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Educational Interventions for Enhanced Learning and Academic Performance: A Comprehensive Systematic Review Across Cognitive, Emotional, and Behavioral Domains

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Abstract

This systematic review examines non subject related educational interventions that support students' learning behavior and academic performance across different age groups. The interventions are grouped into three domains: cognitive, emotional, and behavioral. Cognitive interventions focus on learning strategies, study habits, and metacognition. Emotional interventions address emotional regulation, emotional awareness, and well being. Behavioral interventions emphasize classroom behavior, motivation, and engagement.

The review synthesizes studies from different educational levels and considers how interventions vary across developmental stages. Rather than judging effectiveness through causal claims, this review summarizes existing empirical studies to describe how different types of interventions have been examined in educational settings. Across the literature, consistent patterns indicate that cognitive, emotional, and behavioral processes are closely connected to learning behavior and academic performance. This synthesis provides educators, policymakers, and researchers with a clear and integrated overview of non subject related educational interventions and their relevance to supporting learning behavior and academic outcomes.

Key Words: Education Intervention, Student Learning, Learning Behavior, Academic Performance, Education Psychology, Education Technique

Introduction

The global significance of education in shaping individual earnings, health, and overall well-being underscores the imperative need for effective interventions, especially for disadvantaged children. Governments worldwide recognize this as a pivotal concern. In response to the evolving educational landscape, researchers, educators, and policymakers have increasingly focused on interventions to enhance academic performance. Moving beyond the traditional disciplinary boundaries, this manuscript provides an exhaustive review proceeding with a systematic investigation and evaluation of the different cognitive, emotional, and behavioral aspects that intersect with each other. This will help readers fathom this in-depth exploration with the aim of addressing interrelated topics across different age clusters.

The deliberate exclusion of subject-related interventions aligns with the educational psychology curriculum's orientation, emphasizing the scrutiny of interventions addressing learning strategy instruction. Focusing on non-subject-related interventions, this paper seeks to offer insights into the broader context of educational psychology, emphasizing the generalizable aspects of learning strategies. This review focuses on non subject related educational interventions implemented in general education contexts. The target population is defined as typically developing students. Studies focusing on populations with formally diagnosed clinical or developmental conditions were excluded in order to examine educational interventions outside clinical or special education settings. This scope allows the review to focus on learning behavior and academic processes commonly addressed in general education.

Educational psychology, as a discipline, is dedicated to comprehending and enhancing learning and instructional processes, and the emphasis on non-subject-related interventions is guided by their direct relevance to the educational psychology curriculum. These interventions contribute to a holistic understanding of effective teaching and learning practices, encompassing principles and theories related to cognition, motivation, and learning processes [1].

This review explores non-subject-related interventions across three key domains: cognition, emotion, and behavior. Cognitive interventions aim to enhance processes such as memory, attention,

and problem-solving skills, while emotion-related interventions target emotional intelligence, regulation, and overall well-being. Behavior-related interventions address observable actions and conduct, including classroom management techniques and motivational strategies.

Teaching study strategies to students has been found to have a moderate impact on emotional and motivational aspects, with a minor effect on performance [2], highlighting their distinct yet interconnected influence on academic performance. The academic learning model proposed by Ben-Eliyahu [3] emphasizes integrating emotional learning within cognitive learning, underlining the crucial role of emotions. Meta-analysis research reveals the comprehensive impact of relaxation training, surpassing cognitive-behavioral or mindfulness interventions [4].

By systematically reviewing interventions in these interconnected domains, this paper aims to provide a comprehensive understanding of educational interventions' multifaceted nature. Recognizing the intricate interplay between cognition, emotion, and behavior is essential for developing effective strategies that promote optimal learning environments and contribute to enhanced academic performance across diverse age groups.

Literature Review

Learning and learning behavior

Learning is a journey that fills the gap between where we are to where we are heading, through the means of not only involving skills and knowledge, but also coving values, attitudes, and emotional reactions [5, 6]. Learning drives a learner from the current situation all the way toward the end where the learner is successfully learned. Student learning theory has two approaches: deep learning and surface learning [7]. Deep approaches to learning aims to understand the meaning of text. In contrast, surface approaches describe a paired intention to meet the immediate demands of assessment for identifying and remembering the essential facts. Learning as a behavior is the specific move we conducted in the learning process. The word "behavior" has many physical and psychological meanings, but in this context, it typically refers to an action or activity that is eidetically learned as a result of conditioning.

When exploring the concept of learning, knowledge, skill, motivation, habits, and environment are all well studied as crucial principles. For example, when someone knows what to do, but chooses not to comply, there may be many reasons for their actions specifically in learning environments. Dirksen [6] defined it as a motivation gap. It may be because the destination does not make sense, or the inherent difficulty of finding a path. Other times people get distracted or just are not interested in making any effort. However, in order to promote the learning process, we need to focus on learning habits as opposed to content being learned [6, 8].

Motivation also plays a major role toward explaining behaviors of learners, which influence academic performance. Motivation is commonly examined within the context of self-determination theory, which distinguishes between intrinsic motivation, extrinsic motivation, and amotivation. Intrinsic motivation, driven by the desire for knowledge, achievement, and stimulation, proves most effective in fostering high self-determination and improved self-regulation [9, 10]. A holistic understanding of learning behaviors emerges when considering both arousal theory and motivation theory. The challenge students face is assessed based on the complexity of the context and their prior knowledge. The latter is characterized as an experience filter, wherein learners process new information through past experiences, seeking to interpret and explain novel knowledge. However, individuals may inadvertently learn incorrect lessons from their experiences. A student's willingness to sacrifice immediate gratification for future gains depends on whether they are influenced by past experiences and the immediate consequences within learning situations.

In situations demanding optimal learning behavior decisions, characterized by emotional tension and high stress, the ability to act confidently is crucial. Emphasizing self-efficacy becomes paramount in such circumstances. According to Bandura [11], self-efficacy for learning and performance refers to individuals' assessments of their capabilities to plan and execute behaviors necessary for goal achievement. Substantial evidence, as highlighted by researchers [12], underscores the significant correlation between self-efficacy and learning. Individuals are more inclined to participate in activities when they believe in their ability to succeed, mirroring students' increased commitment to learning when they possess the efficacy for academic success.

Education Intervention

Educational interventions play a pivotal role in shaping students' learning experiences and academic outcomes. Drawing on two decades of procedural data, the interplay among various interventions has become evident over time, with categorizations based on cognition, behavior, and emotion. These interventions often operate in interactive pathways, acknowledging the interdependence of cognition, behavior, and emotion in the learning process. In the realm of educational interventions, Miranda [13] highlighted three primary areas of focus for behavioral educational techniques: academic preparedness, academic skills, and academic self-confidence. Miranda's "Find Your Classroom Voice" program, for instance, employs targeted methods to enhance class participation, fostering active engagement and positive emotions in students. Such behavior-oriented approaches aim to create a conducive environment for active participation and emotional well-being.

Researchers employing cognitive-behavioral techniques, including meditation practices, have also integrated the three aforementioned dimensions. Firth-Clark et al. [14] conducted a six-week heart intervention focusing on self-efficacy and self-regulation, demonstrating the positive impact of perceived value and emotional enjoyment on learning behavior and academic improvement. Mindfulness, diaphragmatic breathing, and heart rate variability biofeedback have similarly been associated with scholastic enhancements, emphasizing the interconnectedness of mental well-being and academic performance [14, 15].

Beyond physically behavior-focused approaches, there is a growing emphasis on mentally and psychologically oriented interventions. Psychological skill training, encompassing strategies such as self-talk, focused attention, goal identification, imagery, and cognitive restructuring, promotes self-regulatory behaviors to enhance performance. These cognitive-related skills demonstrate transferable outcomes, influencing both behavioral change and emotional well-being [16]. The shift towards mentally and psychologically focused interventions underscores the holistic nature of educational strategies aimed at fostering cognitive, behavioral, and emotional development.

In recent years, the Response to Intervention (RtI) approach has gained prominence as a preventative measure for students at risk of learning difficulties. Key to RtI is the integration of functional behavioral assessment, identifying variables contributing to persistent behavioral issues and tailoring interventions accordingly [17]. With a three-tier structure encompassing assessments, progress monitoring, and targeted teaching, the RtI model proves effective in addressing instructional needs in K-12 public school systems. However, the lack of standardized outcome measures poses a significant hurdle in evaluating and refining educational interventions. To ensure sustained success and adaptability across diverse contexts, establishing reliable metrics is crucial, facilitating evidence-based decision-making and continuous improvement in educational practices [18].

As we delve into the examination of educational interventions, a critical consideration surfaces regarding the limitations of standardized measurement tools. Beyond discussing the RtI model and its objectives, subsequent sections will explore the broader implications of standardized measures, specifically in assessing the multifaceted impacts of educational interventions with a focus on academic performance. Through an in-depth analysis of existing literature, this review aims to elucidate the significance of reliable metrics in guiding evidence-based decision-making and fostering continuous improvement in educational practices.

Within the realm of educational psychology, academic performance is a pivotal aspect subject to diverse measurement methodologies [19]. These include self-evaluation questionnaires, IQ tests, knowledge base exams, essays, and performance observations. Standardized tests, notably prevalent in contexts like China, play a central role in measuring academic achievement, reflecting a school's effectiveness in instruction through measurable outcomes in students' test scores [20].

The historical evolution of standardized testing reveals a progression from multiple-choice tests in the 1920s to intelligence tests, or IQ tests, later in the 20th century [19, 20]. While the efficiency of multiple-choice tests led to their preference, the 1980s and 1990s saw the emergence of the alternative assessment movement, promoting open-ended questions, essays, portfolios, and performance tasks. Despite the movement's goals, challenges like bias in scoring and high costs led to the resurgence of multiple-choice tests as the preferred standardized measure [19].

Extensively researched within educational psychology, academic performance is a crucial predictor of educational outcomes and an indicator of potential psychosocial issues or learning disorders [21]. Poor academic performance correlates with adverse outcomes, including burnout, depression, substance use initiation, aggressive behaviors, delinquency, and dropout rates [22].

In light of these multifaceted implications, the measurement of academic performance emerges as a critical domain for educational evaluation and intervention. As we proceed, this literature review will delve into the nuances of measuring academic performance, exploring the varied dimensions influencing student outcomes in educational interventions.

Methods

The systematic review employed a rigorous process to identify relevant literature on educational interventions, learning, and academic performance. The initial search (see Figure 1) was conducted on PsycInfo, yielding a total of 376 papers. After the title scan, 63 reviews, 6 commentaries, 6 other papers, and 27 books that did not represent primary studies were excluded.

Following these exclusions, an abstract scanning phase was implemented, leading to the exclusion of 53 papers for focusing on special needs subjects, 6 non-English papers, and 4 papers with no access to the full text, whittling the total down to 205. After a pilot rough reading phase removed 83 records for not focusing on interventions, 6 for lack of an academic subject, 7 non-primary studies, and 17 studies focusing on overly narrow subject groups, 92 texts remained for thorough scanning. The final selection was based on the relevance of the studies to educational interventions, learning, and academic performance, ensuring a comprehensive and focused analysis of the literature, meaning 27 interventions were not included because they were outside of the scope, which left 65 interventions in total to be included in the systematic review at hand.

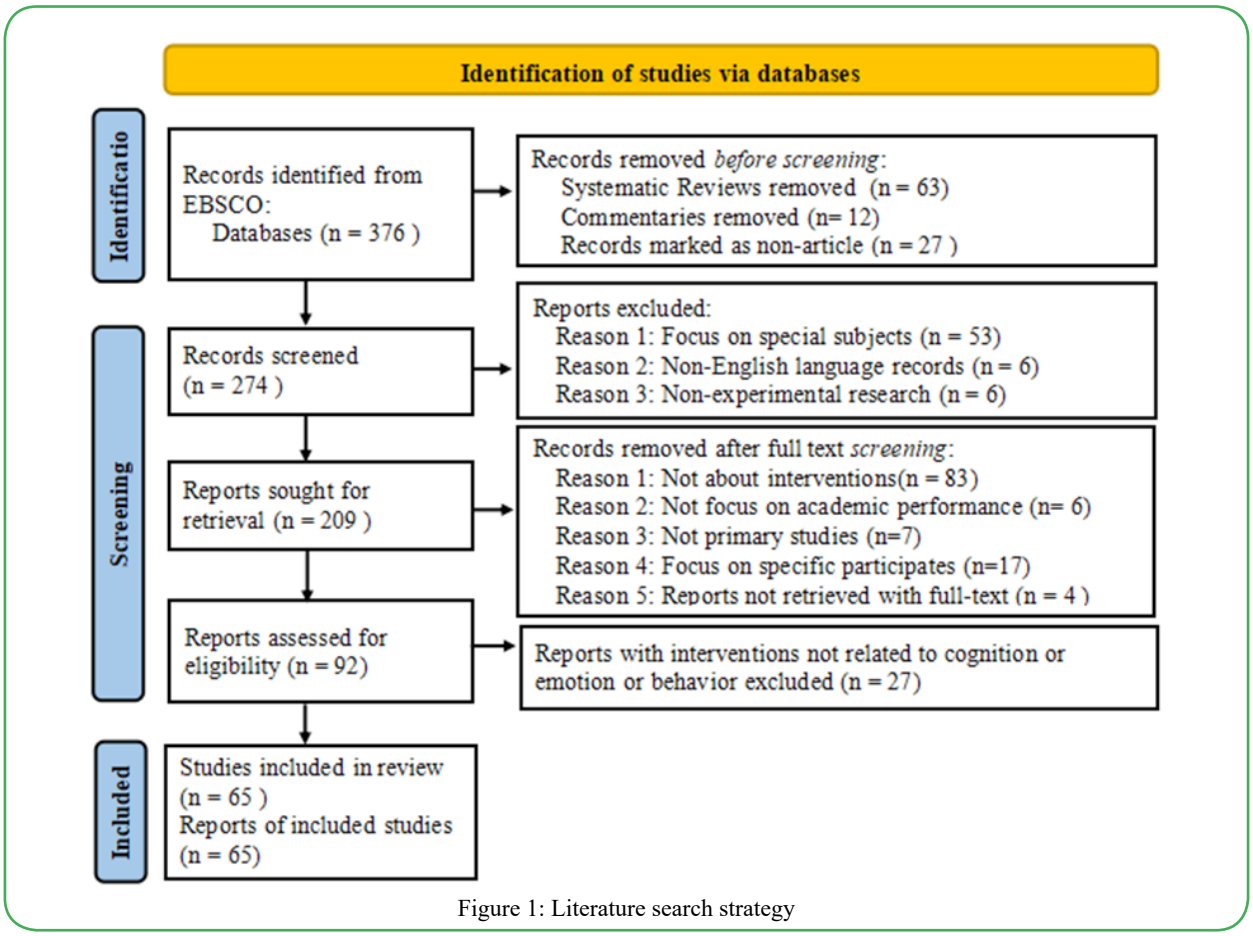

Figure 1: Literature search strategy

In this review, an educational intervention is defined as a structured and intentional approach implemented within educational settings to influence students' learning related cognitive processes, emotional regulation, or behavioral patterns, with the aim of supporting learning behavior or academic performance. This definition distinguishes educational interventions from isolated teaching techniques or subject specific instructional methods by emphasizing systematic implementation and a direct connection to learning processes. Under this definition, cognitive, emotional, and behavioral interventions are considered educational when they are embedded in learning contexts and explicitly linked to learning behavior or academic outcomes.

The systematic review encompassed an extensive range of studies conducted between 1995 and 2025, examining interventions across various countries and age groups. Although the search period extended through 2025, the inclusion of studies was determined by relevance to non-subject-related educational interventions, learning behavior, and academic performance rather than publication year alone. As a result, the distribution of included studies reflects patterns in the existing literature, with fewer recent studies meeting the inclusion criteria across all intervention domains. This approach ensured conceptual consistency while allowing for the inclusion of foundational and contemporary studies relevant to the review scope.

The data included diverse samples, such as 7th graders in the USA (n=215), 5th graders in Canada (n=24), community college students in the USA (n=126), 6th graders in Portugal (n=191), and undergraduate biology students in the USA (n=147), among others. The review incorporated studies involving different educational levels, from elementary schoolers to high school graduates, and encompassed interventions implemented in multiple nations, including the USA, Canada, Portugal, Italy, Palestine, Germany, France, the UK, the Netherlands, and China. The sample sizes varied widely, with studies ranging from small groups, such as 2nd graders in the USA (n=6) or high school students in Spain (n=164), to large-scale studies like the one involving 9th graders in the USA (n=21,364). This comprehensive synthesis provides a nuanced overview of the diverse interventions and populations studied, offering valuable insights for future research and intervention design.

Results

This systematic review identified a wide range of educational interventions targeting academic performance across emotional, cognitive, and behavioral domains (Table 1). Across studies, intervention effects varied in strength and consistency, reflecting differences in intervention focus, design, and measurement approaches.

Category	Intervention
13 records of cognitive intervention	Cost-focused motivational intervention Cognitive Control- Digital Interventions NeuroStratE: teaching brain functioning and practical tools Goal-setting interventions Data-based decision-making interventions National Institute of Health's Research Initiative for Scientific Enhancement program Learner-driven remediation REAL Girls intervention to improve self-efficacy, school connectedness, and identity Conservation of resources perspective Hope intervention Neurocognitive and neuroendocrine interventions Learn to Think (LTT) Intervention Program Mental Contrast intervention
23 records of behavior intervention	Reading interventions Self-Monitoring on-task behavior interventions Good Behavior Game (GBG) interventions Positive behavior interventions Time-management interventions Cognitively-engaging physical activity breaks interventions Calm Spot app interventions to help kids replenish their focus Systematic and Engaging Early Literacy (SEEL) interventions Physically active math and language lessons interventions Social Skills Improvement System Classwide Intervention Program (SSIP-CIP) interventions Learning analytics intervention Mastery Learning (ML) measured against college enrollment Elementary School Success Profile Model of Assessment and Prevention (ESSP MAP) intervention strategy designed to improve academic performance and behavior Learning strategies interventions Meal voucher program (MVP)

Table 1. to be cont...

18 records of emotion intervention	Development of mental toughness and a sense of personal control over surroundings Daily 5-minute Heart Lock-in exercises led by teachers to enhance emotional resilience I Can Succeed-Elementary School (ICS-ES) Social-Emotional Learning (SEL) intervention program Student Success Skills (SSS) intervention Reappraising academic and social adversity intervention Mindfulness training interventions Student-led stress reduction interventions Musically-enriched environment interventions Positive Psychology intervention Relationship-building interventions Self-regulated strategy intervention SEL (Social-Emotional Learning) intervention using the Responsive Classroom (RC) approach Mindfulness Awareness Practices (MAP) intervention Self-Regulation Empowerment Program (SREP)
3 records of BOTH emotional and cognitive	SRSD Self–regulated learning strategies. cognitive-social-emotional skills.
5 records of BOTH cognitive and behavioral	Growth mindset interventions.
2 records of BOTH emotional and behavioral	INSIGHTS into Children's Temperament

Table 1: Classification of Educational Interventions Across Cognitive, Emotional, and Behavioral Domains

Note. Interventions are classified according to their primary focus as reported in the reviewed studies. Some interventions target multiple learning processes and are therefore listed under cross-domain categories. The number of interventions does not correspond directly to the number of studies, as some interventions were examined across multiple publications or populations. This classification represents a descriptive synthesis rather than mutually exclusive categories.

Within the emotional domain, interventions commonly targeted emotional regulation, stress responses, and students' sense of control under academic demands. Programs focusing on mental toughness, mindfulness, and social emotional learning were associated with improvements in academic achievement and well-being in several studies, particularly when standardized academic outcomes were used [23-25]. However, short follow-up periods and reliance on self-reported outcomes in some studies limited conclusions about longer-term academic patterns [24, 26].

Cognitive interventions frequently addressed planning, goal setting, strategic learning, and monitoring processes. Several studies reported improvements in exam performance and academic outcomes when these learning processes were strengthened [27-29]. At the same time, findings were mixed across studies, with some interventions, such as growth mindset programs, showing limited or no effects on academic performance or retention [30]. Variability in outcomes appeared to be influenced by intervention intensity, implementation context, and measurement choices [31, 32].

Behavioral interventions ranged from self-monitoring and classroom routines to classwide and schoolwide behavior support systems. Changes in on-task behavior, classroom participation, and learning routines were frequently reported and were associated with academic outcomes in several studies [33, 34]. More sustained and structured approaches, such as the Good Behavior Game and schoolwide behavior systems, were linked to more stable academic patterns over time [35-38]. Because many behavior-focused programs also incorporated cognitive and emotional elements, attribution to a single underlying mechanism was not always possible [39, 40].

Several interventions spanned multiple domains. Programs combining cognitive, emotional, and behavioral components often reported broader outcome patterns across academic performance, self-efficacy, and social emotional skills [41-43]. However, multi-component designs reduced precision in identifying which specific elements contributed most directly to academic change and limited comparability across studies [44].

Across the reviewed studies, the strength of empirical evidence varied substantially. While some interventions were supported by randomized or quasi-experimental designs with standardized academic outcomes, others relied on smaller samples, short-term implementations, or self-reported indicators. In addition, heterogeneity in outcome measures, including standardized tests, course grades, and self-evaluations, further complicated synthesis and direct comparison of academic effects across intervention domains [19, 20].

Discussion

Taken together, the findings of this review suggest that educational interventions targeting cognition, emotion, and behavior are best understood as interrelated rather than isolated approaches. Across the reviewed studies, learning behavior and academic performance were shaped by overlapping cognitive processes, emotional regulation, and behavioral routines, consistent with integrated perspectives in educational psychology [3, 45]. Rather than treating intervention domains as independent categories or proposing a validated theoretical model, this review adopts a synthesis-oriented perspective to summarize how different intervention approaches converge in supporting learning processes across educational contexts.

Accordingly, the domain-based organization used in this review serves as a descriptive framework for interpreting reported patterns in the literature, not as a basis for causal inference or intervention hierarchies. This framing provides a foundation for the domain-specific discussion that follows.

Behavior Interventions

The prevalence of behavior intervention as the predominant focus in educational research signifies a discernible emphasis on practices associated with Positive Behavioral Interventions and Supports (PBIS). This pronounced inclination toward behavior intervention underscores the recognition and adoption of PBIS principles within educational contexts [36, 38, 46]. The widespread incorporation of behavior-focused interventions suggests a pervasive acknowledgment of the significance of fostering positive behavior and creating supportive learning environments within the educational landscape [38].

Miranda [13] summarized behavioral educational techniques focus on deficiencies in three basic areas: a) academic preparedness (i.e., the level of academic knowledge attained); b) academic skills (i.e., the skills required in order to succeed academically); and c) academic self-confidence (i.e., a determinant in how much effort a student makes in the pursuit of his or her degree). Her delineation of behavioral educational techniques as addressing deficiencies in academic preparedness, skills, and self-confidence lays a foundational understanding of intervention strategies. However, to comprehensively address student development and academic success, it is imperative to extend this perspective to consider the intricate links between behavior, emotion, and cognition. This broader conceptualization aligns with contemporary educational psychology paradigms, enriching the discourse on effective and holistic approaches.

Cross-Domain Interventions

Numerous interventions consist of multiple sessions, often spanning various domains. Some targeted interventions are specifically crafted to integrate elements from more than two domains. As listed in the results section, a growth mindset intervention is typically considered both a cognitive and a behavioral intervention [41]. The concept of a growth mindset, popularized by psychologist Carol Dweck, pertains to the belief that one's abilities and intelligence can be developed through dedication, hard work, learning, and resilience [47]. In this context, the intervention involves fostering a mindset that embraces challenges, persists in the face of setbacks, and sees effort as a path to improvement.

From a cognitive perspective, the intervention targets individuals' beliefs and thought processes about their abilities. It seeks to shift their mindset from a fixed belief that intelligence is static to a growth-oriented perspective that emphasizes the potential for improvement through learning and effort. This cognitive shift involves changing the way individuals perceive challenges and interpret failures [47].

On the behavioral side, a growth mindset intervention often involves specific strategies and practices aimed at promoting adaptive behaviors. For example, educators might encourage students to take on challenging tasks, praise effort rather than innate ability, and provide feedback that emphasizes the link between hard work and improvement. These behavioral components reinforce and support the cultivation of a growth mindset.

Diverse Measurements

Diverse measurement approaches across studies represent a central challenge in interpreting the findings of this systematic review. The reviewed interventions employed a wide range of outcome measures to assess academic performance and learning-related changes, including standardized tests, course grades, and study-specific instruments. The lack of calibration across these measures limits direct comparison of intervention outcomes and contributes to variability in reported effects.

From a methodological perspective, this variability aligns with longstanding concerns in educational psychology regarding precision and control in intervention research. Bijou [48] emphasized the importance of systematic measurement and the identification of controlling variables, principles that are central to the Applied Behavior Analysis (ABA) framework. ABA-based approaches highlight the need to account for individual learning histories and contextual factors when evaluating intervention outcomes, underscoring the importance of precision-based and context-sensitive measurement practices.

Consistent with these principles, Rosenshine [49] recommended the use of standardized outcome measures to improve the comparability and interpretability of intervention studies. Although standardized assessments may be less sensitive to short-term or narrowly targeted intervention effects, they provide a common metric that supports more reliable cross-study comparisons. Their inclusion alongside study-specific measures can strengthen the overall rigor of intervention research and enhance the interpretability of aggregated findings.

Several methodological limitations should therefore be considered when interpreting the results of this review. Substantial heterogeneity across study designs, intervention duration, and implementation contexts constrains direct comparison of academic outcomes [19, 49]. In addition, reliance on non-standardized or locally developed measures increases measurement variability and reduces comparability across intervention domains [20, 31]. Finally, because many interventions integrate cognitive, emotional, and behavioral components, isolating domain-specific mechanisms underlying observed academic patterns remains challenging [3, 45].

Age Distribution

The age distribution in this systematic review shows a clear emphasis on elementary school-aged participants. This pattern reflects trends in the existing literature, where non-subject-related educational interventions are more frequently designed, implemented, and evaluated during compulsory schooling. Interventions at this stage are often easier to integrate into daily instruction and allow sufficient time for implementation and adjustment. This emphasis is also attributed to the foundational role of early interventions and the longer developmental window available in elementary school settings [50]. Studies at this level often focus on establishing basic learning behaviors, self-regulation skills, and classroom routines that support later academic development.

In contrast, interventions targeting secondary and tertiary education levels are less common in the reviewed literature. This imbalance may be partly explained by practical constraints, including shorter instructional periods, higher academic specialization, and greater difficulty in implementing and evaluating interventions in upper-grade contexts. Despite this skew, the inclusion of multiple age groups in the review allows for a broader understanding of how educational interventions function across developmental stages. The observed distribution highlights the strategic importance of elementary school settings in intervention research while also pointing to the need for future studies that extend systematic intervention efforts into secondary and postsecondary education to strengthen developmental continuity.

Turbulence in Results

The findings of this systematic review indicate that interventions administered by either assistants or researchers yield the most significant impact. This outcome may be attributed to the implementers' inclination toward "teaching to the test" or their high motivation and confidence, contributing to the success of the interventions. It is noteworthy that the interventions investigated in

this study were diverse in several aspects, focusing exclusively on learning strategy instruction. Consequently, generalizing the findings regarding the influence of intervention attributes to other educational instructions remains uncertain. While variations in effect sizes among different types of educational interventions may exist, we posit that the identified trends could extend beyond the realm of learning strategy instruction.

Conclusion

This systematic review provides an integrated overview of how cognitive, emotional, and behavioral interventions are associated with learning behavior and academic performance across different age groups. Learning is shaped by the interaction of thinking, feeling, and acting, and educational interventions are most meaningfully understood when these processes are considered together rather than in isolation [3, 45].

Cognitive-focused interventions commonly target skills such as attention, memory, planning, and problem-solving. When these learning processes are intentionally supported, studies have reported improvements in students' persistence, strategic engagement, and academic outcomes [28, 29, 51]. These findings highlight the importance of metacognition and strategic learning as central components of academic development.

Emotional interventions emphasize that learning is not solely an intellectual process but is also shaped by students' emotional experiences. Programs that support emotional regulation, stress management, and interpersonal understanding have been associated with improved engagement, motivation, and academic functioning in educational settings [25, 52, 53]. Supporting emotional well-being allows students to approach academic challenges with greater stability and confidence.

Behavioral interventions, including structured classroom routines, self-regulation practices, and behavior support systems, have also demonstrated positive associations with student engagement and academic performance [34, 36, 54]. Long-term and classwide approaches, such as the Good Behavior Game, suggest that consistent behavioral support can contribute to sustained academic benefits over time [35]. Together, these findings underscore the role of productive learning habits and behavioral expectations in supporting academic growth.

Importantly, the reviewed literature indicates that no single intervention approach is sufficient for all learners or contexts. Educational needs vary across developmental stages, instructional settings, and student characteristics, requiring flexible and adaptive intervention designs that account for both individual and environmental factors [50, 55]. Future research would benefit from increased collaboration among educators, psychologists, and policymakers to develop practical, evidence-based frameworks that align with school realities and implementation constraints [18, 56].

In summary, this review highlights that supporting academic performance requires an integrated approach that attends to cognitive strategies, emotional support, and behavioral guidance together. When these dimensions are aligned within educational contexts, learning becomes more consistent, inclusive, and sustainable [49]. A balanced focus on these interconnected processes provides a foundation for future research and practice aimed at improving learning outcomes across diverse educational settings.

Conflicts of Interest: The authors declare no conflicts of interest.

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	First author	Year	Country	Sample	Age	Intervention	Intervention description	Academic measurement	Findings
1	Zappala-Piemme	2023	USA	215	7th graders	Emotion intervention	Development of mental toughness in the face of adversity and a sense of personal control over their surroundings	Grit Scale for Children and Adults (GSCA); the Children's Nowicki-Strickland Internal-External Control Scale (CNSIE); Northwest Evaluation Association's MAP; NY state tests for ELA and Math	Both grit and locus of control significantly predicted academic achievement on standardized tests for reading and math. The findings support the intervention and highlight the importance of these two factors in academic achievement.
2	Bearden	2023	Canada	24	5th graders	Emotion intervention	Teachers led daily 5-minute Heart Lock-in exercises to increase emotional resilience	Self-reported emotional well-being and ability to focus	37.5% of participants indicated that the Heart Math intervention made them feel more confident in their school-related capabilities.
3	Broton	2023	USA	126	Community college students	Behavior intervention	What is the impact of a meal voucher program (MVP) on hungry students' academic attainment?	Number of credits taken and completed and graduation rate from community college.	MVP improved students' academic outcomes: students completed 2.99 more credits—about one additional class—than those in the control group.
4	Camacho	2023	Portugal	191	6th graders	BOTH emotional and cognitive	SRSD (self-regulation; self-efficacy) for growth mindset	writing motivation and performance	Self-Regulated Strategy Development (SRSD) and SRSD + Growth Mindset generally did not differ significantly from the control group, except in self-efficacy for ideation.
5	Rosenzweig	2022	USA	147	undergraduate biology students	cognitive intervention	cost-focused motivational intervention	exam scores	Success in the intervention predicted success on exams.
6	Li	2022	USA	21364	9th graders	BOTH cognitive and behavior	growth mindset intervention	GPA	Students who participated in the intervention had higher GPAs.
7	Gettinger	2021	USA	6	2nd graders	behavior intervention	reading Fluency	Oral fluency on standard and training reading passages, and engagement in disruptive behaviors in the classroom.	The intervention successfully improved oral fluency.
8	Cogliano	2021	USA	103	undergraduates	cognitive intervention	Cognitive Control; Digital Interventions	tests and a final examination	Students who completed the intervention scored higher on tests and the final exam.

Table 2. to be cont...

9	Meneghetti	2021	Italy	60 (30 emotional, 30 cognitive)	high school graduates	BOTH emotional and cognitive	self–regulated learning strategies	tests	Both groups benefited.
10	Wood	2021	Canada	584	kindergartners	emotion intervention	socio-emotional learning	academic performance	Participation in the intervention increased academic performance across the board.
11	Kopelman-Rubin	2021	Palestine	419	4th graders	emotion intervention	I Can Succeed-Elementary School (ICS-ES): social-emotional learning (SEL) program	academic achievement	Achievement in students' first language improved.
12	van der Beek	2020	Germany	269	high school graduates	emotion intervention	minimal interventions to improve self-regulate learning	mean grade score	Minimal interventions on utility value and implementation intention had no effect on training participation but did impact expectancy for success and mean grade scores.
13	Rames-LaPointe	2020	USA	3 classrooms of 17-18	elementary schoolers	behavior intervention	Self-Monitoring on-task behavior	work completion	All three classrooms demonstrated improvement after the intervention.
14	McCabe	2020	USA	229	undergraduates	BOTH cognitive and behavior	growth-mindset intervention	academic performance and retention	The intervention had no impact on academic performance or retention.
15	Cherrier	2020	France	311	16 year olds	cognitive intervention	NeuroStratE (a cognitive intervention strategy that focuses on teaching the functioning of the brain and practical tools)	school performance	There was no significant difference in school results between the control and intervention groups.
16	Ashworth	2020	UK	3084	elementary schoolers	behavior intervention	Good Behavior Game (GBG)	teacher assessment and Hodder Group Reading Test	GBG eventually produced improvements in academic attainment, but these took time, with effects measured one year post-intervention.
17	Schippers	2020	Netherlands	2928	undergraduates	cognitive intervention	goal setting intervention	academic performance	Goal-setting cohorts showed a 22% increase in academic performance over the control group.

Table 2. to be cont...

18	Angus	2019	USA	8515	middle schoolers	behavior intervention	positive behavior	California Standards Test mean scores	The intervention was strongly associated with an increase in mean scores for the implementing school.
19	Keuning	2019	Netherlands	39 schools	elementary schools	cognitive intervention	data-based decision-making intervention	standardized test scores	Findings revealed a positive intervention effect for both mathematics and spelling.
20	Shanely	2019	USA	23	schools	cognitive intervention	pretest and performance assessment	curriculum based measurement	Participants fell into four distinct performance categories, and performance classifications were associated with pretest measures and gains in mathematics.
21	Goyer and Cohen	2019	USA	669	middle schoolers	emotion intervention	targeted to foster belonging, inclusion, and growth	discipline citations	The intervention reduced citations by 57%.
22	Binning	2019	USA	598	9th graders	BOTH cognitive and behavior	persistence mindset	grades	The intervention was particularly successful for minority students with high educational expectations.
23	Webb	2018	USA	4305	5th graders	emotion intervention	Student Success Skills (SSS) SEL(Social-Emotional Learning)	standardized test scores	The intervention did not significantly impact students' test scores.
24	Borman	2018	USA	1304	middle schoolers	emotion intervention	reappraising academic and social adversity to improve achievement, behavior, well being	grades, attendance, and disciplinary incidents	The intervention reduced disciplinary incidents by 34%, increased attendance by 12%, and reduced failing grades by 18%.
25	Baker	2018	USA	157	undergraduates	behavior intervention	time-management intervention	achievement	The intervention had positive effects on achievement scores.
26	Egger	2018	Australia	142	7–9-year-olds	behavior intervention	cognitively-engaging physical activity breaks	executive functions and academic achievement	Results showed that the combination intervention group benefited the most, displaying enhanced cognitive shifting and mathematics performance.
27	Bakosh	2018	USA	337	elementary schoolers	emotion intervention	mindfulness training	GPA	Some promising results were observed, but nothing was consistently statistically significant.

Table 2. to be cont...

28	Tollefson	2018	USA	87	undergraduates	emotion intervention	student led stress reduction	survey	Students reported reduced stress inside and outside the classroom.
29	Jaschke	2018	Netherlands	176	elementary schoolers	emotion intervention	musically-enriched environment improves executive functions	Wechsler Intelligence Scale, Tower of London planning, Klingberg Matrix backward span, Go/ no-Go task	There was no significant relationship between a musically enriched environment, executive sub-functions, and short-term memory.
30	Moreno	2018	USA	2300	Kindergartners	Behavior intervention	Calm Spot app shows 2 minute nature videos to help kids replenish their focus	Flanker executive function task and Woodcock Johnson applied problems and letter word sub-tests	54% of the sample used the Calm Spot intervention regularly, yet the absolute level of use was likely insufficient to provide compensatory benefits for these students.
31	Muro	2018	Spain	164	High school students	Emotion intervention	Positive Psychology intervention	Average grades	Grades increased significantly after the intervention.
32	Bostwick	2018	USA	86	Undergraduates	BOTH cognitive and behavior	Mindset intervention	Manipulation check	Those in the growth mindset condition outperformed their fixed mindset counterparts by as much as 9%.
33	McCormick	2018	USA	435	Elementary schoolers	BOTH emotion and behavior	INSIGHTS into Children's Temperament intervention	Woodcock Johnson letter word and applied problems assessments	INSIGHTS showed its largest margin of improvement in math and reading skills in classrooms with higher mean classroom-level shyness scores.
34	Malloy	2018	USA	1	High school	Behavior intervention	Positive behavior interventions	School-wide Evaluation Tool (SET)	The intervention was effective in improving school behavior and engagement.
35	Gage	2017	USA	2033	Elementary schools	Behavior intervention	Positive behavior intervention	standardized test scores	Schools that implemented the intervention with fidelity had significantly more students at or above grade-level benchmarks, though the effect sizes were small.
36	Houchens	2017	USA	151	Schools	Behavior intervention	Positive behavior intervention	Teaching, Empowering, Leading, and Learning (TELL) survey	Schools reported higher levels of student and faculty understanding of behavioral expectations and a stronger atmosphere of professional trust and respect.

Table 2. to be cont...

37	Miller	2017	USA	368	5th graders	emotion intervention	relationship building intervention on 5th graders	academic achievement	Participants showed benefits in academic achievement.
38	Orosz	2017	Hungary	55	10th graders	BOTH cognitive and behavior	growth-mindset intervention	IQ tests	Participants had incrementally increased IQs after the intervention.
39	Ranellucci	2017	USA	177	Undergraduates	Behavior intervention	Maladaptive learning behavior	Self reporting	The intervention consistently predicted lower levels of interest-based studying.
40	DeLay	2016	USA	631	5th graders	emotion intervention	Social-Emotional Intervention, Relationship Building Intervention	longitudinal social network analysis, academic performance	The intervention led to significantly more diverse friendships, broke down barriers of social segregation, and improved academic performance.
41	Bingham	2016	USA	102	kindergarten	behavior intervention	Systematic and Engaging Early Literacy (SEEL)	rhyme awareness, rhyme generation, letter knowledge, letter-sound association, spelling, blending, and reading tasks	Children who received the SEEL intervention demonstrated greater rhyme awareness, rhyme generation, letter knowledge, and letter-sound association than the control group, but not improvements in spelling, blending, or reading tasks.
42	Andrzejewski	2016	USA	277	9th graders	emotion intervention	self regulated strategy intervention	science achievement	Reflecting on learning increased science achievement for minority and low-income students.
43	Mullender-Wijnsma	2016	Netherlands	499	2nd and 3rd graders	behavior intervention	physically active math and language lessons	Mathematics test speed, general mathematics, and spelling	Students in the intervention group had significantly greater gains than those in the control group.
44	Woodcock	2016	USA	424	undergraduates	cognitive intervention	National Institute of Health's Research Initiative for Scientific Enhancement program	academic outcomes	RISE program membership changed academic outcomes, with members being more likely to persist in the sciences.
45	Diperna	2016	USA	494	2nd graders	behavior intervention	Social Skills Improvement System Classwide Intervention Program (SSIP-CIP)	engagement, motivation, and academic skills	Students with lower levels of engagement and motivation at pretest experienced significant improvement in these areas after exposure to SSIP-CIP.
46	Bierer	2015	USA	177	medical students	cognitive intervention	learner-driven remediation at a medical school	successful remediation	92% of students successfully remediated.
47	Taub	2015	USA	86	elementary schoolers	behavior intervention	interval timing intervention on elementary mathematics students	Woodcock-Johnson III Tests of Achievement	Students who took the intervention scored significantly higher on mathematics measures.

Table 2. to be cont...

48	Lonn	2015	USA	216	undergraduates	behavior intervention	learning analytics intervention	academic motivations	There were no significant differences between pre-bridge and post-bridge scores.
49	Mann	2015	USA	48	middle schoolers	cognitive intervention	REAL Girls intervention to improve self-efficacy, school connectedness, and identity	academic self-efficacy, school connectedness, and identity	Findings based on both qualitative and quantitative data suggest that REAL Girls contributed to positive increases in academic self-efficacy, school connectedness, and identity.
50	Feldman	2014	USA	83	undergraduates	cognitive intervention	conservation of resources perspective; hope intervention	grades and goal achievement	Students who achieved higher levels of hope during the workshop earned higher grades in the semester following the intervention.
51	Blair and Raver	2014	USA	759	kindergartners	cognitive intervention	neurocognitive and neuroendocrine intervention	literacy, mathematics, and science learning activities	Findings indicated positive effects on executive functions, reasoning ability, control of attention, and levels of salivary cortisol and alpha-amylase.
52	O'Connor	2014	USA	435	1st graders	BOTH emotion and behavior	INSIGHTS into Children's Temperament intervention	math and reading skills	Participants experienced faster growth in math and reading achievement as well as sustained attention.
53	Rimm-Kaufman	2014	USA	2904	2nd-5th graders	emotion intervention	SEL (Social-Emotional Learning) intervention: Responsive Classroom (RC) approach	standardized test scores	RC students did not outperform students in schools assigned to the control condition.
54	Hemelt	2013	USA	2311	1st graders	behavior intervention	2 interventions, GBG and ML (Positive Behavior Game and Mastery Learning) measured against college enrollment	attendance and attainment	There was no average impact of either intervention on reading skills, likelihood of college enrollment, or degree completion.
55	Bingham and Patton-Terry	2013	USA	75	Preschoolers	behavior intervention	Early Reading First program	language and literacy outcomes	Participants performed at average levels on standardized reading measures.
56	Brotman	2013	USA	1050	preschoolers-3rd graders	behavior intervention	positive behavior support and effective behavior management	standardized test scores for reading, writing, and math	Children in intervention schools had higher kindergarten achievement test scores and higher teacher-rated academic performance.
57	Hu	2013	China	200000+	primary and secondary schoolers	cognitive intervention	Learn to Think (LTT) intervention Program	Scientific Creativity Test for Secondary School Students	LTT promoted the development of scientific creativity among secondary school students, with effects that were not necessarily immediate but tended to be long-lasting.

Table 2. to be cont...

58	Yamada and Victor	2012	USA	37	undergraduates	emotion intervention	Mindfulness Awareness Practices (MAP) intervention on college students	self report	The mindfulness intervention did not lead to significant improvements in academic performance across the semester; however, 81% of students self-reported positive effects on their learning.
59	Bowen	2012	USA	11	elementary schoolers	behavior intervention	Elementary School Success Profile Model of Assessment and Prevention (ESSP MAP) intervention strategy designed to improve academic performance and behavior	aggregate academic outcomes	Findings suggest that ESSP MAP was associated with greater growth in reading proficiency rates for Black and White students.
60	Gollwitzer	2011	Germany and USA	112	elementary and middle schoolers	cognitive intervention	mental contrast intervention: asking kids to imagine future with its present reality and charting subsequent academic performance	learning foreign language vocabulary words	Mental contrasting benefited learning.
61	Bradshaw	2010	USA	37	schools	behavior intervention	positive behavior interventions	reduce disruptive behavior problems	Schools with high fidelity experienced significant reductions in student suspensions and office discipline referrals.
62	Rosenblatt and Elias	2008	USA	154	5th and 6th graders	emotion intervention	Self-Regulation Empowerment Program (SREP) used to increase academic achievement	GPA	Students in classrooms where higher doses of the intervention were delivered experienced significantly smaller drops in GPA across transitions than those in lower-dose classrooms.
63	Muscott	2008	USA	28 programs	k-12	behavior intervention	Positive behavior intervention	office discipline, suspensions	Schools were able to implement school-wide positive behavioral interventions and supports with fidelity within two years and sustain implementation afterward.
64	Linares	2005	USA	119	4th and 5th graders	BOTH emotional and cognitive	The Unique Minds School Program, a teacher led program designed to promote cognitive-social-emotional skills.	prevent behavioral problems and promote academic learning	Compared to students in the comparison school, students in the intervention showed gains in self-efficacy, problem-solving, social-emotional competencies, and math grades.
65	Nunn	1995	USA	103	middle schoolers	behavior intervention	learning strategies intervention	GPA	Results indicated significant improvement in GPA and locus of control within the at-risk intervention group.

Table 2: Summary Behavioral, Cognitive, and Emotional Interventions and Their Impacts on Academic Performance