

## Effectiveness of Motivational Interviewing for Adults with Substance Use Disorders

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### CLINICAL SCENARIO:

According to the United Nations Office on Drugs and Crime (2019), there are 35 million people in the world with drug use disorders. Treatments for substance use disorders (SUDs) include pharmacological and non-pharmacological interventions. Motivational interviewing (MI) is a widely used intervention for SUDs that works to resolve ambivalence and strengthen motivation to change (Smedslund et al., 2011). Smedslund et al. (2011) conducted a systematic review and found that MI reduced substance abuse compared to no intervention, but that quality of evidence was low and further research was needed. The purpose of this Critically Appraised Topic (CAT) is to evaluate recent literature on the effectiveness of MI in increasing readiness to reduce or stop using substances.

### FOCUSED CLINICAL QUESTION:

In adults with substance use disorders, does motivational interviewing increase readiness to reduce or stop using?

### SUMMARY of Search, 'Best' Evidence' Appraised, and Key Findings

A literature search identified five studies that examined motivation or readiness to change (RTC) substance use following a MI intervention. Delivery of MI varied between studies. For example, two studies had one session of MI (Celio et al., 2019; Ondersma et al., 2018), and all others had four sessions. D'Amico et al. (2017) delivered MI in a group setting, whereas others delivered MI individually with the exception of Morgenstern et al. (2017), who did not specify. One of the interventions was computer-assisted (Kennedy et al., 2018), and one intervention was computer-delivered (Ondersma et al., 2018).

Two studies found that RTC increased in their intervention group; however, Celio et al. (2019) did not find an effect on heavy drinking outcomes, and Kennedy et al. (2018) found a small effect on drinking outcomes. In comparison, Morgenstern et al. (2017) saw equal reductions in drinking across conditions, but RTC did not moderate condition effects on drinking outcomes. Ondersma et al. (2018), found no differences in drug use between conditions and effects were not moderated by

RTC. D'Amico et al. (2017) found that at follow-up greater rates of change talk and sustain talk led to less heavy drinking and lower RTC, respectively.

### CLINICAL BOTTOM LINE:

MI is a cost-effective, low-risk intervention that can be delivered in a variety of formats. Given the low quality of evidence and differing outcomes related to RTC and substance use, healthcare practitioners should explore if there are more effective interventions for SUDs for their specific client group before using MI.

**Limitation of this CAT:** This critically appraised topic was prepared for a graduate course assignment and has not been peer-reviewed by one other independent person or an instructor.

### SEARCH STRATEGY:

#### Terms used to guide Search Strategy:

- Patient/Client Group: Adults (18 years of age or older) with substance use disorders
- Intervention (or Assessment): Motivational interviewing
- Comparison:
- Outcome(s): Readiness to reduce or stop using substances

Databases Searched	Search Terms	Limits Used
Medline	Exp Substance-Related Disorders/ OR "substance use disorder*" or "drug use disorder*" OR substance-related disorder* or drug-related disorder* OR substance abuse* or drug abuse* OR substance addict* or drug addict* OR substance depend* or drug depend*  AND  Motivational Interviewing/ OR	All adult (19 plus years)  Last 5 years

	<p>motivat* interview* or motivational interviewing*</p> <p>AND</p> <p>“Rehab* ready” or “rehab* readiness” OR “ready to change” or “readiness to change” OR “ready for treatment” or “readiness for treatment”</p>	
<p>Cochrane Central Register of Controlled Trials and Cochrane Database of Systematic Reviews</p>	<p>“substance use disorder*” or “drug use disorder*” OR substance-related disorder* or drug-related disorder* OR substance abuse* or drug abuse* OR substance addict* or drug addict* OR substance depend* or drug depend*</p> <p>AND</p> <p>motivat* interview* or motivational interviewing*</p> <p>AND</p> <p>“Rehab* ready” or “rehab* readiness” OR “ready to change” or “readiness to change” OR “ready for treatment” or “readiness for treatment”</p>	<p>Last 5 years</p>
<p>Embase</p>	<p>Exp drug dependence/ OR exp substance abuse/ OR “substance use disorder*” or “drug use disorder*” OR substance-related disorder* or drug-related disorder* OR substance abuse* or drug abuse* OR substance addict* or drug addict* OR substance depend* or drug depend*</p> <p>AND</p> <p>Exp motivational interviewing/ OR motivat* interview* or motivational interviewing*</p> <p>AND</p> <p>“Rehab* ready” or “rehab*</p>	<p>Adult &lt;18 to 64 years&gt; or aged &lt;65+ years&gt;</p> <p>Last 5 years</p>

	<p>readiness" OR "ready to change" or "readiness to change" OR "ready for treatment" or "readiness for treatment"</p>	
CINAHL	<p>MH "Substance Use Disorders+" OR MH "Substance Abuse+" OR MH "Substance Dependence+" OR "substance use disorder*" or "drug use disorder*" OR substance-related disorder* or drug-related disorder* OR substance abuse* or drug abuse* OR substance addict* or drug addict* OR substance depend* or drug depend*</p> <p>AND</p> <p>MH "Motivational Interviewing" OR TI motivat* interview* or motivational interviewing</p> <p>AND</p> <p>"Rehab* ready" or "rehab* readiness" OR "ready to change" or "readiness to change" OR "ready for treatment" or "readiness for treatment"</p>	<p>All Adult Published Date: 20150101-</p>
PsycInfo	<p>DE "Substance Use Disorder" OR DE "Addiction" OR DE "Alcohol Use Disorder" OR DE "Cannabis Use Disorder" OR DE "Drug Abuse" OR DE "Drug Dependency" OR DE "Inhalant Abuse" OR DE "Opioid Use Disorder" OR DE "Tobacco Use Disorder" OR "substance use disorder*" or "drug use disorder*" OR substance-related disorder* or drug-related disorder* OR substance abuse* or drug abuse* OR substance addict* or drug addict* OR substance depend* or drug depend*</p> <p>AND</p> <p>DE "Motivational Interviewing" OR TI motivat* interview* or</p>	<p>Young adulthood (18-29 yrs) Thirties (30-39 yrs) Middle age (40-64 yrs) Aged (65 yrs &amp; older) Published Date: 20150101-</p>

	<p style="text-align: center;">motivational interviewing</p> <p style="text-align: center;">AND</p> <p style="text-align: center;">DE “Readiness to Change” OR  “Rehab* ready” or “rehab*  readiness” OR “ready to change”  or “readiness to change” OR  “ready for treatment” or “readiness  for treatment”</p>	
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## INCLUSION and EXCLUSION CRITERIA

- Inclusion:
  - Participants with any type of SUDs aged 18 years or older.
  - MI as the primary intervention studied.
  - Readiness or motivation and substance use outcomes are measured.
- Exclusion:
  - MI is delivered in combination with other psychosocial interventions.
  - Studies with a major focus other than the effectiveness of the intervention.
  - Incomplete trials or study protocols.
  - Studies that occurred outside of North America.

## RESULTS OF SEARCH

Five relevant studies were located and categorised as shown in Table 1.

**Table 1:** Summary of Study Designs of Articles Retrieved

Study Design/ Methodology of Articles Retrieved	Level*	Number Located	Author (Year)
Randomised Controlled Trial (RCT)	2	5	Celio et al. (2019) D’Amico et al. (2017) Kennedy et al. (2018) Morgenstern et al. (2017) Ondersma et al. (2018)

\*Based on *The Oxford Levels of Evidence 2* by Howick et al. (2011)

## BEST EVIDENCE

The following study was identified as the ‘best’ evidence and selected for critical appraisal. Reasons for selecting this study were:

- An RCT is appropriate to address an intervention question
- It was the most closely related to the PICO and did not have a secondary target (e.g. sexual risk behaviours, social networks, or perinatal period)

## SUMMARY OF BEST EVIDENCE

**Table 2:** Description and appraisal of *Dismantling Motivational Interviewing: Effects on Initiation of Behavior Change Among Problem Drinkers Seeking Treatment* by Morgenstern et al., 2017

### **Objective of the Study:**

This study retested hypotheses from a pilot study: (1) if the relational and directional components of MI lead to reduced drinking, and (2) if participants with lower motivation see a greater reduction in drinking in the MI condition.

### **Study Design:**

This was a randomised controlled trial with three conditions: (1) MI, (2) spirit-only MI without directional components (SOMI), and (3) nontherapy control (NTC). Participants were screened by phone and then invited to an initial in-person assessment with a research assistant at week 0, and a full baseline assessment at week 1. Participants in MI or SOMI received four psychotherapy sessions at weeks 1, 2, 5, and 8, whereas those in NTC received encouragement to change without treatment. Participants completed online surveys twice daily during weeks 0, 1, 4, and 7 and standard assessments at weeks 1, 5 and 8.

### **Setting:**

There was no information provided on the setting; however, the researchers, funding body, and institutional review boards were all based in the United States.

### **Participants:**

Participants (n = 139) were recruited through general advertisements in local media and online for adults with alcohol use disorder (AUD) seeking treatment to reduce but not abstain from drinking. Inclusion criteria included participants between 18 and 75 years of age with current AUD, who had consumed an average greater than 15 standard drinks for women, and 24 standard drinks for men, per week over the prior 8 weeks. Participants with clinically severe alcoholism, other SUDs, and serious psychiatric disorders, or a risk of suicide or violence, were excluded. Participants were excluded if they experienced social instability, were legally mandated to attend treatment, or expressed a desire to achieve abstinence or to seek other substance abuse treatment. Drinking severity and demographics were similar across conditions at baseline and participants were on average middle-aged, female, Caucasians. 131 of 139 participants provided follow-up data, and attrition rates were similar across conditions.

### **Intervention Investigated:**

Prior to assignment to a condition, all participants received normative feedback on their weekly alcohol consumption. Those assigned to the MI and SOMI conditions received four 45-minute to 1 hour sessions at weeks 1, 2, 5, and 8. The MI condition was adapted from Project MATCH's motivational enhancement therapy (Miller et al., 1992; Project MATCH Research Group, 1993), and included personalized feedback and directional activities and skills to elicit change talk and reinforce commitment to change. The SOMI condition included relational and client-centred strategies while

avoiding behaviours inconsistent with MI and excluding directional strategies. The NTC condition did not include treatment but included elements of brief intervention thought to promote change. The researchers targeted personal responsibility and self-efficacy by telling participants that research shows some people reduce drinking without professional support and that completing the online surveys and research interviews may help them reduce their drinking. The MI and SOMI conditions were delivered by five master's- and doctoral-level therapists, four of whom were experienced and were part of the pilot study. Therapists were provided with three hours of training and weekly group and individual supervision, as well as practice cases for retraining and evaluation of treatment fidelity.

**Outcome Measures:**

The Readiness to Change Questionnaire (RCQ) was used to assess baseline motivation to reduce drinking. The RCQ is a 12-item questionnaire with a 5-point scale from 'strongly disagree' to 'strongly agree' that allocates participants into precontemplation, contemplation, or action stages of change (Heather & Rollnick, 2012).

The Timeline Followback interview (TLFB) was used to assess drinking outcomes based on the sum of standard drinks (SSD) and heavy drinking days (HDD) per week. HDD was calculated based on the number of days per week that women drank more than three drinks and men drank more than four drinks. The TLFB was administered at weeks 1, 5, and 8.

Ecological Momentary Assessment (EMA) surveys were used to assess strength of commitment and drinking outcomes. Participants completed EMA online surveys using their smartphones in the mornings and evenings during weeks 0, 1, 4, and 7. The surveys took 2 to 6 minutes to complete and differed slightly between morning and evening. One item assessed how committed participants were to not drinking heavily on a scale from 0 (not at all) to 8 (extremely), and another item assessed the number of standard drinks consumed in the past 24 hours.

**Main Findings:**

The researchers used chi square tests, *t* tests, and one-way analyses of variance, as appropriate, for baseline characteristics. The researchers included a table of mean differences across conditions on baseline characteristics, such as demographics, drinking severity, RCQ item mean, and average daily commitment. The researchers also included a table of mean differences on outcomes for condition fidelity and discriminability.

The researchers used generalized estimating equations to “analyze the nonnormal, longitudinal data for each of the primary dependent variables. [...] For this analysis, a negative binomial distribution with log-link function was specified [...] with an exchangeable working correlation” (p. 756 – 757). Two models were developed and “time and pretreatment weekly SSD or HDD were added to the respective models as covariates. Condition was coded using Helmert contrast coding [...]” (p.757).

The TLFB-based results showed that effects on SSD and HDD were not significantly different between MI and SOMI conditions versus NTC or between MI and SOMI

conditions (see Table 3). All participants reduced drinking equally across conditions by the end of treatment.

**Table 3***Effects on Drinking at End of Treatment when Controlling for Baseline*

Interaction terms	B	SE	p value
Sum of Standard Drinks (SSD)			
MI+SOMI vs. NTC	0.11	0.10	0.22
MI vs. SOMI	-0.00	0.09	0.97
Heavy Drinking Days (HDD)			
MI+SOMI vs. NTC	-0.04	0.18	0.73
MI vs. SOMI	0.13	0.12	0.27

Effects of RCQ on SSD and HDD were not significant when controlling for condition, in MI and SOMI versus NTC, or in MI versus SOMI conditions (see Table 4).

**Table 4***Readiness to Change Questionnaire (RCQ) Effects on Drinking Outcomes*

Interaction terms	B	SE	p value
Sum of Standard Drinks (SSD)			
Controlling for conditions	0.05	0.10	0.65
MI+SOMI vs. NTC x RCQ	0.17	0.26	0.51
MI vs. SOMI x RCQ	-0.05	0.21	0.80
Heavy Drinking Days (HDD)*			
Controlling for conditions	0.09	0.13	0.46
MI+SOMI vs. NTC x RCQ			
MI vs. SOMI x RCQ			

\*Researchers did not provide data for MI+SOMI vs. NTC x RCQ or MI vs. SOMI x RCQ but indicated that the p value was greater than 0.10

Effects of commitment on SSD and HDD were significant when controlling for condition, but not in MI and SOMI versus NTC, or in MI versus SOMI conditions (see Table 5).

**Table 5***Commitment Effects on Drinking Outcomes*

Interaction terms	B	SE	p value
Sum of Standard Drinks (SSD)			
Controlling for conditions	-0.04	0.02	0.02
MI+SOMI vs. NTC x commitment	0.05	0.05	0.25
MI vs. SOMI x commitment	-0.08	0.04	0.06
Heavy Drinking Days (HDD)*			
Controlling for conditions	0.05	0.02	0.03

MI+SOMI vs. NTC x commitment			
MI vs. SOMI x commitment	-0.06	0.06	0.32

\*Researchers did not provide data for MI+SOMI vs. NTC x commitment but indicated that the p value was greater than 0.10

Data from the EMA surveys showed that RCQ had an independent main effect on SSD, but did not moderate condition effects on SSD. Commitment did not have a significant effect.

**Original Authors' Conclusions:**  
This study replicated findings from the researchers' pilot study, namely that reductions in drinking were equivalent across conditions and that participants with low motivation did not see a greater reduction in drinking in the MI condition. The author's findings "highlight the continued difficulty in demonstrating strong empirical support for MI's theory of change" (p. 760).

**Critical Appraisal:**  
Based on *Guidelines for Critical Review Form – Quantitative Studies* by Law et al. (1998)

**Validity:**  
The PEDro score for this RCT is 7/11. Points were lost for a lack of concealed allocation and no blinding of subjects, therapists, or assessors.

**Study Purpose:**  
The purpose of the study was clearly stated and justified by the need to correct for limitations in the pilot study, namely an inadequate sample size and unequal distribution of baseline drinking.

**Literature:**  
The researchers reviewed relevant background literature on MI and MI's theory of change.

**Study Design:**  
A RCT was appropriate to allow for comparison between MI's relational and directional components and a nontherapy control using standard assessments and an online survey tool.

**Sample:**  
The researchers stated that the sample size was adequate, but failed to provide a power calculation of the sample. Key characteristics were equally distributed across conditions at baseline. There was no information on how participants were randomized to conditions, nor if the participants were blinded to their assignment. Volunteer bias in favour of the treatment group occurred, and the researchers acknowledged that those seeking treatment may already be motivated and committed to reducing their drinking. The researchers received ethical approval from institutional review boards, received consent from participants, and offered treatment to NTC participants after the trial period.

**Outcomes:**

Outcome measures were described in adequate detail including the psychometric properties of measures. Measurement/detection bias in favour of the treatment group may have occurred as there is no information on the blinding of evaluators. Recall bias may have occurred as the TLFB and RCQ are self-report measures, but the EMA surveys may have helped to reduce this bias.

**Intervention:**

Interventions were described in terms of MI therapy and nontherapy components, and frequency and length of sessions. There was not enough information on the intervention, nor any information the setting, to be able to replicate the study. Multiple therapists provided the intervention, and they were not blinded to allocation. The researchers reduced bias by requiring therapists to meet threshold condition fidelity before providing treatment and monitoring for condition fidelity throughout the study. Contamination in favour of the control group may have occurred because the nontherapy elements of MI received by the control group may have had a greater impact on reduced drinking rates than anticipated, as acknowledged by the researchers. This could have also led to a Hawthorne effect where participants' drinking levels reduced because they knew they were being monitored. The researchers reduced co-intervention bias by screening out participants who were interested in other substance abuse treatments.

**Interpretation of Results:**

The researchers provided a CONSORT-type flow diagram of participants, and retention rates were greater than 90% across groups, with compliance with therapy at 89.4% for MI and 89.1% for SOMI. The researchers did not provide reasons for drop-out. Intent-to-treat analyses were completed on SSD and HDD outcomes based on TLFB data from the trial period. Results were reported in terms of statistical significance, and the analysis methods used were appropriate for number and complexity of the outcomes measured. Effects of commitment were significant on SSD and HDD when controlling for condition, and effects of commitment on SSD showed that "for every unit increase in commitment there was a 4% decrease in drinking" (p. 757). Results from the EMA surveys showed that RCQ had an independent main effect on SSD. All participants reduced their drinking equally across conditions, and outcomes did not differ based on MI's relational and directional components. The researchers stated that findings "are limited to an examination of initiation of drink reduction in mild-to-moderately dependent drinkers recruited via advertisement and voluntarily seeking treatment" (p. 760).

**Summary/Conclusion:**

This study failed to demonstrate empirical evidence of the effects of relational and directional components of MI on drinking outcomes. The researchers appeared to place so much emphasis on condition fidelity and correcting for the limitations in their pilot study that they failed to describe other elements of their study in enough detail and left their study vulnerable to a number of biases. The possible contamination of their control group was significant and could have contributed to the equal reduction of drinking across conditions.

## **IMPLICATIONS FOR PRACTICE, EDUCATION and FUTURE RESEARCH**

Morgenstern et al. (2017) made considerable efforts to dismantle MI into its relational and directional components and to ensure fidelity to conditions; however, they were unsuccessful in their attempt to demonstrate how MI's components work to reduce drinking. Further research is needed to understand how and under what conditions MI works with adults with AUD and other SUDs. Qualitative or mixed-methods research could contribute to this understanding by incorporating participants' perceptions of the effectiveness of MI interventions on changing substance use behaviours.

MI is a widely used intervention for substance use disorders that can be provided by a variety of health care providers (Smedslund et al., 2011), and is currently used in practice by some Recreation Therapists and other rehabilitation science professionals. However, this CAT shows that the quality of evidence for MI is low and outcomes on RTC and substance use are varied. Although MI is a low-risk intervention, health care providers should consider using interventions with greater empirical evidence to support adults with substance use disorders to reduce or stop their use.

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