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Youth Interventions With and Without Supervised Practice: A Second-Order Meta-Analysis

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Abstract
Supervised practice pairs behavioral rehearsal (i.e., the practice of skills) with constructive and supportive feedback so that learners can enact new skills accurately and develop the motivation to consistently apply these skills. The current review study takes stock of the literature on supervised practice through second-order meta-analysis, a rigorous quantitative method used to aggregate overall effects from previous meta-analyses. Results from five meta-analyses revealed a significant overall effect of supervised practice compared to unsupervised practice ($SMD = 0.22$). Youth outcome type significantly moderated the effects of supervised practice, with internalizing behavior yielding the largest effect. Findings suggest that providing opportunities for supervised practice has the potential to significantly improve the effectiveness of a range of skills-based interventions. Implications for supervised practice are discussed, including as an adjunct to cognitive behavioral interventions and a valuable role for volunteers and other paraprofessionals in their delivery of research supported care.

Keywords Supervised practice · Behavioral rehearsal · Youth intervention · Second-order meta-analysis

Supervised practice involves practicing new skills in the presence of someone who can observe and provide feedback to ensure its optimal adoption and application (Hinshaw, 2006). Supervised practice and related techniques, such as behavior modeling training, have their roots in Bandura's (1977) social learning theory, which emphasizes practicing new skills and behavioral repertoires as opportunities to receive feedback and social reinforcement (Goldstein & Sorcher, 1974; Taylor et al., 2005). These learning techniques have been applied to a wide range of settings including, but not limited to, managerial and leadership work (Taylor et al., 2005; Young, 2019), technical skills training (Compeau & Higgins, 1995), psychotherapeutic interventions (e.g., Bernstein et al., 2021; Weisz et al., 2005) and a range of prevention programs (universal and indicated) in school and afterschool settings (Conley et al., 2017; Galindo et al., 2018).

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The present quantitative review compares the effectiveness of psychosocial interventions with and without supervised practice for youth ranging from kindergarten through higher education.

The Importance of Supervised Practice

Over the past few decades, a range of preventive interventions, from psychotherapy to universal prevention programs, have shifted their approaches from more passive, psychoeducation and relationship-focused strategies to more active, research-supported, skills-training (Weisz et al., 2017). This shift has been driven, in part, by studies of child and adolescent psychotherapy in which non-specific "usual care" models have proven to be less effective than more targeted, research-supported therapeutic approaches (Weisz et al., 1987, 2005, 2017). Most effective cognitive and behavioral skills-training programs require multiple sessions and ample opportunities for youth to practice, master, apply, and integrate each new skill with previously learned skills (Conley et al., 2015). Supervised practice facilitates this process, enabling learners to modify incorrect approaches and to incorporate and

rehearse new skills as intended (Alvord & Grados, 2005; Boritz et al., 2023). Supervised practice appears to be particularly helpful and motivating in the learning processes of youth. Gresham (1995) has noted that, as they learn new behaviors and skills, children need opportunities to practice combining separate skills and sequencing them into more complicated chains of behavior. Supervised practice provides the necessary context and opportunities for such learning. Practice also increases motivation by providing social reinforcement and opportunities to acquire role play skills in anticipation of relevant situations (Conley et al., 2015). The inclusion of supervised practice is a particularly strong predictor of positive outcomes designed to prevent disorder, reduce symptoms, and enhance well-being (Conley et al., 2017).

Despite these important benefits, many therapists, teachers, and program administrators struggle to provide opportunities for supervised practice. They are often pressed to deliver interventions within fixed timeframes and struggle to set aside sufficient time for individualized, in-session supervised practice and reinforcement of new skills and their integration with previously-learned skills (Conley et al., 2015; Kazdin & Blase, 2011). Nonetheless, extensive research has identified supervised practice over multiple sessions as an important component of successful skills training for both youth and adults (Conley et al., 2015; Elliott et al., 2015; Gottfredson et al., 2015; Kumm et al., 2021; Payton et al., 2000; Salas & Cannon-Bowers, 2001; Taylor et al., 2005; Young, 2019). Compared to instruction-only skills modules, programs that provide young people with supervised opportunities to practice and receive feedback yield far stronger effects than those without the practice component (e.g., Conley et al., 2015). Indeed, a series of evaluations of psychotherapeutic interventions for youth with adjustment disorders, relationship issues, or social difficulties (Adalbjarnardottir, 1993; Blonk et al., 1996), self-regulation challenges (Kendall & Zupan, 1981), and autism spectrum disorder (Laugeson & Park, 2014) have all highlighted the benefits of approaches that include supervised practice (Domitrovich et al., 2007; Laugeson & Park, 2014; Laugeson et al., 2009).

Supervised practice has also been examined in school-related contexts. For example, in a recent quasi-experimental evaluation of a tutoring program, researchers found benefits for supervised practice on the school performance of students struggling academically, including improvements in behavioral regulation and reading performance (Galindo et al., 2018). Others have demonstrated significant positive effects of supervised practice on youth social-emotional skills (Domitrovich et al., 2007; Mokrue et al., 2005). As Salas and Cannon-Bowers (2001, p. 480) observed, "It is well documented that practice is a necessary condition for skill acquisition" (Salas & Cannon-Bowers, 2001, p. 480).

Previous Meta-analyses of Supervised Practice for School-Age and College-Age Youth

To date, five meta-analyses have been conducted with the existing literature on the efficacy of supervised practice for improving youth mental health, social, and academic outcomes (Conley et al., 2015, 2017; Durlak et al., 2010, 2011; January et al., 2011). Although these analyses span a relatively wide developmental range, the definition and processes of supervised practice were consistent across studies. There is also consistency in the research-supported approaches that are applied to improve the mental health, social and academic outcomes of children, adolescents, and young adults (Durlak et al., 2010; Weisz et al., 2015).

The first meta-analysis focused specifically on the effectiveness of supervised practice in 103 universal mental health prevention programs for college students. Analyses explored a range of adjustment outcomes including depression, anxiety, stress, psychological distress, social-emotional skills, self-perceptions, and interpersonal relationships (Conley et al., 2015). Results indicated that skills-training programs that included a supervised practice component were significantly more effective ($g = 0.45$) than skills-training programs that did not incorporate supervised practice ($g = 0.11$). In addition, compared to skills-training programs without supervised practice and psychoeducational interventions, programs including supervised practice were significantly more effective in reducing depression, anxiety, stress, and psychological distress symptoms, as well as promoting positive socio-emotional skills, self-perceptions, and academic-related outcomes. The authors concluded that, "without supervised practice, it is highly unlikely that participants will be able to master new behaviors and apply them appropriately in the future."

Building on this, Conley et al. (2017) conducted a meta-analysis of 79 indicated mental health prevention programs for higher education students at risk for mental health challenges. Supervised practice was not found to be a statistically significant moderator of the observed effects. The authors note, however, that the hypothesis could not accurately be tested because the vast majority of the interventions included practice opportunities. Given this limitation, they called for additional mediation and moderation analyses that explore whether skills training, supervised practice, and supervision help explain the magnitude of observed outcomes in indicated mental health prevention programs.

In another meta-analysis, Durlak et al. (2010) investigated the role of supervised practice approaches through a meta-analysis of 68 studies of after-school programs

focused on promoting youths' social emotional and academic skills. Compared to the control group, youth in after-school programs demonstrated a significant overall positive effect (SMD = 0.22), with improvements in outcomes such as self-perceptions, school bonding, social behaviors, and academic achievement, as well as decreases in problem behaviors. Of note, programs that implemented four practices related to supervised practice (SAFE: sequenced, active, focused, and explicit) showed beneficial significant moderator effects on some outcomes program outcomes (SMD = 0.31). In particular, programs that provided guided opportunities for youth to actively practice, combine, and sequence new skills were more effective. Durlak and colleagues then examined these SAFE practices in a meta-analysis of 213 school-based universal prevention interventions (Durlak et al., 2011). Compared to youth in the control condition, youth in school-based SEL programs significantly improved their social and emotional skills, attitudes, behavior, and academic achievement (overall effect size of $g = 0.30$), with SAFE supervised practice criteria moderating some program outcomes (effect sizes ranging from g = 0.24–0.69).

Finally, supervised practice was explored in the context of classroom-wide social skills interventions for students in preschool through 12th grade (January et al., 2011). Meta-analysis of 28 studies revealed a small, but significant overall effect on youth social behavior ($d = 0.15$). The authors then examined programs' intervention approaches, coding all studies into either passive or active instructional approaches. Active approaches that incorporated supervised practice of skills was found to be a significant moderator, yielding a larger effect size ($d = 0.37$) than programs that took more passive instructional approaches ($d = 0.12$).

Taken together, existing meta-analyses of supervised practice, although relatively limited, have yielded small, but significant findings of supervised practice on youth outcomes. Given that some meta-analyses have not found supervised practice to be a significant moderator and others have found relatively moderate effects, there is utility in synthesizing the existing literature to obtain an overall assessment of the effectiveness of supervised skills practice across—rather than just within—youth preventive interventions.

The Value of Second-order Meta-analysis

Despite these promising trends, important questions about the relative benefits of supervised practice remain unresolved. The effectiveness of practice may vary across the type of intervention or outcome it is designed to address. For example, existing meta-analyses have examined supervised practice by youth program or intervention type (e.g., in psychotherapy, universal prevention programming, academic programs), but no studies to date have explored its effectiveness as a general technique across interventions. Given the heterogeneity of approaches and the potential costs and benefits of adding a supervised practice components to interventions, a second-order meta-analysis is needed.

Second-order meta-analysis employs statistical techniques parallel to that of traditional meta-analysis to combine results across first-order meta-analytic studies (Mingebach et al., 2018). Whereas first-order meta-analyses synthesize primary studies to produce a quantitative summary of results on a certain topic or research question (Glass, 1976), second-order meta-analyses synthesize results from existing and methodologically comparable first-order meta-analyses that examined a similar research question given a certain topic (Cooper & Koenka, 2012; Schmidt & Oh, 2013). First-order meta-analyses are generally considered the top-tier of evidence in many research fields, but they suffer from an important drawback: They do not allow for estimating the amount of between-meta-analysis true variance (Cooper & Koenka, 2012). To address this, second-order meta-analytic techniques have been developed (Schmidt & Oh, 2013), which not only facilitate summarizing the evidence that is produced by more than one first-order meta-analysis but also enables a comparison of findings and an examination of the discrepancies in the results of these first-order meta-analyses (Simonsmeier et al., 2021). A second-order meta-analysis provides an estimate of the overall effect by synthesizing individual effects derived from first-order meta-analyses and an estimate of the between-meta-analysis variability that may (partly) be explained by moderators. This relatively new approach to meta-analysis is a powerful tool for summarizing findings from the increasing body of meta-analytic research in ways that produce a more representative estimate of a true effect than produced by first-order meta-analyses.

An essential advantage of second-order meta-analysis is that it has the potential to resolve conflicting findings from first-order meta-analyses by synthesizing large bodies of research literature in a succinct yet comprehensive way, while the between-meta-analytic variance is assessed and accounted for (Duke et al., 2018). In addition, by synthesizing meta-analytic effect sizes of aggregated individual primary empirical studies, this statistical technique has a high degree of statistical power. As such, this technique allows for a statistically robust comparison of a single variable or construct (i.e., supervised practice in the current study) across various populations, intervention types, and methodologies (Duke et al., 2018). Assessing the between-meta-analytic variance in mean effects enhances the accuracy of each first-order meta-analytic mean estimate, which parallels the process in which meta-analyses combine the results of multiple individual evaluations to produce reliable and precise impact estimates and permit comparisons across approaches and characteristics (Schmidt & Oh, 2013). Therefore,

second-order meta-analytic methods are particularly strong techniques for estimating "meta-analytic moderator analyses (i.e., comparing first-order meta-analytic results of the same relationship across different settings and/or groups)" (Schmidt & Oh, 2013, p. 216). The current second-order meta-analysis is of particular value in assessing the state of the existing literature on supervised practice.

The Current Study

To address gaps in the existing literature, the current second-order meta-analysis examined the impact of supervised practice across a range of youth interventions. Specifically, we used relevant meta-analyses written in English through November 2019 that examined the effectiveness of any form of intervention aimed at improving the psychosocial well-being of youth (ages kindergarten through higher education), and that included a moderator of supervised practice. Although this represents a wide developmental span, the processes that underlie supervised practice are likely to operate in a similar manner across youth (Bandura, 1977). Moreover, as the path from dependency in childhood to independence in adulthood has grown longer and more complicated, distinctions between these developmental periods have become increasingly blurred (Arnett, 2014). Using a multilevel meta-analytic approach, the analyses (1) estimated the overall effect size of supervised practice; (2) tested whether the overall effect size differed across effect size estimators (i.e., Cohen's *d* & Hedge's *g*); and (3) examined whether the type of outcomes (i.e., internalizing outcomes, externalizing outcomes, skills, school outcomes) moderated the overall effect size. It was hypothesized that there would be a significant overall effect of supervised practice compared to unsupervised practice and that outcome type would moderate the overall effect size.

Method

Study Selection

In the current review, all meta-analyses addressing the relation between supervised practice and youth outcomes published before November 2019 were included, except for non-English studies. To find meta-analyses published in scientific journals, books, and unpublished reports, the following databases were used: ERIC, PsycINFO, and ProQuest Dissertations & Theses. Wildcards were used similarly across all databases. The search string included two elements: a supervised practice element and a meta-analysis element. For the supervised practice element, the following terms were used in varying combinations: "supervised practice," "skill*," "behavioral rehearsal," "coach*" or "guided practice." In combination with the supervised practice terms and Boolean operators, the meta-analysis element included the term "meta-analysis," and the age element included the terms: "youth" or "young people."

To warrant inclusion in the final sample, studies had to meet the following inclusion criteria: (1) A meta-analysis of the effect of supervised practice among K-12 and college-aged youth, with supervised practice being defined as the practicing of skills with ongoing guidance and supportive feedback. Studies meeting the inclusion criteria were then screened a second time and eliminated if they met one or more of the following exclusion criteria: (1) adult participants who were not enrolled in a college or university; (2) insufficient information provided for the intervention technique to qualify as supervised practice; (3) outcomes did not fall within one of the following categories: internalizing behavior, externalizing behavior, social-emotional and other skills, or school outcomes; (4) insufficient information to calculate an effect size and authors could not be contacted to obtain necessary data within a specific period of time; and (5) the study was not written in English. This screening procedure yielded 5 studies to be included in the analysis (see Fig. 1 for an overview of the study selection process, and Table 1 for a list of included studies).

Data Extraction and Coding

Synthesizing meta-analyses (as opposed to primary studies) results in a limited number of variables that can be coded and tested as moderators. In this regard, we coded two variables that were examined in moderator analyses.

Type of Outcome

As different youth outcomes have been examined in primary and secondary research, we coded whether an outcome was related to (a) internalizing behavior, (b) externalizing behavior, (c) social-emotional and other skills, and (d) school outcomes. The reported outcomes in the included meta-analyses were categorized into these four broad categories as follows: Internalizing behavior comprised of depression, anxiety, stress, general psychological distress, emotional distress, and self-perception; externalizing behavior comprised of problem behaviors, conduct problems, and drug use; social-emotional and other skills comprised of social-emotional skills and positive social behaviors; and school outcomes comprised of school bonding (which relates to youths' sense of belongingness in the school environment, not strictly social relationships in the school context), school achievement/academic performance, school attendance, and school attitudes.

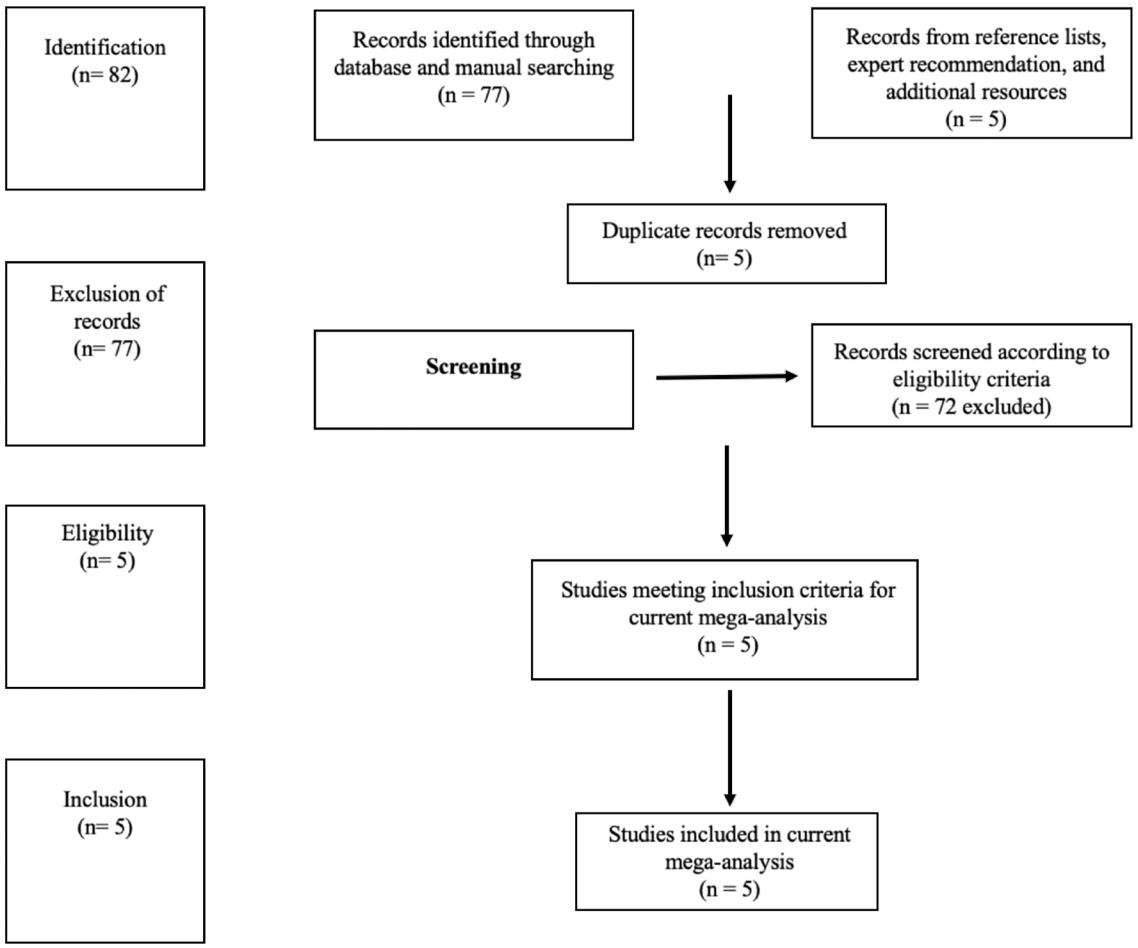

Fig. 1 Study selection process

Type of Effect Size

The included meta-analyses reported either Cohen's *d* or Hedges' *g* values to express effects of supervised practice programs relative to unsupervised practice (or instruction-only) programs. These effect size types are rather similar, and both are somewhat positively biased, although this bias is small for samples of moderate or large size (e.g., Grissom & Kim, 2005; Lipsey & Wilson, 2001). For small samples, Hedges' *g* provides a better estimate of the effect by not assuming equal variances, and by using $n - 1$ instead of n in pooling variances. In this way, the positive bias is somewhat reduced.

Procedures for coding outcome categories and effect size data were performed by one Bachelor's level research assistant and one Master's level research assistant. Both coders received training and weekly supervision from a doctoral candidate and a doctoral-level research expert in meta-analytic techniques to resolve difficulties, questions, or discrepancies that arose throughout the coding process. All studies were double-coded by the Bachelor's level and Master's level research assistants, with the overall agreement being 100% for outcome information and effect size data.

Extracting Effect Sizes

In each of the included meta-analyses, effects of supervised practice programs (relative to unsupervised practice programs) on a range of youth outcomes was expressed either in Cohen's *d* or in Hedges' *g*. As insufficient information was available to transform these two effect size types into a single common effect size (i.e., either Cohen's *d* or Hedges' *g*), we decided to extract both *d* and *g* values from the included meta-analyses. Although it is common practice in meta-analytic syntheses to analyze only a single effect size type, we assumed that including both *g* and *d* values would not distort estimates of the overall and moderator effects substantially, as *g* and *d* values are very similar in nature and magnitude (Grissom & Kim, 2005). As for the direction of the *g* and *d* effect sizes, a positive value would indicate that programs that provide opportunities for supervised practice would outperform those without unsupervised practice given

a particular youth outcome, whereas a negative value would indicate that programs without unsupervised practice outperform those that include supervised practice.

Analytic Strategy

We were interested in the general effect of supervised practice programs relative to unsupervised practice programs, so we first estimated an overall effect. Additionally, we were interested in examining whether supervised practice programs show different effects across youth outcomes. Thus, we tested type of outcome as a moderator of the overall effect in a meta-regression. To test whether effects expressed in Hedges' *g* would differ from effects expressed in Cohen's *d*, we also examined effect size type as a potential moderator of the overall effect.

In our analyses, we applied a random-effects approach, as we considered the included meta-analyses to be a random sample of the population of meta-analyses (e.g., Lipsey & Wilson, 2001). In this approach, we assume that there is not one "true" population parameter that is to be estimated, as differences in effect size magnitude may exist between meta-analyses. These differences may stem from non-identical inclusion and exclusion criteria that were applied in each included meta-analysis. In terms of variance, this implies that not only within-study variance is assumed, but also between-study variance.

Most of the included meta-analyses reported on multiple youth outcomes that are of relevance to the present synthesis. This implies that multiple effect sizes could be extracted from a single included study. However, a central assumption to meta-analysis is independency of effect sizes (e.g., Cooper et al., 2019; Lipsey & Wilson, 2001), and extracting multiple effect sizes from individual included studies violates this assumption because effect sizes extracted from the same study are more alike than effect sizes extracted from different studies. Instead of averaging effect sizes or disregarding effect sizes, we dealt with the problem of effect size dependency by synthesizing the extracted effect sizes in three-level meta-analytic models (Assink & Wibbelink, 2016; Cheung, 2014; Van den Noortgate et al., 2013; Van den Noortgate et al., 2014). In these models, three sources of variance are modeled: Variance in effect sizes extracted from different studies (i.e., between-study variance) at the third level of the model, variance in effect sizes extracted from the same study (i.e., between-study variance) at the second level of the model, and sampling variance of the effect sizes at the first level of the model (Cheung, 2014; Hox, 2002; Van den Noortgate et al., 2013; Van den Noortgate et al., 2014). The sampling variance is not estimated, but considered known and can be calculated using Cheung's formula (2014, p. 215). This three-level approach was used in estimating the overall effect of supervised practice programs as well as in

Table 1 Included studies

Study Title	Authors	Year of Publication	Context/setting/intervention type
A Meta-Analysis of Indicated Mental Health Prevention Programs for At-Risk Higher Education Students	Conley, Shapiro, Kirsch, & Durlak	2017	Indicated prevention programs for higher education students at risk for mental health difficulties
A Meta-analysis of Universal Mental Health Prevention Programs for Higher Education Students	Conley, Durlak, & Kirsch	2015	Universal mental health prevention programs for higher education students on a range of adjustment outcomes
The Impact of Enhancing Students' Social and Emotional Learning: A Meta-Analysis of School-Based Universal Interventions	Durlak, Weissberg, Dymnicki, Taylor, & Schellinger	2011	School-based, universal SEL programs for kindergarten through high school students
A Meta-Analysis of Classroom-Wide Interventions to Build Social Skills: Do They Work?	January, Casey, & Paulson	2011	Classroom wide interventions for social skills improvement
A Meta-Analysis of After-School Programs That Seek to Promote Personal and Social Skills in Children and Adolescents	Durlak, Weissberg, & Pachan	2010	After-school programs that enhance youths' personal and social skills

testing outcome type and effect size type as moderators of the overall effect size.

Prior to conducting moderator analyses, we first examined whether there was significant between-study variance and/or significant within-study variance by performing two separate one-tailed log-likelihood ratio tests. In these tests, the deviance of the full model was compared with the deviance of the model excluding either the between-study or with-study variance component. In case of significant between- and/or within-study variance, we proceeded with the moderator analyses for outcome type and effect size type. Both potential moderating variables were examined in separate three-level meta-analytic models, in which the potential moderator was added as a covariate. Prior to these moderator analyses, a dummy variable was created for each category of the variable.

We used the *R* environment (Version 3.2.0; R Core Team, 2015) to build the three-level meta-analytic models using the "rma.mv" function of the *metafor* package (Viechtbauer, 2010). We used the *R* syntax as written by Assink and Wibbelink (2016) so that the three-level approach to meta-analysis (Cheung, 2014; Van den Noortgate et al., 2013) was applied in the current synthesis. In the effect size synthesis, effect sizes were weighed by the inverse variance, meaning that effect sizes based on a smaller sample size had less influence on the estimated parameters than effect sizes based on larger samples. The standard error of each effect size was extracted from the included meta-analyses or calculated using the reported confidence interval of the effect size. The Knapp-Hartung adjustment (Knapp & Hartung, 2003) was used in testing the significance of model coefficients, meaning that the t and F distributions were used instead of the standard normal *Z* distribution. The model parameters were tested using the restricted maximum likelihood estimation method (REML). A five percent significance level was used in all analyses.

Results

Included Meta-analyses

The search procedure yielded five meta-analyses that could be included in the present review. From these meta-analyses, 22 effect sizes could be extracted. The meta-analyses were published between 2010 and 2017 and were conducted using supervised practice interventions from both in and outside of the United States (see Table 1).

Overall Effect of Supervised Practice and Effect Size Heterogeneity

The overall standardized mean difference (SMD) between participants receiving supervised practice programs and control participants receiving unsupervised practice programs was 0.217, $p < .001$, 95% CI [0.110; 0.325. This implies a positive and significant effect of supervised practice programs (relative to unsupervised practice programs) and, according to Cohen's (1988) criteria for interpreting standardized mean differences, this effect is small in magnitude. Results also revealed heterogeneity in obtained effect sizes, including significant variance in effect sizes that were extracted from different meta-analyses (i.e., significant between-study variance; $\chi^2(2) = 9.308$, $p = .001$ (one-tailed)), whereas the variance in effect sizes extracted from the same meta-analyses was not significant (i.e., non-significant within-study variance; $\chi^2(2) < 0.001$, $p = 1.00$ (one-tailed)). Of the total amount of variance, 41.64% was distributed at level 1 of the model (i.e., sampling variance), less than 0.01% was distributed at level 2 of the model (i.e., within-study variance), and 58.36% was distributed at level 3 of the model (i.e., between-study variance). Given the significant between-study variance, moderator analyses were conducted to identify variables that fully or partially explained this variance.

Moderator Analyses

Table 2 includes the results of the moderator analyses, in which effect size type and outcome type were tested as moderators of the overall effect. The results revealed a significant moderating effect of outcome type, indicating that the effect of supervised practice programs on internalizing behavior (SMD = 0.307) was significantly larger than the effect of supervised practice programs on externalizing behavior (SMD = 0.138), skills (SMD = 0.258), and school outcomes (SMD = 0.124). Results demonstrated that effect size type did not moderate the overall effect of supervised practice programs, as effects expressed in Cohen's *d* values were not significantly different from effects expressed in Hedges' *g* values.

Discussion

In recent years, there have been growing calls for preventive interventions to shift from nonspecific "usual care" models to models that incorporate research-supported skills training. Within this context, supervised practice has gained attention in the literature as a promising strategy to help facilitate the acquisition of critical skills intended to remediate a range of youth challenges and needs. Supervised practice combines the practice of learning new skills with encouraging and corrective feedback, so that participants can learn to enact new skills in relevant situations and remain motivated to master and apply these skills (Conley et al., 2015). Nonetheless, relatively limited research exists on the role of supervised

Table 2 Results for bivariate moderator analyses

Moderator variables	# Studies	# ES	Intercept (95% CI)/ mean SMD (95% CI)	β (95% CI)	F (df1, df2)[a]	p[b]	Level 2 variance	Level 3 variance
Type of outcome					$F(3, 18) = 4.233$	.020*	0.000	0.002
Internalizing behavior (RC)	3	7	0.307 (0.195, 0.419)***					
Externalizing behavior	1	3	0.138 (0.029, 0.247)*	− 0.169 (− 0.320, − 0.017)*				
Skills	5	6	0.258 (0.172, 0.344)***	− 0.049 (− 0.183, 0.086)				
School outcomes	2	6	0.124 (0.046, 0.202)**	− 0.183 (− 0.314, − 0.052)**				
Type of effect size					$F(1, 20) = 0.284$	.600	.000	.013**
Cohen's d	1	8	0.165 (− 0.080, 0.409)					
Hedges g	4	14	0.237 (0.097, 0.376)**	0.072 (− 0.210, 0.353)				

Studies number of studies; # *ES* number of effect sizes, *SMD* Standardized mean difference, *CI* confidence interval, β estimated regression coefficient, *Level 2 variance* residual within-study variance, *Level 3 variance* residual between-study variance

[a]Omnibus test of all regression coefficients in the model

[b]p value of the omnibus test

*$p < .05$; **$p < .01$; ***$p < .001$

practice and findings regarding the strength of its effect have been mixed. In addition, previous studies and meta-analyses have examined supervised practice in a manner that has been siloed by youth intervention type, rather than as a universal technique across interventions. As a result, the current study aimed to fill the gaps in the literature related to the effectiveness of supervised practice across a range of universal and indicated preventive interventions among primary, secondary, and post-secondary students to obtain an broad assessment of this intervention strategy.

Results from a second-order meta-analysis of five meta-analytic studies on supervised practice revealed a significant modest effect ($SMD = 0.22$) for supervised practice compared to interventions without supervised practice. It is possible that a lack of precision and consistency in the definition of supervised practice across settings and populations contributed to the modest effects. Improved operationalization of this feature in psychosocial youth interventions may give rise to new findings that further support or refute its utility as an intervention adjunct. Nonetheless, this modest yet significant positive overall effect is consistent with other studies of supervised practice (Conley et al., 2015, 2017; Durlak et al., 2010, 2011; January et al., 2011), as well as other youth psychosocial interventions in related fields of individual therapy, youth mentoring (e.g., Raposa et al., 2019), and youth after-school programs (e.g., Christensen et al., 2023). Additional research is needed to explore strategies that may bolster the effects of supervised practice, including those that provide opportunities for coaching and practice in the context of technology-delivered interventions (Werntz et al., 2023).

Further, analyses examined whether the effect size of supervised practice was moderated by the type of outcomes. Results revealed a significant moderating effect, with internalizing behaviors yielding the strongest effect ($SMD = 0.31$), suggesting that supervised practice may be a particularly useful intervention strategy for specific types of psychological challenges, skills, or outcomes. For example, this larger effect size for internalizing behaviors has direct implications for integrating supervised practice more fully into depression treatments that may target children, adolescents, and young adults.

One potential explanation for the relatively large effect on internalizing behaviors may relate to the fact that supervised practice helps individuals practice skills explicitly and accurately. Given the visibility of externalizing behaviors and school outcomes, youth may be more likely to receive informal feedback from teachers, parents and others on their performance of such behavioral indicators. By contrast, internalizing behaviors and symptoms (e.g., depressive thoughts, emotional distress, self-perception), which are often less externally apparent and challenged, may be especially amenable to supervised practice. Youth who are provided with supportive contexts for identifying and challenging the cognitive distortions and other unhelpful thinking patterns that are common symptoms of depressive and anxiety-related disorders may be particularly responsive (Schäfer et al., 2017). Oftentimes, youth are expected

to challenge their cognitive distortions as between-session "homework" (Arendt et al., 2016; Kazantzis & Ronan, 2006). Challenging reflexive thought patterns, however, requires a level of executive functioning, meta-cognitive skills, and self-accountability that may be too advanced for many youth to accomplish on their own (Reid et al., 2017). Results from the current review suggest that a more effective approach may involve providing opportunities for youth to practice and apply these cognitive and behavioral skills, and to receive in-vivo supervision and feedback as they gain mastery. These intervention approaches may be particularly effective for internalizing issues since they are aligned with social cognitive theory, which posits that self-efficacy, or how competent an individual feels at achieving a behavior or goal, is facilitated by social support, goal setting, and observational (social) learning (Bandura, 1977).

Further, since many cognitive behavioral interventions have been specifically designed for common internalizing mental health concerns, it is possible that supervised practice interventions have simply been developed with greater precision and goal directedness than academic performance, behavioral challenges, or specific skills. Finally, youth with internalizing symptoms or behaviors may experience a higher level of severity, and thus also have greater room for improvement in the presence of supervised practice. Nonetheless, supervised practice was found to be significantly effective across all outcomes. Thus, results from these moderator analyses suggest that supervised practice does have the potential to be an applicable and effective "common factor" across a range of skills-based interventions.

Study Strengths, Limitations, & Future Research Directions

Several limitations should be acknowledged in the context of interpreting results from the current study. First, current definitions of supervised practice lack precision, and there is insufficient uniformity in how supervised practice is implemented across settings and populations. Consequently, any broad assessment of the field at this stage contains a certain level of variability. Relatedly, variability in reporting practices resulted in incomplete demographic information on samples, including the participants' ages. In attempt to remediate this, it is important to note that we excluded participants who were not enrolled in a college or university. Thus, it will be critical for future studies to document the details and nature of supervised practice at the level of rigor that is applied to other practices and interventions. Likewise, researchers should continue to develop more theoretically- and empirically-informed conceptualizations of supervised practice, including a core set of factors that underlie effective intervention and distinguish it from related constructs (e.g., behavioral rehearsal, between-session homework) and specify for whom and under what circumstances it should be applied. This will allow for a deeper understanding of how supervised practice can be maximized across interventions, contexts and populations. The validity is established by the statistical approach of our second-order meta-analysis, computing overall effect sizes and conducting moderator analyses with adequate standard errors. The effect sizes derived from the five included first-order meta-analyses might not be fully independent, because there may be some overlap in the primary data that were synthesized in these meta-analyses. However, this overlap does not seem to be problematic, as the meta-analyses addressed different issues across different domains of interest and in different populations. Moreover, we applied the three-level statistical approach to our second-order meta-analysis to model statistical dependency arising from the fact that the five meta-analyses reported multiple relevant effect sizes.

Despite these limitations, the current study provides additional evidence for the promise of supervised practice in youth prevention and intervention programs. In particular, this is the first study to use second-order meta-analysis to systematically examine supervised practice across a relatively large body of empirical literature representing a broad array of youth contexts and intervention approaches. Whereas previous meta-analytic studies of supervised practice have focused on subsets of youth in various interventions and settings, this second-order meta-analysis enabled an examination of the effects of supervised practice across a range of populations and contexts. As a result, this represents a more comprehensive landscape of supervised practice beyond what can be obtained using more traditional meta-analytic techniques (Schmidt & Oh, 2013).

Implications and Applications for Practice

Results from this second-order meta-analysis highlight the value of providing youth with opportunities and contexts for the supervised practice of social, emotional, and behavioral skills. Particularly given the value of between-session reinforcement (Gottfredson et al., 2015) as in the context of an increasing emphasis on stepped-care systems of service delivery (Singla et al., 2017), supervised practice represents a clear, well-defined and extremely promising role for paraprofessionals such as volunteer and therapeutic mentors, tutors, SEL program instructors, youth program staff, and others. Training paraprofessionals to deliver research-supported treatments (RSTs) with fidelity, however, often requires in-vivo modeling and feedback as opposed to more passive approaches. Behavioral Skills Training (BST) is a research-supported method that is grounded in applied behavior analysis and involves explicit instruction, modeling, role-play, and feedback (Andzik & Schaeffer, 2019; Leaf et al., 2015; Parsons et al., 2013).

Stepped-training offers one possible framework for scaling BST in youth organizations. First, experts (i.e., program supervisors, outside consultants, researchers), train front-line staff in the delivery of specific RSTs. Program staff then train program volunteers to use or support the RST with a high degree of fidelity through modeling, role-play, and explicit instruction. In this way, volunteers learn a new RST while simultaneously learning how to teach youth that same RST (Andzik & Schaeffer, 2019). Although paraprofessionals often struggle to deliver research-supported interventions with fidelity (Durlak & DuPre, 2008), they are well positioned to provide youth with valuable opportunities to practice, personalize, and master the skills and concepts and skills that youth are learning in their classrooms and through their therapeutic services, mental health apps, and other preventive interventions. Continued specification and evaluation across interventions, contexts, and populations will help to advance our understanding of supervised practice.

Conclusion

Practitioners and researchers have recently advocated for the implementation of more research-supported, skills-focused training in preventive interventions. Supervised practice provides opportunities for youth to learn and practice new skills while also receiving constructive feedback to ensure their understanding and to increase their motivation for mastery and application of the skills (Conley et al., 2015). The current study used second-order meta-analysis to systematically synthesize results from five meta-analytic studies of supervised practice across a range of contexts among kindergarten through higher education aged youth. Findings revealed a significant positive effect of supervised practice compared to unsupervised practice. Outcome category moderated the effectiveness of supervised practice, with internalizing behavior yielding the strongest effect. Results from the current study suggest a number of important directions for future research and practice, including leveraging the volunteer and paraprofessional workforce to implement supervised practice and fill gaps in service provision. Continued investigations of supervised practice across intervention contexts and populations will help maximize the advantages of a range of preventive interventions.

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Data Availability The datasets generated and/or analyzed during the current study are not publicly available but are available from the corresponding author on reasonable request.

Declarations

Conflict of interest The authors declare that they have no conflicts of interest.

Ethical Approval Due to the nature of the manuscript (i.e., systematic review and second-order meta-analysis), the study was granted exemption by the University of Massachusetts Boston Institutional Review Board and the authors certify that the study was performed in accordance with the ethical standards in the 1964 Declaration of Helsinki and its later amendments or comparable ethical standards.

Informed Consent Not applicable.

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