

STUDENT AND INTERVENTION CHARACTERISTICS AS PREDICTORS OF  
RESPONSE TO SCHOOL ENGAGEMENT INTERVENTIONS IN THE 6th GRADE

by

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## DISSERTATION ABSTRACT

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Title: Student and Intervention Characteristics as Predictors of Response to School Engagement Interventions in the 6<sup>th</sup> Grade

School engagement has emerged as a consistent target variable in prevention and intervention efforts to improve student achievement and reduce risk of dropout. This dissertation study analyzed several student-level and intervention-level characteristics as potential predictors of student response to school engagement interventions. Participants included 757 6<sup>th</sup> graders who were a part of a large-scale, comprehensive intervention project for Oregon middle schoolers. The results of the current study indicated that students' baseline school engagement (as measured by the Student Engagement Instrument), Limited English Proficiency (LEP) Status, and school district significantly predicted response. Implications for research and practice are discussed.

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I dedicate the work and research from this project to my current and future students and clients. I promise to always do everything I can to make sure that school is a place where you feel welcome, safe, and supported.



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## CHAPTER I

### INTRODUCTION AND STUDY PURPOSE

Students' engagement with school is a topic that has been widely studied within the field of educational research due to the construct's logical and empirical links to far-reaching academic, social, and life outcomes. School engagement can be seen as a prerequisite for satisfactory academic performance in K-12 education, leading to a link between higher levels of school engagement and higher rates of high school completion and graduation. On the opposite end of the spectrum, students who disengage from school are at increased risk of dropping out before earning a high school diploma. As a result, students with lower levels of school engagement are at greater risk for the negative outcomes associated with dropping out such as lower rates of employment and higher risks of poverty, incarceration, and drug use (Christenson et al., 2008; Dynarski et al., 2008; Lovelace, Reschly, & Appleton, 2018). Put simply, school engagement is a critical piece in helping students stay in school and develop the interpersonal, daily living, and career/professional skills needed to successfully participate and contribute to today's society. Of course, not all students who experience relatively low levels of school engagement drop out of school. However, these students are still more likely to experience discipline problems, frequent absenteeism, and poorer academic performance during the time that they remain in public school settings.

The existing research on school engagement is clear that the construct is not static within and across school years and grade levels. Instead, a student's engagement with school is sensitive to student and contextual circumstances across the span of his or her educational career. The dynamic nature of school engagement can be seen as a double-

edged sword. On one hand, many students face peer, social, societal, academic, and economic pressures that hinder their ability to become and/or remain engaged with their school and education. On the other hand, the fact that school engagement can change is evidence that educators and other stakeholders may be able to improve and increase a student's school engagement with targeted efforts and reforms. In fact, Christenson et al. (2008) highlight school engagement as an ideal variable that can be targeted in interventions and may mediate connections between contextual factors (e.g., family, school, and peer groupings) and student outcomes. Especially as students move into the relatively less-structured and monitored environments of middle school, the possibilities of disengaging from school increase (Balfanz, Herzog, & Mac Iver, 2007). During the critical transition out of the relative safety and security of elementary or primary schools, efforts to facilitate and foster students' engagement with school and learning become increasingly important to ensure that they remain on positive academic trajectories.

The Center on Teaching and Learning (CTL)'s Middle School Intervention Project (MSIP; Baker, Crone, & Fien, 2010) is one project that, in part, aimed to elucidate further information about school engagement and ways in which it can be strengthened for students at risk of school disengagement and/or dropout. The MSIP was a project funded by the U.S. Department of Education's Institute of Education Sciences (IES; Grant #R305E100043 to the University of Oregon) and evaluated a combination of reading interventions, school engagement interventions, and data-based decision-making on reading outcomes for middle schoolers (i.e., grades 6-8) determined to be at-risk for reading underperformance (Baker et al., 2016). This project combined efforts by the CTL and five partner school districts throughout the state of Oregon to increase high school

graduation rates. School engagement, although a critical aspect of the multi-component intervention evaluated within the MSIP, has not been the focus as a primary outcome variable in the original MSIP research team's studies to date, given the project's primary focus on reading achievement. However, the data collected therein can provide a wealth of information about school engagement outcomes. As a result, the MSIP data have the potential to be included in research projects examining multiple facets of school engagement. The current study makes use of the rich MSIP data set in order to examine three questions related to predictors of response to school engagement interventions for 6<sup>th</sup> grade students.

## CHAPTER II

### LITERATURE REVIEW

#### **Definitions and Dimensions of School Engagement**

Within the existing literature, school engagement has been defined and studied as a multi-dimensional construct (Alabanes, 2012; Appleton, Christenson, & Furlong, 2008; Appleton, Christenson, Kim, & Reschly, 2006; Christenson et al., 2008). Unfortunately, the breadth of information captured within the construct has led to ambiguities and inconsistencies in school engagement's definition across various camps of researchers (Reschly & Christenson, 2012). In an effort to bridge the gaps between and among research studies related to school engagement, many researchers have acknowledged the importance of candidly addressing the particular definition of school engagement used in any given study. Therefore, this section will describe the various definitions of school engagement that have influenced the definition used within the current study and manuscript.

In its broadest terms, school engagement has been summarized quite poetically with statements that the construct combines a student's feelings of "I can," "I want to," and "I belong" (National Research Council and the Institute of Medicine [NRC], 2004). Appleton (2012) added that school engagement can be seen as the action a student takes due to the motivation to participate, belong, and/or succeed in school. More precisely, researchers have conceptualized the construct with two to four-factor models. Early and seminal two-factor models often defined school engagement as a process in which a student behaviorally demonstrates a commitment to and investment in learning and emotionally or affectively feels a sense of belonging or identification with school (e.g.,



Finn, 1989; Marks, 2000; Newmann, Wehlage, & Lamborn, 1992). Three-factor models tend to maintain the behavioral and affective factors, while adding a factor related to cognitive aspects of engagement, such as thoughts about the value of school (e.g., Fredericks, Blumenfeld, & Paris, 2004; Jimerson, Campos, & Greif, 2003). More recently, others (Christenson & Anderson, 2002; Christenson et al., 2008; Reschly & Christenson, 2006) have described a taxonomy based on four subtypes of school engagement: academic, behavioral, cognitive, and psychological (later updated to affective) engagement. While each dimension is comprised of unique indicators and qualities, the subtypes of school engagement absolutely interact with each other. For example, increases in cognitive or affective engagement may improve behavioral or academic engagement (Lovelace et al., 2018). This conceptualization of school engagement most closely reflects the definition used for the purposes of the current study and manuscript. Thus, its components are described in more detail below.

### **Academic engagement.**

Academic engagement refers to aspects of school engagement that relate to a student's behavior and efforts "that have, as their purpose, the high-quality accomplishment of the academic tasks of schooling" (Appleton, 2012, p. 726). This component of school engagement is one of the easiest to objectively observe and track. Therefore, it is no surprise that schools already collect data related to a variety of academic engagement indicators such as GPA, number of course credits accrued, and assignment submission (Christenson et al., 2008). In other words, it is assumed that one who is academically engaged with school will demonstrate this engagement via better grades, increased rates of passed courses, and/or a higher likelihood of completing and

turning in assigned tasks. However, as most educators know, these indicators of academic engagement do not necessarily mean that a student is fully engaged with school. A relatively disengaged student may still be able to muster the effort required to achieve passing grades, for example. Therefore, assessing the other sub-types or dimensions of engagement is a critical step to more accurately capturing the true level of a student's engagement with school.

### **Behavioral engagement.**

Behavioral engagement refers largely to school attendance, behavior while at school, and participation in classroom and school-sanctioned extracurricular activities (Reschly & Christenson, 2012). Similar to academic engagement, indicators of behavioral engagement are relatively easy to observe and track. As a result, school personnel and researchers have long used data like attendance records, number of suspensions, office discipline referrals, and extracurricular involvement to assess and monitor students' behavioral engagement. Christenson et al. (2008) argue that a student's behavioral engagement will depend largely on three domains. First, the school environment (via concepts such as the school's overall climate and the quality of relationships between and among students and staff) often has an impact on students' likelihood to consistently attend school and avoid experiencing discipline problems in the school setting. Meanwhile, a student's home and living environment of course can foster or diminish the extent to which a student can and will demonstrate behavioral engagement with school. For example, the frequency and intensity of conflict in the home, family mobility, and the family's socioeconomic status are all variables that are logically involved in the interplay between the home setting and a student's behavioral

school engagement (Christenson et al., 2008). Finally, the student's own personal characteristics play a vital role in how he or she will participate in school and school-related activities and programs. A student who experiences significant academic or cognitive deficits, for example, may express frustration with behavioral outbursts or simple noncompliance, both of which can lead to increased rates of administrative discipline. Similarly, students with Emotional or Behavioral Disabilities (EBD) or social skill deficits may find themselves in an administrator's office or facing suspensions more often than their peers.

### **Cognitive engagement.**

While academic and behavioral school engagement are dimensions that administrators, parents, teachers, and researchers can observe and track fairly easily, the final two components in the four-factor model of school engagement are more internalized and less observable. As a result, schools typically have less data related to the following two dimensions (Lovelace, Reschly, Appleton, & Lutz, 2014). Despite this challenge, cognitive engagement is still a critical aspect of students' engagement with their schooling. Cognitive engagement includes a student's thoughts about how valuable or relevant their schooling is to his or her own life and personal and/or professional goals and values. This dimension also captures ways that a student's self-regulation abilities and self-efficacy interplay with his or her educational efforts (Christenson et al., 2008; Reshly & Christenson, 2012).

Unsurprisingly, cognitive engagement is partially dependent on student-level characteristics and partially on school factors. For example, the nature of a student's goals or educational/professional plans and aspirations would likely contribute to how

relevant his or her schoolwork seemed to be. A student with plans to attend a four-year university and the self-regulation skills to understand that satisfactory performance in the K-12 grades is a prerequisite for this next step may be more likely to see value in his or her classes and invest time in effort into the work. However, this same student, now in a school environment in which the work is perceived to be too hard or too easy, may experience a decrease in cognitive engagement. On the other hand, a student with professional goals of entering into a skilled trade immediately after high school may struggle to see the value in certain courses that he or she sees as irrelevant and unnecessary. Then, this student enters a school context in which (s)he can take courses that align with her goals, and (s)he experiences an increase in cognitive engagement. Clearly, students' cognitions about themselves and their schooling, as well as school contextual factors, can all easily impact their sense of overall engagement with school.

### **Affective engagement.**

The final sub-type of school engagement is commonly referred to as psychological, emotional, or affective engagement. The original version of the Student Engagement Instrument (SEI; described below) utilized the term psychological engagement, but the most recent versions have been updated by the developers and researchers to use the term affective engagement in order to better capture the assessed construct (Betts, Appleton, Reschly, Christenson, & Huebner, 2010). Since the SEI is the target measure of the current study, the term affective engagement will be used for the remainder of this manuscript. Affective engagement captures a student's sense of belonging or identification with his/her schooling. Appleton (2012) adds that affective engagement includes a student's feelings toward and identification with their school's

staff and peers, as well as “the emotions experienced during the tasks of schooling” (p. 726). It follows naturally, then, that this aspect of a student’s school engagement can be fluid and can be dependent on the context of a school, classroom, staff, etc. For example, a student who identifies with a racial/ethnic minority may feel more affectively engaged with school when they see representations from their community within the makeup of the school staff and/or they feel confident that the school staff (regardless of background) respects and values students from their community. In the same way, peer relationships play an important role, with “socially integrated” students experiencing higher levels of affective engagement than their peers with relatively less social acceptance at school (Christenson et al., 2008, p. 1110).

In addition to the various sub-types of school engagement described above, researchers have also posited several ideas related to assessing the level of school engagement. Specifically, some researchers have described school engagement as following multiple continua (engagement vs. disengagement or disaffection), indicating that engagement and disengagement are separate constructs (e.g., Skinner & Pitzer, 2012). However, the current study more closely aligns with the theories of researchers such as Finn (1989) and Appleton, Christenson, Reschly and colleagues (e.g., Appleton et al., 2000, Christenson et al., 2008; Reschly & Christenson, 2012), who posit that school engagement follows along a single continuum from the highest levels of engagement to the lowest (see also Olson & Peterson, 2015).

### **School Engagement and Later Outcomes**

As previously introduced, there is considerable evidence for significant links between school engagement and various academic, social, and life outcomes. First, and

quite intuitively, there are clear connections between levels of school engagement and students' academic achievement and outcomes (Balfanz & Byrnes, 2006; Dotterer & Lowe, 2011; Finn & Rock, 1997; Kieffer, Marinell, & Neugebauer, 2014; Kindermann, 2007; Wang & Holcombe, 2010). In fact, of all the demonstrated relationships between school engagement and other factors, its relationship with academic achievement has one of the most robust evidence bases (NRC, 2004). The strong positive correlation has been replicated within a variety of student samples, demonstrating consistency across race/ethnicity, socioeconomic status, and student gender (Griffiths, Lilles, Furlong, & Sidhwa, 2012). For example, in a study of approximately 3,000 middle school students, academic engagement, as measured by time spent on schoolwork and homework, predicted higher math and science achievement, as indicated by class grades and standardized test scores (Singh, Granville, and Dika, 2002). Similarly, Diperna, Volpe, and Elliott (2001) demonstrated moderate to large effects of academic engagement levels (e.g., class participation) on students' classroom achievement, this time based on teacher-report. Interestingly, there is at least some empirical evidence to support the intuitive notion that school engagement is not just correlated with academic achievement, but that it also functions as a "key mediator of academic achievement through academic performance, grade promotion, and grade retention" (Griffiths et al., 2012, p. 569).

Decreased school engagement has also been linked to adolescent problem behavior, delinquency, and substance use. For example, Wang and Fredricks (2014) found that as school engagement decreased between 7<sup>th</sup> grade and 11<sup>th</sup> grade, delinquency and substance use also increased. Similarly, an additional study demonstrated that, among adolescents who have experienced maltreatment in their homes, school disengagement

has been tied to increased delinquency (Bender, 2012). Snyder and Smith (2015) then extended this research by demonstrating a link between school disengagement and adolescent delinquency (e.g., arson, robbery, public disorder) even after taking peer deviance, closeness with caregiver(s) and Attention-Deficit/Hyperactivity (ADHD) diagnoses into account statistically. Put simply, Appleton and colleagues (2008) summarized that “student perspectives and experiences substantially influence academic and social outcomes” (p. 369).

### **School Engagement and Dropout**

One additional outcome often associated with low levels of school engagement is school dropout. The wealth of existing research analyzing the relationship between these two variables merits a separate section on the topic within this manuscript. It is clear that America’s secondary schools have battled alarming dropout rates for some time. As recently as 2008, when the Institute for Education Sciences (IES) published its first dropout prevention guide, the authors lamented two facts. First, over 500,000 students drop out of high school each year. Second, that rate had proved relatively stable for 30 years, despite increased financial resources allocated to federal and state education programs (Dynarski et al., 2008). Unfortunately, when the IES updated their dropout prevention practice guide in 2017, these statistics remained largely unchanged, with 2013 data indicating only a one percentage point decrease in dropout rates since 1983 (Rumberger et al., 2017). During the 2010-2011 academic year, the U.S. Department of Education began gathering data on a measure called the adjusted cohort graduation rate (ACGR; McFarland et al., 2017). This statistic, expressed as a percentage, indicates how many students graduated with a regular high school diploma within 4 years of starting the

9<sup>th</sup> grade. As recently as the 2014-2015 school year, the ACGR was up to the highest it had been since the indicator's inception: 83% (McFarland et al., 2017). While this percentage indicates that a majority of students who make it to high school end up successfully graduating, it still means that there is a sizable portion (17%) who do not and are likely to face at least some of the challenges associated with dropping out. To be clear, this number is staggering for American society as a whole, but it is important to remember that many of the individual students dropping out of high school face profound setbacks and disadvantages, compared to their peers who successfully graduate high school. As a risk factor, dropping out has been linked to significant increases in substance use (Townsend, Fischer, & King, 2007), a higher likelihood of spending time in prison, as well as significant reductions in career and life opportunities, health outcomes, and even life expectancies (Dynarski et al., 2008; Rumberger et al., 2017).

Given the state of affairs regarding graduation rates and the research indicating the bleak outcomes that dropout predicts, efforts to develop, implement, and improve targeted attempts to reduce students' likelihood of dropping out are certainly worthwhile for societies, states, districts, and schools. It is unsurprising, then, that researchers, educators, and other stakeholders have invested considerable time and resources toward determining best practices for reducing dropout risk and facilitating high school completion. As a result of these efforts, school engagement has emerged as a consistent target for prevention and intervention work. In fact, Christenson et al. (2008) argued that "engagement is the primary theoretical model for understanding dropout and is, quite frankly, the bottom line in interventions to promote school completion" (p.1100).



The evidence that students experiencing low levels of school engagement are more likely to end up dropping out of high school before they receive a diploma is stark (e.g., Fredricks et al., 2004; NRC, 2004). For example, in a study of one large school district, Lovelace, Reschly, and Appleton (2018) found that students reporting lower scores on one facet of school engagement included on the SEI (Future Aspirations and Goals) were about five times more likely to drop out of high school than their peers who reported higher scores. Another longitudinal study that analyzed data for almost 12,000 students indicated that the broad construct of school engagement did significantly predict dropout, with the behavioral engagement dimension adding the most significance to the predictive model (Archambault, Janosz, Fallu, & Pagani, 2009). This link between school disengagement and risk of dropping out is even more salient for students with additional risk factors, such as poverty (Griffiths et al., 2012). One caveat worth mentioning is that, of course, not all students who are disengaged from school end up dropping out. In fact, Lawson and Masyn (2015) found, in a study of over 12,000 representative US high school students, that many students experiencing disengagement from school graduate high school on time and even continue on to enroll in college or trade school. While this is good news overall, it does not negate school disengagement as a clear and persistent risk factor of drop-out. Additionally, the other side of the coin is also true: not all students who eventually drop out show obvious signs of disengagement early on, leading some students to be missed when participants for engagement intervention are selected (Stout & Christenson, 2009).

It is also clear that academic difficulties, lower levels of school engagement, and higher risks of dropping out are intertwined (Kieffer et al., 2014; Nelson et al., 2016;

NRC, 2004). In other words, students struggling academically are more likely to feel disengaged from school and are more likely to leave school before graduating. To make matters worse, Nelson et al. (2016) made an important argument regarding an unintended link between modern efforts to increase achievement standards and increased risk for dropping out. Namely, a majority of U.S. 8<sup>th</sup> graders are not proficient readers and are not prepared to meet the increased standards. Therefore, without “increasing the intensity and quality of [the] academic, behavioral, and social supports” offered to students, educational stakeholders may unintentionally be setting these students up for diminished school engagement and eventual dropout in the name of increased accountability (Nelson et al., 2016, p. 2).

While many studies have examined the role of declining student engagement as a predictor of *dropping out* before completing high school, there has been a more recent push to examine engagement as a malleable factor to increase the likelihood of high school *completion* and other positive educational outcomes (Appleton et al., 2008; Doll & Hess, 2001; Lehr, Hanson, Sinclair, & Christenson, 2003). This conceptual push from dropout prevention to school completion interventions necessarily requires a greater focus on increasing school engagement, in order to target student interest, enthusiasm, belonging, and motivation related to school (Lehr et al., 2003).

### **School Engagement in Middle School**

Researchers and educators have long understood that school dropout is not one isolated event or decision, but is rather a result of a chain of events throughout a student’s life and schooling (Finn, 1989). In fact, some empirical data actually suggest that examining several risk factors as early as the 6<sup>th</sup> grade can help predict a student’s

likelihood of completing high school. For example, 6<sup>th</sup> grade attendance rates of 80% or lower, inappropriate classroom behavior, and/or failing grades in math or English cut students' chances of graduating on time to a frightening degree in one longitudinal study. The project, conducted by Balfanz and Herzog (2005, cited in Stout & Christenson, 2009) found that students with one of these risk factors in the 6<sup>th</sup> grade had a 90% chance of not graduating on time; the risk of not graduating even one year late (after five years) was still only 80%. Clearly, researchers and stakeholders who want to examine and intervene on drop-out risk by increasing students' school engagement would be far behind if they only started their work in high school settings.

Middle school is not only important in the conversation on school engagement and drop out because of the reliability with which it can predict later outcomes, however. The actual transition between elementary school and middle school marks a critical juncture in terms of school engagement trajectories. First, students must leave the relative safety and security of elementary school (e.g., 1-2 primary classroom teachers, consistent peer group, high levels of structure and supervision). Second, they must face the changes that the middle school years bring, such as multiple (usually 6-8) classroom teachers, different peers in each class, decreased classroom and assignment structure, and decreased supervision outside of the classroom (Kieffer et al., 2014). As a result of these significant contextual changes and differences, the transition into middle school is certainly one juncture at which students might veer toward or away from a path of optimal levels of engagement with school (Stout & Christenson, 2009). On the other hand, middle school also introduces new avenues for meaningful participation. For example, the availability of extracurricular activities such as sports teams, clubs, and

student government positions drastically increases once many students enter middle school.

However, much of the existing evidence analyzing school engagement across the K-12 grades indicates that many students do indeed experience declines in school engagement during middle school (Abbott, 2017, Mahatmya, Lohman, Matjasko, and Feldman Farb, 2012). In fact, the difficulties associated with the transition to middle school partially influenced the decision for the original MSIP research team to target middle school as focus in their reading, engagement, and data-based decision-making efforts (Baker et al., 2016). The school districts that participated in the original MSIP implementation efforts also wanted to specifically target struggling readers in middle school due to the unique connections between this developmental period and later educational outcomes, including school completion (Crone et al., 2016).

### **School Engagement and Student Characteristics**

Student characteristics, such as student sex, race or ethnicity, and ethnocultural factors have been commonly examined in relation to school engagement, both as isolated factors as well as intersectional variables. This section will briefly highlight the findings of some of the prior studies linking various status variables with school engagement.

Overall, prior research indicates higher levels of school engagement in female students, compared to their male peers (e.g., Lam et al., 2012). Similar findings have been demonstrated across ethnic and cultural groups. For example, student sex has predicted trajectories of student engagement among Latin American immigrant adolescents (Green, Rhodes, Hirsch, Suarez-Orozco, & Camic, 2008). Additionally, when examining sex by ethnicity differences in school engagement in middle school, Hughes,

Hee Im, and Allee (2015) reported higher levels of school engagement for girls of all ethnicities compared to European American and Latino boys. However, diving more deeply into questions related to student sex and school engagement, Rogers, DeLay, and Martin (2016) examined the impact of conforming to traditional masculinity on school engagement when transitioning to middle school and found evidence that conformity to traditional masculinity did predict decreased academic engagement for both male and female students. These results indicated that between-group differences in levels of school engagement may relate to nuanced aspects of an individual's gender identity and expression, not just the student's biological sex.

In addition to student sex, race and ethnicity has also been a commonly researched correlate of school engagement. Most research on this topic indicates that some racial or ethnic minorities, such as Hispanic, African American, or Native American students, have lower rates of school engagement (Stout & Christenson, 2009). Hughes et al. (2015) found that, in their sample, Latino boys reported lower levels of engagement than African American males. Hispanic/Latino adolescents' risk for lower school engagement may be at least partially due to negative stereotypes, prejudice, and discrimination in schools and in the larger society, as a whole (Suarez-Orozco & Suarez-Orozco, 2001). Indeed, it has been argued that the low graduation rates for Latino youth have more to do with the students being "pushed out" by these prejudicial forces as opposed to the students actively dropping out (Green et al., 2008, p. 396). These findings put together may suggest that, even among racial and ethnic groups at risk of school disengagement, Latino students are at an even greater disadvantage. In another study limited to approximately 200 African American male adolescents in Chicago, increased

school engagement did still predict a decrease in negative social and behavioral outcomes, including aggressive behavior, gang involvement, and unsafe sexual behavior (Voisin & Elsaesser, 2016).

Students with disabilities also tend to face higher risks of disengagement with school, and students specifically with emotional or behavioral disabilities (EBD) are especially likely to feel disengaged with school and eventually drop out (Stout & Christenson, 2009). Sinclair, Christenson, & Thurlow (2005) described one primary mechanism of risk for students with EBD, with emotional or behavioral problems leading to attendance problems and increased discipline referrals (two behavioral indicators of school engagement). Adverse Childhood Experiences (ACEs), such as physical abuse, neglect, or caregiver mental illness, have also been examined as predictors of students' level of school engagement. For example, increased numbers of ACEs have been significantly linked with decreases in indicators of students' academic, behavioral, cognitive, and psychological school engagement (Moses & Villodas, 2017). More generally, Wilcox, McQuay, Blackstaffe, Perry, and Hawe (2017) analyzed the relationship between several traditional predictor variables and student engagement and found that 20% of academic engagement variance was explained by grade level, gender, family affluence, anxiety, and social support.

These findings suggest that, while school variables do certainly influence school engagement, the characteristics, backgrounds, and experiences that students bring to school also play a significant role in determining how effectively they will engage with school staff, peers, and learning. Certainly, each of the studies described here

demonstrates the continued interest in empirically delineating associations between student-level characteristics and a student's engagement with school.

### **School Engagement Interventions**

Targeted school engagement interventions span from comprehensive programs such as The University of Minnesota's *Check & Connect* (Christenson, Stout, & Pohl, 2012), which has an evidence base in increasing school engagement for middle school students, to self-directed, multidimensional interventions (Martin, 2008). Some schools and districts have also adopted advisement programs that connect students with the same advisor across school years to help foster connections to adults in the school (Lovelace, Reschly, & Appleton, 2018). Even well-established programs like Positive Behavior Interventions and Supports (PBIS; see, for example, Horner, Sugai, & Anderson, 2010) can be seen as school-wide (i.e., universal or Tier 1) initiatives to improve student's behavioral engagement with school within a multi-tiered system of support (MTSS) by fostering positive relationships between students and school staff and reducing negative peer interactions and bullying (Bradshaw, 2013; Christenson et al., 2008; Neese, Horner, Dickey, Stiller, & Tomlanovich, 2014).

Among the programs targeting school engagement, *Check & Connect* has one of the most robust levels of evidence of effectiveness directly on improving school engagement and preventing school dropout. Using the stringent criteria of the IES's What Works Clearinghouse, *Check & Connect* was determined to have positive effects on staying in school and potentially positive effects on progressing in school (U.S. Department of Education, 2015). In early research examining the program, significant differences were detected between students receiving the *Check & Connect* intervention

and control students on several factors, including school enrollment and being on track to graduate in five years (Sinclair, Christenson, Evelo, and Hurley, 1998). Other longitudinal evaluations have found beneficial effects on truancy and attendance rates (Lehr, Sinclair, & Christenson, 2002; Sinclair, 2001; Sinclair & Kaibel, 2002); suspensions and course failures (Sinclair & Kaibel, 2002); and five-year high school graduation rates (Sinclair, 2001). Many of these findings have been replicated across subgroups of students, including students with emotional or behavioral disabilities (EBD; Sinclair, Christenson, & Thurlow, 2005).

However, despite the availability of evidence-based school engagement intervention programs across tiers of student need, Baker et al. (2016) highlight that there is not sufficient evidence that US districts and schools are effectively implementing evidence-based, successful school engagement interventions without the support of external agencies such as universities, state organizations, or outside funding. Therefore, it is even more critical that researchers and practitioners identify the most salient factors of effective school engagement interventions in order to minimize the expense of already tight resources on unnecessary (or even counterproductive) components. The following section will describe previous attempts to identify some of these elements.

### **Intervention Characteristics**

There are several core elements of comprehensive school engagement interventions that are commonly used, evidence-based, or both. These elements, the evidence supporting them, and descriptions of how they are commonly incorporated into interventions are described below. The descriptions provided here are intended to illustrate how some exemplar components of engagement interventions may be more or



less beneficial to certain subgroups of students, based on certain baseline student characteristics.

One of the most common aspects of school engagement interventions involves establishing a positive relationship between a supportive adult in the school, the student, the student's family, and other school staff members involved in the student's education (Christenson et al., 2008; Pianta, Hamre, & Allen, 2012). Titles of this supportive adult vary, including mentor, advocate, or monitor. The term monitor will be used in the remainder of this paper, referring specifically to a school staff member matched with a student for the purposes of supporting the student's engagement with school. In connecting students with a monitor, communication among all stakeholders (e.g., student, monitor, family, and other school staff members) is targeted, and, in many established interventions, trust is built by maintaining the relationship with the same monitor long-term. For example, a minimum of two years is preferable within the *Check & Connect* program (Anderson, Christenson, Sinclair, & Lehr, 2004). The long-term nature of the monitor-student relationship is beneficial, especially when considering the finding that fluctuations from year-to-year in adult support are significantly linked to fluctuations in student engagement, for better or worse (Green et al., 2008). Therefore, the persistence of the adult can serve to foster and support high levels of engagement across school years.

Fortunately, the common practice of connecting students with supportive school staff members is supported by the currently available research. For example, the NRC's literature review found plentiful evidence supporting the idea that fostering positive relationships with knowledgeable and caring teachers is a critical component of most successful school engagement interventions (NRC, 2004). Similarly, two What Works

Clearinghouse practice guides outlining evidence-based dropout prevention strategies presented clear empirical support for this aspect of school engagement interventions. Specifically, the panel of experts who produced the first guide included connecting students at risk of dropping out to one or more adult advocates as one of four recommendations (Dynarski et al., 2008). The updated 2017 practice guide retained the spirit of this recommendation, but subsumed it under a revised recommendation to deliver intensive, individualized support to off-track students (Rumberger et al., 2017). Specifically, this revised recommendation included calls to “assign a single person to be the student’s primary advocate, develop a menu of support options that advocates can use to help students, and support advocates with ongoing learning opportunities and tools for tracking their work” (Rumberger et al., 2017, p. 2-3). Overall, the recommendation maintained a moderate level of evidence within both guides.

Further, the centrality of relationship building in many school engagement interventions aligns with findings that positive teacher relationships predict higher engagement at school (Connell, 1990; Connell & Wellborn, 1991; Green et al., 2008; Lam et al., 2012). Put simply, Lam et al. (2012) argued that “when students perceive care and concern from their teachers, the chances for them to be engaged in school are higher” (p. 90-91). Assistance with building connections and trust for the student may be particularly beneficial for students who do not feel represented by adults in their school due to factors such as a mismatch between student and staff race/ethnicity. For example, previous research (Green et al., 2008; Suarez-Orozco, Suarez-Orozco, & Todorova, 2007) has indicated that supportive adult relationships at school are particularly beneficial for Latin American youth. In one manuscript, Green et al. (2008) stated that

“Latin American immigrant youth often have limited access to supportive adults in schools” (p. 395). Latin American students are also less likely to be praised by teachers or have their own ideas incorporated into class (Katz, 1999; Losey, 1995). Green et al. (2008) referenced several ways in which positive adult relationships can benefit this group of students, including providing information about majority/school culture and helping students handle and process language barriers and experiences of discrimination. Additionally, positive adult relationships can help minority students find pride in their ethnic and cultural identities (Green et al., 2008).

However, the relationship building aspect of many school engagement interventions does not just refer to connecting students to staff, but also often includes bringing parents and families further into the school dynamics. In fact, research supports the idea that integrating students’ families into the educational environment can facilitate school engagement (Raftery, Grolnick, & Flamm, 2012). For example, parental involvement significantly predicted behavioral, cognitive, and psychological school engagement in one study conducted by Dotterer and Wehrspann (2016).

In most standardized, comprehensive interventions, the assigned monitor takes a lead in the next common component of school engagement interventions, which involves the routine monitoring of alterable school engagement indicators (Anderson et al., 2004; Powers, Hagans, & Linn, 2017; Reschly & Christenson, 2012). This intervention component refers to the adult’s role in monitoring the student’s behavioral engagement (e.g., tardiness, absences, suspensions) and academic engagement (e.g., course failures, progress toward fulfilling graduation requirements). Most schools already keep data for all of these indicators, but they are rarely centrally monitored effectively. For example,

staff may not recognize that a student is missing too much school until (s)he is flagged for truancy. A school counselor may monitor students' progress toward graduation requirements, but the high numbers of students on most school counselors' caseloads prevent regular, meaningful monitoring of individual students.

In contrast to this business-as-usual approach, having mentors assigned to specific students (within smaller caseloads) can help schools build their capacity to identify indicators of disengagement earlier on in the process (Maynard, Kjellstrand, & Thompson, 2014). Based on the monitoring efforts, the monitor then is expected to facilitate individualized and timely interventions. These interventions include both basic and intensive interventions. For example, basic interventions to help a student address low attendance rates may include giving the student an alarm clock or helping him/her brainstorm solutions to barriers to getting to school each day. More intensive interventions may include actions such as actually picking the student up for school (Anderson et al., 2004; Maynard et al., 2014). Of course, given the time and resource-heavy nature of the more intensive interventions, these are typically prioritized for select students based on individual needs and progress monitoring of school engagement indicators (Sinclair et al., 2003). The practice of monitoring progress on engagement variables and intervening with individualized supports, as necessary, completely aligns with the first recommendation in the What Works Clearinghouse's updated dropout prevention practice guide (Rumberger et al., 2017).

In addition to the monitoring of alterable engagement indicators, many established school engagement interventions also include a problem-solving component to support the development of new skills that will help the student maintain higher levels

of school engagement even in the absence of the monitor or direct interventions (Christenson et al., 2008). Students with high levels of impulsivity, other executive functioning concerns, and/or emotional regulation difficulties might particularly benefit from this aspect of a school engagement intervention due to the focus on skill building. As a result, students eligible for Special Education services under codes such as Other Health Impairment (for a diagnosis of ADHD) or Emotional Disturbance may be likely to demonstrate response to interventions that include this component.

Next, a great deal of efforts to improve a student's school engagement include connecting the student with one or more pro-social extra-curricular activities. Within the *Check & Connect* program, connecting students with personally meaningful extra-curricular participation is appropriately referred to as affiliation with school and learning (Sinclair et al., 2003). As the name implies, this component of many school engagement interventions is specifically targeting the psychological/affective aspects of school engagement by facilitating a sense of meaningful belonging with and contribution to their school. Regardless of the specific engagement intervention, this practice is built on research indicating a link between extra-curricular involvement and reduced dropout (Feldman & Matjasko, 2005; Mahoney, 2014; Mahoney & Cairns; 1997; Rumberger, 1995). More specifically, Brown and Evans (2002) demonstrated that extra-curricular activity involvement facilitated greater connection to school, across all analyzed ethnic groups. Part of the effectiveness of this component may be due to the fact that it often also involves building additional positive relationships with supportive adults and pro-social peers at school. In fact, the NRC pointed out that connecting students with school staff (as previously described) is not the only possible relational route toward fostering

school engagement. Instead, they argue that successful engagement interventions often also support occasions for disengaged students to work with more engaged students (NRC, 2004). Along this line of thinking, extra-curricular involvement can be a positive way to connect students with each other as they work together toward common goals.

It is important to note that some students experience legitimate barriers that impede their access to extra-curricular involvement. For example, a student may ride the bus to and from school and not have an adult who can pick him/her up late from an after-school activity. Another student may shy away from joining a school-sanctioned extra-curricular because (s)he knows there are registration fees that her/his family cannot afford. Effective interventions may need to address these barriers, especially for students with increased risk factors for disengagement. For interventions in which a specific adult is assigned to an at-risk student (e.g., monitors), the adult can take a special role in facilitating the student's access to extra-curricular options (Anderson et al., 2004; Christenson et al., 2008). For example, monitors can provide assistance by addressing transportation difficulties or speaking with staff sponsors or coaches to request that registration fees are waived. Because these challenges may be most salient for students from low socioeconomic status backgrounds, these students may particularly benefit from this aspect of an engagement intervention.

Some school engagement interventions incorporate efforts to address a challenge many districts face: high rates of student mobility. This arena is certainly a worthy target, considering that US students have one of the highest mobility rates and students who move schools more often are at greater risk of dropping out (Stout & Christenson, 2009; Welsh, 2017). To address this challenge, interventionists work to coordinate engagement

interventions across schools to ensure that highly mobile students receive at least some degree of continuous engagement support (Christenson et al., 2012). This intervention component could potentially benefit certain populations of students, such as students with high rates of absenteeism, with limited English proficiency (LEP), or from low socioeconomic status backgrounds, three groups that are more likely to attend multiple schools in a single year (Rumberger & Larson, 1998; Smith, 1995; Welsh, 2017). Schools that serve predominantly low-income neighborhoods with many apartment complexes often face many challenges related to student mobility because their students' families often move to a new apartment home based on the complex providing the best rate or special on rental costs at the time (Welsh, 2017). In fact, almost 1/3 of students involved in the Sinclair (2001) study examining the benefits of *Check & Connect* attended more than one school in one year, indicating that some of the students most needing help with school engagement are also some of the most likely to experience intervention gaps or discontinued support due to frequent moves from school to school.

In addition to specific intervention components that have been shown to be effective in school engagement programs, there are also certain qualities that may facilitate an intervention's effectiveness for certain students. For example, Ungar and Liebenberg (2013) found that engagement interventions that purposefully aim to enhance "children's experience of their culture and involvement in community services" are more likely to succeed in bolstering student engagement (p. 514). More recently, African American, female middle schoolers who received a culturally responsive intervention showed more school engagement than their peers who received a control intervention (Jones, Lee, Matlack, & Zigarelli, 2017). In their brief report on dropout prevention and

intervention efforts, Christenson and Thurlow (2004) agreed; they stated that the interventions that will be successful are those that effectively connect the students and families who feel the most marginalized. Overall, Lehr et al., (2004) argued that successful engagement interventions will facilitate connections between marginalized students to their teachers and peers, to school, and to learning.

Importantly, Balfanz et al. (2007) synthesized the findings of a variety of their research projects by advocating for the importance of comprehensive interventions. These researchers argued that the most successful engagement interventions will utilize and integrate several mechanisms of change to help keep students on the path to graduation (Balfanz et al., 2007). The original MSIP research team agreed regarding the necessity of comprehensive interventions and advocated for a push away from interventions and strategies that are “fragmented, reactive, and piecemeal” (Nelson et al., 2016, p. 3). Similarly, the following excerpt from an article by Christenson and Thurlow (2004) highlights the benefit of comprehensive programs and captures some of the softer elements of school engagement interventions that are critical to effectiveness.

In particular, the ‘personalization’ of education- striving to understand the nature of academic, social, and personal problems affecting students and tailoring services to address individualized concerns- is an essential component. Effective programs aimed at promoting school completion focus on building students’ relationships with teachers, parents, and peers and include systematic monitoring of the students’ performance; they work to develop students’ problem-solving skills, provide opportunities for success in schoolwork, create a caring and



supportive environment, communicate the relevance of education to future endeavors, and help with students' personal problems (p. 38).

### **Differential Intervention Response**

As with most education-related interventions, even the most evidence-based school engagement interventions for children and adolescents will almost always have individual responders and non-responders. In other words, school engagement interventions will rarely, if ever, have 100% response rates 100% of the times they are implemented. Therefore, an important part of continued research and development of effective interventions is analyzing possible reasons for why students may not respond. More specifically, it is helpful to know who is most likely to benefit and who is most likely to need adaptations, individualization, or more intensive intervention. In fact, researchers and policy makers in broad fields of research (e.g., education, psychology, and prevention science) have called for the use of subgroup analyses of evidence-based practices (Flay et al., 2005; Kratochwill & Shernoff, 2004). By analyzing between-group differences for responders and non-responders, researchers can inform the design and implementation of their interventions. Additionally, analyzing response and non-response aligns with the contexts of Response to Intervention (RTI) and problem-solving frameworks promoted in schools (Jones, 2015; Small et al., in press).

In line with this call, many researchers in education and psychology have turned to examining differential response to interventions as a valuable research endeavor due to the potential implications on factors such as when, to whom, how much, and for how long interventions should be delivered. Subgroup analyses and analyses of predictors of treatment response in children and adolescents have been conducted related to anxiety

interventions (e.g., Wergeland et al., 2016), externalizing problem behavior interventions (e.g., Mertens, Dekovic, Asscher, and Manders, 2016); ADHD academic interventions (e.g., Langberg, Becker, Epstein, Vaughn, & Girio-Herrera, 2012), Autism Spectrum Disorder interventions (e.g., Sherer and Schreibman, 2005; van Steensel, Zegers, and Bogels, 2017), and reading interventions (e.g., Al Otaiba & Fuchs, 2002; Nelson, Benner, & Gonzalez, 2003; Lovett et al., 2008).

Similarly, in the current research on school engagement interventions, there is already budding evidence that not all subgroups of students respond equally to policy and intervention-based reforms. This concept is illustrated by recent trends in graduation rates. Increases in high school graduation rates have been noted but the increases are not universally large (Kena et al., 2016). For example, Hispanic/Latino youth are still at an especially high risk of dropping out of school before obtaining a high school diploma (Kena et al., 2016; Sinclair, Christenson, Lehr, & Anderson, 2003). Similarly, the National Center for Education Statistics (NCES) highlighted the persistent gaps between ethnic groups in graduation rates, with Hispanic, Black, and American Indian/Alaskan native students consistently falling below Asian/Pacific Islander and White students in this category (McFarland et al., 2017). For *Check & Connect*, the authors and primary researchers concluded that students may respond differently to the program based on certain school and family contextual factors (Christenson et al., 2008). For example, school factors that can enhance or detract from the program's benefits include the school's climate, clear teacher expectations, and instructional programming. Family factors can include the amount of monitoring and supervision that occurs at home and the

number of resources related to learning in the home and/or accessed by the student's family (Christenson et al., 2008).

However, the need remains to further assess differential response to school engagement interventions across student groups, school settings, and intervention characteristics. In fact, after reviewing 45 studies related to school completion and school engagement interventions, one of Lehr, Hanson, Sinclair, and Christenson's (2003) recommendations for future research clearly aligned with the goals of the current study: "Design intervention studies that can assist in identifying for who, and under what conditions, specific outcomes can be achieved. Further analyses must be conducted to determine which interventions are most effective, with specific populations, and in specific contexts" (p. 360). This research gap is still prevalent 15 years later, and the current study aims to help answer this call by providing insights into which MSIP students effectively responded to their interventions and under which intervention conditions.

### **Middle School Intervention Project (MSIP) School Engagement Interventions**

The types of school engagement interventions provided to students within the MSIP were not prescribed by the original research team in order to better evaluate existing state, district, and school-level initiatives to improve students' engagement with school. This research focus is in line with the aim of the original funding competition for the MSIP: "to determine the impact of fully developed education programs or policies implemented under typical conditions by a state, district, or consortium of States of districts" (Institute of Education Sciences, 2009 as cited in Baker et al., 2016). However, the school engagement interventions were meant to serve as Tier 2 interventions (i.e.,

targeted to students with a higher level of perceived need) to complement universal, or Tier 1, supports (Carlson et al., 2013). Specifically, the involved stakeholders across the MSIP school districts aimed to implement school engagement initiatives that would effectively increase and foster positive connections between students and adults in their school, with the ultimate goal of reducing drop-out rates (Nelson et al., 2016). In line with this aim, many MSIP schools incorporated certain intervention elements intended to facilitate smooth transitions from middle to high school, such as high school visits, conversations with relevant high school staff members, and conversations about possible high school extracurricular activities (Nelson et al., 2016).

The original research team required each school engagement intervention to include several critical elements. First, each student must “check-in” with a supportive adult on a regular basis. A “regular basis” could be determined by student need (e.g., daily, weekly, or monthly). Second, the interventions must include regular, constructive feedback on behavioral or academic performance. Finally, data must be collected on students’ behavior and psychological school engagement (e.g., school attendance, office discipline referrals, and Student Engagement Instrument scores). Ultimately, the interventions typically included check-in/check-out programs, student interest groups, tutoring, homework clubs/study halls, social skill groups, mentoring and counseling, and/or involvement with extracurricular activities (Baker et al., under review; Crone et al., 2018). Formal engagement interventions, including *Check In*, *Check Out* or *Check & Connect* were often used (Carlson et al., 2013). According to Nelson et al. (2016), recreational participation, individual check-ins, counseling sessions, clubs, and study halls were among the most commonly used interventions.

Preliminary analyses of MSIP engagement data, as described by Baker et al. (2016), indicated no significant differences between students in the intervention condition and students in the control condition, based on changes of Student Engagement Inventory (SEI) scores within Grade 6 or Grade 7 (using the SEI) or within Grade 8 (using the Motivation and Engagement Scale, which replaced the SEI in the MSIP studies). However, it is important to note that many students in the comparison condition received engagement interventions as part of their school's standard practice (i.e., business-as-usual) for students at risk of dropout or school disengagement (Baker et al., 2016). In fact, Nelson et al (2016) acknowledged that all MSIP school districts shared a "focus on providing high-quality . . . school engagement interventions to students in the middle school years to increase their academic success and engagement in both the middle and high school years" (p. 4). In other words, students in the intervention condition were required to receive engagement interventions, but those in the control condition were not precluded from participation in similar interventions. Therefore, it is possible that juxtaposing the intervention condition with a counterfactual that included some level of engagement intervention for some students obscured significant benefits that may have been present for students within the intervention condition.

This study begins to address this research gap by first assessing individual students' response to the school engagement intervention (based on SEI pre-intervention and post-intervention scores). Students were determined to be either Responders or Non-Responders, using an indicator known as the Reliable Change Index (RCI; Jacobson & Truax, 1991). This information was then used to determine if response to the school engagement interventions was predicted by any (1) baseline student characteristics, such

as racial/ethnic minority status, sex, or Special Education eligibility, (2) intervention characteristics, such as number of intervention leaders or intervention frequency, (3) or interactions between student characteristics and intervention characteristics (e.g., Special Education Eligibility X Number of Intervention Leaders).

## CHAPTER III

### CONTRIBUTION OF THE CURRENT STUDY

The data collected as part of the original MSIP studies provide opportunities to further contribute to the school engagement literature by examining student-level baseline characteristics and intervention characteristics as potential predictors of differential response. The current study builds on the previous research conducted using the MSIP data in order to help determine which students are most likely to benefit from school engagement interventions and under what conditions (i.e., intervention characteristics). Ultimately, information was synthesized in order to address appropriate placement within interventions as well as potential modifications to interventions to make them more successful for particular subgroups of students. With these aims in mind, the current study addressed the following three research questions:

#### **Research Question 1**

Among the MSIP's 6<sup>th</sup> grade intervention students, do any student-level baseline characteristics (e.g., Limited English Proficiency) predict response to school engagement interventions, as measured by statistically reliable changes in self-reported school engagement (i.e., RCI for SEI scores greater than 1.96)?

By answering this question, the current study begins to provide insights into who might benefit most from existing school engagement interventions. On the flip side, this question also addresses groups of students who do not experience increased school engagement, despite the interventions schools are providing. These results can then inform how educators and intervention developers can adjust programs and strategies to better address students' needs.

The student-level analyses in the current study were largely exploratory. However, several exploratory hypotheses were made based on the existing literature about student characteristics and school engagement. Overall, student groups most at risk of low school engagement were hypothesized to be more likely to respond to interventions. The rationale for this general hypothesis was two-fold. First, students most at-risk would have the most “room” for growth in terms of increasing their engagement with school. Second, the participating MSIP schools and districts may have designed or selected their engagement interventions based on their demonstrated effectiveness with groups of students considered higher risk. Therefore, the following hypotheses were made prior to data analyses: Students with lower pre-intervention SEI scores, males, non-white ethnic/racial minority students, Limited English Proficiency (LEP) students, students eligible for Special Education (SPED) services, and students eligible for free or reduced priced lunch (FRL) would be more likely to respond to their interventions.

### **Research Question 2**

Among the MSIP’s 6<sup>th</sup> grade intervention students, do any intervention characteristics (e.g., session frequency) predict response to school engagement interventions, as measured by statistically reliable changes in self-reported school engagement (i.e., RCI for SEI scores greater than 1.96)?

Addressing this research question contributes to the literature delineating salient school engagement intervention characteristics. Within the field of school engagement intervention development, findings can help indicate which characteristics may be “essential,” and others that either may not be necessary for effective response or need to be revised to more effectively support students in natural school settings. For educators,



these findings may help inform decisions related to selecting established interventions, or (when resources are limited), which non-standardized intervention components can be put into place.

Given the existing literature on school engagement as a construct and school engagement interventions, several hypotheses were made prior to analyses of the data. First, it was hypothesized that students receiving more individualized intervention support would be more likely to respond to their interventions. Therefore, students who received 1-1 interventions would be more likely to fall within the responder group than students who received only whole-group interventions. Next, students receiving increased contact with supportive adults in their school would be more likely to respond to their interventions. Therefore, students in the responder group would be more likely to receive interventions with more leaders throughout the year, longer average session durations, increased frequencies, and longer interventions (in months).

Students receiving more interventions throughout the year would also be more likely to respond to their interventions due to the increased support. However, it was hypothesized that this relationship may be curvilinear, with the connection between increased interventions and increased likelihood of response tapering off at some point. This hypothesis was due to the idea that students receiving more and more engagement interventions throughout the year may be experiencing this because their schools are observing significant school disengagement. Finally, students receiving interventions that target more components of school engagement (e.g., academic, behavioral, cognitive, and affective) would be more likely to respond to their interventions. No a priori hypotheses were made regarding which District would most predict response.

### **Research Question 3**

Among the MSIP's intervention students, are there any interactions among student-level baseline characteristics and intervention characteristics that predict response to school engagement interventions, as measured by statistically reliable changes in school engagement (i.e., RCI for SEI scores greater than 1.96)?

This question actually had the greatest potential to have important implications for intervention developers, schools, and districts selecting appropriate strategies for their particular populations of students since the analyses provided insights into which student groups responded best to certain intervention characteristics. The findings can help support research-based decision-making in determining how standardized interventions may need to be tailored in certain school or geographic settings and/or for certain student groups.

As discussed in the **Intervention Characteristics** section above, there are several hypothesized connections between certain subgroups of students and specific intervention characteristics (e.g., low SES students by adult assistance with transportation and/or financial obstacles to extra-curricular involvement). However, given the limitations of the intervention characteristics available within the current study, only a few preliminary hypotheses were made.

First, it was hypothesized that Limited English Proficiency (LEP) status will interact significantly with Months of Longest Intervention, Group Size, and Session Frequency, with LEP students receiving longer, more individualized, and more frequent interventions being more likely to respond. Next, Special Education (SPED) eligibility was

hypothesized to interact with Intervention Focus, with SPED students receiving academic interventions being more likely to respond to school engagement interventions.

## CHAPTER IV

### METHODS

#### Procedures

The current study utilized extant data for the 6<sup>th</sup> grade participants of the original Middle School Intervention Project (MSIP) sample of students. The MSIP team of investigators graciously granted the author of the current study permission to use Student Engagement Instrument (SEI) data and other relevant data from the 6<sup>th</sup> grade dataset. The original data for the 6<sup>th</sup> grade participants were collected during the 2010-2011 academic year in 22 Kindergarten-6<sup>th</sup> Grade elementary schools and 18 6<sup>th</sup>-8<sup>th</sup> grade middle schools in 5 Oregon school districts. Within the original MSIP dataset, students were separated into either one intervention condition or one control condition within each grade (i.e., 6<sup>th</sup>, 7<sup>th</sup>, or 8<sup>th</sup>). As has been described in other sections of this manuscript, being in the “control” group did not necessarily mean that the other students were receiving no engagement interventions. However, in order to utilize data that were collected for intervention condition students regarding intervention length, session frequency, average session duration, and intervention focus/categorization, only the intervention condition was considered for the purposes of the current study (Baker et al., under review; Crone et al., 2018; Crone, Stoolmiller, Baker, & Fien, 2012).

Participation in the intervention condition for the MSIP was based on reading risk at the end of the students’ 5<sup>th</sup> grade year (i.e., the 2009-2010 academic year). Reading risk was determined using a composite reading score combining each student’s easyCBM passage reading fluency score and his/her Oregon Assessment of Knowledge and Skills Reading/Literature (OAKS-R) 5<sup>th</sup> grade assessment score (Kennedy, 2014). Schools were

allowed to select their own individualized “cut score” along the distribution of their students’ scores, as long as at least 20% of students fell below the cut score (Baker et al., 2016). Students scoring below their school’s cut score received the comprehensive intervention (e.g., reading, school engagement, and data-based decision-making), and students scoring above the cut score served as control/comparison students (Baker et al., 2016; Carlson et al., 2013). Utilizing a sample of students considered to be at-risk of reading failure for a school engagement intervention study is logical and defensible as struggling readers are also at greater risk of dropping out of school before graduation (Baker et al., 2016; Nelson et al., 2016).

### **Participants**

The 6<sup>th</sup> grade sample of intervention students from the original MSIP dataset included 1,184 students (Baker et al., 2016). However, for the purposes of the current study, this group was further restricted for two main reasons. First, some students did not have data related to their pre-intervention (91 students) or post-intervention (181 students) SEI scores (note that some students did not have either data point). Absence from school on the days the SEI was administered is the most likely explanation for this missing data for the majority of the students. Of course, a change in self-reported school engagement between pre-intervention and post-intervention could not be calculated without both of these SEI scores. Therefore, students missing either (both) data point(s) were excluded from analyses.

Second, the MSIP dataset provided to the author of the current study did not include data related to the interventions received by some students. While these students could have been included in the sample used to address the first research question (i.e.,

student-level predictors), they could not have been included in analyses related to the second and third research questions (i.e., intervention-level predictors and interactions between student-level and intervention-level predictors). Therefore, the decision was made to exclude these students from all analyses in the current study in order to maintain a consistent sample across research questions. In total, missing intervention data excluded 168 students (approximately 60 of these students would have also been excluded for missing SEI data). Unlike missing SEI scores, missing intervention data cannot be explained by student absences since all students in the intervention condition were required to receive at least one school engagement intervention. Instead, the participating school districts may have failed to report intervention data for these students to the original MSIP team.

After restricting the available sample to students for whom pre-intervention and post-intervention SEI data AND data for at least one intervention were available, the analyzed sample included 757 6<sup>th</sup> grade students. At this point, a decision was intentionally made to not further exclude two groups of students who had additional missing data. One participating school district elected to not report student data to the original MSIP team on two student-level variables: race/ethnicity and free or reduced priced lunch eligibility. Communications with a member of the MSIP investigation team indicated that the district made this decision because they considered these data sensitive student information (N. Nelson, personal communication, March 6, 2018). However, these students were retained in the sample since the data available for them could help address all research questions; they only would not be counted in calculations related to those two student-level variables. Despite the rationale for this decision, the missing data

is of course still a limitation of the current study. Please refer to the **Discussion** section for a more in-depth exploration of this limitation.

The sample of students was slightly more male (406 students) than female (351). Of the 757 students analyzed, at least 237 self-identified as a non-white racial/ethnic minority. However, given the missing race/ethnicity data from one school district, this number is likely higher. The population of LEP included 223 6<sup>th</sup> graders, and 271 students were eligible for SPED services. At least 196 students were eligible for free or reduced-price lunch, but again, this number is likely higher given the missing FRL data from one school district. As was mentioned previously, all 757 of these students were identified by their school's cut score as being at risk of reading failure. Please refer to Table 1 below for more information regarding the makeup of the final sample used for analyses.

### **Predictor Variables (Student-Level)**

Variables analyzed as student-level predictor variables were included for mostly exploratory purposes. However, the practice of including basic demographic variables (e.g., race/ethnicity, gender) as well as other variables (e.g., Special Education status and Limited English Proficiency status) has been common in studies addressing similar differential response research questions (e.g., Feldman & Matjasko, 2005; Balfanz, Herzog, & Mac Iver, 2007). Finn (1989) identified these as status predictor variables. Additionally, the previously mentioned links between these status variables and school engagement (see **Student Characteristics and School Engagement** section above) suggest that they may also contribute to the effectiveness (or lack thereof) of

engagements aiming to improve an individual student's engagement with school.

Ultimately, the following student-level variables were analyzed:

**Pre-intervention Student Engagement Instrument (SEI) scores.**

Each student's score on the first (Fall 2010) administration of the SEI was included as a baseline student characteristic and potential predictor variable. This practice aligns with previous educational research, in which baseline scores on a particular measure, such as an early mathematics skills measure, are included in predictor analyses to determine the extent to which the baseline scores predict scores in a later administration (e.g., Gersten et al., 2012). The inclusion of pre-intervention SEI scores will help determine whether or not the level of self-reported engagement prior to interventions actually predicted the likelihood of responding to engagement interventions.

**Eligibility for special education services.**

Each participating district provided the MSIP research team with data related to whether or not each student was eligible for Special Education (SPED) services. Though the population of students receiving SPED services in U.S. schools today is certainly a heterogeneous group, it is also a population that often faces unique educational and social barriers to optimal levels of school engagement. Therefore, it is an important variable to consider when assessing differential response to targeted school engagement interventions. SPED eligibility was determined in line with established federal and state procedures. Namely, any student determined by their district to meet eligibility criteria under one or more of the 13 federally recognized disability categories was included in the current study as SPED eligible.



Table 1

*Descriptive Statistics by Student-Level Predictor Variables for Analyzed 6<sup>th</sup> Grade Sample*

Measure	<i>N</i>	%
<i>Total Students</i>	757	100%
<i>Sex</i>		
Female	351	46.4%
Male	406	53.6%
<i>Race/Ethnicity Minority Status</i>		
White	217	28.7%
Non-White Minority	237	31.3%
Not Reported	303	40.0%
<i>LEP Status</i>		
Not LEP	534	70.5%
LEP	223	29.5%
<i>SPED Status</i>		
Not SPED	486	64.2%
SPED	271	35.8%
<i>FRL Eligibility</i>		
Not FRL Eligible	77	10.3%
FRL Eligible	196	25.9%
Not Reported	484	63.9%

**Racial/ethnic minority status.**

For the purposes of the current study, students were also categorized based on whether or not they identified with a non-white racial or ethnic minority group. At the time of enrollment in the participating schools, each student's family is responsible for indicating the student's racial/ethnic identity. These data were included in the information provided by the participating school districts to the MSIP investigative team, with the exception of the one previously mentioned school district that elected to not provide this information. Given the existing literature related to barriers to school engagement common to many racial and ethnic minorities, students were categorized as either White or a Racial/Ethnic Minority.

**Student sex.**

Each student was also categorized using a binary male or female categorization, based on the sex listed in the student's educational record. Again, this categorization aligns with previously cited research regarding between-sex differences in school engagement levels across academic years.

**Free or reduced-price lunch eligibility.**

Research in the field of education often utilizes free or reduced-price lunch (FRL) eligibility as a proxy for socioeconomic status (SES). Of course, this variable does not fully capture a student's SES as it ignores non-income related factors such as family education or occupation. However, for the purposes of this study, students were categorized as FRL Eligible or Not FRL Eligible, based on documentation made available by their home school district.

### **Limited English proficiency status.**

Finally, students identified by their schools as students with Limited English Proficiency (LEP) were analyzed, in comparison for their non-LEP peers. Similar to students eligible for Special Education, LEP students form a diverse population of students. Across the country, LEP students speak many different languages as their native language, come from countries all over the world (including the U.S. itself), and have varying experiences with the U.S., the English language, and the American school system. However, as previously described, the existing literature on school engagement indicates that this group of students, as a whole, experiences significant challenges related to becoming and/or remaining engaged with school and learning.

### **Predictor Variables (Intervention-Level)**

Staff from the Center on Teaching and Learning (CTL) and the participating districts and schools documented all engagement intervention activities that were delivered to the students in the intervention condition of the study. These documentation efforts led to the synthesis of several intervention characteristics for each student. However, many students received more than one intervention, and each intervention could vary in terms of each observed/documented characteristic. Therefore, decisions had to be made at the outset of the current study regarding how to best categorize students for each intervention characteristic.

### **Number of interventions received.**

As a minimum requirement, all intervention condition students were required to receive at least one school engagement intervention. However, many students received multiple interventions. For some students, interventions overlapped with each other;

others received interventions at different times throughout the school year. Ultimately, some students received up to 7 separate school engagement interventions.

**Group format (individual or group).**

Each intervention was originally categorized as either an individual (1-1 interaction between a student and school staff member) or group intervention (two or more students per one or more adult(s)). However, many students receiving multiple interventions received both individual and group interventions. In order to categorize across multiple interventions, students were separated into two groups. The first group included students who received at least one individual intervention (513 students). The second group was comprised of those students who only received group interventions (244 students). This categorization was decided upon due to the existing literature related to the importance of establishing positive, trusting relationships with adults at school, with the idea being that individual interventions would provide more opportunities for student-teacher relationship development.

**Total number of leaders throughout the school year.**

Next, the number of leaders involved with each student across the school year was calculated. Each separate intervention had between 1 and 5 leaders. As a result, students had between 1 and 21 leaders across interventions throughout the year (mean of approximately 3). This intervention characteristic was included in the predictor analyses because of the idea that students may benefit from establishing relationships with multiple adults in their school.

### **Months of the longest intervention received.**

Data on the length of each intervention (in months) was monitored by the MSIP team. However, synthesizing these data across multiple interventions introduced some challenges for the purposes of the current study. For example, some interventions overlapped (e.g., Intervention “X” ran from September 1 through October 31 and Intervention “Y” ran from October 1 through November 30), while others were consecutive or occurred following a gap with no interventions. One alternative that was considered was to categorize by the total number of months each student was in any intervention. In other words, if a student received three interventions that all overlapped and occurred only during the month of September, that student’s length of intervention would be only 1 month. On the other hand, if a student received three month-long interventions back-to-back with no overlap, that student’s length of intervention would be three months. However, this alternative was ultimately rejected. This decision was made with the consideration in mind that three months in three different interventions (with three different leaders, groups of peers, foci, etc.) are quite different from three consecutive months in the same intervention (with continuity of leadership, peer group, intervention focus, etc). Instead, the decision was made to categorize intervention length by the length (in months) of the longest intervention each student received. Lengths ranged from 1 to 9 months across students.

### **Frequency across interventions.**

The original dataset described intervention frequencies with one of several categories:

1. Daily or Less than daily but more than once per week
2. Weekly or less than weekly but more than once per month

### 3. Less than once per month

These categories were retained for the purposes of the current study. For a student to be placed into one of these three categories, he or she must have received only interventions that fell into the corresponding frequency category. Because some students received interventions across categories, a fourth categorization was added. This fourth category, “Combination,” included all students who received any combination of intervention frequencies across the multiple interventions they received.

#### **Average session duration.**

The MISIP research team also maintained data related to the average duration of sessions for each intervention. The categories that the MSIP team used were: 1-14 minutes, 15-29 minutes, 30-44 minutes, 45-59 minutes, and 60 or more minutes. These categories were retained for this study. For a student to be placed in one of these categories, he or she must have received only interventions that fell into the corresponding duration category. However, because some students received interventions across duration categories, a fourth “Combination” category was added. This fourth category included all students who received any combination of session durations across the multiple interventions they received.

#### **Intervention focus.**

The original MSIP categorizations used to describe the focus of each intervention included Academic + Social/Behavioral, Academic, Leadership, Recreational, and Social/Behavioral. Two separate combination categories were used for the purposes of the current study. First, students were grouped together if they received at least one Academic + Social/Behavioral Intervention. Students were also grouped together if they

received multiple interventions with different foci, none of which were Academic + Social/Behavioral. All remaining students were categorized by Academic, Leadership, Recreational, or Social/Behavioral, as appropriate, if they only received interventions with the one corresponding focus.

### **District.**

Finally, in an effort to have some clearer intervention-level predictor variables, District was also included since interventions may have shared certain components or qualities within the same district.

### **Measures**

The Student Engagement Instrument (SEI) was the primary outcome measure for the current study. This 35-item measure assesses students' engagement with school, family, and peers, according to student self-report (Appleton et al., 2006). Lovelace, Reschly, Appleton, and Lutz (2014) emphasized the additive value of this survey measure when used in conjunction with existing school records that often include several indicators of behavioral and academic engagement. These authors (along with Christenson et al., 2008) argued that utilizing a self-report measure is essential to accurately capture a comprehensive view of a student's engagement with school because of the cognitive and psychological aspects of school engagement, which the survey addresses (Lovelace et al., 2014).

Appleton et al. (2006) used exploratory factor analyses (EFAs) and confirmatory factor analyses (CFAs) to determine and evaluate the factor structure of the SEI. The researchers found best fit with six factors: Control and Relevance of School Work, Teacher-Student Relationships, Peer Support for Learning, Family Support for Learning,

Extrinsic Motivation, and Future Aspirations and Goals. However, a later study produced by the SEI development and research team indicated that Extrinsic Motivation was removed as a factor following the original 2006 study, resulting in a 5-factor model (Betts et al., 2010). Moreover, Kennedy (2014) confirmed that this five-factor model of engagement used in the SEI represented the best model fit (compared to a one-factor model and two-factor model) specifically for students in the intervention condition of the MSIP. However, for the purposes of the current study, only overall SEI scores were used in order to examine growth (or lack thereof) in a comprehensive engagement value across the 6<sup>th</sup> grade year. Importantly, researchers have validated the SEI across grade levels (Betts et al., 2010). Therefore, it can reasonably be assumed that the measure is assessing the same construct when administered to 6<sup>th</sup> graders as it is when it is administered to 9<sup>th</sup> or 12<sup>th</sup> graders.

In an attempt to provide preliminary evidence of the validity of student's self-reported SEI scores as a measure of school engagement, attendance and office discipline referral (ODR) data were also used. Attendance and ODR data are prime candidates for validation procedures within this study for two main reasons. First, problematic levels of both of these variables (e.g., low attendance rates and high ODR rates) are frequently cited as strong indicators of behavioral disengagement (e.g., Fredericks, Blumenfeld, & Paris, 2004). Second, attendance and ODR rates have been empirically established as predictors of high school dropout, with one study demonstrating the link specifically for rates collected in the 6<sup>th</sup> grade (Balfanz et al., 2007). Therefore, they both align with the purposes and intent of the current study. These choices for data validation have also been used as concurrent criterion variables in previous validation studies of the SEI (Lovelace



et al., 2014), which provides a precedent for this practice within the field. For the current study, both measures were provided by the participating MSIP schools to the original MSIP research team as a percentage of school days attended and total number of ODRs accrued throughout the entire school year.

## **Analyses**

### **RCI calculations.**

First, individual pre-intervention and post-intervention SEI scores were compared to determine response or non-response by calculating the reliable change index (RCI) for each individual student (Jacobson & Truax, 1991; Small et al., in press). In line with the procedures described in a seminal article by Jacobson and Truax (1991), a student's RCI was determined in several steps. First, the Standard Error of Measurement (SEM) for the SEI was calculated using the following formula:

$$SEM = SEM = SD \sqrt{1 - r}$$

In the formula above, SD represents the observed Standard Deviation of the SEI, and  $r$  represents the SEI's reliability. For the purposes of the current study, the decision was made to use the Standard Deviation for the pre-intervention SEI administration for the 6<sup>th</sup> grade intervention condition students. The reliability of the SEI was determined by calculating the average of the published Cronbach alphas for each subscale comprising the SEI. Next, the standard error of the difference between students' pre- and post-intervention SEI scores was determined using the following calculation:

$$S_{diff} = \sqrt{2(\text{Standard Error of Measurement for the SEI})^2}$$

Then, each student's pre-intervention SEI score was subtracted from their post-intervention SEI score. This difference was then divided by the previously calculated

standard error of the difference between the two SEI scores. The complete, simplified calculation was as follows:

$$RCI = \frac{SEI\ Post-SEI\ Pre}{S_{diff}}$$

Students with an  $RCI \geq 1.96$  ( $p < .05$ ) were considered to have improved in school engagement to a statistically reliable extent. Another way of describing an RCI of this magnitude is saying that the difference between the Pre- and Post-Intervention SEI scores was at least twice the standard error of the difference (Jones, 2015). These students, therefore, made up the “Responders” group for which potential predictor variables were analyzed.

Occasionally, researchers have further analyzed individuals who met the 1.96 threshold by examining functioning improvements. For example, functioning improvements might be determined by establishing a cut off score to differentiate between functional and dysfunctional distributions; individuals crossing over from the dysfunctional to the functional distribution would then be considered responders (Jacobson & Truax, 1991). However, for the current study, participation was determined by reading risk, not engagement risk, and it is possible that some students fell into the functional distribution prior to receiving interventions. Therefore, it was believed that determining response by change from one distribution to another would be too conservative in this case. As a result, response was determined only by the RCI in order to capture students who responded to the engagement intervention to a statistically reliable extent but may not have passed from one distribution to another (i.e., a student who was already in the functional distribution for school engagement but did respond to the intervention, based on his/her RCI).

### **Validation procedures.**

In addition to self-reported SEI scores, the original research team also collected other indicators of student engagement, including attendance and office discipline referrals. As has been done in previous studies involving responder analyses (e.g., Jones, 2015), validation procedures were used to compare changes on the SEI (as indicated by each student's RCI value) to these other engagement indicators in an effort to establish evidence of criterion validity of the RCI method of identifying response to the school engagement interventions. Specifically, T-test analyses were conducted between Responders and Non-Responders for each variable (i.e., Attendance Rates and ODR rates). Significant differences between the two groups on either or both of these other variables would provide some evidence for the validity of SEI scores as an appropriate measure of school engagement for the sample used for the current study.

### **Research question 1.**

In order to address the first research question, correlations were first calculated between each student's pre-intervention SEI score and his/or response group. Since the remaining student-level characteristics were categorical, Chi square statistics were calculated using cross tabulation or contingency table procedures in SPSS software. The results of these analyses indicated how strongly (and, if applicable, statistically significantly) each student-level variable predicted response to the engagement interventions.

### **Research question 2.**

Procedures for Research Question 2 were similar. First, correlations were calculated between each numeric intervention-level characteristic (e.g., number of

interventions received) and response group. Next, the categorical intervention-level characteristics (e.g., intervention focus) were entered into cross tabulations with response group. The results of these analyses indicated how strongly (and, if applicable, statistically significantly) each intervention-level variable predicted response to the engagement interventions.

### **Follow-up analyses for research questions 1 and 2.**

To fully address the first two research questions, however, one follow-up procedure was undertaken. Variables that emerged as significant predictors in the previously described univariate analyses were entered into a binary logistic regression to identify any potentially salient predictors (i.e., variables that add significant predictive value, even when taking the other significant predictors into account). A model-building approach was used, meaning that only variables that emerged as significant predictors in the univariate models were added to the logistic regression level.

### **Research question 3.**

Tackling the final research question required interaction calculations within two step binary logistic regressions. In the first step, the student-level variable and the intervention-level variable were both entered separately in order to take the main effects of each characteristic on response group into account. In the second step, the interaction term between the two variables was added. For this analysis, all variables were entered into the models, not just the ones that emerged as significant predictors in previous univariate analyses. This inclusion was decided upon since even student-level variables that did not alone significantly predict response may contribute to a significant prediction when combined with certain intervention-level characteristics, and vice versa.

## CHAPTER V

### RESULTS

#### RCI Values

As previously described, the Standard Deviation of the observed pre-intervention SEI scores for all MSIP 6<sup>th</sup> grade intervention condition students was used when calculating each student's RCI. This value was published as 12.58 (Baker et al., 2016). The value used to represent the SEI's reliability was the calculated average of the published Cronbach alphas/internal consistencies for each SEI subscale. Internal consistencies ranged from .72 to .88 (Appleton et al., 2016), leading to an average of .79. Therefore, the final RCI calculations were as follows:

$$SEM = 12.58 \sqrt{1 - .79}$$
$$S_{diff} = \sqrt{2(5.76488)^2}$$
$$RCI = \frac{SEI\ Post - SEI\ Pre}{8.15277}$$

RCI calculations yielded a group of 36 responders and 721 non-responders. As seen in the table below, the average Pre-Intervention SEI score for students in the Responder group was approximately 21 points lower than that of the Non-Responder group. RCI metrics for the responder group ranged from 1.96 (the minimum to qualify as a responder) to 9.08. On average, Non-Responders' SEI scores decreased from Pre-Intervention to Post-Intervention data collection by 4.29 points. On the other hand, Responders increased by an average of 25.75 points.

Table 2

*Descriptive Statistics for Student Engagement Instrument (SEI) Data by Clinical Responder Group*

Measure	Clinical Responders <i>n</i> = 36				Non-Responders <i>n</i> = 721			
	<i>Min</i>	<i>Max</i>	<i>M</i>	<i>SD</i>	<i>Min</i>	<i>Max</i>	<i>M</i>	<i>SD</i>
SEI Pre-Int.	44	109	91.61	15.10	50	132	112.36	10.94
SEI Post-Int.	84	132	117.36	10.67	51	132	108.08	12.40
SEI Change	16	74	25.75	11.78	-56	15	-4.29	10.13
RCI	1.96	9.08	3.16	1.45	-6.87	1.84	-.53	1.24

*Note.* *Min* = Minimum reported score/value; *Max* = Maximum reported score/value; *M* = Mean score/value; *SD* = Standard Deviation

### **Validation Procedures**

Validation procedures did not provide significant evidence that students in the responder group demonstrated greater school engagement via increased attendance rates ( $t = -.198, p = .843$ ). On average, Responders attended school 94.6% of available school days, while Non-Responders attended a 94.4% of days. Comparing the number of office discipline referrals between responder and non-responder groups led to an approaching-significance difference ( $t = -1.891, p = .059$ ). Responders accrued an average of 2.84 ODRs throughout the school year (range of 0-17), while Non-Responders received an average of 1.64 (range of 0 to 41).

Table 3

*Descriptive Statistics for Validation Variables by Clinical Responder Group*

Measure	Clinical Responders <i>n</i> = 36		Non-Responders <i>n</i> = 721	
	<i>M</i>	<i>SD</i>	<i>N</i>	<i>SD</i>
<b>Attendance</b>	94.6%	.035	94.4%	.052
<b>ODRs</b>	2.84	5.169	1.64	3.402

*Note.* *M* = Average percentage/value; *SD* = Standard Deviation

**Research Question 1: Student-Level Predictors**

The first research question of the current study aimed to determine if there were any student-level variables that predicted response to school engagement interventions within the 6<sup>th</sup> grade intervention condition of the MSIP. First, point-by-serial correlations between students' Pre-Intervention SEI scores and Response Group (i.e., Responders or Non-Responders) were calculated. This was to determine the magnitude of the association between a student's Pre-Intervention SEI score and their likelihood of responding to the engagement interventions they received. The results ( $r = -.386, p < .001$ ) indicated that lower Pre-Intervention SEI scores were significantly associated with the Responder Group. Put simply, a student with a lower Pre-Intervention SEI score was more likely to respond to their engagement interventions than was a student with a higher Pre-Intervention SEI score.

Table 4

*Descriptive Statistics for Student-Level Predictor Variables by Clinical Responder Group*

Variable	Clinical Responders <i>n</i> = 36		Non-Responders <i>n</i> = 721	
	<i>N</i>	%	<i>N</i>	%
<b>Sex</b>				
Female	17	47.2%	334	46.3%
Male	19	52.8%	387	53.7%
<b>Race/Ethnicity</b>				
<b>Minority Status</b>				
White	9	25.0%	208	28.8%
Non-White Minority	17	47.2%	220	30.6%
Not Reported	10	27.8%	293	40.6%
<b>LEP Status</b>				
Not LEP	20	55.6%	514	71.3%
LEP	16	44.4%	207	28.7%
<b>SPED Status</b>				
Not SPED	20	55.6%	466	64.6%
SPED	16	44.4%	255	35.4%
<b>FRL Eligibility</b>				
Not FRL Eligible	3	8.3%	74	10.3%
FRL Eligible	13	36.1%	183	25.4%
Not Reported	20	55.6%	464	64.3%



Next, contingency tables were created for the remaining proposed student-level predictor variable along with student responder group. See Table 4 (above) to refer to frequency counts and percentages for each evaluated student characteristic, separated by responder group. Of these variables, only LEP Status significantly predicted response to the school engagement interventions; LEP students were significantly more likely to respond ( $\chi^2 = 4.085, p < .05$ ). Therefore, Pre-Intervention SEI scores and LEP status emerged as the significant student-level predictors of response. See Table 5 (below) for more information about the cross-tabulation analyses for each student-level variable.

Table 5

*Cross-Tabulation Analyses of Student-Level Predictor Variables*

Predictor variable	$\chi^2$	df	<i>p</i>
Sex	.011	1	.916
Race/Ethnicity	1.921	1	.166
<b>Limited English Proficiency (LEP) Status</b>	<b>4.085</b>	<b>1</b>	<b>.043</b>
Special Education (SPED) Status	1.229	1	.268
Free or Reduced Lunch (FRL) Eligibility	.750	1	.386

*Note.* Information shown in bold for variables with  $p < .05$

**Research Question 2: Intervention-Level Predictors**

The second research question aimed to determine if there were any intervention-level variables that predicted response to school engagement interventions within the 6<sup>th</sup> grade intervention condition of the MSIP. This question was addressed in two stages. First, analyses were conducted for the numeric intervention variables, and then the categorical intervention-level variables were analyzed. Table 6 (below) displays the minimum, maximum, and mean reported values, as well as the standard deviations, for each numeric intervention-level predictor variable, separated by responder group.

Table 6

*Descriptive Statistics for Numeric Intervention-Level Predictor Variables by Clinical Responder Group*

Variable	Clinical Responders <i>n</i> = 36				Non-Responders <i>n</i> = 721			
	<i>Min</i>	<i>Max</i>	<i>M</i>	<i>SD</i>	<i>Min</i>	<i>Max</i>	<i>M</i>	<i>SD</i>
# of Interventions	1	4	1.83	.811	1	7	1.72	.931
Length of Longest Intervention (in months)	1	9	6.58	2.872	1	9	5.810	2.652
# of Leaders throughout the Year	1	11	3.83	2.903	1	21	3.81	3.060

*Note.* *Min* = Minimum reported value; *Max* = Maximum reported value; *M* = Mean value; *SD* = Standard Deviation

In the first stage, correlations were calculated between these numeric predictor variables and the Response Group variable to determine the magnitude of the associations between each variable and the likelihood of a student responding to their engagement interventions. Table 7 (below) presents the point-by-serial correlation coefficient and significance level for each numeric variable. As the table illustrates, no numeric variable significantly ( $p < .05$ ) predicted intervention response.

Table 7

*Correlation Analyses of Numeric Intervention-Level Predictor Variables*

Predictor variable	<i>r</i>	<i>p</i>
Number of Interventions	0.027	.457
Months of Longest Intervention	0.062	.088
# of Leaders	0.010	.792

Table 8

*Descriptive Statistics for Categorical Intervention-Level Predictor Variables by Clinical Responder Group*

Variable	Clinical Responders <i>n</i> = 36		Non-Responders <i>n</i> = 721	
	<i>N</i>	%	<i>N</i>	%
<b>Group Size</b>				
One (or more) Individual Intervention(s)	28	77.8%	485	67.3%
Group interventions only	8	22.2%	236	32.7%
<b>Intervention Frequency</b>				
More than weekly	16	44.4%	239	33.1%
Weekly to monthly	11	30.6%	260	36.1%
Less than monthly	4	11.1%	55	7.6%
Combination of frequencies	5	13.9%	157	21.8%
Not Reported	0	0%	10	1.4%
<b>Session Duration</b>				
1-14 minutes only	5	13.9%	203	28.2%
15-29 minutes only	6	16.7%	120	16.6%
30-44 minutes only	4	11.1%	56	7.8%
45-59 minutes only	5	13.9%	45	6.2%
60+ minutes only	2	5.6%	29	4.0%
Combination	14	38.9%	266	36.9%
Not Reported	0	0%	2	0.3%

Table 8 (continued)

Variable	Clinical Responders <i>n</i> = 36		Non-Responders <i>n</i> = 721	
	<i>N</i>	%	<i>N</i>	%
<b>Intervention Focus</b>				
At least one combined Academic + Social/Behavioral intervention	21	58.3%	406	56.3%
Academic only	0	0%	26	3.6%
Leadership only	3	8.3%	97	13.5%
Recreational only	4	11.1%	66	9.2%
Social/Behavioral only	0	0%	10	1.4%
Combination of Foci (not including an Academic + Social/Behavioral intervention)	8	22.2%	116	16.1%

Table 8 (above) presents the frequency counts and percentages for each categorical intervention-level variable, separated by responder group. In the second stage of analyses for this research question, contingency tables were created for each of these proposed categorical intervention-level predictor variables along with student responder group. As displayed in Table 9 (below), District ( $p = .026$ ) was the only intervention-level characteristic, at least as they were categorized within the current study, that predicted whether or not a student responded to their engagement interventions.

Table 9

*Cross-Tabulation Analyses of Intervention-Level Predictor Variables*

Predictor variable	$\chi^2$	df	<i>p</i>
Group Size (Individual vs. Group)	1.734	1	.188
Session Frequency	3.074	3	.380
Session Duration	6.277	5	.280
Intervention Focus	3.432	5	.634
<b>District</b>	<b>11.049</b>	<b>4</b>	<b>.026</b>

*Note.* Information shown in bold for variables with  $p < .05$ .

**Follow-Up for Research Questions 1 and 2**

Once the significant predictors from Research Questions 1 and 2 were determined, the next step was to determine which, if any, of these variables were salient predictors. In other words, when all significant predictors were taken into account, did any add significant predictive value? Given that Pre-Intervention SEI scores, LEP Status, and District were the only three variables that reached significance within the bivariate analyses, these were the only variables included in the binary logistic regression analysis. Specifically, direct entry was used. Variables that met the model significance criterion (i.e.,  $p < .05$ ) were considered salient significant predictors when taking the other variables into account.

The results of the logistic regression are presented in Table 10 (below). The results indicated that Pre-Intervention SEI Score was the most salient predictor, and that both LEP Status ( $p < .05$ ) and Pre-Intervention SEI Scores ( $p < .001$ ) remained significant predictor variables in the model. When taking these two significant predictors into account, District did not add significantly to the prediction of intervention response.

The final column in Table 10, labeled Exp(B), includes the Exponential Betas, which are estimates of the Odds Ratios, for each variable. Put simply, these values

indicate the increased likelihood that a student responded to their intervention(s), based on the corresponding variable. Therefore, LEP Students were 2.539 times more likely to respond to their interventions than non-LEP students when taking Pre-Intervention SEI Scores and District into account. Similarly, for every 1 point score decrease in Pre-Intervention SEI Scores (since the Beta value is negative), students were 1.12 times more likely to respond to their interventions, when taking LEP Status and District into account.

Table 10

*Bivariate Logistic Regression Analyses*

	<i>B</i>	<i>S.E.</i>	<i>Wald</i>	<i>df</i>	<i>Sig.</i>	<i>Exp(B)</i>
<b>Step 1</b>						
<b>LEP Status</b>	<b>.932</b>	<b>.411</b>	<b>5.131</b>	<b>1</b>	<b>.024</b>	<b>2.539</b>
District	.235	.175	1.810	1	.178	1.265
<b>Pre-Intervention SEI Scores</b>	<b>-.110</b>	<b>.015</b>	<b>54.767</b>	<b>1</b>	<b>.000</b>	<b>.896</b>
Constant	7.293	1.560	21.853	1	.000	1469.343

*Note.* *B* = Beta; *S.E.* = Standard Error; *Wald* = Wald Chi Square Value; *df* = Degrees of Freedom; *Sig* = Significance level; *Exp(B)* = Exponential Beta; Information shown in bold for variables with  $p < .05$ .

**Research Question 3: Interactions of Student and Intervention Level Predictors**

Lastly, binary logistic regression analyses were conducted to determine whether or not there were any interactions between student and intervention level characteristics that predicted response. Each student-level characteristic was entered into individual regression models with each intervention-level characteristic after taking the main effects of both variables into account. Tables 11- 16 (below) present the results of these analyses.

Table 11

*Pre-Intervention SEI Score Interactions*

	<i>B</i>	<i>S.E.</i>	<i>Wald</i>	<i>df</i>	<i>Sig.</i>	<i>Exp(B)</i>
By Number of Interventions	.001	.014	.004	1	.948	1.001
By Months of Longest Intervention	.003	.006	.278	1	.598	1.003
By # of Leaders	.003	.004	.512	1	.474	1.003
By Group Size (Individual vs. Group)	.033	.030	1.190	1	.275	1.034
By Session Frequency	.017	.012	1.864	1	.172	1.017
By Session Duration	.008	.007	1.083	1	.298	1.008
By Intervention Focus	.007	.006	1.595	1	.207	1.007
By District	-.006	.013	.191	1	.662	.994

*Note.* *B* = Beta; *S.E.* = Standard Error; *Wald* = Wald Chi Square Value; *df* = Degrees of Freedom; *Sig* = Significance level; *Exp(B)* = Exponential Beta

The predictive value did not significantly change for any intervention characteristic based on Pre-Intervention SEI scores (i.e., none of the interactions between Pre-Intervention SEI scores and intervention characteristics were significant).

Table 12

*Student Sex Interactions*

	<i>B</i>	<i>S.E.</i>	<i>Wald</i>	<i>df</i>	<i>Sig.</i>	<i>Exp(B)</i>
By Number of Interventions	.569	.371	2.357	1	.125	1.766
By Months of Longest Intervention	-.010	.049	.043	1	.836	.990
By # of Leaders	.047	.057	.680	1	.410	1.048
By Group Size (Individual vs. Group)	1.512	.914	2.735	1	.098	4.535
By Session Frequency	.402	.340	1.395	1	.238	1.494
By Session Duration	.210	.165	1.625	1	.202	1.234
By Intervention Focus	.248	.156	2.546	1	.111	1.282
By District	-.065	.285	.051	1	.821	.937

*Note.* *B* = Beta; *S.E.* = Standard Error; *Wald* = Wald Chi Square Value; *df* = Degrees of Freedom; *Sig* = Significance level; *Exp(B)* = Exponential Beta; Information shown in bold for variables with  $p < .05$ .

The predictive value did not significantly change for any intervention characteristic based on student sex (i.e., none of the interactions between student sex and intervention characteristics were significant).



Table 13

*Racial/Ethnic Minority Status Interactions*

	<i>B</i>	<i>S.E.</i>	<i>Wald</i>	<i>df</i>	<i>Sig.</i>	<i>Exp(B)</i>
By Number of Interventions	.100	.065	2.340	1	.126	1.105
By Months of Longest Intervention	-.022	.024	.832	1	.362	.978
By # of Leaders	.016	.022	.552	1	.458	1.016
By Group Size (Individual vs. Group)	.182	.150	1.472	1	.225	1.199
By Session Frequency	.075	.053	2.013	1	.156	1.078
By Session Duration	.028	.030	.843	1	.359	1.028
By Intervention Focus	-.004	.024	.023	1	.881	.996
By District	-.062	.252	.060	1	.806	.940

*Note.* *B* = Beta; *S.E.* = Standard Error; *Wald* = Wald Chi Square Value; *df* = Degrees of Freedom; *Sig* = Significance level; *Exp(B)* = Exponential Beta; Information shown in bold for variables with  $p < .05$ .

The predictive value did not significantly change for any intervention characteristic based on racial/ethnic minority status (i.e., none of the interactions between racial/ethnic minority status and intervention characteristics were significant).

Table 14

*LEP Status Interactions*

	<i>B</i>	<i>S.E.</i>	<i>Wald</i>	<i>df</i>	<i>Sig.</i>	<i>Exp(B)</i>
By Number of Interventions	.164	.370	.196	1	.658	1.178
By Months of Longest Intervention	.189	.138	1.873	1	.171	1.207
By # of Leaders	.097	.114	.718	1	.397	1.101
By Group Size (Individual vs. Group)	-1.467	.916	2.565	1	.109	.231
By Session Frequency	-.231	.238	.945	1	.331	.793
By Session Duration	.041	.168	.059	1	.809	1.042
By Intervention Focus	-.091	.147	.382	1	.537	.913
By District	.280	.317	.780	1	.377	1.323

*Note.* *B* = Beta; *S.E.* = Standard Error; *Wald* = Wald Chi Square Value; *df* = Degrees of Freedom; *Sig* = Significance level; *Exp(B)* = Exponential Beta; Information shown in bold for variables with  $p < .05$ .

The predictive value did not significantly change for any intervention characteristic based on LEP status (i.e., none of the interactions between LEP status and intervention characteristics were significant).

Table 15

*SPED Eligibility Interactions*

	<i>B</i>	<i>S.E.</i>	<i>Wald</i>	<i>df</i>	<i>Sig.</i>	<i>Exp(B)</i>
By Number of Interventions	.259	.340	.579	1	.447	1.296
By Months of Longest Intervention	-.158	.138	1.305	1	.253	.854
By # of Leaders	.127	.110	1.327	1	.249	1.135
By Group Size (Individual vs. Group)	.468	.821	.325	1	.569	1.596
By Session Frequency	-.059	.335	.031	1	.860	.943
By Session Duration	.113	.165	.471	1	.492	1.120
By Intervention Focus	.079	.150	.274	1	.600	1.082
By District	-.055	.284	.037	1	.847	.947

*Note.* *B* = Beta; *S.E.* = Standard Error; *Wald* = Wald Chi Square Value; *df* = Degrees of Freedom; *Sig* = Significance level; *Exp(B)* = Exponential Beta; Information shown in bold for variables with  $p < .05$ .

The predictive value did not significantly change for any intervention characteristic based on SPED status (i.e., none of the interactions between SPED status and intervention characteristics were significant).

Table 16

*Free or Reduced-Price Lunch Eligibility Interactions*

	<i>B</i>	<i>S.E.</i>	<i>Wald</i>	<i>df</i>	<i>Sig.</i>	<i>Exp(B)</i>
By Number of Interventions	.487	.292	2.782	1	.095	1.627
By Months of Longest Intervention	-.121	.141	.736	1	.391	.886
By # of Leaders	.139	.122	1.287	1	.257	1.149
By Group Size (Individual vs. Group)	-.202	.728	.077	1	.781	.817
By Session Frequency	.478	.301	2.515	1	.113	1.612
By Session Duration	.059	.110	.287	1	.592	1.061
By Intervention Focus	-.010	.113	.007	1	.932	.990
By District	.010	.205	.003	1	.960	1.010

*Note.* *B* = Beta; *S.E.* = Standard Error; *Wald* = Wald Chi Square Value; *df* = Degrees of Freedom; *Sig* = Significance level; *Exp(B)* = Exponential Beta; Information shown in bold for variables with  $p < .05$ .

The predictive value did not significantly change for any intervention characteristic based on Free or Reduced-Price Lunch Eligibility (i.e., none of the interactions between free or reduced lunch eligibility and intervention characteristics were significant).

## CHAPTER VI

### DISCUSSION

#### **Why Not More Responders?**

The first question worth discussing is: Why, out of so many participants, did only 36 students improve in their school engagement, despite receiving targeted interventions? First, although the interventions were required to meet several basic criteria (e.g., connect the student with a supportive adult at least monthly), the interventions were based on the district and/or school's chosen procedures and typically available resources (Baker et al., 2016). Therefore, the interventions were not necessarily standardized and/or based on the existing evidence of effective school engagement interventions. Baker et al. (2016) acknowledged that "there was substantial variability across districts, schools, and students in terms of what the engagement supports focused on, how they were delivered, and who received support" (p. 7). The schools also did not have access to any outside resources (e.g., financial, coaching, training) from the MSIP or other agencies due to the nature of the funding source's requirements. Therefore, higher levels of implementation quality often observed in research studies that include implementation assistance may not have occurred in this case.

Second, many students in this study actually decreased in their SEI scores from Pre-Intervention to Post-Intervention. While this may be an artifact of students not taking the questionnaire seriously (e.g., answering arbitrarily across the two testing sessions), it is also likely that, to at least some extent, many of these students actually experienced a decrease in engagement with school across the 6<sup>th</sup> grade year. As previously mentioned, school engagement is a dynamic process, so arguing for this downward trend is

reasonable. More specifically, Eccles et al. (1993, cited in Appleton, 2012) previously found that engagement does tend to diminish over time for students in middle and high school. Appleton's (2012) own research involving the SEI in one Southeastern U.S. school district demonstrated that, as a whole, 6<sup>th</sup>, 7<sup>th</sup>, and 8<sup>th</sup> grade students decreased in all but one of the school engagement dimensions assessed by the SEI. In this circumstance, the engagement interventions implemented by the MSIP schools would actually be "working" against a downward trend, not just to keep school engagement levels stable. Therefore, many students could have potentially benefited from the interventions while still demonstrating a decreasing trend in their SEI scores (i.e., demonstrating a smaller decrease than would have occurred in the absence of interventions).

Third, although the Student Engagement Instrument (SEI) has been repeatedly validated as a satisfactory measure of school engagement, it may have limitations in terms of its sensitivity to change (i.e., improvements in school engagement due to interventions). For example, the original MSIP researchers decided to replace the SEI as their measure of school engagement after two years of the study (Baker et al., 2016). Conversations with two of the researchers revealed that concerns related to the SEI's sensitivity to growth in school engagement contributed to this decision (N. Nelson and H. Fien, personal communication, April 16, 2018). Additionally, Fredricks and McColskey (2012) argued that there are several reasons that many existing school engagement measures (SEI included) are not yet to a point at which they can be reliably useful in studies assessing malleability of school engagement. First, the existing measures are often too general. Second (but similarly), the items are often not situation or task specific,

so conclusions cannot be drawn related to whether or not (and if so, how and how much) engagement is dependent on contexts (e.g., different responses for different classes or teachers). Finally, the authors pointed out that existing school engagement measures do not capture qualitative within-domain differences for the individual engagement domains. In other words, Fredricks and McColskey (2012) stated that behavioral, academic, and cognitive engagement all are within a continuum. A student can be behaviorally engaged with school by complying with basic school rules or by going above and beyond school requirements. Similarly, affectively engagement students could merely like school or could experience deep levels of attachment to and identification with school, learning, peers, and teachers. Increases or decreases along these continua for any of the school engagement domains may not be adequately captured by existing measures like the SEI (Fredricks & McColskey, 2012).

As previously mentioned, prior research has demonstrated the factorial invariance of the SEI. In other words, there is evidence that it measures the same construct across ages and grade levels. However, it is important to note that this research analyzed the use of the SEI at different grade levels for different students (i.e., using cross-sectional methods). Therefore, the authors' claims that these findings of invariance across grade levels automatically mean that the SEI is adequately equipped to demonstrate *change* in the same individual students' engagement across time (Betts et al., 2010; Betts, 2012) may not be fully warranted.

In addition to intervention, student, and measurement characteristics that may have contributed to the relatively low number of responders, there are also some factors related to the RCI calculations that are worth considering. First, it is worth noting that the

reliability used in the RCI calculation was a fairly conservative estimate of the internal consistency of overall SEI scores since it was calculated based on the internal consistencies of individual subscales. As the number of items included in a scale increases, the internal consistency also increases. Therefore, individual subscales (e.g., Family Support for Learning), each of which had two to nine items, can be expected to have lower internal consistencies than overall SEI scores, which take all 35 items of the measure into account. Since RCI calculations involved dividing each student's change in SEI scores by the Standard Error of the Difference, using a less conservative reliability estimate could have potentially yielded RCI values greater than or equal to 1.96 for more students.

The relatively few students who made up the responder group may also be partially due to a limitation of the use of the RCI metric within the current study. Namely, students at or above a certain pre-intervention SEI score would have been unable to demonstrate reliable growth, as demonstrated by an RCI value of 1.96 or greater. This is because a student's SEI score would have had to improve 16 points or more between pre-intervention and post-intervention. Since the absolute highest a student could score on the SEI is 140, this means that no student scoring 125 or higher on the pre-intervention SEI assessment would be able to improve enough to demonstrate reliable growth using the RCI metric. Post-hoc frequency counts were conducted to see how many students in the current sample this prohibited from demonstrating reliable change. A total of 77 students had scores of 125 or greater on the pre-intervention SEI. However, of these 77 students, 55 demonstrated a decrease in their SEI score or remained the same. The 12 students with pre-intervention scores of 125 or greater who demonstrated growth only increased



between 1 and 4 SEI points, indicating that alternative methods of determining response likely would not have been more accurate in capturing any of these students. Instead, this limitation suggests that future studies could potentially be limited to students with pre-intervention SEI scores below a certain threshold, indicating students with pre-intervention engagement concerns. For the current study, this would not have actually changed the number of responders, but it would have decreased the number of non-responders.

Finally, although more students weren't captured by the RCI metric as responders, this does not mean that additional students did not experience other practical improvements in school engagement. Multiple prior examinations of links between SEI scores and concurrent school engagement indicators have shown relatively modest correlations, with many not reaching clinical significance (Appleton et al., 2006; Lovelace et al., 2014). These findings may suggest that variables such as discipline problems (or lack thereof), attendance, and class participation may not be fully reflected by SEI scores.

### **General Results**

Validation procedures did not indicate that responders differed significantly from non-responders in their school attendance percentages or rates of office discipline referrals. One possible explanation for this is that both groups had relatively high attendance rates (greater than 99%). With these high rates, there may have been a ceiling effect, of sorts, in which it was difficult to decipher a significant difference between two values that were so close to 100%. It is also worth noting that both indicators (attendance and ODRs) are indicators of behavioral engagement and do not provide a diverse

representation of the several facets of total school engagement (e.g., academic, affective/psychological, cognitive). In other words, students who responded (in terms of SEI score improvements) may have done so because their cognitive, academic, and/or affective school engagement improved, even if their behavioral engagement (via attendance or ODR rates) did not. It is also worth noting that attendance rates and ODR data were collected throughout the school year, not just pre- and post-intervention. Therefore, it cannot be determined if the students who were responding to their interventions improved in these other engagement indicators as they progressed through their interventions (i.e., accrued more ODRs before receiving interventions). This consideration potentially ties into the fact that students in the Responder Group actually had (on average) more discipline referrals than students in the Non-Responder Group.

Several factors are worth considering when interpreting the results of the three research questions and comparing them to the hypothesized outcomes. For Research Question 1, Pre-Intervention SEI scores and LEP status emerged as the only student-level characteristics that predicted response to the engagement interventions; students with lower Pre-Intervention SEI scores as well as LEP students were significantly more likely to respond to the school engagement interventions they received. Based on the empirical rationale that led to the hypotheses that students at greatest risk of low school engagement would be most likely to respond to targeted school engagement interventions, it is logical that students with low SEI scores were more likely than their peers to be in the Responder Group. These students had more “room to grow,” so to speak, and the interventions selected by participating MSIP school districts may have been selected explicitly for their utility in serving disengaged students.

Similarly, LEP students fall into the category of higher risk of school disengagement. These students may have been more likely than their peers to fall into the Responder Group because some of them may have needed targeted support more than non-LEP students. For example, LEP students receiving school engagement interventions may have been able to make the most of connections to supportive school staff by gaining help accessing language-based resources, communicating needs to teachers, or getting involved with other students and pro-social activities.

On the other hand, why did the other student-level characteristics not emerge as significant predictors of response even though prior research indicates that males, racial/ethnic minority students, SPED students, and students from low socioeconomic status (measured in the current study with the proxy variable FRL eligibility) tend to be at greater risk of school disengagement? Students identifying with a non-white racial or ethnic minority were no more or less likely than white students in the current sample to respond to their school engagement intervention(s). One possible reason for a lack of significance in this relationship is the grouping of all racial/ethnic minorities into one category. Of course, not all minority groups experience school engagement challenges in the same ways or to the same extent. For example, students from Asian/Pacific Islander backgrounds tend to outperform white students and all other ethnic minorities in graduation rates (McFarland et al., 2017). Therefore, separating racial/ethnic minority groups within the current study may have yielded slightly different results. An alternative explanation could be that existing school engagement interventions need to be improved in their ability to culturally match certain racial/ethnic minorities.

Special Education eligibility also did not emerge as a significant predictor of response. One possible reason is the heterogeneity among this population. As Lovelace et al. (2014) pointed out, graduation and dropout rates vary widely across the disability categories. For example, students who are eligible for SPED for Speech Impairment services may face very different challenges related to school engagement than students who are eligible due to Emotional and Behavioral Disorders (EBD) or Other Health Impairment (OHI) because of severe Attention-Deficit/Hyperactivity Disorder (ADHD). Examining response by separate disability categories may have yielded more interesting results for this variable. Free or reduced-price lunch (FRL) eligibility may not have significantly predicted response to school engagement interventions at least partially because of the distance between the variable and the construct it is intended to represent (socioeconomic status). As mentioned previously in the current manuscript, FRL eligibility is a common proxy for SES, but it clearly does not capture the construct entirely. Specifically, students with FRL eligibility may not actually come from low SES families or backgrounds and instead experience familial factors that foster higher levels of school engagement.

For Research Question 2, District emerged as the only intervention-level characteristic predicting response. This significant relationship between District and response group likely involves similarities in interventions used within single districts. For example, certain districts may have implemented interventions that provided more frequent contact with supportive adults, a longer time to build rapport and garner adult support, and/or a greater focus on holistic aspects of school engagement. To a certain extent, is unsurprising that more intervention-level characteristics did not emerge as

significant predictors, since the categorization of several of the intervention characteristics certainly limited the specificity with which analyses could be conducted. For example, potential impacts of certain characteristics (e.g., frequency) could have been hidden by the necessity of “Combination” categories, despite the care that was taken to make the distinctions between categories as clear and research-based as possible.

In the follow-up analyses for Research Questions 1 and 2, bivariate logistic regression analyses indicated that District did not add any significant value in the predictive relationship over Pre-Intervention SEI scores or LEP status. It is likely that one or more districts had relatively large populations of LEP students who did not significantly respond to their interventions. On the other hand, Pre-Intervention SEI scores emerged as the most salient predictor. This finding indicates supports the previously described notions that these students, who demonstrate the lowest levels of school engagement via low SEI scores, can perhaps benefit the most from school engagement interventions that target specific areas of need.

Finally, when examining interactions between the student-level variables and the intervention-level variables in predicting response to the engagement interventions, no significant interactions were found between any student-level characteristics and any intervention-level characteristics. The reasons previously discussed for why these variables did not significantly predict response in the univariate analyses also apply here.

### **Implications for Research and Practice**

The results of the current study have the potential to inform various practices in school engagement intervention development, research related to the construct of school engagement, and educational practices aiming to improve students’ school engagement

and increase their likelihood of completing high school. First, students already experiencing low levels of school engagement and LEP students may be particularly good candidates for targeted school engagement interventions. In fact, lower Pre-Intervention SEI scores (an indication of low school engagement prior to interventions) emerged as the most significant predictor of response. Perhaps the most important takeaway from this finding is a reiteration of the idea that disengagement in the early middle school years does not need to be a static student characteristic. On the contrary, students already experiencing disengagement from school simply have the most potential avenues with which educators can reach them with engagement supports.

The indication that LEP students may be benefitting more from targeted interventions than their native English-speaking peers is, in some ways, good news that LEP students can be effectively reached through these interventions. However, this finding may also indicate that the universal (i.e., Tier 1) engagement strategies commonly used in schools may be missing the mark for LEP students. Therefore, Tier 1 strategies may need to be examined and revised, if necessary, especially in school settings that serve a high number of LEP students. On the other hand, educators may consider providing Tier 2 engagement supports for LEP students, especially those with additional risk factors, in order to match them with supportive adults who can help them navigate new systems and potentially unique barriers to successful engagement with school.

Despite the possible explanations for the low number of responders in the current study, the results do suggest that school engagement interventions (at least as they are typically delivered in schools) can and should be strengthened to better meet the needs of students who are increasingly struggling to remain actively engaged with school. Many

schools may need to re-evaluate the strategies currently in use by comparing and contrasting them with the intervention components that have the most empirical support. For example, educators may need to seek out interventions that are a better cultural fit for their population of students. Of course, schools and districts often face funding difficulties that may make many administrators hesitant to allocate additional funds to standardized interventions. In these cases, stakeholders must be creative in revising and revamping existing efforts. For example, there are many universal strategies that would not cost extra funding and would not require any substantial additions to staff members' roles and responsibilities (e.g., universal PBIS strategies).

### **Limitations of the Current Study**

Despite the contributions of the current study and its implications for research and practice, there are several shortcomings and limitations in the study's sample, final data set, and analyses that are worth noting and discussing. The use of extant data from the MSIP provided a wealth of benefits (e.g., a relatively large sample size). However, performing new analyses on existing data also limited the extent to which the data could be adapted for the needs of the current study. For example, the overlap of intervention characteristics for many students (e.g., one student receiving one intervention that occurred monthly and another intervention that occurred weekly) was one problematic aspect of the extant dataset when considering the goal of this study to analyze individual intervention characteristics. Therefore, one important limitation was the necessary grouping of intervention characteristics across interventions. As much care as possible was taken to ensure that the categorizations were reasonable. However, the groupings still

minimized the likelihood of deciphering any significant relationships between intervention characteristics and response group.

Another limitation of the current study was the necessary restrictions to the original data set due to missing data. Some data, such as free or reduced lunch (FRL) eligibility and race/ethnicity, were not reported by certain participating school districts due to the perceived sensitive nature of these data points. Missing these pieces of student information certainly contributed to a limiting factor of the current study. Because a large number of students did not have accessible data relating to their race/ethnicity or FRL eligibility, fewer cases could be analyzed in determining potential relationships between these student-level characteristics and the students' likelihood of responding to the interventions they received. Therefore, the likelihood of finding a true significance in these relationships was artificially diminished. Similarly, some students in the original 6<sup>th</sup> grade sample did not have scores recorded for the Student Engagement Instrument (SEI) measure, either prior to or after the interventions. These cases were relatively few, but, as always with missing data, it is certainly possible that these students differed from the students with both SEI scores in some way. For example, the missing SEI scores could be due to lower attendance, which is of course an indicator of behavioral engagement.

Next, the original and final samples for this study were limited to several districts in a single state in the U.S. Therefore, results, interpretations, and implications cannot be fully generalized to other student populations across the country or the globe. Despite the geographic restrictions, this study did benefit from the fact that the sample size was relatively large and included districts from both urban and suburban areas. In addition to geographic representation, the current study's sample is also limited in its generalizability



due to the sole focus on students determined to be at-risk for reading difficulties and failure. Students selected from the general population or from students specifically at-risk of low school engagement (regardless of their reading risk) may follow different response patterns than the ones demonstrated in the current study. When considering this possibility within the tiered frameworks that are so ubiquitous in education today (e.g., RtI, MTSS, PBIS), it might be expected that a large portion of the general population would benefit from (i.e., respond to) general, universal school engagement interventions, while students in the 2<sup>nd</sup> or 3<sup>rd</sup> tiers would be less likely to respond to only universal supports. Therefore, sampling from the general population of a district's middle school students may yield higher clinical response rates.

Interpretations from the current study are also limited due to the fact that students received reading interventions simultaneously with their school engagement interventions. This concurrent intervention component potentially confounds the student outcomes since an academic-focused intervention could also lead to improvements in school engagement. Since all students received reading interventions, analyses related to differential response would not necessarily be affected. However, it is possible that there would have been fewer responders in the absence of the reading interventions.

Finally, the self-report nature of the SEI as the primary measure may carry with it some limitations, despite its benefits in terms of assessing internal characteristics of school engagement. This may especially be the case given the age of the student self-reporters. Students in the 6<sup>th</sup> grade may not yet have the personal insights or metacognitions necessary to accurately assess themselves on various aspects of school

engagement. Incorporating information from other raters (e.g., teacher reports) may have expanded the interpretability of the results from the current study.

### **Future Research Directions**

Given the results, implications, and limitations of the current study, there are several avenues for potential research questions that would expand, clarify, and/or replicate the findings described in this manuscript. Using indicators of behavioral engagement already collected by schools in order to provide validity evidence for the SEI measures, as attempted in the current study, has the potential to illustrate a fuller, more comprehensive picture of students' school engagement. However, the fact that attendance rates and ODR rates were only provided in terms of the entire year limited the conclusions that could be drawn. Therefore, future research should include baseline, pre-intervention attendance and ODR data in addition to post-intervention data in order to compare these practical indicators of school engagement both before and after students receive interventions.

Of course, future studies aiming to elucidate information about the critical intervention characteristics for school engagement interventions would benefit most from experimental methods, as opposed to retrospective analyses. These experimental studies could use random assignment to assess the extent to which one or more intervention characteristics predict response. For example, students with similar engagement risks and/or pre-intervention SEI scores could be assigned to groups that receive interventions daily, weekly, or monthly. Another study could compare groups of students that are connected to 1, 2, 3, or more supportive adults as a part of their interventions. Similarly, while researchers will never be able to ethically isolate interventions a student receives to

only engagement interventions (i.e., academic instruction will always occur during a school year), future research could make efforts to analyze engagement interventions without the confounding effects of targeted academic interventions such as what occurred via the current study's reading intervention and data-based decision-making efforts.

Since the literature surrounding school engagement emphasizes the multidimensional nature of the construct, future studies could analyze potential relations between student and intervention level characteristics and specific dimensions of school engagement. Examining the relations only with the broad construct (i.e., overall SEI scores) may actually be hiding more direct connections. As a hypothetical example, it is possible that interventions aiming to connect students to an adult mentor could increase a student's affective school engagement, but not necessarily their behavioral or academic engagement, especially within the relatively short timeframe of the current study (i.e., within the same academic year). This line of research would help practitioners meet the aim described in Betts et al. (2010) of matching students with engagement interventions targeted to their specific areas of need.

It is also worth noting that since engagement (and, on the flipside, disengagement) is often described as a process, researchers in this field should analyze the relationships examined in the current study with longitudinal approaches. Specifically, interventions delivered in the 6<sup>th</sup> grade and throughout middle school could be evaluated with a longer-term approach by examining students' increase or decline in student engagement through high school. This line of research would help meet the calls of prior researchers examining school engagement and the SEI, who advocated for the use of longitudinal data in order to identify students who are in the process of disengaging from school and

learning (Betts et al., 2010). In fact, the original MSIP team is dedicated to collecting engagement-related data for the students included in the current study through their high school years. These data include attendance records, course credits, and class grades, among others (Baker et al., 2016). Therefore, future research could evaluate whether or not the student's post-intervention SEI scores predicted actual indicators of academic and/or behavioral engagement throughout high school. Similarly, researchers could determine whether or not the students who met the threshold of clinical response maintained their improvements in school engagement, as measured by high school SEI scores and other indicators such as high school attendance rates and course completions. These efforts would be particularly meaningful for within-district information for districts that are attempting to improve high school graduation rates, decrease truancy, and increase overall school engagement for their students.

The student-level characteristics selected to be analyzed in the current study were largely based on the variables typically explored in previous studies related to school engagement. In terms of assessing the relationships between the variables and actual response to school engagement interventions, some of the analyses were quite exploratory. However, additional student-level characteristics could and should also be examined in future projects. For example, response to engagement interventions could be analyzed for students who identify with minority sexual orientations or gender identities (i.e., Lesbian, Gay, Bi, Transgender, and Queer/Questioning students; LGBTQ). This particular subgroup of students may be an important group to study in this regard for several reasons. First, some of the studies referenced in the current manuscript highlighted that school engagement has been correlated with individual gender identities

more than with biological sex itself. Therefore, including student-reported gender identity, as opposed to the student's biological sex, as a potential predictor of response to interventions may be worthwhile. Second, as federal, state, local, district, and school policies shift (for the most part) toward increased protections of LGBTQ students, the importance of a school's climate in supporting or discouraging their engagement with school is becoming clearer.

Overall, the current study has built on the existing literature bases related to school engagement, interventions designed to increase students' engagement with school, and differential response to engagement interventions. The findings described here reiterate the idea that school engagement is a malleable variable and worthy target for prevention and intervention efforts to improve school performance and graduation rates. However, the findings also illustrate not all students will experience the same success when exposed to engagement interventions and that not all engagement intervention strategies will produce desired results. Therefore, researchers and educators must continue working together to consistently improve the universal and targeted strategies used to engage students with their own learning and help keep them in school through the completion of their K-12 education.

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