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ORIGINAL PAPER

Motivational Interviewing Training and Fidelity Monitoring in School-Based Research: A Scoping Review

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Abstract

Researchers have studied the efficacy of motivational interviewing over the past 30 years. While it is recognized as a highly effective approach overall, variability in outcomes studies is largely attributed to the extent to which it is implemented with fidelity. MI applications in school have become increasingly popular in the past 10 years, yet no reviews have included a comprehensive description of the prevalence and type of school-based MI applications or positioned MI training and fidelity monitoring in the broader framework of implementation science. The present scoping review documents the prevalence and type of MI applications, training strategies and techniques, and fidelity monitoring systems reported in school-based MI research. We identified 62 studies from 8 countries via a multi-step search and review process conducted iteratively between February 2020 and April 2023. For inclusion, articles needed to (a) be peer-reviewed, (b) school-based, (c) describe the use of MI as a primary intervention strategy, and (d) employ a rigorous research design. The results indicated most articles were published since 2012 and the most frequent target behavior was social–emotional, behavioral, or related difficulties. Less than one-third of the articles in the review contained information on the trainer's qualifications. Although MI was an active ingredient in all the studies and 71% indicated that they collected or monitored at least one dimension of intervention fidelity, less than half collected or monitored MI quality as a fidelity indicator. We conclude the lack of transparency in training and limited MI fidelity data among these studies make the evidence base for MI use within educational settings difficult to interpret. We discuss implications for the field and recommendations for future research.

Keywords Motivational interviewing · Scoping review · Motivation · Implementation science

Introduction

Motivational interviewing (MI) is a complex, person-centered approach to foster dialogue about change and growth through strategic use of specific relational and conversational skills (Miller & Rollnick, 2023). Thirty-five years of research and over 2000 RCTs support MI's efficacy across a number of settings and populations, typically generating small to medium effect sizes; the differential effect sizes are largely attributed to variability in the quality of MI delivered (Bahafzallah et al., 2020; Lundahl & Burke, 2009; Miller & Rollnick, 2014; Miller & Rollnick, 2023). Although conceptually easy to understand, MI is difficult to practice with proficiency in real-world settings (Miller & Moyers, 2006). This difficulty, which is well documented in the clinical literature, is due in part to the contextual and interactional complexity of delivering MI and in part to the need for intensive training, ongoing support (i.e., coaching and consultation), and deliberate practice to facilitate the transfer of MI knowledge and skills from *contrived use* within a training environment to *actual use* within a day-to-day work environment (Dunn et al., 2016; Hallgren et al., 2018; Imel et al., 2011; Manuel et al., 2022; Miller & Rollnick, 2014, 2023).

The successful transfer of knowledge and skills from a training environment to daily use is complex. A trainee must (a) retain the declarative and procedural knowledge and

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skills acquired during training, (b) actively use their newly obtained knowledge and skills in practice, and (c) integrate and refine them—ideally through repeated reflection and use over time—to promote generalization and optimize effectiveness (Blume et al., 2019; Ford et al., 2018; Nielsen & Shepard, 2022). A range of implementation strategies have been proposed within the field of implementation science to support knowledge and skill development and to promote training transfer. Implementation strategies used to "train and educate stakeholders" (Kirchner et al., 2018; p. 249) can be implemented prior to training (e.g., develop educational materials), during training (e.g., make trainings dynamic), and following training (e.g., provide ongoing consultation and feedback, create a professional learning collaborative) and serve a range of functions, including support of training quality, knowledge transfer, skill refinement and practice, and high-fidelity implementation (Cook et al., 2019; Powell et al., 2015). Lyon et al. (2011) have documented more granular techniques specific to the delivery of training content such as the use of "interactive didactics" (e.g., role play), small group discussion, self-reflection, peer collaboration, and feedback. These strategies and techniques align with recommendations from the Active Implementation Research Network (AIRN, 2024), particularly with respect to training and coaching. AIRN has recommended a trainer has content expertise. They have recommended trainings emphasize skill development, providing trainees with opportunities to practice skills and obtain constructive feedback. Finally, they have noted that coaching is essential and that effective coaches (a) engage trainees, (b) facilitate use and practice, and (c) offer advice and feedback to guide skill development and refinement.

Implementation strategies such as workshops, consultation, and professional learning communities help support initial skill development, training transfer, and the generalization of skills over time. Delivery of these strategies can differ on a range of dimensions including quality and duration. For example, workshops vary with respect to not only the length of time trainees are exposed to training content but with respect to who delivers content (i.e., novice vs. expert) and how content is delivered (e.g., didactic vs. experiential). These training-specific implementation strategies, in turn, promote—and increase the likelihood of—intervention fidelity. Several systematic and meta-analytic reviews have detailed and summarized MI training processes for health and mental health professionals in medical and clinical settings (Barwick et al., 2012; de Roten et al., 2013; Madson et al., 2009, 2019; Schwalbe et al., 2014; Söderlund et al., 2011). It is clear from this literature that self-study is ineffective, and that, although a one- or two-day workshop may provide a practitioner with an initial introduction to MI's core skills and tasks, workshop-only trainings are insufficient to impart the requisite skills necessary to implement MI skillfully in a real-world setting (Mitcheson, et al., 2009; Walters et al., 2005). Instead, best practice in MI training—in alignment with the implementation science literature and the Motivational Interviewing Network of Trainers (MINT)—combines introductory workshops; opportunities to practice MI skill development within contrived settings; individualized coaching and feedback sessions in practice settings; and ongoing coaching and group-based support mechanisms such as a professional learning communities to ensure skill maintenance and prevent drift over time (Miller, 2023; Miller & Rollnick, 2023).

Motivational Interviewing in Educational Settings

Over roughly the last two decades, several scholarly efforts have highlighted MI as a popular, growing, and promising practice in school-based settings (Beckwith & Beckwith, 2020; Frey et al., 2011; Hebard & Watson, 2017; Wells et al., 2014). In addition, two special issues (Pas & Bradshaw, 2021; Strait et al., 2014), three books on MI in schools (Herman et al., 2021; Reinke et al., 2011; Rollnick et al., 2016), a book on MI use for school counselors (North, 2017), and multiple book chapters (e.g., Frey et al., 2023; Herman et al., 2014; Lee et al., 2014; Reinke et al., in press) have provided guidance on the use of MI in school-based settings and documented interventions that integrate MI as a core intervention component. Examples of MI use in school-based settings are varied. Researchers have integrated MI into family-centered, school-based intervention models targeting parenting practices as a mediating mechanism of students' behavioral and academic outcomes (Dishion & Stormashak, 2007). They have also integrated MI into multi-step screening, brief intervention, and referral to treatment models to support students' behavioral health (Curtis et al., 2014; Hunt et al., 2022). Finally, they have integrated MI into coaching models to strengthen teachers' classroom management practices (Frey et al., 2025; Reinke et al., 2008, 2011), to support teachers' use of culturally responsive strategies (Bradshaw et al., 2018), and to bolster program adoption and implementation (Frey et al., 2023).

Recognizing the important relationship between MI fidelity and outcomes in MI research in non-school settings (See Jelsma et al., 2015; Miller & Rollnick, 2014), many educational scholars have called for greater transparency about how MI is used, interventionists are trained, and how quality is monitored (Frey et al., 2017, 2021, 2023; Herman et al., 2021; Lee et al., 2014; Reinke et al., in press). These authors have acknowledged the importance of participation in workshops, individualized feedback, and ongoing support to prevent drift and have implored those who rely on MI as a key component of an intervention—whether directly with youth or in the context of consultation and coaching with teachers, caregivers, or other school-based professionals—to

specify the scope and sequence of MI professional development systems and to document skill-based proficiency standards (i.e., intervention fidelity) consistent with the use of MI in other settings.

To date, existing school-based reviews of MI have focused on outcomes rather than process and on MI interventions targeting students only, thereby excluding the growing body of literature detailing MI interventions targeting teachers, parents, and other school-based personnel. For example, a review by Woods et al. (2014) identified UK-based studies using MI with secondary students and Snape and Atkinson (2016) published a systematic review of studies in the UK, USA, and Romania with a focus on effectiveness of student-focused studies (i.e., studies where students were the direct recipients of MI). Although we acknowledge the importance of systematic reviews and meta-analyses to drive best practice, we believe school-based researchers and practitioners would benefit at this time from a scoping review documenting the prevalence and type of MI applications being used in schools as well as how school-based personnel are trained in MI and how fidelity is monitored and reported. We believe this process-oriented focus will enable the identification of gaps and inconsistencies—from both an implementation and reporting standpoint—and will spur reflection among researchers and practitioners on how to further refine and optimize MI training models and how to feasibly monitor fidelity in school-based settings.

The purpose of the present scoping review is to (a) document the prevalence and type of MI applications in school settings, (b) document current training approaches and techniques used to teach school-based personnel to use MI, and (c) examine the extent to which fidelity data are being collected, coded, and reported within school-based MI research. Based on these findings, we discuss implications for the field and recommendations for future research.

Method

We identified the articles included in this review via a search and review process conducted iteratively between February 2020 and April 2023. We conducted searches in the following electronic databases: ProQuest Social Science Premium Collection, PsychINFO, and MEDLINE, combining the search term "motivational interview*" with "school*," "teacher," or "principal." We also combined the search term "school*" with search terms for interventions that utilize motivational interviewing and are implemented in school-based settings. These additional searches targeted three interventions: Screening Brief Intervention and Referral to Treatment (SBIRT), the Classroom Check-Up (CCU), and the Family Check-Up (FCU). We limited our search to articles written in English and published from 1990 onward as the first edition of Miller and Rollnick original text on MI was first published in 1991. We conducted a three-stage review process. During stage 1, records were screened and abstracts were reviewed. During stage 2, a full-text review of articles was conducted. Then, during stage 3, a subset of the reviewed articles were identified for inclusion in the current scoping review. Below we describe our inclusion and exclusion criteria, this iterative review process, and our coding procedures.

Inclusion and Exclusion Criteria

As part of a broader review of MI use in school-based settings, we identified and retained articles if they were (a) peer-reviewed, (b) school-based, and (c) described the use of MI as a primary intervention strategy, as an adjunct of a multi-component intervention, or in combination with other evidence-based practices. We limited our focus to peer-reviewed articles because, in part, our goal was to understand how researchers were documenting training models and reporting fidelity data within published literature that had been through a rigorous review process (i.e., What documentation thresholds are deemed sufficient and how consistently are they applied across reviewers and journals?). We defined "school-based" to include any intervention delivered—or designed for delivery—by school-based personnel in, or outside of, a school setting. Thus, the recipients of MI could be not only students or teachers but also parents or others receiving intervention via a school-based support mechanism. We limited our review to studies focused on early childhood, elementary, and secondary (e.g., middle and high school) populations, thereby excluding the growing literature on MI use in higher education settings. We also excluded articles focused on conceptual or theoretical use of MI in school-based settings, previous literature reviews, book reviews, and protocol articles describing procedures for upcoming studies.

Screening and Abstract Review

As detailed in Fig. 1, our initial search yielded over 4000 records. During this initial, stage 1 review, the first author screened article keywords and abstracts to determine whether articles should be included in the full abstract review. This initial screening process resulted in the exclusion of more than 3500 articles that did not meet minimum inclusionary criteria (i.e., MI-focused and school-based). The first author then reviewed abstracts for the remaining 277 articles to search in greater detail for further evidence that the articles met our inclusion and exclusion criteria and to identify a set of articles for full-text review. At this stage, an additional 108 articles that were not excluded during

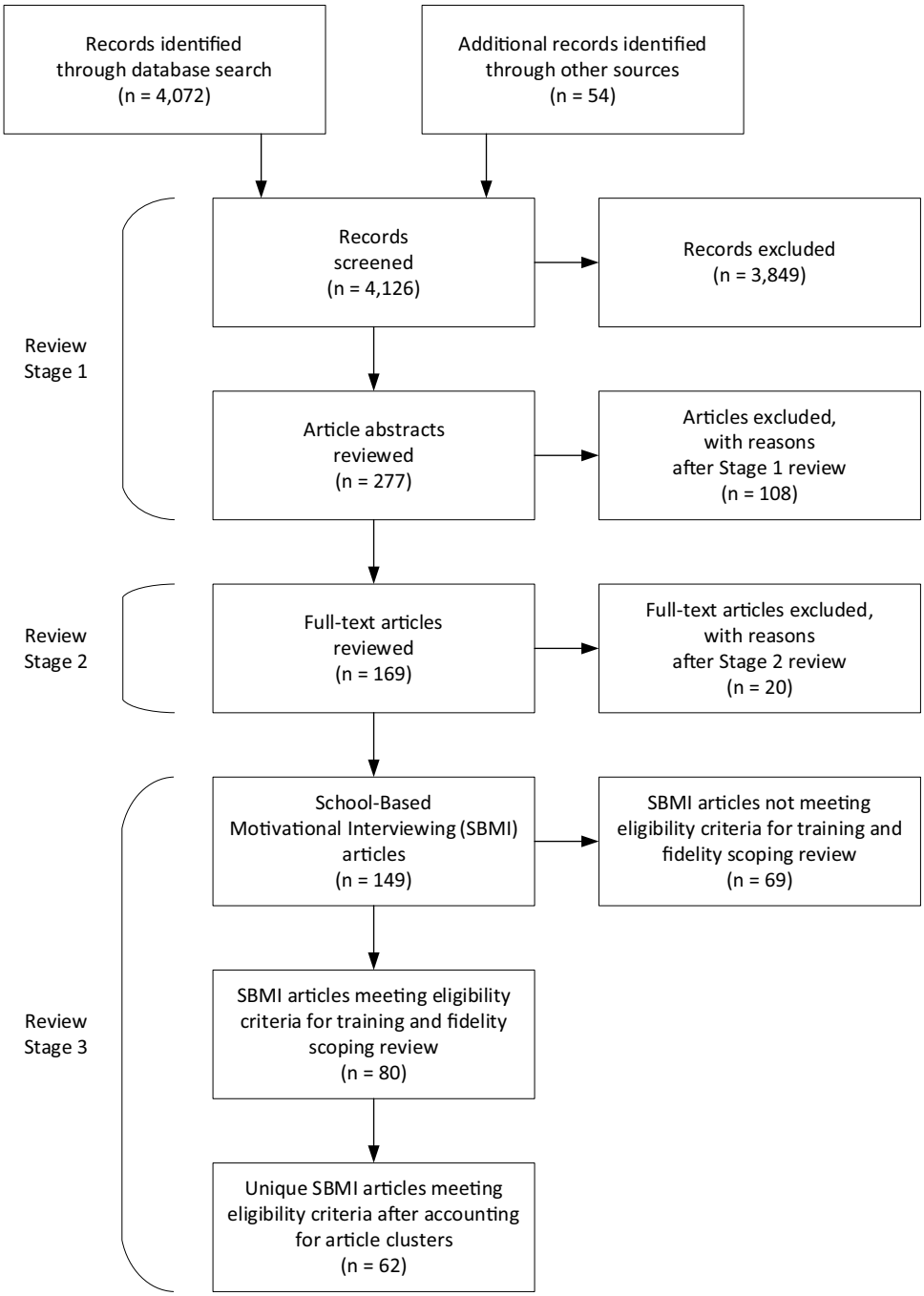

Fig. 1 PRISMA diagram

screening were excluded as they did not meet our most basic inclusion criteria.

Full-Text Article Review

During stage 2 of the review process, we conducted a full-text review of 169 articles. The first author logged the articles in a spreadsheet and randomly assigned them to reviewers (i.e., the three authors and two research assistants). Each reviewer confirmed the article met eligibility criteria and recorded information in an Excel spreadsheet on each article across a set of common indicators identified prior to beginning the review process. The set of indicators were informed by (a) implementation science literature on training strategies (Lyon et al., 2011; Nadeem et al., 2013), (b) MI literature on training and fidelity monitoring (Miller & Rollnick, 2014; Schwalbe et al., 2014; Söderlund et al., 2011), and (c) the collective expertise of our research team, which includes 40 + years of cumulative experience conducting MI-related research in school-based settings (i.e., 14 + years per author)

and two MINT members who are MI practitioners and trainers. The indicators for this study included data on general study characteristics (e.g., study type, purpose, sample size, and country of origin). We documented a range of indicators including the level (e.g., preschool, elementary, secondary), delivery setting (e.g., classroom), delivery agent, tier (i.e., universal, selected, indicated), the target of the intervention (e.g., recipient of MI), and targeted behaviors (e.g., proximal and distal outcomes). To document MI training, we recorded information on trainer qualifications (i.e., MINT-certified, had previous MI training) and training strategies (e.g., workshop). To assess MI fidelity, we recorded information on whether fidelity data were collected, the collection method (e.g., self-report, observation, etc.), whether manuscripts reported data on MI quality, and what measure were used to assess fidelity (e.g., the MITI). Data included both dichotomous indicators (e.g., Was MI training conducted?) and qualitative indicators (e.g., How was MI training conducted?). For 20% of the articles ($n = 30$), we computed a kappa statistic for each dichotomous indicator to assess inter-rater reliability (IRR). Kappa statistics ranged from 0.733 to 1.00 for dichotomous MI training indicators and 0.866 to 1.00 for dichotomous MI fidelity indicators.

For qualitative indicators, each reviewer either briefly described or copied an excerpt from the manuscript into a spreadsheet. The first author compiled and harmonized the qualitative data across reviewers to ensure information was recorded consistently within indicator categories and computed additional dichotomous indicators to capture granular information on specific training techniques (e.g., role play, feedback, modeling) and fidelity type (e.g., adherence, exposure, differentiation, participant responsiveness, quality). For example, if a reviewer's qualitative description of a study's training included the number of workshop days, length of sessions, and whether specific training techniques such as role play were used, these details were parsed into separate variables for (a) workshop, (b) number of training days, (c) length of session, and (d) use of role play to ensure data were disaggregated and comparable across reviewers. Decisions about the harmonization of qualitative data and computation of additional indicators were done in consultation with the second author. Supplemental Table S1 provides definitions and examples of the types of fidelity documented in this study. We computed indicators for when authors reported on the quality of intervention delivery but also distinguished between two MI-specific measures of MI quality: Competence and proficiency. Competence, in this context, pertained to skill level as measured in a contrived setting (e.g., post-training), whereas proficiency pertained to skill level as measured in an authentic setting during intervention delivery.

In total, we identified 149 school-based MI (SBMI) articles. Thus, as reported in Fig. 1, we excluded an additional 128 articles at stage 1 ($n = 108$) and stage 2 ($n = 20$) of the review process. These 128 articles were excluded for the following reasons: 48 articles were excluded because MI was not delivered in a school-based setting; 27 were excluded because they were conceptual or theoretical; and 20 were excluded because they focused on delivery of MI in a college or university setting. The remaining articles were excluded because they described study protocols ($n = 12$); were literature or book reviews ($n = 11$); or did not describe an intervention that included MI ($n = 10$).

SBMI Training and Fidelity Articles

For the current scoping review—given our narrowed focus on MI training and fidelity monitoring—we conducted a further iteration of reviews (i.e., review stage 3) to limit the 149 SBMI articles to include only papers that (a) reported the use of an experimental, quasi-experimental design, or single-subject design, or (b) described a training outcome study. This decision was informed by an initial review of the compiled indicator data, which suggested that qualitative studies or those with less rigorous designs either did not report or did not clearly describe their training and fidelity procedures. Based on this decision, we excluded an additional 69 articles—including all qualitative studies—to ensure our reported prevalence rates did not underestimate the reporting of training and fidelity. The 69 additional studies excluded at this stage were primarily exploratory (e.g., examining barriers and facilitators to using MI in school-based settings) and utilized case study, non-randomized, or single-group designs ($n = 64$); or reported on measurement ($n = 2$) or process ($n = 3$).

Article Clustering

In total, 80 articles—representing 62 unique studies—were included in this scoping review. As reported in Supplemental Table S2, the sample of 80 eligible articles included 15 studies with more than one publication. For these 15 studies, the first author (a) identified each studies earliest publication to include in this study and then (b) aggregated indicator data across the secondary articles to construct a clearer picture of training and fidelity monitoring at the study level (i.e., if the primary article did not report fidelity data but this information was reported in a subsequent study, the indicator for fidelity data was updated to reflect this information). In total, 24 secondary articles were reviewed for supplemental information (see Supplemental Table S2). Six articles met stage 2 criteria (i.e., school-based and MI-focused) and were part of the 149 SBMI articles but did not meet stage 3 criteria (i.e., appropriate study design). The remaining 18 articles met stage 3 criteria but were aggregated at the study level to eliminate study duplication and reduce the likelihood of

artificially deflated (or inflated) prevalence rates (e.g., percentage of studies reporting fidelity data). Following article clustering, the first author reviewed the 62 unique studies and extracted text from each of the 80 article that pertained to training and fidelity monitoring. This information, which is reported in Supplemental Tables S4 and S5, was compiled to serve as an additional cross-check of the data (e.g., to confirm indicator accuracy at the study level) and to provide readers with a compendium of study-level textual data on MI training and fidelity reported in each manuscript.

Analysis

We conducted descriptive analyses of the quantitative indicators compiled for the 62 studies to examine the prevalence of training components, training strategies, and intervention fidelity reported in school-based, peer-reviewed MI literature detailing implementation within a rigorous study design. We calculated prevalence rates across studies and by study design (e.g., experimental, quasi-experimental, single-subject, training). Given the small sample size overall and the limited number of QED, single-subject, and training studies, we did not conduct analyses to test for statistically significant differences between study designs. We also conducted exploratory analysis within a generalized linear modeling framework to examine whether publication date was associated with the collection and reporting of trainer credentials and fidelity data and whether the reporting of training strategies was associated with the reporting of fidelity data. Specifically, we examined the association between year of publication and whether researchers (a) reported use of a MINT-certified trainer, (b) reported collection of MI fidelity data, and (c) reported fidelity data in their manuscript. We limited exploration to these training and fidelity variables because they seemed most likely to be sensitive to changing reporting standards over time. Regarding training strategies, we examined whether reporting use of a training strategy was associated with also reporting the collection of fidelity data. For each, we report the odds ratio (OR) and 95% confidence interval (CI) for the association between the predictor (i.e., publication year or training strategy) and outcome.

Results

Study-level characteristics of the 62 studies included in this review are provided in Supplemental Table S3. The articles were published between 2005 and 2022. The majority (83.9%) were published since 2012. The studies were from eight countries. Fifty studies (80.6%) were from the USA, and an additional five studies (8.1%) were from European countries, including two from Switzerland (3.2%) and one each from Finland, Portugal, and Sweden. The remaining studies were conducted in Australia (6.5%), Iran (3.2%), and Hong Kong (1.6%). Thirty-nine studies (62.9%) reported a randomized controlled trial (RCT). Six studies (9.7%) used a quasi-experimental design, and five studies (8.1%) used a single-subject design. The remaining 12 studies (19.4%) were training outcome studies. Studies were conducted in preschool (8.1%), elementary (27.4%), and secondary settings (69.4%). Eight percent of studies reported implementation in more than one educational setting (e.g., elementary and secondary schools).

The 62 studies targeted a range of behaviors. Twenty-one percent of the studies targeted social–emotional, behavioral, or related difficulties; 19.4% of studies targeted substance use; 17.7% targeted nutrition and exercise; 14.5% focused on improving academic achievement; 11.3% focused on improving teacher effectiveness (e.g., classroom management); and 9.7% targeted parenting behavior. Other targeted behaviors included adoption and implementation issues (3.2%), sleeping difficulties (3.2%), oral health (3.2%), career counseling (1.6%), asthma (1.6%), puberty knowledge and practice (1.6%), and smoking in the home (1.6%). Five studies (8.1%) targeted more than one behavior.

Typically, MI was used to support students (66.1%) and less frequently parents (21%) or teachers (14.5%). A range of school-based implementers delivered MI within the studies. Just over one-fourth of the articles reported MI use by more than one implementer. Most frequently, a counselor (24.2%) or school-based coach or consultant (24.2%) used MI. A number of studies used high school, undergraduate, or graduate students (19.4%) to deliver MI. Some studies reported using school-based health or mental health educators (8.1%), other school staff members (8.1%), nurses (4.8%), or teachers (4.8%) to deliver MI. Two studies reported the manuscript author delivered MI for the study. Finally, one study reported use of dieticians and another reported use of physicians.

MI Training Approaches

Table 1 summarizes information on the percentage of studies reporting information on (a) trainer qualifications, (b) training strategies (e.g., workshops), (c) training techniques (e.g., role play), and (d) use of a training criterion to determine when implementers had received sufficient training. Notably, none of the single-subject studies provided any details about MI training and only two quasi-experimental study provided information on the training. Overall, more than two-thirds of the studies provided no information on the trainer's credentials (69.4%). Another 9.7% reported the trainer had received previous training in MI, and 21% reported use of a MINT-certified trainer to deliver the training. Publication year was not associated with whether researchers reported use of a MINT-certified trainer (OR

Table 1 Studies reporting training information by study design

	Total ($n=62$)	RCT ($n=39$)	Quasi-experimental ($n=6$)	Single subject ($n=5$)	Training study ($n=12$)
Trainer qualifications					
MINT-certified trainer	13 (21.0)	8 (20.5)	1 (16.7)	–	4 (33.3)
Previous training in MI	6 (9.7)	4 (10.3)	–	–	2 (16.7)
Not reported	43 (69.4)	27 (69.2)	5 (83.3)	5 (100.0)	6 (50.0)
Training strategies					
Workshop	37 (59.7)	24 (61.5)	2 (33.3)	–	11 (91.7)
Consultation (e.g., supervision)	20 (32.3)	13 (33.3)	1 (16.7)	–	6 (50.0)
Booster Training	8 (12.9)	5 (12.8)	–	–	3 (25.0)
Training techniques					
Role play	26 (41.9)	17 (43.6)	1 (16.7)	–	8 (66.7)
Feedback	15 (24.2)	7 (17.9)	–	–	8 (66.7)
Modeling	5 (8.1)	4 (10.3)	–	–	1 (8.3)
Training criterion reported	17 (27.4)	12 (30.8)	–	–	5 (41.7)

The information in this table captures the extent to which studies are reporting this information (e.g., the percentage of studies reporting use of a training strategy or trainer qualification). Studies may have used but not reported use of training strategies and techniques

[95%CI] = 1.03 [0.90, 1.19]). The reporting of trainer qualifications varied by study design. One-third of the training studies reported these details followed by RCTs (20.5%). With respect to training strategies, researchers used workshops (59.7%) and consultation (32.3%) most frequently. Nearly all training studies and nearly two-thirds of RCTs reported use of workshops. One-third of RCTs and half of the training studies reported use of consultation. Booster training sessions were reported more frequently in training studies and, overall, were reported in only eight (12.9%) of the studies. Role play (41.9%) and feedback (24.2%) were the most frequently reported training techniques. Finally, only 17 studies (27.4%) reported using a training criterion to determine whether attendees had reached an adequate level of competence following training. Supplemental Table S4 details information of MI training extracted from each of the 62 articles.

MI Fidelity Monitoring

Table 2 reports data on the collection and reporting of any fidelity data (i.e., not just MI-specific fidelity), MI fidelity, and MI fidelity type. Although most studies indicated that they collected or monitored at least one dimension of fidelity (71%), fewer authors reported fidelity data in their manuscript (56.5%). With respect to MI fidelity, just over half of the studies (53.3%) stated that they collected or monitored MI quality but only 43.5% reported some form of MI-specific fidelity data. Thus, even though MI was an active ingredient in all the studies, only 33 of the 62 studies collected or monitored MI-specific fidelity and only 27 studies reported MI-specific fidelity data in their paper. Publication year was not associated with whether researchers reported collecting MI fidelity data (OR [95%CI] = 1.02 [0.92, 1.15]) or reported MI fidelity data in their manuscript (OR [95%CI] = 1.04 [0.93, 1.16]). Studies that reported the use of at least one training strategy (i.e., workshop, consultation, or booster sessions) were 6.4 times more likely to collect or report fidelity data (95%CI = 2.01, 20.19). Specifically, 69.2% of the studies that reported use of a training strategy also reported fidelity data collection. In comparison, only 18% of studies reported fidelity data collection if they did not report use of a training strategy.

Data on the quality of MI delivery were most frequently reported (41.9%), followed by adherence (25.8%), and exposure (e.g., dosage) data (12.9%). Very few studies reported on participant responsiveness (4.8%) or differentiation (3.2%). Fidelity for roughly 13% of studies was based on self-report. Quality is arguably the most important dimension of MI fidelity given that MI is a complex, communication-based intervention; however, very few studies used "gold standard" measures to examine competence following training or proficiency of MI use in authentic settings. Only 9.7% of studies collected data on trainees' initial competence following MI training and only 17.7% of studies used the MISC or MITI to examine how proficiently the interventionist used MI.

The quality of MI fidelity reporting was highly variable across articles. Some authors provided detailed information on (a) the fidelity measures used, (b) the study's data collection procedures, (c) the methods used to assess IRR, and (d) the quality of MI relational or technical skill use. In contrast, other studies referenced collection of fidelity data and stated that interventionists were trained to fidelity but did

Table 2 Studies reporting MI fidelity information by study design

	Total (n = 62) *n* (%)	RCT (*n* = 39) *n* (%)	Quasi-experimental (*n* = 6) *n* (%)	Single subject (*n* = 5) *n* (%)	Training study (*n* = 12) *n* (%)
Any fidelity data					
Collected or monitored[†]	44 (71.0)	29 (74.4)	2 (33.3)	3 (60.0)	10 (83.3)
Reported in manuscript	35 (56.5)	20 (51.3)	2 (33.3)	3 (60.0)	10 (83.3)
MI fidelity data[††]					
Collected or monitored	33 (53.2)	22 (56.4)	2 (33.3)	–	9 (75.0)
Reported in manuscript	27 (43.5)	16 (41.0)	2 (33.3)	–	9 (75.0)
MI fidelity data type					
Adherence	16 (25.8)	14 (35.9)	1 (16.7)	–	1 (8.3)
Quality	26 (41.9)	15 (38.5)	2 (33.3)	–	9 (75.0)
Exposure (e.g., dosage)	8 (12.9)	7 (17.9)	1 (16.7)	–	–
Differentiation	2 (3.2)	2 (5.1)	–	–	–
Participant responsiveness	3 (4.8)	3 (7.7)	–	–	–
Self-reported MI fidelity	8 (12.9)	6 (15.4)	–	–	2 (16.7)
MI quality					
Competence	6 (9.7)	2 (5.1)	–	–	4 (33.3)
Proficiency	11 (17.7)	6 (15.4)	2 (33.3)	–	3 (25.0)

[†]Includes any mention of the collection or monitoring of fidelity within the manuscript regardless of whether procedures were described or data were reported. Quality = Authors reported monitoring or collecting fidelity data on how well interventionists delivered the program using self-reported measures, observation measures, or supervisor feedback. [††]Authors reported collection of at least one type of MI-specific fidelity data

not provide data to support these statements. Supplemental Table S5 contains extracts from each manuscript on the procedures used to collect fidelity data and the results reported.

Discussion

The purpose of this scoping review was to (a) document the prevalence and type of MI applications in school settings, (b) document current training strategies and techniques used to teach school-based personnel to use MI, and (c) examine the extent to which fidelity data are being collected, coded, and reported within school-based MI research. This review contributes to the literature base by providing the most comprehensive description to date of the prevalence and type of school-based MI outcome studies. In doing so, this review adds to and expands upon previous reviews of MI in schools to date (Snape & Atkinson, 2016; Woods et al., 2014). The focus on training and fidelity is particularly salient since differential effect sizes across 30 years of MI research and across multiple service settings indicate that variability in the quality of MI delivered is associated with effectiveness (Bahafzallah et al., 2020; Lundahl & Burke, 2009; Miller & Rollnick, 2014; Miller & Rollnick, 2023) as well as the well-documented challenges transferring MI knowledge and skills from contrived settings (i.e., within a training environment) to authentic practice settings (Dunn et al., 2016; Hallgren et al., 2018; Imel et al., 2011; Manuel et al., 2022; Miller & Rollnick, 2014, 2023). Furthermore, this work echoes the concerns raised in other research syntheses that have highlighted the limited availability of quality fidelity data (Gresham, 2014; Sanetti et al., 2020).

Regarding the prevalence and type of MI applications in school settings, the results document the characteristics of professionals who are implementing MI-based interventions in school settings, the recipients of these interventions, and the targets of behavior change.

It is noteworthy that 149 peer-reviewed articles describing school-based applications of MI since 1990 were identified. Eighty articles, representing 62 unique studies, met our inclusion for this review. Fifty-two of the 62 articles (83.9%) were published since 2012, providing strong evidence that publications related to the use of MI in schools are increasing rapidly. Additionally, our results suggest MI is being used in educational settings in a number of countries worldwide. The articles in this review spanned eight countries, although most of the studies were conducted in the USA. Further, this review suggests MI applications are most common in secondary schools, followed by elementary and preschool settings, respectively. Regarding how and with whom MI applications are being used in schools, it is most frequently used directly with students, followed by caregivers and then teachers. These applications were used most often to improve students' emotional and behavioral functioning, followed by applications to reduce substance use, improve nutrition and exercise, enhance academic achievement, improve teacher effectiveness (e.g., classroom management), and increase parenting skills. In these applications, school

counselors, school-based coaches or consultants, and graduate students are by far the most common implementers.

Regarding MI training, less than one-third of the articles in this review (30.6%) contained information on the trainer's qualifications. Thus, for the majority of studies, it is difficult to assess the extent to which trainers were qualified since the study authors did not include information on the trainer's past experience with, and training in, MI. Encouragingly, 13 of the 19 studies that did identify the trainer's credentials indicated the trainer was MINT-certified. For studies that described MI training strategies, the majority reported using workshops (59.7%). In contrast, training strategies such as booster sessions (12.9%) or consultation (32.3%) were used infrequently, despite being considered essential to successful MI uptake and skill sustainment (Miller, 2023; Miller & Rollnick, 2023; Mitcheson, et al., 2009; Walters et al., 2005). Role play was the most frequently reported training technique used (41.9%). Far fewer studies reported use of other training strategies such as feedback (24.2%) or modeling (8.1%). Additionally, few studies (27.4%) used a training criterion to determine whether attendees had reached minimum levels of competency or proficiency following training. Thus, despite widespread use of interventions that include MI as an active ingredient, only a few studies in our review described trainer credentials and training procedures that can reasonably be assumed to produce interventionists who use MI skillfully in an authentic (e.g., real-world) setting.

The results related to MI fidelity provide empirical data to support concerns raised about the quality of MI in school-based applications and calls for researchers to collect measures of MI quality and report these findings within school-based research (Frey et al., 2017, 2021, 2023; Herman et al., 2021; Lee et al., 2014; Reinke et al., in press). Although the majority of authors reported the collection of some form of fidelity data (71%), far fewer reported collection of MI fidelity data (53.2%) and even fewer reported MI fidelity data in their manuscript (43.5%). In addition, many studies reported MI fidelity data using researcher-created measures, despite the availability of measures such as the MITI, which are used widely within MI research to examine MI skill development (Hurlocker et al., 2020). Only 11 of 62 studies (17.7%) used the gold standard for assessing MI quality (e.g., coding audio recordings using the MISC or MITI). In contrast, a comparable number of studies ($n=8$) used self-reported measures of fidelity despite past research suggesting that interventionists' self-report does not correlate well with observer reports of interventionist proficiency (Beckman et al., 2022; Miller & Moyers, 2017). Calls for more rigorous attention to measuring MI skill as an indicator of fidelity quality are important. The broad absence of MI fidelity data among these studies also calls into question how effective MI is within educational setting and the extent to which effects can be attributed to MI or other intervention components. The perception of MI's effectiveness in school-based settings is fairly remarkable given that so few studies can claim with certainty that MI was implemented to a reasonable degree of fidelity or attribute the results to MI alone. Nevertheless, if MI is conceptualized as an independent variable, study results are difficult to interpret and studies are difficult to replicate and translate into everyday practice in schools.

Recommendations for SBMI Researchers

Our recommendations for SBMI researchers relate to the complete and accurate reporting of how MI is used in the context of school-based interventions, trainer qualifications, training methods and models, and the collection of data to document MI skill as a component of fidelity.

Regarding how MI is being used, we recommend researchers clearly distinguish between a few basic levels of MI practice. For example, if MI is described as a core component of an intervention, make clear (a) how and when the MI Spirit, tasks, and/or skills are incorporated into it, (b) the targets of change the directional use of MI skills are designed to impact, and (c) the relationship between MI and other intervention components or EBPs. Further, if the intervention claims to be anything more than informed by MI, care should be taken when referring to it as such. Miller and Rollnick (2023) note that some confusion still exists in the field between MI and the transtheoretical model of change (and the model's stages of change) as well as between MI and motivational enhancement therapy, which combines the clinical style of MI with personal feedback. Specifically, they state "although assessment feedback can be useful in enhancing motivation, particularly with those lower in readiness to change, it is not a necessary or sufficient component of MI" (p. 29).

Researchers that report on applications of MI in school settings should transparently describe training procedures, including the credentials of the trainer, training strategies used (e.g., workshop, consultation, etc.), training techniques used (e.g., role play, feedback), and, ideally, how training techniques are used within training strategies (e.g., How and when is role play utilized within workshops?). Information on training content, frequency, and duration are also important for comparability across articles. If detailed information on a study's training procedures are not included, justification for excluding it should be provided. We also recommend more school-based personnel obtain MINT certification to ensure that school-based MI training and use conforms to standards within the field of MI.

Going forward, school-based researchers may benefit from leveraging empirically based and publicly available MI training models which have been used to train school-based personnel in MI. For example, the Motivational Interviewing

Training and Assessment System (MITAS) is a comprehensive professional development system that closely matches training procedures used to train skilled practitioners in the field of substance and alcohol use (Frey et al., 2017). The MITAS is publicly available (https://moprevention.org/rumis/), has initial evidence to support its use as an effective method for training school-based personnel (Small et al., 2021), and may serve as a useful resource for skilled MI practitioners who need to train other school-based personnel. A number of studies included in this review used the MITAS (Frey et al., 2015, 2022; Iachini et al., 2018; O'Brennan et al., 2020).

In situations where MI is described as a core component of an intervention, even if it is used in combination with other EBPs, MI skill must be assessed using a measure with evidence of reliability and validity and reported as an indicator of fidelity (e.g., quality). Researcher-developed assessments for which procedures have not been described and psychometric data are not available are unlikely to provide accurate information on MI skill, may generate misleading information, and limit comparability across studies. Further, self-reported measures of MI skills are encouraged as a supplement to the use of more rigorous, observation-based approaches but should not be used as a sole indicator of fidelity.

A number of resources are available to researchers to support informed decision-making with respect to (a) the identification and use of MI fidelity measures and (b) standards for collecting and reporting MI fidelity data. In their book on MI use in schools, Herman et al., (2021; Chapter 10) provide descriptions of a range of tools from simple and brief assessments to intensive coding systems. Hurlocker et al. (2020) systematic review provides further details on many of these assessment tools, including information on psychometric properties and empirical evidence. Furthermore, Jelsma et al. (2015) provide recommendations to researchers for how to measure MI fidelity within RCTs. For example, they provide guidance on (a) the collection of audio-recorded sessions, (b) sample selection (e.g., which recording and/or which part of recordings to sample), (c) identifying and engaging coding labs, (d) reporting results, and (e) calculating and reporting inter-rater reliability. The fidelity results reported will vary depending on a study's design and research questions; however, at a minimum, we recommend reporting mean summary scores and the percentage of interventionists meeting skill cutoffs.

Recommendations for Future Research

Given the limitations described with the documentation of MI training and quality in school-based research, we recommend the field prioritize (a) process research to inform how and for whom MI works in school-based settings and (b) intervention development and evaluation approaches such as the multi-phase optimization strategy (MOST) that enable researchers to identify the components driving intervention effects and optimize their use with respect to sequencing and dose (Collins, 2018). Nearly 63% of the studies in this review were RCTs, yet the absence of MI fidelity data limits understanding of how well MI is used in school-based settings and the extent to which MI is actually an active ingredient in multi-component intervention that purport to use it. We also recommend several lines of research be prioritized given the popularity of the MI in schools. First, there is a need to better understand the efficacy of various training models for school-based practitioners. Second, while we do not recommend gold standard tools such as the MISC and MITI be replaced, we acknowledge these tools are resource intensive and cannot be feasibly used outside of research contexts. In turn, the field would benefit from the development of MI measurement tools that are contextualized for school-based practitioners, are reasonably resource intensive, and can be used across research and authentic settings. This is particularly important given recent efforts to promote the use of pragmatic fidelity tools and, more specifically, recommendations that the use of self-reported fidelity can bridge the research-to-practice gap (Hogue, 2022). Participant responsiveness holds the potential to serve as a valuable indicator of fidelity given its focus on a participant's response to MI in the form of engagement; however, application in school-based settings is limited. It was infrequently reported (4.8% of studies) and two of three studies reporting participant responsiveness relied on interventionist report rather than independent observation. Future research on measures and methods for the accurate collection of participant responsiveness data would benefit the field given that valid and reliable measures of participant responsiveness could serve as an alternative pragmatic measure of fidelity in school-based settings. It also is important to understand the relationship between MI quality and change talk and the extent to which change talk mediates change in more distal outcomes in the context of school-based MI applications. Finally, as the SBMI literature base grows, a meta-analytic study examining the relationship between training, fidelity, and outcomes would build upon and further inform the work provided herein.

Limitations

With regard to describing the landscape of MI applications in schools, this review captured use in school-based research rather than real-world setting and was limited to peer-reviewed literature. Thus, it is possible our findings may not be representative of actual MI use in schools and that our inclusion criteria may have resulted in the omission of studies that remained unpublished due to a lack of findings (i.e.,

publication bias) but may have used a MI training model or collected MI fidelity as part of their research protocol. The screening and review of abstracts (review stage 1) was not conducted by multiple members of the research team. This decision may have resulted in the omission of studies and precluded examination of IRR at that stage of the review process. The findings in this review were further limited by the exclusion of 69 primarily exploratory studies that utilized case study, non-randomized, or single-group designs; or reported on measurement or process only. For example, in the UK extensive work has been conducted, and a number of papers published, on the use of MI in school-based settings, yet much of the work utilized case study designs and therefore was not included in this review. Finally, this review was limited to articles published in English. Although we identified articles demonstrating MI use in school-based settings across eight countries, MI is being used more broadly in school-based settings internationally and peer-reviewed articles in other languages may be available that were excluded from this review.

Conclusion

The current review contributes to the literature by providing the first comprehensive review documenting school-based applications of MI, with an emphasis on outcome studies, the implementation strategies used to facilitate MI skill development and intervention fidelity. This review also contributes to the literature base because it provides a description of the characteristics of the professionals who are implementing MI-based interventions in school settings, the recipients of these interventions, and the targets of behavior change. The results suggest MI applications in schools are used most frequently with students, followed by caregivers and then teachers. MI applications are also used most often to improve students' emotional and behavioral functioning, followed by applications to reduce substance use, improve nutrition and exercise, enhance academic achievement, improve teacher effectiveness (e.g., classroom management), and increase parenting skills. The results related to MI fidelity provide empirical data to support concerns raised about the quality of MI in school-based applications and calls for researchers to collect measures of MI quality and report these findings within school-based research. Findings indicate the majority of authors reported the collection of some form of fidelity data, yet far fewer reported collection of MI fidelity data and even fewer yet reported MI fidelity data in their manuscript. Future research should prioritize the complete and accurate reporting of how MI is used in the context of school-based interventions, trainer qualifications, training methods and models, and the collection of data to document MI skill as a component of fidelity. Information on training content, frequency, and duration are also important for comparability across articles.

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