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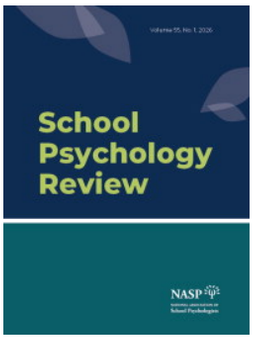

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Academic Skills Training Interventions for Adolescents in Secondary Education: A Systematic Review

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ABSTRACT

Many adolescents require support to enhance their academic skills, which are ideally integrated into the school setting. This article systematically reviews school-based academic skills training interventions (TIs) in secondary education and evaluates their effectiveness on academic functioning, performance, and behavioral problems. Twenty-two studies examining TIs targeting self-management/self-regulation, organization and/or planning, note-taking, thinking skills, concept maps, and combinations of academic skills were included. Data on study design, sample, TI characteristics, targeted academic skill(s), and outcomes were extracted. Many TIs were conducted by research staff and few studies included performance or follow-up measures. Effect sizes ranged from small to large. Study quality was relatively good, but only 27% of the studies were randomized controlled trials (RCTs), indicating a lack of strong study designs. Results showed that research into most TIs has been limited, leaving knowledge of their effectiveness largely unknown. High-quality studies examining short- and longer-term outcomes of school-based TIs for adolescents without research support are warranted.

IMPACT STATEMENT

This systematic review highlights the urgent need for school-based programs to train all secondary school students in essential academic skills. By synthesizing existing research, we reveal significant gaps in the evidence base, such as the limited use of rigorous study designs, lack of follow-up assessments, and minimal testing of interventions delivered by teachers rather than researchers. These findings stress the importance of developing and testing practical, evidence-based academic skills programs that can be feasibly implemented in real-world school settings to support all adolescents in successfully navigating the increasing demands of secondary education.

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In secondary school, the complexity and workload of daily academic life increases, requiring adolescents to develop far more academic skills compared to primary school (Evans et al., 2009). Adolescents must organize their materials, independently plan long-term projects, and reach multiple deadlines for different courses (Evans et al., 2009). They also must deal with the rules and expectations of multiple teachers, find their way in a large school building, and make sure to be on time for classes (Anderson et al., 2000; Hanewald, 2013). Strengthening these academic skills enables adolescents to excel in their studies, build positive relationships with teachers and parents, confidently face the challenges of secondary education, and potentially avoid failing classes or leaving school prematurely (Langberg et al., 2011, 2013; Meltzer, 2018). In the longer term, adequate academic skills may prevent psychosocial, occupational, and economic difficulties (Barkley & Fischer, 2011; Diamantopoulou et al., 2007; Galéra et al., 2012; Huisman et al., 2005; Kuriyan et al., 2013). Despite their importance, many adolescents in secondary education require additional training in academic skills, such as note-taking and summarizing (Meltzer, 2018).

Academic skills training interventions (TIs) are designed to help adolescents develop one or more academic skills. Academic skills refer to the cognitive and practical abilities that enable students to succeed in an educational setting. These skills encompass a broad range of competencies necessary for effective learning, problem-solving, and knowledge application across various subjects. Academic skills include cognitive skills such as

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critical thinking and problem-solving, executing functioning skills such as time management, organization, and task initiation, and study and test-taking skills such as effective study strategies (e.g., Evans et al., 2007, 2011). Typically, academic skills TIs start with a brief description of the target skill. Clear instructions are then provided, often accompanied by demonstrations or models showing how to apply the skill effectively (DuPaul et al., 2019; Evans et al., 2014b). Following this, adolescents engage in exercises or real-life practice to apply the skills, receiving extensive feedback from trainers or teachers to ensure the skills become habitual and integrated into their daily routines (DuPaul et al., 2020; Evans et al., 2014b).

A common belief is that academic skills should be taught in the same environment where adolescents face challenges related to those skills (Evans et al., 2018). For this reason, TIs aimed at academic skills delivered at school are preferred over clinic-based interventions, as they offer the opportunity to immediately apply the learned skills. Additionally, school-based interventions rule out barriers commonly associated with clinic-based interventions, such as accessibility and affordability for all adolescents, irrespectively of a clinical diagnosis (Evans et al., 2011; Green et al., 2013; Langberg et al., 2012; Molina et al., 2008).

Currently, the literature on school-based academic skills training interventions is limited in several ways, underscoring the need for a systematic review that provides an overview for school psychologists and educational researchers. For example, several meta-analyses and systematic reviews on interventions aimed at improving academic skills have already been conducted; however, these predominantly include interventions delivered in clinical settings rather than focusing on school-based interventions specifically (e.g., Alresheed et al., 2018; Bikic et al., 2017; DuPaul, 2007; Sibley et al., 2014). Clinical settings differ significantly from school environments in terms of structure, resources, and the context in which interventions are implemented. For example, interventions in clinical settings often involve one-on-one sessions or small groups with highly trained professionals, conditions that are not always replicable in schools due to larger group sizes, time constraints, and the need for school professionals to balance multiple responsibilities. As a result, studies examining clinical interventions provide limited in-depth insight into the feasibility and effectiveness of interventions when applied in real-world school environments.

Furthermore, most studies target specific populations, such as individuals with ADHD, Autism Spectrum Disorders (ASD), or students with learning disabilities (e.g., Alresheed et al., 2018; Bikic et al., 2017; DuPaul, 2007; Evans et al., 2014b; Sibley et al., 2014). For example, a meta-analysis on organizational skills interventions (e.g., Homework, Organization and Planning Skills; HOPS [Langberg et al., 2011, 2012], Challenging Horizons Program; CHP [Evans et al., 2011; Langberg et al., 2016], Child Life and Attention Skills; CLAS [Pfiffner et al., 2014]) in children and adolescents with ADHD found that these interventions have a large positive impact on outcomes related to ADHD and organizational skills and modest effects on ratings of academic performance (Bikic et al., 2017). Moreover, a review of middle and high school-based interventions for adolescents with ADHD found that these interventions are effective at improving multiple areas of impairment such as social, behavioral, or academic impairment (Evans et al., 2014a). Another systematic review of single-case intervention research targeting academic and related skills (e.g., a self-monitoring procedure [Holifield et al., 2010]; a peer support intervention for promoting academic engagement [McCurdy & Cole, 2014]) indicated that these interventions were generally effective at improving these skills of children with ASD (Alresheed et al., 2018).

While these findings underscore the effectiveness of targeted interventions for students with specific needs, they have limited applicability to the broader population of adolescents in secondary education. Interventions tailored to specific clinical groups often rely on highly specialized strategies or supports that may not be feasible or necessary for all students. As a result, the insights from these studies offer little guidance for the development of programs aimed at improving the academic skills of all adolescents in secondary education.

Other reviews and meta-analyses do focus on the general population and not only individuals with problem behaviors, but they include participants from both primary and secondary education (e.g., Dignath & Büttner, 2008; Guo, 2022; Hattie et al., 1996; Pandey et al., 2018). However, this combined approach may be problematic due to the differing developmental stages, cognitive capacities, and academic skills required at each educational level (de Vries et al., 2023). Consequently, findings from reviews that aggregate data from primary and secondary education may not translate well into effective strategies for adolescents in secondary school specifically, who require tailored academic skills training that directly addresses the unique demands of this stage. Lastly, as mentioned earlier, the transition to secondary school brings unique academic and behavioral challenges, such as greater independence, time management, and organization, while also introducing increased academic complexity and social pressures (Anderson et al., 2000; Evans et al., 2009). These challenges distinguish adolescents from younger children and underscore the importance of studying this age group separately. Struggles with

executive functioning, self-regulation, and motivation further complicate their ability to succeed, underscoring the need to study this age range specifically.

Lastly, dosage, including the number, frequency, and duration of sessions, is an important but understudied factor that may influence the effectiveness of academic skills training interventions. Prior research has produced mixed results, with some studies finding shorter interventions more effective for certain academic behaviors in youth with ADHD (e.g., Richardson et al., 2015), while others suggest longer, more intensive programs lead to better long-term outcomes like improved GPA (e.g., Margherio et al., 2023). Given the practical constraints schools face, such as limited time and high workloads (Gee et al., 2021; Richardson et al., 2015), it is crucial to examine dosage as a parameter in systematic reviews. Doing so can clarify its role in intervention success and guide the design of feasible and effective academic skills programs for secondary education settings.

In summary, there is a notable gap in comprehensive research on school-based academic skills TIs in secondary education, particularly TIs that cater to a broader adolescent population, not limited to those with behavioral concerns. To explore the existing evidence on what school-based academic skills TIs for secondary education are available, what works, what may not work, and where gaps exist in the current literature, this review evaluates the short- and long-term effectiveness of these interventions and examines their characteristics. It is important for school psychologists to gain a better understanding of existing academic skills TIs and their effectiveness. Ultimately, these insights will contribute to the development of a research-driven, school-based academic skills TI for secondary education.

Our primary aim is to assess the effects of academic skills TIs on adolescents' academic functioning, which we divided into three domains: (1) practical academic competencies, defined as specific abilities and competencies that are needed in educational settings and are related to producing academic materials (e.g., note-taking, mind-mapping, and summarizing), (2) academic behaviors, defined as the observable actions and habits which directly influence learning performance and academic success (e.g., homework preparation and completion), and (3) academic executive functioning skills, defined as a set of cognitive processes to plan, organize, make decisions and control behavior to achieve goals (e.g., organizational skills, self-management, and problem-solving skills). Our secondary aim was to assess the effects of school-based academic skills TIs on adolescents' academic performance (e.g., grades and achievement tests) and assessments of behavioral problems (e.g., symptoms of ADHD or learning difficulties).

METHOD

The protocol for this systematic review followed the PROSPERO guidelines and was registered at the Open Science Framework[1] (https://osf.io/4ytvd).

Eligibility Criteria

We included studies on the effects of school-based academic skills TIs for adolescents in secondary education. Studies had to: (a) report quantitative findings of the effects of a school-based academic skills TI: multiple baseline designs (a type of single-case experimental design where the intervention is introduced at different times across participants, settings, or behaviors to establish causal relationships), single-case designs (studies that track individual responses to an intervention over time using structured phases), pre-post designs (studies measuring outcomes before and after an intervention in the same group without a comparison group), quasi-experimental designs (studies using non-randomized control groups to compare intervention effects), and randomized controlled trials (studies in which participants are randomly assigned to intervention or control groups to establish causal effects and (b) be published in a peer-reviewed journal in English. Academic skills TIs were defined as programs that directly train one or more academic skills with frequent practice of the skill and feedback on the practice as follows (DuPaul et al., 2020; Evans et al., 2014b). Studies on TIs that incorporate cognitive techniques (e.g., cognitive restructuring) were also included. School-based was defined as delivered during, before, or after school hours on school premises and incorporated into daily school life. In the case of multi-setting TIs (e.g., partly school-based, partly in a health care setting) the school-based component needed to comprise > 75% of the overall program. For each multi-setting TI, this percentage was determined by comparing the number and total minutes of school-based sessions to the number and total minutes of non-school-based sessions. Secondary education was defined as post-primary school education and thus included both middle school and high school (but not higher education). In the case of a mixed population, at least 50% of the sample had to attend secondary education. This percentage was determined by comparing the number of students in secondary education to those not in secondary education. If the program included a multimodal TI (e.g., a parent-focused component, which involves training parents to support their child's academic development, and/or a teacher-focused component, which focuses on enhancing teachers' skills or behaviors to improve student outcomes), the adolescent-focused component needed to comprise > 75% of the overall program.

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Again, this percentage was determined by comparing the number of adolescent-focused sessions and total minutes to the number and total minutes of non-adolescent-focused sessions. Regarding TIs that also targeted other skills than academic skills (e.g., social skills), the academic skills TI component needed to comprise > 75% of the overall program. This percentage was determined by comparing the number of academic skill-focused sessions and total minutes to the number and total minutes of nonacademic skill-focused sessions. We had no restrictions on the TI format (e.g., duration, individual, group). The cutoff thresholds of >75% and >50% for these criteria were chosen to ensure that the included interventions primarily focused on the target setting, population, and intervention, while still allowing for some degree of flexibility in study inclusion.

To ensure a clear and specific focus of our review on interventions that directly train academic skills within the school context, studies were excluded if they examined the effects of neurofeedback or other computerized programs, physical interventions, sleep interventions, mindfulness interventions, interventions primarily focused on accommodations (e.g., extended time for tests, longer recess between classes, etc.), and dietary interventions. While these types of interventions may enhance academic skills and academic performance indirectly, they target factors such as cognitive, physiological, or emotional processes, that may be linked to academic skills, rather than directly targeting specific academic skills. Additionally, interventions aiming to improve knowledge in specific academic areas (e.g., math or reading) were excluded. Studies were also excluded when the participants in the study were solely diagnosed with internalizing disorders and/or if the main focus of the study or TI was on the improvement of symptoms of internalizing disorders, due to the large differences in intervention goals (aiming to reduce emotional distress rather than improving academic skills) and mechanisms of action (e.g., cognitive behavioral therapy rather than skills training). The medication status of the study participants was neither an inclusion nor exclusion criterion. Lastly, no restrictions were placed on the publication period.

Outcome Variables

Our primary outcome was academic functioning, consisting of (1) practical academic competencies, defined as specific abilities and competencies that are needed in educational settings and are related to producing academic materials (e.g., note-taking, mind-mapping, and summarizing), (2) academic behaviors, defined as the observable actions and habits which directly influence learning performance and academic success (e.g., homework preparation and completion) and (3) executive functioning skills, defined as a set of cognitive processes to plan, organize, make decisions and control behavior to achieve goals (e.g., organizational skills, self-management, and problem-solving skills). Secondary outcomes included academic performance, defined as achievements in educational activities (e.g., grades, achievement tests), and behavioral problems, defined as patterns or inappropriate behaviors that interfere with one's ability to function effectively in social, academic, or home environments (e.g., such as (symptoms of) ADHD or learning difficulties). The authors held joint meetings to collaboratively review and discuss the categorization of outcome measures in the included studies. Through this process, consensus was reached, ensuring consistency and alignment with the study's objectives.

Article Search and Screening Process

The systematic search (final update September 24, 2024) covered articles published in four online databases: Medline, PsychInfo, Web of Science, and ERIC. The search terms were structured into four main categories: (1) educational setting (e.g., middle school, high school, secondary education), (2) target population (e.g., adolescents, students), (3) academic skills (e.g., time management, note-taking, executive function), and (4) interventions (e.g., intervention, training, program). These categories were combined using the Boolean operator AND to ensure that retrieved articles included all relevant aspects. Terms within these categories were combined using the Boolean operator OR. Medical Subject Headings (MeSH) that were used are: middle schools* – middle school education* – middle school students* – junior high schools* – junior high school students* – secondary education* – high schools* – high school students* – high school education* – public school education* – middle school students* – junior high school students* – high school students* – problem-solving* – time management* – note-taking* – executive function* – metacognition* – school-based intervention*. The full search string, which was constructed with a librarian, can be found in the supplementary materials (supplement 2). The search terms were applied to titles, abstracts, and indexing fields (ti, ab, id) but not to the full text of articles. We also checked reference lists of the included studies to identify additional relevant articles. The titles and abstracts of the retrieved articles were screened independently for eligibility by two researchers (K.W. and master's degree students in psychology) independently, using Rayyan (Ouzzani et al., 2016). After the first selection based on titles and abstracts, the

included articles were screened based on the full text. Disagreements were resolved by consensus meetings between both researchers (K.W. and master's degree students in psychology). If the researchers required an additional perspective on whether to include a paper, all authors participated in a consensus meeting to reach a decision.

Data Extraction and Quality Assessment

Two researchers (K.W. and master's degree students in psychology) independently performed the data extraction. In case of unreported data, study authors were contacted. Data extraction was recorded using the Cochrane data collection form for intervention reviews for RCTs and non-RCTs (Data Extraction Forms |Cochrane Developmental, Psychosocial and Learning Problems, n.d.). The extracted data were then compared by the primary researcher (K.W.), and any discrepancies were resolved through discussion and consensus between the researchers involved. While we did not calculate a formal inter-rater reliability statistic, this process ensured consistency and accuracy across the coded study variables. The following data were extracted from each study: (a) study characteristics, including authors, publication year, country of research, study design and type of control group; (b) sample characteristics, including total N, school grade level and age, diagnostic information (e.g., learning disabilities, ADHD); (c) TI characteristics, including delivery mode, provided by (i.e., who delivered the TI to the students), dosage, targeted academic skill(s), (d) outcome measures and outcome data.

To evaluate study quality, study design served as the primary indicator, which we rated using the following scale: 0 – multiple-baseline design and single case study, 1 – pre-post design, 2 – quasi-experimental design, and 3 – randomized controlled trial. In addition to design, we analyzed study quality using 12 items from the "Quality Assessment Tool for Studies with Diverse Designs" (QATSDD; four items were excluded as these are intended for qualitative studies only; [Sirriyeh et al., 2012]). Each criterion was independently scored on a 4-point scale (0 – "not at all," 1 – "very slightly," 2 – "moderately," 3 – "complete"). Example items are: "explicit theoretical framework," "evidence of sample size considered in terms of analysis," "detailed recruitment data," and "good justification for analytical method selected." Sum scores could range between 0 and 36 with a higher score indicating greater methodological quality. A percentage was calculated by dividing the sum score by the maximum score (i.e., 36). Studies scoring higher than 75% were considered "high quality," scores between 51% and 75% "good quality," scores between 50% and 25% "moderate quality," and scores below 25% "poor quality" (Klingenberg et al., 2020). The primary researcher (K.W.) assessed the quality of all the included articles and two other researchers (B.vd.H/B.B) were second assessors. The study quality of both assessments was compared by the primary researcher and possible conflicts were resolved by consensus between the researchers involved.

Data Synthesis

As a first step, a narrative synthesis was conducted to determine what school-based academic skills TIs for adolescents in secondary education have been studied to date. The included studies were grouped into six categories based on the academic skill(s) targeted in each study (see results). This categorization facilitated a better comparison of outcomes and allowed for a clearer assessment of the types of academic skills targeted in academic skills TIs.

To synthesize the effectiveness of the academic skills TIs, Cohen's *d* (Cohen, 2013) was calculated for studies of which means, and standard deviations of the outcome variables were available. In the case of an RCT or quasi-experimental design, between-group Cohens' *d* was calculated for all outcome measures. The formula used was: Cohen's $d_{between\text{-}group} = ((M_{int.post} - M_{int.pre}) - (M_{comp.post} - M_{comp.pre}))/SD_{pooled.}$ Furthermore, within-group Cohen's *d* was calculated for the pre-post changes within the TI groups for all outcome measures. The formula used was: Cohen's $d_{within\text{-}group} = (M_2 - M_1) / SD_{pooled}$ where $SD_{pooled} = \sqrt{((SD_1^2 + SD_2^2) / 2)}$. Effect sizes of 0.2, 0.5, and 0.8 were interpreted as small, medium, and large effects respectively (Cohen, 2013). Although between- and within-group effect sizes were not directly compared, we included them to show a wider range of intervention effects. Logically, within-group effect sizes are inflated. No effect sizes were calculated for single-case design studies as the effect sizes commonly used in SCD research (such as Percentage of Non-Overlapping Data (PND) or Improvement Rate Difference (IRD)), are not directly comparable to Cohen's d. Additionally, the included SCD studies lacked the necessary raw data and consistency in design features (e.g., phase lengths, measurement intervals) to reliably compute design-comparable metrics such as the Between-Case Standardized Mean Difference (BC-SMD; Chen et al., 2023) or Tau-U (Lee & Cherney, 2018; Parker et al., 2011).

If applicable, effect sizes were converted to ensure that positive effect sizes on that outcome indicated beneficial effects of the TI relative to the control condition or improvement on post-test as compared to pretest. For the between-group effect sizes, we distinguished whether the control group was passive or active. Active control groups

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were defined as control groups that receive an alternative unrelated training or receive standard care. Passive control groups were defined as control groups that do not receive (alternative) training or standard care, such as waitlist control groups.

RESULTS

Included Studies

The literature search identified 4404 records, of which 1287 were duplicates. Two additional records were found through a reference list search. After screening the titles and abstracts of 3117 records, 237 full-text articles were assessed. Of these 237 records, 215 records did not meet the inclusion criteria and were excluded, resulting in a final inclusion of 22 studies. Details of the search and screening process are provided in the flow chart in the supplementary materials. The included studies were categorized into six categories based on the targeted academic skill. First, eight studies on self-management/self-regulation skills TIs were included (Ellis et al., 1989; Gureasko-Moore et al., 2006, 2007; Lizarraga & Iriarte, 2001; Merriman & Codding, 2008; Perels et al., 2005; Tollefson et al., 1986; Zepeda et al., 2015). These self-management/self-regulation skills TIs focus on the student's ability to regulate their learning and behavior to meet academic and personal goals. Second, five studies on organization and/or planning skills TIs (Burrus et al., 2017; Langberg et al., 2011, 2012, 2018; Sibley et al., 2020) were included. These organization and/or planning TIs target skills that help students manage their time, resources, and academic tasks such as setting priorities, keeping track of assignments, deadlines, and goals, and keeping materials in order. Third, two studies on note-taking skills TIs (Ahmad, 2019; Ilter, 2017) were included, focusing on the student's ability to effectively record and organize information from educational texts. Fourth, two studies on thinking skills TIs (Gamino et al., 2022; Lizarraga et al., 2010) were included. These TIs focus on improving the cognitive ability that enables students to process information, solve problems, make informed decisions during academic tasks, derive synthesized meanings by combining facts, and apply inferential reasoning. Fifth, one study on a concept maps skill TI (Lenski et al., 2022) targeted creating concept maps, which are graphical tools for organizing and representing knowledge. Sixth, five studies were not categorizable as they targeted several academic skills in one TI (Harrison et al., 2020; Hayden & McLaughlin, 1987; Kalberg et al., 2012; Perels et al., 2005; Tamm et al., 2024). The targeted skills of these combined TIs were (a) study skills (Hayden & McLaughlin, 1987; Kalberg et al., 2012), (b) a combination of organization, self-management, and note-taking skills (Harrison et al., 2020), (c) a combination of self-management and problem-solving skills (Perels et al., 2005), and (d) a combination of social communication, problem-solving, organization systems, planning and prioritization, and study strategies (Tamm et al., 2024). This category was labeled as 'Other skills TI's'. Notably, the Perels et al. study (2005; examining a self-management TI, problem-solving TI, and a TI that combined self-management and problem-solving TI) was synthesized into two TI categories: the self-management/self-regulation TI group and the combined academic skills TI group.

A complete overview of study characteristics, sample characteristics, TI characteristics (i.e., delivery mode, provided by, dosage), targeted academic skill(s), outcome measures, and outcome data, is presented in Table 1. Table 2 summarizes study and intervention attributes across the full study sample. Due to the large variety of extracted data, the review of the included studies and TIs only describes noteworthy aspects rather than a complete overview. In total, 18.7% of the effect sizes could not be calculated due to unanswered requests for data.

Assessment of Study Quality and Training Effectiveness

Self-Management/Self-Regulation TIs

Within the eight self-management/self-regulation TIs, there were many differences in study design, study quality, sample characteristics (i.e., sample sizes, participant grade, age, and diagnostic information), delivery mode, and provider of the TIs. Notably, five of the eight studies were classified as having moderate study quality (Ellis et al., 1989; Gureasko-Moore et al., 2006, 2007; Lizarraga & Iriarte, 2001; Tollefson et al., 1986), and only one RCT was included (Perels et al., 2005). Furthermore, four of the eight TIs were delivered by research staff (i.e., the staff that conducted the study such as the primary investigator (Gureasko-Moore et al., 2006, 2007; Lizarraga & Iriarte, 2001; Tollefson et al., 1986). Furthermore, six of the eight studies focused on a specific population with behavioral problems (ADHD; [Gureasko-Moore et al., 2006, 2007; Merriman & Codding, 2008]) or learning difficulties (Ellis et al., 1989; Lizarraga & Iriarte, 2001; Tollefson et al., 1986).

Considering the primary outcome, two studies compared the experimental group to a passive control group, with effect sizes for academic functioning ranging from .05 to .78, indicating that the included TIs showed small to large improvements compared to a passive control group (Lizarraga & Iriarte, 2001; Perels et al., 2005). Two studies compared the experimental group to an active control group, with effect sizes ranging from −0.17 to .65, indicating mixed results (Perels et al., 2005; Zepeda et al.,

Table 1. Included Studies Organized by the Targeted Academic Skill With Information on Study Characteristics (First Author, Year of Publication, Country, Study Design, Type of Control Group, Study Quality; QATSDD Score) Sample Characteristics (Sample Size, School Grade, Age Range, Diagnostic Information), TIs Characteristics (Delivery Mode, Provider, Dosage), Outcome Measures and Within- and Between Effect Sizes per Outcome

Author (year, country of research)	Study design (type of control group)	Total n	Grade (age)/ diagnostic information	Delivery mode/provided by/dosage (minutes)	QATSDD score (%*)	Academic functioning outcome measures	Academic performance outcome measures	Assessments of behavioral problems outcome measures	Between-group Cohen's d	Within-group Cohen's d	Between-group Cohen's d follow-up	Within-group Cohen's d follow-up
Self-management/self-regulation TI's [a]												
Tollefson et al. (1986, **USA**)***	Multiple-baseline (n.a.)	8	7–8 (not specified)/ learning disabilities.	Individual/Research Assistant/unknown	9 (25)	Rate of assignment completion			n.a.	n.a.	n.a.	n.a.
Ellis et al. (1989, **USA**)***	Multiple-baseline (n.a.)	13	10–12 (15–19)/ learning disabilities	Individual/teacher/1280	11 (30.56)	Executive Awareness Probe			n.a.	n.a.	n.a.	n.a.
						Demands Assessment Probe			n.a.	n.a.	n.a.	n.a.
							Teachers' perceptions of subjects' classroom performance		n.a.	n.a.	n.a.	n.a.
							Grades		n.a.	n.a.	n.a.	n.a.
Gureasko-Moore et al. (2006, **USA**)***	Multiple-baseline (n.a.)	3	7 (12)/ADHD	Individual/first author/ differs per individual	18 (50)	Classroom preparation skills			n.a.	n.a.	n.a.	n.a.
Gureasko-Moore et al. (2007, **USA**)***	Multiple-baseline (n.a.)	6	6–7 (11–12)/ ADHD	Individual/first author (school psychologist)/ differs per individual	18 (50)	Homework behaviors			n.a.	n.a.	n.a.	n.a.
						Classroom preparation skills			n.a.	n.a.	n.a.	n.a.
Lizarraga and Iriarte (2001, **Spain**)	Quasi-experimental (passive control group)	109	1 (Spain; 14–16)/learning difficulties, unmotivated to study, and behavior problems (according to teachers)	Class/one of the authors/225	15 (41.67)	Test de Flexibilidad Cognitiva, Cambios			.778	1.055	n.a.	n.a.
						Escalas de Estrategia de Aprendizaje, Subescala IV			.430	.605	n.a.	n.a.

(*Continued*)

Table 1. Continued.

Author (year, country of research)	Study design (type of control group)	Total n	Grade (age)/ diagnostic information	Delivery mode/provided by/dosage (minutes)	QATSDD score (%*)	Academic functioning outcome measures	Academic performance outcome measures	Assessments of behavioral problems outcome measures	Between-group Cohen's d	Within-group Cohen's d	Between-group Cohen's d follow-up	Within-group Cohen's d follow-up
						The Decision-Making Test			**	**	n.a.	n.a.
						The Problem-Solving Test			**	**	n.a.	n.a.
						Self-regulation of learning test			**	**	n.a.	n.a.
Merriman and Codding (2008, **USA**)***	Multiple-baseline (n.a.)	3	9–10 (not specified)/ADHD	Individual/school psychologists/differs per individual	24 (66.67)	Homework completion			n.a.	n.a.	n.a.	n.a.
						Homework accuracy			n.a.	n.a.	n.a.	n.a.
Zepeda et al. (2015, **USA**)	Quasi-experimental (active control group)	46	8 (age not specified)	Individual/teachers/360	21 (58.33)		FCI		.654	1.608	n.a.	n.a.
						MAI			.297	−0.076	n.a.	n.a.
						MSLQ			.484 – .582	.277 – .475	n.a.	n.a.
						AGQ-R			−0.109 – .799	−0.213 – .068	n.a.	n.a.
						NCS			.182	−0.082	n.a.	n.a.
Perels et al. (2005, **Germany**)	Randomized controlled trial (passive and active control group)	249	8 (13–15)	Groups of no more than 19 students/not specified/540	23 (63.89)	Self-regulation questionnaire			Self-regulation/ control: .098; Self-regulation/ problem-solving: .046; Problem-solving/ Control: .047;	Self-regulation: .064; Problem-solving: .022;	n.a.	n.a.
						Problem-solving test.			Self-regulation/ control: .375; Self-regulation/ problem-solving: −0.169; Problem-solving/ Control: .530	Self-regulation: .243; Problem-solving: .39	n.a.	n.a.

(*Continued*)

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Table 1. Continued.

Author (year, country of research)	Study design (type of control group)	Total n	Grade (age)/ diagnostic information	Delivery mode/provided by/dosage (minutes)	QATSDD score (%*)	Academic functioning outcome measures	Academic performance outcome measures	Assessments of behavioral problems outcome measures	Between-group Cohen's d	Within-group Cohen's d	Between-group Cohen's d follow-up	Within-group Cohen's d follow-up
Organization and/or planning TIs [b]												
Langberg et al. (2011, USA)	Pre-post (n.a.)	11	6–8 (11–14)/ ADHD	Class/school mental health worker/320	20 (55.56)	COSS – P******			n.a.	.862. – 1.406	n.a.	n.a.
						COSS – T******			n.a.	−0.239 – .193	n.a.	n.a.
						COSS – S******			n.a.	.578 – .836	n.a.	n.a.
						HPC – P******			n.a.	1.293 – 1.764	n.a.	n.a.
							School grades (math and social studies)		n.a.	.346 – .526	n.a.	n.a.
								VADRS – T*******	n.a.	Inattention: .508. Hyperactive .275	n.a.	n.a.
Langberg et al. (2012, USA)	Randomized controlled trial (passive control group)	47	6–8 (11–14)/ ADHD	Individual/school mental health worker/320	26 (72.22)	COSS – P******			.430 – .870	467 – 1.155	**	**
						COSS – T Math******			−0.408 – .015	−0.157 – .261	**	**
						COSS – T Language Arts******			−0.113 – .394.	−0.072 – .224	**	**
						HPC – P******			.398 – .655	.469 – .807	**	**
							School grades		**	**	**	**
								VADRS – P*******	Inattentive: .668. Hyper/ impuls: .215	Inattentive: .658 Hyper/ impuls: .152.	**	**
Langberg et al. (2018, USA)	Randomized controlled trial (passive control group)	280	6–8 (10–13)/ ADHD	Individual/school mental health worker/320	27 (75.00)	HPC – P*******			.699 – 1.186	1.063 – 1.209	**	**
						HPQ – P			1.276	1.308	**	**
						HPQ – T			−0.278	.166	**	**
						COSS – P******			.544 – 1.126.	1.004 – 1.317	**	**
						COSS – P******			−0.122 – .567	.251 – .572.	**	**
							School grades		.246	.220	**	**

(*Continued*)

Table 1. Continued.

Author (year, country of research)	Study design (type of control group)	Total n	Grade (age)/ diagnostic information	Delivery mode/provided by/dosage (minutes)	QATSDD score (%*)	Academic functioning outcome measures	Academic performance outcome measures	Assessments of behavioral problems outcome measures	Between-group Cohen's d	Within-group Cohen's d	Between-group Cohen's d follow-up	Within-group Cohen's d follow-up
Burrus et al. (2017, **USA**)	Quasi-experimental (active control group)	149	9 (13 – 14)	Class/school mental health worker/320	16 (44.44)	Advisor ratings of time management behaviors			****	****	n.a.	n.a.
Sibley et al. (study 2, 2020, USA)	Randomized controlled trial (passive control group)	72	9 (13 – 14)/ ADHD	Individual/peer interventionist/480	20 (80.67)	Bookbag organization			*****	*****	n.a.	n.a.
						Planner use			*****	*****	n.a.	n.a.
						The Change Ruler			*****	*****	n.a.	n.a.
							GPA		*****	*****	n.a.	n.a.
						Class Absences			*****	*****	n.a.	n.a.
Note-taking TIs [c]												
Ahmad (2019, **Egypt**)	Quasi-experimental (active control group)	123	1 (Egypt; 15 – 16)	Classes/the researchers/340	16 (44.44)	Test of critical reading skills			***	***	n.a.	n.a.
Ilter (2017, **Turkey**)	Quasi-experimental (active control group)	68	7 (9–13)	Classes/teachers/400	20 (55.56)	Notetaking Performance Test			***	***	n.a.	n.a.
Thinking skills TIs [d]												
Gamino et al. (2014, USA)	Quasi-experimental (passive control group)	913	7–8 (12–14)	Classes/research associate/450	29 (80.56)	SOAR – gist reasoning			.492	.429	n.a.	n.a.
						SOAR – fact recall			.268	.362	n.a.	n.a.
Lizarraga et al. (2010, **Spain**)	Quasi-experimental (active control group)	46	not specified (16–17)	Classes/teachers/720	18 (50)	EFAI – level 4			.810 – 1.211	.968 – 1.705	n.a.	n.a.
						Learning Strategies scales (ACRA) – subscale 4			.626	1.085	n.a.	n.a.
							Academic achievement tests		1.671	1.828	n.a.	n.a.

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Table 1. Continued.

Author (year, country of research)	Study design (type of control group)	Total n	Grade (age)/ diagnostic information	Delivery mode/provided by/dosage (minutes)	QATSDD score (%*)	Academic functioning outcome measures	Academic performance outcome measures	Assessments of behavioral problems outcome measures	Between-group Cohen's d	Within-group Cohen's d	Between-group Cohen's d follow-up	Within-group Cohen's d follow-up
Concept Maps TIs [e]												
Lenski et al. (2022, **Germany**)		167	8 (13–14)	Classes/researcher/270	24 (66.67)		Learning Performance		*****	*****	n.a.	n.a.
						Concept Map Quality			*****	*****	n.a.	n.a.
						Cognitive load			*****	*****	n.a.	n.a.
Other skills TIs												
Hayden and McLaughlin (1987, **USA**)***	Multiple baseline (n.a.)	10	10–12 (14–18)/ learning disabilities	Classes/special education teacher and regular teacher/unknown	11 (30.56)	Attendance			n.a.	n.a.	n.a.	n.a.
							GPA					
							Woodcock reading mastery test		n.a.	n.a.	n.a.	n.a.
							Key Math Diagnostic Arithmetic test		n.a.	n.a.	n.a.	n.a.
							Wide Range Achievement Test – spelling subtest		n.a.	n.a.	n.a.	n.a.
Kalberg et al. (2012, **USA**)	Randomized controlled trial (active control group)	30	7–8 (12–15)/ academic and behavioral concerns	Classes/teachers/1150	22 (61.11)	Study Skills and Conflict Resolution Skills – subscale study scales			1.568	1.310	.975	.888
						SHI			.035	.190	.158	.541
								SSRS – behavior subscale	.143	.265	.809	.648
Harrison et al. (2020, **USA**)	Randomized controlled trial (active control group)	64	6–9 (11–13)/ ADHD	Groups of 3–5 students/ research assistants/700	32 (88.89)	Organization Assessment Sheet			1.245	2.401	n.a.	n.a.
								Science lesson: Engagement	−1.268	−0.346	n.a.	n.a.
								Science lesson: Disruptions	.654	.295	n.a.	n.a.
						Science lesson: Completion of notes			1.085	.461	n.a.	n.a.

(*Continued*)

Table 1. Continued.

Author (year, country of research)	Study design (type of control group)	Total n	Grade (age)/ diagnostic information	Delivery mode/provided by/dosage (minutes)	QATSDD score (%*)	Academic functioning outcome measures	Academic performance outcome measures	Assessments of behavioral problems outcome measures	Between-group Cohen's d	Within-group Cohen's d	Between-group Cohen's d follow-up	Within-group Cohen's d follow-up
						Science lesson: Accuracy of notes			1.152	.700	n.a.	n.a.
								Independent Practice: Engagement	.687	−0.400	n.a.	n.a.
								Independent Practice: Disruption	.277	−0.071	n.a.	n.a.
						Independent Practice: Completion			1.171	−0.106	n.a.	n.a.
						Independent Practice: Accuracy			.559	−0.246	n.a.	n.a.
Perels et al. (2005, **Germany**)	Randomized controlled trial (passive and active control groups)	249	8 (13–15)	Subgroups of no more than 19 students/not specified/540	23 (63.89)	Self-regulation questionnaire			Combined/ Self-regulation: −0.258; Combined/ problem-solving: .293; Combined/ control: .365;	Combined: .326,	n.a.	n.a.
						Problem-solving test			Combined/ Self-regulation: .132; Combined/ control: .265; Combined/ problem-solving: −0.307	Combined: .136.	n.a.	n.a.
Tamm et al. (2024, **USA**)	Pre-post (n.a.)	6	Not specified (12–13)/ASD	Groups no more than six students/ teachers/1440 – 2160	17 (47.22)	HPC – P******			n.a.	.92	n.a.	n.a.
						COSS – P******			n.a.	−0.572	n.a.	n.a.
						COSS – T******			n.a.	.215	n.a.	n.a.

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Table 1. Continued.

Author (year, country of research)	Study design (type of control group)	Total n	Grade (age)/ diagnostic information	Delivery mode/provided by/dosage (minutes)	QATSDD score (%*)	Academic functioning outcome measures	Academic performance outcome measures	Assessments of behavioral problems outcome measures	Between-group Cohen's d	Within-group Cohen's d	Between-group Cohen's d follow-up	Within-group Cohen's d follow-up
						AAPC – P – Academic executive functioning skills*****			n.a.	.302	n.a.	n.a.
								AAPC – P – Disruptive behavior during academics******	n.a.	.088		
						AAPC – T – Academic executive functioning skills*****			n.a.	.321	n.a.	n.a.
								AAPC – T – Disruptive behavior during academics******	n.a.	.132		

*The percentage score (actual score/total score (i.e., 36) x 100%).
**Mean scores and/or SDs were not provided by authors, Cohen's *d* could not be calculated.
***Multiple baseline design, Cohen's *d* could not be calculated.
****Only post-test outcomes were measured, Cohen's *d* could not be calculated.
*****Measurements were collected during the intervention, Cohen's *d* could not be calculated.
******Effect sizes were converted to indicate beneficial effects of the intervention relative to the control condition or improvement on post-test as compared to pretest.

Note: QATSDD = Quality Assessment Tool for Studies with Diverse Designs; FCI = Force Concept Inventory; MAI = Metacognitive Awareness Inventory; MSLQ = Motivated Strategies for Learning Questionnaire; AGQ-R = Achievement Goal Questionnaire-Revised; NCS = Need for Cognition Scale; COSS = Children Organizational Skills Scale; VADRS = Vanderbilt ADHD Diagnostic Rating Scale; HPQ = Homework Performance Questionnaire; SOAR = The Scale of Advanced Reasoning; EFAI = Factor assessment of intellectual aptitudes; SHI = Study Habits Inventory SSRS = Social Skills Rating Scale; AAPC = Adolescent Academic Problems Checklist; P = parent ratings, T = teacher ratings, S = self-ratings. [a]Focus on the student's ability to regulate their learning and behavior to meet academic and personal goals; [b]Target skills that help students manage their time, resources, and academic tasks such as setting priorities, keeping track of assignments, deadlines, and goals, and keeping materials in order; [c]Focusing on the student's ability to effectively record and organize information from educational texts; [d]focus on the improving the cognitive ability that enables students to process information, solve problems, make informed decisions during academic tasks, derive synthesized meanings by combining facts, and apply inferential reasoning; [e]focus on creating graphical tools for organizing and representing knowledge.

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Table 2. Summary of Study and Intervention Attributes Across the Full Study Sample With Information on Study Design, Diagnostic Information of the Sample, TIs Characteristics (Delivery Mode, Provider, Dosage), Study Quality (QATSDD Score), and Outcome Measures

Category	Details
Study design (k/%)	RCT (7/31.8), Quasi-experimental (9/40.9), Multiple-baseline (6/22.3), Pre-post design (1/4.6)
Diagnostic information (k/%)	Participants with behavioral problems (14/63.6), without behavioral problems (8/36.4)
Delivery mode (k/%)	Individual (9/40.9), Small groups (3/13.6), Classroom-based (10/45.5)
Provider of the intervention (k/%)	Research staff (9/40.9), Teachers (4/19.2), School psychologists/ mental health workers (5/22.7), Peer interventionists (1/4.6), Not specified (3/13.6)
Mean dosage	Average: 671 min; Range: 225 – 2160 min*
Quality ratings (QATSDD**; k/%)	High (3/13.6), Good (9/40.9), Moderate (10/45.5), Poor (0/0)
Outcome measures (k/%)	Academic functioning (22/100%), Academic performance (9/40.9), Behavioral problems (2/9.1), Long-term follow-up (3/13.6)

*Dosage varied per individual in 3 studies; 2 studies did not report dosage.
**Studies scoring higher than 75% were considered "high quality," scores between 51% and 75% "good quality," scores between 50% and 25% "moderate quality," and scores below 25% "poor quality" (Klingenberg et al., 2020).
Note: QATSDD = Quality Assessment Tool for Studies with Diverse Design.

2015). In these studies, the active control group outperformed the TI on two academic functioning measures, whereas for the other outcome measures the TI outperformed the active control group. Within-group Cohen's *d* for academic functioning ranged from −0.21 to 1.06. No follow-up measures were assessed in either study.

Considering the secondary outcome, two studies investigated the effects on academic performance (Ellis et al., 1989; Zepeda et al., 2015). In one study, large between-and within-group effect sizes were found (d = .65 and 1.61 respectively, [Zepeda et al., 2015]). The other study had a multiple baseline design and effect sizes could not be calculated (Ellis et al., 1989). No studies investigated the effects on behavioral problems and no follow-up measures were assessed.

Organization and/or Planning TIs

Within the organization and/or planning TIs, three of the five studies investigated the same TI (Homework, Organization, and Planning Skills; HOPS) with the same delivery mode, provider, dosage, and target population (i.e., grades 6–8 and a diagnosis of ADHD; [Langberg et al., 2011, 2012, 2018]). The included studies were of moderate to high quality and four out of five included studies were randomized controlled trials (Langberg et al., 2011, 2012, 2018; Sibley et al., 2020). Four of the TIs were provided by school mental health workers (Burrus et al., 2017; Langberg et al., 2011, 2012, 2018), while one TI was provided by peer interventionists (Sibley et al., 2020). Four of the five studies focused on a population of adolescents with ADHD (Langberg et al., 2011, 2012, 2018; Sibley et al., 2020).

Regarding the primary outcome, academic functioning, between-group effect sizes ranged from −0.41 to 1.28 (compared to a passive control group) and within-group effect sizes from −0.14 to 1.41. Two of the five studies conducted follow-up measurements (Langberg et al., 2012, 2018; three and six months after the intervention respectively), but we could not calculate effect sizes due to unanswered requests for data. Notably, within these organization and planning TIs, declines in academic functioning were primarily observed in teacher ratings, whereas parent- and self-rated measures mostly showed improvements.

Regarding the secondary outcomes, four studies measured academic performance (Langberg et al., 2011, 2012, 2018; Sibley et al., 2020). However, for one study (Langberg et al., 2012) we could not calculate the effect size due to unanswered requests for data, whereas another study (Sibley et al., 2020) collected the measurements during the intervention, preventing the calculation of Cohen's *d*. For the studies where Cohen's *d* could be calculated, the between-group effect size (compared to a passive control group) was .25, and within-group effect sizes ranged from .22 to 63 (Langberg et al., 2011, 2018). Two studies conducted follow-up measurements of academic performance, but effect sizes could not be calculated due to unanswered requests for data (Langberg et al., 2012, 2018). Two studies included behavioral problems as an outcome measure (Langberg et al., 2011, 2012). One study reported between-group effect sizes (compared to a passive control group) ranging from .22 to .67. Within-group effect sizes for both studies ranged from .15 to .66.

Note-Taking TIs

We identified two studies on note-taking TIs, both of which had a quasi-experimental design and moderate (Ahmad, 2019) to good (Ilter, 2017) study quality. The TIs had comparable sample size, delivery mode, and dosage; however, differences existed in the TI provider and target population (9–13 y/o, only girls, no (symptoms of) behavioral problems; Ahmad, 2019; 15–16 y/o, 52% boys, no (symptoms of) behavioral problems; [Ilter, 2017]). One TI was provided by research staff (Ahmad, 2019) while the other TI was provided by teachers (Ilter, 2017). Although both studies provided effect sizes for the primary outcome measure, we could not calculate effect sizes to verify these due to unanswered requests for data. No assessments were conducted for the secondary outcome measures or follow-up.

Thinking Skills TIs

We included two studies on thinking skills TIs (Gamino et al., 2022; Lizarraga et al., 2010). They varied considerably regarding the sample size, participant's age, dosage, and provider of the TI. Both studies conducted a quasi-experimental trial and were classified as having either moderate (Lizarraga et al., 2010) or high quality (Gamino et al., 2014). One TI was provided by research staff (Gamino et al., 2022), while the other intervention was provided by teachers (Lizarraga et al., 2010). Both studies focused on a population of adolescents without (symptoms of) behavioral problems.

Regarding the primary outcome, between-group (comparison active control groups) effect sizes for the academic functioning measure ranged from .27 to 1.21, indicating that the thinking skills TIs showed significant improvements in academic functioning measures as compared to the control group with small to large effect sizes. Within-group effect sizes ranged from .22 to 1.71. No follow-up assessments were included.

Regarding the secondary outcomes, no measurements were conducted to assess behavioral problems and only one study investigated effects on academic performance (with large within- and between-group effect sizes; $d = 1.83$ and 1.67 respectively, Lizarraga et al., 2010). Additionally, no follow-up assessments for the secondary outcome measures were included in either study.

Concept Maps TIs

Only one study investigated the effectiveness of concept-maps TIs (Lenski et al., 2022). This study used a quasi-experimental design and was classified as having good quality. The TI was conducted by school staff, and the study focused on a population without (symptoms of) behavioral problems. No effect sizes could be calculated, as no pre-intervention assessment was conducted; instead, assessments were done during the course of the TI. The study included a performance measure but there were no measures on behavioral problems, nor were there follow-up assessments.

Other Skills TIs

The five studies included in the Other Skills TIs category differed on many characteristics: study characteristics (design, study quality), sample characteristics (sample size, participants' grade, age, diagnostic information), TI delivery mode, and TI provision and targeted skills. Overall, one TI was conducted by research staff (Harrison et al., 2020), while three were conducted by school staff (one study did not specify this). Four of the five studies focused on a target population with (symptoms of) behavioral problems (Harrison et al., 2020; Hayden & McLaughlin, 1987; Kalberg et al., 2012; Tamm et al., 2024). Only one study conducted performance measures (Hayden & McLaughlin, 1987) and only one conducted follow-up measurements (Kalberg et al., 2012).

Of the study skills TIs, one study had a multiple baseline design (Hayden & McLaughlin, 1987), and the other was an RCT (Kalberg et al., 2012). In the RCT, between-group (TI versus an active control group) effect sizes of the academic functioning outcome measures ranged from .35 to 1.57, and within-group effect sizes ranged from .19 to 1.31. For the follow-up measures (eight weeks after intervention), between-group effect sizes for academic functioning ranged from .98 to .16 and within-group effect sizes ranged from .54 to .89.

The study investigating a TI with a combination of organization, self-management, and note-taking skills (Harrison et al., 2020), found between-group effect sizes (control group with active control group) for academic functioning ranging from .55 to 1.26 and within-group effect sizes ranging from −0.25 to 2.40.

The study investigating TIs with a combination of self-management and problem-solving skills found between-group effect sizes for academic functioning ranging from .26 to .37, depending on the outcome measure (self-regulation or problem-solving) and the comparison group (i.e., intervention with only self-regulation or only problem-solving strategies; [Perels et al., 2005]). Within-group effect sizes for academic functioning ranged from .14 to .33 (Perels et al., 2005).

Lastly, for the study investigating a combination of EF and social communication, problem-solving, organization systems, planning and prioritization, and study strategies (Tamm et al., 2024), within-group effect sizes for academic functioning ranged from −0.57 to .32.

DISCUSSION

This systematic review provides school psychologists and educational researchers with a comprehensive overview of school-based academic skills TIs for adolescents in secondary education and summarizes their effects on academic functioning, academic performance, and behavioral problems. We showed that a large variety of academic skills TIs for secondary education exist, targeting a large range of academic skills: self-management/self-regulation, organization and planning, note-taking, thinking, mind-mapping, and an uncategorizable group with TIs targeting combinations of different skills. Although overall study quality was relatively good (mean of 62.25%), only 27% of the studies were RCTs, indicating the lack of strong study designs for testing school-based academic skills TIs. While the effectiveness of one particular TI (i.e., HOPS; Langberg

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et al., 2011, 2012, 2018) has been frequently demonstrated, research into the other interventions has been limited, leaving knowledge on their effectiveness largely unknown.

We identified several features that stood out in the existing research on school-based academic skills TIs in secondary education. First, more than 40% of the included school-based TIs were provided by research staff. While research staff may ensure high fidelity due to their expertise and consistency, this may create challenges for real-world applications and possibly limit the external validity of the TIs. Teachers or other school professionals, who are expected to implement these programs in daily school practice, often face significant barriers, such as time constraints, lack of specialized training, and the complexity of managing diverse classroom environments such as varying academic levels and managing a mix of behavioral and learning challenges (Peters-Corbett et al., 2024). As a result, TIs that rely on research staff may not translate well into regular school settings. Without testing the TIs in real-world environments without ongoing research support, it remains uncertain whether they are feasible or sustainable in daily practice. For that reason, future research should focus on the evaluation of TIs given by teachers or other professionals who belong to the permanent staff of a school (Corte et al., 2000; DuPaul et al., 2020; Eccles & Mittman, 2006).

Second, only 36.4% of the included school-based TIs were specifically designed for the general population of adolescents at secondary schools, whereas the other 63.6% targeted adolescents with behavioral problems, such as ADHD ($k = 8$), learning difficulties ($k = 5$), or ASD ($k = 1$). While many academic skills TIs have been developed within Tier 2 or Tier 3 levels of support – often targeting students with specific disorders such as ADHD or ASD – there remains a critical need for universal, Tier 1 interventions that can be implemented broadly across the general student population. Future research should explore how such interventions can be designed and integrated within a multi-tiered system of support framework to promote academic success for all students and whether school-based TIs are effective for the general population or whether one should focus on specific subgroups.

Third, our findings show that only 43% of studies on academic skills TIs included academic performance as an outcome measure. This is remarkable, as in daily academic life performance is considered the primary indicator of academic success. Additionally, about 50% of these measures considered grades and GPA, which have been proposed as being problematic due to their variability across time, classes, and schools (Sibley et al., 2014). Other performance measures, that provide so-called assignment-level data, such as achievement tests and homework accuracy measures, may provide promising alternatives for the assessment of academic achievement (Lacina, 2006; Sibley et al., 2014). Assignment-level data are more sensitive to treatment effects, as they directly measure academic performance on a daily basis (Lacina, 2006; Sibley et al., 2014). Therefore, future studies should consider using assignment-level data to optimize the assessment of academic performance.

Fourth, we showed a lack of follow-up measurements in the studies that were included in this review; only 14.3% of the included studies conducted a follow-up assessment. This raises the possibility that school-based academic skills TIs are effective in the short term but may offer limited long-term benefits if the acquired skills are not sustained over time (Koegel et al., 2008). Given the paucity of studies with follow-ups, it is essential for future research to explore the long-term effects of academic skills TIs to determine whether short-term gains translate into sustained improvements. Although TIs are often proposed to yield long-term advantages, further research is needed to assess whether these benefits are indeed realized (DuPaul et al., 2020).

Fifth, a remarkable finding specific within the organization and/or planning skills TIs was that, compared to the outcomes that were reported by the adolescents themselves or by their parents, most teacher-rated outcomes showed no significant improvement or, in some cases, indicated a decline in adolescents' academic functioning. Even though this pattern was not observed in the other intervention categories included in this review, this is noteworthy given that teacher ratings are a common tool for evaluating intervention outcomes in school-based programs (e.g., [Evans et al., 2004; Reid et al., 1999]). However, studies have suggested that teachers might not be able to accurately rate the skills and behaviors of the adolescents in their class (Sibley et al., 2014; Zoromski et al., 2015), as they typically teach over 100 adolescents each day and spend very little time with each student (Eccles, 2013; Evans et al., 2005; Langberg et al., 2011, 2011).

Other explanations for the absence of teacher-reported effects of school-based TIs on academic skills might be that the effects of TIs are not large enough to be noticed by teachers or do not generalize sufficiently to the classroom, especially if training took place outside of the classroom. It may also be that teachers primarily focus on improvements in grades versus behaviors or skills, or are biased because of their relationship with the adolescent. Moreover, TIs may not sufficiently meet teachers' expectations (Eccles, 2013; Evans et al., 2005; Langberg et al., 2011). Nevertheless, since teachers assess the academic performance of adolescents during daily academic life, and there is a high prevalence of academic problems among secondary education students, evaluations of these individuals largely depend on the judgments made by teachers (DuPaul et al., 2020). Therefore, it is essential to establish

which behaviors and skills secondary school teachers can accurately assess, which should be evaluated by the adolescents themselves or their parents, and whether assignment-level data might provide the most effective approach. Additionally, it is important to consider what factors influence interrater variability among school-based behaviors. Understanding these factors can help identify potential sources of disagreement between different raters, and ensure that assessment practices can become more consistent and reliable across various contexts.

Sixth, the TIs that were included in our study had a mean dosage of approximately 450 min (median 340 min), with some outliers of 1150 min (Kalberg et al., 2012) and 1280 min (Ellis et al., 1989). Unfortunately, due to the heterogeneity of the included TIs and lack of power, we could not investigate the relation between dosage and effect. Previous studies on this topic have yielded inconsistent findings and the optimal dosage of school-based interventions is therefore still unclear (e.g., Margherio et al., 2023; Richardson et al., 2015). The balance between feasibility within school settings with their busy classrooms, competing obligations, high work pressure, and maximizing academic skills practice for adolescents remains challenging (Gee et al., 2021; Richardson et al., 2015). Therefore, it is important to further explore the effect of intervention dosage on the effectiveness of school-based academic skills TIs, while considering the contextual factors of secondary education when designing new interventions.

LIMITATIONS

Our study has several limitations. First, while we would have preferred to conduct a meta-analysis, the small number of included studies and the substantial heterogeneity between the targeted TIs precluded such an approach. Even though we synthesized the effects of these TIs using between- and within-group Cohen's *d*, we cannot draw definitive conclusions about the effectiveness of different types of academic skills TIs. However, this systematic review gives valuable insights by identifying existing school-based academic skills TIs and exposing significant gaps in the current literature. Moreover, the inability to perform a meta-analysis underscores the pressing need for more robustly designed and well-documented studies in this area. Future research should prioritize rigorous study designs and detailed reporting to enable meaningful meta-analyses. Second, we could not include all outcomes of the included studies due to limitations in data availability. This, along with the inability to calculate effect sizes for some studies, hinders the ability to draw definitive conclusions regarding the effectiveness of the academic skills TIs. Third, while we aimed to focus solely on school-based academic skills TIs for adolescents in secondary education, we recognize that this decision may have inadvertently led to the exclusion of relevant studies that did not fit this specific criterion such as CHP (Evans et al., 2011; i.e., multi-modal TIs, TIs for broader age groups, or those conducted in multiple settings). We believe our focus was necessary to reduce heterogeneity and provide more targeted recommendations for schools, school psychologists, other school professionals, and researchers, but we acknowledge that some potentially relevant interventions may have been overlooked in our search or inclusion processes.

CONCLUSION AND IMPLICATIONS

In conclusion, with this systematic review, we showed that for adolescents at secondary schools, different school-based academic skills TIs exist that target a large variety of adolescents' academic skills. Moreover, whereas one TI has been studied frequently (HOPS; Langberg et al., 2011, 2012, 2018), research into the other TIs was limited. Additionally, the wide range of effect sizes for the academic skills TIs and outcome measures complicates the interpretation of their effectiveness, leaving knowledge on this largely unclear. Further, it is still uncertain whether the investigated TIs can be implemented in daily school practice without research support. Given the critical role academic skills play in adolescents' long-term success, this review highlights the need for effective TIs that are feasible for implementation into daily school practice.

While research on academic skills has shown promising results in the American educational setting (Evans et al., 2011; Langberg et al., 2011, 2012), the challenge remains to translate these findings into everyday school environments outside the American setting One intervention that stands out in terms of empirical support is the HOPS (Homework, Organization, and Planning Skills) program. Although originally developed for students with ADHD, its core strategies, focused on organization, time management, and planning, are broadly applicable and could be adapted for Tier 1, universal implementation. School psychologists are well-positioned to advocate for the integration of such interventions into routine school practice, supporting all students in developing foundational academic skills. To facilitate this, educational policies should promote not only the adoption but also the ongoing evaluation and refinement of these programs to ensure they meet the diverse needs of student populations across different educational settings.

Additionally, future studies that investigate whether TIs without research support are feasible in daily school practice and systematic reviews and meta-analyses that focus on categorizing studies in terms of real-world variables to offer more detailed insights into the (lack of) real-world

applications in school-based interventions are warranted. Lastly, there is a strong need for high-quality studies to examine short- and longer-term outcomes of school-based academic skills TIs for adolescents in secondary education, given the critical importance of academic skills for long-term outcomes of adolescents.

NOTE

1. PROSPERO did not accept systematic reviews and meta-analyses on educational or academic outcomes.

DISCLOSURE

Saskia Van der Oord declares an honorarium and reimbursement for travel expenses from MEDICE for a lecture on non-pharmacological treatment of ADHD. Further, she is co-developer and author of the intervention manuals "Plan My Life" and "Solution Focused Treatment" but does not receive royalties for the sales of the interventions. Bianca Boyer is co-developer and author of the intervention manuals "Plan My Life," "Solution Focused Treatment" and "My Sleep Plan" and receives royalties for the sales of the interventions. Barbara van den Hoofdakker receives royalties as one of the editors of "Sociaal Onhandig" (published by Van Gorcum, The Netherlands), a book for parents that can be used in parent training. She is and has been involved in the development and evaluation of several behavioral interventions, without financial interests; she is and has been a member of ADHD guideline and practice groups and an advisor of the Dutch Knowledge Center for Child and Adolescent Psychiatry.

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REFERENCES

Ahmad, S. Z. (2019). Impact of Cornell notes vs. REAP on EFL secondary school students' critical reading skills. *International Education Studies*, *12*(10), 60–74. https://eric.ed.gov/?id=EJ1230649

Alresheed, F., Machalicek, W., Sanford, A., & Bano, C. (2018). Academic and related skills interventions for autism: A 20-year systematic review of single-case research. *Review Journal of Autism and Developmental Disorders*, *5*(4), 311–326. *2018 5:4*, https://doi.org/10.1007/s40489-018-0141-9

Anderson, L., Jacobs, J., Schramm, S., & Splittgerber, F. (2000). School transitions: Beginning of the end or a new beginning? *International Journal of Educational Research*, *33*(4), 325–339. https://doi.org/10.1016/S0883-0355(00)00020-3

Barkley, R. A., & Fischer, M. (2011). Predicting impairment in major life activities and occupational functioning in hyperactive children as adults: Self-reported executive function (EF) deficits versus EF tests. *Developmental Neuropsychology*, *36*(2), 137–161. https://doi.org/10.1080/87565641.2010.549877

Bikic, A., Reichow, B., McCauley, S. A., Ibrahim, K., & Sukhodolsky, D. G. (2017). Meta-analysis of organizational skills interventions for children and adolescents with Attention-Deficit/Hyperactivity Disorder. *Clinical Psychology Review*, *52*, 108–123. https://doi.org/10.1016/J.CPR.2016.12.004

Burrus, J., Jackson, T., Holtzman, S., & Roberts, R. D. (2017). Teaching high school students to manage time: The development of an intervention. *Improving Schools*, *20*(2), 101–112. https://doi.org/10.1177/1365480216650309

Chen, M., Pustejovsky, J. E., Klingbeil, D. A., & Van Norman, E. R. (2023). Between-case standardized mean differences: Flexible methods for single-case designs. *Journal of School Psychology*, *98*, 16–38. https://doi.org/10.1016/J.JSP.2023.02.002

Cochrane. (n.d). *Data extraction forms | Cochrane Developmental, Psychosocial and Learning Problems*. Retrieved October 20, 2020, from https://dplp.cochrane.org/data-extraction-forms

Cohen, J. (2013). *Statistical power analysis for the behavioral sciences*. Routledge. https://doi.org/10.4324/9780203771587

Corte, E. d., Verschaffel, L., & Eynde, P. O. (2000). Self-regulation: A characteristic and a goal of mathematics education. In M. Boekaerts, P. R. Pintrich, & M. Zeidner (Eds.), In *Handbook of Self-Regulation* (pp. 687–726). Academic Press. https://doi.org/10.1016/B978-012109890-2/50050-0

de Vries, M., van der Oord, S., Evans, S. W., DuPaul, G. J., & Boyer, B. E. (2023). The homework problems checklist: Psychometric properties and usefulness in teens with and without ADHD. *School Mental Health*, *15*(1), 260–271. https://doi.org/10.1007/s12310-022-09548-9

Diamantopoulou, S., Rydell, A.-M., Thorell, L. B., & Bohlin, G. (2007). Impact of executive functioning and symptoms of attention deficit hyperactivity disorder on children's peer relations and school performance. *Developmental Neuropsychology*, *32*(1), 521–542. https://doi.org/10.1080/87565640701360981

Dignath, C., & Büttner, G. (2008). Components of fostering self-regulated learning among students. A meta-analysis on intervention studies at primary and secondary school level. *Metacognition and Learning*, *3*(3), 231–264. https://doi.org/10.1007/s11409-008-9029-x

DuPaul, G. J. (2007). School-based interventions for students with attention deficit hyperactivity disorder: Current status and future directions. *School Psychology Review*, *36*(2), 183–194. https://doi.org/10.1080/02796015.2007.12087939

DuPaul, G. J., Evans, S. W., Mautone, J. A., Owens, J. S., & Power, T. J. (2020). Future directions for psychosocial interventions for children and adolescents with ADHD. *Journal of Clinical Child and Adolescent Psychology*, *49*(1), 134–145. https://doi.org/10.1080/15374416.2019.1689825

DuPaul, G. J., Puzino, K., Cooper, J., Evans, S. W., Allan, D., Xiang, J., & Owens, J. S. (2019). High school teacher ratings of academic, social, and behavioral difficulties: Factor structure and normative data for the school functioning scale. *School Psychology (Washington, D.C.)*, *34*(5), 479–491. https://doi.org/10.1037/SPQ0000323

Eccles, J. S. (2013). Schools, academic motivation, and stage-environment fit. In *Handbook of adolescent psychology: Second edition* (pp. 125–153). https://doi.org/10.1002/9780471726746.CH5

Eccles, M. P., & Mittman, B. S. (2006). Welcome to implementation science. *Implementation Science*, *1*(1), 1–3. https://doi.org/10.1186/1748-5908-1-1

Ellis, E. S., Deshler, D. D., & Schumaker, J. B. (1989). Teaching adolescents with learning disabilities to generate and use task-specific strategies. *Journal of Learning Disabilities*, *22*(2), 108–119. https://doi.org/10.1177/002221948902200206

Evans, S. W., Axelrod, J., & Langberg, J. M. (2004). Efficacy of a school-based treatment program for middle school youth with ADHD. *Behavior Modification*, *28*(4), 528–547. https://doi.org/10.1177/0145445503259504

Evans, S. W., Langberg, J. M., Egan, T., & Molitor, S. J. (2014a). Middle school–based and high school–based interventions for adolescents with ADHD. *Child and Adolescent Psychiatric Clinics of North America*, *23*(4), 699–715. https://doi.org/10.1016/J.CHC.2014.05.004

Evans, S. W., Langberg, J., Raggi, V., Allen, J., & Buvinger, E. C. (2005). Development of a school-based treatment program for middle school youth with ADHD. *Journal of Attention Disorders*, *9*(1), 343–353. https://doi.org/10.1177/1087054705279305

Evans, S. W., Owens, J. S., & Bunford, N. (2014b). Evidence-based psychosocial treatments for children and adolescents with attention-deficit/hyperactivity disorder. *Journal of Clinical Child and Adolescent Psychology*, *43*(4), 527–551. https://doi.org/10.1080/15374416.2013.850700

Evans, S. W., Owens, J. S., Wymbs, B. T., & Ray, A. R. (2018). Evidence-based psychosocial treatments for children and adolescents with attention deficit/hyperactivity disorder. *Journal of Clinical Child and Adolescent Psychology*, *47*(2), 157–198. https://doi.org/10.1080/15374416.2017.1390757

Evans, S. W., Schultz, B. K., DeMars, C. E., & Davis, H. (2011). Effectiveness of the Challenging Horizons after-school program for young adolescents with ADHD. *Behavior Therapy*, *42*(3), 462–474. https://doi.org/10.1016/j.beth.2010.11.008

Evans, S. W., Schultz, B. K., White, L. C., Brady, C., Sibley, M. H., & Van Eck, K. (2009). A school-based organization intervention for young adolescents with attention-deficit/hyperactivity disorder. *School Mental Health*, *1*(2), 78–88. https://doi.org/10.1007/s12310-009-9009-6

Evans, S. W., Serpell, Z. N., Schultz, B. K., & Pastor, D. A. (2007). Cumulative benefits of secondary school-based treatment of students with attention deficit hyperactivity disorder. *School Psychology Review*, *36*(2), 256–273.

Galéra, C., Bouvard, M.-P., Lagarde, E., Michel, G., Touchette, E., Fombonne, E., & Melchior, M. (2012). Childhood attention problems and socioeconomic status in adulthood: 18-year follow-up. *The British Journal of Psychiatry: The Journal of Mental Science*, *201*(1), 20–25. https://doi.org/10.1192/bjp.bp.111.102491

Gamino, J. F., Frost, C., Riddle, R., Koslovsky, J., & Chapman, S. B. (2022). Higher-order executive function in middle school: Training teachers to enhance cognition in young adolescents. *Frontiers in Psychology*, *13*, 867264. https://doi.org/10.3389/fpsyg.2022.867264

Gamino, J. F., Motes, M. M., Riddle, R., Lyon, G. R., Spence, J. S., & Chapman, S. B. (2014). Enhancing inferential abilities in adolescence: New hope for students in poverty. *Frontiers in Human Neuroscience*, *8*, 924.

Gee, B., Wilson, J., Clarke, T., Farthing, S., Carroll, B., Jackson, C., King, K., Murdoch, J., Fonagy, P., & Notley, C. (2021). Delivering mental health support within schools and colleges—A thematic synthesis of barriers and facilitators to implementation of indicated psychological interventions for adolescents. *Child and Adolescent Mental Health*, *26*(1), 34–46. https://doi.org/10.1111/camh.12381

Green, J. G., McLaughlin, K. A., Alegría, M., Costello, E. J., Gruber, M. J., Hoagwood, K., Leaf, P. J., Olin, S., Sampson, N. A., & Kessler, R. C. (2013). School mental health resources and adolescent mental health service use. *Journal of the American Academy of Child and Adolescent Psychiatry*, *52*(5), 501–510. https://doi.org/10.1016/J.JAAC.2013.03.002

Guo, L. (2022). The effects of self-monitoring on strategy use and academic performance: A meta-analysis. *International Journal of Educational Research*, *112*, 101939. https://doi.org/10.1016/j.ijer.2022.101939

Gureasko-Moore, S., DuPaul, G. J., & White, G. P. (2006). The effects of self-management in general education classrooms on the organizational skills of adolescents with ADHD. *Behavior Modification*, *30*(2), 159–183. https://doi.org/10.1177/0145445503259387

Gureasko-Moore, S., DuPaul, G., & White, G. P. (2007). Self-management of classroom preparedness and homework: Effects on school functioning of adolescents with attention deficit hyperactivity disorder. *School Psychology Review*, *36*(4), 647–664. https://doi.org/10.1080/02796015.2007.12087923

Hanewald, R. (2013). Transition between primary and secondary school: Why it is important and how it can be supported. *Australian Journal of Teacher Education*, *38*(1), 62–74. https://doi.org/10.14221/ajte.2013v38n1.7

Harrison, J. R., Evans, S. W., Baran, A., Khondker, F., Press, K., Noel, D., Wasserman, S., Belmonte, C., & Mohlmann, M. (2020). Comparison of accommodations and interventions for youth with ADHD: A randomized controlled trial. *Journal of School Psychology*, *80*, 15–36. https://doi.org/10.1016/j.jsp.2020.05.001

Hattie, J., Biggs, J., & Purdie, N. (1996). Effects of learning skills interventions on student learning: A meta-analysis. *Review of Educational Research*, *66*(2), 99–136. https://doi.org/10.3102/00346543066002099

Hayden, L. K., & McLaughlin, T. F. (1987). Effects of a study skills curriculum with rural high school learning disabled students. *Techniques*.

Holifield, C., Goodman, J., Hazelkorn, M., & Heflin, L. J. (2010). Using self-monitoring to increase attending to task and academic accuracy in children with autism. *Focus on Autism and Other Developmental Disabilities*, *25*(4), 230–238. https://doi.org/10.1177/1088357610380137

Huisman, M., Kunst, A. E., & Mackenbach, J. P. (2005). Intelligence and socioeconomic inequalities in health. *Lancet (London, England)*, *366*(9488), 807–808. https://doi.org/10.1016/S0140-6736(05)67212-1

Ilter, I. (2017). Notetaking skills instruction for development of middle school students' notetaking performance. *Psychology in the Schools*, *54*(6), 596–611. https://doi.org/10.1002/pits.22021

Kalberg, J. R., Lane, K., & Lambert, W. (2012). The utility of conflict resolution and study skills interventions with middle school students at risk for antisocial behavior: A

methodological illustration. *Remedial and Special Education*, *33*(1), 23–38. https://doi.org/10.1177/0741932510362514

Klingenberg, O. G., Holkesvik, A. H., & Augestad, L. B. (2020). Digital learning in mathematics for students with severe visual impairment: A systematic review. *British Journal of Visual Impairment*, *38*(1), 38–57. https://doi.org/10.1177/0264619619876975/ASSET/IMAGES/LARGE/10.1177_0264619619876975-FIG1.JPEG

Koegel, L. K., Koegel, R. L., Fredeen, R. M., & Gengoux, G. W. (2008). Naturalistic behavioral approaches to treatment. In *Autism spectrum disorders in infants and toddlers: Diagnosis, assessment, and treatment* (pp. 207–242).

Kuriyan, A. B., Pelham, W. E., Molina, B. S. G., Waschbusch, D. A., Gnagy, E. M., Sibley, M. H., Babinski, D. E., Walther, C., Cheong, J., Yu, J., & Kent, K. M. (2013). Young adult educational and vocational outcomes of children diagnosed with ADHD. *Journal of Abnormal Child Psychology*, *41*(1), 27–41. https://doi.org/10.1007/s10802-012-9658-z

Lacina, J. (2006). Technology in the classroom: Virtual record keeping: should teachers keep online grade books? *Childhood Education*, *82*(4), 252–254. https://doi.org/10.1080/00094056.2006.10522835

Langberg, J. M., Epstein, J. N., Girio, E. L., Becker, S. P., Vaughn, A. J., & Altaye, M. (2011). Materials organization, planning, and homework completion in middle-school students with ADHD: Impact on academic performance. *School Mental Health*, *3*(2), 93–101. https://doi.org/10.1007/s12310-011-9052-y

Langberg, J. M., Dvorsky, M. R., & Evans, S. W. (2013). What specific facets of executive function are associated with academic functioning in youth with attention-deficit/hyperactivity disorder? *Journal of Abnormal Child Psychology*, *41*(7), 1145–1159. https://doi.org/10.1007/s10802-013-9750-z

Langberg, J. M., Dvorsky, M. R., Molitor, S. J., Bourchtein, E., Eddy, L. D., Smith, Z. R., Oddo, L. E., & Eadeh, H.-M. (2018). Overcoming the research-to-practice gap: A randomized trial with two brief homework and organization interventions for students with ADHD as implemented by school mental health providers. *Journal of Consulting and Clinical Psychology*, *86*(1), 39–55. https://doi.org/10.1037/CCP0000265

Langberg, J. M., Dvorsky, M. R., Molitor, S. J., Bourchtein, E., Eddy, L. D., Smith, Z., Schultz, B. K., & Evans, S. W. (2016). Longitudinal evaluation of the importance of homework assignment completion for the academic performance of middle school students with ADHD. *Journal of School Psychology*, *55*, 27–38. https://doi.org/10.1016/j.jsp.2015.12.004

Langberg, J. M., Epstein, J. N., Becker, S. P., Girio-Herrera, E., & Vaughn, A. J. (2012). Evaluation of the homework, organization, and planning skills (HOPS) intervention for middle school students with attention deficit hyperactivity disorder as implemented by school mental health providers. *School Psychology Review*, *41*(3), 342–364. https://doi.org/10.1080/02796015.2012.12087514

Langberg, J. M., Vaughn, A. J., Williamson, P., Epstein, J. N., Girio-Herrera, E., & Becker, S. P. (2011). Refinement of an organizational skills intervention for adolescents with ADHD for implementation by school mental health providers. *School Mental Health*, *3*(3), 143–155. https://doi.org/10.1007/s12310-011-9055-8

Lee, J. B., & Cherney, L. R. (2018). Tau-U: A quantitative approach for analysis of single-case experimental data in aphasia. *American Journal of Speech-Language Pathology*, *27*(1S), 495–503. https://doi.org/10.1044/2017_AJSLP-16-0197;PAGE:STRING:ARTICLE/CHAPTER

Lenski, S., Elsner, S., & Großschedl, J. (2022). Comparing construction and study of concept maps – An intervention study on learning outcome, self-evaluation and enjoyment through training and learning. *Frontiers in Education*, *7*, 892312. https://doi.org/10.3389/feduc.2022.892312

Lizarraga, M. L. S. d A., & Iriarte, M. D. I. (2001). Enhancement of cognitive functioning and self-regulation of learning in adolescents. *The Spanish Journal of Psychology*, *4*(1), 55–64. https://doi.org/10.1017/S1138741600005655

Lizarraga, M. L. S. d A., Baquedano, M. T. S. d A., & Oliver, M. S. (2010). Stimulation of thinking skills in high school students. *Educational Studies*, *36*(3), 329–340. https://doi.org/10.1080/03055690903425003

Margherio, S. M., Evans, S. W., Monopoli, W. J., & Langberg, J. M. (2023). Cost-effectiveness of a training intervention for adolescents with ADHD. *Journal of Clinical Child and Adolescent Psychology*, *52*(6), 819–833. https://doi.org/10.1080/15374416.2021.1875323

McCurdy, E. E., & Cole, C. L. (2014). Use of a peer support intervention for promoting academic engagement of students with autism in general education settings. *Journal of Autism and Developmental Disorders*, *44*(4), 883–893. https://doi.org/10.1007/S10803-013-1941-5/METRICS

Meltzer, L. (2018). Executive function in education: From theory to practice. In L. Meltzer (Ed.), *Executive function in education: From theory to practice* (2nd ed.). The Guilford Press.

Merriman, D. E., & Codding, R. S. (2008). The effects of coaching on mathematics homework completion and accuracy of high school students with attention-deficit/hyperactivity disorder. *Journal of Behavioral Education*, *17*(4), 339–355. *2008 17:4*, https://doi.org/10.1007/s10864-008-9072-3

Molina, B. S. G., Flory, K., Bukstein, O. G., Greiner, A. R., Baker, J. L., Krug, V., & Evans, S. W. (2008). Feasibility and preliminary efficacy of an after-school program for middle schoolers with ADHD: A randomized trial in a large public middle school. *Journal of Attention Disorders*, *12*(3), 207–217. https://doi.org/10.1177/1087054707311666

Ouzzani, M., Hammady, H., Fedorowicz, Z., & Elmagarmid, A. (2016). Rayyan—A web and mobile app for systematic reviews. *Systematic Reviews*, *5*(1), 210. https://doi.org/10.1186/s13643-016-0384-4

Pandey, A., Hale, D., Das, S., Goddings, A. L., Blakemore, S. J., & Viner, R. M. (2018). Effectiveness of universal self-regulation–based interventions in children and adolescents: A systematic review and meta-analysis. *JAMA Pediatrics*, *172*(6), 566–575. https://doi.org/10.1001/JAMAPEDIATRICS.2018.0232

Parker, R. I., Vannest, K. J., Davis, J. L., & Sauber, S. B. (2011). Combining nonoverlap and trend for single-case research: Tau-U. *Behavior Therapy*, *42*(2), 284–299.

Perels, F., Gürtler, T., & Schmitz, B. (2005). Training of self-regulatory and problem-solving competence. *Learning and Instruction*, *15*(2), 123–139. https://doi.org/10.1016/j.learninstruc.2005.04.010

Peters-Corbett, A., Parke, S., Bear, H., & Clarke, T. (2024). Barriers and facilitators of implementation of evidence-based interventions in children and young people's mental health care–a systematic review. *Child and Adolescent Mental Health*, *29*(3), 242–265. https://doi.org/10.1111/camh.12672

Pfiffner, L. J., Hinshaw, S. P., Owens, E., Zalecki, C., Kaiser, N. M., Villodas, M., & McBurnett, K. (2014). A two-site randomized clinical trial of integrated psychosocial treatment for ADHD-inattentive type. *Journal of Consulting and Clinical Psychology*, *82*(6), 1115–1127. https://doi.org/10.1037/A0036887

Reid, J. B., Eddy, J. M., Fetrow, R. A., & Stoolmiller, M. (1999). Description and immediate impacts of a preventive intervention for conduct problems. *American Journal of Community Psychology*, *27*(4), 483–517. https://doi.org/10.1023/A:1022181111368

Richardson, M., Moore, D. A., Gwernan-Jones, R., Thompson-Coon, J., Ukoumunne, O., Rogers, M., Whear, R., Newlove-Delgado, T. V., Logan, S., Morris, C., Taylor, E., Cooper, P., Stein, K., Garside, R., & Ford, T. J. (2015). Non-pharmacological interventions for attention-deficit/hyperactivity disorder (ADHD) delivered in school settings: Systematic reviews of quantitative and qualitative research. *Health Technology Assessment (Winchester, England)*, *19*(45), 1. https://doi.org/10.3310/HTA19450

Sibley, M. H., Kuriyan, A. B., Evans, S. W., Waxmonsky, J. G., & Smith, B. H. (2014). Pharmacological and psychosocial treatments for adolescents with ADHD: An updated systematic review of the literature. *Clinical Psychology Review*, *34*(3), 218–232. https://doi.org/10.1016/J.CPR.2014.02.001

Sibley, M. H., Morley, C., Rodriguez, L., Coxe, S. J., Evans, S. W., Morsink, S., & Torres, F. (2020). A peer-delivered intervention for high school students with impairing ADHD symptoms. *School Psychology Review*, *49*(3), 275–290. https://doi.org/10.1080/2372966X.2020.1720803

Sirriyeh, R., Lawton, R., Gardner, P., & Armitage, G. (2012). Reviewing studies with diverse designs: The development and evaluation of a new tool. *Journal of Evaluation in Clinical Practice*, *18*(4), 746–752. https://doi.org/10.1111/j.1365-2753.2011.01662.x

Tamm, L., Risley, S. M., Hamik, E., Combs, A., Jones, L. B., Patronick, J., Yeung, T. S., Zoromski, A. K., & Duncan, A. (2024). Improving academic performance through a school-based intervention targeting academic executive functions–a pilot study. *International Journal of Developmental Disabilities*, *70*(3), 549–557. https://doi.org/10.1080/20473869.2022.2095690

Tollefson, N., Tracy, D. B., Johnsen, E. P., & Chatman, J. (1986). Teaching learning disabled students goal-implementation skills. *Psychology in the Schools*, *23*(2), 194–204. https://doi.org/10.1002/1520-6807(198604)23:2<194::AID-PITS2310230213>3.0.CO;2-C

Zepeda, C. D., Richey, J. E., Ronevich, P., & Nokes-Malach, T. J. (2015). Direct instruction of metacognition benefits adolescent science learning, transfer, and motivation: An in vivo study. *Journal of Educational Psychology*, *107*(4), 954–970. https://doi.org/10.1037/edu0000022

Zoromski, A. K., Owens, J. S., Evans, S. W., & Brady, C. E. (2015). Identifying ADHD symptoms most associated with impairment in early childhood, middle childhood, and adolescence using teacher report. *Journal of Abnormal Child Psychology*, *43*(7), 1243–1255. https://doi.org/10.1007/S10802-015-0017-8/TABLES/5

*Articles included in the systematic review.

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Kim Wolters is a PhD student at Accare. Her research focuses on the development and investigation of the Plans At School (PLOS) program: a program to support pupils with planning problems in secondary education.

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