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Using Physical Activity to Deliver Social and Emotional Learning Programming in
Schools

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

Master of Arts

in

Education

by

Danielle Zahn

September 2023

Thesis Committee:
Dr. Wesley Sims, Chairperson
Dr. Stephanie Moore
Dr. Eui Kyung Kim

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September 2023

The Thesis of Danielle Zahn is approved:

Committee Chairperson

University of California, Riverside

ABSTRACT OF THE THESIS

Using Physical Activity to Deliver Social and Emotional Learning Programming in
Schools

by

Danielle Zahn

Master of Arts, Graduate Program in Education
University of California, Riverside, September 2023
Dr. Wesley Sims, Chairperson

Social and emotional learning (SEL) has become a central component of educational programming in recent years. As schools continue to shift toward a holistic approach to education, the implementation of SEL programs has proliferated in an effort to promote students' social and emotional competence development. Traditional SEL instruction typically occurs within the classroom setting and results in various positive outcomes for students. In light of the benefits of traditional SEL, there is a pressing need to pursue innovative practices to supplement existing ones and provide students with additional opportunities to facilitate social and emotional competence development within school settings. One such approach that has begun to capture the attention of educators and researchers involves utilizing school-based physical activity as a method to teach SEL (PA+SEL). Research investigating the effects of PA+SEL practices within school settings appears limited, despite the potential for this approach to generate positive

personal and social-emotional outcomes for students. Thus, this study will expand upon previous research connecting physical activity with SEL by investigating the effects of a PA+SEL program that uses an established SEL framework and is implemented within the school setting. Results from this investigation may offer support for physical activity being utilized as an effective methodology to teach social and emotional skills within the school environment, providing educators with an alternative approach to promoting SEL.

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Introduction

Over the last several decades, the focus of education has expanded beyond strictly attending to academic content to include the affective and social development of children (Greenberg et al., 2017). Critical to children's development is the promotion of social and emotional competencies (Green et al., 2021), which are a collection of non-academic skills that can and should be promoted in schools (Brush et al., 2022). These skills help enable children to establish and maintain satisfactory interpersonal relationships, learn to successfully cope with personal and social challenges, effectively understand and manage emotions, make responsible decisions, and set and achieve positive personal and collective goals (Domitrovich et al., 2017).

Children with lower levels of social and emotional competence are at a heightened risk of experiencing chronic academic disengagement (Durlak et al., 2011), obtaining lower grades, having inconsistent attendance, and dropping out of school (Eklund et al., 2018; Greenberg et al., 2003). Deficiencies in social and emotional skills are also related to higher rates of internalizing and externalizing behaviors in some youth (Elliott et al., 2021), and a higher likelihood of being referred for special education due to behavioral concerns (Stoiber, 2011). Conversely, sufficient social and emotional skills are important for student well-being, positive peer attitudes and relationships, increased positive attitudes toward oneself, greater engagement in prosocial behavior, and lower levels of emotional distress (Brush et al., 2022; Durlak et al., 2011).

Educational settings have been identified as playing a central role in promoting students' social and emotional competencies by providing prevention- and intervention-

oriented support services and instruction (Duong et al., 2021; Hoffman, 2009). One predominant approach to providing this support is through the implementation of social and emotional learning (SEL) programs in school, often classroom, settings. SEL is a logical addition to holistic education programming with a focus on enhancing the development of these important non-academic skills. Efforts to incorporate SEL into education have recently expanded through the inclusion of SEL into core academic curricula within classroom settings (Weissberg, 2019). Schools have also begun implementing SEL within multi-tiered systems of support to promote the well-being of all students (Eklund et al., 2018; Gueldner et al., 2020). One approach that has recently captured educator's attention involves integrating SEL into school-based physical activity (Hooper et al., 2020). This is a relatively new and underutilized practice that has the potential to provide students with additional opportunities for social and emotional competence development within the school setting.

Unfortunately, the incorporation of SEL within school-based physical activity contexts has been largely neglected. Only recently have educators and researchers begun exploring school-based physical activity as an avenue through which SEL skills can be taught and reinforced (Hooper et al., 2020; Olive et al., 2020). Physical activity can teach students a variety of developmental skills, such as those within the social and affective domains (Dyson, 2019; Wright, Gordon, & Gray, 2020). However, knowledge in these domains does not come naturally or automatically for all students (Barney et al., 2021). Thus, incorporating explicit social and emotional skill instruction, such as SEL, within physical activity contexts may be important for generating positive outcomes (Barney et

al., 2021; Olive et al., 2020). Combining SEL instruction with school-based physical activity has the potential to maximize the benefits of both practices, improving positive effects on social and emotional competence development and related outcomes. However, research in this domain has been limited (Wright, Gordon, & Gray, 2020). Therefore, this study aims to address this gap by evaluating the effects of a school-based physical activity program that explicitly incorporates SEL on the development of students' social and emotional competence and related personal and social outcomes.

SEL Background

The term *social and emotional learning* originated from a 1994 Fetzer Institute conference of educators and researchers from a variety of disciplines who were interested in addressing the psychological, social, emotional, and developmental needs of youth (Borowski, 2019; Butzer et al., 2016; Elbertson et al., 2009). The goal was to discuss these needs in the context of school curricula and identify solutions for meeting them within educational settings (Jomaa et al., 2023). Until this time frame, an understanding of the role of affective, social, and related well-being factors relative to students' academic functioning was largely unknown and disregarded (Oberle & Schonert-Reichl, 2017; Zins et al., 1998). Following this conference, the Collaborative for Academic, Social, and Emotional Learning (CASEL) was founded as an organization with a mission to develop and promote high-quality SEL instruction and practices for youth, primarily within K-12 education settings (Greenberg et al., 2003; Kress & Elias, 2006). Within the next several years, guidance for SEL practices targeting educators and school-based implementation appeared in the literature (Elias et al., 2003). These guidelines set the

foundation for the emergence of SEL as a field, solidified its position within education, and catalyzed future research and practice.

While the domain of SEL has expanded since its inception, there has been an accelerated emphasis on SEL within education in recent years (Barlett, 2019; Hooper et al., 2020; Wanless & Domitrovich, 2015). This stems from schools being identified as ideal settings for fostering youth's social and emotional development and an increased need for this type of support for students. To provide this support, schools across the United States have turned toward implementing SEL programming and integrating these principles into foundational instructional practices (Chafouleas & Iovino, 2021; Dusenbury et al., 2014). SEL is best conceptualized as a framework and is broadly identified as the process through which individuals develop their social and emotional competence (Domitrovich et al., 2017). It promotes the acquisition of a variety of social, cognitive, affective, and behavioral skills that are fundamental for development across the lifespan (Durlak et al., 2015; Lawson et al., 2019).

SEL Definition

Within research and the applied literature, multiple frameworks attempting to explicitly define SEL and outline its core components have emerged, resulting in a lack of consensus within the field regarding a single, overarching conception (Hooper et al., 2020; Watson & Emery, 2010; Wright et al., 2021). This has led to SEL being defined in a variety of ways, with a number of key skills and competencies identified as important (Brush et al., 2022). Nevertheless, there is substantial overlap in the foundational components that comprise SEL among the various frameworks (Collie, 2020).

Predominantly, there is widespread agreement that the fundamental elements of SEL consist of a blend of social, affective, and cognitive skills that combine to form social and emotional competence (Brush et al., 2022). There is also one particular framework that has become arguably the most enduring, well-known, and widely accepted within SEL research and practice, despite the presence of multiple conceptualizations (Frye et al., 2022; Merrell et al., 2008; Osher et al., 2016; Ross & Tolan, 2018). The prominent model stems from CASEL (2020), which defines SEL as:

The process through which all young people and adults acquire and apply the knowledge, skills, and attitudes to develop healthy identities, manage emotions and achieve personal and collective goals, feel and show empathy for others, establish and maintain supportive relationships, and make responsible and caring decisions. (p. 1)

SEL Competencies

This CASEL framework outlines five interrelated social and emotional competencies that fall under the broad constructs of intrapersonal and interpersonal skills (Wigelsworth et al., 2022). They are further subdivided into various behaviors, thoughts, and skill sets and represent the core domains of SEL (Greenberg et al., 2017). The five competencies associated with this prevalent model include self-awareness, self-management, social awareness, relationship skills, and responsible decision-making (CASEL, 2020). Collectively, these competencies are seen as an integral part of education and are considered important for positive developmental and life outcomes for youth.

Self-Awareness. Self-awareness is an intrapersonal competency that refers to the ability for youth to recognize and understand the nature of personal thoughts, emotions, beliefs, and interests (Wigglesworth et al., 2022). It also encompasses the understanding of how these factors impact one's actions and choices across a variety of contexts (CASEL, 2020; Oberle & Schonert-Reich, 2017). The capacity to assess one's strengths and weaknesses also falls under the domain of self-awareness. Developing a firm sense of self-confidence, self-efficacy, personal interests, and purpose are additional components of self-awareness.

Self-Management. Self-management is also considered an intrapersonal skill (Wigglesworth et al., 2022). It involves the ability of youth to engage in productive emotion-regulation and manage their thoughts and behaviors in a range of contexts and settings (CASEL, 2020; Greenberg et al., 2017; Oberle & Schonert-Reich, 2017). This domain also encompasses the capacity to successfully regulate feelings and experiences of stress, manage impulses, and engage in self-control. The ability to motivate oneself and set and make progress towards personal and educational goals are also important components of self-management.

Social Awareness. Social awareness is an interpersonal skill that refers to the ability of youth to engage in perspective-taking, including looking beyond their own point of view, considering how others might feel or think about things, and developing and displaying empathy for others (CASEL, 2020; Oberle & Schonert-Reich, 2017; Wigglesworth et al., 2022). Engagement in these skills with individuals from both similar and diverse backgrounds is a critical component of social awareness (Osher et al., 2016).

This competency also involves cultivating an understanding and awareness of diverse social norms for behavior across contexts and settings (CASEL, 2020). Learning how to recognize social supports, such as familial, peer, school, and community resources is also an element of social awareness.

Relationship Skills. Relationship skills is another interpersonal competency (Wigglesworth et al., 2022). It involves youth developing skills associated with establishing and maintaining supportive, healthy, and rewarding interpersonal relationships with others, including those from diverse backgrounds (CASEL, 2020; Oberle & Schonert-Reich, 2017). Relationship skills also include the abilities of communicating effectively, engaging in active listening, successfully navigating conflict, cooperating well with others, and problem-solving collaboratively. Developing effective leadership abilities while also learning when to seek or extend help and support are also important relationship skills.

Responsible Decision-Making. Responsible decision-making is regarded as both an intrapersonal and interpersonal skill (Elliot et al., 2021). It refers to the ability of youth to make productive decisions about their own behavior and social interactions across a range of diverse situations and settings (CASEL, 2020; Jomaa et al., 2023; Oberle & Schonert-Reich, 2017). Part of making responsible decisions involves having the ability to understand and consider concerns about safety and ethical standards, in addition to being able to effectively appraise the consequences and benefits of one's actions while acknowledging the well-being of oneself and others. Analyzing information to make

informed decisions and generate solutions to personal and social problems also falls under this competency.

SEL Programming in Schools

As interest in SEL has proliferated in recent years, so too has the implementation of SEL programs in education settings. Schools are seen as a “durable context” for providing interventions that promote students’ social and emotional competence and minimize the risk of future challenges (Mahoney et al., 2021). In fact, interventions in schools are one of the more common approaches to supporting students’ SEL (Goldberg et al., 2019). School programming often targets the development of specific SEL skills and competencies (Cramer & Castro-Olivo, 2016), such as those outlined by CASEL and other frameworks. These competencies are considered both changeable and teachable (Jones & Bouffard, 2012; Jones & Khan, 2017), especially when developed through high-quality SEL programs within the educational context (Brush et al., 2022).

Traditional SEL Instructional Approaches

SEL skills are traditionally taught in schools using various methods, including classroom-based practices and whole-school initiatives (Goldberg et al., 2019). The majority of SEL practices in schools, however, take place within the classroom setting using specific programming and strategies (Gueldner et al., 2020). Generally, traditional evidence-based SEL programs in schools tend to use at least one of the following strategies within the classroom setting: integration into the context of core academic curricula, discrete or free-standing lessons and instruction, and general teaching strategies and practices. These strategies are frequently used in school-based practice because they

have been shown to be effective in developing students' competency across the five core SEL skills (Dusenbury et al., 2015).

Integration into the context of core academic curricula involves teaching lessons that cover academic content while also embedding material geared toward developing social and emotional skills. This includes directly incorporating instruction in the core SEL competencies into academic subjects such as mathematics, language arts, history, or science (Dusenbury et al., 2015; Weissberg, 2019). The use of discrete or free-standing lessons involves teachers carving out instructional time to explicitly teach SEL lessons and competencies (Dusenbury et al., 2015). Generally, this includes programs that provide guided, step-by-step instructions and lesson plans designed to teach content on the core domains of SEL. Often, these lessons teach concepts that students can apply to various situations and aspects of their lives. To promote generalization, discrete lessons also tend to provide students with opportunities to practice the skills they are developing. General teaching strategies and practices refers to the incorporation of a set of pedagogical strategies, instructional processes, and classroom management approaches that create classroom conditions that are conducive to the development of social and emotional competence (CASEL, 2012; Dusenbury et al., 2015). Such practices can include establishing positive student-teacher and peer relationships, providing students with authentic praise, encouraging students to delve into their interests, helping students identify and develop their unique strengths, and allowing students appropriate agency in decision-making. Further, this strategy includes incorporating pedagogical approaches, such as cooperative learning and project-based learning, which are important for

developing several SEL competencies, including relationship skills, self-management, and social awareness. Together, these three practices represent traditional approaches to SEL instruction in the classroom setting.

In addition to classroom-based SEL instructional approaches, schools have recently begun implementing SEL at the school-wide level within multi-tiered systems of support, including universal SEL programming for all students and targeted intervention approaches for more intensive support (Eklund et al., 2018). Within multi-tiered systems of support, SEL can be integrated into all three tiers of prevention and intervention (Gueldner et al., 2020; Sailor et al., 2021). The goal is to provide students with support designed to prevent social-emotional difficulties and remediate these challenges for students who are most at-risk (Eklund et al., 2018; Marsh & Mathur, 2021).

Outcomes Associated with School-based SEL Programming

School-based SEL programming is thought to yield both short- and long-term positive effects for students (Greenberg et al., 2017; Mahoney et al., 2018). Studies investigating school-based implementation generally conceptualize SEL outcomes as a process with inputs (i.e., SEL programming) and outputs, or short-term outcomes (i.e., effects immediately at post-intervention) and long-term outcomes (i.e., effects at various follow-up periods). The six outcomes with the most extensive research base include students' SEL skills, attitudes, positive social behaviors, conduct problems, emotional distress, and academic performance (Mahoney et al., 2018). *SEL Skills* is a measure of students' competency across the core domains. *Attitudes* refers to students' thoughts and beliefs about themselves (e.g., self-esteem, self-efficacy), others (e.g., peer relationships,

peer behavior), and school (e.g., school connectedness). *Positive Social Behaviors* include actions such as helping others, problem-solving, teamwork and cooperation, leadership, and relationship building. *Conduct Problems* encompasses actions such as disruptive behavior, disciplinary infractions, aggressive behavior, risky behavior, and bullying. *Emotional Distress* includes various domains of psychological functioning and well-being (e.g., anxiety, depression). *Academic Performance* is a measure of students' achievement in various scholastic disciplines and is based on products such as grades, test scores, or teacher reports. These school-based outcomes have been evaluated in several large-scale meta-analyses.

An early meta-analysis examined the impact of universal school-based SEL interventions and targeted programs on the six outcomes identified above (Payton et al., 2008). Universal interventions were defined as those delivered to the general student population, which are appropriate for students without identified social, emotional, and behavioral challenges. Targeted programs were defined as those implemented with students exhibiting signs of social, emotional, and behavioral difficulties. This meta-analysis included 180 universal intervention studies ($n = 277,977$) and 80 targeted program studies ($n = 11,337$) with students in kindergarten through eighth grade. For universal intervention studies, students who participated in SEL programming exhibited significantly greater improvements in all six outcomes immediately at post-intervention compared to students in control conditions. Specifically, SEL intervention students demonstrated better SEL skills ($g = 0.60$); improved attitudes toward themselves, others, and school ($g = 0.23$); more positive social behaviors ($g = 0.24$); fewer conduct problems

($g = 0.23$); decreased emotional distress ($g = 0.23$); and better academic performance ($g = 0.28$). For targeted program studies, students exposed to SEL interventions also demonstrated significantly greater outcomes than students in control conditions across all six categories at post-intervention. Participating students exhibited improved SEL skills ($g = 0.77$); better attitudes toward themselves, others, and school ($g = 0.38$); more positive social behaviors ($g = 0.50$); decreased instances of conduct problems ($g = 0.47$); lower levels of emotional distress ($g = 0.50$); and improved academic performance ($g = 0.43$). For both types of programming evaluated, significant follow-up effects were demonstrated for several outcome domains, however, the effects were generally smaller than at post-intervention. Regarding universal programs, emotional distress was the only category without a significant effect size at follow-up. For targeted programs, academic performance was the only outcome that did not yield a significant effect size at follow-up. Together, findings demonstrate the immediate and long-term effectiveness of school-based SEL interventions for kindergarten through eighth grade students with and without social, emotional, and behavioral concerns.

Another large-scale meta-analysis investigated the impact of 213 school-based universal SEL programs implemented with students in kindergarten through high school ($N = 270,034$; Durlak et al., 2011). Expanding the population to include older students addressed a limitation of the analysis conducted by Payton et al. (2008). In their analysis, Durlak et al. (2011) focused on what they considered to be universal SEL interventions, or those that are appropriate for entire student populations, rather than programs intended only for students experiencing signs of social, emotional, or behavior problems or

learning difficulties. Included studies also had to concentrate on the development of at least one SEL skill and include a control condition. The dependent variables evaluated in this analysis included the same six outcome categories described above and previously evaluated by Payton et al. (2008). Findings indicated that, compared to students in control groups, students who received SEL instruction demonstrated significantly better-developed SEL skills ($g = 0.57$), improved attitudes toward self and others ($g = 0.23$), more positive social behaviors ($g = 0.24$), increased academic performance ($g = 0.27$), fewer conduct problems ($g = 0.22$), and decreased levels of emotional distress ($g = 0.24$). Durlak et al. (2011) also evaluated long-term SEL effects on the subset of studies ($n = 33$) that collected follow-up data at least 6 months after the termination of an intervention. Effects remained statistically significant for all six outcomes with effect sizes ranging from 0.11 for *Attitudes* to 0.32 for *Academic Performance*. These meta-analytic findings provide additional support for the beneficial effects of SEL programs in schools across a range of important outcomes.

A more recent meta-analysis focused solely on the long-term effects of school-based universal SEL programming (Taylor et al., 2017). This investigation reviewed 82 studies that assessed follow-up SEL outcomes collected between 6 months and 18 years post-intervention. Included studies focused on universal SEL programming provided to students in kindergarten through high school ($N = 97,402$). The dependent variables included the six outcomes evaluated in previous meta-analyses (Durlak et al., 2011; Payton et al., 2008) in addition to self-reported substance use (Taylor et al., 2017). Statistically significant effects at follow-up were found across all outcome categories.

Students who participated in school-based SEL interventions were found to have better SEL skills ($g = 0.23$); more improved attitudes toward self, others, and school ($g = 0.13$); engaged in more positive behaviors ($g = 0.13$); had better academic performance ($g = 0.33$); demonstrated fewer conduct problems ($g = 0.14$); exhibited lower levels of emotional distress ($g = 0.16$); and reduced substance use ($g = 0.16$) at follow-up than students in control groups. This meta-analysis filled a gap in the literature by also evaluating whether the development of primary social-emotional assets (i.e., *SEL Skills* and *Attitudes*) immediately at post-intervention predict long-term outcomes associated with positive and negative indicators of well-being (i.e., positive social behavior, academic performance, fewer conduct problems, less emotional distress, less substance use). Results indicated that higher levels of social-emotional assets (i.e., *SEL Skills* and *Attitudes*) at post-intervention were linked with better follow-up outcomes on both positive and negative indicators of well-being. Follow-up meta-regressions to evaluate the predictive power of *SEL Skills* compared to *Attitudes* determined that higher levels of *SEL Skills* at post-intervention significantly predicted more beneficial outcomes at follow-up. *Attitudes* alone was found to be an insignificant predictor of more positive follow-up effects. Together, findings from this meta-analysis highlight the longevity of positive outcomes obtained from participation in school-based SEL programming and the importance of developing students' social and emotional competence to promote long-term well-being outcomes.

Altogether, meta-analyses consistently find that school-based SEL programming is associated with a range of beneficial outcomes for students, both immediately

following intervention participation and in the long term. Thus, school-based SEL programming is considered an effective approach for developing students' social and emotional competence and promoting well-being and should continue to be prioritized in educational settings.

Explicit SEL Instruction

One of the key components of effective school-based SEL programming is the use of explicit and intentional instructional practices. Knowledge in this domain and the development of SEL skills does not come automatically for all students and instead may need to be modeled, taught, practiced, and reinforced through the use of clear and direct instruction (Weissberg et al., 2015). Rather than relying on the implicit acquisition of SEL skills and leaving children's social and emotional competence development to chance, high-quality programming tends to utilize explicit approaches, such as scripted curricula or structured lessons (Jones et al., 2019).

To accomplish the intentional teaching of SEL skills, research suggests that SEL practices should follow what is known as SAFE instructional procedures (Durlak et al., 2010; Durlak et al., 2011). SAFE stands for sequenced, active, focused, and explicit. *Sequenced* involves utilizing a coordinated and connected set of activities to achieve outlined objectives related to the development of specific skills (e.g., SEL skills). *Active* refers to using active forms of learning (e.g., role play) to promote the development of new skills and competencies. *Focused* involves the inclusion of specific components devoted to developing students' SEL skills. *Explicit* refers to directly targeting specific SEL skills (e.g., the CASEL five core competencies) rather than focusing on positive

youth development in more general terms. Outlining and describing the SEL competencies students are expected to learn is important for knowledge acquisition. Comprehensively teaching SEL skills is also beneficial, as SEL programs that focus on all five of the CASEL core competencies have been found to be more effective than those targeting a subset of the competencies (e.g., one or two; Elias, 2006).

Programming that adheres to these recommended, evidence-based SAFE procedures is more likely to promote positive outcomes for students (Weissberg, 2019). Several meta-analyses of SEL programs have found stronger positive student outcomes when SAFE instructional practices are followed. For example, in their meta-analysis of 213 school-based SEL programs, Durlak and colleagues (2011) concluded that the implementation of all four SAFE practices moderated positive outcomes for students. Programs utilizing all four practices resulted in significant effects on all six outcome domains (i.e., SEL skills, attitudes toward self and others, social behaviors, academic performance, conduct problems, and emotional distress). Conversely, programs that did not implement these practices (non-SAFE programs) yielded statistically significant effects for only three outcome domains (i.e., attitudes toward self and others, conduct problems, and academic performance). In addition, outcome effect sizes for programs that utilized SAFE procedures were larger than those of non-SAFE programs, even for the three outcomes found statistically significant with non-SAFE programs. A meta-analysis of 68 after-school SEL programs that foster personal and social skills found similar results for SAFE programs (Durlak et al., 2010). Programs utilizing SAFE procedures were associated with statistically significant effects for all eight outcome

categories measured (i.e., child self-perceptions, bonding to school, positive social behaviors, problem behaviors, drug use, achievement test scores, grades, and attendance). In contrast, non-SAFE programs did not demonstrate significant effects for any outcome category. Thus, findings illustrate the importance of explicitly and deliberately teaching SEL skills, with adherence to SAFE instructional practices appearing as a critical factor in promoting positive student outcomes. Without considering these procedures, students' social and emotional competence is often left to chance, and students may be less likely to reap the range of benefits associated with SEL program participation.

Expanding SEL Practices in Schools

The field of SEL has grown significantly in recent years, especially within education. As traditional approaches to SEL instruction consistently demonstrate beneficial outcomes for students, there is a call to further develop these practices and expand SEL into other areas of schooling. Proponents of SEL argue that it must continue to advance within research and practice and that new SEL approaches are necessary to supplement existing ones and progress the field forward (Bailey et al., 2019; Oberle et al., 2016). Given that SEL is now seen as a critical component of contemporary schooling, there is a present need to pursue innovative practices that can provide students with additional opportunities to facilitate SEL within the school setting.

As the delivery of SEL programming proliferates throughout education, it is important to look for ways to strengthen student outcomes, differentiate instructional approaches to meet students' diverse needs, and incorporate SEL into additional portions of the school day beyond traditional core academic subjects. Implementing SEL within

the context of school-based physical activity may be one such approach. This is a relatively new and underutilized practice within education (Hooper et al., 2020) that has the potential to capitalize on the benefits of both SEL and physical activity for youth, amplifying positive outcomes for students.

Physical Activity as a Method to Teach SEL

Physical activity, including school-based physical activity (e.g., physical education), is one domain that is becoming increasingly linked to the SEL and education phenomenon. Participation in sport and physical activity has long been associated with a range of physical and mental health benefits for youth (Janssen & LeBlanc, 2010; Biddle et al., 2019). Beyond the mental health benefits and gross-motor skill acquisition, it has been argued that physical activity, and physical education in particular, can and should be utilized to teach youth a variety of developmental skills, such as those within the social and affective domains (Barney et al., 2021; Wright, Gordon, & Gray, 2020). Skills in these domains include the SEL core competencies; therefore, pairing school-based physical activity with SEL instruction appears to be a natural fit. Unfortunately, however, the social and affective domains are often neglected within school-based physical activity and physical education, despite their importance (Hastie, 2017; Wright & Irwin, 2018). Research, practice, and policy has typically targeted the psychomotor domain and physical developmental outcomes instead, leaving affective and social outcomes as low priorities (Johnson, 2016; Wright & Walsh, 2015). This has led to a call for more instruction and a greater emphasis placed on the inclusion of instruction within the social and affective domains of physical education and school-based physical activity (Barney

et al., 2021). Further, it has been asserted that school-based physical activity has historically disregarded one of its more significant strengths—incorporating SEL and promoting the development of social and emotional competence and related outcomes (Wright, Gordon, & Gray, 2020).

Social and Affective Outcomes Associated with Physical Activity

Interest in exploring the connection between physical activity and social and affective learning accelerated within the sports-based positive youth development domain (Perkins & Noam, 2007). In this regard, sports-based positive youth development programming emphasizes participation in a particular sport or physical activity to promote the development of various life skills, many of which are comparable to skills taught with the SEL framework (Wright, Howell, et al., 2020). This is based on the premise that sport and physical activity are related to positive personal, psychological, social, and emotional development for youth (Fraser-Thomas et al., 2005; Opstoel et al., 2020).

Participation in physical activity is associated with youth's psychological and emotional development (Fraser-Thomas et al., 2005). Specifically, participation in sports and structured physical activities have been related to higher life satisfaction, improved self-esteem, lower levels of stress, and higher levels of subjective well-being (Fraser-Thomas et al., 2005). Sport participation has also been associated with more positive mood states and improved emotional control (Crane & Temple, 2015). For example, research has found that middle school students who participate in organized physical activity (e.g., sports) report higher levels of life satisfaction than those who do not (Zullig

& White, 2011). Further, school-age children who participate in organized sports have been found to report more positive affect, greater well-being, and higher levels of self-esteem than those who do not participate in organized sports (Findlay & Coplan, 2008). These findings provide support for physical activity serving as a context for promoting developmental outcomes within the affective domain.

A recent review of 88 studies outlined the range of personal and social developmental outcomes for school-age children associated with participation in physical activity within the context of sports and physical education (Opstoel et al., 2020). Evaluated outcomes were grouped into 11 personal and social developmental themes: work ethic, control and management, goal-setting, decision-making, problem-solving, responsibility, leadership, cooperation, meeting people and making friends, communication, and prosocial behavior. Regarding the work ethic category, sports were found to be positively related to work ethic, assertiveness, initiative, effort, commitment, self-discipline, perseverance, concentration, independence, and self-direction. Similar outcomes were found in studies conducted within the physical education setting, with research demonstrating positive effects of program participation on perseverance, self-direction, effort, and assertiveness. Within the control and management theme, participation in sports was associated with positive effects on self-control, time management skills, self-management, emotional control, resilience, and stress management. Research conducted within the physical education setting also demonstrated positive outcomes for self-control, coping skills, and managerial skills (Opstoel et al., 2020).

Regarding the goal-setting theme, sports participation was positively associated with goal-setting, achieving goals, and an increased focus on personal improvement and shared goals (Opstoel et al., 2020). One of two studies conducted within the physical education context found a positive increase in focusing on group and individual improvement. Only a handful of studies evaluated decision-making outcomes, with all studies finding positive associations between sports and physical education and decision-making. Sports were differentially associated with youths' problem-solving skills, with two studies reporting positive effects and two studies demonstrating either no relationship or a partial relationship between sports and problem-solving abilities. Three out of four studies within the physical education context found that physical education programs positively impacted students' problem-solving skills (Opstoel et al., 2020).

In terms of the responsibility theme, both physical education and sports participation were found to be positively associated with accountability, general responsibility, personal responsibility, and social responsibility (Opstoel et al., 2020). Mixed results were demonstrated for the relationship between sports and leadership. Several studies outlined overall positive relationships between sports and being a role model, being a leader, coaching others, and various leadership skills, whereas other studies indicated positive leadership effects for only some participating students. The small number of studies conducted within the physical education setting reported a positive association between physical education and leadership. Various aspects of cooperation were found to be differentially associated with sports and physical education participation. Several studies demonstrated positive associations between sports and

cooperation skills, helping others, teamwork, interpersonal skills, playing and working better as a team, group effort, and team bonding. Other studies either found partial associations or no relationships between sports and aspects of teamwork and cooperation. The majority of reviewed studies within physical education settings demonstrated positive associations with cooperation, helping others, teamwork, and sharing resources (Opstoel et al., 2020).

Regarding the category of meeting new people and making friends, participation in sports was found to be positively related to increased positive interactions with others, improved peer relationships, making new friends, and establishing meaningful relationships (Opstoel et al., 2020). Only three reviewed studies were conducted within the physical education setting, with all investigations demonstrating positive associations with establishing meaningful relationships with peers and improved interpersonal interactions. Sports and physical education participation were found to be positively associated with youths' communication skills, including engaging in positive communication and becoming more vocal. Mixed results were demonstrated for the prosocial behavior theme for both sports and physical education. In general, however, research has found that sports are positively associated with engaging in fair play, honesty, empathy, trust, respect, following rules, relating to others, displaying encouragement, and appropriately handling conflict. Similar positive results were found for the majority of reviewed studies that were conducted within the physical education context. However, some studies found inconsistent or null findings for the relationship

between physical education and various aspects of prosocial behavior (Opstoel et al., 2020).

Altogether, findings from this review support the claim that participation in sports and physical education can promote development in various personal and social domains for school-age children (Opstoel et al., 2020). Though specific program characteristics were not evaluated within this review, the authors emphasize the importance of teaching developmental skills systematically and intentionally within physical activity contexts to generate positive outcomes (Richards et al., 2019; Opstoel et al., 2020). They caution that simply participating in physical activity, whether sports or physical education, will not automatically produce positive effects for all youth (Bailey et al., 2009; Cryan & Martinek, 2017; Fraser-Thomas & Côté, 2009). Thus, combining physical activity with explicit SEL instruction may amplify positive outcomes for students. Additionally, a majority of the reviewed research was conducted within sports contexts rather than physical education settings. This supports the need for additional research investigating the development of youth's personal, affective, and social development through school-based physical activity programming (Goh & Connolly, 2020; Hooper et al., 2020; Opstoel et al., 2020; Wright, Gordon, & Gray, 2020).

Current Empirical Support and Gaps in the Literature

Current research, although limited, highlights the potential for school-based physical activity to be paired with SEL instruction to contribute to the development of students' social and emotional competencies and related positive outcomes. Several gaps

are also illuminated within the existing literature, supporting the need for additional investigations into the physical activity and SEL connection within school settings.

Some of the research evaluating the effects of pairing physical activity with SEL instruction to generate positive outcomes has taken place within the sports-based youth development domain. For example, one study investigated the benefits of a sports-based youth development soccer program designed to teach SEL utilizing a curriculum based on the CASEL framework (Wright, Howell, et al., 2020). Participants included six adult coaches who implemented the program and 51 students aged 8 to 11 years old. Students participated in the program two to three times per week for 1.5 hours. A case-study design was implemented with a primarily qualitative approach to analyses. Results from student interviews indicated that they learned various SEL skills throughout participation in the program. Interviews and surveys completed by the coaches suggested that there were noticeable improvements in students' social and emotional skills as a result of program participation. Findings support the integration of SEL instruction with physical activity to promote the development of social and emotional competencies (Wright, Howell, et al., 2020).

A recent study conducted a similar investigation of the effects of a sports-based youth development program that taught SEL through the teaching personal and social responsibility (TPSR) model (Shen et al., 2022). The TPSR model, though not directly considered an SEL framework, is an evidence-based pedagogical model frequently utilized within the sports-based youth development domain to teach various life skills (Hellison, 2011). Components of the TPSR model, which include relational time,

awareness talk, physical activity lesson, group meeting, and reflection time, have been found to promote developmental outcomes closely aligned with the CASEL framework, suggesting that this model can be paired with SEL instruction to promote students' SEL skills (Gordon et al., 2016). The program in this study did not implement a specific SEL framework and instead focused on teaching respect, effort, goal setting, helping and leadership, and positivity through soccer and utilizing TPSR model components (Shen et al., 2022). Participants included 17 middle school-aged boys. A case study design with qualitative data analysis was utilized. Results from student interviews and field notes suggest that the program helped students learn to demonstrate respect and effort, control their emotions, support and help their peers, and engage in teamwork. Findings support pairing explicit instruction in social and affective skills with physical activity to promote students' SEL within the out-of-school context. This study also provided evidence for the use of the TPSR model to promote SEL in physical activity contexts (Shen et al., 2022).

Outside of the sports-based youth development domain, before- and after-school physical activity programs as contexts for supporting SEL skill development have begun to be investigated. One study evaluated the effects of a voluntary before-school physical activity program on elementary and middle school students' social and emotional competence (Goh et al., 2022). The program included 30-minute sessions three days per week for a total of six weeks and was implemented by physical education teachers. The program did not implement explicit instruction in SEL and instead focused on incorporating sports and games that required students to work in teams. Students' social and emotional competence was measured before and after participation in the program

utilizing an adapted measure aligned with the CASEL framework. Analyses revealed that participating students demonstrated improved social and emotional competence following participation in the physical activity program compared to before. The social and emotional competence of control group students who did not participate in the program remained the same at both measurement timepoints. Although the program did not implement explicit SEL instruction, findings provide support for the development of social and emotional competence through participation in physical activity programming (Goh et al., 2022).

Additional research evaluated the effects of a 4-week voluntary after-school physical activity-based SEL program (PA+SEL) on students' social-emotional character development (Olive et al., 2020). The program deliberately taught social-emotional and character development skills utilizing a modified version of the TPSR pedagogical model. Each session included the awareness talk, one to two social-emotional character development physical activities, and the group meeting. Participants included second through fifth grade students, with 17 students who participated in the intervention and 12 students in the control group. Students' social-emotional character development skills were measured before and after participation in the program. Results did not indicate a significant difference in students' social-emotional character development skills before and after participation in the physical activity program. The lack of significant findings was attributed to the short duration of the program and the small sample size which likely resulted in insufficient power to demonstrate a significant effect. Thus, additional

investigations of PA+SEL are necessary to better understand the effects of combining these practices on developing students' social and emotional skills (Olive et al., 2020).

While the current research base supports the use of physical activity for promoting students' social and emotional competence development, future investigations in this domain are warranted due to several gaps in the existing literature. Less than a handful of studies have investigated the connection between physical activity and SEL outcomes (Goh et al., 2022; Olive et al., 2020; Shen et al., 2022; Wright, Howell, et al., 2020). Further, two of these studies relied primarily on qualitative data (Shen et al., 2022; Wright, Howell, et al., 2020), suggesting a need for more quantitative investigations. In addition, all current studies have been conducted with sports-based youth development programs (Shen et al., 2022; Wright, Howell, et al., 2020) or within before- and after-school settings (Goh et al., 2022; Olive et al., 2020), rather than during the school day. This is a significant limitation because all students do not have access to out-of-school time programming, and these types of programs often allow participation on a voluntary basis. For example, Goh and colleagues (2022) recruited students who volunteered to participate in a before-school physical activity program, potentially recruiting a biased sample of students with an increased interest in physical activity. Implementing PA+SEL during the school day, such as within physical education classes, has the potential to reach far more students than out-of-school time programs. Incorporating these practices into the school day may also provide students with a differentiated form of SEL instruction utilizing active learning, which may be more beneficial for students who may

not respond to typical classroom-based SEL instruction. Thus, research on the effects of in-school PA+SEL is critical.

Another gap in the current literature is the lack of research on PA+SEL that provides systematic instruction aligned with an established SEL framework. One study did not provide any explicit or intentional instruction in SEL concepts (Goh et al., 2022), which is against recommendations from the SEL literature (Durlak et al., 2011; Dyson et al., 2021; Jacobs & Wright, 2014; Wright, Gordon, & Gray, 2020). To teach SEL skills through physical activity, systematic and explicit integration of instruction in SEL concepts is recommended (Barney et al., 2021; Olive et al., 2020). In fact, if the goal of a physical activity program or physical education is to promote social and affective development, physical activity by itself is likely insufficient for achieving desired outcomes (Oh & Lee, 2023). Therefore, even though the context of physical activity and physical education appears to be a natural fit for SEL development (Hooper et al., 2020; Wright, Gordon, & Gray, 2020), positive social and emotional skill development and related outcomes are not necessarily guaranteed (Oh & Lee, 2023). Out of the three studies that did incorporate systematic SEL instruction (Olive et al., 2020; Shen et al., 2022; Wright, Howell, et al., 2020), only one of them provided instruction aligned with an established SEL framework (i.e., CASEL; Wright, Howell, et al., 2020). Thus, additional research on PA+SEL utilizing an established SEL framework is important. The proposed study aims to address these gaps by investigating the effects of a school-based physical activity program that explicitly incorporates SEL on the development of students' social and emotional competence and related personal and social outcomes.

Current Study

The implementation of SEL initiatives in the school setting has expanded in recent years, with a focus on students' SEL becoming a core feature of contemporary education. While traditional school-based SEL approaches have consistently yielded positive outcomes for students, new innovations in SEL practice have begun to capture the attention of educators and researchers. Utilizing physical activity as a method to teach SEL is one approach that has the potential to generate positive personal and social-emotional outcomes for youth (Oh & Lee, 2023). Although SEL is thought to naturally align with physical activity, sports-based programming, and physical education, research investigating the effects of PA+SEL within the school environment appears limited. Further, less than a handful of studies have evaluated the effects of programming integrating SEL competencies with physical activity using an established SEL framework (i.e., the CASEL model). Combining the benefits of both physical activity and SEL instruction may be an effective practice for expanding or amplifying positive outcomes for students.

One population of students who may particularly benefit from this practice to promote social and emotional competence and related positive outcomes are students in middle school. Adolescence, and particularly early adolescence (i.e., middle school), is a critical period for social and emotional development (Green et al., 2021; Oberle et al., 2014). Early adolescents may be especially likely to need support with their SEL skills and benefit from programming targeting this area (Yeager, 2017), as social and emotional

competence is critically linked to healthy development during adolescence (Ross & Tolan, 2018).

Purpose and Research Questions

The purpose of this study is to expand upon previous work connecting physical activity with SEL by investigating the outcomes associated with a 10-week PA+SEL program for middle school students that uses an established SEL framework and is implemented within the school setting. Further, this study aims to use more rigorous empirical methodology to evaluate the effectiveness of PA+SEL programming. This approach will compare student outcomes across three groups: students who do not receive explicit SEL support (No SEL), students who participate in a classroom SEL program (SEL), and students who participate in a PA+SEL program. First, this study seeks to evaluate the effect of program participation on the development of students' SEL skills (i.e., social and emotional competence). Results from this investigation may offer support for physical activity being utilized as an effective methodology to teach SEL skills within the school environment, providing educators with an alternative approach to facilitating SEL. Findings may also provide insight into whether combining physical activity with SEL instruction leads to greater improvements in students' social and emotional competence than traditional SEL instruction. Furthermore, this study aims to determine the effect of program participation on students' quality of peer relationships and global self-esteem. Both peer relationships and self-esteem are outcomes associated with traditional SEL programming and physical activity participation, making them ideal outcomes to assess in relation to the combination of these practices. While the promotion

of SEL skills is important in its own right, knowledge of whether program participation is also associated with improved personal outcomes provides insight into the positive effects of different forms of SEL instruction beyond skill development. Specific research questions include:

1. Are there differences in social and emotional competence scores between students who participated in PA+SEL, students who participated in SEL, and No SEL students, when controlling for baseline levels of social and emotional competence?
2. Are there differences in ratings of peer relationship quality between students who participated in PA+SEL, students who participated in SEL, and No SEL students, when controlling for baseline levels of peer relationship quality?
3. Are there differences in level of self-esteem between students who participated in PA+SEL, students who participated in SEL, and No SEL students, when controlling for baseline levels of self-esteem?

Method

Participants

A total sample of 159 middle school students will be recruited for this study. Each study condition (i.e., PA+SEL, SEL, and No SEL) will include a minimum of 53 students currently enrolled in one of three middle schools located within the greater Orange County, California, metropolis. To be eligible for this study, students must be able to read and write in English.

Measures

Demographic Information

Student demographic information will be collected from the participating schools using a researcher-created form. The form will ask schools to report on students' grade level, age, gender, race, ethnicity, and current academic performance (i.e., grade point average/GPA).

Social and Emotional Competence (SEL Skills)

To measure students' levels of social and emotional competence, the Social Skills Improvement System—Social Emotional Learning Brief Scales—Student Form (SSIS SEL*b*-S; Anthony et al., 2020) will be used. The SSIS SEL*b*-S is a brief version of the Social Skills Improvement System—Social Emotional Learning Edition Rating Form—Student (SSIS SEL-RF-S), which is a nationally normed rating scale that assesses students' social and emotional learning abilities. The SSIS SEL*b*-S was developed to combat the long length of the SSIS SEL-RF-S and create an efficient measure more suitable for repeated (e.g., periodic progress monitoring) assessment. This measure was specifically designed to assess SEL skills aligned with the CASEL framework.

The SSIS SEL*b*-S is a self-report measure of SEL skills for students in grades 3 through 12 (ages 8–18; Anthony et al., 2020). It takes approximately 5 to 8 minutes to complete and includes 20 total items with four items from each of the five CASEL competencies (i.e., self-awareness, self-management, social awareness, relationship skills, and responsible decision-making). Each item is rated on a 4-point Likert scale with the response options of 0 (*not true*), 1 (*a little true*), 2 (*a lot true*), and 3 (*very true*). The

measure yields separate scores for each of the five CASEL domains (scales) plus a total SEL Composite score, with higher scores being indicative of greater competency. Total scores for each of the five CASEL scales range from 0 to 12 and are summed to obtain the SEL Composite score which ranges from 0 to 60. SEL Composite scores can also be interpreted using a competency-based criterion-referenced performance framework (CRPF) which characterizes the scores of the five CASEL scales into four performance levels: Emerging, Developing, Competent, and Advanced.

A primary use of the SSIS SEL*b*-S is to monitor and document change in students' SEL skills over time and evaluate the effects of intervention programs on students' level of SEL skills. Investigations of the SSIS SEL*b*-S found a high internal consistency value of .91 for the SEL Composite score and moderate internal consistency values ranging from .67 to .72 across scales (Anthony et al., 2020; Elliot et al., 2021). For test-retest reliability, an intraclass correlation coefficient of .87 was found for the SEL Composite score and intraclass correlation coefficients ranging from .64 to .83 were found across scales (Anthony et al., 2020).

Peer Relationships

Quality of peer relationships will be measured using the Patient-Reported Outcome Measurement Information System Pediatric Peer Relationships Short Form (PROMIS PR-SF; DeWalt et al., 2013). The PROMIS PR-SF is a youth self-report measure for ages 8 to 17 that assesses perceptions of the quality of peer relationships over the past seven days. The PROMIS PR-SF was developed from the PROMIS Pediatric Peer Relationships item bank, which is a pool of 15 items that was created using item

response theory (DeWalt et al. 2013). The item bank resulted in two versions of the measure: a computerized adaptive test version that presents select items to the individual based on their responses to specific questions and a fixed-item short form (i.e., the PROMIS PR-SF). Using the fixed-item PROMIS PR-SF is preferred to ensure that all respondents answer the same set of questions.

The PROMIS PR-SF is a single-factor measure containing eight items that are rated on a 5-point Likert scale ranging from 1 (*never*) to 5 (*almost always*). The measure yields a total raw score ranging from 8 (lowest possible score) to 40 (highest possible score). Total raw scores are converted into T-scores which have a mean of 50 and a standard deviation of 10 (PROMIS, 2018). Higher T-scores are indicative of better-quality peer relationships. The measure takes approximately 5 to 10 minutes to complete and is appropriate for use with both general and clinical pediatric populations (DeWalt et al., 2013). The eight items on the PROMIS PR-SF were selected based on psychometric properties and a consideration for the item content being representative of the social health aspects of peer relationships. The PROMIS PR-SF demonstrates high internal consistency with a Cronbach's alpha value of .84 for the general pediatric population (Varni et al., 2014). The measure also has good test-retest reliability with an intraclass correlation coefficient of .81 for the general pediatric population (Varni et al., 2014).

Self-Esteem

Self-esteem will be measured using a modified child version of the Rosenberg Self Esteem Scale (CRSES; Wood et al., 2021). The original Rosenberg Self Esteem Scale (RSES) is a widely utilized, valid, and reliable 10-item self-report scale that

measures an individual's global self-esteem by evaluating both positive and negative feelings about the self (Rosenberg, 1965). The RSES has been validated for adolescents 12 years of age and older. Despite a lack of validity evidence supporting its use with children younger than 12, it has been utilized in several studies with younger populations (Joosse et al., 2008; Quinlan et al., 2009; Tirlea et al., 2016; Weintraub et al., 2008). Thus, the CRSES, a modified version of the original RSES, that serves as a comparable measure of self-esteem in younger children was developed (Wood et al., 2021). The RSES was analyzed and was determined to be too semantically, grammatically, and morphologically complex for younger children. As a result, the language of items on the RSES was simplified so that children could understand the meaning of each item, creating the CRSES. For example, item 7 on the RSES, "I feel that I'm a person of worth, at least on an equal plane with others," was modified to read "I feel that I'm as good as everyone else" on the CRSES.

The CRSES can be completed by students as young as 7 years old and serves as a self-report measure to assess global self-esteem in children (Wood et al., 2021). The CRSES contains 10 total items with five positively worded and five negatively worded statements. Each item is rated on a 4-point Likert scale ranging from 1 (*definitely not true*) to 4 (*very true*) for positively worded statements and is reverse-scored for negatively worded statements. Ratings for each item are summed to yield a total score ranging from 10 to 40, with higher scores indicating better global self-esteem. While the authors of the CRSES do not provide an established length of completion time for the measure, it is estimated that the CRSES will take approximately 5 to 10 minutes to

complete due to its short length. The CRSES has demonstrated appropriate levels of internal consistency with a Cronbach's alpha value of .79 in samples of children between 7 and 12 years old (Wood et al., 2021).

Social Validity

SEL students and PA+SEL students will complete a social validity assessment to evaluate acceptability of and satisfaction with their respective programs. Social validity items will be adapted from a measure used to assess the social validity of the Strong Teens SEL program (Castro-Olivo, 2014; Cramer & Castro-Olivo, 2016). The original questionnaire's items were developed based on Wolfe's (1978) definition of social validity which includes evaluating perceptions on the significance of the intervention's goals, the appropriateness (or acceptability) of the intervention's procedures, and the importance of the intervention's outcomes. The researcher-created questionnaire included nine items rated on a 6-point Likert scale ranging from 1 (*strongly disagree*) to 6 (*strongly agree*). Internal consistency values for the questionnaire ranged from .85 to .87 (Castro-Olivo, 2014; Cramer & Castro-Olivo, 2016). For this study, eight of the nine original items will be used, though the wording of some items has been modified to align more specifically with the SEL programs implemented in this study. Two additional items related to students' perceptions of the physical activities utilized in the program will be added to the social validity measure for PA+SEL. The final measure for participants in the PA+SEL condition will contain 10 items and the final measure for participants in the SEL condition will contain 8 items. Both versions of the measure are estimated to take between 5 to 10 minutes for students to complete.

Implementation Fidelity

Treatment adherence, quality, and dosage for each SEL program condition will be evaluated using a researcher-created implementation fidelity measure. Adherence refers to the degree to which a program is being delivered as intended (Carroll et al., 2007). PA+SEL includes three main components of each session: an awareness talk, physical activity, and a joint group meeting and reflection time. Each component includes specific features that will be rated on adherence using a yes/no question. SEL also includes three main components (i.e., an awareness talk, lecture, and group meeting and reflection time) with specific features that will similarly be rated on adherence using a yes/no question. Quality broadly refers to how well specific program steps are implemented (Carroll et al., 2007). Each feature of all program components, for both PA+SEL and SEL, will be rated on a three-point Likert scale with response options of 1 (*low quality*), 3 (*adequate quality*), and 5 (*high quality*). Dosage refers to how much of the program is delivered to participants (Carroll et al., 2007). The number of lessons and the duration of each lesson will be recorded for both programs to measure dosage. The SEL competency of focus for each lesson will also be recorded for both programs to ensure all five CASEL competencies are covered throughout the program as intended.

The PA+SEL and SEL interventionists will complete the implementation fidelity measure each session. Approximately 30% of program sessions will be evaluated by a second rater to ensure reliability of the collected data. Implementation fidelity data will be reviewed periodically throughout the program to ensure fidelity remains at appropriate levels.

Procedures

Recruitment

Students from three Orange County area middle schools will be recruited for participation. Recruitment will be facilitated by a local Orange County youth sports and character development non-profit organization that currently provides SEL programming support to schools and community organizations in this area. Recruitment will take place at the beginning of the school year to allow for data collection to occur in the winter to spring of the same academic year. Once university IRB and school district approval has been obtained, emails will be sent to individual middle schools within the district to invite them to participate in this study. The emails will contain information providing a brief overview of the study and the three groups (i.e., PA+SEL, SEL, and No SEL) schools will be able to choose from if they decide to participate. Schools will be instructed to contact the principal investigator if they are interested in having their students participate in one of the study groups. All three schools will be required to have students within the same grade level participate in this study (e.g., 7th grade only across schools) in an attempt to eliminate potential grade-level differences. Participating schools will be selected according to their willingness to participate in one of the three study groups and for having student populations that are closely matched on demographic characteristics.

After three schools have agreed to have students participate in the study, written consent forms will be sent to the parents or legal guardians of the students, along with a letter providing information about the study. Parents will have a specified amount of time

to return signed consent forms. Once written consent from parents or legal guardians has been obtained, students will provide written assent for their participation. After all parties have provided consent and assent, the students will be eligible to participate in the study.

Training

Data Collection. Data on demographic information and primary outcome measures will be collected via online Qualtrics surveys. No training will be required for students to complete the surveys. Interventionists and outside observers will participate in an hour-long training covering procedures for collecting implementation fidelity data. The training will cover the implementation fidelity measure, aspects of implementation fidelity assessed (i.e., adherence, quality, and dosage), and instructions for how to complete the implementation fidelity measure for this study.

Program. Prior to PA+SEL and SEL implementation, interventionists will participate in a two-hour training session provided by the principal investigator. Separate training sessions will be held for the two programs due to differences in program components. Both trainings will provide an overview of the five CASEL core SEL competencies, cover the main components and features of each program session, and review details and procedures for delivering the sessions. The trainings will also include opportunities for interventionists to practice conducting a mock program session to familiarize themselves with implementation procedures. The principal investigator will be available to provide additional training and support as necessary throughout the study upon request from interventionists. Additional training will also be provided to interventionists if inadequate implementation fidelity is found throughout the study.

Data Collection

After receiving written consent and assent, student demographic information will be collected from students' schools. The demographics form will be provided to schools electronically through Qualtrics. Data will be collected at two time points during this study: prior to the start of program implementation (baseline) and following completion of the program (post-intervention).

Baseline. Prior to the start of the study, students participating in all three groups (i.e., PA+SEL, SEL, and No SEL) will complete the SSIS SEL*b*-S to collect baseline data on level of social and emotional competence. The SSIS SEL*b*-S will be administered to all students electronically and scored through the assessment's online scoring software that generates the total SEL Composite score and separate scores for each of the five CASEL scales. All students will also complete the PROMIS PR-SF to collect baseline ratings of peer relationship quality, and the CRSES to collect baseline levels of global self-esteem. The PROMIS PR-SF will be administered electronically through Qualtrics and scored according to procedures outlined in the measure's technical manual. The CRSES will be administered electronically through Qualtrics and scored by summing the ratings for each item to yield a total self-esteem score.

Post-Intervention. Following completion of the study (10 weeks), all students will complete the SSIS SEL*b*-S to collect post-intervention data on level of social and emotional competence. The SSIS SEL*b*-S will be administered to students electronically and scored through the assessment's online scoring software. Students will also complete the PROMIS PR-SF to collect post-intervention data on perceptions of peer relationship

quality, and the CRSES to collect post-intervention data on students' global self-esteem ratings. The PROMIS PR-SF will be administered electronically through Qualtrics and scored according to procedures outlined in the measure's technical manual. The CRSES will be administered electronically through Qualtrics and scored by summing the ratings for each item to yield a total self-esteem score. Lastly, PA+SEL and SEL students will complete the social validity measure administered through Qualtrics to evaluate their acceptability and satisfaction with their respective programs.

Study Conditions

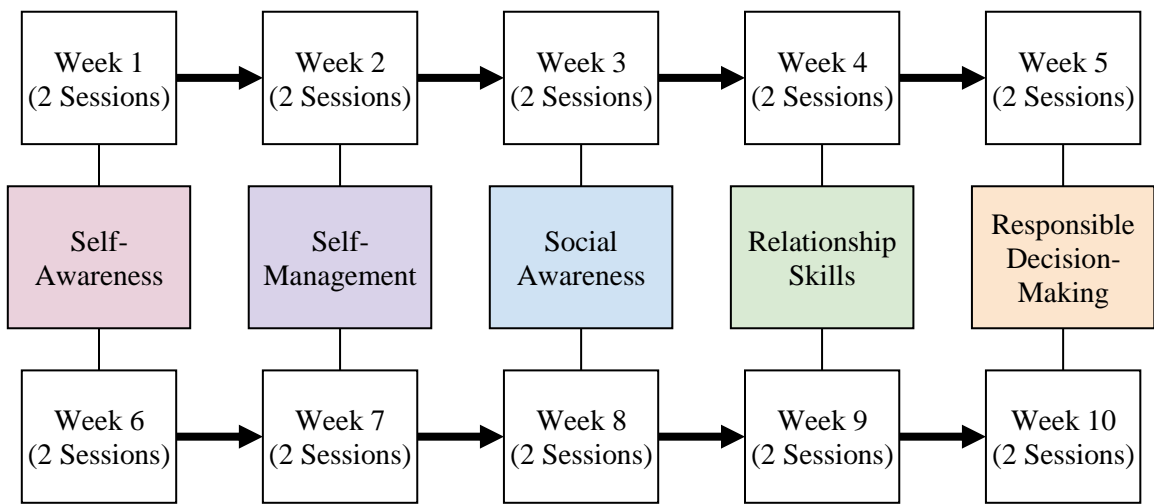
No Explicit SEL Support. The school in the No SEL condition will not receive any form of SEL programming for students. The principal investigator will ensure that the school is not currently implementing systematic, explicit instruction in the CASEL core competencies to establish a comparable group of students who are not receiving SEL programming.

Classroom SEL Program. The SEL condition will adhere to the CASEL framework when delivering discrete SEL lessons, which is consistent with traditional school-based SEL programming (Dusenbury et al., 2015). Each lesson will focus on core SEL skills aligned with the five CASEL competencies (i.e., self-awareness, self-management, social awareness, relationship skills, and responsible decision-making). The program will be implemented twice per week for 10 weeks (20 total sessions), with each of the five CASEL competencies covered for a total of two weeks (four sessions; see Figure 1). Program sessions will follow the order of the five CASEL competencies with one competency addressed each week for five weeks; this structure will then be repeated

for the remaining five weeks. Each session will be designed to be approximately 45 minutes, but can be flexibly adapted to the length of classes at participating school sites, as necessary.

Figure 1

Structure of the SEL and PA+SEL Programs



Program sessions will be delivered in the general education class setting by a trained outside interventionist. Instruction in SEL content will be delivered in a large group setting (i.e., whole class). Each session will include an awareness talk, lecture, and group meeting and reflection time. The awareness talk will introduce students to the SEL competency and associated skill(s) that are the focus of the session. Lecture will involve direct instruction and discussion of the competency and skills. The session will end with the group meeting and reflection in which the interventionist leads a discussion on how students can use the competency and skills they learned about in their lives.

Physical Activity-Based SEL Program. PA+SEL will be comprised of physically active SEL lessons adapted from a local youth sports and character development non-profit organization. The program adheres to the CASEL framework for SEL, which is considered the most widely accepted and ubiquitous SEL framework within research and practice (Frye et al., 2022; Ross & Tolan, 2018). Each lesson integrates core SEL skills that are aligned with the five CASEL competencies (i.e., self-awareness, self-management, social awareness, relationship skills, and responsible decision-making). The SEL skills and competencies are integrated into teachable moments and physically active games that students participate in, serving as an active form of learning for youth. This approach provides students with opportunities to practice the SEL skills they are being taught through engagement in physically active games and activities.

The program will be implemented twice per week for 10 weeks during physical education classes. This format ensures 20 total sessions, which allows for two weeks (four sessions) to be spent on topics associated with each one of the five CASEL competencies. Program sessions will follow the order of the five CASEL competencies with one competency addressed each week for five weeks; this structure will then be repeated for the remaining five weeks (see Figure 1).

Each session is designed to be approximately 45 minutes, but can be flexibly adapted to the length of physical education classes at participating school sites, as necessary. Program sessions will be delivered in the general education physical education class setting by a trained outside interventionist. Instruction in SEL content will be

delivered in a large group setting (i.e., whole class) with physically active games played in either a large group or small group (e.g., team) format depending on the activity.

Program sessions will follow a specific format aligned with a modified version of Hellison's (2003, 2011) TPSR pedagogical model. Incorporating elements from the well-established TPSR model has been proposed as an effective practice for teaching students SEL (Jacobs & Wright, 2014), as long as SEL concepts are intentionally addressed during instruction. Each session will include an awareness talk, physical activity, and a joint group meeting and reflection time. This modified TPSR session approach is similar to the lesson format implemented by Olive and colleagues (2020) in their investigation of an after-school physical activity-based social-emotional and character development program.

Sessions will begin with the awareness talk in which one of the five SEL competencies and associated skill(s) are identified as the focus of the session. The awareness talk provides students with explicit instruction in SEL skills and competencies. During the awareness talk, the interventionist will discuss the competency and skill with students and provide examples of how the skill can be used and what it looks like in practice. Next, students will participate in the physical activity portion of the session, which includes physically active games, activities, and experiences that are aligned with the session's SEL skill and allow students to practice the skill. Students will participate in one or more physical activities depending on the topic of the session and if time allows. After physical activity, each session will end with a group meeting and reflection time. This involves an interventionist-led discussion that reviews the session's SEL skill and

provides students with opportunities to share (either to the group or with a partner) how they or a peer used the SEL skill during the physical activity. Students will also be prompted to think about what they did well and what they could have improved upon regarding their use of the skill during the physical activity. Lastly, the interventionist will discuss and prompt students to think about how they can use the SEL skill and competency in other areas of their lives. Following this session format will provide students with systematic SEL instruction that incorporates active forms of learning and opportunities for practice, while also encouraging self-reflection to internalize the concepts and promote the transfer of these skills to other areas of their lives.

Analytic Plan

Demographic Information

Descriptive statistics will be calculated for demographic information. While equivalence across study conditions will be emphasized, descriptive statistics will be used to evaluate demographic similarities between groups. A Chi Square test of independence will be used to examine group independence across the three groups.

Differences in Social and Emotional Competence

The first research question investigates whether level of social and emotional competence differs between PA+SEL students, SEL students, and No SEL students, after controlling for baseline levels of social and emotional competence. A one-way analysis of covariance (ANCOVA) will be conducted to answer this question. An ANCOVA is an analytic technique used to investigate the relationship between one or more categorical independent variables and a continuous dependent variable while accounting for one or

more covariate factors (Huitema, 2011). The one-way ANCOVA includes one independent variable with two or more groups (levels), one dependent variable, and one or more covariates. An ANCOVA can be used to evaluate treatment effects on a post-intervention outcome while controlling for baseline (or pre-intervention) scores (Oakes & Feldman, 2001).

The ANCOVA for this research question will include the three groups (i.e., PA+SEL, SEL, and No SEL) as the independent variable, students' baseline scores on the SSIS SEL*b*-S as the covariate, and students' post-intervention scores on the SSIS SEL*b*-S as the dependent variable. According to an a priori power analysis conducted using the G*Power statistical program (Faul et al., 2007), the recommended total sample size was calculated to be 158 to achieve an acceptable power level of 0.80 with an alpha error probability of 0.05 and to determine a medium Cohen's *f* effect size of 0.25 (Cohen, 1988). Thus, the intended recruitment of a sample of 159 students (i.e., 53 per group) is adequate to conduct this evaluation.

There are several assumptions associated with an ANCOVA, including independence of errors, normality, homogeneity of variance, linearity, independence of the covariate and independent variable, reliability of the covariate, homogeneity of regression slopes, and absence of outliers (Lomax, 2007). In an ANCOVA, independence of errors assumes that the observations in each group are independent. This assumption is typically met as a result of randomly assigning participants to treatment groups (Huitema, 2011). However, ANCOVAs are also commonly utilized in quasi-experimental studies in which random assignment of participants does not or is unable to take place (Gall et al.,

1996; McMillan & Schumacher, 1989; Newsom, 2023). Particularly within applied research settings, including education and the social and behavioral sciences, random assignment poses a significant challenge or is altogether impractical (Reichardt, 2019). In such cases, ANCOVA is still considered useful and appropriate within educational research in which multiple non-randomized groups are being compared on a particular outcome (Crowl, 1993; Gall et al., 1996). Despite a lack of random assignment, use of ANCOVA is also still supported considering other methods for analyzing this type of data are similarly susceptible to dependent error effects (Stevens, 1992). Thus, ANCOVA is considered the best fit to analyze data from the proposed study. A plot of the residuals for a random pattern will be used to visually evaluate independence (Huitema, 2011). An intraclass correlation coefficient, a measure of dependency, will be computed to support the visual inspection of independence.

Normality assumes that the means are normally distributed within each group (Lomax, 2007). Constructing and visually inspecting a Q-Q plot, which plots the standardized residual values against theoretical quantiles from a normal distribution, will be used to evaluate normality. A Shapiro-Wilk test will be conducted to follow up a Q-Q plot and statistically assess for normality. Homogeneity of variance is an assumption that states that the variance between the different groups should be equal. This assumption will be evaluated by visually inspecting a residuals versus fitted values plot for data that is equally spread for each of the different groups, suggesting that homogeneity of variance has been met. A Levene's test will then be conducted to statistically assess for homogeneity of variance. Linearity assumes there is a linear relationship between the

covariate and the dependent variable. Linearity will be evaluated by using a bivariate scatterplot. Independence of the covariate and independent variable is an assumption that is also known as the absence of multicollinearity. This ANCOVA assumption states that the covariate and independent variable are not highly correlated. Variance Inflation Factor (VIF) values will be examined to check for multicollinearity. A VIF value of 1 suggests the absence of multicollinearity, a VIF value between 1 and 5 indicates that the covariate and independent variable are moderately correlated, and a VIF value between 5 and 10 indicates a high correlation between the variables (Shrestha, 2020). Reliability of the covariate assumes consistency of the covariate and that the covariate is measured without error (Lomax, 2007). Utilizing the same assessment across groups to measure the covariate will ensure this consistency. Homogeneity of regression slopes is an assumption that states that the regression slopes associated with each treatment group should be similar. This assumption will be evaluated by assessing for an interaction between the covariate and the independent variable. A significant interaction would be indicative of a violation of the homogeneity of regression slopes assumption. The final ANCOVA assumption is the absence of outliers, which states that the data should be free of outliers. The data will be checked for outliers by using the standardized residual values. Any standardized residual value that is greater than +3 or less than -3 may be considered an outlier. To visually check for outliers, a plot of the standardized residual values for each group will be created.

The analysis will be conducted using SPSS Version 28.0. The ANCOVA assumptions will be assessed before proceeding with the analysis. Results from the

ANCOVA will indicate whether there are any statistically significant differences in mean post-intervention social and emotional competence for the three groups after adjusting for baseline levels of social and emotional competence. If a significant difference between any of the adjusted means for the three groups is found, as indicated by a significant between-subjects p-value (less than .05), post hoc tests will be conducted to determine which group means are statistically significantly different (Field, 2000).

Differences in Quality of Peer Relationships

The second research question asks if there are differences in ratings of peer relationship quality between PA+SEL students, SEL students, and No SEL students, after controlling for baseline levels of peer relationship quality. A one-way ANCOVA with the three groups (i.e., PA+SEL, SEL, and No SEL) as the independent variable, students' baseline scores on the PROMIS PR-SF as the covariate, and students' post-intervention scores on the PROMIS PR-SF as the dependent variable will be conducted using SPSS Version 28.0 to answer this research question. Based on an a priori power analysis conducted using the G*Power statistical program (Faul et al., 2007), the recommended total sample size was calculated to be 158 to achieve an acceptable power level of 0.80 with an alpha error probability of 0.05 and to determine a medium Cohen's *f* effect size of 0.25 (Cohen, 1988). This sample size will ideally be met by the planned recruitment of 159 students (i.e., 53 per group). The ANCOVA assumptions of independence of errors, normality, homogeneity of variance, linearity, independence of the covariate and independent variable, reliability of the covariate, homogeneity of regression slopes, and absence of outliers (Lomax, 2007) will be tested using the procedures outlined in the

above section. ANCOVA results will indicate whether there are any statistically significant differences in mean post-intervention ratings of peer relationship quality for the three groups after adjusting for baseline levels of peer relationship quality. If a significant difference between any of the adjusted means for the three groups is found, post hoc tests will be conducted to determine which group means are statistically significantly different (Field, 2000).

Differences in Level of Self-Esteem

The third research question examines whether the level of self-esteem differs between PA+SEL students, SEL students, and No SEL students, after controlling for baseline levels of self-esteem. A one-way ANCOVA with the three groups (i.e., PA+SEL, SEL, and No SEL) as the independent variable, students' baseline scores on the CRSES as the covariate, and students' post-intervention scores on the CRSES as the dependent variable will be conducted using SPSS Version 28.0 to answer this research question. The a priori power analysis conducted using G*Power (Faul et al., 2007) calculated a recommended total sample size of 158 to achieve an acceptable power level of 0.80 with an alpha error probability of 0.05 and to determine a medium Cohen's f effect size of 0.25 (Cohen, 1988). This sample size will ideally be met by the planned recruitment of 159 students (i.e., 53 per group). The ANCOVA assumptions of independence of errors, normality, homogeneity of variance, linearity, independence of the covariate and independent variable, reliability of the covariate, homogeneity of regression slopes, and absence of outliers (Lomax, 2007) will be tested using the procedures outlined previously. ANCOVA results will indicate whether there are any

statistically significant differences in mean post-intervention levels of self-esteem for the three groups after adjusting for baseline levels of self-esteem. If a significant difference between any of the adjusted means for the three groups is found, post hoc tests will be conducted to determine which group means are statistically significantly different (Field, 2000).

Based on the presence of multiple dependent variables, a multivariate analysis of covariance (MANCOVA) was considered as an analytic approach to answering the three research questions. However, to eliminate the influence of unrelated covariates (i.e., baseline scores) on some dependent variables, a separate ANCOVA for each of the three research questions appeared more appropriate considering the interest in multiple univariate results (Tinsley & Brown, 2000). For example, the inclusion of baseline self-esteem scores as a covariate in the model testing between group differences in relationship quality posttest scores would be unnecessary and problematic, as it would make the model unnecessarily complex. Including too many or unnecessary covariates restricts the ability to observe variance and the ability to appropriately attribute differences in outcomes to the independent variables included and decreases statistical power (Statistics Solutions, 2023). Separate ANCOVA analyses address concerns related to potential pre-post score correlations and limit the influence of extraneous covariates (i.e., baseline scores on all measures) on a single outcome.

Social Validity

Students will rate the social validity and acceptability of the PA+SEL and SEL programs. Scores on the social validity measure will be calculated per item as the

percentage of students who selected each Likert scale response option for each item. For example, on the item “I am likely to use the skills that were taught,” the percentage of students who selected each Likert scale response option (i.e., *strongly agree*, *agree*, *somewhat agree*, *somewhat disagree*, *disagree*, and *strongly disagree*) will be calculated. Item ratings for the 8 social validity items answered by students in both groups (i.e., PA+SEL and SEL) will also be summed to generate total acceptability scores. These scores will then be used to calculate mean total acceptability scores for each group. A paired samples t-test will be conducted comparing mean acceptability scores between the PA+SEL group and the SEL group to determine if acceptability significantly differs between the two groups.

Anticipated Findings

Differences in Social and Emotional Competence

The goal of the first research question is to evaluate whether level of social and emotional competence differs between PA+SEL students, SEL students, and No SEL students, after controlling for baseline levels of social and emotional competence. After conducting the one-way ANCOVA, it is expected that there will be a significant difference in mean post-intervention social and emotional competence scores for at least one group after adjusting for baseline levels of social and emotional competence. Subsequent post hoc analyses are expected to reveal that adjusted mean post-intervention social and emotional competence scores for PA+SEL students will be significantly different than adjusted mean scores for SEL students, and No SEL students.

Differences in Quality of Peer Relationships

The second research question investigates whether there are differences in ratings of peer relationship quality between PA+SEL students, SEL students, and No SEL students, after controlling for baseline levels of peer relationship quality. Results generated from the one-way ANCOVA are expected to indicate that there will be a significant difference in mean post-intervention ratings of peer relationship quality for at least one group after adjusting for baseline peer relationship quality ratings. Post hoc tests after the ANCOVA are expected to indicate that adjusted mean ratings of peer relationship quality for PA+SEL students will be significantly different than adjusted mean scores for SEL students, and No SEL students.

Differences in Level of Self-Esteem

The third research question evaluates whether level of self-esteem differs between PA+SEL students, SEL students, and No SEL students, after controlling for baseline levels of self-esteem. After running the one-way ANCOVA, it is expected that there will be a significant difference in mean post-intervention levels of self-esteem for at least one group after adjusting for baseline levels of self-esteem. Post hoc analyses are expected to demonstrate that adjusted mean post-intervention levels of self-esteem for PA+SEL students will be significantly different than adjusted mean scores for SEL students, and No SEL students.

Potential Implications

Findings from this study will contribute to the literature base supporting implementation of SEL programming in schools. Despite their importance, social and

affective outcomes have been primarily disregarded within school-based physical activity contexts. Currently, school-based physical activity has fallen behind other content areas relative to implementing practices aimed at promoting social and emotional competence. Thus, this study will serve as a preliminary evaluation of programming aligned with an established SEL framework that utilizes physical activity as a method to teach SEL within the school setting. Furthermore, this study will compare the PA+SEL approach with a form of traditional school-based SEL programming to investigate whether combining SEL with physical activity is more effective for social and emotional competence development and related outcomes. Thus, results from this study may support the inclusion of SEL concepts within school-based physical activity, providing educators with an alternative method of SEL instruction in schools.

This approach can provide a form of differentiated instruction for students who may not respond favorably to traditional school-based SEL practices. Additionally, combining these practices has the potential to expand or amplify positive social-emotional and related outcomes for students. Further, implementing PA+SEL within the school setting may provide social and emotional support to a greater number of students than out-of-school time programming, which is currently the primary context for PA+SEL. Evidence in favor of the inclusion of explicit SEL instruction within school-based physical activity contexts may also offer schools an additional approach to facilitating social and emotional support within a multi-tiered system of support framework. PA+SEL could be implemented at the universal level for all students through their physical education classes and as targeted and intensive intervention for students

who need additional social and emotional support. Findings from this study may also offer support for developing SEL education standards that can be addressed through physical education. Altogether, combining SEL with physical activity in the school setting may be a positive addition to the holistic education approach to provide students with a well-rounded educational experience.

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