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RECEIVED 08 December 2023

ACCEPTED 21 March 2024

PUBLISHED 02 April 2024

CITATION

Martin B, Peck B and Terry D (2024) Yoga in schools that contributes to a positive classroom atmosphere for young children and educators: a PRISMA scoping review. *Front. Educ.* 9:1352780. doi: 10.3389/feduc.2024.1352780

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Yoga in schools that contributes to a positive classroom atmosphere for young children and educators: a PRISMA scoping review

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Introduction: This scoping review aims to examine yoga taught to children in a variety of different educational settings including after-school and in-school activity. Yoga has been found to support children in regard to wellbeing in a number of ways.

Methods: A scoping review using a systematic approach was undertaken using EBSCO, CINAHL, Medline and Psycinfo. Google Scholar was used to search for grey literature and journal reference lists reviewed.

Results: Fourteen studies were identified within the review that describe how children are able to understand and regulate their bodies through movement. As such four main themes were identified and included: (1) yoga and psychological wellbeing in school children; (2) yoga and self-regulation in pre-school children (3) yoga and cognitive function in school children; and (4) yoga and contemplative practices.

Conclusion: Children who participate in yoga during and after school were framing their world using their own creativity and fantasy in an attempt to understand and navigate it. The physical and psychological difficulty of some of the yoga shapes assisted children to develop a persistent mindset which enabled them to use in other unrelated contexts, such as difficulties at school.

KEYWORDS

yoga, asana, wellbeing, exercise, children, school

1 Introduction

Schools are an important context for the development of Social and Emotional Learning (SEL) in children (Jones and Bouffard, 2012). Social-emotional competencies are a set of one or more beliefs, habits or behaviors that has been reinforced as the result of participation in the classroom and include assessments of social-cognitive and affective competencies (Durlak et al., 2011). Greenberg and Harris (2012) highlight good SEL programs assist children to regulate their emotions, increase awareness of emotional states in others, learn to have frank conversations about feelings, plan and think ahead as well as develop a sense of purpose. Children need to develop these abilities to regulate their emotions and learn ways to manage

social conflict in order to be successful in school and life (Jones and Bouffard, 2012; Farrington et al., 2019b).

Jones and Bouffard (2012) in their seminal paper on social and emotional learning in schools describe these skills as developing over time and developed in the context of daily life, as social challenges and other teaching opportunities arise. A ten year report by CASEL (2021) describes SEL programs that include five core competency: self-awareness; self-management; social awareness; relationship skills; and responsible decision-making. The report provides evidence that SEL helps to bolster academic achievement, improve school climate, strengthen relationships, develop equitable practices, improve health and wellbeing and prepare students to achieve their goals, live healthy lives and contribute to their communities (Dusenbury et al., 2015). Integrating these competencies requires scaffolded strategies that are meaningful and sustained on a regular basis in the classroom by the teacher. Effective ways to contain emotional reactions and impulsive behaviors are challenging for children both in the classroom, on playgrounds and other places where students feel most unsafe are within the scope of SEL (Lopez, 2018). Yoga programs within schools have the potential to positively contribute to SEL strategies and provide educators with practical and easy to implement options during the day that engage physical activity, reduce student stress and improve health and academic outcomes (Finnan, 2015; Accardo, 2017).

Khalsa et al. (2012, p. 81) provided a definition of yoga and defines it as a “holistic system of multiple mind body practices for mental and physical health that include physical postures and exercises, breathing techniques, deep relaxation practices, cultivation of awareness, mindfulness and meditation.” According to ancient Indian tradition yoga originated some 4,000 or 5,000 years ago (Kaley-Isley et al., 2010). In western culture, hatha yoga is a branch of yoga and tends to focus on postures (asanas), breath work (pranayama), meditation (Case-Smith et al., 2010; Gard et al., 2012; Kishida et al., 2018). A code of conduct is found within Patanjals’ eight limbs of yoga and include ethics (yamas and niyamas), non-violence (ahimsa) and truth (satya) (Garfinkel and Schumacher, 2000; Brems et al., 2016).

Specifically, yoga for children is commonly a group activity that involves engaging in a series of movements or postures (Case-Smith et al., 2010). These movements in yoga have been adapted for children using animal names being the primary articulation by the yoga teacher, thus encouraging children to learn through their imagination and sensory integration and shown to be beneficial (Peck et al., 2005; Tummers, 2005; Case-Smith et al., 2010). As such, the center of yoga includes a focus on mindfulness and has become a widespread global phenomenon over the last decade (Bazzano et al., 2018). Mindful awareness practices are exercises that promote a state of heightened and receptive attention to moment-by-moment experience (Bishop et al., 2004; Siegel, 2007).

1.1 Benefit of yoga for children

Previous reviews have highlighted the benefits of yoga for young children. For example, de Oliveira (2020) within their scoping review of yoga and emotional-social intelligence in children and youth, concluded yoga may be of significant value in supporting emotional, social intelligence, development among youth presenting with a variety of issues such as social and behavioral problems, substance abuse, autism, trauma, obesity, ADHD and other psychiatric

conditions. Conversely, Hart et al. (2022) aimed to map out the relationship between yoga in schools and mental health and cognition among the neurodiverse and neurotypical youth populations. They found that despite a diversity in school-based yoga programs examined, there was clear evidence supporting the benefits of yoga in schools.

A growing interest in the developmental consequences of extracurricular and after-school programs for children has seen the inclusion of yoga programs, with positive effects on student psychosocial outcomes such as self-regulation (Eccles et al., 2003; Bergen-Cico et al., 2015; Razza et al., 2015; Cooper Stapp and Wolff, 2019; Rashedi et al., 2020). Capitalizing on a child’s propensity to be active (Mendelson et al., 2010), the physical and psychological difficulty of some of the yoga shapes assist children to develop a persistent mind-set which enables the transfer of knowledge to different contexts (Martin et al., 2022).

In addition, the ability of young children to control their emotional and cognitive impulses is considered beneficial (Payton et al., 2008; Cooper Stapp and Wolff, 2019). Yoga is one strategy to help children become aware of their emotional state so as to regulate their emotions, find strategies to help them calm down and augment any uncomfortable feelings they perceive (Case-Smith et al., 2010, p. 234; Tummers, 2005). Specifically, yoga has been found to be a strong indicator of short-term and long-term academic and social success among children (Cooper Stapp and Wolff, 2019).

In addition to the social and emotional impacts of school and associated development, children are challenged in numerous ways throughout the 21st century due to technological, economic and social pressures, which have been shown to require greater levels of intrinsic resilience (Farrington et al., 2012; Choo et al., 2017; Power, 2017). Yoga has also been shown to support children in regard to wellbeing in a number of ways. Many studies reported similar benefits for children who participate in yoga programs during school including: better dietary intake (Conboy et al., 2013), and improved self-control (Case-Smith et al., 2010). In addition, other studies, from the perspective of parents and teachers, have identified that yoga has an influence on helping children get to know their bodies Kaley-Isley et al. (2010), and improved self-regulation of students (Rashedi et al., 2020). Debate continues about the time period for which a yoga intervention should persist. Pandit and Satish (2013) found significant long term change started to emerge after three months and improved self-esteem scores for seventh grade children after a year-long program (Eggleston, 2015).

Finding effective ways to develop a child’s SEL can be challenging. The research would suggest that yoga programs offer one possibility for positively contributing to SEL strategies and provide educators with practical and easy to implement options during the day that engage physical activity, reduce student stress and improve health and academic outcomes (Finnan, 2015; Accardo, 2017).

It is evident that yoga programs have the ability to assist children in many ways, despite this the everyday experiences and perceptions of the children themselves is lacking from our collective understanding. Specifically, the importance of how children, as they connect to their imagination, experience freedom found within the physical body itself and as expressed through the words of the children themselves. Specifically, what are the factors that contribute to the lived experiences and perceptions of children, while clarifying the outcomes of why and how these factors matter to children.

2 Purpose of the study

Overall it has been demonstrated that mindfulness and yoga activities improved children's psychosocial and emotional wellbeing more than the usual care the school (Bazzano et al., 2018). However, the lived experiences and perceptions of children who participate in yoga during school and as an after-school activity is also limited with further research concerning children and yoga required. Within this context, the aim of this scoping review was to examine the experiences and outcomes of school-based yoga classes among children three to ten years of age and contributes to social emotional learning. The review seeks to broaden the current knowledge base on school-aged children who engage in yoga.

3 Methods

3.1 Study design

The scoping review was planned and conducted in adherence to the Preferred Reporting Items for Systematic reviews and Meta-Analysis extension for Scoping Reviews (PRISMA-ScR) statement (Tricco et al., 2018). This scoping review also follows the theoretical framework for scoping reviews developed by Arksey and O'Malley (2005), in their five-stage approach to scoping reviews. These stages include identifying the research question, searching for relevant studies, the study selection, charting the data and collating, summarizing and reporting the results (Arksey and O'Malley, 2005).

3.2 Search strategy and study selection process

The database search strategy was designed to be comprehensive and included a preliminary consultation with an academic information specialist. First, the databases EBSCO, CINAHL, MEDLINE and Psycinfo were explored. In addition, Google Scholar and Google were also searched to identify any additional research that may have not been captured through the database searcher. Lastly, reference lists of relevant studies were also examined to identify any relevant studies not captured through the database and search engine searches.

The initial literature search enabled the author to identify the fundamental index terms and keywords from the main searches. To ensure inclusivity, keywords included "yoga" and "school*" and "children*" and were the main terms used in the database searches. Secondary search terms were combined with the Boolean operator OR and then in combination with additional terms such as (program*, yoga-based* OR "asana" OR "after-school") to facilitate the recovery of relevant studies. All relevant keywords and their synonyms were used to develop search strings to increase search sensitivity and reduce the risk of relevant key studies being omitted. The literature search was conducted between April and June 2019 with follow-up searching conducted in 2023 to ensure recent literature were gleaned.

The search strings focused on keywords in titles and abstracts and were used in the databases. Titles and abstracts were screened based on the eligibility criteria. Agreement was reached between all authors regarding the search strings. To ensure currency of the literature, the search was restricted from 2010 to 2023.

3.3 Inclusion and exclusion criteria

The search strategy was developed based on specific inclusion criteria which included children between the ages of 3 and 10 years. Articles were considered eligible for inclusion in this scoping review if encompassed a yoga or yoga-based intervention; if the intervention was restricted to school or kindergarten settings (integrated into the school schedule or after class); included children between the ages of 3 and 10 years; included an evaluation of anxiety, depression, stress, or other psychological measures such as mood indicators, self-esteem, confidence and quality of life as both preintervention and postintervention; included the assessment of academic or cognitive performance as a consequence of the yoga; written in English; and any geographical location. Only peer review literature was included to increase the likelihood of high-quality information being included in the study. Articles were excluded if they were not original research; only focused on meditation, relaxation, breathing techniques or mindfulness practices without the physical components of postures (asana); participants were post-graduate students; or articles were not written in English. In addition, studies that also included additional interventions or health such as autism and other specific illnesses were excluded.

3.4 Study screening

The articles retrieved from the search were exported to EndNote (version X7). Titles and abstracts were initially screened independently by the first author and crossed-checked by the second and third authors. To increase rigor and reliability, a second round of full-text articles were reviewed independently by the second and third authors. After screening and selecting titles and abstracts, eligible records were obtained as full texts. The screening and selection of the full-text articles were performed by the first, second and third author. Any disagreements about the inclusion or exclusion of studies that arose were resolved through discussion with the three authors. Once full agreement was achieved between the research team full-text assessment was undertaken. The final list of included studies was evaluated and verified by the research team.

Informed by the approach to qualitative systematic review outlined by Voils et al. (2008), the data extraction was undertaken by the first author, who extracted all data using a spreadsheet. Following a modified version of the process outlined by Colaizzi (1978), each reviewer BM, BP, and DT independently read and re-read each article. Reviewers then shared their interpretation of the articles resulting from the independent review. Here common or recurring patterns in the significant statements and meanings among the significant statements and understandings identified from the independent review process were aggregated and formulated into thematic representations to describe the phenomena as suggested by Braun and Clark (2021).

Given the complexities and diversity of literature that was gleaned, various methodological assessments were undertaken to ensure the quality. This appraisal was undertaken among all identified publications to assess risk of bias, guided by checklists produced by the Critical Appraisal Skills Program (Critical Appraisal Skills Program, 2018), the Best Evidence Medical Education (BEME) quality indicators (Buckley et al., 2009; Thistlethwaite and Hammick, 2010),

and the JBI critical appraisal tool for randomized control trials (Aromataris, 2020).

The qualitative articles were scored as “met” (1), “partially met” (0.5) and “not met” (0), and then added to gain a full final score of 10.0–9.00 (high quality), 9.0–7.5 (moderate quality), 7.5–6.0 (low quality), and 6.0 (exclude), as guided by the Critical Appraisal Skills Program (CASP) checklist (Supplementary File 1).

The methodological quality assessment of the quantitative randomized controlled trials were evaluated according to the JBI critical appraisal tool for randomized control trials in systematic reviews (Aromataris, 2020; Supplementary File 1). The methodological assessment of the remaining quantitative papers were rated using Best Evidence Medical Education (BEME) systematic review guide (Buckley et al., 2009), where higher quality studies are those which met the minimum of seven of the 11 indicators. Using the BEME checklist within this context, all identified articles were examined using each criterion as either being “met” (+), “not met” (–) or “not applicable” (n/a). Each criteria of the BEME is then scored to provide an overall quality score ranging between 0 to 11, while those excluded had a score equal to or less than 6 (Buckley et al., 2009; Supplementary File 1).

3.5 Data extraction and analysis

Given the diversity of the data, textual data extraction was undertaken according to best practice principles (Peters et al., 2020). Following a modified process outlined by Colaizzi (1978), each identified article was read and re-read in order to formulate significant statements and meaning, while formulating interpretation, ideas, accounts and assumptions of what the findings presented. Common or recurring patterns and meanings among key statements and understandings were identified from the review process and were aggregated. In addition, textual data were also extracted from each study and due to the heterogeneity research questions and findings of each article, this precluded undertaking meta-analysis.

As data were extracted, findings were grouped into other similar topics and domains, leading to the identification of key themes. The process of aggregation occurred where findings that had been identified as communicating the same understanding of the phenomena of interest were grouped together as a confirmation of the finding (Popay et al., 2006). Conversely, the process of configuration occurred whereby key findings that were thematically diverse and not amendable to data pooling were used to extend, explain, or otherwise counter-argue other findings in an effort to gain greater insights and understanding (Sandelowski et al., 2013).

4 Results

4.1 Selection process

The literature search yielded 630 potentially relevant publications. Following removal of duplicates 313 records remained and titles were screened for relevance and further review. Of these, 44 were considered directly related to the research question and full texts were reviewed. A further 30 were removed at this point following

application of inclusion criteria, leaving 14 papers for the final review as outlined in Figure 1. The 14 studies took place in the following locations: U.S. $n = 10$; India $n = 2$; Germany $n = 1$; Columbia $n = 1$.

4.2 Grouping of the selected studies and identification of the themes

Thematic analysis was used as a method for analyzing the qualitative data and requires searching across a data set to identify, analyze and report repeated patterns in the context of a particular phenomenon (Braun and Clarke, 2013a,b).

4.2.1 Psychological wellbeing in school children

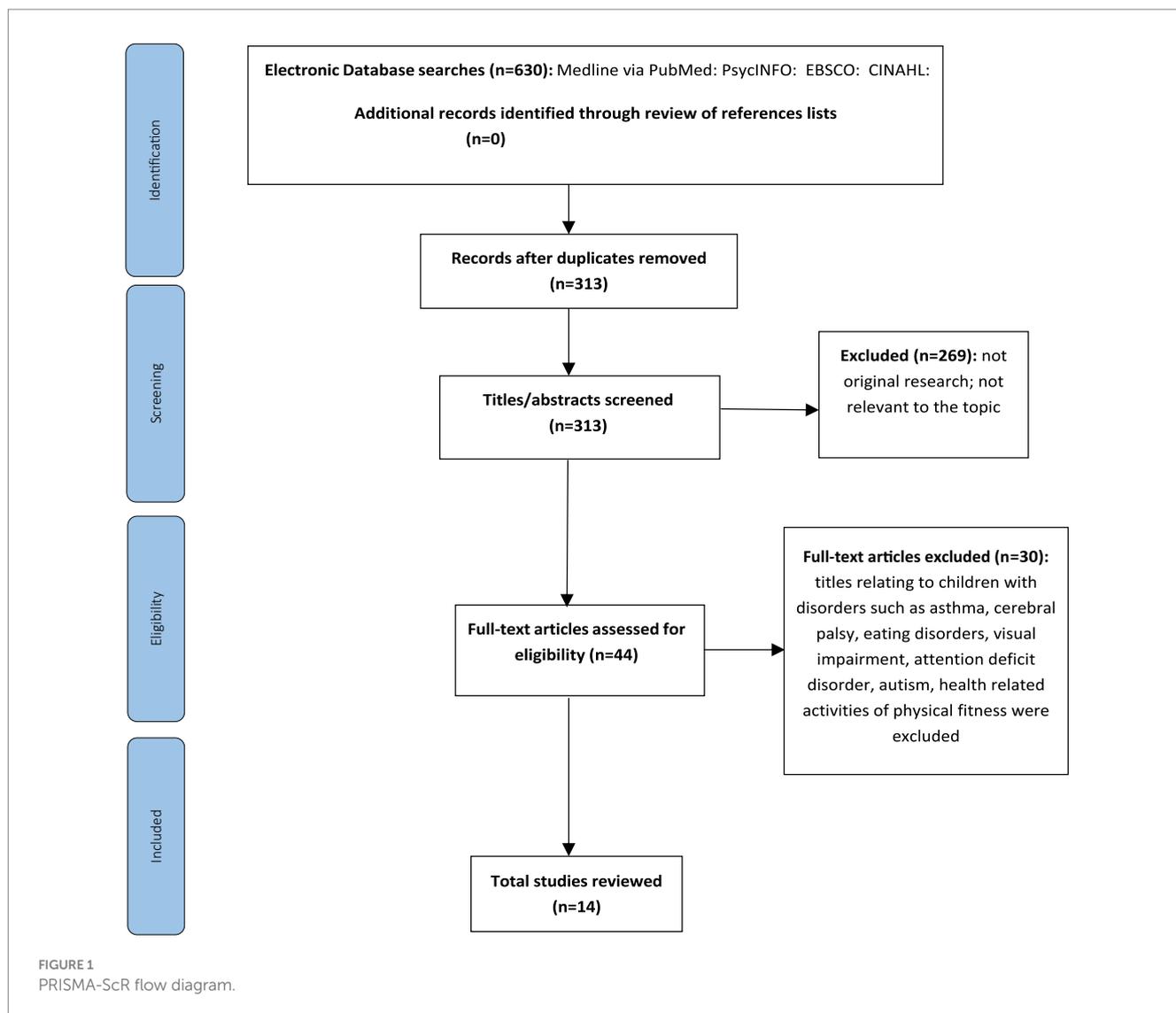
The psychological wellbeing among school children aged between six and ten years inclusive was a predominant theme within the study literature. Many authors measured psychological wellbeing in school children (Berger et al., 2009; Butzer et al., 2015; Eggleston, 2015; Velásquez et al., 2015; Richter et al., 2016; Bazzano et al., 2018; Cook-Cottone et al., 2018). Within the identified literature, psychological wellbeing was described as a positive sense of self which is correlated to both emotional and physical health and those with low self-esteem treat themselves badly the negative effects manifesting within classrooms as high rates of problem behaviors (e.g., aggression, fighting, disruption). This definition is also inclusive of positive appropriate behaviors (e.g., positive social interactions, completing tasks on time) that were often used as a measure of the influence of yoga on the children.

A consistent theme identified in a number of the papers was that schools have an important role in the development of psychological wellbeing among children. Schools promoted healthy behaviors, identifying children with low physical fitness to become active. As part of this development of the child, physical exercises have been introduced as a method for improving, and maintaining physical and emotional health (Berger et al., 2009; Butzer et al., 2015; Richter et al., 2016).

Other studies described teachers being given professional development in yoga training (Butzer et al., 2015; Richter et al., 2016; Bazzano et al., 2018). The ‘Yoga 4 Classrooms’ program included four key elements of classical yoga: breathing exercises, physical exercises and postures, meditation techniques and relationships. A particular focus of the program was an approach of self-regulation, including the steps of noticing, mindful choice, regulation, reflection and integration and being woven through the yoga programs (Butzer et al., 2015). Reported benefits included students’ ability to self-regulate, helping students be calm, helping the teacher be calm, or improving the classroom climate (Bazzano et al., 2018). Significant changes were perceived between second and third graders, including social interaction with classmates, attention span, ability to concentrate on work, ability to stay on task, academic performance, ability to deal with stress and anxiety, confidence and self-esteem and overall mood (Butzer et al., 2015).

4.2.2 Yoga and self-regulation in pre-school children

Several studies examined the links between yoga and self-regulation (Razza et al., 2015; Cooper Stapp and Wolff, 2019; Rashedi



et al., 2020). Self-regulation refers to the process of modulating systems of emotion, attention and behavior in response to a given contextual situation, stimulus or demand and are often used as a measure for school readiness (Razza et al., 2015). Cooper Stapp and Wolff (2019) concluded that self-regulation for pre-school children can begin as early as two years of age. It has been shown that mindfulness-based yoga interventions have resulted in significant benefits in attention and self-regulation. However, further research is needed to determine the potential benefits of yoga for pre-school children. The general agreement across the three articles is that the two components of self-regulation that undergo substantial growth during the pre-school years are effortful control (EC) and executive function (EF). It is noteworthy that the children identified within the research could give their opinions about participating in yoga and thereby given agency about how the yoga impacted their feelings, self-regulation, cognition and creativity (Cooper Stapp and Wolff, 2019).

The qualitative study by Cooper Stapp and Wolff (2019), challenged the assumption that children cannot speak for themselves. Children were found to be collaborators in their own learning. For

example, a teacher gives space for children to learn to attune to their bodily sensations choosing a posture and therefore taking agency over their embodied experience. From this place of intentionality, a child's sense of agency for action was shown to lead to intentional aspects of themselves.

4.2.3 Yoga and cognitive function in school children

The links between cognitive function and yoga among school children aged six and ten years was a strong theme within the literature. Here cognitive function is described as mental abilities and includes, but is not limited to learning, thinking, reasoning, problem solving, attention and decision making (Telles et al., 2013; Richter et al., 2016).

Telles et al. (2013) found that yoga practice improves several aspects of cognition and executive functions. School children practicing yoga for ten days improved spatial memory scores, strategic planning and the ability to concentrate. Furthermore, the assessments were selected to simultaneously evaluate physical fitness and cognitive mechanisms. Previously, both yoga and physical exercise have been

separately found to influence physical fitness, cognitive functioning and emotional wellbeing (Telles et al., 2013). Yoga appeared to influence physical fitness and cognitive function simultaneously. Several authors explored the links between measures of cognitive function in school children and yoga practice and found that children became more resilient and increasingly able to cope with psychosocial stress (Berger et al., 2009; Hagins et al., 2013; Eggleston, 2015; Velásquez et al., 2015; Richter et al., 2016; Bazzano et al., 2018; Cook-Cottone et al., 2018).

The study by Cook-Cottone et al. (2018) focused their research on children in Kenya. The children's perceptions of how they had changed since practicing yoga with the African Yoga Project (AYP) are best summarized by six main concepts (1) neurological and interpersonal integration; (2) gratitude for yoga community and practice; (3) improved emotional and physical health; (4) finding steadiness and ease; (5) experience of efficacy and possibilities; and (6) increased wellness. Overall, the findings in the study by Cook-Cottone et al. (2018) are consistent with the study by Butzer et al. (2015) which states that mind-body awareness, self-regulation and physical fitness are the key mechanisms for change among children practicing yoga.

Regarding this theme, the existing literature supports the inclusion of yoga programs as a means of providing a foundation for developing cognitive function in school children. By offering children opportunities to participate in physical exercise, children stay active influencing their physical fitness, mental health and wellbeing.

4.2.4 Yoga and contemplative practices

Mindfulness programs introduced into schools has become widespread in the US over the last decade Bazzano et al. (2018). Small group yoga and mindfulness activities at school improved students' psychosocial and emotional wellbeing. Bazzano et al. (2018) found that yoga instruction improved quality of life more than the usual care the school provided to students who were identified as having symptoms of anxiety.

The mindful yoga interventions reported by Razza et al. (2015) was implemented by the classroom teacher on a regular basis. Integrated into the class routine were several transition points. For example, as the children arrived, they sat in a circle. Another transition point included before or after lunch and recess, as these times are considered to be appropriate for the children to engage in the practice of mindfulness (Razza et al., 2015).

One of the consistent commonalities throughout each paper identified the benefits associated with yoga as a body practice and part of a bigger mindfulness practice program (Razza et al., 2015; Bazzano et al., 2018; Cooper Stapp and Wolff, 2019). This theme of contemplative practices were interventions that support emotion regulation skills in children and forms of mental training (Table 1).

5 Discussion

The review has explored the phenomena of children aged between three and ten years of age who practice yoga after school or during school times. Within all articles, yoga practices were identified as positive and beneficial within early childhood and primary school environments. Four major themes emerged and encompass the enablers of wellbeing for school-aged children and include

psychological wellbeing in school children, self-regulation in pre-school children, cognitive function in school children, and yoga and contemplative practices.

Within the first theme, psychological well-being was found to be the target of social emotional learning (SEL) goals. The competency was described in CASEL (2021), as self-awareness in terms of identifying emotions, accurate self-perception, recognizing strengths, self-confidence, self-efficacy and social awareness and translates within the articles as assisting children to become aware of how their behaviors affect others. Yoga was found to be a positive influence on self-worth, self-awareness and self-esteem and strengthened through the social context of physical exercise, sports or yoga in schools (Weiss and Smith, 1996). Interpersonal and relationship skills relate to students' emotional capacity to experience feelings congruent to the situation of another person and included feelings of empathy for another and for teachers to develop this quality within the children. While the academic research on the use of yoga in the classroom is developing, what has been done so far suggests yoga is a powerful and immediately available practice to support students and the entire school community (Cohen Harper, 2010). Martin et al. (2022) found in their study that yoga gave students specific strategies when encountering stressful situations at school. The after-school yoga classes had cultivated within the children the ability to recognize feelings from inside their body which required a particular sensitivity. Velásquez et al. (2015) found evidence of yoga having practical implications for the reduction of aggression in the classroom and may inform social competencies promotion efforts of educational practitioners.

The second theme *self-regulation in pre-school children* was connected to children finding steadiness and ease within themselves. The benefits of the balancing postures of yoga assisted children to find strength inside their bodies and to stay with challenging school situations. The literature expressed this capacity to focus and stay with the 'hard' or difficult shapes expressed as linking the hard elements of yoga and the hard elements occurring at school (Rashedi, 2019). This was achieved by keeping the focus of attention on the physical body to perform the balancing postures, therefore shifting attention toward the skills required to balance and away from anxiety or frustration (Kaley-Isley et al., 2010; Finnan, 2015). Farrington et al. (2019a) describe the competencies of self-management and self-discipline as skills children require to take responsibility for their own behavior. This was found to align with the CASEL (2021), framework whereby the focus of attention is self-management, described as successfully regulating one's emotions, thoughts and behaviors in different situations, effectively managing stress, controlling impulses and motivating oneself. Consistent with the literature, children enjoyed the challenge, together with a sense of purpose, achievement and satisfaction described by the children as "being complicated at the beginning, but becoming easier" (Davis et al., 2011; Rashedi et al., 2019). For children, becoming physically stronger is characterized by psychological engagement, intrinsic, motivation and enjoyment, the crucial determinant being 'structure' (Delle Fave and Massimini, 2003).

Within the literature children were found to be collaborators in their own learning (Cooper Stapp and Wolff, 2019; Rashedi et al., 2019). This is in contrast to the pedagogy of learning common within the school system where children, for the most part, are acted upon by others. It is where education becomes the act of imparting

TABLE 1 Identified articles.

Study	Design and aim	Sample	Intervention	Findings	Evaluation tool
Bazzano et al. (2018), United States	Quantitative – RCT	Elementary 3rd grade 20 students	Yoga before school 40 min 8 weeks	The yoga-based intervention was associated with an increase in student emotional and psychosocial outcomes	The Brief Multidimensional Students' Life Satisfaction Scale- Peabody Treatment Progress Battery The Pediatric Quality of Life Inventory
Butzer et al. (2015), United States	Quantitative Pilot Study To examine a school-based yoga program and the effects on physiological markers related to stress and behavior	Second and third grade 36 students	Yoga 4 Classrooms program 30-min yoga sessions 10 sessions	The second-grade teacher perceived significant improvements in several aspects of students' behavior	Attention network test Perceived Behavior Change survey (teachers only)
Donahoe-Fillmore and Grant (2019), United States	Quantitative To investigate the effects of yoga on balance, strength, coordination, and flexibility in health children	Middle school 10 to 12 years 26 participants	Hatha yoga 40 min x 3 times a week 8 weeks	Children are at their peak of motor planning and development. Yoga can facilitate improvements in various physiological and psychological measures in healthy and non-healthy children	Buitinks-Oseretsky Test of Motor Proficiency Balance measurements contains nine items Strength measurements and contains five items Bilateral Coordination measurements contains seven items Flexibility measurements
Hagins and Rundle (2016), United States	Quantitative – RCT To investigate if yoga would improve academic performance	Middle school grades 10,11,12 112 students	Mindfulness and yoga-based exercises twice a week 36 weeks	The data supported the hypothesis that participation in yoga classes is associated with higher mean GPA when compared to an equivalent amount of participation in PE classes.	Response to stress questionnaire Behavior Rating Inventory of Executive Function Child and Adolescent Mindfulness Measure The Warwick-Edinburgh Mental Well-Being Scale
Pandit and Satish (2013), India	Quantitative RCT To examine the long-and short-term effects of yoga among pre-adolescent children	Elementary school grades 5 and 6 178 students	Hatha yoga 2 years	Within subject's time and person factors changed significantly	Cancelation Test Raven's Progressive Matrices Test MAPS Assessment of Personality dimensions Self-awareness and emotional regulation scale

(Continued)

TABLE 1 (Continued)

Study	Design and aim	Sample	Intervention	Findings	Evaluation tool
Razza et al. (2015), United States	Quantitative To determine the feasibility and evaluate the effectiveness of a mindfulness-based yoga intervention among pre-school children	Preschool children 3–5 years 34 students	Hatha yoga 40 h of mindful yoga across 25 weeks	The intervention was successful in promoting EC, EF, and attention control across children in the treatment group	Questionnaire for the parents Children's Behavior Questionnaire Toy Wrap task Toy Wait task Pencil-tapping task Head should knee and toes Drawing task
Richter et al. (2016), Germany	Quantitative To investigate the influence of yoga practice as compared to physical skill training on motor function and physical self-concept as well as emotion and cognitive function	Junior primary 24 students	six weeks twice a week 6 weeks	In terms of physical self-concept significant group differences were revealed only for perceived movement speed.	Tests of Executive Functions Flanker Test Go-Nogo test Physical Self-Concept Questionnaire for children (PSC-C) Anxiety Questionnaire (BAV 3–11) Movement-ABC 2
Telles et al. (2013), India	Quantitative RCT To investigate the effect of yoga and physical exercise on physical, cognitive, and emotional measure in children	Elementary and middle school 8–13 years 57 children	Hatha yoga 5 days per week 12 weeks	There was one significant difference. Social self-esteem was higher after physical exercise compared to yoga.	Eurofit physical fitness test Stroop color-word task Battle's self-esteem inventory
Cooper Stapp and Wolff (2019), United States	Qualitative To explore children's perceptions of how yoga influenced feelings, self-regulation, cognition, and creativity perceptions	Early childhood 34 children	Daily pre-school program	Participants demonstrated they were capable, knowledgeable as active agents in the research process.	
Rashedi et al. (2019), United States	Qualitative To investigate children's embodied experiences in the yoga intervention	Preschool children 154 children	Hatha yoga eight weeks six times weekly	Yoga serves as a buffer to the negative impact of stress on children's development and cultivates a positive mindset.	
Cook-Cottone et al. (2018), United States	Mixed methods To explore and document the breadth of experiences and perceived effects of yoga among school-aged children in Nairobi and Kenya	Elementary and middle school 155 participants	Yoga once a week One school year	On average children rated cluster 2 statements as least important and cluster 3,4 and 5 statements as important	Concept mapping
Eggleston (2015), United States	Mixed methods To investigate the relationship and effect of yoga on self-esteem and perceived stress in children	Middle school 12 to 13 years 20 students	Hatha yoga 30 min x 1 36 weeks (1 academic year)	Self-esteem scores increased over time for the yoga group only.	Rosenberg's Self-Esteem Scale Perceived Stress Scale

(Continued)

TABLE 1 (Continued)

Study	Design and aim	Sample	Intervention	Findings	Evaluation tool
Berger et al. (2009), United States	Mixed methods To assess the effects of yoga on children's wellbeing, specifically its effects on those aspects of self commonly thought to be positively influenced by yoga	Fourth and fifth grade 39 students	After-school program one hour per week	Children in the yoga group had better negative scores after the study	Emotional Well-being Assessment Harter's Self-Perception Profile for Children Physical Appearance subscale The Global Self-Worth subscale Physical Well-being Assessment Effects of Yoga on Well-being Survey (designed by the authors)
Velásquez et al. (2015), Columbia	Mixed methods To carry out an evaluation of the impact of the implementation of extracurricular workshops on depression, anxiety, and aggression	Middle school 5.8 and 9th grade 125 students	Hatha yoga 5 days p/w 12 weeks	Students identified by peers as highly aggressive showed a decrease in aggressive behaviors	Strengths and difficulties Questionnaire Empathy and anger management by means of two self-report questionnaires

knowledge into children, also described as “the banking system of education” rather than experiencing education as a process of inquiry (Freire, 2014, p. 163). It was recognized that yoga gave children opportunities to experience themselves as embodied, thereby listening through their bodies, which created a sensitivity toward themselves (Fedosh, 2010; Jennings, 2015; Rashedi et al., 2019).

In addition, the practices of yoga and mindfulness together were reported in three studies (Razza et al., 2015; Bazzano et al., 2018; Cooper Stapp and Wolff, 2019). Two studies reported on pre-school children's experiences of participating in practices that were aimed to enhance mindfulness and yoga (Razza et al., 2015; Cooper Stapp and Wolff, 2019). Razza et al. (2015) reported that mindfulness practices that included yoga and incorporated into the classroom enhanced pre-children's self-regulatory behavior. This included a delay of gratification and inhibitory control and was beneficial in teaching self-regulation for young children. In addition, a yoga and mindfulness curriculum integrated into the third-grade curriculum found students psychosocial and emotional scores increased as a result of participating in a small-group and mindfulness activities at school including with more interested in yoga than mindfulness practices (Bazzano et al., 2018).

The third theme *yoga and cognitive function in school children* highlights our understanding about how yoga supports the growth mindset. It was found that yoga supported children's positive feelings about themselves as on a continuum of developing their abilities through the hard work of the yoga poses, learning to stay calm and learning through their expression of positive mindsets. Self-expression and identity help children to develop an integrated identity of who they are as it contributes to confidence and growth (Farrington et al., 2019b). Through willful embodiment fixed mindsets, also described as stereotypes, were challenged in ways that included children having a fixed quotient of intelligence, or the belief that talent and intelligence are largely determined at birth (Dweck, 2006; Dweck and Yeager, 2019). This is in contrast to a malleable theory, or a growth mindset, whereby recovery from setbacks and difficulty is predicted by attitudes of motivation, learning and achievement outcomes (Dweck and Yeager, 2019).

Statements from the children assisted in understanding how a physically active lifestyle during childhood are positively associated with growth mindsets of learning. Preliminary evidence indicates that competence grows with effort and is positively influenced by physical exercise (Cook-Cottone et al., 2018). Despite the suggestion of a strong relationship between exercise, yoga and cognition, its true effect is yet to be established and thereby remains a gap within the current research.

The final theme, *yoga and contemplative practices* confirms the introspective aspect of doing yoga, such as concentration, focus, breathing and relaxation (Berger et al., 2009; Velásquez et al., 2015). Although not always expressed, the children indicated they learned to use yoga to calm and center themselves trusting their instincts. The stillness can be found within the child and begins to develop an inner peace that can help them through a difficult situation (Wenig, 2003). Goleman (2011) described emotional intelligence as consisting of two key components which included self-awareness along with self-regulation. Saltzman (2014) suggest children need to be taught emotional intelligence so as not to become overwhelmed by emotions. Ways in which to teach children emotional intelligence is through finding the still quiet place ‘inside’ (Saltzman, 2014). In addition

becoming quiet and reaching quietness as a state is necessary for the wellbeing of children (Dent, 2009; Dariotis et al., 2016). Jennings (2015) points out the importance of rest for the brain, the capacity to pause, even just for five minutes, allows the individual to center their thoughts, feelings and emotions.

The review demonstrated that yoga programs in schools are beneficial for children. Embodied experiences were found to contribute to children becoming effect agents for their own continual wellbeing and learning. It was found that yoga participants reported using significantly few negative behaviors that include screaming and yelling and may have assisted participants to release stress, thereby releasing the need to react impulsively. This included middle school students who were found to benefit greatly from a regular yoga practice during the school day.

5.1 Limitations

The strength of this scoping review is that it followed a rigorous framework Arksey and O'Malley (2005), and followed the published protocol for PRISMA-ScR (Tricco et al., 2018). There were a diverse range of study designs which allowed a more extensive interrogation of the literature. It provides a synthesis of current literature on how yoga is used among children in primary school and pre-school settings and explored children's experiences of yoga through dialogical encounter. A limitation was the diversity of the yoga programs and not being comparable between each. The length of each the interventions varied resulting in an inability to compare results and therefore a limitation. Specific yoga poses were not always documented, such as poses to develop strength, poses that improve balance and poses that focus on the breath.

In accordance with the protocol of scoping reviews we were not required to appraise the quality of the evidence. Instead, the authors were able to scope out all the evidence in the area and map out any potential gaps. It could be argued that inclusion of the available evidence was not achieved however, a high degree of confidence that the review represents an excellent overview of yoga in schools for young children and how dialectic inquiry helps realize non propositional knowledge including imagination as ways to understand and navigate the world.

The sample scoping reviews of 14 articles was only a small sample of potential articles and derived from only four data bases. However, the use of highly ranked international journals and a sample that included the past twelve years would suggest that these findings are representative of the topic under investigation.

5.2 Future recommendations

While this study adds to the small, albeit, growing body of knowledge that supports the benefits of yoga with young children, future opportunities for extending our understanding of this domain is through an examination of the ways in which embodied experiences contribute to children becoming effective agents for their own continual learning and wellbeing. A future study could proceed over a longer period-of- time, such as six-monthly interviews, both with the children and their parent with the inclusion of developmentally appropriate tests of emotional skills, such as emotion understanding and awareness.

6 Conclusion

The scoping review highlighted a framework of competencies that may positively influence social emotional learning (SEL) and positive mindsets for children who participate in yoga in schools. Yoga has the potential to compliment other forms of exercise within school settings, as well as being a foundation program for teaching SEL competencies to children. Overall, the findings of this scoping review have contributed to evidence that yoga provided children with strategies when challenging situations arise and self-regulation is the essence of controlling these emotions as they arise within the embodiment of the child.

Data availability statement

The original contributions presented in the study are included in the article/[Supplementary material](#), further inquiries can be directed to the corresponding author.

Author contributions

BM: Conceptualization, Data curation, Formal analysis, Methodology, Project administration, Resources, Software, Writing – original draft, Writing – review & editing. BP: Conceptualization, Data curation, Formal analysis, Methodology, Project administration, Resources, Software, Supervision, Validation, Writing – review & editing. DT: Conceptualization, Data curation, Formal analysis, Methodology, Project administration, Resources, Software, Supervision, Validation, Writing – review & editing.

Funding

The author(s) declare that no financial support was received for the research, authorship, and/or publication of this article.

Conflict of interest

The authors declare that the research was conducted in the absence of any commercial or financial relationships that could be construed as a potential conflict of interest.

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Supplementary material

The Supplementary material for this article can be found online at: <https://www.frontiersin.org/articles/10.3389/educ.2024.1352780/full#supplementary-material>

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