Evaluating the Impact of School-Based Social Emotional Learning Programs: A Systematic Review and Meta-Analysis

by

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DISSERTATION ABSTRACT

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Doctor of Philosophy in Counseling Psychology

Title: Evaluating the Impact of School-Based Social Emotional Learning Programs: A Systematic Review and Meta-Analysis

Early adolescence is characterized by significant social, physical, and cognitive changes that increase emotional reactivity and interpersonal stress, necessitating well-developed social and emotional skills to facilitate adjustment and prevent negative health consequences. Given the established connection between social emotional skills and adolescent wellbeing, along with rising prevalence of social emotional problems in schools, implementation of SEL programs has increased significantly. To understand the current state of research regarding school-based SEL programming for middle school students, a systematic review and meta-analysis were conducted that synthesized evidence on specific SEL skills taught across CASEL's five core domains, transformative SEL elements present, and the effects of SEL programs on mental health and school functioning outcomes. A secondary aim of this meta-analysis was to examine SEL program implementation level, setting, and transformative SEL elements as moderators for the effectiveness of SEL programming on mental health and school functioning outcomes. Results from 17 studies revealed that school-based SEL programming for early adolescents demonstrate modest but reliable positive effects on certain outcomes, specifically reductions in internalizing and PTSD symptoms and improvements in academic achievement and disciplinary behavior. However, program impacts on substance use behaviors and truancy show considerable variability across studies. Furthermore, moderator analyses for SEL program implementation level, setting, and transformative SEL elements were unable to be conducted due to the limited number of studies

included in each meta-analysis. Results from the current meta-analysis must be considered with caution as there were significant methodological concerns of the included studies. Although this meta-analysis reveals an overall positive effect for select mental health and school functioning outcomes, the low methodological quality of the current available evidence limits the ability to draw conclusions from the synthesis. To inform evidence-based practices, policymakers, researchers, and educational decision-makers require additional rigorous research alongside more robust support systems and clearer guidance to navigate the complex landscape of SEL programming and select interventions most appropriate for their specific student populations and targeted outcomes.

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CHAPTER 1

INTRODUCTION

The Problem, Condition, or Issue

Across the period of early adolescence significant social, physical, and cognitive changes occur that can lead to heightened emotional reactivity and increased interpersonal stress, subsequently necessitating the need for well adapted social and emotional skills to facilitate adjustment (Grant et al., 2006; Gross, 2014) and avoid long term negative health consequences (e.g., mental health disorders, unplanned pregnancy, or substance use disorders, etc.; Brown et al., 2013; Young et al., 2019). Social and emotional skills encompass a range of abilities related to understanding and managing emotions, building positive relationships, demonstrating empathy, making responsible decisions, and effectively handling challenging situations (Collaborative for Academic, Social, and Emotional Learning [CASEL], N.d.-a). Prior research highlights the influence of social and emotional skills on early adoelscent mental health and school functioning. As early adolescents encounter difficulties in navigating the demands and pressures of adolescence, emotion management challenges have been associated with the development of mental health problems (e.g., internalizing and externalizing problems; Delhaye et al., 2013; Durlak et al., 2011; Segrin, 2000). Moreover, deficits in social skills have been associated with challenges in effective communication, leading to difficulties in conflict resolution and the establishment and maintenance of positive relationships with peers and teachers (Chow et al., 2013; Walker & Graham, 2021). This, in turn, may heighten the risk of social isolation and it's associated mental health implications (Matthews et al., 2015). Additionally, underdeveloped social and emotional skills have implications for school functioning. Lack of social and emotional skills can be associated with emotion dysregulation,

potentially leading to greater difficulty coping with academic stress and performing well on academic tasks (Saklofske et al., 2012). Moreover, students with greater effectiveness in managing their emotions tend to have more positive social relationships (Eryılmaz, 2012). As a result, better social skills may contribute to the establishment of a stronger social network within the classroom. This fosters a supportive social environment characterized by positive peer and teacher relationships, potentially facilitating better cooperative work, group learning, and greater support from classmates (Hogan et al., 2010). Indeed, research has demonstrated that underdeveloped social and emotional skills have been associated with sub-optimal academic performance (e.g., lower grades), truancy, and academic disengagement, and an increase in behavioral problems (e.g., classroom disruption, interpersonal conflict with peers; Ahmed et al., 2015; Durlak et al., 2011; Ernst, 2014; Farrington et al., 2012; Hall & DiPerna, 2017; Thayer et al., 2019; Woodward & Fergusson, 2000). Fortunately, prior research highlights the influence of social emotional learning (SEL) on improving early adolescent mental health and school functioning (e.g., truancy, academic performance; Durlak et al., 2022). Given the ample evidence connecting social emotional skills to early adolescents' well-being and learning outcomes and a noticeable rise in the prevalence of early adolescents' social emotional problems in schools, there has been an increase in the promotion and implementation of SEL programs in school settings (Jagers et al., 2019)

The Application of Theory to SEL Program Development

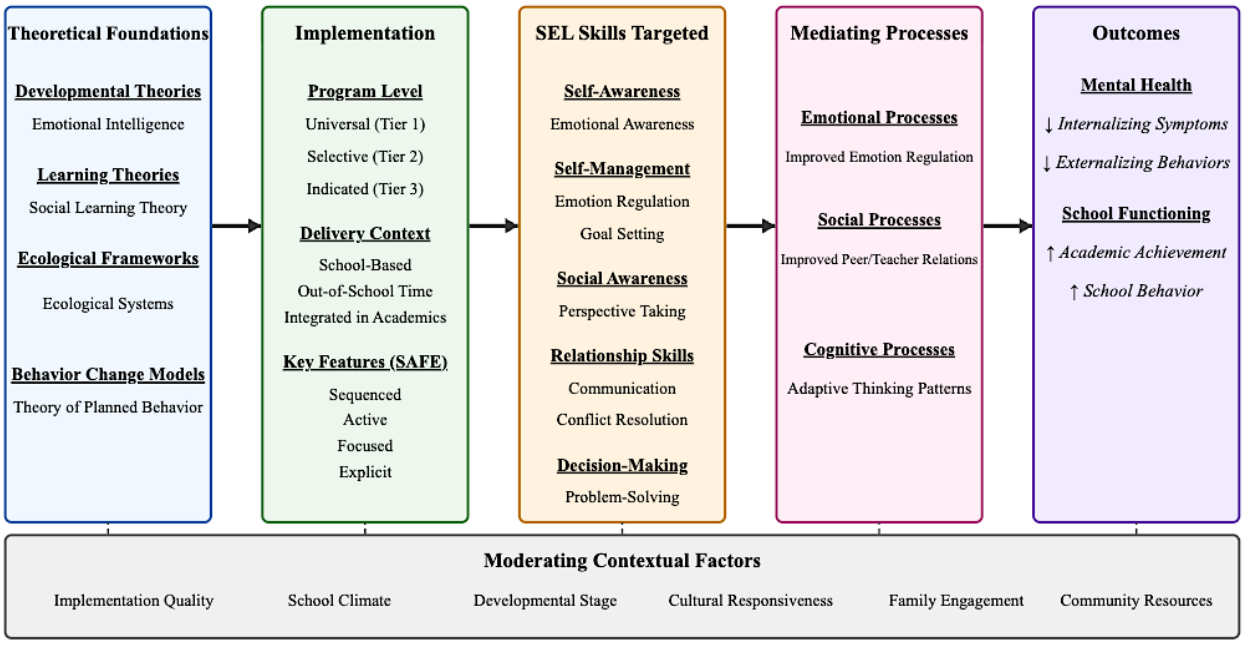
The origins of SEL programs can be traced back to the educational reforms of the 1960s when researchers and educators began to recognize the importance of social and emotional development among youth, particularly those who had been historically marginalized within the educational system (i.e., Black, Indigenous, and people of color [BIPOC] and those who

experience poverty; Beaty, 2018; Frankenberg & Taylor, 2015). SEL programs target social skills (e.g., developing meaningful relationships and resolving conflict, engaging in self-reflections; hereafter termed "social competence") and emotional skills (e.g., emotion management; hereafter termed "emotional competence"; Payton et al., 2008; Weissberg et al., 2015) through an emphasis on building a core set of emotion management and relationship skills (Weissberg et al., 2015). Common theories informing SEL programming include models of emotional intelligence (Goleman, 1996; Salovey & Mayer, 1990) emotional consciousness (Damasio & Carvalho, 2013), ecological systems (Bronfenbrenner & Morris, 1998; Tseng & Seidman, 2007), social learning theory (Bandura et al., 1977), and theories of behavioral change (Ajzen, 1998; Catalano & Hawkins, 1996). These theories emphasize the significance of cognitive abilities, emotional awareness, social skills, and the impact of environmental factors on student development (Kanesan & Fauzan, 2019). SEL programs often integrate teachings from these theories into the academic curriculum, providing opportunities for adult collaborators (e.g., school leaders, teachers, staff) to acquire and apply these skills in their daily interactions. Moreover, theories like social learning theory inform the design of SEL programs, highlighting the importance of social interactions and adult role modeling in social instruction of emotional skills that subsequently shape students' positive social behaviors within the school context (Elias et al., 2003). Moreover, theories of behavior change (e.g., social development theory, social cognitive theory, theory of planned behavior; Ajzen, 1998; Bandura et al., 1977; Catalano & Hawkins, 1996) inform decisions about who delivers SEL content, where SEL content is implemented (e.g., classrooms), and how SEL content is presented (e.g., activities students engage in for skill acquisition). In sum, a diverse range of theories have significantly contributed to the evolution of school-based SEL programming, collectively emphasizing the importance of

emotional awareness, ecological influences, and social interactions in fostering successful interpersonal and goal-oriented outcomes among students (see Figure 1).

Figure 1

Logic model of SEL programs on student outcomes



In tandem with programmatic evolution spanning several decades, SEL programming implemented in the school context gained prominence through initiatives like the Collaborative for Academic, Social, and Emotional Learning (CASEL; Beaty, 2018; CASEL, N.d.-b). In 1997, CASEL and collaborators further defined SEL by providing a set of social and emotional skills that translate into key social and emotional learning competencies (Beaty, 2018). These SEL competencies have been grouped into five standardized domains: self-awareness (identifying one's thoughts and feelings and how they influence one's behavior), self-management (managing how one experiences and expresses their emotions across varying contexts), social awareness (understanding the needs and feelings of others and how that influences one's behavior), relationship skills (communication and negotiation skills to establish and maintain supportive

relationships), and responsible decision-making (generating, implementing, and evaluating one's response to environmental and internal stimuli while recognizing the consequences of personal decisions and behaviors [see Figure 2]; CASEL, n.d.-a). These set of competencies serve as a guide for SEL program development and implementation and can help inform the selection of evidence-based SEL programs (CASEL, n.d.-a.; Weissberg et al., 2015).

Figure 2

CASEL social emotional learning framework (CASEL, N.d.-a)



School-Based SEL Programs

Considering the broad spectrum of theories that shape SEL programming, SEL programs vary in terms of their scope, implementation, and structure into a school-based settings. The majority of school-based SEL programs (i.e., programs that are implemented during regular school hours) are considered universal (i.e., refers to approaches designed for an entire population without regard to individual risk factors) as compared to selective (i.e., when

strategies are targeted to one or more moderators of a population determined to be at risk for a particular problem such as behavioral problems) and indicated (i.e., when programs are aimed at individuals already engaged in a certain a behavior such as truancy or anti-social behavior; Durlak et al., 2011). Implementation of universal school-based SEL programs tend to occur at the classroom and school level (Weissberg et al., 2015). At the classroom level, universal SEL typically includes supporting teachers' pedagogy and instructional quality or incorporating SEL curricula to build and reinforce students' social and emotional competencies (e.g., modeling social and emotional skills, providing support to apply skills in various situations; Weissberg et al., 2015). Whereas school level SEL strategies focus on improving school climate (e.g., targeting norms, values, and expectations of school personnel and students and by school personnel modeling social and emotional skills in settings outside of the classroom such as the hallways or cafeteria; Durlak et al., 2011; Weissberg et al., 2015). Selective SEL are more targeted in their approach and can be implemented in the school classroom (e.g., focus on increasing positive reinforcement for particular students) or outside of the classroom (e.g., provide small group support for students in need of focused skill instruction), and may involve more frequent instruction to reinforce students' social and emotional competencies (Greenberg & Abenavoli, 2017). Similarly, indicated SEL programs incorporate single intervention components (e.g., small groups focused on specific social and emotional skills); however, these programs are considered more intensive (e.g., higher dosage of intervention) compared to universal and selective SEL programs (Payton et al., 2008).

Prior Reviews of School-Based SEL Programs

Prior meta-analyses have confirmed that school-based SEL programs generally yield positive outcomes for Kindergarten through 12th grade students. For example, in their meta-

analysis, Durlak et al. (2011) included 213 studies of primary and secondary universal SEL programs and found a moderate significant positive effect on students' social and emotional skills; and a small significant positive effect on students' attitudes, prosocial behavior, conduct problems, academic achievement, and internalizing mental health problems (e.g., anxiety, depression, stress). They further assessed whether program effects were moderated by intervention features and found those that met SAFE criteria (i.e., sequenced, active, focused, and explicit forms of teaching social and emotional competencies) had significant small to moderate effects across all six outcomes compared to programs that lacked all four components of SAFE practices which had small significant positive effects across three of the six outcomes (i.e., attitudes, conduct problems, and academic performance; Durlak et al., 2011). Additionally, a meta-analysis by Sklad et al. (2012) showed a large significant positive effect on students' social and emotional skills; a moderate positive effect on students' antisocial behavior, academic achievement, and positive self-image; and a small positive effect on students' substance use and internalizing mental health problems (e.g., depression, anxiety, stress) across 75 studies inclusive of primary and secondary universal SEL programs. Sklad et al. (2012) further explored the moderating effects of program features on social skills and antisocial behavior. Notably, there were no reported significant differences between programs specifically targeting students' social skills and antisocial behaviors (e.g., teaching specific skills such as refusal skills related to violence) compared to more general programs (e.g., social skills are more derived from a broad teaching of social and emotional skills or from a positive self-concept). Furthermore, in their meta-analysis, Taylor et al. (2017) reported on long-term follow-up outcomes (i.e., six months or more postintervention) from studies identified in (Durlak et al. (2011). Taylor et al. (2017) demonstrated that SEL programs had small significant long-term effects on students social and

emotional skills, attitudes, academic achievement, substance use, and internalizing mental health problems (e.g., depression, anxiety, stress) across 82 studies inclusive of primary and secondary universal SEL programs. Notably, no significant effects were found for positive social behaviors or conduct problems (Taylor et al., 2017). In their systematic review of 40 studies that exclusively focused on the adolescent developmental period (i.e., ages 11 through 19), van de Sande et al. (2019) reported that students participating in secondary SEL programming exhibited significant small to moderate positive effects on social and emotional competencies and small significant positive effects on psychosocial health (i.e., depression, anxiety, substance use, and aggression). Lastly, in their meta-analysis of 424 studies, Cipriano et al. (2023) found that among Kindergarten through 12th grade students who participated in primary and secondary SEL programs demonstrated small significant immediate improvement on students' social and emotional competences, attitudes, prosocial behaviors, school climate and safety, peer relationships, school functioning, externalizing behaviors, internalizing mental health problems, and academic achievement. Long term follow-up effects (i.e., six months or more postintervention) remained significant and yielded a small to moderate effects in favor of the SEL intervention condition on student outcomes such as social and emotional competencies, attitudes, peer relationships, externalizing behaviors, and internalizing mental health problems. Additionally, Cipriano et al. (2023) assessed which specific content or content combinations yield the best outcomes and found that: (a) programs that met SAFE criteria had a small significant positive effect on students' social and emotional competencies and externalizing behaviors; (b) programs that taught intrapersonal skills prior to interpersonal skills had a large significant positive effect on school climate; and, (c) found no significant differences between programs integrated into academic curriculum than those that were not on student outcomes.

Moreover, most of these meta-analyses examined age as a moderator, with some studies suggesting that younger students tend to derive greater benefits from SEL programming compared to older students (Durlak et al., 2011; Taylor et al., 2017). Interestingly, van de Sande et al. (2019) and Cipriano et al. (2023) found no significant moderation effect. However, meta-analyses often categorize early adolescents into broad groups (e.g., elementary versus middle school students) and report on the contrasts between said groups, potentially reducing the within-group heterogeneity on student outcomes. Thus, it may be more illuminating to report outcomes separately for distinct age groups.

In summary, there are some discrepancies in reported effect sizes and moderators (i.e., age) on student outcomes across meta-analyses, likely stemming from variations in inclusion and exclusion criteria used by research teams (e.g., criteria based on different student outcomes or temporal and developmental periods; Rosen et al., 2022). Additionally, the samples and characteristics of SEL programs being evaluated and how study variables are operationalized may have impacted the magnitude of reported outcomes across these reviews (Rosen et al., 2022). Despite these variations, overall, prior meta-analyses have consistently demonstrated the effectiveness of school-based universal SEL programs on primary and secondary students' SEL abilities and key outcomes such as mental health and school functioning.

Out-of-School Time SEL Programs

Additionally, prior meta-analyses excluded SEL programs implemented outside of regular school hours, referred to as out-of-school time (OST). These SEL programs provide opportunities for students to engage in social and emotional skill-building activities, which contribute to their overall well-being and academic achievement. Findings from prior meta-analyses exploring the efficacy of OST programs on student outcomes are mixed. For example,

in their meta-analysis of primary and secondary OST programs, Kremer et al. (2015) found non-significant effects of OST programs on attendance, academic achievement, and externalizing behaviors, whereas other meta-analyses of primary and secondary OST programs found small significant positive effects of OST across various student outcomes (e.g., academic achievement, problem behaviors; Durlak et al., 2010; Lauer et al., 2006). However, the inclusion of OST studies in these reviews include SEL and non-SEL programs that were delivered at various sites (e.g., school campuses, community settings). Therefore, a focused analysis of OST SEL programs tailored for implementation within the school setting could offer valuable insights for schools in SEL programming decisions. It is plausible that OST SEL programs at school sites can leverage existing resources, enhance student accessibility, and ensure alignment between academic and SEL components. Overall, the efficacy of OST SEL programming, particularly when implemented within or outside school settings, remains uncertain.

Transformative SEL Elements

While many school-based SEL programs aim to promote social and emotional competencies, educational disparities among historically marginalized students remain significant (Hecht & Shin, 2015; Jagers et al., 2019). In addition, there have been notable discrepancies between social and emotional competencies among these groups of students, with larger gaps observed during early adolescence (i.e., middle school). For example, West et al. (2020) found that students from economically disadvantaged backgrounds reported significantly lower SEL competencies (i.e., social awareness, self-management, self-efficacy domains) from 4th through 12th grade compared to their economically advantaged counterparts. Additionally, Black and Latine students reported significantly lower skill levels in the self-management and social awareness domains compared to White and Asian students. Of note, a noticeable decline

in self-management and social awareness between 6th through 8th grade was observed for all students, regardless of economic or race/ethnicity status (West et al., 2020). These disparities have prompted critiques about whether SEL practices and programs implemented in school settings reflect, cultivate, and promote the well-being of students from diverse or historically marginalized backgrounds (Castro-Olivo, 2014; Hough et al., 2018). Critics have highlighted that traditional SEL programs in the United States tend to be rooted in and perpetuate social and emotional norms and expectations of middle-class Whiteness and are grounded in deficit theory (El Mallah, 2022; Forman et al., 2022; Hoffman, 2009). Thus, prevailing models of SEL promote context-neutral practices that do not account for the unique experiences and barriers faced by students from diverse backgrounds (El Mallah, 2022).

Studies have demonstrated that experiences with discrimination based on identity (e.g., race/ethnicity, socioeconomic status) can make it more challenging for students to engage in learning and navigate social situations often resulting in negative consequences such as a decline in mental health and school functioning (Benner et al., 2018; Gaylord-Harden et al., 2011; Gonzalez et al., 2014; Hill, 2022; Polanin & Vera, 2013; Vera, 2023). Moreover, because interpretation of SEL competencies can vary by culture, BIPOC students may have to balance adhering to school cultural norms while also upholding their home value systems, which may not always be congruent with SEL initiatives (Hecht & Shin, 2015; Hill & Torres, 2010). For example, for SEL domains such as self-awareness and self-management, students from individualistic cultures may focus on their personal emotions as behavior drivers; whereas, students from collectivist cultures focus on others' emotional states, linking decision making to interpersonal contexts (Hecht & Shin, 2015). The individualistic-collectivist distinction also applies to the processes involved in social awareness. For example, a collectivist culture may

promote more social awareness (e.g., people tend to describe emotional situations from the perspective of those around them) relative to those from a more individualistic culture (e.g., people tend to describe emotional situations from their own perspective; Hecht & Shin, 2015). It is important to note that social structure can also shape these dynamics and the attainment of social awareness skills between students from the dominant culture and those who are marginalized, with marginalized students often exhibiting stronger perspective-taking skills because they must accommodate more powerful people (e.g., school personnel; Hecht & Shin, 2015). Furthermore, cultural influences extend to relationship skills, impacting, how individuals may consider others' feelings. For example, those from a more collectivist culture may structure interactions to evade conflicts to avoid embarrassment, whereas individuals from a more individualistic culture may place less emphasis on this aspect (Hecht & Shin, 2015). Lastly, individualistic and collectivist cultures adopt distinct decision-making processes; people from a more individualistic culture may prioritize autonomy in their decision-making process, while those from a more collectivist culture may lean towards decisions influenced by the interests of their primary social network (Hecht & Shin, 2015). Considering these differences, it's important to consider the potential outcomes for students striving to conform to cultural norms that may differ between their school and home environments. For example, individuals whose emotional expression and behaviors that align with their culture's norms tend to report lower levels of depression and higher satisfaction in relationships compared to those whose displays do not align with their cultural norms (Matsumoto et al., 2008).

Additionally, BIPOC students residing in less diverse communities may experience assimilation pressure (e.g., ethnic identity/heritage suppression) which can hinder their positive adaptation (Dimitrova et al., 2015). The pressure to assimilate can impede their capacity to

uptake SEL competencies that respect and honor their cultural norms and values (Vera, 2023). Thus, without contextual and cultural considerations SEL initiatives may unintentionally harm students by perpetuating behavior management frameworks that may not resonate with historically marginalized students and reproduce or exacerbate existing and harmful educational inequities among these students (Hecht & Shin, 2015; Jagers et al., 2019).

Prior meta-analyses have attempted to explore the efficacy of SEL programs across varying racial/ethnic and socioeconomic groups, however, no differential academic outcomes were found based on race or ethnicity (Cramer & Castro-Olivo, 2016; Taylor et al., 2017) or socio-economic status (Corcoran et al., 2018). Although initially promising, it's important to exercise caution regarding the absence of significant moderation by student race/ethnicity or socioeconomic status. For instance, this lack of differentiation may stem from how studies operationalize student demographic characteristics, such as race/ethnicity and socioeconomic status, within meta-analyses (Rowe & Trickett, 2018). The current broad operationalization of these race/ethnicity (e.g., Latine versus White) and socioeconomic status (e.g., low versus high) might diminish within-group heterogeneity, thus impacting the magnitude of reported outcomes and limiting our ability to discern meaningful findings (Rowe & Trickett, 2018). Lastly, even if historically marginalized students achieve comparable gains through SEL programming, it does not ensure that the content adequately addresses the distinct social and emotional experiences of these students. For example, evaluation research on a universal school-based drug prevention SEL program (i.e., Keepin' It REAL) that included multicultural curriculum incorporating cultures of three cultural groups (i.e., Mexican American, White, and African-American culture) was found to be more effective overall in reducing students' substance use compared to alternative versions that integrated less cultural perspectives (i.e., Mexican American culture

only and White and African American cultures only; Hecht et al., 2006). While further research is needed to directly assess the impact of multiculturalism on student outcomes, this evidence highlights the potential benefits of integrating content that accurately captures diverse social and emotional experiences, potentially leading to more effective results for all students. Hence, for SEL interventions to resonate with historically marginalized students, they must acknowledge and account for these cultural nuances.

More recently, there have been movements to improve existing SEL programs by including content that explicitly addresses power, privilege, discrimination, social justice, and empowerment (i.e., transformative SEL; Jagers et al., 2019). Transformative SEL introduces culturally responsive pedagogy, acknowledges systemic inequities, and empowers students to navigate social complexities (e.g., providing opportunities for early adolescents to practice curiosity by teaching and learning from one another [see Appendix B for definitions and examples of transformative SEL elements]; Jagers et al., 2019). This emphasis on transformative SEL is vital as it ensures that interventions not only enhance social and emotional competencies but also address the systemic barriers and challenges that historically marginalized students face. Thus, the incorporation of these elements into school-based SEL programs aims to build upon current social and emotional competencies (e.g., promoting self-reflection of one's own biases, agency, collective problem solving) that are relevant for both historically marginalized students and other students across racial/ethnic and social class groups (e.g., middle class White students). Although the integration of transformative SEL components is expected to improve students' mental health and school functioning, a meta-analysis confirming its efficacy has not yet been conducted.

Why it is Important to do this Review

While evidence supports the positive effects of universal school-based SEL programs on student outcomes across primary and secondary school students, significant gaps persist. Notably, these reviews exclude selective and indicated school-based SEL programs that are typically designed for students who demonstrate risk for or have been identified to have behavioral, emotional, or academic challenges. Furthermore, there is a lack of meta-analyses investigating the efficacy of selected or indicated school-based SEL programming specifically among early adolescents. Prior evidence supports school-based SEL program implementation through structured lessons provided during the regular school day (Cipriano et al., 2023; Payton et al., 2008; Taylor et al., 2017). While this may be relatively easy in elementary schools (where students remain in a single classroom) this may pose as a challenge in middle schools where students often move from class to class across the school day (Williamson et al., 2015). Considering potential classroom constraints and rising mental health and behavioral issues among early adolescents (Prothero, 2021), there may be a growing interest in school-based SEL programming that can be implemented outside of traditional classroom settings to address specific mental health and behavioral concerns (Williamson et al., 2015). This underscores the importance of evaluating selected and indicated SEL programs targeting early adolescents. Additionally, previous meta-analyses examining school-based SEL programs have generally overlooked OST programs that are integrated within the school environment. As a result, the effectiveness of these OST SEL programs on early adolescent outcomes remains unclear. Therefore, conducting a focused analysis specifically on OST SEL programs implemented within school settings could yield valuable insights into their impact on students' mental health and academic achievement during early adolescence. Most importantly, none of these reviews

investigate the variability within the early adolescent developmental period, omitting analysis of whether programs or program features yield smaller or larger effects among this demographic. As a result, the evaluation of universal school-based SEL program impacts on middle school students may be an overestimation. Therefore, a systematic review and meta-analysis approach provides a comprehensive method to consolidate existing research findings, enabling a more robust understanding of the effectiveness of these programs on early adolescents' social and emotional competencies, mental health, and school functioning. By examining universal, selective, and indicated SEL programs, including after school programs, a more thorough examination can be performed to assess the full spectrum of SEL programs available to support middle school students with varying needs. This thorough examination not only contributes to the body of knowledge surrounding social and emotional learning but also informs school policy and decision-makers in selecting which programs to implement. With a clearer understanding of the impact of these interventions, educators and administrators can make informed decisions about resource allocation and intervention strategies to best support the social, emotional, and academic needs of their middle school students.

Objectives

This study will address the gap in knowledge through a systematic review and meta-analysis of SEL programs designed to be implemented in the school environment targeting early adolescents (6th through 8th grade), inclusive of transformative SEL programs. By addressing these research gaps, valuable insights into the effectiveness of SEL programs for middle school students are gained. Further, if sufficient data are available, the implementation level of school-based SEL program (i.e., universal, selective, and indicated), SEL program setting (i.e.,

integrated during or outside of regular school hours within the school setting), and transformative SEL elements will be examined as moderators of program effect.

CHAPTER II

METHODS

The primary objective of this research was to conduct a systematic review and meta-analysis that addresses the following research questions among early adolescents enrolled in 6th through 8th grade: (a) what specific SEL skills are taught by school-based SEL programs across CASEL's five core domains; (b) what transformative SEL elements are present in school-based SEL programs; (c) what are the effects of school-based SEL programs on student outcomes (i.e., mental health and school functioning) ; (d) does the implementation level of school-based SEL program (i.e., universal, selective, and indicated) moderate the effects of these programs on this population; (e) does the SEL program setting (i.e., within or outside regular school hours) moderate the effects of these programs on this population; and, (f) does the inclusion of transformative SEL elements (i.e., culturally responsive and/or social justice pedagogy) moderate the effects of these programs on this population?

Criteria for Including and Excluding Studies for this Review

Language

Given the limited resources available to the research team to explore non-English studies, non-English studies were excluded.

Geography

Given the focus on transformative SEL elements that address cultural and contextual factors within the United States educational system, studies conducted outside of the United States were excluded. This decision reflects the unique structure of the United States school systems and recognizes that transformative approaches to SEL may manifest differently across

international contexts, where educational frameworks, cultural norms, and sociopolitical environments significantly differ.

Date Available

Studies published prior to July 1st, 2024, were included in this review with no lower date boundary established. This inclusive approach to publication dates was intentionally adopted to capture the full historical development of SEL programming for middle school students. Given the relatively limited body of rigorous research specifically targeting this developmental period and meeting our stringent methodological criteria (see below), restricting the timeframe would have further reduced the already small pool of eligible studies.

Setting

School-based SEL programming was operationally defined as interventions implemented exclusively on school premises during or outside of regular school hours. Studies were excluded if they involved SEL programs delivered in non-school settings (e.g., community centers, YMCA facilities, or private clinics), even if they targeted school-age populations or addressed school-related outcomes. This criterion ensured that all included interventions were situated within the ecological context of the school environment, allowing for more direct comparisons across implementation approaches and more relevant implications for school-based practitioners.

Types of Studies

This review focused exclusively on randomized controlled trials (RCTs) with participants randomly allocated to SEL program or control conditions, ensuring the highest level of causal inference for evaluating SEL program effects. This review deliberately excluded quasi-experimental designs, where randomization might be compromised by allocation based on pre-existing groups or convenience factors. Studies were also excluded if they did not use a between-

groups design to compare the effects of SEL intervention to a no-treatment control or business as usual comparison condition. This methodologically rigorous approach was adopted to strengthen the validity of effect size estimates and minimize potential biases that could inflate SEL program effects, despite the risk of reducing the number of eligible studies.

Types of Participants

This review specifically targeted the early adolescent developmental period by focusing exclusively on students enrolled in 6th through 8th grades. Studies including students outside this designated range (e.g., elementary or high school students) were excluded unless they provided disaggregated data allowing for the extraction of grade-specific effects. This focused approach was adopted to address the unique developmental challenges and opportunities of early adolescence, a period characterized by significant biological, cognitive, and social-emotional changes (Grant et al., 2006; Gross, 2014) that may influence the effectiveness of SEL programming.

Types of Intervention

This review included studies evaluating programs that promote SEL competencies, operationally defined as addressing at least one social competency and one emotional competency based on the CASEL framework. While CASEL's program guide primarily focuses on universal, school-day interventions, we deliberately expanded our inclusion criteria to encompass selective and indicated programs, as well as interventions implemented outside regular school hours but within the school setting. This more comprehensive approach was adopted to address the full spectrum of SEL programming available to middle schools and to recognize the diverse needs of early adolescent populations. Of note, for comprehensive data extraction and accurate coding of SEL program components, this study intended to request

program manuals from program developers; however, due to time constraints associated with this project, no such requests were made to authors, and this study relied exclusively on information available in published reports and publicly accessible program documentation to code intervention characteristics.

Study Outcomes

Included studies were required to report on at least one outcome in either the mental health or school functioning domains from baseline to immediate post-baseline follow-up:

1. Mental health outcomes included measures of internalizing problems (e.g., depression, anxiety, suicidality aside from depression; somatic problems, eating problems and/or disorders, Bipolar and related disorders) and externalizing problems (attention deficit/hyperactivity disorder, conduct disorder, oppositional defiant disorder, and substance use behaviors).
2. School functioning outcomes included measures of academic achievement (in the form of scores on standardized tests, grades/grade-point average, graduation/drop-out rates) and indices of behavioral school adjustment (e.g., truancy, disciplinary referrals).

Types of Articles

This review will include studies that are either published or unpublished reports of SEL programs that meet eligibility and content criteria described above.

Effect Size Calculation

Studies meeting all inclusion criteria described thus far were incorporated into the systematic review. However, only studies providing sufficient statistical information to calculate an effect size through data available in print were included in the meta-analytic review. Given

time constraints, no supplementary data to calculate an effect size were requested from study authors.

Search Methods for Identification of Studies

Electronic Searches

To prevent publication bias, both published peer-reviewed literature an unpublished grey literature will be included by searching the following databases: PsychINFO, PubMed, ERIC, and ProQuest Dissertations & Theses A&I.

Searching Other Resources.

To find other relevant literature, two additional search methods were employed. Reference lists from relevant systematic reviews and meta-analyses found during the database searches were hand searched for relevant studies. Additionally, hand searching on the CASEL (https://pg.casel.org/review-programs/), the What Works Clearinghouse (WWC) (https://ies.ed.gov/ncee/wwc/Resources/Evidence), and Blueprints websites (https://www.blueprintsprograms.org/blueprints-standards/) were conducted to identify potential SEL programs. When specific filters were available on these websites, they were leveraged to identify eligible SEL programs (specific grades that identified SEL interventions are targeting). When research articles associated with specific SEL programs were listed, they were subsequently included as part of this review upon meeting eligibility criteria.

Search Strategy

Search terms were initially developed by examining similar reviews and eligible studies identified during the review. This was followed by identification of indexing terms in topic relevant databases. This approach used an iterative process of translating and refining the searches.

The search terms included the following categories: eligible population (early adolescents), intervention type (social emotional learning program), and intervention setting (on school premises), and study design (RCT). Search terms were truncated where applicable (e.g., adol* to capture "early adolescents," "adolescents") and combined using Boolean operators (e.g., OR, AND, NOT). Search terms were applied to the title and abstract fields for all databases. The exact structure of the search terms was modified if needed dependent upon the database being used. A sample search strategy is provided in Appendix A.

Data Collection and Analysis

Selection of Studies

Search results were uploaded to Covidence Systematic Review Software (2024) for screening, where duplication was removed. To ensure duplicate removal, the review team examined all relevant citation fields to determine duplication and remove duplicates prior to the title and abstract screening. Subsequently, all unique title and abstracts underwent screening using the inclusion and exclusion criteria described above. To ensure reliability on study exclusion, at least two reviewers independently reviewed each title and abstract. All discrepancies in screening decisions were resolved through discussion to reach consensus. Once the title and abstract screening was complete, the review team transitioned to full-text review of eligible articles. To ensure reliability on study exclusion, at this phase, at least two team members independently reviewed all articles. All discrepancies in screening decisions were resolved through discussion to reach consensus.

Data Extraction and Management

Eligible articles retained from the full-text screening phase were coded within Covidence using the coding manual provided in Appendix B. Broadly, the following information was extracted and coded within the following domains:

1. General article characteristics (e.g., year of publication, author names).
2. Setting characteristics (e.g., geographical location).
3. Participant characteristics (e.g., sample size, key adolescent demographic characteristics).
4. Intervention characteristics (e.g., SEL skills, implementation level, SEL program setting, transformative SEL elements).
5. Outcome measures (e.g., number of weeks to immediate post-baseline, name of measure).
6. Results (e.g., effect size data, risk of bias).

Assessment of Risk of Bias or Study Quality in Included Studies

Two review authors independently assessed the risk of bias of included studies, with any disagreements resolved by discussion to reach consensus. The methodological risk of bias of included studies were assessed and reported in accordance with the Cochrane Handbook (Sterne et al., 2019) and the guidelines of the Cochrane Consumers and Communication Review Group (Ryan et al., 2019), which recommends the explicit reporting of the following individual elements for RCTs: random sequence generation; allocation sequence concealment; missing outcome data, measurement of the outcome, and selection of the reported result (see Appendix B for the full risk of bias coding procedures). While studies were assessed for masking of participants, less emphasis was placed on this domain as the participatory nature of interventions and the informed consent process underpinning the evaluation of the intervention makes masking unrealistic. Specifically, each domain of study bias was then categorized as “high”, “low”, or

"unclear" risk of bias as set out in the criteria provide by Sterne et al. (2019). Furthermore, studies were determined to be at highest risk of bias if they scored as "high" or "unclear" risk of bias for either sequence generation or allocation concealment domains.

Effect Size Measures

Hedges' *g* was used to quantify findings relevant to the primary research question (and subsequent secondary research questions). Hedges' *g* has less bias compared to other approaches (i.e., Cohen's *d*) when studies with small sample sizes are included (Hedges, 1981). For continuous variables, data was analyzed the data based on the unadjusted mean and standard deviation (SD) and number of people assessed for both the SEL program and control group to calculate the mean difference (MD) and 95% confidence interval (CI). For dichotomous outcomes, data was analyzed based on the number of events and the number of people assessed in the SEL program and comparison group. This was used to calculate the risk ratio (RR) and 95% CI, which was transformed into standardized mean differences (SMDs) for meta-analyses (Borenstein et al., 2009). Effect sizes for all studies were calculated using the Campbell Collaboration's online effect size calculator (Wilson, 2023), which accounts for various study designs (i.e., individual and cluster RCTs).

Only one effect size per participant sample was included in any given meta-analysis to ensure the statistical independence of the effect size estimates in each analysis. To address the unit-of-analysis error when a study provides multiple group comparisons, the recommended approach is to combine relevant groups (Higgins et al., 2024). In the current study, both Chaplin et al. (2006) and Gillham et al. (2007) provided multiple group comparisons between two SEL program conditions that were compared to one control condition. Therefore, for each study, the

effect sizes from the two SEL program conditions were merged into a single SEL program condition to maintain statistical independence between comparisons (Higgins et al., 2024).

Similarly, to manage multiple effect sizes for a single outcome within studies, a systematic decision-tree approach was implemented (López-López et al., 2018; McKenzie et al., 2024). First, effect sizes based on the most commonly assessed outcome were prioritized (e.g., for mental health outcomes, depression was the most commonly measured outcome within the internalizing problems subdomain). This option was subsequently employed until there were no more common outcomes identified. Next, when options still remained, the selected effect sizes were associated with the largest number of participants within that measurement category. This methodical selection process maximized available data while maintaining consistent measurement approaches across studies.

Multiple Study Reports

Only two eligible studies were found to report on the same sample. These references were merged together in Covidence and treated as a single study in this review (Botvin et al., 1980).

Data Synthesis

Due to the variability in the population, interventions, and study outcomes of included studies, this review used a random-effects model for meta-analysis and reported 95% CI with mean effect sizes. The analysis was carried out using R (version 4.2.1) (R Core Team, 2020) and the metafor package (version 4.2.0) (Viechtbauer, 2010).

The timepoint analyzed was immediate post-baseline follow-up. The mental health variable was initially constructed to include three categories (i.e., studies that reported student outcomes specific to internalizing problems only, externalizing problems only, and both

internalizing and externalizing problems). Similarly, the school functioning variable initially included two categories (i.e., studies that reported student outcomes specific to academic achievement and indices of behavioral school adjustment). However, upon data extraction, the mental health and school functioning domains were further separated into more distinct sub-outcomes based on the systematic decision-tree approach described above to address multiplicity (i.e., when multiple outcomes within a study and outcome domain are available for inclusion). For example, for the subdomain of "internalizing symptoms," depression was the most commonly reported outcome, followed by general measures of internalizing symptoms. Though two studies reported on PTSD symptoms, these could not be included in the internalizing symptoms meta-analysis due to multiplicity concerns (McKenzie et al., 2024). Therefore, outcomes specific to the subdomain of "PTSD symptoms" were analyzed as a separate meta-analysis. In addition, "substance use behaviors" was the only externalizing behavior consistently reported across studies; thus, the specific term "substance use behaviors" was used rather than the broader "externalizing symptoms only" to provide greater clarity. Similarly, for the subdomain of "academic achievement," math achievement was the most commonly reported outcome, followed by measures of GPA. For the subdomain of "behavioral indices," disciplinary referrals and truancy were the most commonly reported outcomes. However, while some studies indicated that their measures of disciplinary referrals included disciplinary referrals as a result of truant behavior, it was unclear if other studies measuring general disciplinary incidents were associated with truant behavior. Thus, as a cautionary approach to ensure statistical independence of effect size estimates between disciplinary referral and truancy outcomes, these outcomes were analyzed as separate meta-analyses. As a result, the final sub-outcomes for mental health included internalizing symptoms, PTSD symptoms, and substance use behaviors,

while school functioning included academic achievement, disciplinary referrals, and truancy. Separate meta-analyses were conducted for each outcome variable (i.e., six meta-analyses in total).

Assessment of Heterogeneity. To assess heterogeneity, the *Q* (Cochran, 1954)*, I^2 (*Higgins & Thompson, 2002*), and* τ^2 (Viechtbauer, 2005) statistics were examined. Prediction intervals were also estimated to assess the dispersion of effects and variance across studies (Riley et al., 2011). Additionally, heterogeneity was inspected using a forest plot; (Lewis & Clarke, 2001). Of note, all meta-analyses were conducted with less than 10 studies. Therefore, these heterogeneity statistics may be imprecise, leading to less informative inferences (Borenstein, 2023).

Assessment of Publication/Small Study Bias. Publication bias/small sample bias was assessed by examining funnel plots, conducting a trim and fill analysis (Duval & Tweedie, 2000), and using Egger's regression test (Egger et al., 1997). Additionally, a cumulative meta-analysis was conducted to determine whether the mean effect size shifted by including studies with smaller sample sizes. While funnel plots were provided for each meta-analysis, trim and fill, Egger's regression, and cumulative analyses were not conducted for models with less than six studies.

Moderator Analyses. The implementation level, setting, and transformative SEL elements of SEL programs, were planned to be analyzed as moderators of program effect on student mental health and school functioning outcomes. The implementation level of SEL program included three categories (i.e., universal, selective, and indicated SEL programs). The setting of SEL program was operationalized as two categories (i.e., interventions implemented during regular school hours and interventions implemented outside of regular school hours

within the school setting). Due to the recent emergence of transformative SEL and its translation into applied intervention, there was a scarcity of studies eligible for inclusion in this meta-analysis. Therefore, the review adopted broad inclusion criteria for transformative SEL components to ensure inclusivity and an adequate number of studies for meta-analysis. Thus, the transformative element variable was operationalized such that interventions that meet criteria for including transformative SEL element(s), the intervention must include at least one of the following: (a) opportunities for adolescents to practice curiosity by teaching and learning from one another; (b) instruction that honors and makes connections to students' lived experiences and identities and scaffolds learning to build an understanding of others' lived experiences; (c) culturally responsive education and youth-guided approaches, such as project-based learning and youth participatory action research; (d) developmentally appropriate learning opportunities that engage students and adults in examining current and historical events; social norms; prejudices and biases; and how issues of race, class, and culture impact our society; (e) opportunities for adolescents to use their voice and skills to examine inequities and create solutions for social change; (f) authentic partnering among families, schools, and communities to share power and decision-making; and, (g) individual and collective analysis, reflection, and sense-making around relevant data.

However, statistical best practices for moderation analyses recommend a minimum of 10 effect sizes per moderator variable to ensure adequate statistical power and reliable estimation (Deeks et al., 2024). Due to the limited number of studies meeting our inclusion criteria for each outcome domain, formal moderation analyses examining implementation level, SEL program setting, and transformative SEL elements could not be conducted. Instead, a narrative comparison of potential moderating effects where possible was provided. When providing these

narrative comparisons, effect sizes for a given outcome were grouped according to their classification on the moderator variable of interest, and then combined within each category to create summary effect sizes for comparison.

CHAPTER III

RESULTS

Search Results

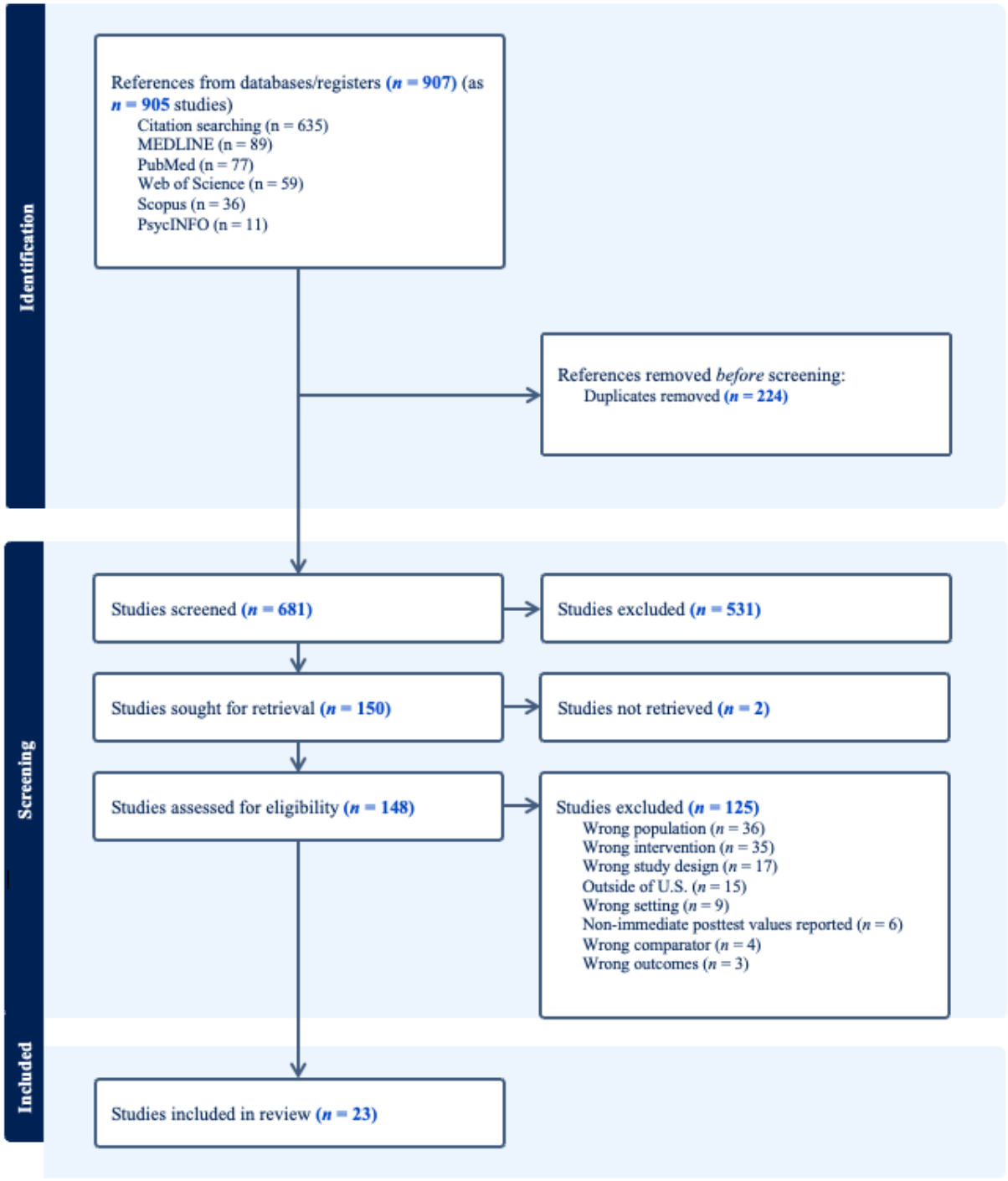
From the initial 907 reports identified, 148 were eligible for full-text review. Of these, 125 were excluded primarily due to: (a) the sample included participants outside of the 6th-8th grade range, and findings for participants within this range could not be separated from those outside it (n = 36); (b) the intervention did not meet SEL criteria or it was unclear whether SEL criteria were met (n = 35); and (c) an inappropriate study design was utilized (e.g., quasi-experimental design; n = 17). The final sample consisted of 23 reports (19 journal articles, three unpublished organization reports, and 1 dissertation) representing 23 unique samples of participants. See Figure 3 for the PRISMA diagram and further information.

Risk of Bias

Risk of bias in included studies was measured in six domains: (a) presence of a consort diagram, (b) random sequence generation (assessment of methods used to randomize participants), (c) allocation concealment (whether group assignment was properly masked), (d) masking of outcome assessment (whether outcome assessors were properly masked to participant condition), (e) incomplete outcome data (approaches used to address participant attrition and missing data), and (f) selective reporting (whether all pre-specified outcomes were reported regardless of results). Overall, studies included in this systematic review had several areas with potential risk of bias to consider. Of the 23 studies, only six (26.1%) provided a consort diagram. The areas with the greatest percentage of studies at high risk were the selective reporting (17.4%, n = 4), random sequence generation (13.0%, n = 3) and allocation concealment (8.7%, n = 2) domains. Additionally, there was a high proportion of studies with unclear risk of bias across

Figure 3

PRISMA flow diagram



multiple domains, particularly the blinding of outcome assessors (87.0%, *n* = 20), allocation concealment (73.9%, *n* = 17), and selective reporting (60.9%, *n* = 14) domains. The results of the following systematic review and meta-analysis should be evaluated within the context of these risk of bias considerations. A complete risk of bias table is displayed in Appendix C.

Cumulative Characteristics of Included Studies

Table 1 provides descriptive statistics from the 23 studies included in the systematic review. Participant characteristics revealed a sample of early adolescents with a mean age of 11.94 years (SD = 0.74, range = 10.95-12.90). Gender distribution was relatively balanced across studies, with females representing a slight majority (52.6%, SD = 6.4) compared to males (47.4%, SD = 6.4). The racial/ethnic composition varied considerably across studies, with White participants representing an average of 49.8% (SD = 30.4) of the samples, Black participants 28.4% (SD = 32.4), followed by Hispanic/Latine participants 25.5% (SD = 24.7), Native Hawaiian/other Asian/Pacific Islander participants 10.2% (SD = 10.6), American Indian/Alaska Native 3.6% (SD = 3.9), and multi-racial participants 4.5% (SD = 2.6).

For study design, slightly more than half (52.1%) employed individual randomized controlled trials, while the remainder (47.8%) used cluster randomized designs. The interventions were predominantly universal in their implementation (73.9%) and implemented during school hours (91.3%). Regarding geography, the majority of studies were conducted in urban settings (52.2%), with 17.4% in inner-city, low-income urban areas and 34.8% in unspecified urban settings.

Lastly, a total of 15 studies reported on mental health outcomes, and 10 studies reported on school functioning outcomes, with many studies reporting on multiple outcomes across different categories. Of the mental health studies, nine studies reporting on internalizing

problems. Among these, depression was the most commonly assessed internalizing problem (*n* = 7), followed by general measures of internalizing symptoms (*n* = 3), and PTSD (*n* = 2).

Table 1

Cumulative features of the included studies (N = 23)

	n	**Percentage**	**Mean (SD)**	**Range**
Study Design				
Individual Level RCT	12	52.1		
Cluster Level RCT	11	47.8		
Geography Characteristics				
Urban: inner city, low-income area	4	17.4		
Urban: not otherwise clarified	8	34.8		
Suburban	4	17.4		
Rural	3	8.7		
Mixed	1	4.3		
Unknown	3	8.7		
Participant Characteristics				
Average Age (years)	19		11.94 (0.74)	10.95-12.90
Percent Male	20		47.4 (6.4)	36.0-56.0%
Percent Female	20		52.6 (6.4)	44.0-63.0%
Percent White	14		49.8 (30.4)	6.0-97.0%
Percent Black/African-American	16		28.4 (32.4)	2.1-96.0%
Percent Hispanic/Latine	13		25.5 (24.7)	1.5-66.3%
Percent American Indian/Alaska Native	4		3.6 (3.9)	0.0-10.0%
Percent Native Hawaiian/other Asian/Pacific Islander	9		10.2 (10.6)	0.5-31.0%
Percent Multi-racial	7		4.5 (2.6)	1.0-8.0%
Implementation Level				
Universal	17	73.9		
Selective	5	21.7		
Indicated	1	4.3		
SEL Setting[a]				
During School Hours	21	91.3		
Out-of-School Time	3	8.7		
Mental Health Outcome Characteristics	15	62.2		
Internalizing Problems	9	39.1		
Externalizing Problems	9	39.1		
School Functioning Outcome Characteristics	10	43.5		
Academic Achievement	6	26.1		
Behavioral Indices	7	30.4		

Notes. n refers to the number of studies providing data for rows with means and standard deviations.

[a]Frequencies sum to more than 23 used the same intervention across multiple settings within a single study.

Nine studies reported on externalizing problems, all of which assessed substance use behaviors. Within the school functioning domain, six studies reported outcomes within the academic achievement subdomain, with math achievement (n = 4) and GPA (n = 3) being the most commonly assessed outcomes. Additionally, seven studies reported on indices of behavioral school adjustment, including disciplinary referrals (n = 7) and truancy outcomes (n = 5).

Prevalence of SEL Skills Across SEL Programs

Across the 23 studies included in this systematic review, a comprehensive analysis of SEL skill coverage was conducted based on the five domains established by CASEL (see Table 2). At least one self-awareness skill was identified in all of the studies. A large number of studies also included at least one self-management 95.6% (n = 22) or social awareness skill (95.6%, n = 22). Lastly, 73.9% (n = 17) included at least one relationship skill and 86.9% (n = 20) included at least one responsible decision-making skill.

Self-awareness Domain

The self-awareness domain was consistently addressed across all studies (100%), featuring several key skill areas. Emotional awareness — the ability to identify and understand emotions based on physical and situational cues — was the most prevalent skill, appearing in 86.9% of studies (n = 20; Botvin et al., 1980, 1992, 2001; Chaplin et al., 2006; De Long-Cotty et al., 2008; Farrell et al., 2001, 2003; Gillham et al., 2007 [PRP and PEP]; Hecht et al., 2003; Kataoka et al., 2011; Lemberger-Truelove et al., 2021; McCarty et al., 2013; Mendelson et al., 2015; Merle et al., N.d.; Perry et al., 2008; Stein et al., 2003; Sumi et al., 2021; Tobias & Myrick, 1999; Trudeau et al., 2003; Vicary et al., 2004). SEL programs involved various techniques for emotional awareness training, including emotion vocabulary development, physical sensation identification, and structured reflection activities. Metacognition -the ability to

monitor the quality of thought- was the second most common self-awareness skill (34.7%, *n* = 8; Chaplin et al., 2006; Gillham et al., 2007 [PRP]; Kataoka et al., 2011; Lemberger et al., 2015; Lemberger-Truelove et al., 2021; Mendelson et al., 2015; Stein et al., 2003; Sumi et al., 2021), with SEL programs predominantly emphasizing identification of thinking styles. Understanding the connection between thoughts, feelings, and behaviors appeared in approximately one-third of studies (30.4%, *n* = 7; Gillham et al., 2007 [PRP]; Kataoka et al., 2011; Lemberger-Truelove et al., 2021; McCarty et al., 2013; Stein et al., 2003; Sumi et al., 2021; Tobias & Myrick, 1999), often using frameworks like the ABC model (i.e., a framework from cognitive behavioral therapy that demonstrates how Activating events trigger Beliefs which then create emotional and behavioral Consequences).

Self-Management Domain

Self-management skills were present in 95.6% (*n* = 22) of studies, demonstrating high consistency across programs. Response modulation strategies appeared in 82.6% (*n* = 19) of studies, making them the most common self-management skill (Botvin et al., 1980, 1992, 2001; Butzer et al., 2017; Chaplin et al., 2006; De Long-Cotty et al., 2008; Farrell et al., 2001, 2003; Gillham et al., 2007 [PRP and PEP]; Kataoka et al., 2011; Lemberger et al., 2015; Lemberger-Truelove et al., 2021; McCarty et al., 2013; Mendelson et al., 2015; Perry et al., 2008; Stein et al., 2003; Sumi et al., 2021; Trudeau et al., 2003; Vicary et al., 2004). Response modulation ER techniques included relaxation exercises such as deep breathing exercises and progressive muscle relaxation. Goal setting and achievement skills were incorporated in 65.2% (*n* = 15) of studies, making them the second most common skill in this domain (Botvin et al., 1980, 1992, 2001; Chaplin et al., 2006; Coleman, 2012; De Long-Cotty et al., 2008; Gillham et al., 2007 [PEP]; Hecht et al., 2003; Lemberger et al., 2015; Lemberger-Truelove et al., 2021; McCarty et

al., 2013; Perry et al., 2008; Tobias & Myrick, 1999; Trudeau et al., 2003; Vicary et al., 2004), typically involving SMART goal frameworks, progress monitoring, and structured planning processes. Cognitive change ER strategies appeared in 60.8% of studies (n = 14; Botvin et al., 1980, 1992, 2001; Chaplin et al., 2006; De Long-Cotty et al., 2008; Gillham et al., 2007 [PRP]; Kataoka et al., 2011; Lemberger et al., 2015; McCarty et al., 2013; Perry et al., 2008; Stein et al., 2003; Sumi et al., 2021; Trudeau et al., 2003; Vicary et al., 2004), with approaches ranging from positive visualization to cognitive restructuring.

Social Awareness Domain

Social awareness skills were included in 95.6% (n = 22) of the reviewed studies, showing high consistency across programs. Within social awareness, interpersonal listening emerged as the most prevalent skill (60.8%, n = 14; Botvin et al., 1980, 1992, 2001; Coleman, 2012; De Long-Cotty et al., 2008; Gillham et al., 2007 [PEP]; Hecht et al., 2003; Lemberger et al., 2015; McCarty et al., 2013; Mendelson et al., 2015; Merle et al., N.d.; Perry et al., 2008; Trudeau et al., 2003; Vicary et al., 2004), followed by perspective-taking (30.4%, n = 7; Chaplin et al., 2006; De Long-Cotty et al., 2008; Gillham et al., 2007 [PRP]; Lemberger-Truelove et al., 2021; Perry et al., 2008; Tobias & Myrick, 1999). Interpersonal listening was typically taught through structured activities focusing on non-verbal (e.g., maintain eye-contact) and verbal (e.g., clarifying questions, paraphrasing) communication techniques. Perspective-taking (i.e., learning how to consider, predict, identify or describe somebody's point of view) was often framed as considering others' viewpoints before responding in social situations or through structured storytelling exercises.

Relationship Skills Domain

Relationship skills appeared in 73.9% (n = 17) of the studies, with conflict resolution (60.8%, n = 14; Botvin et al., 1980; 1992; 2001; Chaplin et al., 2006; De Long-Cotty et al., 2008; Farrell 2001, Farrell 2003; Gillham et al., 2007 [PRP and PEP]; Hecht et al., 2003; McCarty et al., 2013; Perry et al., 2008; Trudeau et al., 2003; Vicary et al., 2004) and assertiveness (52.2% n = 12; Botvin et al., 1980; 1992; 2001; Chaplin et al., 2006; De Long-Cotty et al., 2008; Farrell 2001, Farrell 2003; Gillham et al., 2007 [PRP]; Hecht et al., 2003; Perry et al., 2008; Trudeau et al., 2003; Vicary et al., 2004), emerging as the most commonly taught skills. Conflict resolution was typically structured and paired with problem solving frameworks like RAID (resolve, avoid, ignore, diffuse; Farrell et al., 2001, 2003) or DEAL (Describe, Explain, Ask, List; Chaplin et al., 2006; Gillham et al., 2007 [PRP]). Assertiveness training focused on distinguishing between passive, assertive, and aggressive communication styles, with emphasis on both verbal and non-verbal aspects of assertion.

Decision-Making Domain

Responsible decision-making skills were present in 87.0% (n = 20) of studies, with this domain displaying the most homogeneous skill focus. Problem solving appeared in 82.6% (n = 19) of the studies (Botvin et al., 1980, 1992, 2001; Chaplin et al., 2006; De Long-Cotty et al., 2008; Farrell et al., 2001, 2003; Gillham et al., 2007 [PRP]; Hecht et al., 2003; Kataoka et al., 2011; Lemberger et al., 2015; McCarty et al., 2013; Mendelson et al., 2015; Perry et al., 2008; Stein et al., 2003; Sumi et al., 2021; Tobias & Myrick, 1999; Trudeau et al., 2003; Vicary et al., 2004). Problem solving was typically taught through structured decision frameworks such as the "3 Cs" (Clarify, Consider, Choose; Botvin et al., 1980; 1992; 2001; Trudeau et al., 2003; Vicary et al., 2004). Notably, 33.3% of the studies (6 out of 18) paired ER skills with problem solving

Table 2

SEL skills by study

Author(s) (Year)	Intervention *CASEL Tiered Designation*[a]	CASEL SEL Skills Endorsed				
		Self-Awareness	**Self-Management**	**Social Awareness**	**Relationship Skills**	**Decision-Making**
Botvin et al. (1980, 1992, 2001); Trudeau et al. (2003); Vicary et al. (2004)	Life Skills Training • *No Designation*	**Emotional Awareness** • *Situations causing anxiety & physical effects*	**Goals Setting** • *Not specified* **Response Modulation ER** • *Progressive relaxation & breathing to manage anxiety* **Cognitive Change ER** • *Mental rehearsal and/or visualization to manage anxiety*	**Interpersonal Listening** • *Using verbal and non-verbal communication; techniques for avoiding misunderstandings; clarifying; asking questions; being specific; paraphrasing*	**Social Engagement** • *Making social contacts* **Resisting Peer Pressure** • *Refusal responses, awareness of persuasive tactics* **Respect/Kindness** • *Giving/ receiving compliments/ feedback* **Assertive** • *Difference between assertion/aggression; verbal/non-verbal assertiveness* **Conflict Resolution** • *Analyzing conflict resolution choices; building consensus; negotiation*	**If, then:** • *Reflecting on consequences* **Problem Solving** • *Decision analysis; 3 Cs of effective decision-making (Clarify, Consider, Choose)* **Reflection on Thoughts/Actions** • Reflecting on actions taken

Table 2 (continued).

Butzer et al. (2017)	Kripalu Yoga in the Schools • *No Designation*	**Self-Compassion** • *Self-observation without judgement; compassion meditation (e.g., loving-kindness)*	**Mindful Listening** • *Guided meditation* **Response Modulation ER** • *Taking deep breaths (e.g., alternative nose breathing); journaling about ways to de-stress*	**Social Engagement** • *Peer-to-peer interaction; students leading poses*		
Chaplin et al. (2006); Gillham et al. (2007)	Penn Resiliency Program (PRP) • *No Designation*	**Metacognition** • *Thinking styles* **Difference Thoughts/Feelings/ Behaviors** • *ABC model*	**Goal Setting & Achieving Goals** • *SMART goals* **Organization** • *Breaking down larger tasks* **Response Modulation ER** • *Controlled breathing; muscle relaxation* **Cognitive Change ER** • *Positive visualization; reattribution training; cognitive restructuring*	**Perspective** • *5-step approach - thinking before acting*	**Assertive & Conflict Resolution** • *DEAL (i.e., Describe the problem, explain how you feel, ask for a change, list the improvements in change)*	**Problem Solving** • *5-step approach - thinking before acting*
Coleman (2012)	Counselor-Led Student Success Skills	**Character Traits/Strengths/ Roles** • *Identify strengths*	**Goal Setting & Achieving Goals** • *SMART goals*	**Interpersonal Listening** • *Practicing with teachers*		**Help Seeking** • *Asking peer/ teachers for support/feedback*

Table 2 (continued).

Coleman (2012) (continued)	• *No Designation*					
De Long-Cotty et al. (2008); Perry et al. (2008)	Ripple Effects for Teens • *Promising*	**Emotional Awareness** • *Identify emotions and associated physical sensations* **Character Traits/Strengths/ Roles** • *Identify personal strengths*	**Goal Setting** • *Not specified* **Response Modulation ER** • *Not specified* **Cognitive Change ER** • *Self-talk*	**Perspective** • *Not specified* **Expressing Empathy** • *Not specified* **Interpersonal Listening** • Paraphrasing **Diversity** • *Appreciating Diversity (not specified)*	**Social Engagement** • *Not specified* **Peer Support/Inclusion** • *Not specified* **Friendship** • *Not specified* **Resisting Peer Pressure** • *Not specified* **Respect/Kindness** • *Not specified* **Assertive** • *Not specified* **Conflict Resolution** • *Not specified*	**If, Then** • *Not specified* **Problem Solving** • *Not specified* **Control** • *Not specified* **Help Seeking** • *Not specified* **Social Responsibility** • *Bystander (not specified)*
Farrell et al. (2001, 2003)[b]	Responding in Peaceful and Positive Ways • *SELect*	**Emotional Awareness** • *Identify triggers, emotions, and associated physiological responses*	**Response Modulation ER** • *Breathing techniques*	**Expressing Empathy** • *Develop cognitive scripts for pro-social behavior* **Stereotypes** • *Diminish stereotypes,*	**Team Player** • *Students work in small groups to achieve a common goal to get to participate in various roles (i.e., leader, reporter, recorder)*	**ER During Problem Solving; Problem Solving; Reflection on Thoughts/Actions** • *SCIDDLE (stop; calm down, identify the problem & feelings about it;*

Table 2 (continued).

Farrell et al. (2001, 2003)[b] (continued)				*beliefs, attributions, and cognitive scripts that support violence (not specified)* • *Critical analysis of violent media*	**Assertiveness; Apologizing/ Reparation; Conflict resolution** *RAID (resolve, avoid, ignore, and diffuse)*	*decide among your options; do it; look back; and evaluate* **Help Seeking** • *Peer mediation (not specified)* **Social Responsibility** *Bystander (not specified)*
Gillham et al. (2007)	Penn Enhancement Program • *No Designation*	**Emotional Awareness** • *Identification of triggers to depression* **Emotion Expression** • *Sharing thoughts and feelings*	**Goal Setting & Achieving Goals** • *Not specified*	**Interpersonal Listening** • *Improving communication (not specified)*	**Friendships** • *Not specified* **Resisting Peer Pressure** • *Not specified* **Conflict Resolution** • *Not specified*	**Ethical Judgements** • *Not specified*
Hecht et al. (2003)	Keepin' it R.E.A.L • *Promising*	**Emotional Awareness** • *Identify triggers and emotions and associated non-verbal cues* **Character Traits/Strengths/ Roles** • *Honor individual strengths* ***(European/African American version)***	**Goal Setting** • *Having a purpose in life to get ahead and setting priorities accordingly; value in hard work in achieving a goal* ***(European/African American Version)***	**Identifying Emotions in Others** • *Identify emotions in others through non-verbal cues* **Interpersonal Listening** • *Identify emotions in others through non-verbal cues* • *Directness in communication*	**Resisting Peer Pressure** • *R.E.A.L. (refuse, explain, avoid, leave)* **Assertive** • *Knowing the difference between "passive," "assertive," and "aggressive" behaviors*	**If, Then** • *How risk taking can have impact the self and others* **Reflection on Thoughts/Actions** • *Consequences of action* **Problem Solving** • *Identifying options and the act of choosing*

Table 2 (continued).

Hecht et al. (2003) (continued)				*(e.g., direct eye contact;* ***European/African American version)***	**Conflict Resolution** • *Using "I" statements* **Respect/Kindness** • *Valuing people's boundaries; honoring the family/elders; affective orientation* ***(European/African American version)*** • *Respeto/simpatia – (****Mexican American version)***	• *ABCD (ask, brainstorm, choose, do)* **Help Seeking** • *Asking help from social network (e.g., hinting; asking indirectly; asking directly* • *Familismo* ***(Mexican American version)*** • *Communalism* ***(European/African American version)***
Kataoka et al. (2011); Stein et al. (2003); Sumi et al. (2021)	Cognitive Behavioral Intervention for Trauma in Schools • *No Designation*	**Metacognition** • *Thinking styles* **Emotional Awareness** • *Fear thermometer* **Emotion Expression** • *Labeling terms to describe expressions of distress* **Difference Thoughts/Feelings/ Behaviors** • *Describing the link between thoughts and feelings*	**Response Modulation ER** • *Relaxation (not specified)* • *Writing a song; creating a poem or graphic novel to process trauma narrative* **Cognitive Change ER** • *"Hot seat" thoughts; cognitive restructuring*			**ER During Problem & Problem Solving** • *Stop, think, what's your goal?* **Help Seeking** • *Talking to community leaders*

Table 2 (continued).

Lemberger et al. (2015)[c]	Student Success Skills • *SELect*	**Metacognition** • *Thinking style*	**Attention** • *Not specified* **Achieving Goals** • *Select goal; write a plan to achieve goal; get feedback from peers* **Situation Modification & Attentional Deployment ER** • *Visualization of an alternative place (e.g., calm place)* **Response Modulation ER** • *Breathing techniques* **Cognitive Change ER** • *Cognitive restructuring*	**Identifying Emotions in Others** • *Structured storytelling model to learn how others are feeling* **Expression Empathy** • *Empathic responding during social interactions* **Interpersonal Listening** • *Attending skills; summarization*	**Team Player** • *Not specified*	**Problem Solving** • *Not specified*
Lemberger-Truelove et al. (2021)	Advocating Student-within-Environment • *No Designation*	**Metacognition** • *Understand inner self-talk* **Emotional Awareness** • *Label emotions and associated physical sensations*	**Mindful Listening** • *Not specified* **Response Modulation ER** • *BREATHE program; mindful moving*	**Perspective** • *Consider other's perspectives and reflect before responding*	**Social Engagement** • *Seek out student feedback and reflect*	

Table 2 (continued).

Lemberger-Truelove et al. (2021) (continued)		**Difference Thoughts/Feelings/ Behaviors** • *Linking thoughts and feelings* **Character Traits/Strengths/ Roles** • *Understand the role of feelings play and inner strength* **Self-Compassion** *Observing thoughts and letting go*				
McCarty et al. (2013)	Positive Thoughts and Actions • *No Designation*	**Emotional Awareness** • *Not specified* **Emotion Expression** • *Not specified* **Difference Thoughts/Feelings/Behaviors** • *Not specified*	**Goals Setting** • *Not specified* **Response Modulation ER** • *Not specified* **Cognitive Change ER** • *Not specified*	**Interpersonal Listening** • *Not specified*	**Conflict Resolution** • *Not specified*	**Emotion Regulation during Problem & Problem Solving Solving** • *STOP before Responding*
Mendelson et al. (2015)	RAP Club • *No Designation*	**Metacognition** • *Not specified* **Emotional Awareness** • *Identification of emotions*	**Response Modulation ER** • *Breathing techniques*	**Interpersonal Listening** • *Not specified*		**Problem Solving** • *Not specified*

Table 2 (continued).

Merle et al. (N.d.)	CharacterStrong Serve Model • *No Designation*	**Emotional Awareness. & Emotion Expression** • *Empathy statement by teachers (i.e., asking students how they feel and acknowledge that feeling)*		**Interpersonal Listening** • *Shuffle and share (paraphrasing; attentive listening)*	
Tobias & Myrick (1999)	Peer Facilitator-Led Intervention • *No Designation*	**Emotional Awareness** • *Identify own feelings in peer and teacher relationships/hypothetical scenarios* **Difference Thoughts/Feelings/ Behaviors** • *Hypothetical scenarios to link triggers, feelings, and behaviors*	**Goal Setting & Achieving Goals** • *Identify a behavior to change and strategies to meet goal*	**Perspective** • *Identify others' feelings and associated behavior sin hypothetical scenarios*	**Reflection on Thoughts/Actions & Problem Solving** • *4-step model (identify problem; past strategies; new strategies; how to implement)*

Notes. ER = Emotion Regulation.

[a] CASEL applies a three-tiered classification system for SEL programs, with "SELect Programs" requiring interventions to meet stringent criteria including universal school-based implementation, rigorous research designs, and demonstrated positive impacts on student outcomes, while "Promising" and "SEL-Supportive" designations represent progressively less comprehensive approaches with fewer evidential requirements (Skoog-Hoffman et al., 2020).

[b]Identification of SEL skills was also sourced from Meyer & Farrell (1998). [c]Identification of SEL skills was also sourced from Villares et al. (2011).

content (Farrell et al., 2001, 2003; Kataoka et al., 2011; McCarty et al., 2013; Stein et al., 2003; Sumi et al., 2021), which was also taught through structured decision frameworks (e.g., SCIDDLE [stop; calm down, identify the problem & feelings about it; decide among your options; do it; look back; and evaluate]; Farrell et al., 2001; 2003).

In summary, most SEL programs addressed multiple CASEL domains. Self-awareness and problem-solving techniques emerged as the most predominant SEL skills. Several studies lacked identifiable skill examples in their printed descriptions, limiting our ability to comprehensively code program characteristics. Printed works often provide abbreviated information; thus, this summary represents a conservative estimate of SEL content that may have been actually implemented in these programs.

Transformative SEL Elements Across SEL Programs

Thus far, this review has examined specific CASEL SEL skills identified across the SEL programs. Next, this review examined the specific transformative SEL elements identified across the SEL programs. Descriptive characteristics of transformative SEL elements are provided in Table 3.

Four distinct categories of transformative elements were identified across the included studies. The most frequently implemented element was culturally responsive education and youth-guided approaches (39.1%, n = 9), followed by instruction that honors students' lived experiences (17.4%, n = 4), authentic partnering among families, schools, and communities (13.0%, n = 3), and opportunities to examine social norms, prejudices, and biases (8.7%, n = 2). Culturally responsive education and youth-guided approaches were predominantly implemented through participatory action research methods to inform intervention development (Botvin et al. 1980, 1992, 2001; Hecht et al., 2003; Trudeau et al., 2003; Vicary et al., 2004); where some

studies integrated cultural responsiveness by using terminology relevant to specific cultural groups (Kataoka et al., 2011; Stein et al., 2003; Sumi et al., 2021). Instruction honoring students' lived experiences was evidenced in four studies, in which some studies incorporated examples and situations that aligned with specific cultural groups (Botvin et al., 1992; Hecht et al., 2003) with Hecht et al. (2003) specifically including values from various racial/ethnic communities in their SEL program content. In addition, De Long-Cotty et al. (2008) and Perry et al. (2008) described content aimed at helping students recognize the importance of diversity and appreciating differences, though specific examples were not detailed in the print materials. Authentic partnering among families, schools, and communities was documented in the studies implementing trauma-focused interventions (Kataoka et al., 2011; Stein et al., 2003; Sumi et al., 2021), where SEL program development occurred in partnership with clinicians and administrators from the local public school system to ensure cultural and contextual relevance. Lastly, developmentally appropriate opportunities to examine social norms, prejudices, and biases were least prevalent among the transformative elements. This approach was exemplified in the Responding in Peaceful and Positive Ways (Farrell et al., 2001, 2003), which included activities focused on learning about stereotypes and how to avoid acting on preconceived notions about others that support violence, as well as critical analysis of violent media.

Overall, the limited presence of transformative elements represents an area for growth in integrating skills that address the broader socio-cultural contexts shaping early adolescents' development and learning. However, these findings should be interpreted with caution, as abbreviated information in published materials may underrepresent the full range of transformative SEL content actually implemented in these programs.

Table 3

Transformative SEL elements

Transformative SEL Elements	Author(s), (Year) Intervention ***Examples***
Instruction that honors and makes connections to students' lived experiences	**Botvin et al. (1992)** Life Skills Training • *Examples used to illustrate program content and suggested situations for behavioral rehearsal exercises that align with specific cultural groups* **Hecht et al. (2003)** Keepin' It R.E.A.L. • *Examples to illustrate program content and values from various racial/ethnic groups that align specific cultural groups* **De Long-Cotty et al. (2008) & Perry et al. (2008)** Ripple Effects for Teens • *Not Specified*
Culturally responsive education and youth-guided approaches	**Botvin et al. (1980, 1992, 2001); Trudeau et al. (2003); Vicary et al. (2004)** Life Skills Training • *Participatory action research* **Hecht et al. (2003)** Keepin' It R.E.A.L. • *Participatory action research* **Kataoka et al. (2011); Stein et al. (2003); Sumi et al. (2021)[a]** Cognitive Behavioral Intervention for Trauma in Schools • *Using terminologies that are relevant for certain cultural groups (e.g., certain Latino groups may refer to "nervious" or "mal ojo")*
Developmentally appropriate learning opportunities that engage students and adults in examining current and historical events; social norms; prejudices and biases; and how issues of race, class, and culture impact our society	**Farrell et al. (2001, 2003)** *Responding in Peaceful and Positive Ways* • *Learning about stereotypes and how to avoid acting on them or other preconceived notions about others (e.g., diminish stereotypes, beliefs, attributions, and cognitive scripts that support violence; critical analysis of violent media)*
Authentic partnering among families, schools, and communities to share power and decision-making	**Kataoka et al. (2011); Stein et al. (2003); Sumi et al. (2021)** Cognitive Behavioral Intervention for Trauma in Schools • *Intervention was developed in partnership with clinicians and administrators from the local public school system*

Notes. [a]Identification of transformative SEL skills was also sourced from Lopez et al. (2002).

Results of Meta-Analysis

Of 23 studies that measured mental health and school functioning outcomes, 17 unique studies were able to be included in the various meta-analysis regressions. Six studies were excluded due the inability to retrieve necessary statistical data to code an effect size from the report (e.g., N for intervention and comparison groups, SD). After completing data extraction, mental health outcomes were further classified into the following three constructs: internalizing symptoms (k = 7), PTSD symptoms (k = 2), and substance use behaviors (k = 4). Additionally, school functioning outcomes were further classified into three domains: academic achievement (k = 6), disciplinary referrals (k = 4), and truancy (k = 4). Primary meta-analyses were completed- one for each outcome construct (see Appendix D for summary of findings table).

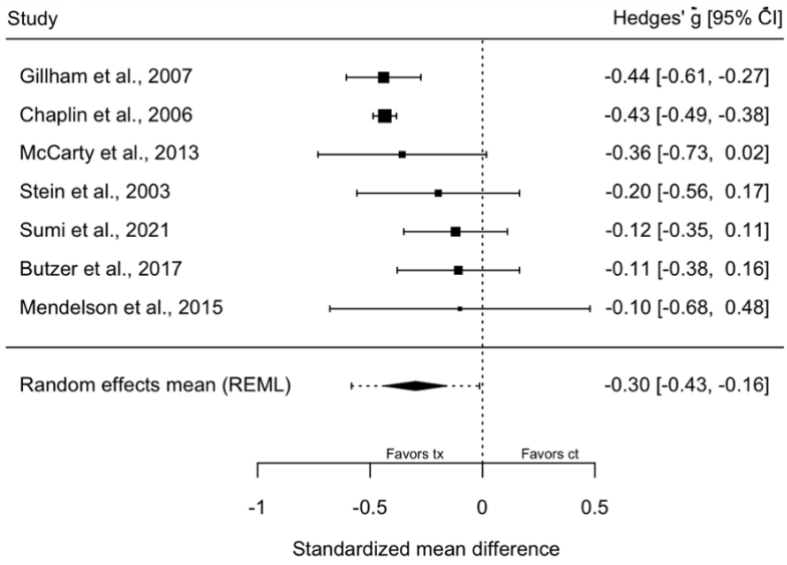
Mental Health Outcomes

Internalizing Symptoms. Seven studies were reported on measures that fell within the internalizing symptoms domain. One study reported on a general measure of adolescent internalizing symptoms (teacher-report; Mendelson et al., 2015). The additional six studies in the sample reported on self-reported measures of depressive symptoms (Butzer et al., 2017; Chaplin et al., 2006; Gillham et al., 2007; McCarty et al., 2013; Stein et al., 2003; Sumi et al., 2021). In synthesizing these findings, a total of k = 7 studies were included in this meta-analysis with a total of n = 7 effect sizes. The observed standardized mean difference (g) ranged from -0.44 to -0.10, with 100% of the estimates being negative. The estimated average g based on the random-effects model was -0.30 (95% CI = [-0.43, -0.16]), demonstrating that SEL programs was significantly associated with lower levels of internalizing symptoms (z = -4.32, $p < 0.001$). Adolescents who were assigned to the SEL program condition reported mean scores of internalizing symptoms that were 0.30 standard deviation lower than their peers in the control

condition. A forest plot showing the observed effect sizes and the estimate based on the random-effects model is shown in Figure 4.

Figure 4

Forest plot for internalizing symptoms meta-analysis

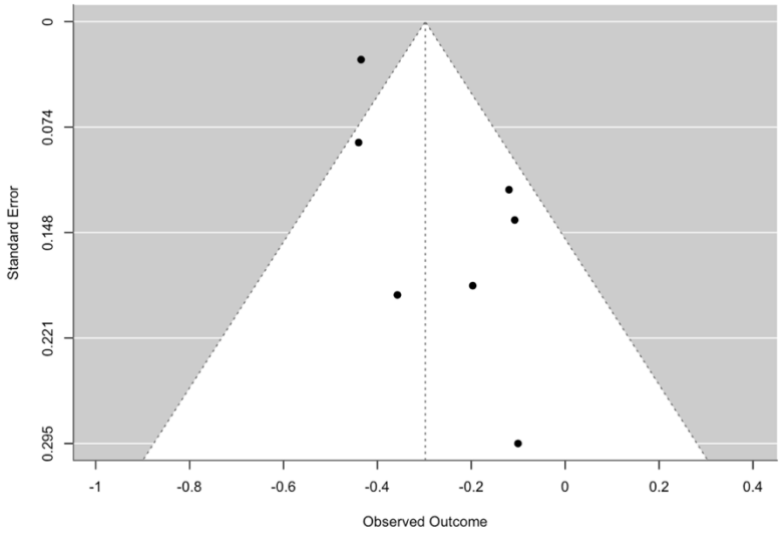


The *Q*-statistic provides a test of the null hypothesis that all studies in the analysis share a common effect size. In the case that all studies shared the same effect size, the value of *Q* would be equal to the degrees of freedom (the number of studies minus 1). According to the *Q*-test, there was no significant amount of heterogeneity in the true outcomes ($Q(6) = 14.30$, $p = 0.03$) and the null hypothesis that the true effect size is identical in all studies cannot be rejected. The I^2 statistic indicates that 61.5% of the variance in the observed effect sizes reflects variance in true effects rather than sampling error. The variance of true effects (τ^2) is 0.02, and the standard deviation of true effects (τ) is 0.00. The 95% prediction interval for the true effect sizes is -0.58 to -0.01, suggesting that in the universe of populations represented by these studies, the true effect size will fall within this range in 95% of cases. This prediction interval indicates that most studies will yield a positive impact and are likely to have a small to medium magnitude of effect.

A funnel plot of the estimates is shown in Figure 5. Upon visual inspection, there appeared to be indications of funnel plot asymmetry and Egger's regression test supports this conclusion ($p = 0.02$). Additionally, the trim and fill analysis estimated two missing studies on the right side. Finally, the cumulative meta-analysis shows a slight shift towards larger effect sizes with the addition of smaller sample size studies (see Appendix E for the trim and fill and cumulative meta-analysis plots). Based on the funnel plot, trim and fill, and cumulative meta-analysis, the bias appears to be minimal overall and can likely be trusted.

Figure 5

Funnel plot for internalizing symptoms analysis



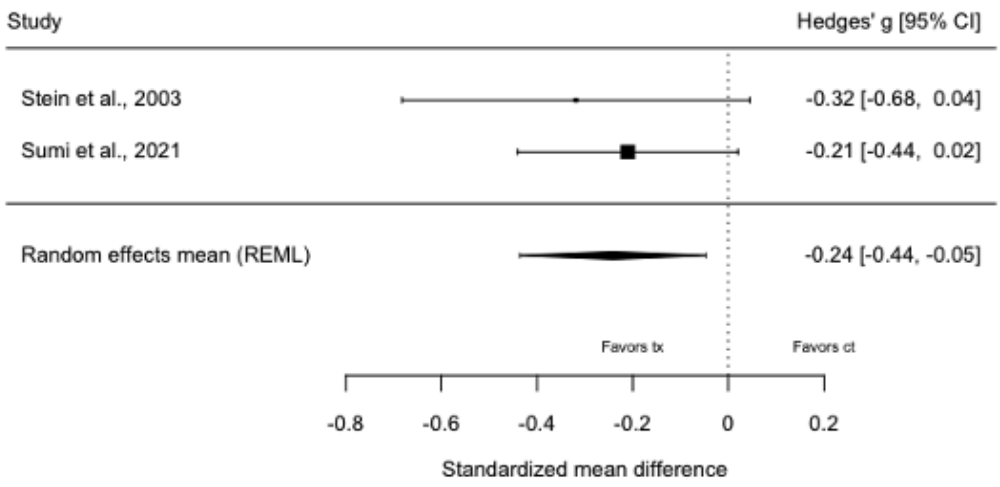
Note. These effect sizes are coded such that Observed Outcome > 0 indicate a negative finding favoring control conditions.

PTSD Symptoms. Two studies in the sample used self-report measures of adolescent PTSD symptoms (Stein et al., 2003; Sumi et al., 2021). In synthesizing these findings, a total of $k = 2$ studies were included in this meta-analysis with a total of $n = 2$ effect sizes. The observed standardized mean differences ranged from -0.32 to -0.21, with 100% of the estimates being

negative. The estimated average *g* based on the random-effects model was -0.24 (95% CI = [-0.44, -0.05]), demonstrating that the intervention was significantly associated with lower levels of PTSD symptoms (z = -2.43, $p = 0.02$). Adolescents who were assigned to the SEL program reported mean scores of PTSD symptoms that were 0.24 standard deviation lower than their peers in the control condition. A forest plot showing the observed effect sizes and the estimate based on the random-effects model is shown in Figure 6.

Figure 6

Forest plot for PTSD symptoms meta-analysis

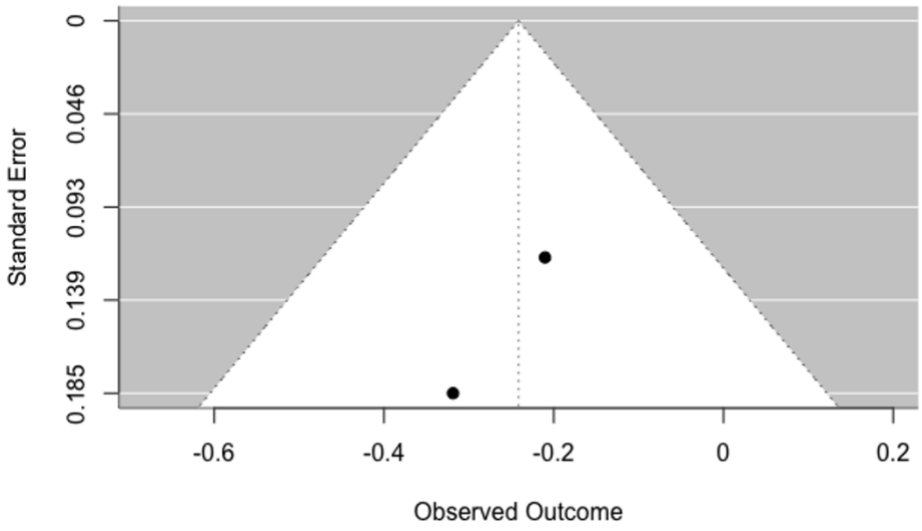


According to the *Q*-test, there was no significant amount of heterogeneity in the true outcomes and the null hypothesis that the true effect size is identical in all studies cannot be rejected ($Q(1) = 0.24$, $p = 0.62$). The I^2 statistic indicates that zero percent of the variance in the observed effect sizes reflects variance in true effects rather than sampling error. The variance of true effects (τ^2) is 0.00, and the standard deviation of true effects (τ) is 0.00. The 95% prediction interval for the true effect sizes is -0.44 to -0.05. This prediction interval indicates that most studies will yield a positive impact and are likely to have a small magnitude of effect.

A funnel plot of the estimates is shown in Figure 7. Upon visual inspection, there appeared to be indications of funnel plot asymmetry. However, due to the limited number of studies included in this model, Egger's regression, trim and fill, and cumulative analyses were not conducted. Therefore, it is unclear how bias may impact these results.

Figure 7

Funnel plot for PTSD symptoms analysis



Note. These effect sizes are coded such that Observed Outcome > 0 indicate a negative finding favoring control conditions.

Substance Use Behaviors. Measurement approaches for assessing substance use behaviors varied considerably across studies, presenting challenges for meta-analysis synthesis. To address this heterogeneity while maintaining adequate statistical power, the decision-tree approach was implemented. First, studies were prioritized based on general measures substance use behaviors with sufficient data to calculate effect sizes. This included Farrell et al. (2003), which assessed frequency of cigarettes, alcohol, cannabis, and other drug use over the past 30 days, and Trudeau et al. (2003), which measured substance use initiation across multiple

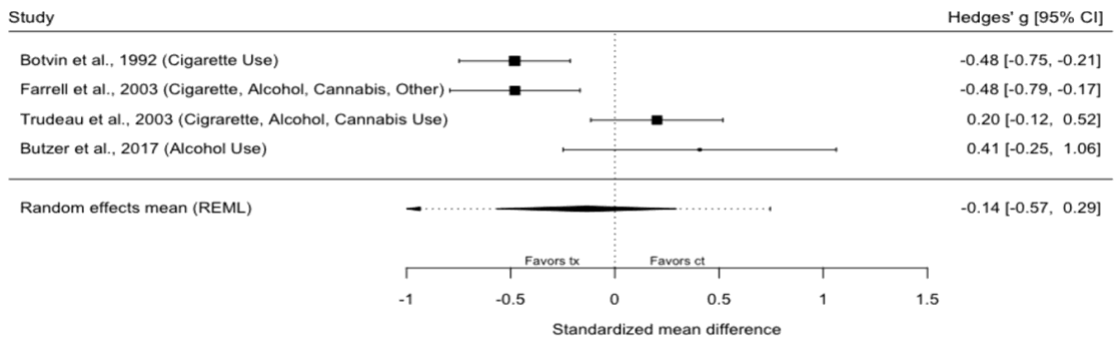
substances. Next, studies were included with the largest sample sizes that assessed specific substances use behaviors, resulting in the inclusion of Botvin et al. (1992), which reported on cigarette use frequency in the past 30 days, and Butzer et al. (2017), which measured lifetime alcohol use. This methodical selection process allowed us to maximize available data while acknowledging the limitations imposed by the inconsistent substance use measurement approaches across the primary studies.

In synthesizing these findings, a total $k = 4$ studies were included in this meta-analysis with a total of $n = 4$ effect sizes. The observed standardized mean difference ranged from -0.48 to 0.41, with 50.0% of the estimates being negative. The estimated average *g* based on the random-effects model was -0.14 (95% CI = [-0.57, 0.30]). Therefore, the average outcome did not differ significantly from zero ($z = -0.62$, $p = 0.54$), suggesting that there was not an observable difference between participants in the intervention and control groups on adolescent substance use behaviors. A forest plot showing the observed effect sizes and the estimate based on the random-effects model is shown in Figure 8.

According to the *Q*-test, the true effect sizes appear to be heterogeneous ($Q(3) = 16.62$, $p < 0.01$) and the null hypothesis that the true effect size is identical in all studies may be rejected. The I^2 statistic indicates that 83.9% of the variance in the observed effect sizes reflects variance in true effects rather than sampling error. The variance of true effects (τ^2) is 0.23, and the standard deviation of true effects (τ) is 0.48. The 95% prediction interval for the true effect sizes is -1.02 to 0.74. Given the wide range of the prediction interval, some studies may yield a negative, null, or positive effect, but the magnitude of the effect could vary greatly.

Figure 8

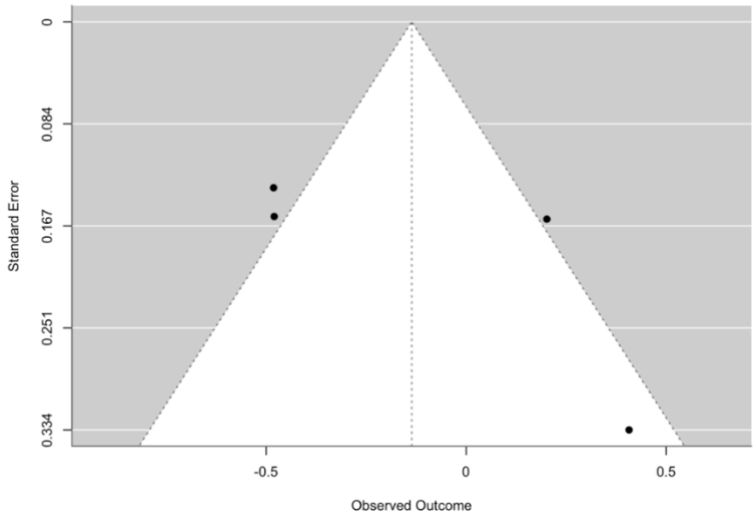
Forest plot for substance use behaviors meta-analysis



A funnel plot of the estimates is shown in Figure 9. Upon visual inspection, there appeared to be indications of funnel plot asymmetry. However, due to the limited number of studies included in this model, Egger's regression, trim and fill, and cumulative analyses were not conducted. Therefore, it is unclear how bias may impact these results.

Figure 9

Funnel plot for substance use behaviors analysis



Note. These effect sizes are coded such that Observed Outcome > 0 indicate a negative finding favoring control conditions.

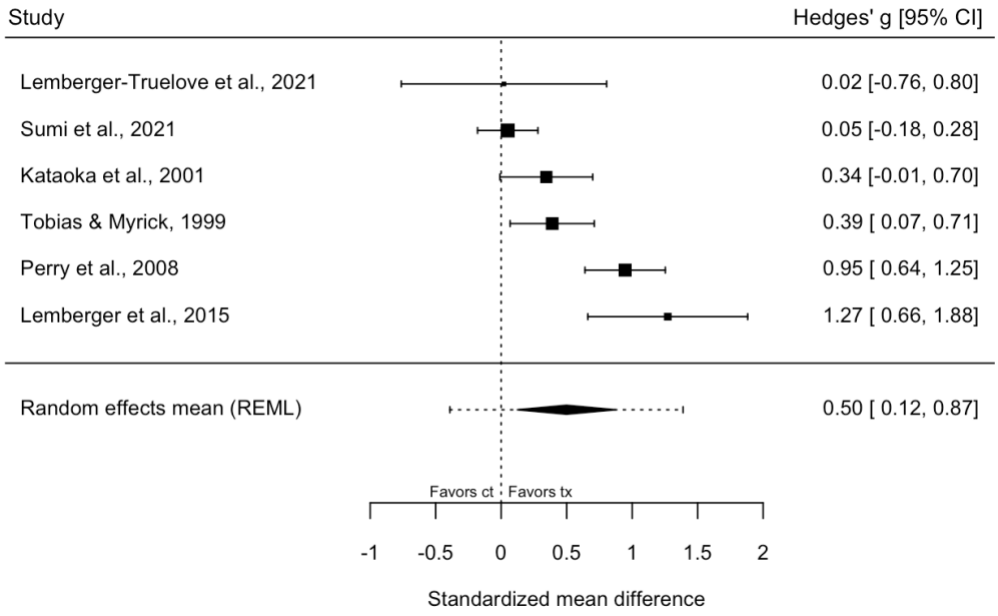
School Functioning Outcomes

Academic Achievement. Four studies reported on measures of math achievement. Three studies measured math achievement through a standardized academic achievement assessment (Lemberger et al., 2015; Lemberger-Truelove et al., 2021; Sumi et al., 2021) and one study assessed academic achievement based on students' math grades (ranging from A's to F's; Kataoka et al., 2011). In addition, two studies reported on measures of GPA (Perry et al., 2008; Tobias & Myrick, 1999). In synthesizing these findings, a total of $k = 6$ studies were included in this meta-analysis with a total of $n = 6$ effect sizes. The observed standardized mean difference ranged from 0.02 to 1.27, with 100% of the estimates being positive. The estimated average g based on the random-effects model was 0.50 (95% CI = [-0.12, 0.87]), demonstrating that the SEL program was significantly associated with higher academic achievement ($z = 2.61$, $p = 0.009$). Adolescents who were assigned to the SEL program reported mean scores of academic achievement that were 0.50 standard deviation higher than their peers in the control condition. A forest plot showing the observed effect sizes and the estimate based on the random-effects model is shown in Figure 10.

According to the Q-test, the true effect sizes appear to be heterogeneous ($Q(5) = 29.87$, $p < 0.001$) and the null hypothesis that the true effect size is identical in all studies may be rejected. The I^2 statistic indicates that 83.6% of the variance in the observed effect sizes reflects variance in true effects rather than sampling error. The variance of true effects (τ^2) is 0.17, and the standard deviation of true effects (τ) is 0.41. The 95% prediction interval for the true effect sizes is -0.39 to 1.39. Given the wide range of the prediction interval, some studies may yield a negative, null, or positive effect; but the magnitude of the effect could vary greatly.

Figure 10

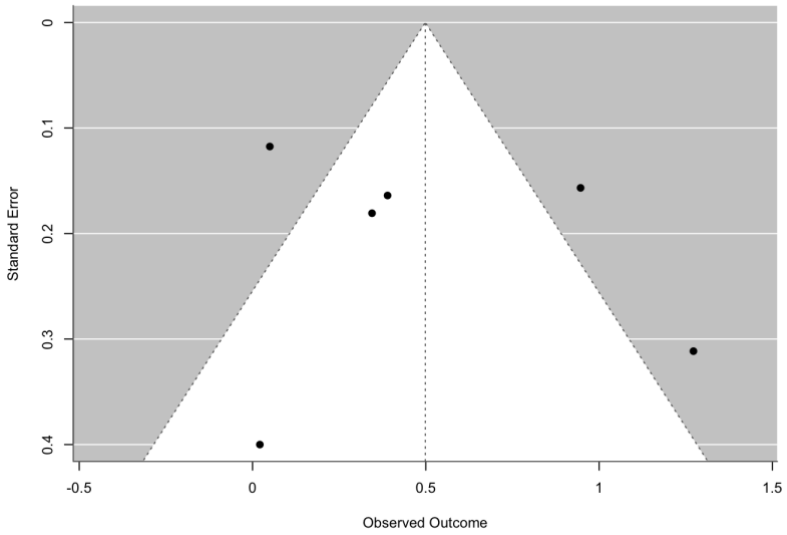
Forest plot for academic achievement meta-analysis



A funnel plot of the estimates is shown in Figure 11. Upon visual inspection, there appeared to be indications of funnel plot asymmetry (with missing studies in the lower right side); however, Egger's regression test did not indicate any funnel plot asymmetry ($p = 0.76$). Additionally, the trim and fill analysis estimated no missing studies. Finally, the cumulative meta-analysis shows a slight shift towards larger effect sizes with the addition of smaller sample size studies (see Appendix E for the trim and fill and cumulative meta-analysis plots). Based on the funnel plot, trim and fill, and cumulative meta-analysis, the bias appears to be minimal overall and can likely be trusted.

Figure 11

Funnel plot for academic achievement analysis



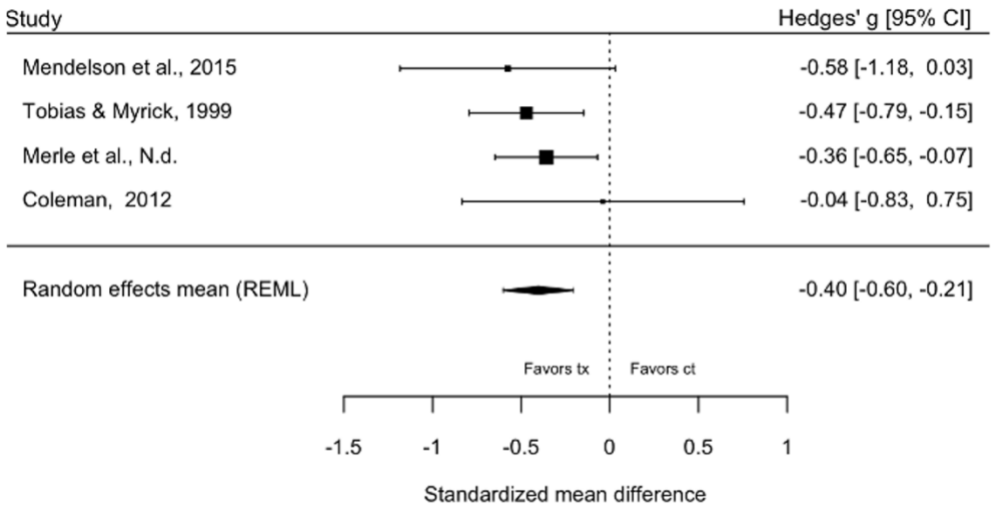
Note. These effect sizes are coded such that Observed Outcome < 0 indicate a negative finding favoring control conditions.

Disciplinary Referrals. Four studies reported on measures of disciplinary referrals (Coleman, 2012; Mendelson et al., 2015; Merle et al., N.d.; Tobias & Myrick, 1999). These studies reported on general measures of disciplinary referrals and did not provide supplemental information on the types of referrals that participants had (e.g., violent behaviors). In synthesizing these findings, a total of $k = 4$ studies were included in this meta-analysis with a total of $n = 4$ effect sizes. The observed standardized mean difference ranged from -0.58 to -.04, with 100% of the estimates being negative. The estimated average g based on the random-effects model was 0.40 (95% CI = [-0.60, -0.21]), demonstrating that the SEL program was significantly associated with lower disciplinary referrals ($z = -4.02$, $p < 0.001$). Adolescents who were assigned to the SEL program reported mean scores of disciplinary referrals that were 0.40

standard deviation lower than their peers in the control condition. A forest plot showing the observed effect sizes and the estimate based on the random-effects model is shown in Figure 12.

Figure 12

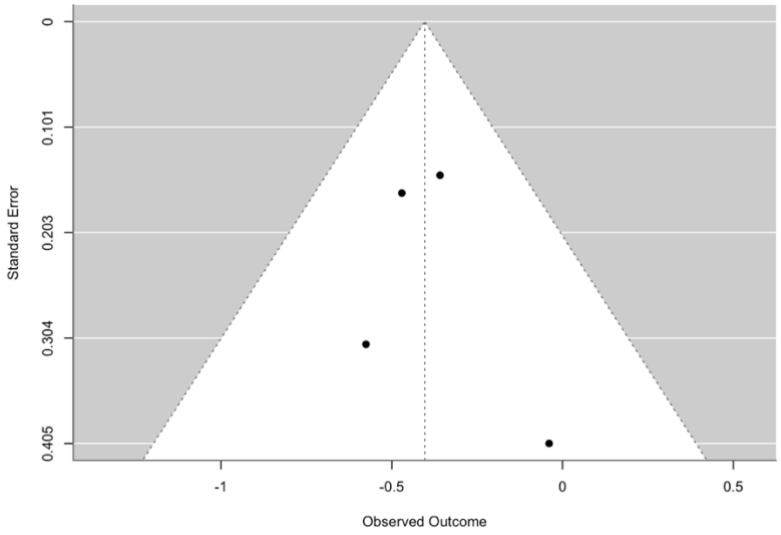
Forest plot for disciplinary referrals meta-analysis



According to the *Q*-test, there was no significant amount of heterogeneity in the true outcomes and the null hypothesis that the true effect size is identical in all studies cannot be rejected ($Q(3) = 1.37$, $p = 0.71$). The I^2 statistic indicates that zero percent of the variance in the observed effect sizes reflects variance in true effects rather than sampling error. The variance of true effects (τ^2) is 0.00, and the standard deviation of true effects (τ) is 0.00. The 95% prediction interval for the true effect sizes is -0.60 to -0.21. This prediction interval indicates that most studies will yield a positive effect and are likely to have a small to medium magnitude of effect. A funnel plot of the estimates is shown in Figure 13. Upon visual inspection, there appeared to be indications of funnel plot asymmetry. However, due to the limited number of studies included in this model, Egger's regression, trim and fill, and cumulative analyses were not conducted. Therefore, it is unclear how bias may impact these results.

Figure 13

Funnel plot for disciplinary referrals analysis



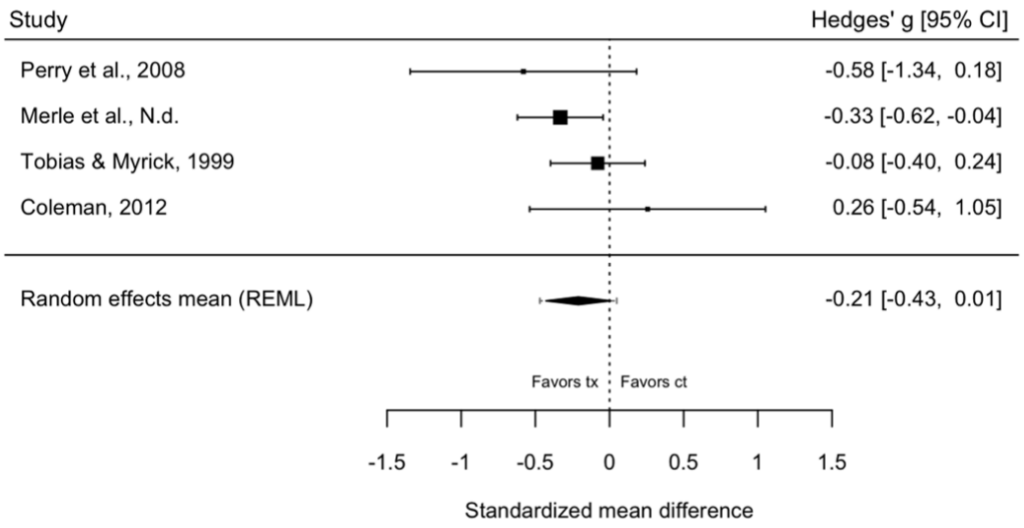
Note. These effect sizes are coded such that Observed Outcome > 0 indicate a negative finding favoring control conditions.

Truancy. Four studies reported on measures that were within the truancy domain. One study reported on the numbers of hours students were absent (Coleman, 2012), while the other studies reported on the number of days absent (Merle et al., N.d.; Perry et al., 2008; Tobias & Myrick, 1999). In synthesizing these findings, a total of $k = 4$ studies were included in this meta-analysis with a total of $n = 4$ effect sizes. The observed standardized mean difference ranged from -0.58 to 0.26, with the majority of estimates being negative (75%). The estimated average g based on the random-effects model was -0.21 (95% CI = [-0.43, -0.01]). Therefore, the average outcome did not differ significantly from zero (z = -1.90, $p = 0.06$), suggesting that there was not an observable difference between participants in the intervention and control groups on truancy outcomes. The 95% prediction interval for the true effect sizes is -0.47 to -0.05. This prediction interval indicates that while most outcomes will yield a negative effect, some studies may yield a

null or positive effect. A forest plot showing the observed effect sizes and the estimate based on the random-effects model is shown in Figure 14.

Figure 14

Forest plot for truancy meta-analysis



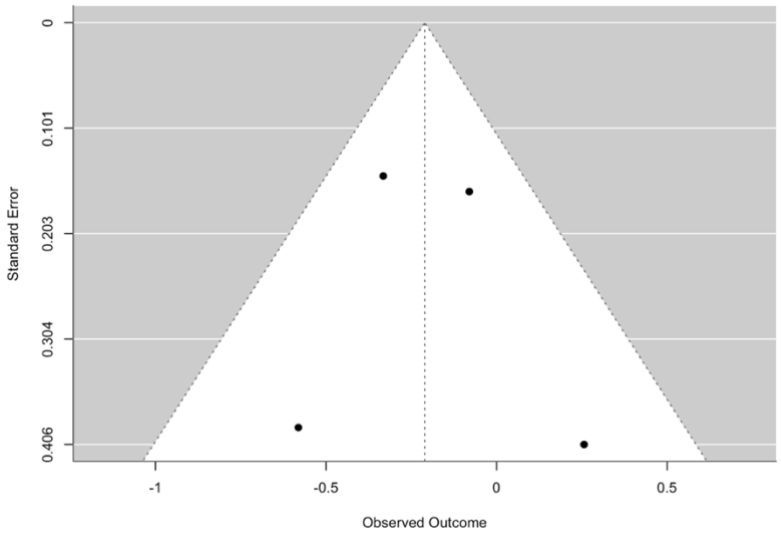
According to the *Q*-test, there was no significant amount of heterogeneity in the true outcomes and the null hypothesis that the true effect size is identical in all studies cannot be rejected ($Q(3) = 3.56$, $p = 0.31$). The I^2 statistic indicates that 9.2% of the variance in the observed effect sizes reflects variance in true effects rather than sampling error. The variance of true effects (τ^2) is 0.01, and the standard deviation of true effects (τ) is 0.07. The 95% prediction interval for the true effect sizes is -0.47 to -0.05. This prediction interval indicates that while most outcomes will yield a negative effect, some studies may yield a null or positive effect and are likely to have a small magnitude of effect.

A funnel plot of the estimates is shown in Figure 15. Upon visual inspection, there appeared to be indications of funnel plot asymmetry. However, due to the limited number of

studies included in this model, Egger's regression, trim and fill, and cumulative analyses were not conducted. Therefore, it is unclear how bias may impact these results.

Figure 15

Funnel plot for truancy analysis



Note. These effect sizes are coded such that Observed Outcome > 0 indicate a negative finding favoring control conditions.

Moderator Analyses

Implementation Level. For mental health outcomes, formal statistical and narrative moderator analyses examining implementation level differences were unable to be conducted for PTSD and substance use behaviors due to the homogeneity of program settings within each outcome category. For internalizing symptoms, where greater diversity in implementation approaches existed, a narrative comparison was performed, though formal statistical comparison remained inappropriate due to the limited number of studies. Three studies implemented universal programs (n = 3 effect sizes; Butzer et al., 2017; Chaplin et al., 2006; Mendelson et al., 2015) and four studies implemented selective programs (n = 4 effect sizes; Gillham et al., 2007;

McCarty et al., 2013; Stein et al., 2003; Sumi et al., 2021). The summary effect size for universal programming (g = -0.21, 95% CI [-0.52, 0.09]) was comparable to that for selective programming (g = -0.28, 95% CI [-0.56, 0.01]). While these findings suggest that both universal and selective approaches may yield similar benefits for reducing internalizing symptoms, the limited number of studies prevents drawing definitive conclusions regarding differential effectiveness by implementation level.

For school functioning outcomes, the distribution of implementation levels across studies precluded formal statistical comparisons of moderating effects. Only one study (Tobias & Myrick, 1999) examined indicated programming, two studies (Kataoka et al., 2011; Sumi et al., 2021) implemented selective programming, while the remaining six studies (Coleman, 2012; Lemberger et al., 2015; Lemberger-Truelove et al., 2021; Mendelson et al., 2015; Merle et al., N.d.; Perry et al., 2008) utilized universal approaches. This limited number of studies necessitated narrative comparison rather than statistical moderation analysis. For academic achievement, universal programming (g = 0.75, 95% CI [0.18, 1.31]; three studies; n = 3 effect sizes; Lemberger et al., 2015; Lemberger-Truelove et al., 2021; Perry et al., 2008) demonstrated a notably larger effect than selective programming (g = 0.20, 95% CI [-0.10, 0.49]; two studies; n = 2 effect sizes; Kataoka et al., 2001; Sumi et al., 2021) and indicated programming (g = 0.39, 95% CI [0.07, 0.71]; one study; n =1; Tobias & Myrick, 1999). Additionally, selective and indicated programming demonstrated comparable effects for academic achievement. For behavioral outcomes, the patterns were less pronounced, with universal programming demonstrating a slightly smaller effect on disciplinary referrals (g = -0.33, 95% CI [-0.89, 0.24]; three studies; n = 3 effect sizes) compared to indicated programming (g = -0.47, 95% CI [-0.79, -0.15]), but a slightly larger effect on truancy (g = -0.22, 95% CI [-0.83, 0.40]; three studies, n = 3

effect sizes) compared to indicated programming (g = -0.08, 95% CI [-0.40, 0.24]). While these narrative comparisons suggest potentially stronger effects of universal programming on academic achievement with comparable effects on disciplinary referrals and truancy, the limited number of studies in each implementation category prevents drawing definitive conclusions about differential effectiveness.

SEL Setting. The limited number of studies implementing OST programming (i.e., Chaplin et al., 2006; Gillham et al., 2007) prevented formal statistical comparison of this potential moderator. However, a narrative comparison was able to be conducted focused solely on internalizing symptoms. The narrative comparison revealed that OST programming demonstrated a slightly larger effect size (*g* = -0.44, 95% CI [-0.55, 0.33]; two studies; *n* = 2 effect sizes) compared to DSH programming (*g* = -0.18, 95% CI [-0.54, 0.19]; five studies; *n* = 5 effect sizes). This pattern suggests that SEL programs implemented OST might potentially offer greater benefits to SEL programs implemented DSH for reducing internalizing symptoms. However, there is not enough evidence to make substantial conclusions regarding the differential effectiveness of implementation setting.

Transformative SEL Elements. For mental health outcomes, formal statistical comparisons were precluded by the limited number of studies within each outcome category. For PTSD symptoms, meaningful comparison was not possible as both studies implemented the same intervention. The narrative comparison of internalizing symptoms revealed that programs identified as incorporating transformative SEL elements (*g* = -0.16, 95% CI [-0.46, 0.14]; two studies; *n* = 2 effect sizes; Stein et al., 2003; Sumi et al., 2021) demonstrated a slightly smaller effect on reducing internalizing symptoms than those without such components (*g* = -0.29, 95% CI [-0.58, 0.002]; five studies; *n* = 5 effect sizes; Butzer et al., 2017; Chaplin et al., 2006;

Gillham et al., 2007; McCarty et al., 2013; Mendelson et al., 2015). A more pronounced pattern emerged for substance use behaviors, where SEL programs with transformative SEL elements showed a small effect in reducing substance use behaviors (g = -0.25, 95% CI [-0.55, 0.05]; three studies; n = 3 effect sizes; Botvin et al., 1992; Butzer et al., 2017; Farrell et al., 2003) while the programming without transformative elements demonstrated a small counter-effect (g = 0.41, 95% CI [-0.25, 1.06]; one study; n = 1 effect size; Tobias & Myrick, 1999). These findings suggest that transformative SEL elements provide greater benefits to SEL programming without transformative elements for reducing internalizing symptoms. Additionally, transformative SEL elements appear to offer small effects for decreasing substance use behaviors compared to SEL programs without transformative elements. However, the limited number of studies and considerable heterogeneity in program characteristics necessitate caution in interpreting these patterns as definitive evidence of differential effectiveness by transformative content.

For school functioning outcomes, the limited number of studies incorporating transformative SEL elements again necessitated narrative comparison rather than formal statistical moderation analysis. For disciplinary referrals and truancy outcomes, meaningful narrative comparison was not possible. For academic achievement, SEL programs with transformative SEL elements (g = 0.20, 95% CI [-0.10, 0.49]; two studies; n = 2; Kataoka et al., 2011; Sumi et al., 2021) demonstrated a smaller effect than those without such elements (g = 0.66, 95% CI [0.15, 1.16]; four studies; n = 4 effect sizes; Lemberger et al., 2015; Lemberger-Truelove et al., 2021; Perry et al., 2008; Tobias & Myrick, 1999). Despite these findings, caution is warranted in drawing firm conclusions about the differential effectiveness by transformative content due to the small sample of available studies.

CHAPTER IV

DISCUSSION

The following section summarizes the findings from this systematic review and meta-analysis as well as provides a discussion around the limitations of the current evidence available for SEL programs for early adolescents and the methodology for this meta-analysis. Finally, practice, policy, and research implications are discussed.

SEL Skills Endorsed Across SEL Programs

The systematic review revealed considerable diversity in SEL skills and teaching approaches across programs. All studies (100%) included at least one self-awareness skill, with high representation of self-management and social awareness (95.6%), responsible decision-making (86.9%), and relationship skills (73.9%). These findings parallel Cipriano et al.'s (2023) meta-analysis of SEL skill distribution. Emotional awareness and problem-solving emerged as the most commonly taught specific SEL skills, reflecting their developmental significance during early adolescence. Emotional awareness is particularly crucial during this period when adolescents experience heightened emotional intensity and variability due to pubertal changes in neural and hormonal systems (Grant et al., 2006; Gross, 2014), serving as the essential foundation for developing effective emotion regulation capabilities (Gross, 2014). Emotional awareness and problem-solving emerged as the most commonly taught specific SEL skills, reflecting their developmental significance during early adolescence. Notably, few programs teaching problem-solving (33.3%) integrated these skills with emotion regulation strategies—a particularly valuable approach during this developmental period. This integration is critical because underdeveloped emotion regulation capacities can significantly impair problem-solving abilities and undermine effective decision-making. (Luciana, 2013). SEL curriculum developers

should consider implementing a progressive instructional sequence that establishes emotional awareness activities first, builds regulation strategies second, and subsequently introduces more complex problem-solving frameworks—optimizing the developmental synergy between these interconnected SEL domains.

Transformative SEL Elements Across SEL Programs

The limited implementation of transformative SEL elements across reviewed programs represents a significant gap in current middle school SEL approaches. While culturally responsive education appeared in approximately 39% of programs—primarily through participatory action research methods and culturally relevant terminology—other transformative elements were notably less prevalent. Only 17% of programs incorporated instruction honoring students' lived experiences, 13% demonstrated authentic family-school-community partnerships, and 8.7% provided opportunities to examine social norms and biases. These findings demonstrate the scarcity of studies that report transformative elements as components of SEL programs, and when such elements are reported, they represent only a narrow spectrum of possible transformative approaches. Thus, transformative SEL remains an emerging area in the field, with considerable room for growth and development. As early adolescence represents a critical period when youth develop more sophisticated understandings of social inequities and cultural identity (Umaña-Taylor, 2016), there is a pressing need for clearer operational definitions of transformative SEL elements and explicit implementation examples. Future research should focus on developing taxonomies of transformative SEL practices with concrete curriculum activities, establishing measurable indicators of implementation fidelity, and creating accessible resources that help practitioners integrate these elements into existing programs. Such

efforts would advance both the conceptual clarity and practical application of transformative SEL, potentially enhancing program relevance for diverse adolescent populations.

Summary of Evidence

This systematic review of SEL programs for early adolescents enrolled in 6th through 8th grade (N = 23 studies) demonstrated inconsistent effectiveness. Meta-analyses, which included a subset of the reviewed studies with sufficient statistical information (n = 19), demonstrated that SEL programs for early adolescents showed small but significant positive effects on internalizing symptoms (g = -0.30, 95% CI [-0.43, -0.16]) and PTSD symptoms (g = -0.24, 95% CI [-0.44, -0.05]). However, no significant effects were observed for substance use behaviors (g = -0.14, 95% CI [-0.57, 0.30]). For school functioning outcomes, SEL programs demonstrated a moderate positive effect on academic achievement (g = 0.50, 95% CI [0.12, 0.87]) and a small reduction in disciplinary referrals (g = -0.40, 95% CI [-0.60, -0.21]). However, no significant effects were observed for truancy (g = -0.21, 95% CI [-0.43, -0.01]).

Comparison of Findings with Previous Meta-Analyses

Results from the current review were compared to previous meta-analyses (including K-12 students) across outcome categories most comparable to those in the current review. Some findings from the current meta-analysis are in line with a previous meta-analysis that found non-significant effect sizes for substance use behaviors and truancy (d = 0.11 and d = 0.10, respectively with positive values indicating positive SEL program effect; Durlak et al., 2011). However, Sklad et al. (2012) found a significant small effect for substance use behaviors (d = -0.09). Additionally, the small effect size for internalizing symptoms found in the current meta-analysis, was comparable to prior meta-analyses assessing internalizing symptoms (d = -0.19; Sklad et al., 2012) and emotional distress (g = 0.14; positive value indicates positive SEL

program effect; Cipriano et al., 2023). Alternatively, the current meta-analysis found a larger effect of SEL program on academic achievement (moderate effect) compared to prior meta-analyses assessing school grades (d = 0.20; Durlak et al., 2011), achievement test scores (d = 0.17; Durlak et al., 2011), and academic achievement (d = 0.46; Sklad et al., 2012). Lastly, the current meta-analysis found a small effect of SEL programming on disciplinary referrals, whereas another meta-analysis found a non-significant effect (g = 0.18; Cipriano et al., 2023).

Overall, it is particularly promising that our findings align with previous meta-analyses in showing positive effects of SEL programs for internalizing symptoms and academic achievement, suggesting these may be areas where SEL programs consistently demonstrate effectiveness across developmental stages. However, differences observed in effect sizes may be attributed to the current review's stricter inclusion criteria (RCTs only, U.S. studies only, specific grade levels), producing a more homogeneous but smaller set of studies than previous reviews, potentially limiting statistical power while enhancing specificity. Additionally, differences could also reflect the unique developmental period of early adolescence, indicating that future meta-analyses should focus on distinct developmental stage rather than aggregating across broader age ranges. This approach may be more beneficial in identifying which SEL programs and their associated features most effectively address mental health and school functioning outcomes by developmental periods.

Moderator Analyses

Moderator analyses were limited and unable to be completed as planned for SEL program implementation level, setting, and transformative elements due to the lack of available evidence on mental health or school functioning outcomes. However, the narrative comparisons of moderators revealed several tentative patterns. For implementation level, universal and selective

programming yielded comparable effects for internalizing symptoms (g = -0.21 and g = -0.28, respectively). For school functioning outcomes, universal programming appeared to demonstrate larger effects for academic achievement (g = 0.75) compared to selective (g = 0.20) or indicated programming (g = 0.39), while effects on disciplinary referrals and truancy were relatively comparable across implementation levels. For SEL setting, our limited comparison suggested a slightly larger effect of OST programming on internalizing symptoms (g = -0.44) compared to DSH programming (g = -0.18). However, with only two studies examining OST programs, this finding requires extreme caution in interpretation. Lastly, narrative comparisons found that SEL programs with transformative SEL elements demonstrated: (a) comparable effects on internalizing symptoms (g = -0.16 versus g = -0.29), (b) larger effects on substance use behaviors (g = -0.25 versus g =0.41), and (c) smaller effects on academic achievement (g = 0.20 versus g = 0.66) compared to SEL programs without transformative SEL elements.

Overall, findings regarding SEL program implementation level and setting offer preliminary guidance for middle schools considering SEL programming. The comparable effectiveness of universal and selective approaches for mental health outcomes suggests that schools might select implementation models based on their specific resource constraints and student needs rather than assuming one approach is inherently superior. Similarly, the potential effectiveness of OST programming highlights an alternative implementation pathway that may circumvent scheduling challenges in departmentalized middle school structures (e.g., students moving between different subject-specific teachers throughout the day rather than remaining with a single teacher). Additionally, the limited presence of transformative SEL elements across the reviewed programs represents an area for potential growth. As adolescents become increasingly aware of social inequities and develop more sophisticated understandings of identity

and culture, incorporating transformative approaches that address these dimensions may enhance program relevance and effectiveness. The preliminary finding that transformative elements may be particularly beneficial for substance use outcomes warrants further investigation, as it suggests that addressing broader social contexts may be important for preventing risk behaviors. Notably, the finding that SEL programs with transformative elements had smaller effect sizes on academic achievement compared to programs without transformative elements merits careful attention, particularly since academic achievement metrics often influence school funding and reputation. These findings suggest that transformative SEL approaches may have differential effectiveness across outcome domains, potentially offering stronger support for behavioral outcomes with less impact on traditional academic metrics. However, the limited number of studies in each category warrants significant caution from drawing definitive conclusions about differential effectiveness of these program characteristics.

Associations Between Skill Components and Effective SEL Programs

Qualitative analysis of programs with significant meta-analysis effects demonstrated outcome-specific skill patterns. Programs effectively reducing internalizing and PTSD symptoms (e.g., CBITS, Penn Resiliency Program) consistently featured emotion awareness skills coupled with cognitive change ER skills, such as teaching participants to identify emotions through physical sensations and apply cognitive restructuring techniques. In addition, programs showing significant effects on disciplinary referrals and GPA (e.g., CharacterStrong S.E.R.V.E., Ripple Effects for Teens) emphasized interpersonal listening skills, problem solving frameworks, and help-seeking behaviors. Programs yielding significant effects across mental health and school functioning outcomes typically featured comprehensive skill coverage spanning at least four CASEL domains and incorporated explicit practice opportunities through structured behavioral

rehearsal or role-playing. The Responding in Peaceful and Positive Ways program, which demonstrated significant SEL program effects on both substance use behaviors and disciplinary referrals, exemplified this comprehensive approach through its integration of emotional awareness, explicit response modulation techniques, and detailed problem-solving frameworks (e.g., SCIDDLE), while also addressing broader social context through its focus on challenging stereotypes and biases. This pattern suggests that programs achieving broader impact successfully balance intrapersonal skill development with interpersonal competencies while providing structured opportunities for skill application.

Limitations

While the current systematic review and meta-analysis provides valuable insights into the effectiveness of SEL programs for middle school students, several important limitations must be acknowledged. First, the current meta-analysis is limited by both the small number of included studies and their methodological rigor. The number of studies available for each outcome was extremely limited: internalizing symptoms ($k = 7$), PTSD symptoms ($k = 2$), substance use behaviors ($k = 4$), academic achievement ($k = 6$), disciplinary referrals ($k = 4$), and truancy ($k = 4$). These small sample sizes severely restricted our ability to conduct robust meta-analyses and moderator analyses. Moreover, the risk of bias assessment revealed significant methodological concerns across the included studies. Only 26.1% ($n = 6$) of studies included a consort diagram, and high percentages of studies showed high/unclear risk of bias in critical domains including masking of outcome assessors (86.9% $n = 20$), allocation concealment (82.6%, $n = 19$), and sequence generation (69.6%, $n = 16$). In addition, due to the limited number of studies, publication/small study bias was assessed in only two models (i.e., internalizing symptoms and academic achievement). Of which, there appeared to be minimal evidence of publication bias,

suggesting that the included studies for internalizing symptoms and academic achievement are likely representative of the overall population of studies. However, less than ten studies were included in the internalizing symptoms and academic achievement meta-analyses. Thus, taken together, these methodological limitations raise concerns about the internal validity of the findings and highlight the need for additional RCTs evaluating SEL program effectiveness on mental health and school functioning outcomes to strengthen the evidence base for these interventions.

Furthermore, the included studies varied considerably in their outcome measures, making direct comparisons challenging. The heterogeneity in measurement approaches, particularly for constructs like substance use behaviors, may have contributed to the mixed findings observed in the current meta-analyses. For example, this meta-analysis demonstrated a wide range of effect sizes from individual studies for all of the outcomes, which leads to wider prediction intervals for what may be expected for future studies' effect sizes. This variability of effect sizes that spans between negative and positive impacts lowers confidence in the ability to conclude that SEL programs have an overall positive effect. Moreover, the reliance on self-report measures across many studies also introduces potential measures that are susceptible to bias associated with social desirability, or the desire to present oneself favorably, and recall bias, in which participants may or may not be able to accurately recall past events (Althubaiti, 2016), particularly for sensitive outcomes like mental health symptoms and substance use. Overall, these risks of bias may lead to an overestimation of effect sizes, inferring that SEL programs has a more positive effect than the true effect.

An important limitation of this study was our inability to conduct formal statistical comparisons for SEL program implementation level, setting, and transformative elements as

moderators due to the lack of research available on mental health and school functioning outcomes. There was limited representation of selective and indicated programs, studies examining OST programs within the school setting, and studies incorporating transformative SEL elements. These gaps are particularly concerning given the increasing mental health challenges faced by adolescents, the potential advantages of diverse implementation approaches, and the importance of addressing systemic inequities in educational settings.

In addition to the limitations within the available literature, there are also limitations to the meta-analysis procedures to consider. For reasons of efficiency and lack of author responses, this review based extraction of program information from the texts of the studies reviewed. This approach likely affected our coding of SEL skills and program characteristics, as published descriptions often provide abbreviated information about intervention components. This may have led to an underestimation of skill coverage or transformative elements actually present in curricula, created artificial distinctions due to inconsistent terminology across studies, and limited our ability to clarify ambiguities or access unpublished program modifications. These extraction limitations suggest our analysis of program characteristics represents a conservative estimate of the actual SEL content implemented.

Another significant limitation is the lack of longitudinal data examining the sustainability of program effects over time. The current review focused exclusively on immediate post-baseline outcomes, providing no insight into whether SEL program benefits are maintained, diminish, or potentially increase in the months and years following implementation. Given that early adolescence represents a critical developmental period with potentially far-reaching consequences for later adjustment, understanding the long-term effectiveness of SEL programs is essential for evaluating their true utility and cost-effectiveness.

Finally, though the author attempted to capture the currently available literature, there are limitations to the search procedures in which databases were chosen and where grey literature was retrieved. It is possible that some studies were not located during the data collection, especially as the current standardized nomenclature for SEL programming has and continues to evolve.

Implications

Practice and Policy Implications

Based on the information from this meta-analysis, school-based SEL programs show small but significant positive effects on internalizing symptoms and moderate and significant effects on academic achievement among early adolescents. It is important to note that most research was predominantly conducted on majority White samples, with limited representation of racially and ethnically diverse populations, students from low socioeconomic backgrounds, and rural communities. This indicates that these findings are particularly relevant to a more homogenous set of participants and may not be generalizable to more diverse populations. Overall, practitioners should be cautioned against interpreting SEL programming as universally beneficial across diverse populations and settings.

Despite promising findings for certain outcomes, the evidence base remains characterized by mixed results across a limited number of studies, with only 23 studies meeting inclusion criteria and even fewer providing adequate data for meta-analysis calculations underscoring the need for additional high-quality research examining SEL program effectiveness for diverse populations through rigorous methodological designs. The current evidence landscape presents a challenging reality for educational decision-makers, particularly given the mounting pressure on schools to respond to escalating mental health concerns and academic challenges among middle

school students. Educators often find themselves caught between urgent needs and insufficient guidance, forced to make high-stakes decisions without adequate information about which SEL programs might best serve their specific student populations and targeted outcomes. While organizations like CASEL provide valuable frameworks and program classifications, current guidance lacks crucial details about specific skill components and their differential effects across diverse contexts, populations, and outcomes. To bridge this gap, CASEL and similar organizations could significantly enhance their guidance by: (1) developing comprehensive skill inventories for recommended programs that clearly identify which CASEL domains and specific skills receive substantial emphasis; (2) expanding reviews to include high-quality selective and indicated SEL programs that address the needs of students requiring more targeted support; and (3) strengthening evaluation standards to ensure program quality and generalizability. This could include requiring data submission to repositories for future meta-analyses, establishing stricter criteria for "SELect" designation (e.g., multiple supporting RCTs), providing appropriate cautionary notes for programs with limited evidence, and offering critical analysis of each program's generalizability across diverse student populations. These enhancements could facilitate more informed decisions about which programs might best serve educational decision-makers specific contexts and targeted outcomes.

It should be emphasized that the responsibility for navigating this complex landscape should not primarily land on educators who are already overburdened with numerous demands with limited time and specialized research training. Rather, it is incumbent upon researchers, funding agencies, and SEL-focused organizations to take greater accountability for translating complex findings into accessible, actionable guidance based on rigorous evidence. These professionals and entities possess the methodological expertise and resources to synthesize

evidence and develop context-specific recommendations that educators can confidently apply. By failing to provide this level of support, we risk not only implementing ineffective SEL programs that waste taxpayer dollars and school providers time to train, but also contribute to educator burnout and disillusionment with evidence-based practices. Moving forward, the field must commit to more transparent communication about both the promise and limitations of SEL programming, working collaboratively with educators to develop SEL programs and associated implementation approaches that genuinely meet the diverse needs of middle school students.

Research Implications

This systematic review and meta-analysis illuminate significant gaps in current literature regarding SEL programming for middle school students. Most notably, current evidence for SEL programs has focused on SEL acquisition rather than application, as evidenced by the limited number of methodologically rigorous studies examining mental health and school functioning outcomes. The general goal of SEL programming is often to promote the update of SEL skills because they are theorized to be effective at improving students' social and emotional well-being and performance in academic settings. However, the current body of evidence does not have strong evidence to ascertain whether these trainings are effective in improving mental health and school functioning amongst early adolescents. Future research should prioritize evaluating both the acquisition of SEL skills and how these skills (e.g., implementation of various skill combinations) translate into meaningful improvements in mental health and academic outcomes.

In addition, transformative SEL represents a critically important evolution in SEL programming, particularly given the high rates of mental health and academic disparities among historically marginalized student population (Beaty, 2018; Frankenberg & Taylor, 2015). While approximately 57% (n =13) of studies in this review incorporated at least one transformative

SEL element, the current review was unable to make firm interferences about their effectiveness on mental health and school functioning outcomes. This limitation reflects the broader field's lack of robust evidence regarding the specific impact of transformative SEL elements. Currently, descriptions of transformative SEL remain largely conceptual, leaving practitioners without concrete guidance on how to meaningfully integrate transformative concepts such as culturally responsive practices or youth-led approaches into school programming.

To address this gap, future research should pursue two key directions. First, researchers should use community-engaged/participatory approaches and qualitative methodologies to develop concrete, operational definitions of transformative practices, with explicit implementation examples specifically tailored to middle school developmental needs. Second, more rigorous evaluation of transformative SEL approaches is needed, particularly examining how specific transformative elements contribute to different outcomes and how these approaches can be effectively implemented within diverse school contexts. Finally, given the current polarized political climate surrounding educational content addressing diversity, equity, and social justice, the field must develop strategic approaches to continue this essential work. This might include framing transformative elements in terms of their universal benefits for critical thinking, perspective-taking, and community building, skills valued across the political spectrum. Additionally, engaging stakeholders in research design through community-engaged/participatory research practices can help ensure transformative SEL research reflects local priorities and values while still addressing systemic inequities. By developing this evidence base through politically sustainable approaches, the field can continue advancing our understanding of how transformative SEL can effectively support the well-being and success of all students, particularly those from historically marginalized communities.

Conclusion

The current systematic review and meta-analysis provides important insights into the effectiveness of SEL programs for middle school students while highlighting significant gaps in the current evidence base. Findings from the current meta-analysis highlight that while SEL programming shows promising small consistent effects on internalizing and PTSD symptoms as well as disciplinary issues, and moderate positive effects on academic achievement. However, effects on substance use and truancy appear highly variable and context-dependent. In addition, the variability in SEL program characteristics and effectiveness emphasizes the importance of carefully selecting SEL programs to address the specific developmental needs of early adolescents and the contextual features of middle school environments. Educational decision-makers need more robust support systems and clearer guidance to help them navigate the complex landscape of SEL programming and select interventions most appropriate for their specific student populations and targeted outcomes. While findings from the current review provide some guidance for such selection, they also underscore the need for continued research utilizing rigorous methodologies to enhance our understanding of whether SEL programming for middle school students is having the desired effect on students' psychological well-being and academic success.

APPENDIX A: SEARCH STRINGS

Searched in Title/Abstract fields unless otherwise specified. Search terms are based on the following categories: eligible population, intervention type, intervention setting, and study design (RCT).

Adol* OR youth OR teens OR “early adolescents” OR “middle school students” OR “secondary school students”

AND

“Social emotional learning” OR “emotional intelligence” OR “emotional development” OR “social skills” OR “social skills training” OR “social learning” OR “psychosocial development” OR “interpersonal relationships” OR “interpersonal communication” OR “communication skills training” OR “childhood development” OR “emotional learning” OR empathy OR “interpersonal competence” OR “responsible decision making” OR “social awareness” OR “stress management” OR “positive youth development” OR

AND

“Educational environment” OR “classroom environment” OR “secondary school” OR “middle school” OR school-based OR “out-of-school-time” OR “after school” OR “Tier 1” OR “Tier 2” OR “Tier 3”

AND

"randomi* control* trial" OR RCT OR "randomi* clin* trial" OR allocation OR allocated OR assigned OR “casual design” OR “cluster design” OR “comparison condition” OR “comparison group” OR “control condition”

APPENDIX B: CODING MANUAL

EVALUATING THE IMPACT OF SCHOOL-BASED SOCIAL EMOTIONAL LEARNING PROGRAMS

SYSTEMATIC AND META-ANALYSIS

CODING MANUAL

Last updated December 31st, 2024

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ELIGIBILITY CRITERIA

Social-Emotional Learning Programs Operational Definition: school-based social and emotional learning programs support the development of intra- and interpersonal skills (i.e., social and emotional skills, respectively) to promote physical and psychological health for all students in a given school or grade, including fostering emotional intelligence, behavior regulation, identity formation, and the skills necessary for establishing and maintaining supportive relationships and making empathic and equitable decisions in the best interest of the school community. Programs may include any combination of skills across CASEL SEL domains, but content must target at least one emotional competency and one social competency to be included as SEL in this study.

Phase I and Phase II Screening Criteria:

1. **LANGUAGE**: Exclude studies not published in English
2. **GEOGRAPHY**: Include studies conducted in the United States
3. **DATE AVAILABLE**: Studies included must be published prior to July 1st, 2024.
4. **POPULATION AGE:** Studies including students outside this designated range (e.g., elementary or high school students) were excluded unless they provided disaggregated data allowing for the extraction of grade-specific effects.
5. **SETTING**: Exclude studies in which SEL programming occurred outside of the school setting.
    - School-based SEL programming was operationally defined as interventions implemented exclusively on school premises during or outside of regular school hours. Studies were excluded if they involved SEL programs delivered in non-school

settings (e.g., community centers, YMCA facilities, or private clinics), even if they targeted school-age populations or addressed school-related outcomes.

6. **INTERVENTION AIMS/CONTENT:** Include studies in which SEL programming primarily focused on promoting SEL competencies, which requires content of the SEL program to address at least one social competency and one emotional competency based on the CASEL framework definition to be considered a SEL intervention/program.
7. **INTERVENTION PARTICIPANTS**: Include studies that target students (i.e., studies must include at least one student outcome listed below in "Study Outcomes").
8. **STUDY OUTCOMES**: Include studies that identify/include at least one of the following student outcomes: mental health and school functioning.
    - Mental health outcomes included measures of internalizing problems (e.g., depression, anxiety, suicidality aside from depression; somatic problems, eating problems and/or disorders, Bipolar and related disorders) and externalizing problems (attention deficit/hyperactivity disorder, conduct disorder, oppositional defiant disorder, and substance use behaviors).
    - School functioning outcomes included measures of academic achievement (in the form of tests, grades/grade-point average, graduation/drop-out rates) and indices of behavioral school adjustment (e.g., truancy, disciplinary referrals).
9. **STUDY DESIGN**: Include studies with a randomized controlled trial (RCT) study design, in which participants were randomly allocated to SEL program or control conditions. This review deliberately excluded quasi-experimental designs, where randomization might be compromised by allocation based on pre-existing groups or convenience factors. Studies were also excluded if they did not use a between-groups

design to compare the effects of SEL intervention to a no-treatment control or business as usual comparison condition.

10. **ARTICLE TYPES**: This review will include studies that are either published or unpublished reports of SEL programs that meet program aims and content criteria described above.
11. **EFFECT SIZE CALCULATION**: Studies meeting all inclusion criteria described thus far were incorporated into the systematic review. However, only studies providing sufficient statistical information to calculate an effect size through data available in print were included in the meta-analysis review. Given time constraints, no supplementary data to calculate an effect size were requested from study authors.

FULL-TEXT CODING

QUALITY ASSESSMENT

[consort]

CONSORT Diagram: Do the authors provide a CONSORT flow diagram, or similar, documenting study design?

1. Yes
2. No

[randseq]

Random Sequence Generation: What is the risk of selection bias due to inadequate generation of a randomized sequence?

1. **Low risk.** The investigators describe a random component in the sequence generation process such as referring to a random number table, using a computer random number generator, coin tossing, shuffling cards/envelopes, throwing dice, drawing of lots, or minimization.
2. **High risk.** The investigators describe a non-random component in the sequence generation process. This might involve some systematic non-random approach such as odd/even birth dates, rules based on dates of admission, rules based on some sort of record number. Other non-random approaches might include allocation by judgement (e.g., teacher, practitioner ratings), allocation by participant preferences, or allocation by availability of the intervention.
3. **Unclear risk**. Insufficient information is provided about the sequence generation process to permit judgement of low or high risk.

[randseqdetails]

Sequence Generation Details. Please describe the justification for this risk of bias assessment for random sequence generation. Include direct quotes (with quotation marks) where appropriate. Include page numbers and report ID# to sections of the text used for the risk of bias assessment.

[alloccon]

Allocation Concealment: What is the risk of selection bias due to inadequate concealment of allocations prior to assignment?

1. **Low risk.** Participants and investigators enrolling participants could not foresee assignment because one of the following, or an equivalent method was used to conceal allocation: central allocation (e.g., telephone, web-based randomization), sequentially numbered containers of identical appearance, or sequentially numbered, opaque sealed envelopes.
2. **High risk.** Participants or investigators enrolling participants could possibly foresee assignments and thus introduce selection bias such as allocation based on: using an open random allocation schedule (e.g., a list of random numbers), assignment envelopes without appropriate safeguards (e.g., if envelopes were unsealed, or nonopaque, or non-sequentially numbered); alternation or rotation, date of birth, case record number, or any other explicitly unconcealed procedure.
3. **Unclear risk.** Insufficient information is provided about the concealment of allocation process to permit judgement of low or high risk. This is usually the case if the method of concealment is not described or not described in sufficient detail to allow a definite judgement – for example if the use of assignment envelopes is described

[alloccondetails]

Concealment Details. Please describe the justification for this risk of bias assessment for allocation concealment. Include direct quotes (with quotation marks) where appropriate. Include page numbers and report ID# to sections of the text used for the risk of bias assessment.

[blindassess]

Blinding of Outcome Assessors: What is the risk of a detection bias due to inadequate blinding of outcome assessors?

1. **Low risk.** Blinding of outcome assessors was ensured and it was unlikely that blinding could have been compromised; OR, there was no blinding of outcome assessors, but the review authors provide rationale for believing outcome measurement was not likely to be influenced by lack of blinding.
2. **High risk.** No blinding of outcome assessment and the outcome measurement is likely to be influenced by lack of blinding; OR, there was blinding but it was broken/compromised; OR, all outcomes were self-reported (and thus inherently NOT blinded).
3. **Unclear risk.** Insufficient information is provided about the concealment of blinded outcome assessors to permit judgement of low or high risk.

[blindassessdetails]

Blinding Details. Please describe the justification for this risk of bias assessment for blinding of outcome assessors. Include direct quotes (with quotation marks) where appropriate. Include page numbers and report ID# to sections of the text used for the risk of bias assessment.

[incompdata]

Incomplete Outcome Data: What is the risk of attrition bias due to incomplete outcome data?

1. **Low risk.** The study meets any of the following:
    - no missing outcome data;
    - reasons for missing outcome data are unlikely to be related to the true outcome;
    - missing outcome data are balanced in numbers across intervention groups with similar reasons for missing data across groups;
    - for dichotomous outcome data the proportion of missing outcomes compared with observed event risk is not enough to have a clinically relevant impact on the intervention effect estimate;
    - for continuous outcome data the plausible effect size among missing outcomes is not enough to have a clinically relevant impact on observed effect size;
    - missing data have been imputed using appropriate modern missing data techniques.
2. **High risk.** The study meets at any of the following:
    - reasons for missing outcome data are likely to be related to the true outcome, with either imbalance in numbers or reasons for missing data across groups;
    - for dichotomous outcome data the proportion of missing outcomes compared with observed event risk is enough to have a clinically relevant bias in the intervention effect estimate;
    - for continuous outcome data the plausible effect size among missing outcomes is enough to induce clinically relevant bias in observed effect size;
    - 'as-treated' analysis done with substantial departure of the intervention received from that assigned at randomization; or potentially inappropriate application of simple imputation (e.g., mean imputation).

3. **Unclear risk.** Insufficient information is provided to permit judgement of 'low risk' or 'high risk' (e.g., number randomized not stated, no reasons for missing data provided).

[incompdatadetails]

Incomplete Data Details. Please describe the justification for this risk of bias assessment for incomplete outcome data. Include direct quotes (with quotation marks) where appropriate. Include page numbers and report ID# to sections of the text used for the risk of bias assessment.

[selectreport]

Selective Reporting: What is the risk of reporting bias due to selective outcome reporting?

1. **Low risk.** Any of the following:
    - the study protocol is available and all of the study's pre-specified (primary and secondary) outcomes that are of interest in the review have been reported in the pre-specified way;
    - the study protocol is not available but it is clear that the published reports include all expected outcomes, including those that were pre-specified (note that convincing text of this nature may be uncommon).
2. **High risk.** Any of the following:
    - not all of the study's pre-specified primary outcomes have been reported;
    - one or more primary outcomes is reported using measurements, analysis methods or subsets of the data (e.g., subscales) that were not pre-specified;
    - one or more reported primary outcomes were not pre-specified (unless clear justification for their reporting is provided; such as an unexpected adverse effect);
    - one or more outcomes of interest in the review are reported incompletely so that they cannot be entered in a meta-analysis;

- the study fails to include results for a key outcome that would be expected to have been reported for such a study.

3. **Unclear risk.** Insufficient information is provided to permit judgement of 'low risk' or 'high risk'. It is likely that many studies will fall into this category.

[selectreportdetails]

Selective Reporting Details. Please describe the justification for this risk of bias assessment for selective reporting. Include direct quotes (with quotation marks) where appropriate. Include page numbers and report ID# to sections of the text used for the risk of bias assessment.

[otherbias]

Other Bias: What is the risk of other bias not covered elsewhere in the quality assessment measures?

1. **Low risk.** The study appears to be free of other sources of bias.
2. **High risk.** There is at least one important risk of bias. For example, the study: • _had a potential source of bias related to the specific study design used;
    - has been claimed to have been fraudulent;
    - has conflicts of interest declared; or
    - has some other problem.
3. **Unclear risk.** Insufficient information is provided to permit judgment. There may be a risk of bias, but there is either: • insufficient information to assess whether an important risk of bias exists; or • insufficient rationale or evidence that an identified problem will introduce bias.

[otherbiasdetails]

Other Bias Details. Please describe the justification for this risk of bias assessment for other risks of bias. Include direct quotes (with quotation marks) where appropriate. Include page numbers and report ID# to sections of the text used for the risk of bias assessment.

IDENTIFICATION

Study Identifiers

[studyid]

Study ID. Enter the study ID # here (from Covidence).

[yearpub]

Year of Publication.

[fullcite]

Full citation.

[reportformat]

Report format:

1. Published article
2. Unpublished dissertation
3. Unpublished master's thesis
4. Unpublished report available on organization website
5. Other (please specify):

Setting Characteristics

[community]

What type of geographical community or communities was the study conducted in?

1. Urban: not otherwise clarified
2. Urban: inner city, low-income area
3. Suburban
4. Rural

5. Mixed
6. Missing or unknown

[setting]

Did the INTERVENTION take place at more than one site (e.g., across schools)?

1. Yes
2. No

[multiplesetting]

Multiple settings. If yes to the above question, specify:

METHODS

Study Design

[studydesign]

Study Design. Describe the study design.

1. Randomized Controlled Trial
2. Cluster Randomized Controlled Trial

Baseline Participant Characteristics

Aggregated Data (if applicable)

[admeanage]

Aggregate Mean Age. Enter the average age of study participants using numbers in years, out to two decimals. Use -9 for cannot tell.

[adagerange]

Aggregate Age Range. Enter the minimum and maximum ages of participants using "XX-XX" whole number format (e.g., 19-20). Use -9 for cannot tell.

[adfemale]

Aggregate Proportion Female. Enter the proportion of Female participants using ". XX" format (e.g., .25). Use -9 for cannot tell.

[admale]

Aggregate Proportion Male. Enter the proportion of White participants using ". XX" format (e.g., .25). Use -9 for cannot tell.

[adnonwhite]

Aggregate Proportion Non-White. Enter the proportion of Non-White participants using ". XX" format (e.g., .25). Use -9 for cannot tell.

[adnonhispanic]

Aggregate Proportion Hispanic. Enter the proportion of Hispanic participants using ". XX" format (e.g., .25). Use -9 for cannot tell.

[adasian]

Aggregate Proportion Native Hawaiian or other Asian/Pacific Islander. Enter the proportion of Native Hawaiian or other Asian/Pacific Islander participants using ". XX" format (e.g., .25). Use -9 for cannot tell.

[adblack]

Aggregate Proportion Black or African American. Enter the proportion of Black or African American participants using ". XX" format (e.g., .25). Use -9 for cannot tell.

[adLatine]

Aggregate Proportion Latine. Enter the proportion of Latine participants using ". XX" format (e.g., .25). Use -9 for cannot tell.

[adamericanindian]

Aggregate Proportion American Indian or Alaska Native. Enter the proportion of American Indian or Alaska Native participants using ". XX" format (e.g., .25). Use -9 for cannot tell.

[admultiplerace]

Aggregate Proportion More than one race. Enter the proportion of participants who identify as more than one race using ".XX" format (e.g., .25). Use -9 for cannot tell.

[adattrition]

Aggregate Attrition Rate. What is the attrition rate of study participants between the time of assignment to groups to the first follow-up? Enter number of subjects at each time point. Calculate by (Assigned N/First follow-up N) = %Attrition rate. Use -9 for cannot tell.

[adses]

Aggregate Socioeconomic Status. Indicate the proportion of sample for each SES level.

1. High poverty/Low SES (>75% FRPL eligibility)
2. Mid-high poverty/Middle-Lower SES (50.1-75% FRPL eligibility)
3. Mid-low poverty/Middle-Upper SES (FRPL eligibility)
4. Low poverty/Upper SES (<25% FRPL eligibility)
5. Mixed income level groups (including lowest exact % unknown)
6. Mixed (excluding lowest SES)
7. Unclear: Copy and paste text that authors used to describe the SES status of students

Note. % of students eligible for free or reduced-price lunch provides a proxy measure for the concentration of economically disadvantaged students within a school (NCES, 2020).

[addisability]

Aggregate Disability Status. Indicate the percentage of sample by disability status.

1. IEP status
2. Receiving Special Education services
3. Formal disability diagnosis
4. Other (List)

[exclusion]

Is there any indication that potential participants were excluded from the intervention because of:

1. Intellectual or cognitive functioning

2. Placement in special education classes
3. Race or ethnicity
4. Language proficiency (i.e., second language learners)
5. Economic status
6. Other (List)

INTERVENTION AND CONTROL GROUPS

Group Data (if applicable). For the intervention group, assign a numeric ID, starting with 1. Increment for each additional group (e.g., intervention2attrition for a second intervention group).

[controlgrouptreatment]

Control Group "Treatment" Description. What best describes the "treatment" received by group the control group?

1. Treatment as usual/usual care
2. General health booklet/information
3. Sham intervention
4. Other (specify):

[intervention1attrition]

Intervention 1 Attrition Rate. What is the attrition rate of study participants between the time of assignment to the intervention group to the first follow-up?

[controlattrition]

Control Attrition Rate. What is the attrition rate of study participants between the time of assignment to the control group to the first follow-up?

Intervention Characteristics

[Intervention1name]

Name of Intervention 1. What is the name of the intervention?

[i1sel]

Does intervention 1 self-identify as an SEL program? If no, please select "Other" and describe (e.g., positive youth development, character education, prevention program, etc.)

1. Yes
2. Other (specify)

[i1description]

Intervention 1 Brief Description. Briefly describe the intervention 1 (copy and paste text):

[i1type]

Intervention 1 Type. Identify the type of intervention based on implementation level or targeting of students (e.g., targeting specific groups of students, school-wide implementation, etc.)

1. Universal/Primary
2. Secondary/Selective
3. Tertiary/indicated
4. Unknown

Note.

- Universal/Primary: refers to approaches designed for an entire population without regard to individual risk factors.
- Selective/Secondary: is when strategies are targeted to one or more moderators of a population determined to be at risk for a particular problem (e.g., behavioral problems).
- Indicated/Tertiary: is when interventions are aimed at individuals already engaged in a certain a behavior (e.g., truancy, anti-social behavior).

[i1timing]

Intervention 1 Timing. What type of program is the intervention based on the timing the program is implemented (e.g., implemented during school hours versus out of school time)?

1. School-Based Program
2. Out-of-School Time Program

Note.

- School-Based: refers to approaches designed to be implemented during regular school hours on school campuses.
- Out-of-School Timing: refers to approaches designed to be implemented outside of regular school hours on school campuses.

[i1tailored]

Intervention 1 Tailored. Was the intervention tailored for a specific population?

1. Yes, for individuals within a particular racial or ethnic group
2. Yes, specifically for at-risk group or specific moderator who participated
3. No information that it was tailored in any way

Note.

- Individual tailoring (#1) means individuals from the same target population received more or less of the intervention based on such things as individual need, progress through the program, etc. Does not mean an adult intervention was modified for a younger sample because all in the sample got the same intervention. The intervention must vary across individuals.
- Population tailoring (#2) means one of two things:

  1) subpopulations within the total target population received different things (e.g., groups of females and males seen separately and addressed different issues.

  2) the intervention was modified because of the target group's diversity status. This will usually mean that a previous intervention was changed because it was previously

applied to primarily to a majority population and is now being applied to a different (ethnic/racial/disability/etc.) group. Such tailoring should be clear in the intro & method.

Social-Emotional Skills

Data will be auto recoded into following CASEL *Competencies (https://casel.org/sel-framework/) and core components. *TSEL = transformative SEL components/competencies.*

C1=self-awareness

C1.1 = Identifying one's own feelings

C1.2 = Understanding the interplay of thoughts, feelings, and behaviors

C1.3 = Mindful attitude

C1.4 = Self knowledge

C2=self-management

C2.1 = Behavioral coping skills/relaxation

C2.2 = Cognitive coping skills/positive self-talk

C2.3 = Setting goals and planning to reach goal

C2.4 = Focus one's attention mindfully

C3=social awareness

C3.1 = Identifying other people's feelings

C3.2 = Perspective taking/empathy

C3.3 = Recognizing the importance of diversity and valuing differences

C4=relationship skills

C4.1 = Assertiveness

C4.2 = Social skills

C5=responsible decision-making

C5.1 = Problem solving

[i1selfawareness]

Intervention 1 Self-Awareness. What self-awareness SEL skills instruction was included in the intervention? Mark all that apply. If yes to any self-awareness SEL skills, select "Other" and copy and paste text in open text box.

1. Metacognition: Learning to monitor the quality of their thought (e.g., reflection or metacognition). (C1.2)
2. Emotional Awareness: Learning how to identify (e.g., face and physical bodily sensation cues, context), monitor, and predict emotions including their intensity. (C1.1)
3. Emotion Expression: Learning how to express emotions to others in effective ways (e.g., using feeling words) to explain one's behavior or using respectful/assertive body language (posture, eye contact, tone of voice). (C1.2.)
4. Difference thoughts/feelings/behaviors: Learn about how thoughts, feelings, and behaviors can lead to each other. (C1.2)
5. Gratitude: Learning about how to cultivate or express gratitude or appreciation for good and/or everyday things. (C1.3)
6. Openness: Learning about or practicing curiosity and open-mindedness (e.g., accepting past and present or feelings without judgment, and being open to new and unfamiliar ideas). (C1.3)
7. Character traits/strengths/roles: Learning to identify or understand character traits, strengths (e.g., creative, hardworking), or roles (e.g., friend, student)

8. Growth mindset: Learning about how intellectual abilities and personality traits are qualities that can be developed or improved, including that challenges are things that one can take on and overcome with time and effort. (C1.4)
9. Self-compassion: Learning about how to extend kindness or understanding to oneself (e.g., self-compassion, emotional self-respect, etc.) including forgiving oneself for errors or mistakes (e.g., accepting and moving on from past actions). (C1.3)
10. Other (copy and paste text):

[i1selfmanagement]

Intervention 1 Self-Management. What self-management SEL skills instruction was included in the intervention? Mark all that apply. If yes to any self-management SEL skills, select "Other" and copy and paste text in open text box.

1. Attention: Learning strategies (e.g., using self-talk to keep focused, focusing on the task at hand, using listening skills [e.g., looks at speaker, sits still, puts hand in lap, doesn't talk) to maintain attention and ignore distractions. (C2.2, C2.1)
2. Mindful Listening: Learning or practicing to listen by bringing one's attention back to the speaker when distracted. (C2.4)
3. Body attention: Learning or practicing to focus attention through the five senses (observe an object, attention on touch, attention on taste, attention on internal physical sensations, attention on smell). (C2.4)
4. Planning: Learning the steps, skills and strategies to plan and/or carry out complex commands or tasks to accomplish a task or reach a goal. (C2.3)
5. Goals setting: Learning to identify and setting one's own goals including distinguishing between positive and negative goals. (C2.3)

6. Achieving Goals: Learning how to engage in goal directed behavior including using strategies (e.g., positive self-talk to provide encouragement) to accomplish tasks independently or when instructed (i.e., acting to achieve a goal). (C2.3)
7. Organization: Learning about the importance of and developing good organizational skills (e.g., plans ahead, manages time wisely, arrives to class prepared, etc.). (C2)
8. Situation Modification & Attentional Deployment Emotion Regulation: Learning to get away from an emotional trigger (e.g., leaving the situation by going on a walk) or focusing your attention on something else (e.g., leaving the situation mentally such as thinking about your happy place) to regulate one's emotions. (C2.2)
9. Response Modulation Emotion Regulation: Learning how to release emotional energy in healthy ways (verbally or physically) such as punching a pillow, playing a sport, expressive writing, singing a song, deep breathing) to regulate one's emotions. (C2.2)
10. Cognitive Change Emotion Regulation: Learning how to use cognitive skills to regulate one's emotions (e.g., thinking about a trigger differently, thinking about the consequences, thinking about what someone you care about would say or positive self-talk) to regulate one's emotions. (C2.2)
11. Other (copy and paste text):

[i1socialawareness]

Intervention 1 Social-Awareness: What social-awareness SEL skills instruction was included in the intervention? Mark all that apply. If yes to any social-awareness SEL skills, select "Other" and copy and paste text in open text box.

1. Identifying emotions in others: Learning to identify emotions in others based on face and body cues, and context. (C3)

2. Perspective: Learning how to consider, predict, identify or describe somebody's point of view (i.e., thoughts, feelings, behaviors) including understanding that another's experiences differ from one's own (including that people can have different feelings in response to the same situation), such as through active role-taking (considering oneself in another's situation). (C3.2)
3. Complex/simultaneous feelings, other: Learning that feelings can be complex/ and other people can have simultaneous or multiple feelings at once (e.g., being nervous and excited at the same time) (C3.1)
4. Expressing empathy: Learning about appropriate and effective (e.g., whether solution was effective, whether all parties are satisfied) ways to respond to empathetic concern including physical gestures or verbal expression to comfort or provide relief to another person in distress (e.g., hugs, pats, expressing concern, verbal sympathy). (C3.2)
5. Interpersonal listening: Learning active interpersonal listening strategies to elicit and understand the feelings and opinions of others (e.g., asking probing questions, making eye contact, paraphrasing and reflecting, nodding, and leaning forward) (C3.2)
6. Tolerance: Learning about the importance/value of being tolerant and accepting of differences in others. (C3.3)
7. Diversity: Learning to recognize the importance/value of diversity and valuing/celebrating/appreciating differences. (C3.3, TSEL)
8. Stereotypes: Learning about stereotypes and how to avoid acting on them or other preconceived notions about others. (C3.3, TSEL)

9. Human rights: Focuses on the value of understanding and respecting the intrinsic worth and rights of all people (e.g., belief in human rights/human dignity, equality, etc.) (C3.3, TSEL)
10. Social Justice: Developing an awareness of and learning about how to work to correct unfairness/promote social justice in school, community, and the world. (C3.3, TSEL)
11. Other (copy and paste text):

[i1relationship]

Intervention 1 Relationship Skills. What Relationship SEL skills instruction was included in the intervention? Mark all that apply. If yes to any relationship SEL skills, select "Other" and copy and paste text in open text box.

1. Social engagement: Learning how to effectively initiate interactions with peers or enter and engage in a variety of social situations including asking. (C4.2)
2. Peer support/inclusion: Develop the capacity or skills to include, stand up for (e.g., when others are teased, insulted, or left out), help others in problematic situations or to resolve conflicts/disputes, or encourage/support others. (C4.2)
3. Team player: Learning about how to be an active and successful member of a team/community to achieve a common goal (doing something together) including roles related to completing one's responsibilities within a team, encouraging others, demonstrating leadership or allowing others to lead in team tasks. (C4.2)
4. Friendship: Learning about how to build and maintain positive relationships including the actions and behaviors that foster friendship (e.g., understand what a friend is and how to make and sustain them, agreeing, compromising, and suggesting ideas). (C4.2)

5. Resisting peer pressure: Learning to stand one's ground when another child tries to pressure them. (C4.2)
6. Respect/kindness: Learning how to act respectfully and kindly toward others, including giving compliments to others. (C4.2)
7. Assertive: Learning how to respectfully, calmly, diplomatically or appropriately express feelings, wants, needs or state values and preferences (e.g., is assertive in ways appropriate to situation; uses I messages, calmly and diplomatically states values and preferences, etc.) including knowing the difference between "passive", "assertive", and "aggressive" behavior. (C4.1)
8. Apologizing/reparation: Learning to identify and take action to correct hurtful situations (e.g., apologizes). (C4.2)
9. Conflict resolution: Develops capacity and strategies to effectively address, solve, or work towards consensus regarding social dilemmas and conflicts (e.g., talking to an adult, seeking out mediation, peace path, using “I messages,” etc.), including reflection or considering more or less effective/constructive approaches and outcomes to conflicts (e.g., win-win, compromising). (C4.2)
10. Other (copy and paste text):

[i1decisionmaking]

Intervention 1 Responsible Decision-Making: What responsible decision-making SEL skills instruction was included in the intervention? Mark all that apply. If yes to any responsible decision-making SEL skills, select “Other” and copy and paste text in open text box.

1. If, then: Generating and updating hypotheses (e.g., consequential thinking: “if X, then Y”) (C5.1)

2. Reasoning: Learning how to utilize reason to understand, predict and/or deduce. (C5.1)
3. Problem solving: Learning how to plan processes needed or carry out a solution to solve a problem; evaluate options for solving a problem; or carry out or monitor progress in solving a problem. (C5.1)
4. Reflection on thoughts/actions: Learning to use reflection to consider past thoughts and actions. (C5.1)
5. Control: Learning how to identify problems that are within or outside of our control. (C5.1)
6. Emotion regulation during problem solving: Learning how to stop and use coping skills before trying to solve a problem. (C5.1)
7. Following rules/norms: Learning how to follow classroom/institution/society rules and expectations (norms, directions) and exhibiting appropriate behavior for context. (C5.1)
8. Help seeking: Developing the knowledge, capacity and strategies to know how, when, and who to ask. (C5.1)
9. Ethical judgements: Learning about making ethical judgements including constructing and/or expressing opinions about right and wrong or weighing options and considering consequences to make ethical decisions. (C5.1)
10. Social cues, other: Learning how to identify and accurately interpret and appropriately respond to others' social cues such as body language and tone of voice (refers to others, including characters). (C5.1)
11. Social responsibility: Learning about one's connection and responsibility to family, classroom, school community, neighborhood, country, and world; understands the value of civic responsibility. (C5.1)

12. Other (copy and paste text):

[i1transformativesel]

Intervention 1 Transformative SEL: Did this intervention include transformative SEL practices? Mark all that apply. If yes to any responsible decision-making SEL skills, select "Other" and copy and paste text in open text box.

1. Opportunities for adolescents to practice curiosity by teaching and learning from one another.
2. Instruction that honors and makes connections to students' lived experiences and identities and scaffolds learning to build an understanding of others' lived experiences.
3. Culturally responsive education and youth-guided approaches, such as project-based learning and youth participatory action research.
4. Developmentally appropriate learning opportunities that engage students and adults in examining current and historical events; social norms; prejudices and biases; and how issues of race, class, and culture impact our society.
5. Opportunities for adolescents to use their voice and skills to examine inequities and create solutions for social change.
6. Authentic partnering among families, schools, and communities to share power and decision-making.
7. Individual and collective analysis, reflection, and sense-making around relevant data.
8. Professional learning and collaboration opportunities that prioritize adult well-being and build capacity to partner and co-create with students.
9. Other (specify):

[i1transformativetext]

Intervention 1 TSEL Text. If any of the above Transformative SEL were marked, copy and paste the text here. Be sure to include the report ID and page number in which the text was located. Use this format to report information: Report ID; pg(s) XXX; [SEL Component]: [INCLUDE TEXT].

SAFE Practices

[i1safe]

Intervention 1 SAFE Practice. Describe the features of the intervention

1. The program uses a connected and coordinated set of activities to achieve their objectives relative to skill development? (Sequenced)
2. The program uses active forms of learning to help youth learn new skills? (Active)
3. The program has at least one component devoted to developing personal or social skills? (Focused)
4. The program targets specific SEL skills rather than targeting skills or positive development in general terms? (Explicit)

[i1sequenced]

Intervention 1 Sequenced: If Sequenced was marked above, describe the order of intrapersonal and interpersonal skills?

1. There appears to be no order to how intrapersonal and interpersonal skills are taught
2. Intrapersonal skills precede interpersonal skills (either as a whole across the program or in cycles within the program)
3. Interpersonal skills precede intrapersonal skills (either as a whole across the program or in cycles within the program)

OUTCOMES

[#weekspostbaseline]

Number of weeks postbaseline. Report the # of weeks to the first follow-up. This number should also be consistent to when the outcomes were re-measured. If there is inconsistency, please make a note of that.

Mental Health Outcomes. For the mental health outcome, assign a numeric ID, starting with 1. Increment for each additional outcome (e.g., mh2name for a second mental health outcome).

Mental Health Outcome #1

[mh1name]

Mental Health Outcome #1 Name. Provide a short name/description of this outcome. This will often be the variable name used by the study authors themselves.

[mh1scalename]

Mental Health Outcome #1 Scale Name. List the name of the instrument/scale used to measure outcome "X". Please spell out the instrument name, followed by an acronym (where appropriate).

[mh1scalerange]

Mental Health Outcome #1 Scale Range. List the measurement range for outcome "X" using "XX-XX" format. Include page numbers. Use "nr" if not reported.

[mh1typemeasure]

Mental Health Outcome #1 Types of Measure. Indicate the type of measure(s) used to collect data for outcome "X".

1. Self-report

2. Parent-report
3. Teacher-report
4. Direct Observation
5. Other (specify):

[mh1direction]

Mental Health Outcome #1 Direction. In what direction is outcome "X", scored? For mental health variables, typically lower values will indicate less mental health problems.

1. Lower is better – typically lower values on the outcome indicate better outcomes.
2. Higher is better – higher values on the outcome indicate better outcomes.

[mh1variabletype]

Mental Health Outcome #1 Type. Report the variable type for this outcome.

1. Continuous
2. Dichotomous
3. Categorical
4. Ordinal

[mh1group]

Mental Health Outcome #1 Group. Select the construct domain for outcome "X".

1. Internalizing problems (e.g., depression, anxiety, eating problems, disorders, Bipolar and related disorders, suicidality aside from depression)
2. Externalizing problems (e.g., ADHD disorders, conduct disorder, oppositional defiant disorder, substance use disorder)
3. Both internalizing and externalizing problems.

Effect Size Calculation and Data Entry

It is now time to identify the data you will use to calculate the effect size and to calculate the effect size yourself if necessary.

Note that effect sizes can be calculated from a variety of statistical estimates; to determine which data you should use for effect size calculation, please refer to the following guidelines in order of preference:

1. Compute ES from regression coefficients with statistical controls for pretest measures and other potential confounding measures at baseline.
2. Compute ES from univariate descriptive statistics (means, sds, frequencies, proportions).
3. Compute ES from test statistics (t, F, Chi square).
4. If significance tests statistics are unavailable or unusable but p-values and degrees of freedom (df) are available, determine the corresponding value of the test statistic (e.g., t, chi-square) and compute ES as if that value had been reported. If you encounter these types of data, please see Dash for guidance.

Note that if the authors present both covariate adjusted and unadjusted means, you should use the covariate adjusted ones. If adjusted standard deviations are presented, however, they should not be used.

[mh1espage]

Page number for this effect size. Indicate the page number and report ID# on which you found the effect size data. If you used data from two different pages, you can type in both, but use a comma or dash between the page numbers.

[mh1esreport]

Mental Health Outcome #1 Reporting. Select whether the statistical information needed for effect size calculations was fully reported or partially reported.

1. Fully reported. The report includes all necessary information needed for effect size calculations, and no approximations were needed.
2. Partially reported. The report did not include all information needed for effect size calculations, so additional approximations and calculations were needed to estimate the effect size (Provide explanation).

[mh1authquery]

Mental Health Outcome #1 Author Query. Is it necessary to contact the author to acquire these missing details?

1. Yes
2. No

[mh1esbetter]

Mental Health Outcome #1 Better. Which group has done "better"?

1. Intervention

2. Comparison

3. Neither, Exactly Equal

4. Cannot tell

Note. Remember that you cannot rely on simple numerical values to determine which group is favored.

Sometimes it may be difficult to tell which group is better off because a study uses multi-item measures in which it is unclear whether a high score or a low score is more favorable.

In these situations, a thorough reading of the text from the results and discussions sections usually can bring to light the direction of effect – e.g., the authors will often state verbally which group did better on the measure you are coding, even when it is not clear in the data table.

Note that if you cannot determine which group has done better, you will not be able to calculate a numeric effect size. (You will still be able to create an effect size record—just not a numeric effect size.)

[mh1esderivation]

Mental Health Outcome #1 Effect Size Derivation. Effect size derived from what type of statistics?

1. Means and SDs; means and variances; means and standard errors
2. Independent t-test
3. Chi-square statistic (1 degree of freedom)
4. Effect sizes as reported directly in the study
5. Odds ratio as reported directly in the study
6. Other statistical approximation

[mh1esadj]

Mental Health Outcome #1 Adjusted or Unadjusted Data. For this effect size, did you use adjusted data (e.g., covariate adjusted means) or unadjusted data? If both unadjusted and adjusted data are presented (for post-test measures), you should use the adjusted data for the group means

or mean difference but use unadjusted standard deviations or variances. (If both adjusted and unadjusted data are presented for baseline measures, use the unadjusted data). Adjusted data are most frequently presented as part of an analysis of covariance (ANCOVA). The covariate is often either the pretest or some personal characteristic such as socioeconomic status. If you encounter data that is adjusted using something other than a covariate, please see Dash.

1. Unadjusted data
2. Pretest adjusted data (or other baseline measure of an outcome variable construct)
3. Data adjusted on some variable other than the pretest (e.g., socioeconomic status)
4. Data adjusted on pretest plus some other variables

Mental Health Outcome #1 Effect Size Data. Data is captured in a table through Covidence. Make sure that the information provided is enough to calculate an effect size (hedges g). Use this website link ((Duval & Tweedie, 2000))

[mh1estxobn_i1]

Observed N for the **intervention 1** group. Use -9 for cannot tell.

[mh1exctobn]

Observed N for the **control** group. Use -9 for cannot tell.

[mh1estxmean_i1]

Mean for **intervention 1** group. Use -9 for cannot tell.

[mh1esctmean]

Mean for **control** group. Use -9 for cannot tell.

[mh1estxsd_i1]

Standard deviation for **intervention 1** group. Use -9 for cannot tell.

[mh1esctsd]

Standard deviation for **control** group. Use -9 for cannot tell.

[mh1estxse_i1]

Standard error for **intervention 1** group. Use -9 for cannot tell.

[mh1esctsd]

Standard error for **control** group. Use -9 for cannot tell.

[mh1estxvar_i1]

Variance for **intervention 1** group. Use -9 for cannot tell.

[mh1esctvar]

Variance for **control** group. Use -9 for cannot tell.

[mh1esindt_i1]

Independent t-value. Use -9 for cannot tell.

[mh1eschisq_i1]

$\chi 2$ (df=1). Use -9 for cannot tell.

[mh1esauth_i1]

Effect size reported by authors. Use -9 for cannot tell.

[mh1esor_i1]

Odds ratio reported by authors. Use -9 for cannot tell.

[mh1esprob_i1]

Any problems coding this effect size?

School Functioning Outcomes. For the school functioning outcome, assign a numeric ID, starting with 1. Increment for each additional outcome (e.g., sf2name for a second school functioning outcome).

[sf1name]

School Functioning Outcome #1 Name. Provide a short name/description of this outcome. This will often be the variable name used by the study authors themselves.

[sf1scalename]

School Functioning Outcome #1 Scale Name. List the name of the instrument/scale used to measure outcome "X". Please spell out the instrument name, followed by an acronym (where appropriate).

[sf1scalerange]

School Functioning Outcome #1 Scale Range. List the measurement range for outcome "X" using "XX-XX" format. Include page numbers. Use "nr" if not reported.

[sf1typemeasure]

School Functioning Outcome #1 Types of Measure. Indicate the type of measure(s) used to collect data for outcome "X".

1. Self-report
2. Parent-report
3. Teacher-report
4. Direct Observation
5. Other (specify):

[sf1direction]

School Functioning Outcome #1 Direction. In what direction is outcome "X", scored? For mental health variables, typically lower values will indicate less mental health problems.

1. Lower is better – typically lower values on the outcome indicate better outcomes.
2. Higher is better – higher values on the outcome indicate better outcomes.

[sf1variabletype]

School Functioning Outcome #1 Type. Report the variable type for this outcome.

1. Continuous
2. Dichotomous
3. Categorical
4. Ordinal

[sf1group]

School Functioning Outcome #1 Group. Select the construct domain for outcome "X".

1. Academic achievement (in the form of tests, grades/GPA, graduation/dropout rates)
2. Indices of behavioral school adjustment (attendance, tardiness, disciplinary actions)

Effect Size Calculation and Data Entry

It is now time to identify the data you will use to calculate the effect size and to calculate the effect size yourself if necessary.

Note that effect sizes can be calculated from a variety of statistical estimates; to determine which data you should use for effect size calculation, please refer to the following guidelines in order of preference:

1. Compute ES from regression coefficients with statistical controls for pretest measures and other potential confounding measures at baseline.
2. Compute ES from univariate descriptive statistics (means, sds, frequencies, proportions).
3. Compute ES from test statistics (t, F, Chi square).
4. If significance tests statistics are unavailable or unusable but p-values and degrees of freedom (df) are available, determine the corresponding value of the test statistic (e.g., t,

chi-square) and compute ES as if that value had been reported. If you encounter these types of data, please see Dash for guidance.

Note that if the authors present both covariate adjusted and unadjusted means, you should use the covariate adjusted ones. If adjusted standard deviations are presented, however, they should not be used.

[sf1espage]

Page number for this effect size. Indicate the page number and report ID# on which you found the effect size data. If you used data from two different pages, you can type in both, but use a comma or dash between the page numbers.

[sf1esreport]

School Functioning Outcome #1 Reporting. Select whether the statistical information needed for effect size calculations was fully reported or partially reported.

1. Fully reported. The report includes all necessary information needed for effect size calculations, and no approximations were needed.
2. Partially reported. The report did not include all information needed for effect size calculations, so additional approximations and calculations were needed to estimate the effect size (Provide explanation).

[sf1authquery]

School Functioning Outcome #1 Author Query. Is it necessary to contact the author to acquire these missing details?

1. Yes
2. No

[sf1esbetter]

School Functioning Outcome #1 Better. Which group has done "better"?

1. Intervention
2. Comparison
3. Neither, Exactly Equal
4. Cannot tell

Note. Remember that you cannot rely on simple numerical values to determine which group is favored.

Sometimes it may be difficult to tell which group is better off because a study uses multi-item measures in which it is unclear whether a high score or a low score is more favorable.

In these situations, a thorough reading of the text from the results and discussions sections usually can bring to light the direction of effect – e.g., the authors will often state verbally which group did better on the measure you are coding, even when it is not clear in the data table.

Note that if you cannot determine which group has done better, you will not be able to calculate a numeric effect size. (You will still be able to create an effect size record—just not a numeric effect size.)

[sf1esderivation]

School Functioning Outcome #1 Effect Size Derivation. Effect size derived from what type of statistics?

1. Means and SDs; means and variances; means and standard errors

2. Independent t-test
3. Chi-square statistic (1 degree of freedom)
4. Effect sizes as reported directly in the study
5. Odds ratio as reported directly in the study
6. Other statistical approximation

[sf1esadj]

School Functioning Outcome #1 Adjusted or Unadjusted Data. For this effect size, did you use adjusted data (e.g., covariate adjusted means) or unadjusted data? If both unadjusted and adjusted data are presented (for post-test measures), you should use the adjusted data for the group means or mean difference but use unadjusted standard deviations or variances. (If both adjusted and unadjusted data are presented for baseline measures, use the unadjusted data). Adjusted data are most frequently presented as part of an analysis of covariance (ANCOVA). The covariate is often either the pretest or some personal characteristic such as socioeconomic status. If you encounter data that is adjusted using something other than a covariate, please see Dash.

1. Unadjusted data
2. Pretest adjusted data (or other baseline measure of an outcome variable construct)
3. Data adjusted on some variable other than the pretest (e.g., socioeconomic status)
4. Data adjusted on pretest plus some other variables

School Functioning Outcome #1 Effect Size Data. Data is captured in a table through Covidence.

Make sure that the information provided is enough to calculate an effect size (hedges g). Use this website link (https://www.campbellcollaboration.org/calculator/d-means-sds)

[sf1estxobn_i1]

Observed N for the **intervention 1** group. Use -9 for cannot tell.

[sf1exctobn]

Observed N for the **control** group. Use -9 for cannot tell.

[sf1estxmean_i1]

Mean for **intervention 1** group. Use -9 for cannot tell.

[sf1esctmean]

Mean for **control** group. Use -9 for cannot tell.

[sf1estxsd_i1]

Standard deviation for **intervention 1** group. Use -9 for cannot tell.

[sf1esctsd]

Standard deviation for **control** group. Use -9 for cannot tell.

[sf1estxse_i1]

Standard error for **intervention 1** group. Use -9 for cannot tell.

[sf1esctsd]

Standard error for **control** group. Use -9 for cannot tell.

[sf1estxvar_i1]

Variance for **intervention 1** group. Use -9 for cannot tell.

[sf1esctvar]

Variance for **control** group. Use -9 for cannot tell.

[sf1esindt_i1]

Independent t-value. Use -9 for cannot tell.

[sf1eschisq_i1]

$\chi 2$ (df=1). Use -9 for cannot tell.

[sf1esauth_i1]

Effect size reported by authors. Use -9 for cannot tell.

[sf1esor_i1]

Odds ratio reported by authors. Use -9 for cannot tell.

[sf1esprob_i1]

Any problems coding this effect size?

APPENDIX C: RISK OF BIAS TABLE

Author(s), (Year)	Consort Diagram	Random sequence generation (selection bias)	Allocation concealment (selection bias)	Blinding of outcome Assessment (outcome Assessors)	Incomplete outcome data (attrition bias)	Selective reporting (reporting bias)
Botvin et al (1980)	N	U	U	H	U	U
Botvin et al. (1992)	N	U	U	U	U	H
Botvin et al. (2001)	N	U	U	U	H	U
Butzer et al. (2017)	Y	H	H	U	L	L
Chaplin et al. (2006)	N	L	L	U	L	U
Coleman (2012)	N	U	U	U	U	U
De Long-Cotty (2008)	N	U	U	U	L	U
Farrel et al. (2001)	N	L	U	U	L	H
Farrel et al. (2003)	N	U	U	U	L	L
Gillham et al. (2007)	Y	L	L	L	L	H
Hecht et al. (2003)	N	U	U	U	L	U
Kataoka et al. (2011)	N	U	U	U	L	L
Lemberger et al. (2015)	N	U	U	U	L	U
Lemberger-Truelove et al. (2021)	N	L	U	U	L	U
McCarty et al. (2013)	Y	L	L	L	U	U
Mendelson et al. (2015)	N	H	U	U	L	H
Merle et al. (N.d.)	Y	U	U	U	L	U
Perry et al. (2008)	N	H	H	L	L	U
Stein et al. (2003)	Y	L	L	U	L	U
Sumi et al. (2021)	Y	U	U	U	L	U
Tobias & Myrick (1999)	N	L	U	U	U	U
Trudeau et al. (2003)	N	U	U	U	U	U
Vicary et al. (2004)	N	U	U	U	L	U

Notes. N = No, Y = Yes, H = High risk, L = Low risk, U = Unclear risk. The use of boarders and shading is intended to assist with the organization and clarity of data presented.

APPENDIX D: SUMMARY OF FINDINGS TABLE

Author(s) (Year)	**Outcome Measure** **Effect Size (Standardized Mean Gain)** **95% [CI]**					
	Internalizing Symptoms	**PTSD Symptoms**	**Substance Use Behaviors**	**Academic Achievement**	**Disciplinary Referrals**	**Truancy**
Botvin et al (1980)	N/A		N/A			
Botvin et al. (1992)	N/A		0.48 [-.75, -.21]			
Botvin et al. (2001)			N/A			
Butzer et al. (2017)	-0.11 [-.38, .16]		0.41 [-0.57, 0.29]			
Chaplin et al. (2006)	-0.44 [-.84, -.03]					
Coleman (2012)					-0.04 [-.83, .75]	0.26 [-.54, 1.05]
De Long-Cotty (2008)				N/A	N/A	N/A
Farrel et al. (2001)			N/A		N/A	
Farrel et al. (2003)			0.48 [-.79, -.17]			
Gillham et al. (2007)	-0.44 [-.62, -0.28]					
Hecht et al. (2003)			N/A			
Kataoka et al. (2011)				0.34 [-.01, .70]		
Lemberger et al. (2015)				1.27 [0.66, 1.88]		
Lemberger-Truelove et al. (2021)				0.02 [-0.76, 0.80]		
McCarty et al. (2013)	-0.36 [-.73, .02]					
Mendelson et al. (2015)	-0.10 [-.68, .48]				-0.58 [-1.18, .03]	
Merle et al. (N.d.)					-0.36 [-.65, -.07]	-0.33 [-.62, -.04]
Perry et al. (2008)				0.95 [0.64, 1.25]		-0.58 [-1.34, .18]

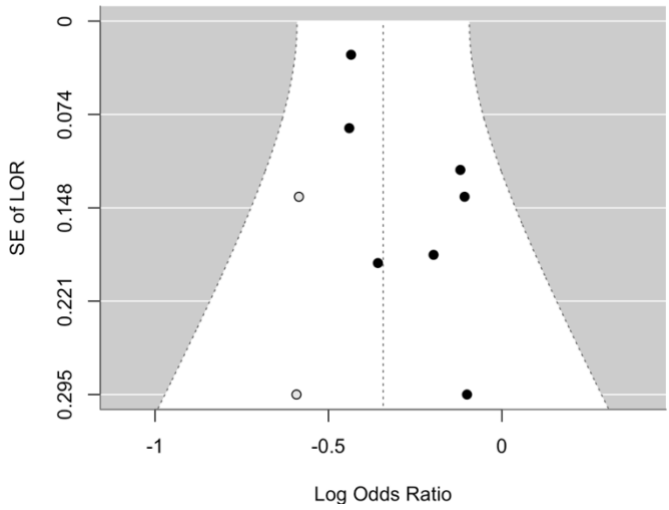
Author(s) (Year)	Outcome Measure Effect Size (Standardized Mean Gain) 95% [CI]					
	Internalizing Symptoms	**PTSD Symptoms**	**Substance Use Behaviors**	**Academic Achievement**	**Disciplinary Referrals**	**Truancy**
Stein et al. (2003)	-0.20 [-.56, .17]	-0.32 [-.68, .04]				
Sumi et al. (2021)	-0.12 [-.35, .11]	-0.21 [.44, .02]		0.05 [-.18, .28]		
Tobias & Myrick (1999)				0.39 [.07, .71]	-0.47 [-.79, -.15]	-0.08 [-.40, .24]
Trudeau et al. (2003)			0.20 [-.12, .52]			
Vicary et al. (2004)			N/A			

Notes. One effect size is reported for each outcome. For studies reporting multiple effect sizes for one outcome, the decision-tree approach was applied (see methods section for more details regarding this approach). N/A indicates the study could not provide appropriate data to code an effect size. Cells left blank indicate that outcome was not measured.

APPENDIX E: ADDITIONAL PUBLICATION/SMALL STUDY BIAS FIGURES

Figure FI

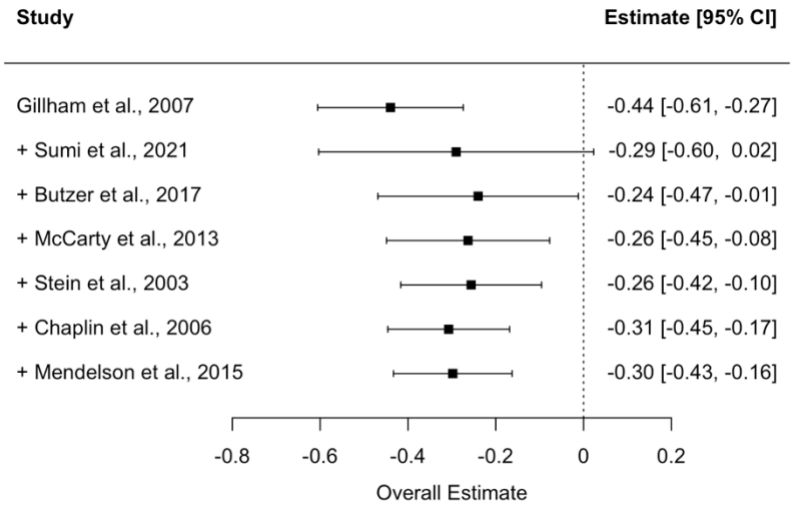
Trim and fill funnel plot for internalizing symptoms analysis



Note. These effect sizes are coded such that LOR > 0 indicate a negative finding favoring control conditions.

Figure F2

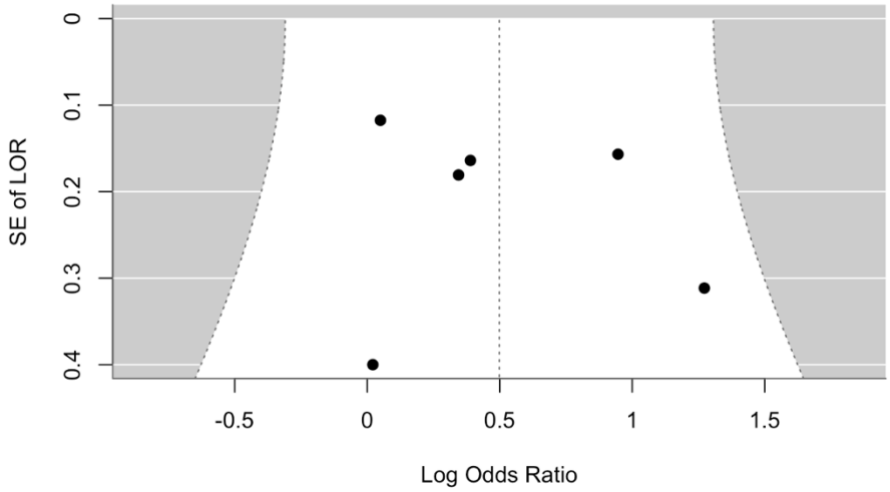
Cumulative meta-analysis for internalizing symptoms analysis



Note. These effect sizes are coded such that Overall Estimate > 0 indicate a negative finding favoring control conditions.

Figure F3

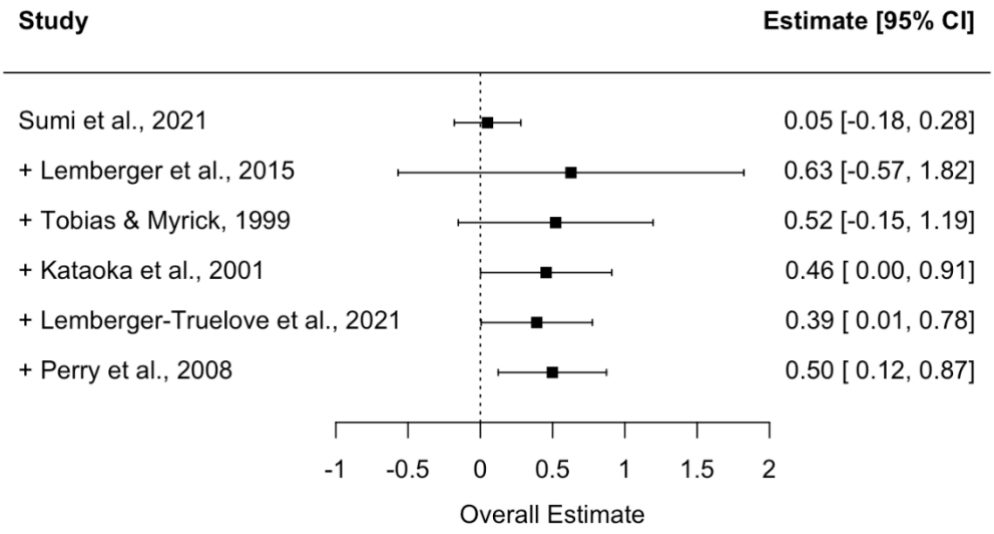
Trim and fill funnel plot for academic achievement analysis



Note. These effect sizes are coded such that LOR < 0 indicate a negative finding favoring control conditions.

Figure F4

Cumulative meta-analysis for academic achievement analysis



Note. These effect sizes are coded such that Overall Estimate < 0 indicate a negative finding favoring control conditions.

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