



MOTIVATIONAL INTERVIEWING AND MOTIVATIONAL ENHANCEMENT THERAPY FOR THE TREATMENT OF STIMULANT USE DISORDERS

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OHIO SUBSTANCE USE DISORDER
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Executive Summary

Background

This report provides a thorough explanation of different types of motivational interventions, defining the history, implementation, and efficacy of this approach to treatment. Motivational Interviewing (MI) was developed by William R. Miller and Stephen Rollnick in 1983 to address alcoholism and behavioral issues stemming from problem drinking. It has since been expanded to incorporate treatment for smoking cessation, chronic disease management, criminal justice populations, and parenting education. It is considered more of a practice approach rather than a discrete clinical intervention, with an emphasis on maintaining core elements that foster rapport with the patient. The most recent update to the Miller and Rollnick MI model, *Motivational Interviewing: Helping people change and grow (4th Ed.)*, was recently published in August of 2023, and includes some conceptual changes as well as changes in terminology. Motivational Enhancement Therapy (MET) is a four-session manualized version of the core components of MI that was developed in 1993 as part of a large-scale alcohol use disorder study known as Project MATCH. In order to compare a motivational approach to other treatment modalities for this study, the core tenets of MI were clearly defined, documented, and manualized, with a focus on identifying and resolving ambivalence regarding drug and alcohol use. MET was then studied and compared with 12-step facilitation and cognitive behavioral therapy (CBT) to determine if matching patients to specific treatment modalities alters outcomes.

Methods

To understand and examine the effectiveness of MI and MET when applied to individuals with stimulant use disorder, a systematic literature review was completed. Twenty-two articles were identified for a complete review. Fourteen studies were experimental, using randomization

to separate participants into intervention groups and comparison groups. Seven were pilot studies, including four that also included randomization, as well as single group or feasibility focused implementation studies. One study was quasi-experimental, dividing participants based on which psychiatric hospital they were in. Fourteen of the studies were conducted in the U.S., one in South Africa, two in the United Kingdom (U.K.), two in Iran, one in Thailand, one in Brazil, and one in Taiwan. While most of the studies had adult participants, the Taiwanese study examined a sample of adolescents and one U.K. study enrolled participants aged 16-22 years old.

There were a broad range of outcomes investigated by the studies. For example, drug use, abstinence or relapse were examined by seventeen of the studies, while addiction severity was examined in 10 studies. Due to the nature of MI and its core components, several studies focused on change readiness, treatment adherence, and participant feelings about treatment or their counselor specifically. Additional outcomes explored overall functioning in daily life, risky behaviors, self-efficacy, depression or anxiety, psychiatric symptoms, cognitive functioning or decision-making skills, quality of life, admission to detoxification centers, attending 12-step meetings, cravings to use, homelessness, and adherence to psychiatric or human immunodeficiency virus (HIV) medications. Twenty of the studies reviewed also reported data on retention. Fidelity measures were captured for eleven of the twenty-two studies.

Findings

The overall findings regarding effectiveness of MI or MET for reducing stimulant use are mixed. When examining the studies comparing some form of MI or MET to a comparison group, seven of the 17 studies that looked at drug use as an outcome indicated a difference in the use of methamphetamines or crack or cocaine for some portion of the participants. Of the three pilot studies with no comparison group, two examined methamphetamine or crack or cocaine use as

an outcome and indicated a reduction in use after implementation of MI or MET. According to some studies, MI or MET demonstrated effectiveness in reducing use for individuals who used drugs more heavily at baseline or reported lower levels of motivation to change their use at baseline. One study found reductions in alcohol use only for women with co-occurring stimulant use disorder but not men with both alcohol and stimulant use disorder. Another study found a difference in heroin use, but not cocaine use for polysubstance users receiving MI.

Of the 13 studies that examined change readiness, treatment adherence, and/or participant feelings about treatment, nine indicated significant differences in treatment participation, change readiness, and treatment attendance and adherence. One study found a significant difference between those receiving intensive MI and a comparison group in the perceptions of the therapeutic alliance with a treatment provider for female participants only. A pilot study assessing an MI intervention with EEG-based psychophysiological feedback showed preliminary findings that highlighted an increase in participants' recognition of the negative effects of cocaine use. Only four studies did not detect significant changes in any of these focal areas of MI and MET.

Although most of the comparison studies did not show differences between groups regarding stimulant use, there was evidence that interaction with a provider implementing any minimal intervention led to a reduction in use for all participants. Additionally, there were few significant differences found in other outcomes examined, such as cognitive functioning, quality of life, depression, anxiety, psychiatric symptoms and medication adherence. This finding suggests that any treatment is better than no treatment for individuals using stimulants.

Conclusion

After reviewing the available evidence published in peer-reviewed literature to date, MI and MET show mixed evidence of treatment effectiveness depending on the type of outcome studied and the type of implementation or combined treatment studied. Fidelity was measured in eleven of the twenty-two studies. Eight studies were completed outside of the United States, which limits generalizability to the U.S. population due to significant cultural differences and attitudes about substance use and abuse. In addition, two of the studies included adolescents as participants, whose substance use profiles are often distinctively different than those of adults.

Stimulant Use Disorder Trends in the U.S. and Ohio

Substance misuse poses a significant challenge in the United States, particularly with increases in overdose deaths from stimulant use (Ahmad et al., 2023). The term “stimulants” refers to a class of drugs that includes “prescription drugs such as amphetamines, methylphenidate, diet aids, and other illicitly used drugs such as methamphetamine, cocaine, methcathinone, and other synthetic cathinones that are commonly sold under the guise of ‘bath salts’ that can come in multiple forms, such as ‘pills, powders, rocks, and injectable liquids’” (U.S. Drug Enforcement Administration [DEA], 2020). While there are important therapeutic and medical uses for stimulants under the guidance and supervision of medical and behavioral health professionals, the misuse of these substances can lead to serious individual and public health consequences (U.S. DEA, 2020). The Diagnostic and Statistical Manual of Mental Disorders (5th ed.; DSM–5TR) defines stimulant use disorder as “a pattern of amphetamine-type substance, cocaine, or other stimulant use leading to clinically significant impairment or distress” (American Psychiatric Association [APA], 2022).

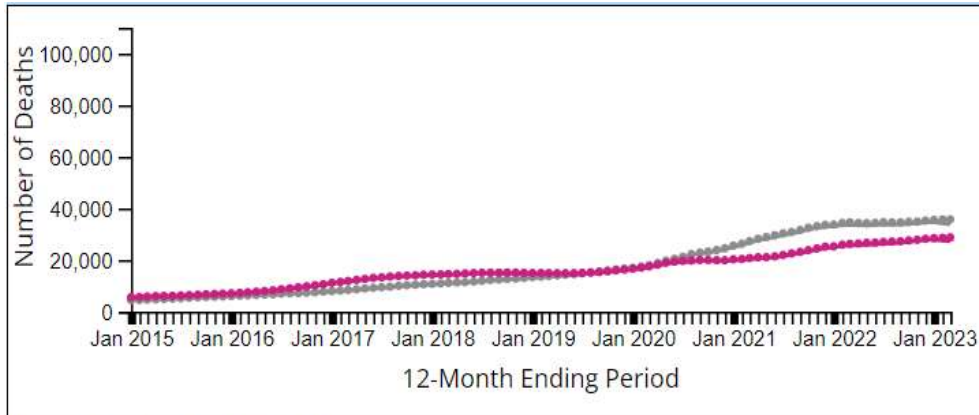
The Centers for Disease Control and Prevention’s National Vital Statistics System provides reported and provisional drug overdose death estimates every month from January 2015 through the present (Ahmad et al., 2023). Estimates represent the count of deaths that occurred over the last 12 months since the month of the estimate. Data are available at the national and state levels for several drug classes. Stimulant use drug classes available in these data include cocaine and psychostimulants with abuse potential, which includes methamphetamines. Figures 1 and 2 show trends in drug overdose deaths connected to stimulant use in the US and Ohio between 2015 and 2023 where data are available. The reported number of deaths from cocaine and psychostimulants with abuse potential has increased dramatically between January 2015 and

March 2023 in the U.S. Cocaine-related deaths rose from 5,496 to 28,783, a five-fold increase, while deaths attributed to psychostimulants with abuse potential surged from 4,402 to 35,462, representing an eight-fold increase. Ohio has also witnessed a significant increase in overdose deaths due to these substances. From April 2015 to March 2023, cocaine overdose deaths in Ohio increased from 581 to 1,763, a three-fold increase, and overdose deaths related to psychostimulants with abuse potential rose from 77 to 1,401, representing an 18-fold increase (Ahmad et al., 2023).

According to the 2022 National Survey on Drug Use and Health (NSDUH), 1.8 million people over the age of 12 had methamphetamine use disorder, 1.4 million people had cocaine use disorder, and 1.8 million people had prescription stimulant use disorder in the U.S. (Substance Abuse and Mental Health Services Administration [SAMHSA], 2023). Reports of the percentage of the population using cocaine and methamphetamines show variation from year to year. The latest data from the NSDUH show that the prevalence of methamphetamine use in Ohio had a sharper increase (83%) than the United States (9%) in 2017-2018 and 2018-2019. The prevalence of cocaine use in Ohio showed an increase of 8% for the same period, whereas there was a 5% decrease in the United States during that time frame.

Figure 1

Provisional Number of Drug Overdose Deaths by Drug or Drug Class: United States



Legend for Drug or Drug Class

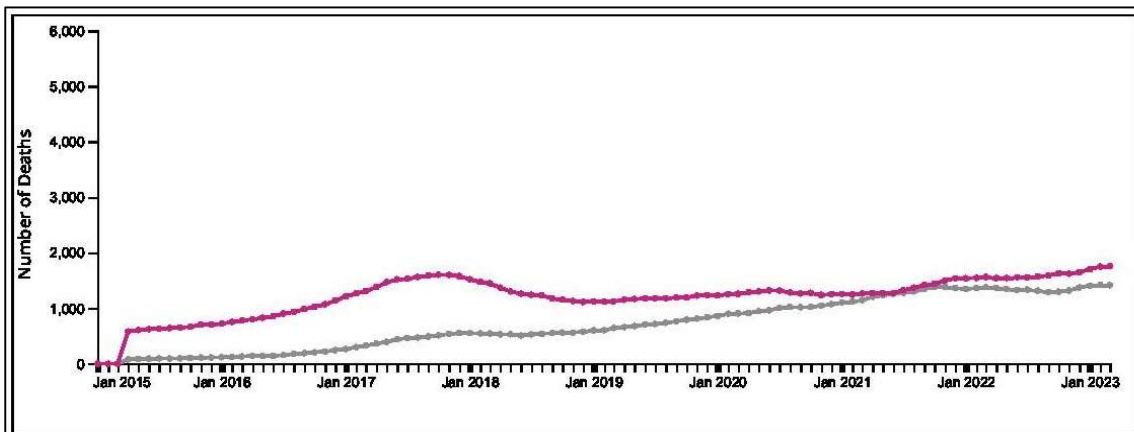
- Cocaine (T40.5)
- Psychostimulants with abuse potential (T43.6)

- Reported Value
- Predicted Value

Source: Ahmad, F. B., Cisewski, J. A., Rossen, L. M., and Sutton, P. (2023). *Provisional drug overdose death counts*. National Center for Health Statistics.

Figure 2

Provisional Number of Drug Overdose Deaths by Drug or Drug Class: Ohio



Legend for Drug or Drug Class

- Cocaine (T40.5)
- Psychostimulants with abuse potential (T43.6)

- Reported Value
- Predicted Value

Source: Ahmad, F. B., Cisewski, J. A., Rossen, L. M., and Sutton, P. (2023). *Provisional drug overdose death counts*. National Center for Health Statistics.

This report describes the use of Motivational Interviewing (MI) and Motivational Enhancement Therapy (MET) for addressing stimulant use disorder and preventing overdose deaths. The following sections define and describe MI and MET and summarize the results of a systematic literature review that was conducted to understand the nature of the research on applying MI and MET to stimulant use disorder specifically. The literature review focused on answering the following questions:

1. What are the clinical outcomes associated with the use of MI to address stimulant use disorder?
2. What are the clinical outcomes associated with the use of MET to address stimulant use disorder?
3. What is the impact of using MI with individuals with stimulant use disorder?
4. What is the impact of using MET with individuals with stimulant use disorder?

Results from this review are organized and presented by outcome type: substance use and addiction severity outcomes, change readiness outcomes, treatment attendance and adherence outcomes, feelings about treatment outcomes, functioning outcomes, psychological and psychiatric outcomes, and other outcomes. For each outcome type, results are presented for MI studies initially, followed by MET studies.

Motivational Interviewing

MI is a therapeutic approach that is fundamentally a specific type of conversation about change (Motivational Interviewing Network of Trainers [MINT], 2023); it is a technique framed in helping people who are ambivalent or resistant to making changes in their lives. MI is collaborative, centered around the individual, and supportive of individual autonomy around

behavior and choices. It is grounded in respect for the individual and belief in their ability to make positive and healthy decisions in their lives. MI works by helping to alleviate the pressure that people feel when they think they need to change but feel stuck and incapable of moving forward. MI is a strengths-based approach, empowering individuals to work through their fears about change. It employs evocative methods to draw out an individual's own motivation and commitment to change. It uses the relationship between the provider and the individual as a tool for personal growth, in which both the provider and the individual enter the relationship on equal footing. Because the individual is the expert on their own experience, they are encouraged to look inward and identify their own understanding and skills that they can apply towards the changes they want to make, rather than a didactic interaction in which the provider is educating the individual. MI strengthens individuals' motivation for and commitment to specific goals by exploring their reasons for change within an atmosphere of acceptance and compassion (MINT, 2023). It is most commonly used in combination with other treatment methods such as cognitive behavioral strategies. MI is built on a set of core skills, fundamental principles, and main techniques.

Core Skills of MI

MI relies on a set of core skills: open-ended questioning, affirming, reflecting, and summarizing. With open-ended questioning, the provider needs to create a dialogue with the individual, asking questions that encourage discussion about what is going on in the individual's life and thinking process. Affirming involves offering positive feedback and reinforcing a sense of believing in oneself and one's ability to do the things needed to move forward in their lives. The provider needs to be a strong reflective listener, repeating the individual's thoughts and feelings back to them to demonstrate understanding, attunement, and empathy. When

summarizing, the provider needs to be attuned to what the individual is reporting in order to effectively capture and restate the individual's ideas around why they are considering change.

Principles of MI

In addition to a set of core skills, the fundamental principles of MI include expressing empathy, developing discrepancies, rolling with resistance, and supporting self-efficacy.

Expressing empathy involves building empathy with the individual through reflective listening.

To develop discrepancies, the provider points out the gaps between the individuals' stated goals and values and their current behaviors. Rolling with resistance requires the provider to avoid argumentative and confrontational language. The provider adjusts to the individuals' resistance rather than combatting it. To support self-efficacy, the provider maintains a positive and optimistic mindset, supporting the individual's self-efficacy and autonomy.

Main Techniques of MI

MI techniques include engaging, focusing, evoking, and planning. The provider engages the individual in establishing a trusting relationship by using reflective listening to understand the individual's concerns and perspective. While engaging, the provider focuses on developing rapport, building a relationship through helping the individual let their guard down, and pushing past ambivalence. When working on focusing, the provider helps focus the work and establishes clear initiatives and goals with the individual. The individual discusses the behavior or issue they want to address while identifying potential barriers to change. The evoking technique helps reveal the individual's motivation and reasons for wanting to change. The provider uses active listening to elicit the individual's own ideas and points out the individual's use of change-oriented behavior. Sessions focus on drawing out the individual's internal motivation and reinforcing ways to build upon it. Finally, when planning, the provider assists the individual with

developing concrete plans to move towards change, building on the established engagement, clearly defined goals and identified motivation. The provider supports the individual as they develop the skills to remove or overcome barriers and establish tangible steps towards change.

History of MI

While working as faculty in the Department of Psychology at the University of New Mexico in 1976, William Miller conducted clinical trials of behavior therapies for alcohol use disorders, using behavior therapy and empathic listening. He found that two-thirds of the variance in client's drinking outcomes were attributed to the therapist's empathy while delivering the behavioral therapy (Miller, 2023). In 1982, Miller went to Norway on sabbatical and provided role-plays and demonstrations of his developing therapeutic techniques. He began to identify that using Carl Rogers' client-centered approach within his own style of therapeutic practice was giving birth to a specific new method for working with clients. In 1983, Miller wrote a paper describing this approach, which he called Motivational Interviewing. Steve Rollnick, a colleague and soon to become collaborator with Miller, was one of the initial reviewers of this groundbreaking manuscript. Miller then began to focus on turning this therapeutic approach into a treatment method.

While on a sabbatical leave, Miller began to work with Steve Rollnick, who was developing a PhD thesis on brief MI with heavy drinkers in a hospital setting. They collaborated for a year and developed the first edition of the MI text on preparing people to change addictive behavior (Miller & Rollnick, 1991). Rollnick contributed a fresh perspective, adding the concept of resolving ambivalence. MI then incorporated the newly emerging Transtheoretical Model of change (TTM) developed by James Prochaska and Carlo Di Clemente (1982). The stages of

change, from pre-contemplation to action and maintenance, became a core component of identifying where an individual was said to be on this continuum.

Project MATCH, which was completed in 1993, was the largest randomized clinical trial ever conducted with psychotherapies for alcohol use disorders (Miller, 2023). It was designed to compare three different treatment methods and match specific individuals with specific types of therapy. The treatments studied were cognitive behavioral therapy (CBT), 12-step facilitation therapy and Motivational Enhancement Therapy (MET). MET was designed as a four-session manualized format incorporating the key components of MI into a specific treatment modality. There were no significant differences in treatment efficacy between the three treatment types. However, the project revealed that MET was more effective with angrier clients and with females with lower initial motivation. In addition, this project helped highlight MI as a valid treatment methodology for alcohol use disorders. MET and MI differ in that MI focuses more on assessment, using the information provided by the individual to provide personalized feedback and move towards change planning. MI is fundamentally a client-led approach whereas MET is a structured, manualized intervention. The application of MET can be challenging because if the client is not ready for the stage of treatment manualized for a specific session, fidelity to MI would not allow the provider to move forward with those manualized strategies. MET has been researched as a stand-alone treatment modality as well as in conjunction with other methods. Motivational Enhancement Therapy is often used interchangeably with Motivational Interviewing, as it takes the core tenets of MI and incorporates them into a manualized treatment process.

Over time, Miller and Rollnick have changed and revised various aspects of MI. The initial training workshops focused primarily on treatment techniques, but both developers felt the implementation was missing key components. The second edition of the *Motivational Interviewing* text, published in 2002, emphasized the spirit of MI as collaboration, evocation and autonomy, while also emphasizing these components of the therapeutic relationship rather than the specific techniques used in MI. These first two editions focused on preparing people for change. In 2013, the *Motivational Interviewing* third edition text included a chapter emphasizing acceptance and compassion as crucial pieces of the therapeutic approach. Based on the core components noted in these editions, Miller and Rollnick recognized that MI could be a general way of working with clients, even beyond moving through the stages of change. The fourth edition, published in August 2023, defined MI as a ‘particular way of talking with people about change and growth to strengthen their own motivation and commitment’ (Miller & Rollnick, 2023). According to Rollnick, this edition of MI focuses more on individuals’ internal motivation and less on external behavior changes. The evocation component was broadened to ‘empowerment’ to emphasize the importance of the individual’s strengths, motivations, resourcefulness, and autonomy (Miller & Rollnick, 2023). Ongoing research combined with practitioner experiences helped move MI along its trajectory towards continuous improvement. This current version of MI is focused on growth, moving beyond individual behavior change and includes discussion and opportunity for organizational, community, and system changes. In addition, the fourth edition aligns MI terminology to reflect everyday language more closely.

Although the stages of change are not a core component of MI, the development of MI and its implementation incorporate the stages as delineated in Prochaska and DiClemente’s *Transtheoretical Model* (1982). A total of five stages are included within the *Transtheoretical*

Model. In the *pre-contemplation* stage, the individual is not yet considering making a change. Upon entering the *contemplation* stage, the individual is beginning to consider making a change but is not yet ready to commit to change. In the *preparation* stage, the individual is preparing for action to change in the foreseeable future. Individuals are in the *action* stage when they are actively implementing a plan for change, and they enter the *maintenance* stage when they consistently and routinely incorporate the changes into their daily life. Table 1 outlines the primary goals and responsibilities for each of the main stages of change for MI-oriented providers.

Table 1. Stages of Change and MI Provider Goals

Stage	Provider goals and responsibilities
Pre-contemplation	Build rapport Gather history and engage in active listening Listen for discrepancies between client's reported goals and lifestyle choices Provide education Instill hope, providing information about possibilities through lifestyle changes
Contemplation	Explore both positive and negative aspects of the lifestyle choice being considered Use reflective listening to help the individual begin to identify the disconnect between stated goals and current behaviors Apply summarizing and reflecting back techniques to help the individual move towards change
Preparation	Assess the individual's commitment towards change Offer a menu of choices and strategies Identify supports and barriers to change
Action	Identify unexpected hurdles and help individual define coping strategies Assist individual in identifying sources of support Help individual track their progress
Maintenance	Continue to track gains associated with healthy change Identify potential relapse triggers and continue to support skill-building to prevent relapse Support individual in actively maintaining changes

Literature Review Process

Systematic literature reviews are carried out in order to identify and understand what has been published on a particular topic. The stages of a literature review include creating a search strategy including terms and inclusion criteria, identifying relevant sources, summarizing and organizing the findings around relevant themes, and synthesizing the information identified. The

purpose of this systematic literature review was to gain insight about the effectiveness of MI and MET when applied to individuals with stimulant use disorder.

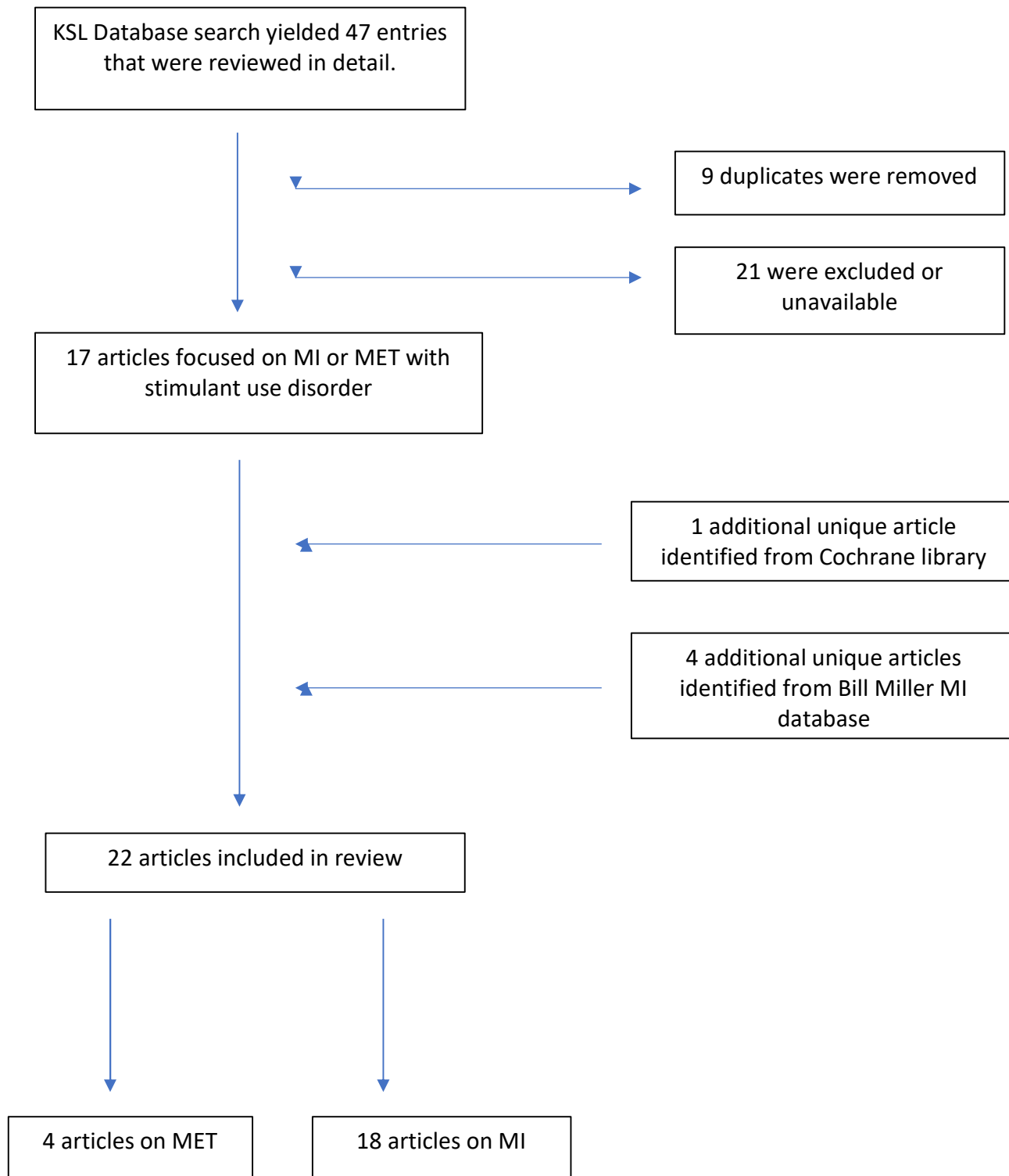
Methods

The first phase of the literature review included identifying and utilizing specific search terms that represent the topic of interest and pinpointing key medical, social, and behavioral sciences research databases for use in the literature search. PsycINFO, MEDLINE, SocINDEX, and Psychology and Behavioral Sciences Collection databases were searched using the following terms: “Motivation* Interview* OR MI OR Motivational* Enhancement Therapy AND cocaine OR methamphetamine OR amphetamine OR stimulant*.” The search was completed in July 2023 and captured the existing literature available in the above listed databases. Forty-seven articles met inclusion criteria and an initial screening for relevance. After eliminating duplicates, 38 of these articles were more closely inspected for relevance. Eighteen articles were identified as candidates for in depth review and analysis and of these, one was a case study published in Australia and did not have full text available. This phase of the search resulted in a total of 17 articles selected for in depth review and analysis. MET was studied in four of the articles and MI was studied in the remaining thirteen. (Figure 3).

The second phase of the literature search was conducted using the Cochrane Library database of clinical trials, systematic reviews, and meta-analyses (Cochrane, 2023). Using the previously listed search terms in this database yielded 208 clinical trials. After applying inclusion criteria, 20 entries were identified as relevant. After completing a deduplication process, four entries remained, three of which were conference presentations for which full text was not accessible. This phase of the search yielded one additional article that was eligible for full review.

The final phase of the literature search used the Motivational Interviewing Network of Trainers (MINT) database of MI-focused controlled trials (MINT, 2023). Conducting a search in this database resulted in six additional articles for consideration, but two of the articles did not meet inclusion criteria. Thus, this phase of the search resulted in four additional entries for review. (Figure 3.)

In total, 22 articles were included in the systematic review. Of these, 14 used a randomized control design, one used a quasi-experimental design, and seven were based on pilot studies, three of which contained no control or comparison group.

Figure 3**Literature Search Process Funnel for Identifying MI and MET Studies with Stimulant Use**

Summary of MI and MET Outcome Studies

The studies reviewed varied widely in terms of research design, dosages of treatment, augmentations of treatment, and outcomes measured.

- Types of research designs in reviewed studies: experimental (n=16), quasi-experimental including control or comparison group (n=4), non-experimental (n=2)
- Outcomes examined (most studies included multiple outcomes): drug use (n=17), addiction severity (n=10), change readiness (n=8), treatment adherence/attendance (n=6), depression/anxiety (n=6), psychiatric symptoms (n=4), treatment experience (n=4), cognitive functioning/decision making (n=3), risky behaviors (n=3), global functioning (n=3), self-efficacy (n=3), medication adherence (n=2), cravings (n=2), quality of life (n=1), entrance into detox (n=1), attendance to 12-step meetings (n=1), and homelessness (n=1).
- Drug use type represented in entries: methamphetamine use (n=7), cocaine use (n=7), crack use (n=1), some cocaine users and some marijuana users (n=1), ecstasy, crack or cocaine (n=1), methamphetamine use plus alcohol (n=1), crack use among methadone patients (n=1), methamphetamine use among methadone patients (n=1), cocaine and heroin use (n=1), and methamphetamine and MDMA use (n=1).
- Geographic location of studies: United States (n=14), United Kingdom (n=2), Iran (n=2), South Africa (n=1), Thailand (n=1), Brazil (n=1), and Taiwan (n=1).

Study retention/attrition rates were captured in 20 of the articles. Fidelity was measured in eight of the 18 MI studies (44.4%) and three of the four MET studies (75%). Most of the

studies examined individuals with methamphetamine or cocaine use disorder primarily, although there were some that included polysubstance use as well. The outcomes identified from the reviewed studies are grouped into the following categories: (1) drug use and addiction severity, (2) change readiness, (3) treatment attendance and adherence, (4) feelings about treatment, and (5) other outcomes. Findings related to each of the outcome categories are outlined in the following sections.

1. Drug Use and Addiction Severity Outcomes

Drug use was measured utilizing self-report as well as urinalysis screenings. Fourteen of the experimental studies measured participants' drug use or abstinence in comparison with another group. One study measuring drug use was quasi-experimental and two were pilot studies with no comparison group. All the studies examining addiction severity were randomized control designs.

1.1. MI vs. Comparison Group on Drug Use and/or Addiction Severity Outcomes

Polcin et al. (2014) compared intensive MI to standard MI on drug use outcomes among 217 individuals with methamphetamine dependence. Drug use was measured through both self-report and urinalysis testing. Participants were randomized to receive intensive MI on a weekly basis for nine weeks or a single 90-minute session of MI plus eight nutrition education sessions. Fidelity was measured by recording the MI sessions and randomly selecting 34% of the recorded sessions for rating using the Yale Adherence and Competence Scale (YACS; Carroll et al., 2000). There was no statistically significant difference in methamphetamine use between the two groups. Both groups received MI initially, and both groups showed a reduction in methamphetamine use at the 2-month follow up after receiving the intervention. There were similar outcomes for addiction severity, which measures seven domains addressing the impact of

drug use- medical, employment, drug, alcohol, legal, family/social, and psychiatric. Both groups showed improvements on the Addiction Severity Index (ASI) at the 2-month follow up and did not indicate statistically significant ongoing improvements at the 4- or 6-month follow-ups.

Stein et al. (2009) examined the effectiveness of MI on drug use outcomes with 198 self-reported cocaine users who used cocaine at least weekly. Participants were randomized into either four sessions of MI or a control group, which consisted of an assessment at baseline as well as handouts of treatment resources. Fidelity was measured through audio-recording the counseling sessions and reviewing the recordings in bi-weekly supervision sessions. The study interventionists were trained using a modification of the MI Skill Code (MISC; Miller, 2000). Supervision sessions were centered around ensuring interventionist adherence to MI. Both groups experienced a reduction in cocaine use between baseline and 6-month follow up, with no statistically significant difference between the groups regarding drug use outcomes or addiction severity outcomes. There was a larger reduction in use for those participants who reported using cocaine on more than 50% of the previous 30 days at the baseline interview. This result indicates that the motivational intervention was more effective at reducing use among heavier users when compared to those receiving the intervention who used less at baseline.

Martino et al. (2006) examined drug use outcomes among 44 individuals with psychotic disorders, by comparing two sessions of modified MI with a two-session manualized standard psychiatric interview. Participants were randomly assigned to each treatment group. Fidelity was measured through videotaping of sessions, reviewing the interviews and rating them. Both groups experienced a reduction in drug use. Participants who were primary cocaine users in the intervention group showed a larger reduction in use, while the comparison group with primary marijuana users showed a larger reduction in their use. This result indicates the importance of

understanding which substances individuals are using to best match their needs with appropriate treatment methods. There were no statistically significant differences in the addiction severity outcomes between groups.

Marsden et al. (2006) evaluated drug use outcomes among ecstasy, cocaine and crack users, aged 16-22 years old, in a community agency outside of London. The study recruited 342 participants who were randomized to receive either one session of brief MI or receive information alone regarding substance use. No statistically significant differences were found between the two groups regarding substance use and addiction severity. However, 59% of the intervention group and 41% of the control group reported that they had made efforts to stop or reduce their use. Seventy-eight percent of the intervention group attributed their motivation for change to the intervention they received, while 13% of the control group attributed their motivation for change to the information they received.

Korcha et al. (2014) examined drug use and addiction severity outcomes among 163 participants with methamphetamine and alcohol dependence. Participants were randomly assigned to either nine weekly 50-minute sessions of intensive MI combined with group cognitive behavioral sessions or to a comparison group. The comparison group received a single 90-minute session of MI along with weekly education classes on nutrition, in addition to group cognitive behavioral sessions. For fidelity adherence, all the MI sessions were audiotaped and randomly selected for rating using the Yale Adherence and Competence Scale (YACS; Carroll et al., 2000). The analyses indicated a greater reduction in alcohol use for women in the intervention group but not for the men. The percentage of days abstinent from methamphetamines was higher for both groups from baseline to the 6-month follow up, with no statistically significant difference between groups. The women in the intensive MI group also

showed a steady decline in average ASI scores over the four time points (baseline, 2-month, 4-month and 6-month), unlike the men. The effect size for the average difference between the women in the intervention group vs. the comparison group at six months was medium to large.

Stotts et al. (2007) examined the effectiveness of MI plus EEG on cocaine use outcomes among 31 males seeking outpatient treatment for cocaine use. The intervention group received MI plus a 2-hour EEG session providing psychophysiological feedback whereas the comparison group received two brief 10-minute sessions with research assistants, during which participants discussed how they were doing and received supportive listening. Adherence to MI was managed through utilization of standardized training videotapes and practice interviews to enhance inter-rater reliability. MI plus EEG group had fewer cocaine-positive urine samples compared to the comparison group.

Bernstein et al. (2005) explored the impact of a brief motivational intervention on heroin and cocaine use at a walk-in clinic. This study included 1,175 participants who reported using cocaine and/or heroin in the last 30 days. Participants were randomly assigned into either brief motivational intervention or control group. The control group received handouts, while the intervention group received a single brief semi-scripted motivational interview that was delivered by a peer recovery worker (i.e., an individual in recovery themselves and working as a substance abuse outreach worker). Fidelity was managed through checking adherence to all components of the intervention. Adherence was monitored and documented, measuring at 90% for all components of the intervention. Both groups had lower drug use at follow-up compared with baseline. Cocaine use reduction was greater in the intervention group (29% reduction) than in the control group (4% reduction), but the difference did not meet criteria for statistical significance ($p = 0.058$). There were statistically significant improvements in addiction severity

over time for both groups, but there were no statistically significant differences between the groups.

Stotts et al. (2001) conducted a study to examine the effectiveness of MI in facilitating completion of detoxification and improving outcomes of subsequent relapse prevention program. A total of 105 cocaine-dependent participants who were enrolled in a detoxification center in Houston, Texas were randomized to intervention and comparison groups. The intervention group received a 60-minute MI session on the first and fourth days of the detoxification program. The comparison group received the detoxification program treatment as usual (TAU). Eighty-eight percent of the intervention group submitted cocaine-negative urine at the first relapse prevention session, compared with 62% of the comparison group. Over the duration of twenty relapse prevention sessions, the intervention group had 18% cocaine-positive urines compared with 36% cocaine-positive urines with the comparison group. These results were statistically significant. When initial motivation level was taken into account, this study demonstrated that the MI intervention was more effective with those participants with lower initial motivation and had a detrimental effect with participants with higher initial motivation. The participants with higher motivation to change at baseline who did not receive MI more successfully completed the detoxification program. This may be a result of the intensity and comprehensiveness of the detoxification program alone. There was not a statistically significant difference between groups in initial abstinence from cocaine use, but the intervention group did have a statistically higher likelihood of abstinence during the relapse prevention program.

Parsons et al. (2018) conducted a randomized control trial testing the efficacy of combined MI and cognitive behavioral skills training to reduce methamphetamine use among HIV-positive gay and bisexual men. This study recruited 210 biological males who reported at

least three days of methamphetamine use in the past 90 days. The intervention group received two sessions of MI to establish rapport and listen to the participants' perspectives, a collaboration-focused third session, and four sessions of CBT training based on mutually agreed upon goals. The comparison group received eight 60-minute educational sessions about HIV and methamphetamine use. There were no statistically significant differences between groups on methamphetamine use. Both groups experienced a statistically significant reduction in methamphetamine use between baseline and 3-month follow-up.

Mausbach et al. (2007) investigated the efficacy of an intervention called Fast-Lane, an integration of MI with social cognitive theory, theory of reasoned action, and the stages of change model. This study recruited 451 self-identified methamphetamine users in San Diego County and randomly assigned them to intervention or comparison groups. The intervention group received four weekly 90-minute individual counseling sessions, with some participants receiving four booster sessions at 7-, 8-, 9-, and 10-months post-baseline. The comparison group received four 90-minute diet and exercise counseling sessions. For fidelity measures, the counselors began with experience in SUD counseling and received an additional five-day training workshop using role-playing and demonstrations. They were critiqued and given constructive feedback. During the intervention, supervisor observations were conducted, and sessions were audiotaped. The counselors participated in weekly group sessions for review, measuring their implementation of the intervention against the Fast-Lane checklist. There were no statistically significant differences in methamphetamine use between groups.

Mitcheson et al. (2007) conducted a randomized-controlled study with 29 participants in a methadone maintenance program in the United Kingdom who were using crack cocaine. The intervention group received a single session of MI, focused on engaging the client in a discussion

about their crack cocaine use. The control group participants were part of the general crack awareness initiative at the methadone clinic, incorporating posters and leaflets about the impact of crack cocaine use. Analyses indicated no statistically significant differences between groups regarding crack cocaine use or addiction severity. There was a statistically significant difference in heroin use between the groups, with a large effect size. The follow-up interview revealed one individual in the control group and three in the comparison group that reported discontinuing crack cocaine use.

Salimi et al. (2018) examined the impact of five weekly 60-minute sessions of MI on 276 methadone patients with methamphetamine dependence in Iran, compared to the wait-listed control group. The study was designed to examine the efficacy of MI on entrance into the Matrix Treatment Program for methamphetamine use. The sample consisted of 87 men and 50 women in the intervention group and 88 men and 50 women in the control group. The intervention was provided individually, in one-on-one sessions. There were no fidelity measures and no specific training explained in the study. There was no statistically significant difference between the groups on the addiction severity measure.

Sorsdahl et al. (2021) conducted a randomized-controlled trial to explore the efficacy of a six-session imaginal desensitization intervention used with MI for 60 participants with methamphetamine use disorder in South Africa. The control group participants were referred to local substance abuse centers for treatment. Fidelity to the specific intervention used was monitored by providing the clinicians with a three-day training, audio-recording sessions and checking them against the imaginal desensitization plus MI (IMDI) fidelity checklist. Baseline measures were compared with 6-week and 3-month follow up data assessing methamphetamine use along with other outcomes. Analyses demonstrated that the frequency of methamphetamine

use was statistically significantly lower in the treatment group than in the control group at both the 6-week follow up and the 3-month follow up. This data was exclusively based on self-report and not supplemented with urinalysis screenings.

Suvanchot et al. (2012) examined using four sessions of group MI plus brief CBT with 200 adults with co-occurring amphetamine use and psychological problems in out-patient psychiatric hospitals in Thailand. This study used a quasi-experimental design, with participants assigned to groups based on which hospital they attended. The control group received no treatment but were informed that they would be contacted for data collection at 2-, 4-, and 6-month intervals for follow-up data collection. Analyses indicated a reduction in amphetamine use for both groups, with no statistically significant difference between the groups. The intervention group had longer periods of time between positive urinalyses.

1.2. MET vs. Comparison Group on Drug Use and/or Addiction Severity Outcomes

Rohsenow et al. (2004) assessed cocaine dependent individuals enrolled in a partial hospitalization treatment program in an urban psychiatric hospital. This randomized controlled study examined the use of MET and Group Coping Skills Training (GCST). The intervention group received daily 50-minute MET sessions with GCST sessions on subsequent days after the first two. The comparison group received meditation and relaxation trainings plus group sessions, which were either GCST or educational discussions. For fidelity adherence, all therapists conducted all forms of the treatment using manuals. MET training involved a seven-hour workshop followed by 30 hours of supervised training and practice. GCST, meditation and relaxation training and education discussion training involved 10 hours of training and practice. MET sessions were audiotaped and reviewed against written checklists to monitor for adherence and competence. Statistical analyses indicated that MET participants with low initial motivation

had a statistically significant reduction in use of alcohol and cocaine compared to MET participants with high initial motivation. MET used with those with higher initial motivation resulted in more cocaine use than the meditation and relaxation comparison group. GCST resulted in a statistically significant reduction in cocaine and alcohol use for women but not for men.

McKee et al. (2007) evaluated adding an MET component to three sessions of CBT for cocaine users. This randomized controlled study identified 74 eligible individuals who were recruited through an outpatient substance abuse clinic. The intervention group received three 60-minute sessions of MET plus CBT over a 7-week timeframe, while the comparison group received CBT alone. Fidelity was managed by utilizing clinicians who were already experienced in treatment for SUD and received additional specialized training. Clinical case supervision was also provided. There was no statistically significant difference in cocaine use between groups.

1.3. MI Alone on Drug Use and/or Addiction Severity Outcomes

Pulliam conducted a nonexperimental pilot study in 2012 investigating whether combining MI, motivational incentives, and harm reduction in group therapy sessions with African American crack cocaine users with HIV would increase abstinence. Nine participants were identified through a hospital system in urban Chicago. No statistical analyses were completed, but six of the participants remained abstinent over the 6-month period of the study. Five of the six participants who maintained abstinence became peer recovery counselors and reported that the experience was very helpful to them in their early recovery.

1.4. MET Alone on Drug Use and/or Addiction Severity Outcomes

A nonexperimental study examined the impact of nine sessions of MET on methamphetamine use and addiction severity with individuals with methamphetamine use

disorder (Galloway, 2007). Participants attended weekly sessions of MET for nine weeks and were assessed weekly on outcomes of methamphetamine use and addiction severity. Adherence to fidelity was managed by utilizing master's level clinicians who were trained in the manual as part of the study team. Weekly supervision was provided with review of audiotaped therapy sessions. Two independent raters rated the recorded sessions. Results indicated that participants used methamphetamines on fewer days during the nine weeks of intervention, per self-report and urinalyses, compared to the 60 days prior to beginning the intervention.

1.5. Summary of Findings on Drug Use and Addiction Severity Outcomes

Ten of the 17 studies examining drug use also measured addiction severity. One study, conducted by Salimi et al. (2018), investigated addiction severity without looking specifically at drug use, and showed no statistically significant differences in the addiction severity outcome. Eight of the studies examining methamphetamine use, crack cocaine use, or ecstasy use found no difference in use between the intervention group and the comparison group (Polcin et al., 2014; Marsden et al., 2006; Korcha et al., 2014; Mitcheson et al., 2007; Suvanchot et al., 2012; Parsons et al., 2018; Mausbach et al., 2007; McKee et al., 2007). Korcha et al. (2014) determined that for individuals addicted to alcohol and methamphetamines, the MI intervention resulted in a reduction in alcohol use among female participants only. Mitcheson et al. (2007) found that among those using heroin and crack cocaine, the MI intervention group showed a statistically significant reduction in heroin use. Suvanchot et al. (2012) discovered that although there was no difference in overall methamphetamine use between the two groups, the intervention group showed statistically significantly longer time periods being substance free between urinalysis tests.

Two studies found that the use of MI or MET techniques had increased efficacy only with those individuals who started with lower motivation levels (Stotts et al., 2001; Rohsenow et al., 2004). Stein et al. (2009) reported a statistically significant difference in cocaine use in the intervention group for participants who used drugs more heavily at baseline. Martino et al. (2006) found statistically significant decreased cocaine use for those in the intervention group, but a statistically significant increase in marijuana use for participants in the intervention group. Findings from another study indicated a statistically significantly larger decrease in methamphetamine use for the intervention group, although this study relied exclusively on self-report (Sorsdahl et al., 2021). One MI pilot study and one extended MET pilot study indicated promising results for reduction in use (Pulliam, 2012; Galloway, 2007).

Overall, there is no conclusive evidence about the efficacy of MI or MET techniques with stimulant use disorders. Due to the significant differences in the dosage and type of implementation of motivational interventions in the literature, it is challenging to compare all of the individual implementations with each other. Two of the studies investigating drug use outcomes (Polcin et al., 2014; Korcha et al., 2014) implemented intensive MI and compared it to traditional MI. Three of the studies combined a motivational intervention with some implementation of CBT (Suvanchot et al., 2012; Parsons et al., 2018; McKee et al., 2007). Five of the studies assessed the efficacy of a brief one- or two-session implementation of MI (Martino et al., 2006; Marsden et al., 2006; Mitcheson et al., 2007; Berstein et al., 2005; Stotts et al., 2001). Several of the studies investigated other variations of motivational interventions, including a motivational intervention with psychophysiological feedback (Stotts et al., 2007), MI combined with imaginal desensitization (Sorsdahl et al., 2021), and MET combined with Group Coping Skills Training (Rohsenow et al., 2004).

Overall, literature review results regarding stimulant use indicated that the efficacy of motivational interventions is highly contingent on the nature of the substance used and initial motivation levels. Gender also plays a role in efficacy levels. Regarding methamphetamine use specifically, the only studies that detected differences in use were a comparison study relying exclusively on self-reported data (Sorsdahl et al., 2021) and a pilot study with no comparison group (Galloway et al., 2007). Among the studies that investigated cocaine or crack use and had a comparison group, four studies reported differences in use between the intervention group and the comparison or control group (Martino et al., 2006; Stotts et al., 2001; Stotts et al., 2007; Rohsenow et al., 2004). In addition, the study examining crack cocaine usage with no comparison group showed promising results regarding drug use (Pulliam, 2012). The summary of these results appeared to indicate that with stimulant use disorders, methamphetamine use disorder seemed to have a more persistent and pervasive presentation than cocaine use disorder, at least with regard to responsiveness to motivational interventions.

2. Change Readiness Outcomes

Nine studies measured change readiness and motivation for change in patients with stimulant use disorder in various settings. Outcomes were measured by use of the following scales: Motivation for Change Ladder (Biener & Abrams, 1991), the University of Rhode Island Change Assessment Scale (McConaughy, 1981), the Processes of Change Questionnaire (DiClemente & Prochaska, 1982), the Decisional Balance Scale (King & DiClemente, 1993), the Readiness for Change Ruler (Miller & Tonnigan, 1996), the Thoughts about Abstinence Scale (Hall et al., 1991), the Cocaine Change Assessment Questionnaire (Prochaska et al., 1994), and the Cocaine Decisional Balance Scale (Prochaska et al., 1994). Eight articles reviewed investigated readiness to change by comparing an intervention group to a control or comparison

group. One quasi-experimental study compared data from two groups of participants that were recruited from two psychiatric hospitals.

2.1. MI on Change Readiness Outcomes

Stotts et al. (2001) found that among 105 cocaine-using participants in a detoxification and relapse prevention program, participants who received the MI intervention statistically significantly increased their use of behavioral processes relative to those assigned to the comparison group receiving treatment as usual. This is an indication that those in the intervention group were thinking more about changing their behaviors, which is considered movement in the right direction regarding stages of change. However, the subscale of experiential processes and overall readiness to change scores were not statistically significantly different between the two groups. Experiencing feelings of readiness to change in general did not show a difference between groups.

In 2007, Stotts et al. assessed change readiness among 31 cocaine-dependent males, comparing the group receiving an MI intervention plus EEG-based psychophysiological feedback with a control group who participated in two brief 10-minute discussions with research assistants about anything they were struggling with or chose to discuss. Findings indicated that the intervention group statistically significantly increased their use of behavioral processes, or contemplation of readiness to change behaviors, from pre- to post- treatment relative to the comparison group, but there was no statistically significant difference in change readiness overall between the groups.

Bernstein et al. (2005) examined 1,175 self-reported heroin or cocaine users and compared change readiness scores between the group receiving a brief motivational intervention and the control group. There were no statistically significant differences in this outcome between

the groups. Peer recovery educators and research assistants involved in the project were engaged with both groups. Thus, it is possible that the peer recovery educators and research assistants may have impacted all of the participants' motivation to change by being examples of successful recovery, contributing to the lack of any statistically significant differences in this area.

Martino et al. (2006) evaluated change readiness using the Rhode Island Change Assessment Scale (McConaughy, 1981) among patients with co-occurring psychiatric and drug use disorders. Most participants in both groups had a high level of baseline investment in changing their drug use. There was no difference in groups either pre- or post-intervention, indicating a lack of support for using MI with individuals with psychotic disorders who also abuse drugs.

The study completed by Suvanchot et al. (2012) examined motivation for change in methamphetamine users between a group receiving four sessions of Group MI plus Brief CBT and a group receiving TAU with 200 participants in two out-patient psychiatric hospitals in Thailand. The goal was to examine the efficacy of the interventions implemented with a population of individuals abusing drugs who also have co-occurring psychological problems. Using a quasi-experimental design, researchers found a statistically significant difference in change motivation with a moderate effect size between the two groups.

2.2. MET on Change Readiness Outcomes

Huang et al. (2011) investigated the effectiveness of a three-session MET intervention with 200 adolescent users of MDMA and methamphetamine who had been arrested for illicit drug use and were incarcerated in an abstinence center. In Taiwan, adolescents who are arrested for illicit drug use are required to undergo a 1- to 2-month detoxification program at an abstinence center. In this randomized-controlled trial, the participants in the intervention group

received three sessions of MET lasting 45-60 minutes over the course of one week. The control group received education materials about the consequences of MDMA and methamphetamine use. The University of Rhode Island Change Assessment (McConaughy, 1981) was used to evaluate readiness to change drug use behaviors. The tool includes four subscales representing the precontemplation, contemplation, action, and maintenance stages of change. The posttest scores for the intervention group on overall readiness to change and on the contemplation subscale were statistically significantly different than those for the control group. This result suggests that MET could help adolescents abusing MDMA or methamphetamines move towards change.

McKee et al. (2007) examined whether combining MET with CBT would increase participation in treatment, engagement in treatment, and commitment to abstinence. Multiple measures were utilized to assess components of change, including thoughts about abstinence, desire to quit, expectation of success in quitting, and anticipated difficulty in remaining abstinent. Individuals in the MET plus CBT group reported statistically significantly greater desire for abstinence as well as expecting greater difficulty in maintaining abstinence after quitting compared to those who received CBT alone. However, the intervention group did not report higher commitment to abstinence when compared to the comparison group.

Rohsenow et al. (2004) used the Cocaine Change Assessment Questionnaire (Prochaska et al., 1994) and the Cocaine Decisional Balance Scale (Prochaska et al., 1994) to assess readiness for change among 165 cocaine-dependent participants. The intervention group received MET plus Group Coping Skills Training (GCST), while the comparison group received meditation and relaxation training plus GCST. Participants receiving MET expected more benefits from the treatment process and perceived more negative effects from cocaine use than

those in the comparison group. MET did not statistically significantly affect the perceived positive effects of cocaine or the stages of change score.

2.3. Summary of Findings on Change Readiness Outcomes

Eight of the identified studies evaluated change readiness among the study participants. Two of the eight studies showed statistically significant differences between the intervention group and the comparison group with regard to change readiness (Suvanchot et al., 2012; Huang et al., 2011). It is important to note that both of these studies took place outside of the United States, and one was also conducted with incarcerated adolescents. Incarceration may be a confounding factor, especially for studies evaluating readiness for drug-related behaviors because incarcerated individuals are in a controlled environment where they may lack access to drugs. In other words, for an incarcerated sample, it can be difficult to determine whether changes in drug-related behaviors are due to factors such as motivation and desire, or if they are more related to factors such as lack of access and opportunity.

3. Treatment Attendance and Adherence Outcomes

Six of the reviewed articles examined treatment adherence, retention in treatment, or treatment attendance outcomes. Attendance in treatment and completion of treatment were measured by the treatment centers as well as interviews with participants and family members. Retention in treatment was defined by examining whether or not participants remained in treatment throughout the duration of the treatment process. Treatment adherence was defined as remaining in treatment and following the expectations required of the specific treatment protocols.

3.1. MI on Treatment Attendance and Adherence Outcomes

Martino et al. (2006) compared treatment adherence outcomes among individuals with both psychotic and drug use disorders receiving either MI or standard psychiatric interview. The MI group did not differ statistically significantly from the comparison group on treatment attendance or admission into treatment. No differences in days of attendance were identified for individuals admitted into the treatment program.

Danaee-far et al. (2016) examined the effectiveness of a brief home-based social work motivational intervention for male methamphetamine users in Iran. This study invited families participating in treatment and harm reduction through a community agency to participate. They recruited 56 adult men who were: 1) using methamphetamines, 2) unwilling to participate in MI at the clinic, and 3) currently living with their families. Participants were randomly assigned to intervention and comparison groups. The intervention group received two 60-minute MI sessions focused on preparation and one to three 60-minute home social work MI sessions conducted by a social worker and peer recovery counselor. The comparison group received individual counseling in the clinic, defined as TAU. The results indicated a statistically significant difference between groups in the outcomes of treatment attendance and retention.

Korcha et al. (2014) looked at alcohol use problem severity for men and women with methamphetamine dependence. They found that among 163 participants randomized to nine weekly sessions of Intensive MI plus group CBT compared with a single session of MI plus education classes on nutrition plus group CBT, both men and women attended statistically significantly more sessions in the intervention group than in the comparison group.

Daley et al. (1998) conducted a pilot study to determine if a modified motivational therapy intervention would have an effect on outpatient treatment adherence and completion for

individuals with comorbid depressive disorder and cocaine dependence. Twenty-three participants were identified from a psychiatric hospital dual diagnosis unit. They were stabilized on anti-depressant medication and were then assigned to a motivational therapy intervention following discharge or TAU. The intervention group received motivational therapy based on the FRAMES (feedback, responsibility, advice, menu of options, empathy, and self-efficacy) model. The first month after hospital discharge consisted of five individual sessions and four group sessions. The comparison group received pharmacotherapy, psychoeducation on dual disorders and encouragement to attend 12-step meetings. The intervention group had statistically significantly higher treatment completion rates at both the 30-day and 90-day points following hospital discharge.

Salimi et al. (2018) studied decision-making related to entering treatment in a sample 275 individuals who were both methamphetamine dependent and receiving methadone maintenance treatment in Iran. This study used a quasi-experimental design, comparing the intervention group with a control group. Participants were selected from 20 distinct methadone clinics. They found that five sessions of MI were statistically significantly effective in influencing participants' decisions to enter a Matrix Model treatment program for Stimulant Use Disorder in conjunction with methadone maintenance treatment for Opioid Use Disorder.

3.2. MET on Treatment Attendance and Adherence Outcomes

McKee et al. (2007) investigated whether adding MET to CBT would improve treatment motivation, satisfaction, and retention for 74 cocaine-using individuals recruited through an outpatient substance abuse clinic. This study found that the participants in the intervention group attended statistically significantly more drug treatment sessions than participants in the comparison group, who received CBT alone.

3.3. Summary of Findings on Treatment Attendance and Adherence Outcomes

Five of six studies evaluating treatment attendance and/or treatment adherence reported statistically significant differences between intervention and comparison groups. This finding is relevant because remaining in treatment longer is associated with better long-term outcomes (Condelli & Hubbard, 1994; Gossop et al., 1999; Simpson, 1981; Simpson et al., 1997). If using motivational treatment strategies can improve treatment attendance and retention, then it is possible that these strategies could contribute to a reduction in drug use over a longer duration of time.

4. Treatment Experience Outcomes

Four of the identified studies addressed participants' feelings about the treatment they were receiving and/or their feelings about their relationship with their treatment counselor. This outcome was measured using interviews and gathering responses from the participants about their overall feelings and experiences during their treatment process, including the participants' senses of rapport with their counselors. This outcome is particularly relevant when it comes to looking at the impact of motivational interventions, as developing rapport is one of the core components of MI (Miller, 2023).

4.1. MI on Treatment Experience Outcomes

Korcha et al. (2014) specifically assessed the relationship between the therapist and the client, measured by the Helping Alliance Questionnaire (Luborsky et al., 1996). The 163 participants in the study had both methamphetamine and alcohol dependence. The findings indicated that for women only, the MI intervention provided a stronger therapeutic alliance. This result implies among people who use stimulants and alcohol, the rapport building component of MI is potentially more efficacious for women than men.

Stotts et al. (2007) examined perception of treatment with 31 cocaine-using men. This study investigated whether cocaine-using individuals found biologically based feedback relevant in their treatment process. Participants were asked if the MI intervention with EEG-based psychophysiological feedback was presented in a way that they understood, and whether it had an impact on their motivation and cocaine use. Participants reported finding the feedback useful, but not as valuable as individual MI sessions. This was a small study aimed at assessing feasibility, acceptability, and preliminary data regarding potential effect.

Mitcheson et al. (2007) measured treatment satisfaction outcomes using interviews with 29 study participants in a methadone clinic in the United Kingdom who also reported cocaine use. Although the study reports that treatment satisfaction was evaluated, no statistical analyses were reported for this outcome. There were also no differences reported between groups for most of the measures addressing satisfaction with treatment.

4.2. MET on Treatment Experience Outcomes

McKee et al. investigated treatment satisfaction with the Client Satisfaction Scale (CSQ; Larsen et al., 1979) among 74 adults who met criteria for cocaine abuse or dependence. The evaluation of results indicated an increase in overall treatment satisfaction over time, with no statistically significant difference between participants who received MET plus CBT and participants who received CBT alone.

4.3. Summary of Findings on Treatment Experience Outcomes

Of the four studies investigating outcomes related to treatment experience, only one found any statistically significant difference with regard to participants' feelings about treatment and/or their treatment provider. This study indicated a difference between the intervention and comparison groups for women but not for men.

5. Other Outcomes

5.1. Psychological and/or Psychiatric Outcomes

Six of the identified studies looked at outcomes related to psychological and/or psychiatric health. All studies focused on an implementation of MI. Three of the studies were randomized control trials, one was quasi-experimental, and two were pilot projects that compared the intervention group with a comparison group with a smaller sample size. Six of the studies examined depression or anxiety symptoms in addition to psychiatric outcomes, while two of the studies looked at depression or anxiety alone.

Polcin et al. (2014) included scales measuring the number of days the participant reported experiencing anxiety, the number of days of reported depression, and the number of days of reported psychiatric issues. This randomized clinical trial recruited participants with methamphetamine dependence lasting for at least the past 12 months. The participants were randomized to receive either Intensive MI (intervention group) or traditional MI plus nutrition education (comparison group). In examination of the two groups, both male and female participants in the intervention condition showed statistically significantly more severe psychiatric symptoms than participants in the comparison group at baseline. Psychiatric symptoms were statistically significantly reduced from baseline to follow-up timepoints for the intervention group, but primarily for men. Regarding anxiety symptoms, no differences between the two groups were identified. Women in the intervention group were statistically significantly more likely to report depressive symptoms at baseline and men were more likely to report depressive symptoms at the first 2-month follow up. A statistically significant reduction in depressive symptoms was found for those in the intervention group. There was no reduction in depression found among participants in the comparison group. Women in the comparison group

demonstrated an increase in depressive symptoms, but the severity of depression for women was statistically significantly lower at baseline in the intervention group. Men in both groups showed statistically significant improvement in depressive symptoms.

Martino et al. (2006) incorporated the Beck Depression Inventory measure (Beck et al., 1961) for depressive symptoms as well as the Positive and Negative Syndrome Scale (Kay et al., 1992) to measure severity of psychiatric symptoms. Overall, participants in both groups (two sessions modified MI vs. two-session psychiatric interview) reported a reduction in both positive and negative psychotic symptoms as well as depressive symptoms with no statistically significant change between groups. When examining the negative symptom subscale, which measures negative psychotic symptoms, findings indicated that negative psychotic symptoms declined more quickly in the comparison group than in the intervention group.

Daley et al. (1998) conducted a pilot study in which participants were either in an intervention group receiving modified MI or a comparison group (psychoeducation, pharmacotherapy). They investigated psychiatric re-hospitalization rates within one year and depression levels measured with the Beck Depression Inventory (Beck, 1961) with 23 patients with depressive disorder and cocaine dependence who were discharged from the dual diagnosis hospital unit. The patients in the intervention group receiving a modified motivational therapy were re-hospitalized less often than the patients receiving TAU. Two of the eleven participants in the intervention group were re-hospitalized within a year after entry into outpatient treatment, while eight of the twelve participants in the comparison group were re-hospitalized a total of 13 times in the same time frame. In addition, the mean Beck Depression Inventory score decreased by over 20 points for those in the intervention group.

Measures used by Sorsdahl et al. (2021) for their pilot feasibility trial in South Africa included the Hamilton Rating Scale for Depression (Hamilton, 1960) and the Hamilton Rating Scale for Anxiety (Hamilton, 1959). The intervention group, receiving imaginal desensitization with MI, reported statistically significantly lower anxiety scores than the control group, referred to a local treatment center, at both six weeks and three months post intervention. There were no statistically significant differences between groups on the depression scale.

Suvanchot et al. (2012) utilized the Mini International Neuropsychiatric Interview (Sheehan et al., 1998) and the Thai version of Hospital Anxiety and Depression Scales (Zigmond et al., 1983) to measure psychiatric symptoms, anxiety, and depression in 200 participants recruited from two psychiatric hospitals in southern Thailand. Both groups (four sessions group MI plus brief CBT vs. control) showed a statistically significant decrease in depression scores at both the 3-month and the 7-month follow up, with moderate effect size. There was no statistically significant difference between the groups. There was no reported difference in anxiety scores or psychiatric symptoms scores between the two groups.

In the study completed by Mitcheson et al. (2007) in the United Kingdom, the Hospital Anxiety and Depression scale (HADS, Zigmond & Snaith, 1983) was implemented to measure the mood and psychological symptoms of the participants. There were no statistically significant differences between the groups regarding mood and psychological symptoms.

5.2. Cognitive and Decision-Making Outcomes

Three of the reviewed articles examined cognitive skills or decision-making skills with MI. Two of these studies (Stotts et al., 2007; Goncalves et al., 2014) were pilot studies comparing a motivational intervention with comparison groups. The remaining study (Pulliam, 2012) was a pilot study with no comparison group.

Stotts et al. (2007) utilized the Decisional Balance Scale, a 12-item assessment (Janis & Mann, 1977), to measure the participants' feelings about the decision to continue to use cocaine. The group receiving the MI intervention slightly increased their endorsement of the negative aspects of cocaine use, while the participants in the comparison group receiving two 10-minute sessions of supportive listening from research assistants decreased their endorsement of cocaine's negative aspects. This is an indication that regarding decision-making skills, the MI intervention implemented in this study, combined with EEG psychophysiological feedback, supported cocaine-using participants in healthier decision making about their substance use.

Goncalves et al. (2014) conducted a pilot study with 46 cocaine-dependent patients enrolled in a four-week inpatient program for cocaine dependence in a hospital in Brazil. The purpose of this quasi-experimental study was to investigate the impact of combining MI and chess on cognitive outcomes for cocaine users who were abstinent at the time of the study. Cognitive domains were measured with the Trail Making Test Part B (Cunha et al., 2004; Lezak et al., 2004), the Stroop Color-Word test (Stroop, 1935), the Wechsler Memory Scale Digit Span Backward task (Wechsler, 1997), the Wisconsin Card Sorting Test (Cunha et al., 2010; Heaton et al., 2005), the Iowa Gambling Task (Cunha et al., 2011; Bechara et al., 1994), and the Barratt Impulsiveness scale (Malloy-Diniz et al., 2010; Patton et al., 1995). Participants in the intervention group engaged in 10 sessions of group intervention using MI and chess for three weeks. The comparison group received TAU. Both groups experienced improvements in neuropsychological performance over the three weeks, potentially due to forced abstinence due to being in-patient for the duration of the study. The Motivational Chess group showed greater improvements than the comparison group in the area of working memory.

Pulliam (2012) studied nine African American users of crack cocaine and living with HIV. This study combined MI, motivational incentives, and harm reduction in an effort to increase positive decision-making around both substance use and risk of homelessness. Over the six-month period of the study, all nine participants paid their rent and avoided homelessness. This indicates the potential positive impact of motivational strategies on decision-making regarding harm reduction.

5.3. Global Functioning Outcomes

Three identified studies implementing MI addressed functioning, implementing the Clinical Global Impression Scale (Haro et al., 2003), the Sheehan Disability Scale (Sheehan, 2008), the Global Assessment Scale (Endicott et al., 1976), the General Health Questionnaire (Khosravi et al., 2015) and the Social Functioning Subscale of the Opiate (Darke et al., 1992) Treatment Index.

Martino et al. (2006) studied 44 participants in a randomized pilot trial. The participants had co-occurring psychiatric and drug use disorders, including cocaine and marijuana use. The intervention group received two sessions of MI while the comparison group received a two-session standard psychiatric interview. There were no statistically significant differences on the Global Assessment Scale (Endicott et al., 1976) between groups.

In Sorsdahl et al.'s (2021) South African randomized feasibility trial, the 60 participants (methamphetamine users) received either six sessions of imaginal desensitization plus MI or were placed in a control group and received referrals to local treatment centers. There were improvements for both groups, but no statistically significant difference between them on the Clinical Global Impression Scale (Haro et al., 2003) or the Sheehan Disability Scale (Sheehan, 2008).

Salimi et al.'s (2018) quasi-experimental study in Iran examined 276 methadone patients with methamphetamine use disorder, providing the intervention group with five 60-minute sessions of MI over five consecutive weeks. The control group was waitlisted over the same period of time. Attendance in the MI group was statistically significantly associated with improved psychological well-being and social functioning according to the General Health Questionnaire (Khosravi et al., 2015) and the Social Functioning Subscale of the Opiate (Darke et al., 1992) Treatment Index.

5.4. High-Risk Behaviors and Self-Efficacy Outcomes

Two of the identified studies, one using MI and one using MET, examined both high-risk behavior and self-efficacy outcomes (Mausbach et al., 2007; Rohsenow et al., 2004). In addition, Suvanchot et al. (2012) investigated self-efficacy and Parsons et. al (2018) evaluated high-risk behavior, specifically around sexual behavior and HIV medication adherence among HIV-positive gay and bisexual men.

Mausbach et al. (2007) investigated data around high-risk sexual decision making, utilizing a computer assisted self-interview system to measure sexual behavior, condom use, and substance use during sex acts over an 18-month period. The sample consisted of 451 self-identified methamphetamine using heterosexuals who were HIV-negative. The MI-based Fast-Lane intervention showed improvements over the comparison group, who received diet and exercise counseling, in decreasing risky sexual behaviors. The self-efficacy scale demonstrated that as self-efficacy scores increased, there was a moderate association with safer sex behavior. The intervention group participants had statistically significantly greater increase in self-efficacy scores over the active intervention phase compared with the diet and exercise group.

Parsons et al. (2018) examined the impact on sexual risk behavior and HIV medication adherence of a combined MI and CBT intervention with 210 HIV-positive men who have sex with men. Risk behavior was measured using Timeline Follow-Back with 30-day recall for engaging in condomless anal sex and 14-day recall for HIV medication adherence. The findings indicated an increase in medication adherence and a reduction in condomless anal sex for both groups. A specific subset of the population, identified as having global barriers to change, indicated a difference between the intervention and comparison groups in medication adherence.

Rohsenow et al. (2004) examined MET and Group Coping Skills Training with 165 participants with cocaine dependence at a partial hospitalization treatment program. This study implemented the Risk Behavior Assessment (National Institute on Drug Abuse [NIDA], 1991) and the Self-Efficacy Scale (Monti et al., 1997) to examine these outcomes. Cravings to use were measured as well. This study showed no statistically significant difference between the MET group and the meditation and relaxation training group regarding self-efficacy, risk behavior, or urges to use. Both groups showed positive changes over time in these outcomes.

Suvanchot et al. (2012) measured self-efficacy among 200 methamphetamine users in Thailand, implementing group MI plus brief CBT. The intervention group showed a statistically significant improvement in self-efficacy scores over time, with moderate effect size. The paper does not report on this measure in comparison with the comparison group.

5.5. Additional Outcomes

Martino et al. (2006) examined psychiatric medication adherence among 42 patients with psychotic and drug use disorders. There were no statistically significant differences between the group who received two sessions of MI and the comparison group.

Stein et al. (2009) implemented a four-session motivational intervention with 198 self-reported cocaine users and compared quality of life, entrance into a detoxification program, and attendance to 12-step meetings with a group only receiving resources. There were no statistically significant differences between groups on these measures.

Sorsdahl et al. (2021) examined cravings among 60 methamphetamine users in South Africa. Both the imaginal desensitization MI group and the control group showed a decrease in cravings over time, with no statistically significant differences between the groups.

5.6. Summary of Findings for Other Outcomes

Most of the six studies that investigated the impact of MI or MET on anxiety, depression, and other psychiatric symptoms found no statistically significant differences on any of these outcomes. One study (Polcin et al., 2014) that used randomized group assignment detected a difference in psychiatric symptoms for male participants in the intervention group and a decrease in depression for both genders in the intervention group. Martino et al. (2006) demonstrated better psychiatric outcomes with the comparison group, indicating that motivational interventions might be contra-indicated for a severely mentally ill or psychotic population. Sorsdahl et al.'s (2021) pilot study showed a difference in anxiety but not depression. Daley et al.'s (1998) pilot study indicated better psychiatric outcomes for severe depression with the intervention group.

There were no randomized control designs investigating cognitive skills or decision-making skills with stimulant-using participants. The pilot studies showed early promising results regarding the use of motivational interventions to improve cognitive or decision-making skills with this population.

One study (Salimi et al., 2018) provided evidence for MI as a promising approach for improving functioning outcomes for stimulant users. Findings from two studies supported the notion that MI can positively impact self-efficacy over time (Mausbach et al., 2007; Suvanchot et al., 2012). The studies by Mausbach et al. (2007) and Parsons et al. (2018) also showed reduced high-risk sexual behavior with the MI intervention, although Parsons' study did not show a statistically significant difference between groups.

Limitations

One limitation identified in the literature is the inconsistent use of fidelity measures. Of the 22 studies reviewed, 11 reported use of fidelity measures. In addition, two of those 11 did not report the use of fidelity checklists, but rather used practice interviews and clinical case supervision as measures (Stotts et al., 2007; McKee et al., 2007). Eight studies were completed outside of the United States, which limits generalizability to the U.S. population due to significant cultural differences and attitudes about substance use and abuse. In addition, two of the studies included adolescents as participants, whose substance use profiles are often distinctively different than those of adults.

The most recent update to the Miller and Rollnick MI model, *Motivational Interviewing: Helping people change and grow (4th Ed)* was published in August 2023. Due to the newness of the model update, there is no research reflecting the most updated implementation of this treatment approach. Also, most of the studies examined some versions of MI or MET and compared them with either a different version of MI or another intervention. Many of the studies used MI as an augmentation to another treatment modality, such as CBT, psychoeducation, or Group Coping Skills Training. It is challenging to compare outcomes with such a wide variety of independent variables. There are opportunities for future research investigating the effectiveness

of the most recent edition of MI with various populations, including those with stimulant use disorders.

Conclusion

Motivational Interviewing is a practice approach rather than a specific treatment strategy. It was never intended to be used as a stand-alone treatment. MI is centered around a client-led approach, during which the practitioner is supportive and maintains the perspective of acceptance. It was designed for individuals who are not yet engaged in treatment and was intended to be utilized as a bridge to help the client achieve an internal willingness to participate in treatment for their addiction. This makes it hard to measure the effectiveness of MI in isolation or as a standalone treatment. Motivational Enhancement Therapy was developed as an attempt to manualize the principles of MI, which could have added benefits of improving consistency and measurability of motivation-based treatment strategies. However, the structured and manualized aspects of MET may be incompatible and inconsistent with the tenets of MI that encourage providers to be flexible, adaptable, and highly responsive to the needs of clients as they emerge. Providers may find it difficult to implement strategies that are aligned with a flexible and client-led MI tradition while faithfully following a structured manual that dictates a specific order of activities in sessions.

Motivational methods include a focus on building rapport between the clinician and the individual receiving services. When examining the therapeutic experience of the participants in these studies, the individuals receiving motivational interventions only demonstrated a statistically significant difference in their treatment experience in one of the four studies. This is an interesting finding, as motivational interventions require the foundation of a strong

relationship between the client and the provider in order to proceed through the stages of change (Miller, 2023).

There are multiple gaps in the research that offer some direction for future studies. Seven studies explored outcomes for substance users in a study condition where either MI or MET was combined with another intervention (Sorsdahl et al., 2021; Suvanchot et al., 2012; Korcha et al., 2014; Parsons et al., 2018; Stotts et al., 2007; McKee et al., 2007; Rohsenow et al., 2004). Only two of these studies were unable to detect differences in use between groups (Parsons et al., 2018; McKee et al., 2007). However, McKee et al. (2007) demonstrated that those in the intervention group had a greater willingness to remain engaged in treatment. This finding could indicate efficacy of the motivational intervention, as it increased the participants' motivation to change, even if behavior change had not yet come to fruition. This result also suggests that motivational interventions may not show immediate results in a study but can impact an individual's internal motivation to change over time. Of the remaining five studies, there were significant differences between the intervention group and the comparison group for at least a subset of participants. These differences point to the need for additional research combining motivational interventions with other treatment modalities and using the MI approach the way it was originally intended, as a precursor to other treatments. When used in conjunction with other evidence-based treatments, motivational interventions have stronger potential to produce better outcomes.

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