April; this remains true for all subsequent analyses. Given the strong relationship between ratings reported across time 1, 2, and 3 (see Table 6), the mean of the fidelity ratings across

time 1, 2, and 3 was used to represent the overall program implementation fidelity score for each case (see Table 7).

Table 6

Correlations between fidelity scores across time 1, 2, and 3

	Fidelity at Time 1	Fidelity at Time 2	Fidelity at Time 3
Fidelity at Time 1	-		
Fidelity at Time 2	.59**	-	
Fidelity at Time 3	.75**	.54**	-

** Correlation is significant at the 0.01 level (2-tailed).

Table 7

Number of TIERS elements reported as fully implemented across time 1, 2, and 3

Participating Schools	Fidelity at Time 1	Fidelity at Time 2	Fidelity at Time 3	Overall Mean Fidelity Score
Elementary School 1	12	11	13	12
Elementary School 2	3	0	5	2.67
Elementary School 3	4	7	3	4.67
Elementary School 4	4	3	9	5.33
Middle School 1	3	6	6	5
Middle School 2	7	10	9	8.67
High School 1	0	0	0	0
High School 2	3	6	5	4.67
High School 3	3	8	0	3.67
High School 4	10	6	6	7.33
High School 5	9	4	8	7
High School 6	2	5	0	2.33
High School 7	2	2	1	1.67

Note. Range is 0 to 16 for each cell.

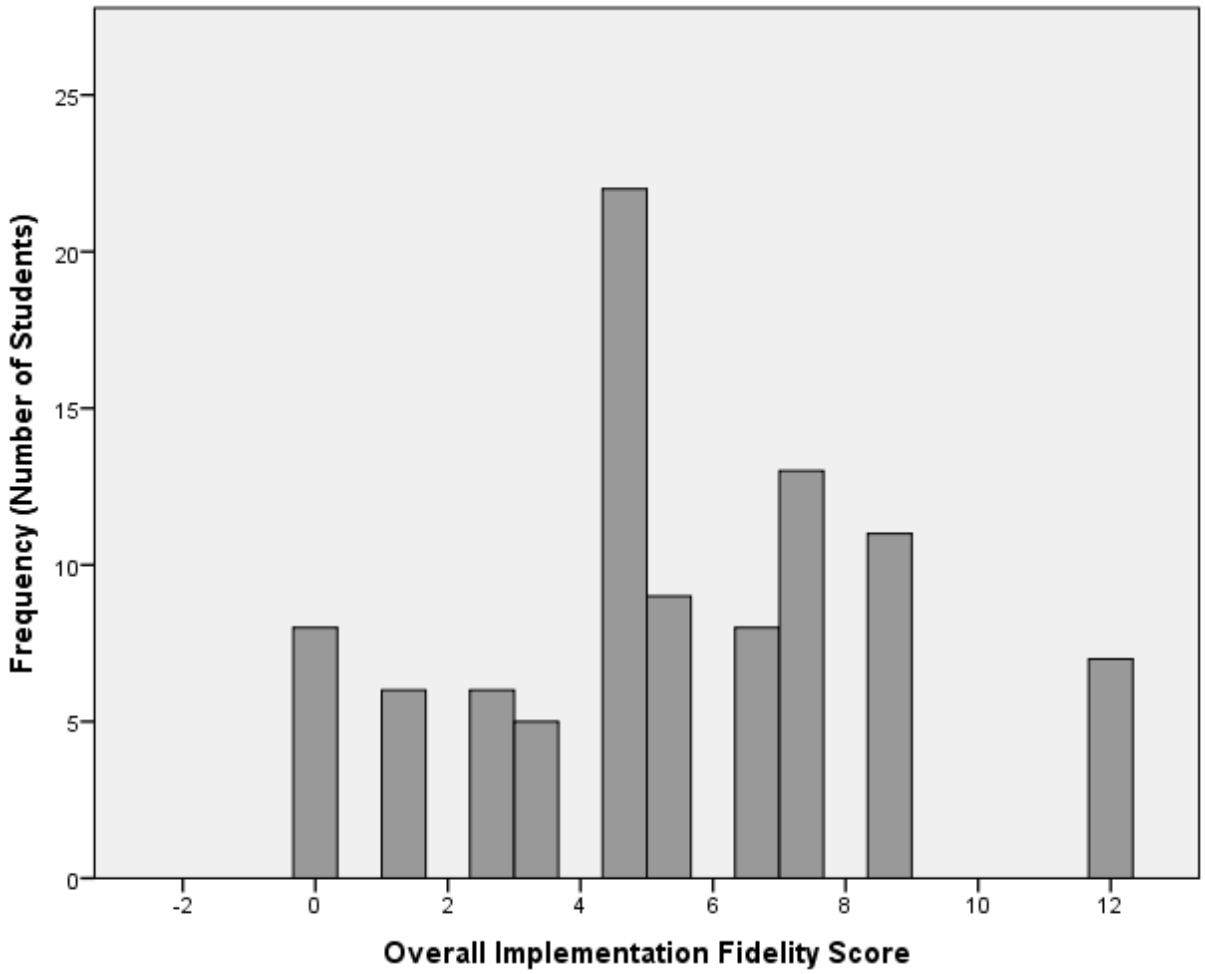

Figure 2. Distribution of overall implementation fidelity scores (based on the count of the number of elements reported as being fully implemented by 80 percent or more of respondents).

Examination of the studentized residuals indicated two cases to have a single outlying PCB value, and one case to have two outlying PCB values. Review of the pattern of daily behavior ratings that contribute to the outliers did not indicate data entry error or measurement error, and the outlying values were determined to be valid data points to be

included in this analysis. PCB was observed to be approximately normally distributed as indicated by normal Q-Q plots of the residuals.

Results of the Levene's test show that the variance of PCB between the low, medium, and high implementation fidelity groups across Time 2 and Time 3 can be assumed to be equal ($p > .05$); however, the variance of PCB between the low, medium, and high implementation fidelity groups at Time 1 cannot be assumed to be equal ($p < .05$) (see Table 8). A two-way mixed ANOVA with repeated measures is considered robust to moderate violations of homogeneity of variance when the sample sizes in each group are roughly equal to each other (Maxwell & Delaney, 2004). For this analysis, the sample of students were split into three, roughly equal, groups ranging from 29 to 32 students for each level across all time points. Overall implementation fidelity scores ranged from 0 to 4.67 for the low implementation group, 5 to 7 for the medium implementation group, and 7.33 to 12 for the high implementation group. Box's test is significant, which suggests that the assumption of the equality of covariance matrices is violated (see Table 9). However, Box's M is a notoriously sensitive test of homogeneity of variance-covariance matrices and can be safely ignored when sample sizes are roughly equal (Tabachnick & Fidell, 2012).

Table 8

Levene's Test of Equality of Error Variances

	F	*df1*	*df2*	*p*
PCB at Time 1	4.26	2	88	.02
PCB at Time 2	0.54	2	88	.58
PCB at Time 3	1.98	2	88	.14

Table 9

Box's Test of Equality of Covariance Matrices

Box's M	*F*	*df1*	*df2*	*p*

61.79	4.89	12	36959.24	< .001

In a two-way mixed ANOVA with repeated measures, the assumption of sphericity is important. Mauchly's test of sphericity indicated that the assumption of sphericity was violated for the two-way interaction, $\chi^2(2) = 42.29$, $p < .001$ (see Table 10). This indicates that the variances of the differences between the low, medium, and high fidelity of implementation groups are not equal. A violation of sphericity can lead to an inaccurate F-test. Fortunately, this can be corrected with an adjustment to the degrees of freedom for the effect that elicits a more accurate significance value. Given that the Greenhouse-Geisser estimate of sphericity (ε) is less than .75 (see Table 10), a Greenhouse-Geisser correction is considered most appropriate (Field, 2013; Gray & Kinnear, 2012; Maxwell & Delaney, 2004). Therefore, the Greenhouse-Geisser corrected statistic will be used in this analysis.

Table 10

Mauchly's Test of Sphericity

Within Subjects Effect	Mauchly's W	Approx. Chi-Square	*df*	*P*	Epsilon		
					Greenhouse-Geisser	Huynh-Feldt	Lower-bound
Time	.62	42.29	2	< .001	.72	.75	.50

There was no statistically significant interaction between the fidelity of implementation of TIERS and time on PCB, $F(2.89, 127.08) = 1.02$, $p = .39$, partial $\eta^2 = .02$, $\varepsilon = 2.42$ (see Table 11). The main effect of time did not show a statistically significant difference in mean PCB across the three different time points, $F(1.44, 127.08) = 1.59$, $p = .21$, partial $\eta^2 = .02$. The main effect of fidelity level also did not show a statistically significant difference in mean PCB between the low, medium, and high implementation fidelity of TIERS groups, $F(2, 88) = 2.16$, $p = .12$, partial $\eta^2 = .05$ (see Table 12).

Table 11

Tests of Within-Subjects Effects

Source		Type III Sum of Squares	*df*	*MS*	*F*	*p*	Partial η^2
Time	Sphericity Assumed	.04	2	.02	1.59	.21	.02
	Greenhouse-Geisser	.04	1.44	.03	1.59	.21	.02
	Huynh-Feldt	.04	1.50	.03	1.59	.21	.02
	Lower-bound	.04	1	.04	1.59	.21	.02
Time * Fidelity _Level	Sphericity Assumed	.06	4	.01	1.02	.40	.02
	Greenhouse-Geisser	.06	2.89	.02	1.02	.39	.02
	Huynh-Feldt	.06	2.99	.02	1.02	.39	.02
	Lower-bound	.06	2	.03	1.02	.37	.02
Error (Time)	Sphericity Assumed	2.42	176	.01			
	Greenhouse-Geisser	2.42	127.08	.02			
	Huynh-Feldt	2.42	131.57	.02			
	Lower-bound	2.42	88	.03			

Table 12

Tests of Between-Subjects Effects

Source	Type III Sum of Squares	*df*	*MS*	*F*	*p*	Partial η^2
Intercept	184.98	1	184.98	4940.32	< .001	.98
Fidelity_Level	.16	2	.08	2.16	.12	.05
Error	3.30	88	.04			

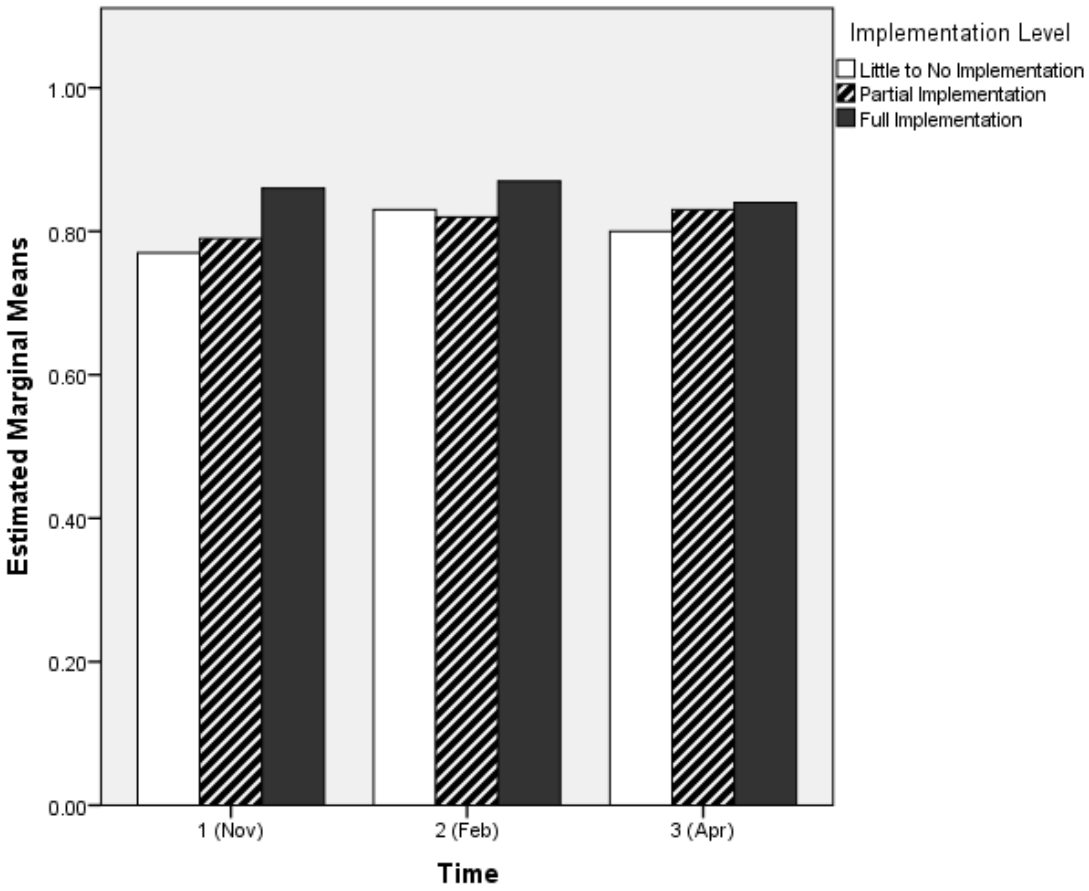

Figure 3. Estimated Marginal Means for PCB across Low, Medium, and High Implementation Fidelity Groups at Time 1, Time 2, and Time 3.

Question 2b: Does the effect of being in a restrictive classroom implementing TIERS on positive classroom behavior depend on the level of implementation fidelity (as measured by number of elements that are fully implemented and number of elements that are partially implemented)?

The same procedure used to evaluate Question 2a was repeated to evaluate whether the level of implementation fidelity had a statistically significant effect on PCB when accounting for both fully and partially implemented elements of TIERS. Unlike the previous approach (used to address Question 2A) that assigned a implementation fidelity score to

each program by simply counting the number of elements that were reported as being fully implemented by 80 percent of respondents, this analysis calculated the implementation fidelity score by summing the mean of the ratings obtained for each element. Each response that indicated full implementation was given a score of 2, partial implementation received a score of 1, and little to no implementation received a score of 0; thus, the maximum implementation fidelity score would be 32.

Given the strong relationship between ratings reported across time 1, 2, and 3 (see Table 13), the mean of the fidelity ratings across time 1, 2, and 3 was used to represent the overall program implementation fidelity score for each case (see Table 14).

Table 13

Correlations between fidelity scores across time 1, 2, and 3

	Fidelity at Time 1	Fidelity at Time 2	Fidelity at Time 3
Fidelity at Time 1	-		
Fidelity at Time 2	.77**	-	
Fidelity at Time 3	.79**	.54**	-

** Correlation is significant at the 0.01 level (2-tailed).

Table 14

Number of TIERS elements reported as fully implemented across time 1, 2, and 3

Participating Schools	Fidelity at Time 1	Fidelity at Time 2	Fidelity at Time 3	Overall Mean Fidelity Score
Elementary School 1	30	29.17	29.5	29.56
Elementary School 2	24.67	20.33	24	23
Elementary School 3	21.67	26	21.5	23.06
Elementary School 4	24.83	21.83	27.67	24.78
Middle School 1	18	22.6	22.17	20.92
Middle School 2	26.67	27.5	27.83	27.33
High School 1	16.33	15.67	18	16.67
High School 2	21.83	24.67	24.25	23.58
High School 3	25.17	28	21.83	25

High School 4	27.83	25.4	26.2	26.48
High School 5	23.75	23.33	26.6	24.56
High School 6	22.67	24.5	17.5	21.56
High School 7	23.67	23.5	23	23.39

Note. Range is 0 to 32 for each cell.

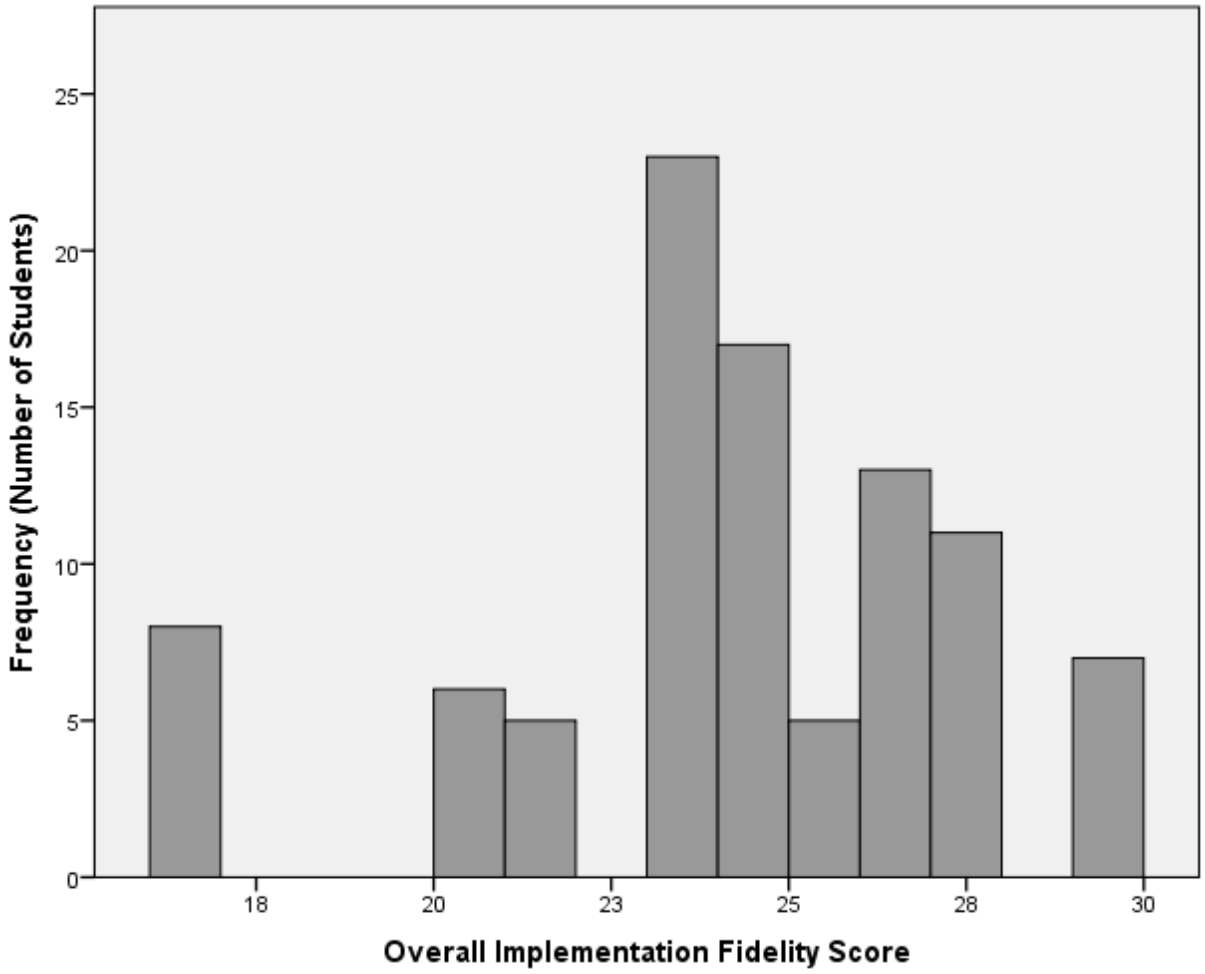

Figure 4. Distribution of overall implementation fidelity scores (sums of weighted scores assigned to each possible response for each element; *little to no implementation* = 0, *partial implementation* = 1, *full implementation* = 2).

Again, examination of studentized residuals indicated two cases to have a single outlying PCB value, and one case to have two outlying PCB values. Review of the pattern of daily behavior ratings that contribute to the outliers did not indicate data entry error or

measurement error, and the outlying values were included in this analysis. PCB was observed to be approximately normally distributed as indicated by normal Q-Q plots of the residuals.

Results of the Levene's test show that the variance of PCB between the low, medium, and high implementation fidelity groups across all three time points can be assumed to be equal ($p > .05$) (see Table 15). Student participants were split into three groups ranging from 29 to 32 for each level across all time points. Overall implementation fidelity scores ranged from 16.67 to 23.39 for the low implementation group, 23.58 to 25 for the medium implementation group, and 24.56 to 29.56 for the high implementation group. Box's test is significant, which suggests that the assumption of the equality of covariance matrices is violated (see Table 16). As previously discussed, Box's M is very sensitive to homogeneity of variance-covariance matrices and can be ignored when sample sizes are approximately equal (Tabachnick & Fidell, 2012).

Table 15

Levene's Test of Equality of Error Variances

	F	*df1*	*df2*	*p*
PCB at Time 1	.68	2	88	.51
PCB at Time 2	.72	2	88	.49
PCB at Time 3	.40	2	88	.67

Table 16

Box's Test of Equality of Covariance Matrices

Box's M	*F*	*df1*	*df2*	*p*
54.52	4.32	12	36959.20	< .001

Mauchly's test indicated that the assumption of sphericity was violated for the two-way interaction, $\chi^2(2) = 40.31$, $p < .001$ (see Table 17). This indicates that the variances of

the differences between the low, medium, and high fidelity of implementation groups are not equal. Consequently, a Greenhouse-Geisser correction was applied given that the Greenhouse-Geisser estimate of sphericity is less than .75.

Table 17

Mauchly's Test of Sphericity

Within Subjects Effect	Mauchly's W	Approx. Chi-Square	*df*	*P*	Epsilon		
					Greenhouse-Geisser	Huynh-Feldt	Lower-bound
Time	.63	40.31	2	< .001	.73	.75	.50

There was no statistically significant interaction between the fidelity of implementation of TIERS and time on PCB, $F(2.92, 128.39) = 2.32$, $p = .08$, partial $\eta^2 = .02$, $\varepsilon = 2.35$ (see Table 18). The main effect of time did not show a statistically significant difference in mean PCB across the three different time points, $F(1.46, 128.39) = 1.53$, $p = .22$, partial $\eta^2 = .02$. However, the main effect of fidelity level did show a statistically significant difference in mean PCB between the low, medium, and high implementation fidelity of TIERS groups, $F(2, 88) = 3.17$, $p = .047$, partial $\eta^2 = .07$ (see Table 19).

Table 18

Tests of Within-Subjects Effects

Source		Type III Sum of Squares	*Df*	*MS*	*F*	*p*	Partial η^2
Time	Sphericity Assumed	.04	2	.02	1.53	.22	.02
	Greenhouse-Geisser	.04	1.46	.03	1.53	.22	.02
	Huynh-Feldt	.04	1.51	.03	1.53	.22	.02
	Lower-bound	.04	1	.04	1.53	.22	.02
Time * Fidelity _Level	Sphericity Assumed	.12	4	.03	2.32	.06	.02
	Greenhouse-Geisser	.12	2.92	.04	2.32	.08	.02
	Huynh-Feldt	.12	3.02	.04	2.32	.08	.02

	Lower-bound	.12	2	.06	2.32	.10	.02
Error (Time)	Sphericity Assumed	2.35	176	.01			
	Greenhouse-Geisser	2.35	128.39	.02			
	Huynh-Feldt	2.35	132.97	.02			
	Lower-bound	2.35	88	.03			

Table 19

Tests of Between-Subjects Effects

Source	Type III Sum of Squares	*df*	*MS*	*F*	*p*	Partial η^2
Intercept	184.60	1	184.60	5038.22	< .001	.98
Fidelity_Level	.23	2	.12	3.17	.047	.07
Error	3.22	88	.04			

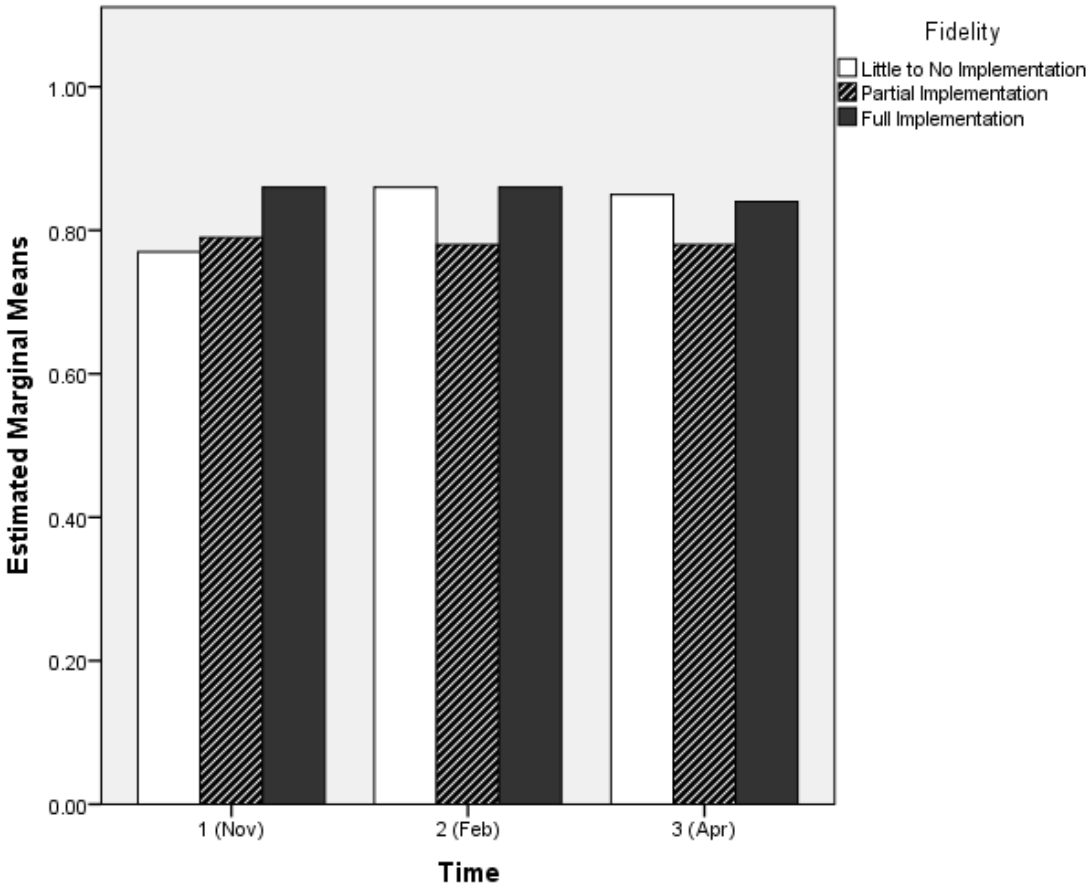

Figure 5. Mean PCB scores across low, medium, and high implementation fidelity groups at time 1, 2, and 3.

To see where the difference lies, pairwise comparisons with a Bonferroni adjustment (α = .0056) were examined. Results revealed that a high level of implementation fidelity was associated with a mean PCB score .07 or seven percent higher than partial implementation, a statistically significant difference, $p = .04$ (see Table 20).

Table 20

Pairwise Comparisons of Low, Medium, and High Implementation Fidelity Groups

(I) Implementation Level	(J) Implementation Level	Mean Difference (I-J)	Std. Error	*p*	95% CI for Difference	
					Lower Bound	Upper Bound
Little to No Implementation	Partial Implementation	.04	.03	.45	-.03	.11
	Full Implementation	-.03	.03	.81	-.10	.04
Partial Implementation	Little to No Implementation	-.04	.03	.45	-.11	.03
	Full Implementation	-.07*	.03	.04	-.14	.00
Full Implementation	Little to No Implementation	.03	.03	.81	-.04	.10
	Partial Implementation	.07*	.03	.04	.00	.14

* The mean difference is significant at the .05 level.

Adjustment for multiple comparisons: Bonferroni (α = .0056).

An additional two-way mixed ANOVA with repeated measures using the same procedures described above was conducted to compare mean PCB levels between the three TIERS classroom with the highest overall fidelity scores (27.83 to 29.56) and the three TIERS

classrooms with lowest overall fidelity scores (16.67 to 20.92). The groups being compared each consisted of 23 students.

Table 21

Levene's Test of Equality of Error Variances

	F	*df1*	*df2*	*p*
PCB at Time 1	1.04	1	44	.31
PCB at Time 2	.28	1	44	.60
PCB at Time 3	4.01	1	44	.051

Table 22

Box's Test of Equality of Covariance Matrices

Box's M	*F*	*df1*	*df2*	*P*
21.06	2.84	6	596.62	.01

Mauchly's test indicated that the assumption of sphericity was violated for the two-way interaction, $\chi^2(2) = 9.58$, $p = .008$ (see Table 23) and a Greenhouse-Geisser correction was applied.

Table 23

Mauchly's Test of Sphericity

Within Subjects Effect	Mauchly's W	Approx. Chi-Square	*df*	*p*	Epsilon		
					Greenhouse-Geisser	Huynh-Feldt	Lower-bound
Time	.80	9.58	2	.008	.83	.88	.50

There was no statistically significant interaction between the two groups (three TIERS classrooms with the highest fidelity scores versus the three TIERS classrooms with the lowest fidelity scores) and time on PCB, $F(1.67, 73.35) = 3.16$, $p = .06$, partial $\eta^2 = .07$, $\varepsilon = .99$ (see Table 24). The main effect of time did not show a statistically significant difference in mean PCB across the three different time points, $F(1.67, 73.35) = .77$, $p = .45$, partial $\eta^2 = .02$. The main effect of group shows that there is no statistically significant

difference in mean PCB between the three TIERS classrooms with the overall highest fidelity scores and the three TIERS classrooms with the lowest fidelity scores, $F(1, 44) = .02$, $p = .89$, partial $\eta^2 = .00$ (see Table 25).

Table 24

Tests of Within-Subjects Effects

Source		Type III Sum of Squares	*df*	*MS*	*F*	*p*	Partial η^2
Time	Sphericity Assumed	.02	2	.01	.77	.47	.02
	Greenhouse-Geisser	.02	1.67	.01	.77	.45	.02
	Huynh-Feldt	.02	1.76	.01	.77	.45	.02
	Lower-bound	.02	1	.02	.77	.39	.02
Time * Group	Sphericity Assumed	.07	2	.04	3.16	.05	.07
	Greenhouse-Geisser	.07	1.67	.04	3.16	.06	.07
	Huynh-Feldt	.07	1.76	.04	3.16	.05	.07
	Lower-bound	.07	1	.07	3.16	.08	.07
Error (Time)	Sphericity Assumed	.99	88	.01			
	Greenhouse-Geisser	.99	73.35	.01			
	Huynh-Feldt	.99	77.63	.01			
	Lower-bound	.99	44	.02			

Table 25

Tests of Between-Subjects Effects

Source	Type III Sum of Squares	*df*	*MS*	*F*	*p*	Partial η^2
Intercept	91.32	1	91.32	1919.37	< .001	.98
Group	.001	1	.001	.02	.89	.00
Error	2.09	44	.05			

While inspection of the mean PCB scores between the three TIERS programs with the highest overall implementation fidelity scores appear higher across time 1 and 2, the mean PCB score for three TIERS programs with the lowest overall implementation fidelity were higher at time 3 (see Figure 6). Results of this analysis do not indicate a significant

difference in PCB scores between students in the three programs implementing TIERS with the highest level of fidelity and students in the three programs implementing TIERS with the lowest level of fidelity.

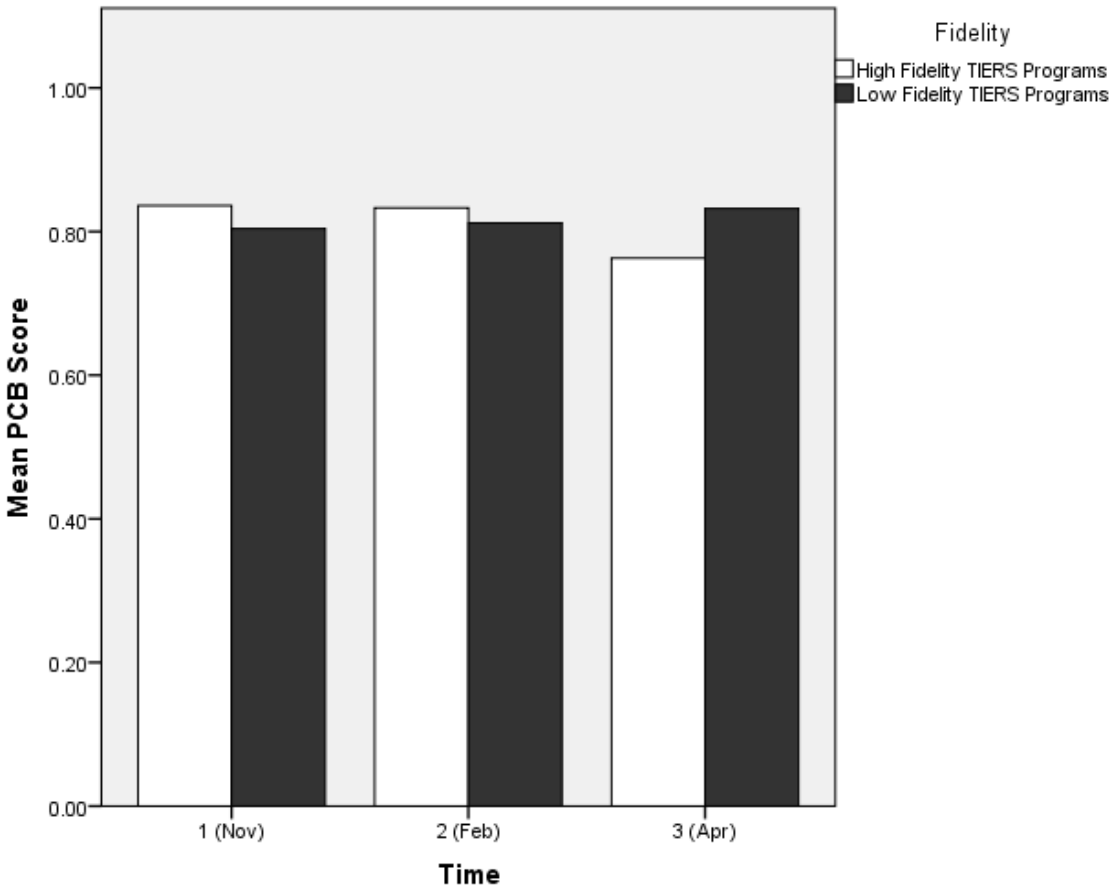

Figure 6. Mean PCB scores between the three TIERS programs with highest overall implementation fidelity scores (27.83 to 29.56) and the three TIERS classrooms with lowest overall fidelity scores (16.67 to 20.92) at time 1, 2, and 3.

Question 3: Does the effect of being in a restrictive classroom implementing TIERS on positive classroom behavior depend on students' grade level?

A three-way mixed ANOVA with repeated measures was conducted to determine how PCB changes over time (November, February, and April) depending on level of

implementation fidelity of TIERS (low, medium, or high) and grade level (elementary/middle or high school). While there are between one and two outlying PCB values in the distribution of each pair combination of the between-subjects variables, close examination of the pattern of daily behavior ratings that contribute to the outliers did not indicate data entry error or measurement error; outlying values were determined to be genuinely unusual but valid data points that were included in this analysis.

As assessed by Shapiro-Wilk's test of normality, PCB was observed to be approximately normally distributed across time points for elementary/middle school students in the low and medium implementation fidelity groups ($p > .05$); however, the distribution for the elementary/middle school students in the high implementation fidelity group across all three time points was not normal ($p < .05$) and similarly negatively skewed. PCB was observed to be approximately normally distributed across time points for high school students in the medium and high fidelity groups, but the distribution for the low fidelity group across all time points was not normal ($p < .05$) and similarly negatively skewed. Results of the Levene's test show that the variance of PCB between the low, medium, and high implementation fidelity groups across Time 2 and Time 3 to be equal ($p > .05$); however, the variance of PCB between the low, medium, and high implementation fidelity groups at Time 1 are not equal ($p < .05$) (see Table 26). Fortunately, a three-way mixed ANOVA with repeated measures is considered robust to violations of non-normality and homogeneity of variance (Maxwell & Delaney, 2004). Box's test is significant, which suggests that the assumption of the equality of covariance matrices is violated (see Table 27). However, Box's M is a notoriously sensitive test of homogeneity of variance-

covariance matrices and can be safely ignored when sample sizes are roughly equal (Tabachnick & Fidell, 2012).

Table 26

Levene's Test of Equality of Error Variances

	F	*df1*	*df2*	*p*
PCB at Time 1	2.62	5	85	.030
PCB at Time 2	1.30	5	85	.271
PCB at Time 3	1.00	5	85	.425

Table 27

Box's Test of Equality of Covariance Matrices

Box's M	*F*	*df1*	*df2*	*p*
114.70	3.43	30	8789.82	< .001

Like the two-way mixed ANOVA with repeated measures, the three-way mixed ANOVA with repeated measures requires that the differences between the levels of the within-subjects factor (i.e., PCB across time 1, 2, and 3) to be approximately equal. If this assumption of sphericity is violated, an adjustment can be used to produce the correct statistical significance value. Mauchly's test of sphericity indicated that the assumption of sphericity was violated for the three-way interaction, $\chi^2(2) = 42.12$, $p < .001$ (see Table 28). This indicates that the variances of the differences between PCB scores between grade levels across the low, medium, and high fidelity of implementation groups are not equal. A violation of sphericity can lead to an inaccurate *F*-test. This is not uncommon when using real-world data. Fortunately, this can be corrected with an adjustment to the degrees of freedom for the effect that elicits a more accurate significance value. Given that the Greenhouse-Geisser estimate of sphericity (ε) is less than .75 (see Table 28), a Greenhouse-

Geisser correction is considered most appropriate (Field, 2013; Gray & Kinnear, 2012; Maxwell & Delaney, 2004).

Table 28

Mauchly's Test of Sphericity

Within Subjects Effect	Mauchly's W	Approx. Chi-Square	*df*	*p*	Epsilon		
					Greenhouse-Geisser	Huynh-Feldt	Lower-bound
Time	.61	42.12	2	< .001	.72	.77	.50

There was no statistically significant three-way interaction between the fidelity of implementation of TIERS, grade level, and time on PCB, $F(2.87, 121.92) = 1.54$, $p = .21$, partial $\eta^2 = .04$, $\varepsilon = 2.24$ (see Table 29). The main effect of grade level did not show a statistically significant difference in mean PCB between elementary/middle and high school groups, $F(1, 85) = .17$, $p = .68$, partial $\eta^2 = .04$. As seen in Table 30, a two-way interaction between grade level and fidelity of implementation of TIERS is not indicated, $F(2, 85) = .88$, $p = .42$, partial $\eta^2 = .02$.

Table 29

Tests of Within-Subjects Effects

Source		Type III Sum of Squares	*Df*	*MS*	*F*	*p*	Partial η^2
Time * Grade_Level	Sphericity Assumed	.03	2	.02	1.12	.33	.01
	Greenhouse-Geisser	.03	1.43	.02	1.12	.32	.01
	Huynh-Feldt	.03	1.54	.02	1.12	.32	.01
	Lower-bound	.03	1	.03	1.12	.29	.01
Time * Grade_Level * Fidelity_Level	Sphericity Assumed	.08	4	.02	1.54	.19	.04
	Greenhouse-Geisser	.08	2.87	.03	1.54	.21	.04
	Huynh-Feldt	.08	3.08	.03	1.54	.21	.04

	Lower-bound	.08	2	.04	1.54	.22	.04
Error(Time)	Sphericity Assumed	2.24	170	.01			
	Greenhouse-Geisser	2.24	121.92	.02			
	Huynh-Feldt	2.24	130.74	.02			
	Lower-bound	2.24	85	.03			

Table 30

Tests of Between-Subjects Effects

Source	Type III Sum of Squares	*df*	*MS*	*F*	*p*	Partial η^2
Intercept	171.36	1	171.36	4625.53	< .001	.98
Grade_Level	.01	1	.01	.17	.68	.06
Fidelity_Level * Grade Level	.07	2	.03	.88	.42	.02
Error	3.15	85	.04			

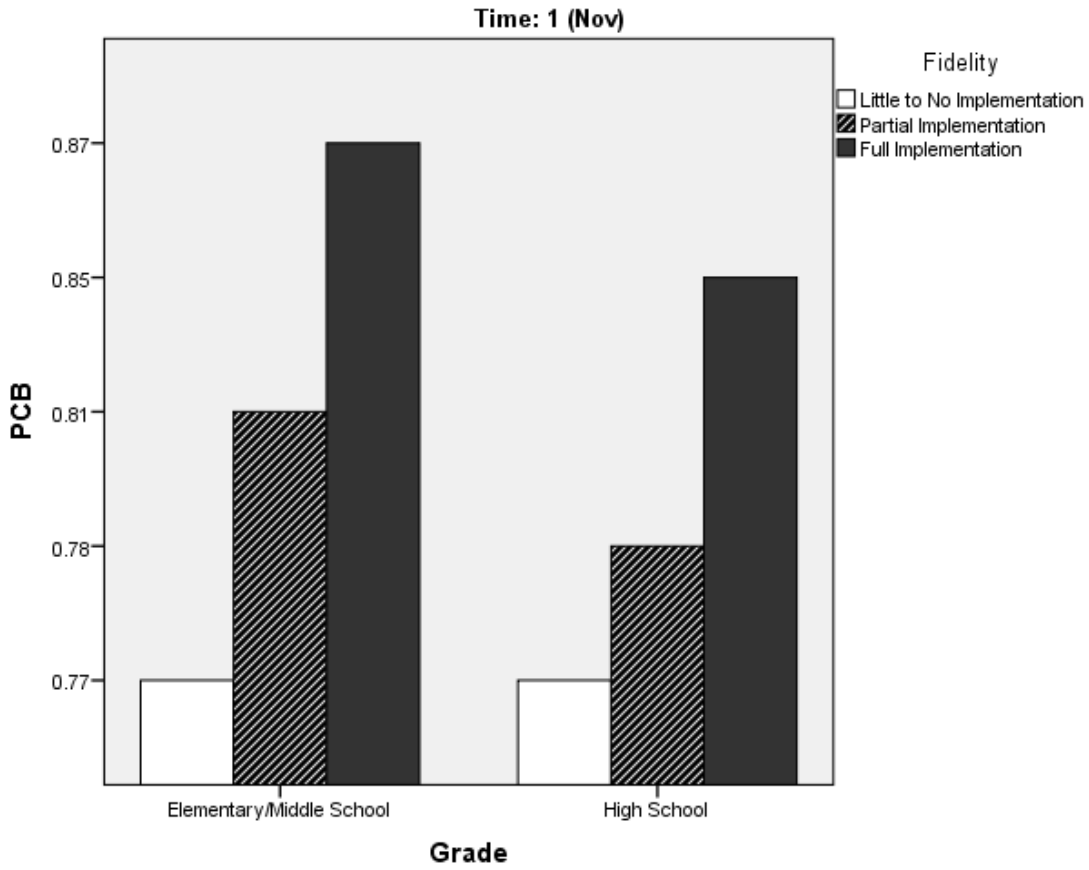

Figure 7. Mean PCB across low, medium, and high fidelity of implementation between elementary/middle school and high school students at time 1 (November 2015).

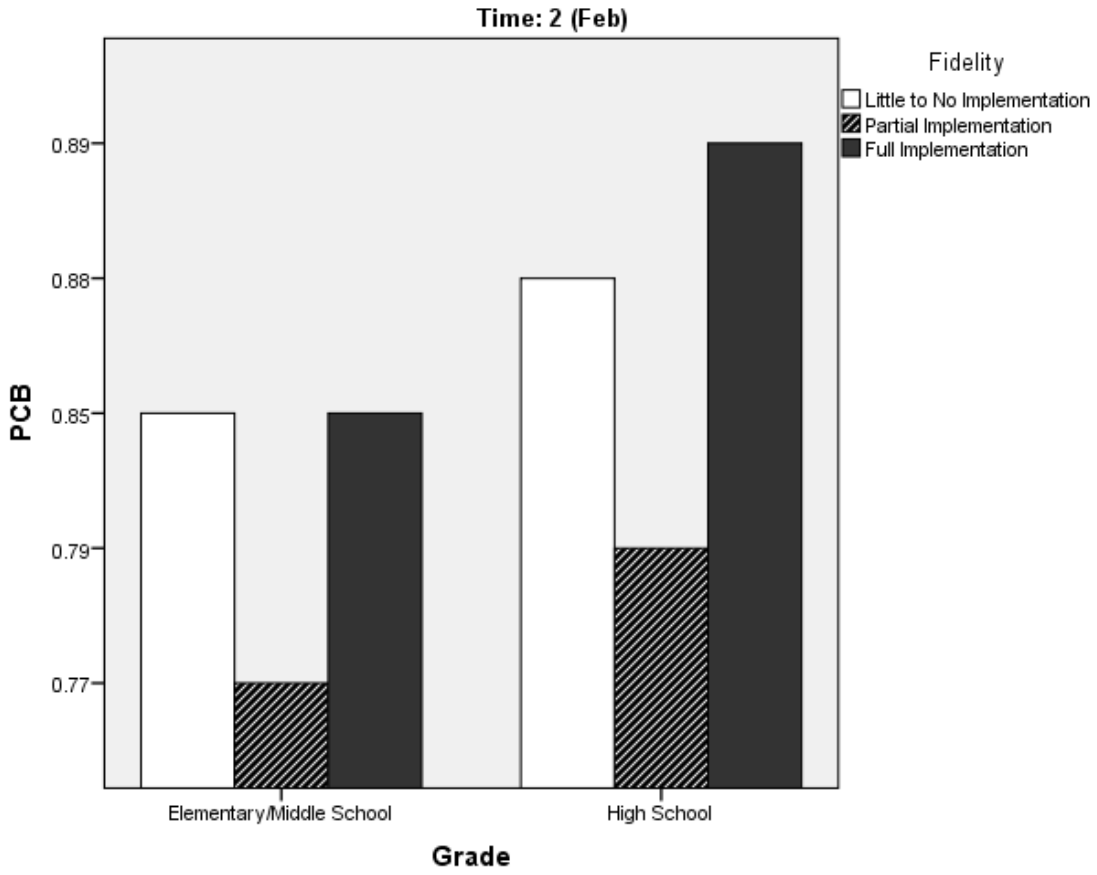

Figure 8. Mean PCB across low, medium, and high fidelity of implementation between elementary/middle school and high school students at time 2 (February 2016).

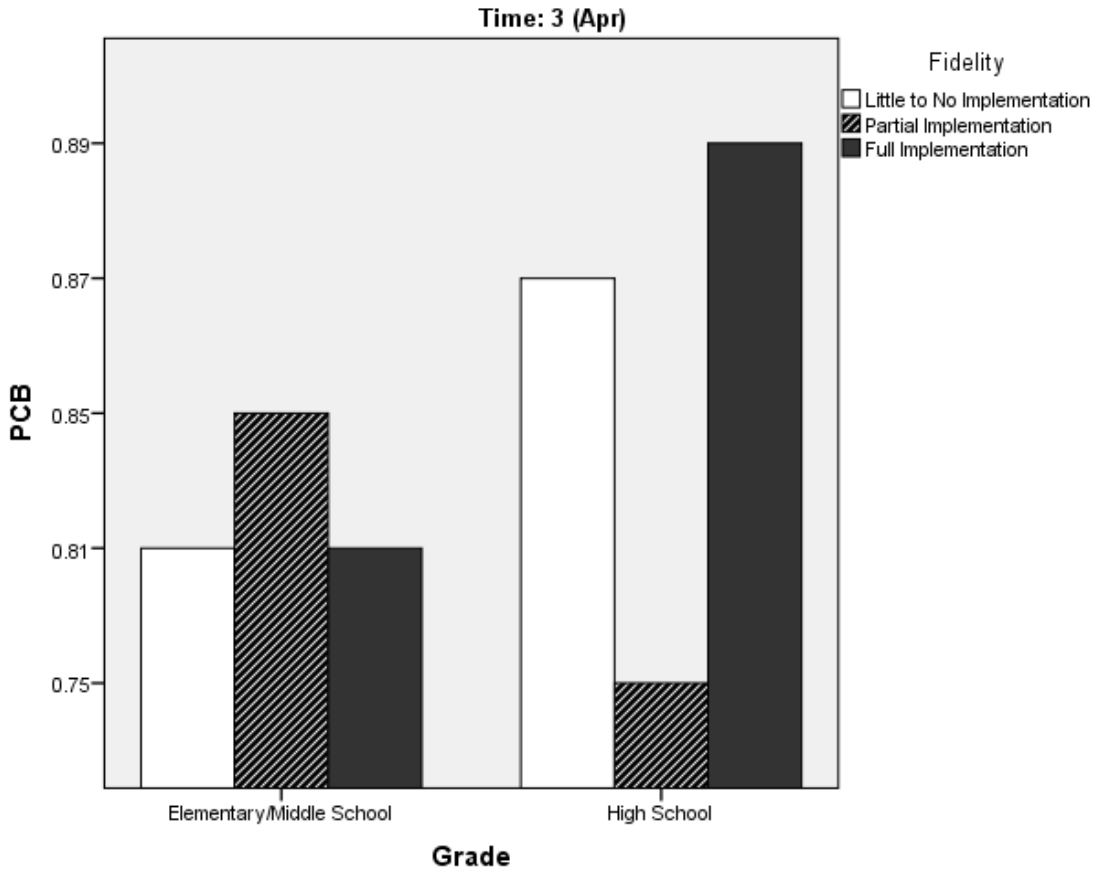

Figure 9. Mean PCB across low, medium, and high fidelity of implementation between elementary/middle school and high school students at time 3 (April 2016).

VI. DISCUSSION

The efforts of researchers in the field of EBD have led to our increased understanding of practices that are effective for improving outcomes for students struggling with emotional and behavioral challenges (Tankersley, Landrum, & Cook, 2004; Walker, Sprague, Close, & Starlin, 2000). The elements of TIERS are an assemblage of empirically supported practices that, to varying degrees, improve the social, behavioral, and academic outcomes of students with EBD (Cook & Browning Wright, 2009). While practices have been developed to support the educational success of students with EBD, it is clear that

there is much we have yet to learn about school-based programming for students with EBD. This study contributes to contemporary knowledge regarding the effectiveness of TIERS in serving students with EBD within restrictive classroom settings. The following provides a brief synthesis and interpretation of the findings related to each of the questions examined in their study.

Association of TIERS and Positive Classroom Behavior (PCB) Over Time

To address the first research question regarding whether participation in a restrictive classroom implementing TIERS was associated with PCB over time, results of the analysis indicated that there was a statistically significant increase in the mean PCB score from September to February of the 2015-2016 school year. However, there was no significant difference in reported PCB scores between any other pair of time points across the academic year (i.e., September November, February, April). Visual inspection of the mean PCB scores across the first three of the four time points sampled revealed a general positive trend. The mean PCB score for the last time point, April, showed a slight, but not statistically significant, decline from the previous time point in February. The last time point, April, was approximately one month before the end of the 2015-2016 school year. This time of the school year is known for increased behavioral challenges among students (Reinke, Lewis-Palmer, & Merrell, 2008), which may have contributed to data at that time of the year. Although significant change was not observed between consecutive time points, the significant difference found between September and February suggests that significant behavior change may occur over longer time intervals. In other words, students' PCBs may not increase significantly after 1 to 2 months; however, a significant increase may be observed after a period of four to five months. Thus, the findings generally support the

hypothesis that there will be an increase in PCBs for students in a restrictive classroom implementing TIERS.

Implementation Fidelity and the Association of TIERS and PCB Over Time

The second research question regarding whether the effect of being in a restrictive classroom implementing TIERS on PCB is associated with the implementation fidelity was examined with two different approaches: 1) measuring only the number of elements that were fully implemented, and 2) measuring both the number of elements that were partially and fully implemented. When level of implementation fidelity was measured only by the number of elements that were fully implemented, results did not show any significant difference between the PCB scores of students in the low, medium, and high fidelity groups. Granted, it should be recognized that the range of implementation was limited, with the high implementation fidelity group ranging from 7 to 12, of the 16 elements fully implemented. There was only one classroom that managed to fully implement 12 of the 16 TIERS elements, whereas, 12 of the classrooms fully implemented only 8 or fewer elements. Overall, most classrooms implemented 5 or fewer elements, thus, interpretation of these findings are compromised by the lack of classrooms fully implementing the TIERS program elements.

When level of implementation fidelity was measured by the number of elements that were fully and partially implemented, results revealed that there was a significant difference between PCB scores of students in the low, medium, and high fidelity groups. Pairwise comparisons indicated that the full implementation fidelity group was significantly associated with a mean PCB score that was higher than partial implementation fidelity group. However, results did not indicate the mean PCB score of the low implementation

fidelity group to be significantly different from medium and high implementation fidelity groups. An additional analysis comparing the three TIERS programs with the highest overall fidelity scores and the three TIERS programs with the lowest overall fidelity scores also failed to show a significant association between greater implementation fidelity and higher PCB scores. As previously discussed, consideration of implementation fidelity when evaluating the effectiveness of interventions is important in school-based practice. The findings from this study, with a limited range of full implementation, are inconsistent with the implementation science literature that largely supports the idea that greater adherence to implementing evidence-based practices leads to better behavioral outcomes.

Grade Level and the Association of TIERS and PCB Over Time

The final analysis of this study to investigate the third research question regarding whether students PCB depended on students' grade level (elementary/middle versus high school) did not reveal a significant interaction between implementation fidelity, grade level, and time on PCB. Results did not suggest that there was a difference between PCB levels across time between students in elementary/middle school and students in high school TIERS programs. While there has been speculation that older students or adolescents in high school are likely to be more resistant to behavior change when compared to younger students (e.g, Glanz, Rimer, & Viswanath, 2008; Kazdin, 1993), the results of this study do not appear to support this hypothesis. Furthermore, there was no significant interaction between grade level and implementation fidelity. This means that results also did not show implementation fidelity to significantly differ between elementary/middle school TIERS programs and high school TIERS programs.

Implications for Research and Practice

The successful development of an intervention program is an important first step towards helping students with EBD, but it is only the first step. As Durlak and DuPre (2008) have articulated, putting an intervention program into action as designed can be a long and complicated process. This study expands on the existing literature on programming for students with EBD in several ways. Although the individual elements of TIERS benefit from empirical support, there remains a fundamental question regarding their generalizability. To date, the majority of studies conducted describe the application and effects of these intervention strategies within clinical or analog settings. Few studies actually describe their use and effects within natural contexts, such as school classrooms. When information about the generalizability of these intervention strategies to school settings are presented in the literature, it is generally limited to anecdotal data (Gresham & Kern, 2004). Although Cook and Browning-Wright (2009) have described the intervention strategies to be implemented in a TIERS program, there has not been a single published study describing its effect on any student outcome variable when implemented under real-world classroom settings. This study expands the data available on implementation of a combination of evidence-based strategies beyond the experimental settings that fail to accurately replicate the real-world conditions that students with EBD experience. Using information gathered from actual school settings, this study helps to advance the discussion of whether schools can successfully implement classroom programs and adequately serve students with severe emotional and behavioral problems.

Perhaps related to the lack of information regarding the generalizability of the individual intervention elements of TIERS is that most of the studies conducted to date describe researchers and clinicians implementing the interventions in clinical settings, not

educators in school settings serving students with EBD (Gresham & Kern, 2004). This has raised the question of whether these interventions can be successfully implemented by typical staff members that work with students with EBD. As indicated previously, none of the 13 TIERS programs in this study fully implemented all of the elements of TIERS with full fidelity. The highest level of implementation fidelity reported belonged to an elementary school classroom indicating full implementation of 13 (of 16) TIERS elements at one time point (April). The number of elements fully implemented across the remaining programs across all time points were lower. In fact, 74 percent of the fidelity ratings gathered indicated that less than half of all 16 TIERS elements were fully implemented.

The lack of classrooms implementing all parts of TIERS as intended suggests the presence of barriers to implementation due to either lack of effective program design or other contextual factors. According to Durlak and DuPre (2008) in their review of hundreds of studies to summarize findings regarding the effects of prevention and promotion programs, multiple factors were indicated to have a possible influence on the level of implementation fidelity of any given program. These include community-level factors (e.g., policy, funding, and political climate), provider characteristics (e.g., skill level), and delivery system (e.g., administrative support, availability of resources and technical assistance). It is also possible that TIERS may consist of too many intervention elements for professionals to practically implement. The implementation science literature argues that intervention programs are less likely to be implemented with full fidelity when they are considered complex (i.e., have a high number of treatment components, require multiple service providers, and lack user friendly resources) (Borrelli, 2011). Given the numerous interventions that are to be implemented in a TIERS program, it is possible that TIERS may

include too many components for most classrooms to properly and consistently implement, even when given a low staff to student ratio.

This study also contributes to the literature on programming for secondary students with emotional and behavioral challenges. While a number of studies have been conducted on the effects of social skills training for secondary students with EBD (Cook et al., 2008; Quinn et al., 1999), few studies have focused on other school-based interventions for secondary students (DuPaul, Laracy, & Gormley, 2014). In two-meta-analyses that included a total of 123 school-based intervention studies between 1975 and 2010 (DuPaul & Eckert, 1997; DuPaul et al., 2012), few included high schools. This study is the first to explore the question of whether there is a significant difference in the behavioral outcomes of students with severe EBD in a school-based intervention program when they are compared by grade level (elementary/middle versus high school). As previously discussed, some scholars have suggested that students at the secondary level are less amenable to change. However, results of this study did not indicate a significant difference between the behavioral outcomes of elementary/middle school students and high school students, which may suggest that students at the secondary level can benefit from strategies that have been found to be effective for younger students with emotional and behavioral challenges.

Study Limitations and Future Directions

As a preliminary examination of the effectiveness of TIERS, this study does include several important limitations that are important to address here. First, all elements of TIERS were treated with equal weight in terms of actual impact or effect on students' behavior. In other words, there was no differentiation made between the elements of TIERS in terms of their potential influence on student behavioral outcomes. While there is a plethora of research

that supports the application of the elements that define TIERS, it is highly unlikely that all elements are equally effective in promoting positive classroom behaviors. In fact, it is unclear whether all of the elements of TIERS are truly needed in a program serving students with EBD. As indicated by Dhillon and colleagues (2015), most school-based intervention programs have both essential and non-essential elements. Despite the challenges of practical limitations such as capacity, time, and funding that often hinder researchers from evaluating all the elements of any given program, efforts towards identification of the critical elements is a practical next step towards increasing our knowledge about what is most effective for helping students with EBD in school settings.

Another limitation of the study relates to the measurement of implementation fidelity. How this has been conceptualized and measured varies in the literature. As a result, there remains a lack of consensus among scholars about how to best define and interpret adherence to the procedures of an intervention (Dhillon, Darrow, & Meyers, 2015; Dane & Schneider, 1998; O'Donnell, 2008). While many studies have defined fidelity as being either high or low (e.g., Gottfredson, Gottfredson, & Hybl, 1993; Hansen, Graham, & Wolkenstein, 1991; Kovaleski, Gickling, Morrow, & Swank, 1999), this study accounted for high, low, and partial implementation. However, it is unlikely that *partial implementation* fully captures the extent to which each element has been implemented. Compared to reports of *little to no implementation* and *full implementation*, it is probable that *partial implementation* allows for and captures reports from school staff that represent a greater variance in the level of implementation of each of the TIERS elements. For example, in two different TIERS programs where one classroom implemented a social skills curriculum for only one week and the other classroom implemented the same intervention for four weeks in the same reporting

period, the staff in both of those programs may report *partial implementation*. In other words, the measure used in this study to determine level of implementation fidelity may lack the sensitivity needed to produce more accurate information about how much programs are truly being implemented in classrooms. Although, given the relatively low degree of implementation of most elements, it is possible that there was simply not a sufficient number of programs fully implementing most elements of the TIERS program.

It is also important to acknowledge that a non-standardized measure for implementation fidelity was used in this study. As previously indicated, there remains a lack of agreement about how implementation fidelity can and should be measured. This is an area that warrants further study. As proposed by Walker, Koroloff, and Schutte (2003) after a series of studies identifying critical elements necessary for collaborative individualized support planning, it is necessary to consider organizational level characteristics (i.e., training and supervision, staffing patterns, and implementation protocols) and service level characteristics (i.e., funding and degree of collaboration among providers). This framework proposed by Walker and colleagues was used to help develop a formal measure of fidelity that accounted for both adherence and also program and system supports by Bruns and colleagues (2006) in their study of wraparound programs. Future examination of the implementation of TIERS may benefit from collection of data related to organizational and system factors to potentially enhance the accuracy of fidelity data.

There were also limitations related to the data collected on implementation fidelity and student behavior. While having multiple respondents report on implementation fidelity at each of the sites may have buffered against possible response bias effects, it should be acknowledged that prior research has shown that individuals implementing interventions

have a tendency to overrate how well they did (Lugtenberg, Burgers, Besters, Han, & Westert, 2011). Future research may consider the use of an additional fidelity check method (e.g., observation of implementation processes). Regarding the student daily behavior data reported by school staff, it is important to note that many students were already frequently demonstrating positive classroom behaviors. This is evidenced by the overall mean PCB value of .78 (or 78 percent) for the entire student sample in this study at Time 1. Given this, it can be reasoned that the range above .78 was limited, which means there may have been less room for growth. It is possible that this ceiling effect may have impacted the results of this study.

Another limitation of the data collected relates to the number of elementary and middle school student participants versus the number of high school student participants. In order to maintain adequate power for detecting moderate effects, the entire sample had to be used. As a result, elementary and middle school students had to be grouped together to address the question of whether student PCBs depended on students' grade level. Many studies in the EBD literature have combined elementary and middle school students into a single group and proceeded to report on outcomes that do not differentiate between the two. Further research is needed to determine whether this grouping is appropriate.

Finally, this study did not consider the factors of implementation competence (also known as quality of implementation). The fidelity data gathered for this study only provided information about educators' adherence to the TIERS program. However, research in the psychotherapy and substance abuse literature has emerged that examines fidelity in terms of both adherence and competence (Schulte et al., 2009). This is an important distinction as a teacher may display a behavior to meet criteria for full adherence, but may not necessarily do

so with good quality. Future examinations of implementation fidelity of TIERS may benefit from evaluating fidelity with consideration for quality in addition to adherence.

Conclusions

There is much left to be learned about programming for children and adolescents with EBD in school settings. The TIERS program does incorporate evidence-based interventions for reducing student behavior problems and the focus in this study has primarily focused on the behavioral outcome of students in restrictive settings implementing TIERS. Evidence for behavior change is important given the overwhelming number of teachers that place a focus on interventions designed to ameliorate behavior problems in order to create classroom environments that are conducive to teaching and learning. However, behavioral outcomes are not the only outcomes of value. Further attention to students' outcomes in the domains of social and academic competence are also needed. This preliminary study provides some valuable information about the effectiveness of TIERS, but it is only a first step towards a long road ahead to understanding what works for this unique group of students. Regarding the value and utility of TIERS programs, the question remains whether it can be feasibly and effectively implemented to ultimately build students' behavioral, social-emotional, and academic competencies for reintegration back into the general education program.

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Appendix

TIERS Implementation Fidelity Survey

In order to more fully understand the implementation of TIERS within the local context, please take 15 minutes to complete the TIERS implementation survey.

The information you provide is both confidential and anonymous; no names or identifying information will be included. The information collected will only be used in the aggregate and will not be used in any personnel reviews. The aggregated ratings and comments will be summarized and used to inform ongoing implementation efforts.

Please take 15 minutes to complete the survey by DATE. Please note that you will need to provide a response for each question on the survey.

Thank you for taking time to share this important information.

Element 1: Establish, maintain, and restore positive relationships (i.e. spending individual time with the student, keeping track of special occasions for individual students and personalizing it, reference information learned about student strategically during greetings at the door and in conversations, separating the deed from the doer, using 5:1 ratio of positive to negative interactions with students, smiling, etc.)

- ○ 1 – Little or No Implementation
- ○ 2 – Partial Implementation, but not at fidelity
- ○ 3 – Full Implementation at fidelity

Element 2: Establishing physiology to learn (i.e. stress inoculation, sleep, exercise, and eating well)

- ○ 1 – Little or No Implementation
- ○ 2 – Partial Implementation, but not at fidelity
- ○ 3 – Full Implementation at fidelity

Element 3. Positive Behavior Supports (i.e. teach, model, cue, reinforce desirable behaviors)

- ○ 1 – Little or No Implementation
- ○ 2 – Partial Implementation, but not at fidelity
- ○ 3 – Full Implementation at fidelity

Element 4. Social Skills Curriculum (i.e. Boys Town)

- ○ 1 – Little or No Implementation
- ○ 2 – Partial Implementation, but not at fidelity

- 3 – Full Implementation at fidelity

Element 5. Social Emotional Learning Curricula (SEL) (i.e. Second Step)

- 1 – Little or No Implementation
- 2 – Partial Implementation, but not at fidelity
- 3 – Full Implementation at fidelity

Element 6. Proactive Classroom Management Strategies (i.e. greeting students at the door, classroom rules/expectations are visible and known by every student, teacher proximity, visual schedule of classroom activities, effective cuing system to release and regain attention, etc.)

- 1 – Little or No Implementation
- 2 – Partial Implementation, but not at fidelity
- 3 – Full Implementation at fidelity

Element 7. Good Behavior Game (i.e., splitting the class into teams, awarding points for desired behaviors, subtracting points for undesirable and winning team or teams access preferred activity from a menu)

- 1 – Little or No Implementation
- 2 – Partial Implementation, but not at fidelity
- 3 – Full Implementation at fidelity

Element 8. Points and Levels System tied to Honors and Reboot Room (previously Boring Room)

- 1 – Little or No Implementation
- 2 – Partial Implementation, but not at fidelity
- 3 – Full Implementation at fidelity

Element 9. PROMPT procedure is followed in response to problem behavior (i.e. proximity control, redirection strategy, ongoing monitoring, prompt expected behavior, teaching interaction)

- 1 – Little or No Implementation
- 2 – Partial Implementation, but not at fidelity
- 3 – Full Implementation at fidelity

Element 10. Honors Room / Outings (i.e., motivating items/activities are available and provided when earned)

- 1 – Little or No Implementation
- 2 – Partial Implementation, but not at fidelity
- 3 – Full Implementation at fidelity

Element 11. Reboot Room (previously Boring Room) / Reflective Time to encourage better behavior (i.e., student receives folders based on zero out behavior, student performs restitution tasks in order to get out of the boring time, reflection form to identify replacement behaviors and plan for handling the situation better next time, etc.)

- 1 – Little or No Implementation
- 2 – Partial Implementation, but not at fidelity
- 3 – Full Implementation at fidelity

Element 12. Effective Academic Instruction (i.e. instruction that is engaging and tailored to the maximum extent possible to each student's needs)

- 1 – Little or No Implementation
- 2 – Partial Implementation, but not at fidelity
- 3 – Full Implementation at fidelity

Element 13. Relentless outreach to parents (i.e. on-going parent training and school-home collaboration)

- 1 – Little or No Implementation
- 2 – Partial Implementation, but not at fidelity
- 3 – Full Implementation at fidelity

Element 14. Daily debriefs to communicate and coordinate (i.e. between teacher and instruction assistants, involve admin and school psych when needed)

- 1 – Little or No Implementation
- 2 – Partial Implementation, but not at fidelity
- 3 – Full Implementation at fidelity

Element 15. Self-governance meetings (i.e. regular meetings that allow students the opportunity to provide input about their classroom)

- 1 – Little or No Implementation
- 2 – Partial Implementation, but not at fidelity
- 3 – Full Implementation at fidelity

Element 16. Problem-Solving Efforts for students who are being non-responsive to the base program supports (i.e., identify the problem, analyze the problem, develop a plan to address the problem, implement and evaluate whether the plan worked)

- 1 – Little or No Implementation
- 2 – Partial Implementation, but not at fidelity
- 3 – Full Implementation at fidelity