



Comparative Evaluation of Motivational Interviewing Components in Alcohol Treatment

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Abstract

Previous research has firmly established the efficacy of Motivational Interviewing (MI) in helping individuals to overcome their alcohol addiction. However, there is a large diversity in the sizes of these effects and it is not clear how the different MI strategies and techniques contribute to treatment outcomes. We compared the efficacy of three MI intervention plans using a randomized matched pre-test/post-test design spanning a 10-week period. The participants were 45 French individuals (29 male and 16 female) seeking treatment for alcohol dependence who received 5 sessions of MI. Participants from all groups reported moderate to strong changes ($d > 0.80$) in alcohol consumption, temptation to drink, abstinence self-efficacy, internal motivation to change behavior, and well-being (anxiety, depression, satisfaction with life, and self-esteem). ANCOVA analyses showed that the changes in alcohol consumption, temptation to drink, and abstinence self-efficacy were weakest in the group that only used the internal motivation strategies and strongest in the group using a combination of the internal motivation strategies, decisional balance, and self-efficacy strategies. The findings support the efficacy of a combination of three MI strategies. Future research comparing the effects of different MI intervention plans could help to ensure consistently effective alcohol addiction treatment.

Keywords Alcohol Use Disorders · Decisional balance · Motivational Interviewing · Self-efficacy · Internal motivation to change · Subjective well-being

Introduction

Motivational Interviewing (MI) has become widely adopted as a counselling approach to facilitate behaviour change. MI was developed as a client-centered approach that combines a supportive, collaborative, and empathic counselling style with a consciously directive method of selectively reinforcing change talk aiming to resolve in a positive way the tension created by ambivalence about change (Miller, & Rollnick, 2002, 2012). MI counsellors accept their clients in an unconditional way and aim to establish a collaborative relationship. The goal of the counsellors in this approach is to accompany clients in the process of change and to help

them achieve change in agreement with their aspirations and values. Counsellors seek to evoke the clients' intrinsic motivation to change, rather than imposing it on them. This process starts from the clients' perspectives and needs and the clients are considered to be the main persons responsible for their own behaviour change. In this way MI supports the clients' autonomy.

MI was recently proposed as a positive psychology intervention (Csillik, 2015). Contrary to the deficit model often used in professional consultations about change where the aim is to detect deficits to be corrected by professional expertise, MI starts with a very different strength-focused premise: that individuals already have within themselves the strengths, motivations, and resources they need to activate in order for change to occur. The professionals' task is to evoke the change, to call it forth, and to support individuals in pursuing and achieving it. The working assumption is that clients have their own wisdom, insight, creativity, and experience that the counselors can draw on and elicit. Thus, MI is about evoking what is already present, rather than installing something that is missing (Miller & Rollnick, 2002, 2012).

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Consistent with a positive perspective, MI aims to facilitate and affirm positive states, such as hope for success in change and confidence about one's ability to change. This process is based on the clients' pre-existing change-skills and abilities that the counsellors aim to foster and strengthen by identifying and activating the clients' positive strengths and resources.

Understanding the clients' sources of hope and drawing upon them with a particular focus on self-efficacy is an important component of MI. Self-efficacy designates the level of confidence individuals have in their ability to execute certain courses of action, or achieve specific outcomes (Bandura, 1997). MI aims to foster the clients' confidence in their ability to change, which is acknowledged as one of the most potent change factors on the clients' side. Change self-efficacy can be developed using various means, such as reviewing the client's past successes at changing, reframing failures as learning experiences, finding new ideas about changing the situation, which can help the clients to gain confidence in their abilities to improve their lives (Miller & Rollnick, 2002, 2012). These techniques are consistent with the style of MI and are used to elicit the client's ideas, experiences, perceptions, and strengths and to evoke the ability to change.

The literature on the efficacy of MI has grown rapidly. MI has been used for a variety of clinical problems and applications and the research has provided strong support for its efficacy. The efficacy of MI has been tested in three main domains: addictive behaviors, health behaviors, and treatment adherence. Several systematic reviews and meta-analyses of randomized controlled trials of MI interventions exist to date, showing its positive effects (e.g., Hettema et al., 2005; Lundahl et al., 2013), particularly in the area of addictive behaviours and alcohol abuse. Motivational Interviewing (MI) has demonstrated efficacy and effectiveness across a range of behavior change outcomes, most notably, alcohol and other drug use (Hettema et al., 2005; Lundahl et al., 2013; Li et al., 2016). An increasing number of systematic reviews and meta-analyses have shown that MI is effective for treating alcohol-related problems in adults (Hettema et al., 2005) and adolescents (Steele et al., 2020). Across studies, MI appears to be at least as effective as other treatments for problem drinking and is significantly better than no treatment. However, there is a wide variability in effect sizes of MI interventions across studies addressing different problem areas. In particular, for alcohol abuse, most MI trials have reported statistically significant effects, but the observed effect sizes have varied from $d=0$ to over 3.0 (Hettema et al., 2005). Such variability in treatment outcomes across studies and even within studies indicates the need to better understand the conditions of MI delivery that may affect its efficacy.

MI was not initially grounded in a theory and its principles and strategies were proposed prior to any empirical evaluation (Miller, 1983). Despite the extensive evidence supporting the effectiveness of MI, until recently, explanations concerning the precise relationship between the therapeutic process generated by this approach and its effectiveness were lacking. In the later years, there has been a significant increase in MI process research with the aim to understand how MI produces clinical benefits (Magill et al., 2018). A theory of MI effectiveness (Miller & Rose, 2009, 2015) emphasizes two active components underlying the change process in MI: a relational component related to the empathy and the interpersonal spirit of MI) and a technical component involving the evocation and reinforcement of client change talk (clients' expressions of their desire, ability, reasons, and need for change). The latter path is the most commonly explored in the studies of MI effectiveness, the research data showing that MI-consistent skills significantly increase the clients' in-session change talk (Magill et al., 2018), which, in turn, predicts behavior change post-treatment (Apodaca & Longabaugh, 2009) and at follow-up (Magill et al., 2018).

In addition to therapist attitudes that are considered as central for MI style and consistency (unconditional positive regard, acceptance, empathy, genuine interest and warmth, avoiding coercion), various specific techniques have been proposed in the MI context. These techniques include strategies of internalisation of motivation, strategies for eliciting and reinforcing self-efficacy, and the decisional balance (DB) procedure, which involves an examination of the pros and cons related to a behaviour choice (Miller & Rollnick, 2002). The main MI strategies for increasing internal motivation to change aim to resolve ambivalence and build motivation for change and mainly consist of exploring through scales the importance and priority of change as well as clients' confidence in their ability to change, using open-ended questions, affirmations and reflections to explore clients' reasons for change as well as their values and goals in life and further eliciting change talk (Miller & Rollnick, 2002).

DB was particularly recommended in the early formulations of MI, with one study showing that it played an important role in decreasing alcohol consumption (Labrie et al., 2006). However, a number of studies have failed to find any positive effects of DB in the alcohol use context (Collins & Carey, 2005; Matzger et al., 2005) and on tobacco cessation in smokers not intending to quit (Krigel et al., 2017). Recently, Miller and Rose have argued that DB may only be helpful to increase commitment once the decision to change has been made by the client, but may have adverse in ambivalent individuals (Miller & Rose, 2015). Thus, in spite of the abundance of evidence showing the positive effects of MI for addictive behaviours, it is still necessary to understand

how the different components of MI contribute to the treatment efficacy.

Aim of the Study

We aimed to compare the effects of different combinations of the main components of MI in the context of alcohol addiction.

Method

Participants

The sample comprised 45 individuals seeking outpatient help for drinking problems at two different clinical consultation centers in the Parisian region after being diagnosed by their physicians. Participants were invited based on the following inclusion criteria: (1) they met the DSM-IV-TR (American Psychiatric Association, 2000) criteria for alcohol dependence, (2) they reported alcohol as the principal drug of abuse, (3) at least 18 years of age, (4) French-speaking, (5) they were not currently in treatment for alcohol disorders, (6) they had been drinking in the past three months, and (7) they lived within commuting distance of the program site. The exclusion criteria were ongoing psychotherapy, a diagnosed personality disorder that could interfere with group dynamics, an unstable psychotic or neuropsychological disorder. The participants were informed about the study and provided their written informed consent.

The demographic characteristics are given in Table 1. The participants were predominantly male (58%), ranging in age from 21 to 80 ($M=44.6$, $SD=11.6$), most of them professionally active (56%). They reported an average of 10.4 abstinent days per month ($SD=8.3$) and 11.7 heavy drinking days per month ($SD=9.4$). Participants reported a serious level of alcohol-related problems with a mean score of 25.0 ($SD=6.52$) on the AUDIT and individual scores ranging from 11 to 38, indicating hazardous use or alcohol dependence. Most of them (73%) had already attempted to stop drinking in the past and relapsed.

Design and Procedure

Assessment

Individuals who met the inclusion criteria were presented with a brief description of the study and could choose to enroll or receive a treatment as usual. The study staff confirmed their diagnosis and eligibility by conducting an alcohol consumption history interview. The clients who provided

informed consent were randomly assigned to one of the three intervention conditions and completed the baseline assessment, including demographic variables (age, gender, education, work status, marital status) and a set of self-report questionnaires tapping into alcohol use and well-being. The post-test assessment 10 weeks later paralleled the baseline assessment. Two additional follow-up measurement waves had been planned, but the data could not be used due to very low response rate.

Intervention

The intervention consisted of five individual face-to-face MI sessions conducted over a ten-week period (approximately two sessions per month) within routine clinical settings. Each session lasted for one-hour and was based on the treatment guidelines and session outlines proposed by Miller and Rollnick (2002).

To assess the effects of different MI strategies, we used a between-group matched factorial design with three conditions. The clients were matched according to their self-reported alcohol consumption severity and former attempts to quit drinking and were randomly assigned to one out of three intervention groups. Three MI intervention strategies were isolated and progressively introduced at three time points. At the first session, we used strategies for enticing and eliciting change talk targeting internal motivation to change (IM) in all groups. At the second session, we introduced the decisional balance (DB) exercise in the second and the third groups only, while the first group continued to work using the same approach (IM). At the third session, we introduced strategies for eliciting and reinforcing self-efficacy (SE) in the third group only, while clients in the first and the second group had an MI session of the same type (IM in Group 1 and IM+DB in Group 2). Finally, participants in all three groups received two MI sessions focused on eliciting and reinforcing commitment to change. Thus, the number of each group reflects the number of varying MI strategies used.

The MI style and principles as described by Miller and Rollnick (2002) were used throughout the entire treatment. The study counsellor who delivered the intervention was a professional clinical psychologist with prior training and experience in MI. The training focused on practice and development of skills at minimizing resistance and eliciting change talk using various MI techniques, including reflective listening, asking open-ended questions, providing summaries and affirmations. The clinician received regular clinical supervision focused on supporting fidelity to the MI treatment and refining MI skills. None of the differences between the groups on demographic variables were statistically significant.

Table 1 Sociodemographic characteristics of participants

Baseline characteristic	Group 1 (IM)		Group 2 (IM+DB)		Group 3 (IM+DB+SE)	
	N	%	N	%	N	%
Gender						
Male	8	50	12	75	9	69
Female	8	50	4	25	4	31
Age						
18–44	6	38	9	56	6	46
45–64	10	63	4	25	7	54
65–80	0	0	3	19	0	0
Education						
Secondary (Collège)	2	13	3	19	4	31
High (Lycée/Bac)	3	19	2	12	3	23
Professional (CAP, BEP)	4	25	3	19	4	31
Undergraduate (Bac + 2)	3	19	6	38	1	8
Graduate degree	4	25	2	13	1	8
Employment status						
Employed	6	38	10	63	9	69
Unemployed, on benefits	6	38	2	13	3	23
Unemployed	2	13	1	6	1	8
Retired	2	13	3	19	0	0
Family situation						
Single	4	25	6	38	1	8
Married	6	38	5	31	5	38
Divorced/separated	3	19	3	19	6	46
Widowed	3	19	1	6	1	8
Other	0	0	1	6	0	0
Attempts to stop drinking						
0	6	38	5	31	1	8
1–2	8	50	10	63	10	77
3+	2	13	1	6	2	15
Adherence						
Full (5 sessions)	11	69	12	75	11	85
Partial (dropout)	5	31	4	25	2	15
After the 1st session	1		0		2	
After the 2nd session	3		4		0	
After the 3rd session	1		0		0	

IM internal motivation, DB decisional balance, SE self-efficacy

Instruments

Alcohol Use Disorders Identification Test (AUDIT)

Saunders et al. (1993) is a ten-item screening tool developed by the World Health Organization (WHO) to assess alcohol use, drinking behaviors, and alcohol-related problems. The AUDIT has been validated across genders for a wide range of racial and ethnic groups. Each response is scored 0 to 4 points, with higher overall scores indicating harmful and hazardous use. The French version was validated in a French-Swiss study (Gache et al., 2005), showing high internal consistency (Cronbach's $\alpha=0.87$) and validity evidence. As a main outcome

measure, we used AUDIT-C (Bush et al., 1998), which includes the first three AUDIT items focused on alcohol consumption and appears to be a practical and valid primary care screening tool for problematic alcohol use. The full version of AUDIT was only administered at baseline to quantify the general alcohol use severity in the sample. The psychometric characteristics of all measures are given in Table 2.

Alcohol Abstinence Self-Efficacy Scale (AASE)

This scale is similar to an existing English-language instrument (DiClemente et al., 1994) and includes 20 situations related to typical drinking situations. Participants are

Table 2 Psychometric properties of the measures and results of student t test for paired samples

Scale	α	Pre-test ^a		Post-test ^a		Comparison	
		<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>	<i>t</i> (<i>df</i> =33) ^b	<i>d</i>
AUDIT-C	0.54	7.94	2.82	1.65	2.77	10.72***	1.84
TDS							
TD overall	0.88	49.12	12.14	33.65	13.32	6.57***	1.13
TD social	0.90	14.79	5.44	10.15	4.98	5.03***	0.86
TD psychological	0.81	22.94	5.93	14.71	5.99	6.64***	1.14
TD habitual	0.63	11.38	3.94	8.79	4.14	3.22**	0.55
AASE							
ASE overall	0.91	50.44	13.35	67.50	13.69	6.47***	1.11
ASE social	0.85	14.15	5.32	19.12	5.13	5.16***	0.88
ASE psychological	0.88	18.94	6.68	27.29	6.31	6.48***	1.11
ASE habitual	0.80	17.35	4.57	21.09	3.86	4.76***	0.82
TSRQ							
Internalized	0.60	34.32	5.03	37.15	4.31	5.45***	0.94
External	0.70	24.53	7.52	23.21	7.62	1.63	0.28
Amotivation	0.86	4.82	3.56	3.71	1.68	2.36*	0.41
SWLS	0.87	16.82	5.94	19.24	5.71	6.05***	1.04
RSES	0.78	20.23	4.35	23.80	3.91	8.50***	1.55
HADS							
Anxiety	0.72	10.76	3.47	7.80	3.69	7.87***	1.57
Depression	0.81	8.80	4.72	6.48	4.40	4.85***	0.97

^a*N* = 34 for all scales, except for RSES (*N* = 30) and HADS (*N* = 25)

^b*df* = 29 for RSES and 24 for HADS. Two-tailed significance levels: **p* < 0.05. ***p* < 0.01. ****p* < 0.001

asked to rate their confidence in their ability to abstain from drinking, or abstinence self-efficacy, in each situation using a Likert scale (from 1 “not confident at all” to 5 “very confident”). For the French version (Csillik et al., paper in preparation), we selected 20 most frequently reported drinking situations from a French-language drinking habits questionnaire (Bouvard & Cottraux, 1996; Pelc, 1978) based on mean scores in a sample of 50 French patients (29 male and 21 female) diagnosed with alcohol dependence. The factor structure of the resulting item set was evaluated in a separate sample (*N* = 403). Exploratory SEM [$\chi^2(117) = 321.58$, CFI = 0.942, RMSEA = 0.066, 90% CI (0.057, 0.075), SRMR = 0.029] followed by bifactor CFA supported a model for 17 items with a general factor and three subdimensions, Social drinking (5 items, e.g.: “When I am in a group of people who drink”, “When I am enticed to drink by others”), Psychological drinking (7 items, e.g. “When I have troubles or difficulties that I would like to forget about”, “When I feel abandoned”), and Habitual drinking (5 items, e.g.: “With meal”, “When I miss the taste of alcohol”).

Temptation to Drink Scale (TDS)

This scale uses the same set of situations as the AASE (DiClemente et al., 1994) with different instructions:

participants are proposed to rate their temptation to drink in each situation using a Likert scale (from 1 “not tempted at all” to 5 “extremely tempted”). Validation studies (DiClemente et al., 1994) have found high reliability of both scales and a negative correlation ($r = -0.58$) between the temptation to drink and alcohol abstinence self-efficacy indices.

Treatment Self-Regulation Questionnaire (TSRQ)

Levesque et al. (2007) and Ryan et al. (1995); includes 15 reasons to stop or modify alcohol use reflecting different motivational regulation types, based on Self-Determination Theory. Participants are asked to rate the extent to which each answer corresponds to the reasons why they would stop or modify alcohol consumption using a 7-point Likert scale (from 1 “Does not correspond” to 7 “Corresponds exactly”). In line with the findings of Ryan et al. (1995), we calculated a total score for internalized regulations (combining identified regulations, e. g., “...because I personally believe this is best for my health” and introjected regulations, e. g., “...because I would feel bad about myself if I didn’t do it”), external regulations (“...because I am forced to do it by the legal system or by others”, “...because I am expected to do it”), and amotivation (“...I do not really know why”).

Satisfaction with Life Scale (SWLS)

Diener et al., (1985); French version by Blais et al., (1989) is a five-item measure with a seven-point Likert response scale assessing global life satisfaction. The SWLS is shown to have favourable psychometric properties, including high internal consistency and high temporal reliability. Scores on the SWLS correlate moderately to highly with other measures of subjective well-being.

Hospital Anxiety and Depression Scale (HADS)

Langevin et al., (2011 and Zigmond and Snaith (1983) was applied to assess general anxiety and depressive symptoms. The HADS consists of 14 items (7 assessing anxiety and 7 assessing depression symptoms) rated on a Likert scale from 0 to 3.

Rosenberg Self-esteem Scale (RSES)

Rosenberg (1965); French version by Vallieres and Vallerand (1990) is a ten-item unidimensional measure of global self-esteem. The RSES has good psychometric properties and has been validated for use with various clinical groups.

Data Analysis

Statistical analyses were performed in *Jamovi* 1.6. First, we compared the scores at pre-test and at post-test to evaluate the overall efficacy of the intervention. Next, to compare the effects of three intervention plans, we used ANCOVA with the pre-test score as a covariate and a group factor. This approach is preferable for randomized pretest–post-test designs (Dimitrov & Rumrill, 2003). To evaluate the magnitude of the effects, we calculated eta-squared (η^2) and omega-squared (ω^2), which provides a more unbiased estimate in small samples.

After the main hypothesis, we tested a planned linear contrast based on the expectation that each element of MI strategy makes an additional contribution to the intervention efficacy. We expected that a combination of eliciting change talk with the aim of increasing the internal motivation to change, using decisional balance, and eliciting self-efficacy approaches (Group 3) should be the most effective, followed by a combination of strategies for increasing the internal motivation to change and decisional balance (Group 2), with the minimum approach (Group 1) expected to be the least effective. To evaluate this hypothesis, we used a linear contrast followed by three pairwise group differences for each dependent variable.

We performed sensitivity analysis in *GPower* 3.1.9.2 to investigate the statistical power. Given our sample size, we could only attain high statistical power (0.80 or above) for

strong main intervention effects ($\eta^2 \geq 0.19$) and group differences ($d \geq 0.93$).

Missing Data Analysis

The descriptive statistics for the full sample at baseline are provided in Table 2. Eleven individuals (24%) dropped out of the intervention and did not complete the post-test. Additionally, four individuals failed to complete the RSES, and nine the HADS at post-test. Student *t* tests did not reveal any significant differences between dropouts and the rest of the sample at baseline. There was only a marginal difference for AUDIT-C ($d = 0.69$, $p = 0.052$), indicating that participants who dropped out had had a higher baseline score ($M = 9.73$, $SD = 1.56$) than those who remained in the intervention ($M = 7.94$, $SD = 2.81$). The proportion of participants who dropped out did not differ largely across groups, and their mean baseline AUDIT-C scores were comparable ($M = 10.20$, 9.50 , and 9.00 , respectively). To rule out the possibility of bias due to missing data, we repeated the analyses using multiple regression with FIML approach in *Mplus* 8.5. As there were no substantive differences in the number and direction of significant effects, we kept ANCOVA for the sake of simplicity.

Results

Overall Intervention Efficacy

The comparison between mean scores at pre-test and post-test is given in Table 2. The difference was strongest for AUDIT-C scores, indicating a pronounced decrease. Indeed, at post-test, 24 out of 34 participants (71%) reported a score of 0, indicating complete alcohol abstinence. The TDS and AASE indicated lower temptation to drink and higher self-efficacy to abstain from alcohol at post-test, compared to pre-test. The effects were somewhat stronger for the drinking behaviour related to psychological reasons, compared to social drinking and habitual drinking. The TSRQ scores showed a relatively small, but significant decrease of amotivation coupled with an increase of internalized motivation to reduce or stop taking alcohol. The effect size was comparable for the 3 introjected and 3 identified items taken separately ($d = 0.64$ and 0.58 , respectively). Interestingly, we found an increase of self-esteem and satisfaction with life coupled with a decrease in anxiety and depression at post-test.

Differences Between the MI Intervention Plans

The results of ANCOVA are given in Table 3. We discovered significant differences across groups for AUDIT-C scores,

Table 3 Results of analysis of covariance

	Estimated marginal means at post-test, M (SD)			Group effect			Linear contrast
	Group 1 (IM)	Group 2 (IM + DB)	Group 3 (IM + DB + SE)	<i>F</i> (<i>df</i> = 2)	η^2	ω^2	<i>p</i>
AUDIT-C	3.26 (0.74) _a	1.63 (0.71) _{ab}	0.05 (0.74) _b	4.67*	0.222	0.170	0.005
TDS							
TD Overall	36.52 (3.28) _a	39.20 (3.18) _a	24.72 (3.28) _b	5.58**	0.238	0.191	0.016
TD Social	11.62 (1.30) _a	11.34 (1.21) _a	7.37 (1.26) _b	3.59*	0.147	0.104	0.027
TD Psychological	16.41 (1.47) _a	17.65 (1.42) _a	9.79 (1.49) _b	8.05**	0.342	0.293	0.004
TD Habitual	8.85 (1.15) _{ab}	10.50 (1.11) _a	6.88 (1.17) _b	2.41	0.131	0.075	0.243
AASE							
ASE Overall	62.74 (3.59) _a	63.87 (3.42) _a	76.22 (3.56) _b	4.45*	0.198	0.150	0.012
ASE Social	17.72 (1.24) _a	16.91 (1.19) _a	22.92 (1.28) _b	6.44**	0.218	0.181	0.007
ASE Psychological	25.56 (1.70) _a	25.43 (1.64) _a	31.05 (1.69) _b	3.63*	0.178	0.126	0.029
ASE Habitual	19.41 (1.02) _a	21.06 (0.99) _{ab}	22.80 (1.02) _b	2.79	0.131	0.082	0.025
TSRQ							
Internalized	37.45 (0.78) _a	36.05 (0.76) _a	38.03 (0.78) _a	1.68	0.041	0.017	0.597
External	22.23 (1.40) _a	22.99 (1.34) _a	24.42 (1.41) _a	0.63	0.016	-0.009	0.279
Amotivation	3.74 (0.39) _a	3.24 (0.38) _a	4.19 (0.38) _a	1.52	0.051	0.017	0.409
SWLS	19.12 (0.71) _a	19.03 (0.67) _a	19.57 (0.71) _a	0.17	0.002	-0.009	0.664
RSES	22.50 (0.61) _a	24.55 (0.63) _b	24.35 (0.63) _b	3.41*	0.062	0.043	0.046
HADS							
Anxiety	8.17 (0.65) _a	7.87 (0.65) _a	7.23 (0.74) _a	0.46	0.010	-0.012	0.356
Depression	6.89 (0.78) _a	6.15 (0.78) _a	6.38 (0.88) _a	0.23	0.005	-0.018	0.674

IM internal motivation, DB decisional balance, SE self-efficacy

* $p < 0.05$. ** $p < 0.01$. *** $p < 0.001$. Means within rows with no subscripts in common are significantly different, $p < 0.05$

the estimated marginal means indicating the strongest effect of intervention in Group 3 (IM + DB + SE), followed by Group 2 (IM + DB), and the weakest effect in Group 1 (IM). Linear contrast was also significant, supporting the proportional effect hypothesis. In pairwise comparisons, however, only the difference between Groups 1 (IM) and 3 (IM + DB + SE) reached statistical significance.

For the temptation to drink, we found a somewhat different pattern of means, showing a significantly stronger effect of the intervention in Group 3 (IM + DB + SE), compared to the other two groups that did not differ from one another. The effect of the intervention was strongest for the temptation to drink for psychological reasons (such as emotional control difficulties or desire to “cheer up”). The linear contrast, however, was also significant, suggesting that the possibility of proportional association between the number of MI strategies used and intervention efficacy could not be ruled out. The effect for the temptation to drink in habitual situations was weaker and failed to reach significance.

For the abstinence self-efficacy, we observed an inverse pattern of means, indicating substantially the same result, that is, stronger effect of the intervention in Group 3 (IM + DB + SE), compared to the other two groups. This result was significant for all three AASE subscales, with the strongest effect for the confidence in one’s capacity to

abstain from social drinking. The linear contrast was, again, statistically significant.

RSES showed a slightly different pattern, indicating that the intervention was least effective in Group 1 (IM), but had an equally positive effect in Groups 2 (IM + DB) and 3 (IM + DB + SE). The linear contrast was still significant, suggesting a potential proportional association between the diversity of MI strategies and the improvement in self-esteem. The graphs of estimated marginal means for these variables are given on Fig. 1.

Finally, we did not discover any statistically significant differences across groups in the effects of MI on motivation to change, satisfaction with life, anxiety, or depression.

Discussion

The Effects of MI

Prior work has documented the efficacy of individual MI in alcohol abuse. However, few studies have focused on the efficacy of different MI strategies and none, to the best of our knowledge, have assessed their efficacy separately in a controlled between-group design. Our study attempted to fill this gap.

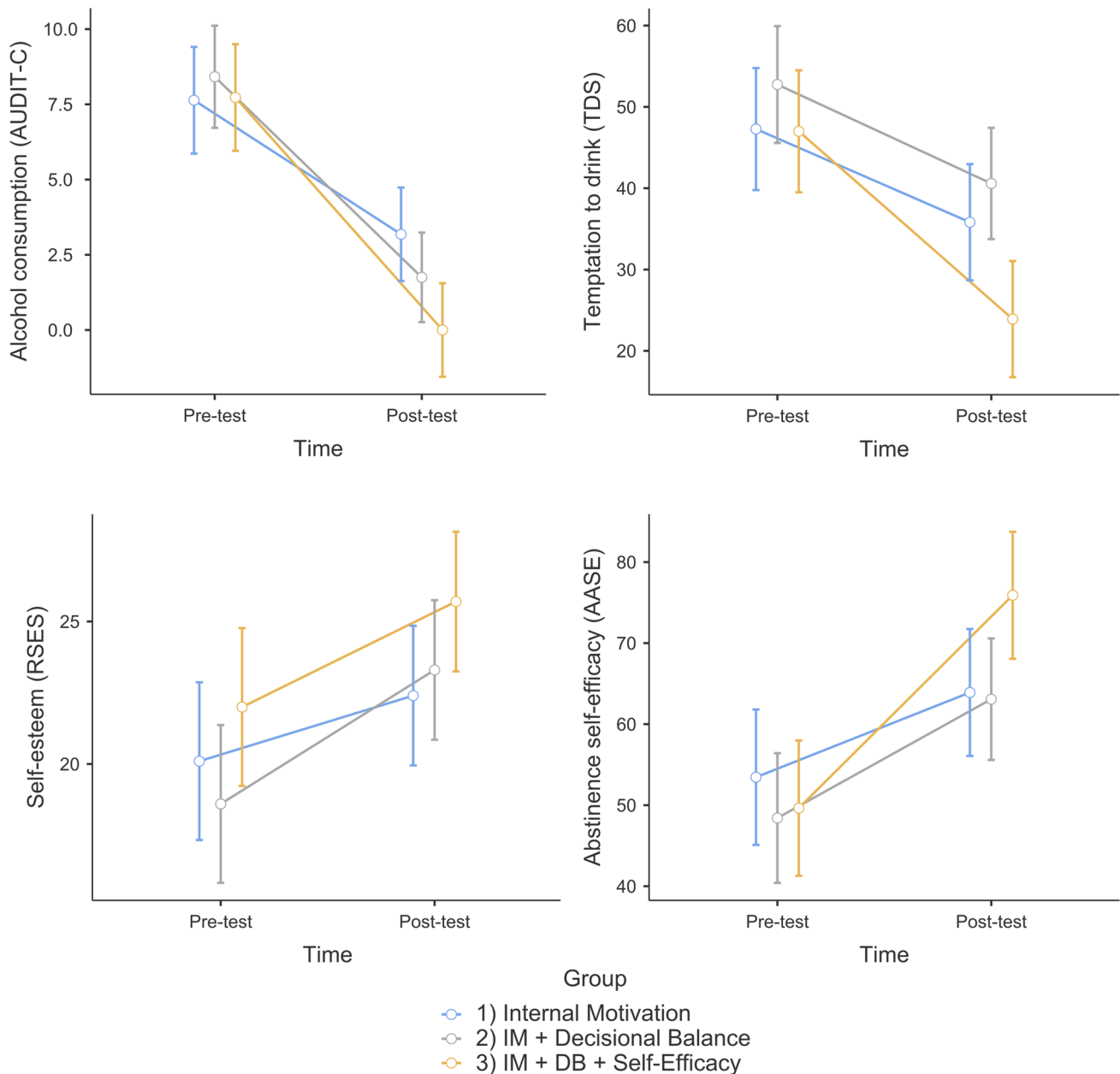


Fig. 1 Means with 95% confidence intervals for the AUDIT-C, TDS, AASE, and RSES scores

Overall, the MI intervention showed strong effects on our main outcome, alcohol consumption. We also observed moderate to strong effects reflecting increased alcohol abstinence self-efficacy and internal motivation to reduce or stop drinking, as well as decreased temptation to drink and amotivation to reduce or stop drinking. Given the absence of a control group, these findings are to be interpreted cautiously, as participant expectation effects and regression to the mean cannot be completely ruled out. However, the effect sizes we observed are consistent with other studies using short-term (less than 1 month post-treatment) follow-ups (Hettema

et al., 2005). The effect on self-efficacy seems particularly promising, given the recent findings (Müller et al., 2019) showing that post-treatment self-efficacy predicts motivation and self-efficacy to abstain one year later and alcohol abstinence in a five-year perspective.

We also found a significant change in well-being: an increase in self-esteem and satisfaction with life coupled with a decrease in anxiety and depression symptoms after the treatment, compared to pre-test. In recent years, the issue of increasing clients' well-being has been gaining importance in clinical settings and health care and has led

to development of a range of positive psychology interventions (Wood & Tarrier, 2010). Given the generally low levels of well-being in people with alcohol abuse disorders (Parackal & Parackal, 2016), these results constitute promising evidence for proposing MI as a positive psychological intervention for the clients in this clinical population.

MI Efficacy: Is It a Matter of Strategy Configuration?

The central question of the study was which MI intervention plan is the most effective at helping individuals to achieve a positive behavior change? Does the use of several MI strategies in combination predict better outcomes, by means of a synergistic effect? Three different formats of MI intervention combining various strategies have been tested in this study. In line with our proportional effect expectation, the third group that used a combination of three strategies demonstrated the strongest improvement on the alcohol consumption, temptation to drink, abstinence self-efficacy, and self-esteem measures, whereas the first group using a single component of MI emerged as the least successful at achieving change. These results suggest the need to combine various MI strategies across several MI sessions, in order to achieve higher effectiveness. Existing studies have also shown that the intensity of MI intervention is associated with better outcomes and accounts for nearly a quarter of the outcome variance.

There are specific MI strategies used to increase self-efficacy (e.g., fostering the clients' sense that they can accomplish a specific goal, such as abstinence, exploring their past successes, resources, and competences, etc.), and the differences in the use of these strategies may partly explain the differences in MI outcomes across studies. Given the well-known links between self-efficacy and performance that hold in various contexts, including addiction (DiClemente, 1986; Ilgen et al., 2005), it is hardly surprising that self-efficacy reinforcement had the strongest effect on the study outcomes.

The results concerning the effects and the role of decisional balance in determining these outcomes are not so clear. Self-esteem emerged as the only outcome where the effects of DB alone and DB combined with self-efficacy reinforcement were similar. Some studies have suggested that the efficacy of MI is positively related to the use of decisional balance (Apodaca & Longabaugh, 2009; LaBrie et al., 2006). However, a more recent and comprehensive review (Miller & Rose, 2015) suggests that DB may backfire in clients who are still ambivalent about change. Interestingly, in our study, all four individuals who dropped out from Group 2 did it after the second session, where DB was introduced. Generally, our findings suggest that DB might be effective when it is preceded by strategies to increase internal motivation to change and followed by self-efficacy strategies.

Future research should use more complex designs to investigate the interactions between those MI strategies in detail.

One of the main goals of MI is to increase intrinsic motivation to change. In line with this, our results show a significant increase of internal motivation across all groups. The absence of the differential effects on the TSRQ might be explained by the fact that motivation is addressed by the general MI approach shared by all three groups. However, given that Group 1, where only the internal motivation was targeted, consistently emerged as the least successful, we can expect that working on motivation without using strategies to build self-efficacy might not be sufficient in order to obtain a strong and sustained behaviour change. A recent study has found that abstinence self-efficacy predicts sustained motivation to abstain, and it is sustained self-efficacy, rather than motivation, that predicts long-term abstinence (Müller et al., 2019). Patients with higher self-efficacy may develop a sense of mastery as a result of experiencing success at controlling their consumption during treatment and this success may further motivate and reinforce behavioral changes. Therefore, the use of MI strategies aimed to reinforce self-efficacy may lead to its additional increase and further nurture the clients' internal motivation to change their alcohol consumption. These findings indicate the importance of using these strategies and of activating the client's self-efficacy and other competences and resources in order to achieve better outcomes.

The absence of differential effects of the three MI intervention plans on satisfaction with life, anxiety, and depression is not surprising. Given that these variables were not specifically targeted by the MI strategies used, similar positive changes in all three groups are in line with the observed efficacy of all three MI protocols against the primary outcome variables. However, the limitations of the study (small sample size and the absence of a longer-term follow-up) do not allow us to rule out the possibility of weaker or delayed differential effects of the three protocols on well-being indicators.

Conclusion

Despite the vast existing evidence of the general effectiveness of MI, until recently, studies of the differences in the effects of its various therapeutic strategies were lacking. The theory of MI efficacy (Miller & Rose, 2009) highlights two components of the process of MI, a relational and a technical one. However, the relative contributions of these two components of MI to its efficacy are yet to be clarified, and the differential effects of MI strategies targeting motivation and self-efficacy are yet to be investigated. By conducting the present study, we aimed to make a step in that direction.

Naturally, the study is not without limitations. First, a small sample size has only allowed to detect strong effects. Second, the lack of long-term follow-up data made it impossible to find out which of the intervention effects held in the long-term. Third, as only one therapist delivered the intervention, it was impossible to control for the possible effects of therapist expectations concerning the efficacy of different treatments. Fourth, the study was implemented before the decisional balance controversy and was designed and delivered according to the former description of MI (Miller & Rollnick, 2002). Finally, we did not use any specific measures besides regular supervision to control the treatment fidelity.

Nevertheless, we believe that our results shed some new light on the issues of MI efficacy and have applications for clinical practice and training in MI. To the best of our knowledge, this is the first study that has assessed the efficacy of MI strategies separately using a between-group design. We hope that this study will open avenues for further research into the complex processes that underlie the efficacy of MI, especially those allowing to activate clients' strengths and resources, in line with positive psychology interventions.

In order to ensure consistent treatment efficacy within MI, it is essential to identify its specific aspects, strategies, and intervention plans that influence the treatment outcomes and facilitate positive behavior change. Process research focused on the mechanisms of therapeutic change within MI could identify the relative importance of its active ingredients. A better understanding of the processes involved in MI can shed light on ways to improve its delivery and to help practitioners develop proficiency in this clinical method. Studies of the efficacy and the mechanisms of MI using a pluralistic methodological approach could also suggest new pathways for positive interventions by revealing the mechanisms of positive change. Finally, more research is needed into the individual moderators of treatment response to better understand the "indications" and "counter-indications" of specific MI strategies for different individuals in order to adapt the treatment to the client.

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