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Journal

Journal of Consulting and Clinical Psychology, 83(1)

ISSN

0022-006X

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Publication Date

2015-02-01

DOI

10.1037/a0037635

Peer reviewed

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J Consult Clin Psychol. Author manuscript; available in PMC 2016 February 01.

Published in final edited form as:
J Consult Clin Psychol. 2015 February ; 83(1): 56–67. doi:10.1037/a0037635.

In-session Processes of Brief Motivational Interventions in Two Trials with Mandated College Students

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Abstract

Objective—Each year, thousands of college students receive mandated intervention as a sanction for alcohol use or alcohol-related behavior. For these mandated students, Brief Motivational Interventions (BMIs) are currently the most efficacious individual intervention. However, little is known about how the technical (therapist behaviors) and relational (e.g., global ratings of therapist empathy) components of BMIs influence client language as well as subsequent change in alcohol use and consequences in mandated students.

Method—This study used the Motivational Interviewing Skills Code (MISC 2.0; Miller, Moyers, Ernst, & Amrhein, 2003) to code BMI sessions from two randomized clinical trials that facilitated significant reductions in alcohol use (Study 1, $n = 91$) and alcohol-related consequences (Study 2, $n = 158$) in mandated students.

Results—There were significant relationships among therapist behaviors, global scores, and client language both for and against change, yet there were no links between in-session client language and subsequent changes in alcohol use or problems. In contrast, relational aspects of MI (global ratings of therapist MI Spirit and client self-exploration) were most predictive of post-session alcohol use. Mediation models incorporating both technical and relational components revealed that higher levels of client self-exploration mediated the relationship between higher therapist ratings of MI Spirit and improved drinking at follow-up.

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Conclusions—Findings highlight the importance of considering how both technical and relational components of MI may influence alcohol use in mandated college students, and also suggest more exact analyses to better understand this complex relationship.

Keywords

Motivational Interviewing; therapy process; alcohol use; brief intervention; change language

Tens of thousands of college students violate campus alcohol policies and receive mandatory alcohol interventions each year (Porter, 2006). Brief Motivational Interventions (BMIs) are currently the individual intervention with the strongest empirical support for use with mandated students (Carey, 2012). BMIs are often delivered in one to two individual face-to-face meetings that are approximately 50 minutes long (Carey, Scott-Sheldon, Carey, & DeMartini, 2007), use motivational interviewing (MI; Miller & Rollnick, 2013) as the counseling approach, and often include personalized feedback to promote less risky drinking. Mandated students who receive individual BMIs have consistently shown lower alcohol consumption and alcohol-related problems relative to students in control conditions over follow-up periods ranging from 6 weeks to 15 months (Borsari & Carey, 2005; Carey, Carey, Henson, Maisto, & DeMartini, 2011; Carey, Henson, Carey, & Maisto, 2009; White, Mun, Pugh, & Morgan, 2007). BMIs, often variations of the Brief Alcohol Screening and Intervention in College Students (BASICS; Dimeff, Baer, Kivlahan, & Marlatt, 1999), at last count have been implemented in approximately 1,100 college sites in the United States (SAMHSA, 2008).

Understanding the mechanisms of client change in BMIs with mandated college students would help develop enhanced and refined interventions with a stronger impact. Most research thus far in this area has focused on student self-reported mediators of treatment effects. Only changes in perceived norms (Carey, Henson, Carey, & Maisto, 2010; Fachini, Aliane, Martinez, & Furtado, 2012) and self-reported protective behavioral strategies (Barnett, Murphy, Colby, & Monti, 2007) have been shown to mediate BMI effects in mandated students. A better understanding of therapist and client behavior change mechanisms that occur within BMI sessions and lead to therapeutic improvement is needed.

Research has indicated that within-session therapist and client processes of BMIs should be related to subsequent behavior change (Moyers, Martin, Houck, Christopher, & Tonigan, 2009), and Miller and Rose (2009) identified causal paths that provide a theoretical explanation for this relationship. The first path is from therapist clinical skills to client language. MI theory proposes that therapists facilitate behavior change by evoking client change talk, defined as “any self-expressed language that is an argument for change” (2013, p. 159). In contrast, sustain talk is defined as “the person's own arguments for *not* changing, for sustaining the status quo” (2013, p. 7). Ideally, therapists evoke change talk and reduce sustain talk via two therapeutic components: a *technical* component involving specific therapist behaviors designed to elicit client change language (such as use of reflective listening), and a *relational* component focused on global therapist and client factors (such as therapist empathy and client self-exploration; Miller & Rose, 2009). The second path is from client language to client outcomes. Specifically, in-session client change talk will predict

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subsequent changes in behavior, and sustain talk will predict lack of change (sustaining the status quo).

A recent meta-analysis examined the technical components of this model in 12 published studies evaluating MI addressing addictive behaviors (alcohol, illicit drugs, gambling) in a variety of populations (Magill et al., in press). Therapist MI-consistent (MICO; e.g., open questions, simple and complex reflections) behaviors were significantly correlated to increased change talk, but not decreased sustain talk. Therapist MI-Inconsistent (MIIN; e.g., warning) behaviors were significantly correlated with less change talk *and* more sustain talk. Client change talk was not significantly associated with outcome; sustain talk was significantly associated with *worse* outcomes. This meta-analysis provides valuable initial support for the theoretical links between therapist behaviors, client language, and intervention outcomes. That said, it focused on therapist technical skills, not relational components, and did not directly test the causal model of therapist evocation of client change talk influencing subsequent behavior change. To our knowledge, only one study found change talk to mediate the relationship between therapist MICO skills and client reductions in substance use (Moyers et al., 2009).

Research with college students has only partially supported the mediational model of MI efficacy, in which client language mediates the relationship between therapist technical MI skills and subsequent client behavior change. For example, MICO among peer counselors in BMI sessions has been linked to *increased* drinking at 3 months follow-up in both volunteer (Tollison et al., 2008; Tollison et al., 2013) and mandated (Mastroleo, Magill, Barnett, & Borsari, in press) students. These results are in contrast to MI theory, but these studies focused solely on therapist skills and outcome; client language and relational components were not evaluated. Another study examining BMI sessions with heavy drinking college students (Vader, Walters, Prabhu, Houck, & Field, 2010) revealed that MICO behaviors resulted in more client change talk *and* sustain talk (contrary to MI theory proposed by Miller and Rose, which suggests that MICO should results in less change talk), and change talk and sustain talk were both predictive of subsequent drinking in the expected directions (e.g., change talk linked to lower use, sustain talk linked to higher use). However, client language did not mediate the relationship between therapist language and outcomes. Furthermore, this study was not conducted with mandated college students and did not examine relational components of MI. Together, findings from prior work suggest the need for a comprehensive mediation analysis of the rapist behaviors, client speech, and subsequent drinking.

Relational components, both of the therapist and client, have also been linked to BMI outcomes in non-college student samples. Therapist relational variables that have received particular attention are acceptance, empathy and MI Spirit (a combination of partnership, acceptance, compassion, and evocation; Miller & Rollnick, 2013). With adults, therapist relational skills (including acceptance, warmth and MI Spirit) correlated significantly with measures of client involvement (e.g., collaboration, disclosure, disclosure of affect) during the session (Moyers, Miller, & Hendrickson, 2005). In-session relational aspects have also been linked with subsequent substance use in young adults: therapist empathy was associated with lower levels of drinking (Gaume, Gmel, Faouzi, & Daeppen, 2008), and

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increased MI Spirit has been shown to predict less frequent marijuana use (McCambridge, Day, Thomas, & Strang, 2011). More recently, MI Sprit has been linked to both decreased drinking (US trial in Bertholet, Palfai, Gaume, Daeppen, & Saitz, 2014) as well as increased drinking (Swiss Trial 2 in Bertholet et al., 2014; Mastroleo et al., in press). Regarding client relational variables, self-exploration has been linked to increased drinking in adults (US Trial in Bertholet et al., 2014).

In sum, there have been conflicting findings as to what degree therapist technical skills, client language, and relational variables are related to each other and to drinking outcomes for young adults. Furthermore, all of these variables have not been simultaneously analyzed in order to provide a stringent test of the mediational model of MI efficacy. The present study represents an important step in clarifying this issue though the examination of coded session tapes of BMIs from two separate randomized clinical trials with mandated students at separate college campuses. Participants in one trial (Carey et al., 2009) reported significant reductions in alcohol use 12 months following a BMI. In the other trial (Borsari et al., 2012) students reported significant reductions in alcohol-related consequences 9 months following a BMI. The similarity and high fidelity of the BMIs implemented in both trials, as well as the participants' sustained changes in alcohol use and problems, provided a unique opportunity to test theory-based hypotheses regarding how MI works. Specifically, we conducted the first simultaneous examination of the paths among both technical and relational components of MI on change talk and sustain talk as well as subsequent alcohol use and problems.

We examined these relationships in three sequential steps. First, we examined the associations in the path between therapist behaviors and client response (see Figure 1, Path a). We hypothesized that: (1) therapist MICO behaviors would be positively associated with client change talk and the client global rating of self-exploration and negatively associated with sustain talk; (2) therapist MIIN would be positively associated with client sustain talk and negatively associated with client change talk and client self-exploration; and (3) therapist relational global ratings (empathy, acceptance, and MI spirit) would be positively associated with more client change talk, less client sustain talk, and higher levels of client self-exploration. Second, we examined associations among the second path linking client change talk, sustain talk, and client self-exploration to post-session alcohol use and problems (see Figure 1, Path b). We hypothesized that: (4) client change talk and self-exploration would be negatively associated with subsequent alcohol use and problems; and (5) client sustain talk would be positively associated with subsequent alcohol use and problems. Third, we examined an integrated mediation model in which therapist behaviors and global ratings were associated with client change talk, sustain talk and client self-exploration, which in turn would be associated with alcohol involvement (both use and problems) at the 6-month follow-up. We hypothesized that (6) client change talk and self-exploration would mediate the relationship between MICO and reductions in alcohol involvement, and that (7) client sustain talk would mediate the relationship between therapist MIIN and alcohol use and problems.

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Method

Design

This project coded audio recordings of BMI sessions from two randomized controlled trials with students who were required to attend a session of alcohol education following an alcohol-related disciplinary violation. Both trials demonstrated within- and between-group reductions across a range of drinking behaviors. We focused on outcomes at 6-months post-BMI, an assessment point that was common across both trials.

Study 1—Participants were randomly assigned to either a BMI (*n*= 99) or a standard education (SE) condition (n=99) that consisted of a session with a CD-ROM program (Carey et al., 2009; Alcohol 101plus; Century Council, 1998). Follow-ups were conducted 1, 6 and 12 months after the interventions. Participation in a BMI was associated with fewer drinks per week and fewer heavy drinking episodes than participation in the SE. BMIs resulted in significant improvement on multiple outcomes (drinks per week, binge frequency, peak BAC, and problems). Supplemental analyses documented an overall reduction in alcohol use in both conditions after the sanction and before the intervention; however, the BMI, but not the SE, produced additional reductions in alcohol use (Carey et al., 2009).

Study 2—The second trial evaluated stepped care with mandated students (Borsari et al., 2012). All participants (*N* = 598) received Step 1: a 15-minute Brief Advice session that included the provision of a booklet containing advice to reduce drinking. Participants were assessed six weeks after receiving the Brief Advice, and those who continued to exhibit risky alcohol use (*n* = 405) were randomized to Step 2, a 45-60 minute BMI (*n* = 193) or an assessment-only control (*n*= 194). Follow-up assessments conducted at 3, 6 and 9 months revealed that the participants who received a BMI significantly reduced the number of alcohol-related problems compared to those who received assessment-only, despite no significant group differences in alcohol use.

Participants and Procedure

Participants in Study 1 and 2 were undergraduate students age 18 years and older, who violated campus alcohol policy at one of two four-year, private universities in the Northeast. In both studies, students were referred for mandatory counseling following adjudication by campus judicial affairs staff. Students who declined to participate in the project received treatment as usual. Institutional Review Boards at Brown University and both study sites approved all study and coding procedures.

Follow-up Assessments

For both studies, participants received telephone or email reminders to complete web-based follow-up assessments. Participants in both studies completed follow-up assessments 6 months after the BMI (follow-up rates: Study 1 = 63%, Study 2 = 87%).

Measures

Demographic information—Participants provided information regarding their gender, age, weight, year in school, and race/ethnicity.

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Alcohol use—In both studies, alcohol use outcome variables were obtained using an adaptation (Borsari & Carey, 2000, 2005) of the *Alcohol and Drug Use Measure* (Collins, Parks, & Marlatt, 1985). Drinks per week were derived from a 7-day grid representing typical drinking week in the last month. Number of heavy drinking episodes was measured using a gender-specific question that asked participants to report the number of times that they consumed 5 or more drinks for males (4+ for females) in the past month. This measure also recorded the amount of time spent drinking for each of those episodes to calculate (along with gender and weight) the students' estimated peak and typical BAC (pBAC and tBAC, respectively), using the Matthews & Miller (1979) equation and an average metabolism rate of 0.017 g/dL per hour.

Alcohol-related problems—Study 1 used *the Rutgers Alcohol Problems Index* (RAPI; White & Labouvie, 1989), a 23-item list of problems associated with alcohol that was developed and validated for adolescents aged 12-21. Study 1 also assessed 12 problems from the College Alcohol Survey (Wechsler, Lee, Kuo, & Lee, 2000) as well as 4 additional problems (have a hangover, say or do something embarrassing, say harsh/cruel things, ridden in a car with a driver who had too much to drink). Study 2 used the *Young Adult Alcohol Consequences Questionnaire* (YAACQ; Kahler, Strong, & Read, 2005; Read, Kahler, Strong, & Colder, 2006), a 48-item measure of alcohol-related consequences experienced in the past month. Both studies utilized 1-month recall periods. As there were 21 identical problems assessed in both Study 1 and Study 2, we used these items to construct an alcohol-related problems scale that demonstrated good internal consistency at the baseline (α = .83) and 6-month (α = .86) assessments.

Counselor in-session behaviors—The Motivational Interviewing Skill Code (MISC 2.0; Miller et al., 2003) was used to code the BMI sessions. The MISC assesses 19 specific counselor behaviors that fall into three main categories: MI-consistent (MICO; affirm, emphasize control, open question, advise with permission, raise concern with permission, simple reflection, complex reflection, reframe), MI-inconsistent (MIIN; advise without permission, raise concern without permission, confront, direct, warn), and Other (facilitate, filler, closed question, giving information, support, structure).

Client in-session behaviors—The MISC also has guidelines for coding client utterances related to the target behavior change, which in this investigation was alcohol use reduction or cessation, avoidance of future alcohol-related negative consequences, or use of harm reduction strategies (e.g., using a designated driver, not engaging in drinking games). Seven MISC client language codes (reason, desire, need, ability, commitment, taking steps, other), were used and the valence of the codes reflected movement toward change (change talk) or away from change (sustain talk). Client utterances that were not related to the target behavior were coded as follow/neutral; these included asking a question, reporting what had happened to them, or just following along with the conversation (e.g., “Uh huh,” “yeah”).

Global ratings—Global ratings are based on the entire session interaction and are designed to capture the overall *gestalt* of the therapist-patient relationship. Three global measures of therapist skillfulness were coded on a 7-point Likert scale: empathy,

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acceptance, and MI spirit (the latter captures respect for client autonomy, use of a collaborative approach, and therapist evocation of the client's own reasons for change). A single 7-point global rating of client self-exploration during the treatment session reflects the client's highest level of self-exploration during the session.

Interventions

The format of sessions in both studies was similar. Participants met with interventionists in private rooms, and the BMI was designed to last approximately 45-60 minutes. At the beginning of the BMI, all participants received a personalized feedback form, populated with information provided during the baseline assessment, which helped structure subsequent discussion. Both presented didactic information on BAC, drinking games, and tolerance along with personalized feedback on those topics. Harm reduction theory (cf. Marlatt & Witkiewitz, 2002) was also explicitly discussed in all BMIs; both interventions concluded with goal setting and discussion of harm reduction strategies. Interventionists delivering the BMI were trained in motivational interviewing (MI); this training specifically addressed both style (e.g., empathy) and technique (e.g., reflective listening).

The BMI manual used in Studies 1 and 2 had been developed and refined through previous randomized trials with volunteer (Borsari & Carey, 2000; Carey, Carey, Maisto, & Henson, 2006) and mandated (Borsari & Carey, 2005; Borsari, O'Leary Tevyaw, Barnett, Kahler, & Monti, 2007) college students. There were two notable differences between the studies. First, the Study 2 BMI also addressed alcohol-related expectancies and their influence on alcohol use, while Study 1 did not. Second, the Study 2 BMI compared specific alcohol-related consequences reported both at baseline and the six-week assessment (i.e., the assessment that determined whether participants were included in the stepped-care arm); the Study 1 BMI only addressed consequences reported at the baseline assessment.

Interventions: Training and Supervision

The three Study 1 interventionists were all female, non-Hispanic White, in their mid-20's, had a Bachelor's level education, and completed an average of 30 BMIs each (range of 21 to 43). In Study 2, the 11 interventionists (2 males and 9 females; 9 non-Hispanic White, 1 Asian, 1 Hispanic) were PhD students or postdoctoral fellows in their 20's or early 30's and completed and average of 15 BMIs each (range 2 to 58). Study 1 and Study 2 used similar methods to ensure the consistent delivery of the BMI; in both studies interventionists followed an intervention manual and received 20 hours of training on MI, including reading, didactic information, and role-play exercises. Interventionists completed supervised, full session role-plays until they met the study threshold of competency, a subjective judgment by the project PIs who had developed the interventionist manual. Interventionists in both studies then received weekly group supervision using videotape (Study 1) or audiotape (Study 2) to maintain fidelity to manual content and MI style. In both projects, weekly group supervision was held that included case presentations, review of actual session tapes, and supervisor feedback regarding the use of BMI techniques and the interventionists' adherence to the protocol. Fidelity in Study 1 was evaluated by randomly selecting videotapes of the session (20%) and rating them using content checklist of 54 items as well as evaluating 10-minute segments the Motivational Interviewing Skills Code (Moyers, Martin, Catley, Harris,

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& Ahluwalia, 2003). Fidelity in Study 2 was monitored by listening to randomly selected BMI sessions in their entirety and providing the interventionists with written feedback regarding provision of feedback content and adherence to MI.

Process Coding Measurement and Procedure

In Study 1, 91 of 99 sessions (92%) were video recorded, and comprise the sample for the current study. As the MISC 2.0 recommends coding audiotapes rather than videotapes (Miller et al., 2003), audio files were created from the videotapes in order to make the format consistent between Study 1 and 2. In Study 2, 158 of 193 (82%) BMI sessions were recorded. Therapist error, recorder malfunction, and unintelligible tapes account for the missing cases.[1]

Training—The BMI sessions were transcribed, and five trained bachelors- and masters-level raters coded therapist and client language variables with the MISC 2.0. The study raters received approximately 40 hours of training in the MISC coding system, and participated in ongoing weekly supervision. The training protocol involved graded learning tasks, beginning with simple to increasingly complex identification of therapist and client behaviors. Raters progressed through a training library of role play and pilot audiotapes until rating proficiency was achieved (an intraclass correlation coefficient of .75 or greater).

Coder reliability—Weekly supervision meetings addressed coder questions, specified decision rules, and provided targeted training on low agreement items. A coding log book was used to help track coding decision rules throughout the study, and a 20% random selection of cases (n = 28 for Study 1; n = 38 for Study 2) was double-coded to verify inter-rater reliability. Intraclass correlation coefficients (ICCs; two-way mixed, single measure) were calculated for each variable to determine interrater reliability across rater pairs (using the 20% sample of double-coded tapes). As can be seen in Table 1, reliabilities ranged from the "good"to "excellent" range, according to criteria established by Cicchetti (1994). The notable exceptions were the therapist global ratings in study 1, which were in the "poor" (ICCs < .40) to "fair" range (ICC's from .40 to .50). That said, other studies that have coded therapist globals (Apodaca, Magill, Longabaugh, Jackson, & Monti, 2013; Bertholet et al., 2014; Gaume et al., 2008; Moyers et al., 2005; Vader et al., 2010) have obtained similar interrater reliabilities (.20 - .62 for acceptance, .22 – .53 for empathy, and .45 - .67 for MI Spirit). Therefore, we decided to retain these global ratings in subsequent analyses.

Data Reduction

Consistent with previous research (Gaume, Bertholet, Faouzi, Gmel, & Daeppen, 2010; Vader et al., 2010) and with the MISC 2.0, MI-inconsistent individual codes (advise without permission, raise concern without permission, confront, direct, warn) were combined into a MIIN category. Similarly, we combined individual therapist MI-consistent codes (affirm, emphasize control, open question, advise with permission, raise concern with permission,

[1]Participants in Study 1 whose BMIs were videotaped (n = 91) were more likely to be White than those who were not (n = 8) and non-videotaped participants reported less drinking than videotaped participants (ps < .05); however, there were no group differences on alcohol-related problems. Participants in Study 2 whose BMI sessions were audiotaped (n = 158) did not differ from those whose BMI sessions were not audiotaped (n = 35) on demographic or outcome variables (ps > .05).

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reframe) into a MICO category. Other coded therapist utterances (facilitate, filler, closed question, giving information, support, structure) were combined into an Other category. For clients the seven language codes captured in the MISC (reason, desire, need, ability, commitment, taking steps, other) reflecting movement toward change were collapsed into the general construct of change talk. The same seven categories of language that reflected movement away from change were collapsed into the construct of sustain talk, also summed across the session.[2] Client utterances not related to drinking behavior were coded as a separate "follow-neutral" category.

Table 1 contains descriptive information about the coded therapist and client behaviors for each study. In both studies, therapists exhibited a large number of MI-consistent statements and very few MI-inconsistent statements. Global therapist ratings were generally high, indicating good adherence to MI principles. Regarding client language, the participants averaged more than twice as much change talk as sustain talk. Comparisons between the two studies revealed that sessions in Study 1 were shorter and contained fewer total utterances than the sessions in Study 2; however, when therapist and client language codes were expressed as a proportion of all utterances (not presented) there was a similar distribution across studies. Therapist global ratings in Study 1 were significantly lower than those in Study 2; however, the client self-exploration global ratings were similar.

Study Demographics

We examined baseline sample descriptors (including demographic factors and baseline alcohol outcome variables) and summary scores for language counts and the global ratings separately by study. Demographic information for the sample is provided in Table 2. Participants in Study 1 were slightly older, less likely to be male, and more ethnically diverse than the participants in Study 2. Baseline drinking patterns also differentiated the samples: Study 1 participants drank more frequently but consumed lower quantities per week and per occasion than did Study 2 participants.

Analysis Plan

Descriptive analyses of the two studies revealed that (a) participants in the two studies reported significant differences in baseline alcohol involvement, (b) the in-session technical components were remarkably similar, yet (c) the studies differed on global ratings. Therefore, we conducted the analyses examining both path a and then path b (Figure 1) separately by study in order to determine the significance of similarities and differences in the effects of in-session processes on drinking outcomes.[3] To do so, we first calculated inter-correlations among the observed within-session measures (language counts and global ratings) and then correlated these within-session measures with five alcohol consumption

[2]In order to evaluate the proportion of change talk to other utterances, some researchers have also constructed composite codes such as CT/CT+ST+FN (Apodaca et al., 2013). To examine proportions of client language, we conducted parallel correlations, regression models and path analyses with these variables rather than raw behavior counts of ST and CT. There was no appreciable difference in the pattern of findings.

[3]An alternate strategy would have been to combine the samples at the outset and present findings for the merged sample. We also conducted exploratory analyses identical to those presented using a combined dataset. Even with the increased statistical power of these analyses, there were no consistent or compelling differences from the study-specific analyses. Therefore we present them separately to demonstrate replication and generalizability of findings.

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and consequence measures measured at 6 months post-intervention (drinks per week, number of heavy episodic drinking, pBAC, tBAC, and alcohol-related problems). Next, we used MPlus (Muthen & Muthen, 1998-2012) to regress these five alcohol outcomes at 6-month follow-up on each within-session measures in each study. Models controlled for sex, baseline responses on the predictor variables, and the total number of client and therapist utterances per session. As therapists were nested by study, we modeled therapists using the clustered data option in Mplus to adjust for nonindependence.

Finally, we conducted structural equation models to examine the hypothesized causal relationships among therapist language and globals, client language and self-exploration, and the five alcohol outcomes. In order to maximize the statistical power of our path analysis models in MPlus, we pooled the data across studies. The mediation models included the therapist behaviors (MICO, MIIN) and therapist global ratings (acceptance, empathy, and MI Spirit) as exogenous variables, the two general client language codes (change talk, sustain talk) and client self-exploration global rating, and a given alcohol outcome (see Figure 1).[4] These models controlled for the corresponding baseline alcohol outcome measure, sex, number of utterances, and study, and we again adjusted for nonindependence of therapists using the clustered data option. Path analysis models were estimated in MPlus (Muthen & Muthen, 1998-2012) and mediation was tested using the delta method for the indirect effect (MacKinnon, 2008).

Results

In-Session Processes

Correlations among therapist language, client language, and global ratings Study 1 and Study 2 are presented in Tables 3 and 4, respectively. Regarding the associations between therapist and client behaviors, MICO was positively associated with change talk, sustain talk, and client self-exploration with roughly equal magnitude in the two datasets (*r's*=.48 to .66 for Study 1; *r's*=.41 to .62 for Study 2). In contrast, MIIN operated differently in Study 1 versus Study 2, with positive associations with change talk, sustain talk, and client engagement in Study 1, but negative associations in Study 2. Of particular interest, global ratings of the therapist and client demonstrated the most consistent and significant relationships in both studies, being positively associated with MICO but negatively associated with MIIN, as well as showing positive relationships with change talk and sustain talk.

In-Session Processes and Alcohol Outcomes

Table 5 presents correlations between in-session processes and the five drinking outcomes. Regarding therapist language, both MICO and MIIN were positively associated with alcohol-related problems at 6 month follow-up. More significant associations emerged in Study 2; however, instead of the hypothesized MICO and MIIN associations, we found therapist Other behaviors were linked to increases in drinking and problems. Regarding

[4]We conducted ancillary models where we treated alcohol involvement as a latent variable with the alcohol consumption and problem variables as manifest indicators, but substantive findings were similar. Thus, we chose to report the individual outcomes to maintain consistency with the rest of the manuscript.

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client language, sustain talk was positively related to drinking in Study 1, whereas client follow neutral utterances were positively associated with alcohol use (heavy episodic drinking, pBAC and tBAC) in Study 2 (r=.20, r=.17, r=.19). Therapist global ratings were negatively related to drinking and problems in both studies, with stronger associations for weekly drinking for Study 1 and pBAC and tBAC for Study 2.

We then conducted a series of regressions for each of the five outcome variables. As can be seen in Table 6, for both Study 1 and 2, few associations emerged between therapist MICO, MIIN, or Other on any outcome variable. However, change talk was negatively associated with alcohol use (heavy episodic drinking and tBAC) in Study 2. In Study 1, therapist global ratings of acceptance and empathy were both negatively associated with weekly drinking and/or heavy episodic drinking. A similar pattern was seen in Study 2, with a negative relationship between global ratings (acceptance, empathy, and MI Spirit) and typical BAC. Client self-exploration was negatively associated with alcohol use in Study 2.

Integrated Model

Finally, we conducted path models on the full (combined) sample to examine the hypothesized causal relationships among therapist language, client speech, and alcohol outcomes, controlling for the corresponding baseline alcohol use measure, sex, number of utterances, and study, and modeling therapist as clustered variable.[5] For each of the five outcome variables, we calculated the paths from therapist language to client utterances (path a), the paths from client utterances to outcomes (path b), and the indirect (mediated) effect from therapist language and global ratings to outcomes (see Figure 1). Regarding therapist language to client utterances, across the five outcomes the paths from MICO to client utterances were each significant at $p < .001$ for change talk and sustain talk (standardized β ranged from β = .56 to β = .57 for change talk and from β = .49 to β = .51 for sustain talk). None of the paths from MIIN to client speech were significant in any of the models ($-.05 < \beta < .05$).[6] Regarding therapist global ratings, paths for acceptance and empathy to client language and self-exploration were all non-significant (all p's > .10). In contrast, the paths from MI Spirit to self-exploration were significant in all 5 models (β = .49 to β = .52; p's< .001). None of the paths from client variables to outcomes (path b) reached significance with the exception of the path from Client Self Exploration to Weekly drinking (β = -.11).

The only mediated effects to approach significance were the path from Global Therapist MI Spirit to Client Self Exploration to alcohol use (weekly drinking and tBAC, $p's$< .09). These were negative mediated effects, such that global therapist MI Spirit was positively

[5]We conducted additional models to explore whether mediation was evident when looking at each study separately; none of these mediated effects reached significance in a single sample.

[6]The latest version of the Motivational Interviewing book (Miller & Rollnick, 2013) distinguishes between “preparatory” and “mobilizing” forms of change talk and sustain talk. Specifically, preparatory talk represents consideration of change and mobilizing talk is indicative of movement toward a resolution of a change decision. We were intrigued as to how results might be altered if these two forms of talk were separated in the analysis. In an exploratory analysis, we grouped the client language subcodes of desire, ability, reasons, and need into two composite categories: preparatory change talk and preparatory sustain talk. Similarly, we grouped the commitment and taking steps subcodes into two new composite variables: mobilizing change talk and mobilizing sustain talk. We then repeated the path analyses described above. The pattern of results remained similar to our initial results: preparatory and mobilizing change talk and sustain talk were not associated with any drinking outcomes. Hence, dividing change talk and sustain into the conceptual groupings of “preparatory” versus “mobilizing” language did not seem to increase the explanatory value of the current analyses.

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associated with Client Self Exploration, which in turn was negatively associated with alcohol use.

Discussion

To our knowledge, this is the first study to combine two studies in order to examine therapist and client in-session technical and relational components of motivational interviewing delivered to mandated college students. Despite using nearly identical manuals and training and supervision protocols, study differences were evident in the relationships among therapist and client variables as well as drinking outcomes. In addition, although the ratings of in-session technical and relational components appeared to be consistent with MI theory, the link between client language and self-exploration to post-session alcohol outcomes was weak and inconsistent. Taken together, these results provide limited support for the technical and relational aspects of MI theory, as well as some counter-intuitive findings that suggest alternate explanations of how BMIs facilitate behavior change in mandated students.

Regarding the link between therapist and client language, the technical and relational components of MI generally performed as hypothesized. Specifically, therapist technical (MICO) skills and global ratings were associated with increased client change talk and self-exploration (hypotheses 1 and 3). Furthermore, the relational components of MI, as measured by the global therapist and client ratings, also demonstrated theoretically-consistent relationships. Namely, MICO behaviors were positively associated with therapist global ratings of acceptance, empathy, MI spirit, and client engagement. The strong positive relationship between MICO behaviors and sustain talk replicates the previous findings in non-mandated college students that MICO elicits both change and sustain talk (Vader et al., 2010). Taken together, these findings suggest that sustain talk is not necessarily something to be avoided. Instead, it may very well be a natural reflection of the ambivalence that MI is designed to elicit from the client and resolve. The presence of both change talk and sustain talk can be conceptualized as ambivalence or change exploration (Gaume et al., 2010). This is consistent with MI theory, which posits that sustain talk is “simply one side of the argument for change” (Miller & Rollnick, p. 197). The presence of both change talk and sustain talk also may reflect the reality of the student participants' experience that drinking is enjoyable and normative, and that change involves risk reduction but not elimination of the target behavior. That is, BMIs in both studies (and with college students in general) had a harm reduction approach and thus the presence of both change talk and sustain talk may reflect that the participant was considering both changing (i.e., reducing harm) and maintaining the status quo (i.e., continuing to drink).

Also of interest were the inconsistent relationships between therapist MIIN behaviors such as providing advice without permission, directing, confronting, or warning and client language (hypothesis 2). In Study 1, MIIN occurred less frequently and demonstrated positive associations with both change talk and sustain talk. In contrast, MIIN occurred twice as often in Study 2 and was *negatively* associated with both change talk and sustain talk. This suggests that at higher levels MIIN may reduce, or “squash,” both change talk and sustain talk in clients. Taken together, these findings indicate that MICO behaviors appear to be the most effective way to facilitate the exploration of ambivalence, yet the occasional

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MIIN behaviors are not necessarily harmful. We note that the examples of MIIN in the current studies emerged occasionally in the context of an intervention dominated by MICO. Thus our data are consistent with findings of Moyers and colleagues (Moyers et al., 2005) that a skillful MICO intervention can tolerate some MIIN. In a larger context, training interventionists to use MICO to selectively solicit change talk exclusively at the expense of sustain talk may limit the evocation of a significant part of the story the client is trying to communicate.

To fully evaluate whether the presence of sustain talk is useful, its relationship to positive behavior change must be established. This has yet to be done; in contrast, sustain talk has been consistently linked to worse outcomes (Magill et al., in press). Despite the observed relationships among both technical and relational components of MI during the session, the expected link between client language and outcomes was not supported (hypotheses 4 and 5). Instead, only the therapist and client global scores were consistently and negatively associated with subsequent alcohol use and problems in both studies. Furthermore, client self-exploration, not client change talk, mediated the relationship between therapist MI spirit and weekly drinking. This finding is perhaps indicative of a “sum is greater than the whole of its parts” phenomenon, in which the process of MI rather than specific client utterances are more linked to change. Specifically, tallies of the MICO and MIIN therapist behaviors and client change talk and sustain talk may not adequately represent in-session communication and relationship. Instead, continued development and incorporation of MISC global scores, or other measurements of the therapist-client relationship such as the therapeutic alliance (see Horvath, Del Re, Fluckiger & Symonds, 2011), may be vital to understanding the how MI influences client behavior.

The difference between ambivalence and discord may highlight the need to consider both technical and relational components of MI. As discussed earlier, the presence of client change talk and sustain talk may represent the discussion of ambivalence about a behavior, where as the therapist and client global ratings may best reflect the presence of discord in the therapeutic relationship. Discord represents a fissure in the therapist-client relationship or alliance (Miller & Rollnick, 2013), and discord may very well be more predictive of increases in alcohol use and problems. Indeed, high levels of therapist empathy have been consistently linked to improved outcomes in the addictions field, and the role of empathic listening skills is posited to foster this relationship (Moyers & Miller, 2013). In both Studies 1 and 2, therapist global ratings of acceptance, empathy and MI spirit were negatively associated with MIIN, indicating that therapist behaviors that are inconsistent with MI theory may negatively influence the overall *gestalt* of the session (as measured by the global ratings), again consistent with previous research (Moyers et al., 2005). Furthermore, in both studies, therapist overall global ratings of acceptance, empathy and MI spirit were associated with higher rates of client change talk and engagement, which is consistent with MI theory, as well as sustain talk, which is not. This further suggests that sustain talk is not necessarily representative of discord in the context of a harm reduction intervention. Therefore, therapist use of MICO skills, as well as being comfortable with the presence of sustain talk, may be key strategies in providing a calm, eliciting and collaborative environment that fosters the client's disclosure of the pros and cons of a target behavior in an engaged fashion.

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While interesting in-session links between therapist and client behaviors were observed, the link between therapist technical skills, client language, and outcomes was not evident in this study (hypotheses 6 and 7). Perhaps more detailed process approaches such as sequential analyses (e.g., Gaume et al., 2010; Moyers et al., 2009) could detect this relationship. For example, it remains to be determined which MICO and MIIN skills are most effective at enhancing change talk. Although MIIN may inhibit client language, it is not known which components (e.g., confronting, offering advice without permission) are especially effective at doing so. However, aggregate process codings like those used here cannot detect if giving information comes before or after change talk and/or sustain talk. Furthermore, it may be that certain classifications of change talk (desire, ability, reason, etc.) or when it occurs in the session (beginning, middle or end) may be more predictive than the sum of discrete utterances during the session (e.g., Amrhein, Miller, Yahne, Palmer, & Fulcher, 2003). Participant characteristics may also influence in-session processes. For example, mandated women respond significantly better to a BMI than to a computer-delivered intervention (Carey et al., 2011; Carey et al., 2009), participants low in personal attributions to the referral event responded significantly worse to a BMI than a computer-delivered intervention (Mastroleo, Murphy, Colby, Monti, & Barnett, 2011), and participants involved in an incident requiring medical or police attention responded significantly better to a BMI than to written feedback alone (Mun, White, & Morgan, 2009). Therapist characteristics also may play a role. For example, the interventionists in study 2 were more educated and may have been more experienced than those in Study 1. These or other characteristics may significantly interact with the therapeutic processes.

The findings of the study should be considered in the context of some limitations. First, participants in both studies were predominately non-Hispanic White mandated students, limiting generalization of the findings to BMI conducted with different racial and ethnic populations. Second, differences in the samples may have also influenced the results. Specifically, participants in Study 1 only received a BMI; in contrast, participants in Study 2 had already received a brief advice session (and continued to drink in a risky fashion). Therefore, it is possible that the students in Study 2 were more experienced in discussing their alcohol use and infractions with a counselor. This experience may have resulted in the observed link between follow-neutral client utterances and increases in drinking in Study 2: the discussion of non-drinking topics or following along (“uh-huh”) may have represented subtle resistance rather than engagement, but not enough to create discord in the session (which would have been evidenced by lower globals). This is of particular relevance to mandated populations, who have had a specific incident occur that may facilitate the reduction of risky behaviors (e.g., Morgan, White, & Mun, 2008). There is evidence that participants in both studies modestly reduced their alcohol use following the infraction (Carey et al., 2009; Hustad et al., 2011);however, it is not known whether these reductions were reflected in client speech (e.g., sustain talk) in the BMI. Third, the high fidelity accomplished by both studies resulted in relatively low levels of MIIN, limiting our ability to determine the impact of these types of therapist technical skills on the client's in-session behaviors and subsequent substance use. Future process research with MI sessions that have significantly more amounts of MIIN, perhaps from research conducted in a naturalistic setting, may enhance our understanding of these relationships. Fourth, there were a large

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number of therapists involved in the project, especially in Study 2. Therefore, it is possible that other unknown therapist qualities may have influenced the observed findings. Finally, neither study used collateral report verification of self-reported drinking, alcohol-related problems, or other variables. That said, self-report is generally considered valid and reliable (Del Boca & Darkes, 2003), with little evidence of intentional bias even among mandated students (Borsari & Muellerleile, 2009).

In sum, this study supported some aspects of the proposed causal chain of motivational interviewing and contradicted others. However, analysis of the theoretical model of MI clearly indicated that aggregate counts of therapist and client language are not related to outcomes in mandated students. While this study represents an important initial step of process analyses, more fine-grained analyses are required to fully detect the link between in-session processes and subsequent changes in alcohol use and problems following a BMI.

Acknowledgments

Brian Borsari, Mental Health and Behavioral Sciences Service, Department of Veterans Affairs Medical Center, and the Department of Behavioral and Social Sciences, Department of Psychiatry and Human Behavior, Center for Alcohol and Addiction Studies, Brown University; Timothy R. Apodaca, Department of Pediatrics, University of Missouri-Kansas City School of Medicine; Kristina M. Jackson, Molly Magill, Nadine R. Mastroleo, Nancy P. Barnett, and Kate B. Carey, Department of Behavioral and Social Sciences, Center for Alcohol and Addiction Studies, Brown University.

This work was supported by National Institute on Alcohol Abuse and Alcoholism grants R01 AA015518, R01 AA017427 and VISN1 Career Development Award V1CDA2012-18 to B. Borsari, R01 AA017874 to T. Apodaca, and R01 AA012518 to K. Carey. Special thanks to Colleen Peterson, MS, for assistance in organizing the massive datasets.The authors would like to thank the students and therapists who allowed their audiotapes to be utilized for this study.

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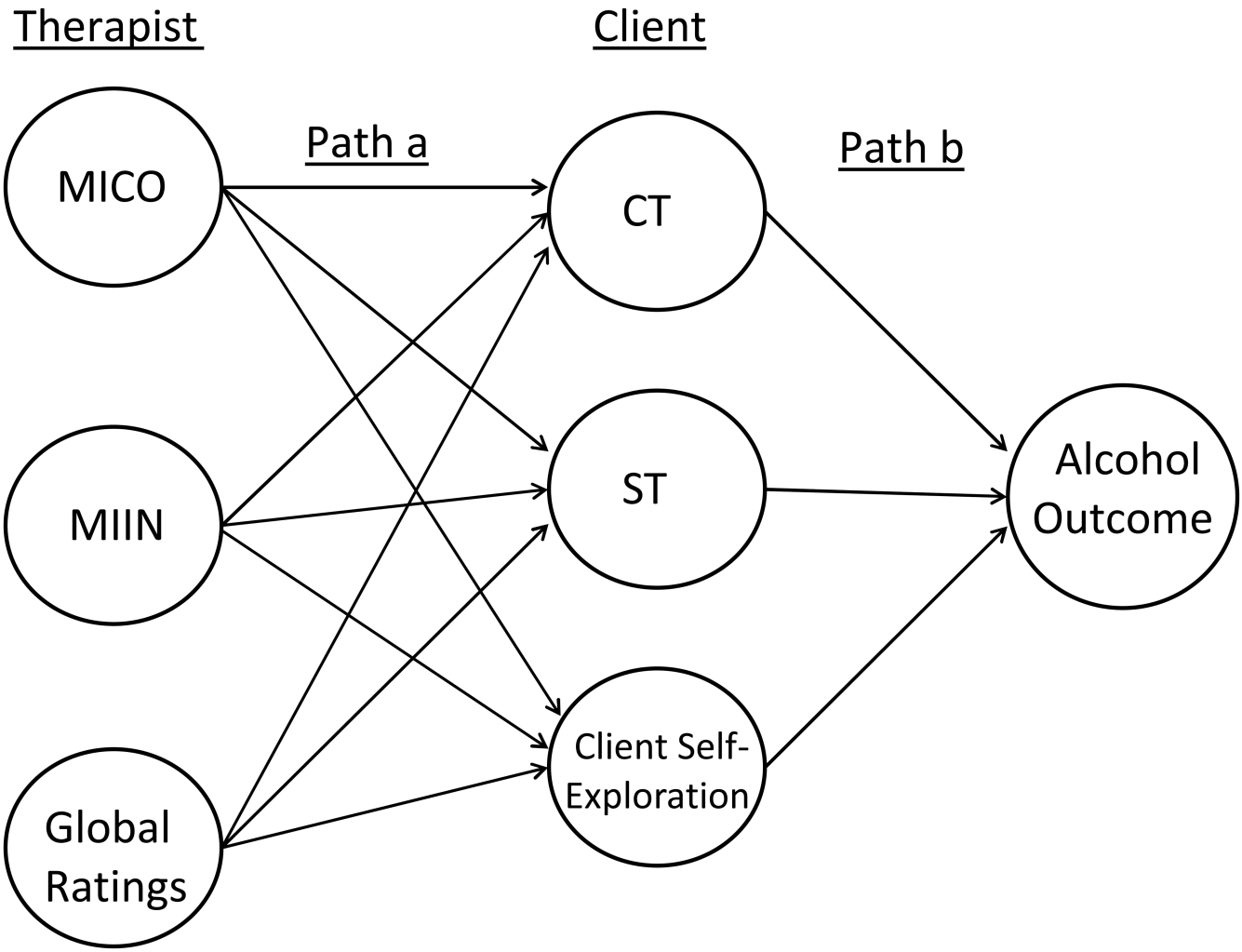

Figure 1. Model of Therapist Language, Client Language, Therapist and Client Global Ratings, and Alcohol Outcomes

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Table 1

Descriptive information of within-session variables for Study 1 (left panel) and Study 2 (right panel)

	Study 1					Study 2					Test of Group Diff.
	M	*SD*	Range	ICC[a]	Prop[b]	*M*	*SD*	Range	ICC[a]	Prop[b]	z
Therapist Language											
MICO	73.97	20.39	23-127	0.98	20%	99.74	34.88	20-184	0.97	21%	0.18
MIIN	0.78	1.25	0-6	0.49	<1%	1.47	2.84	0-15	0.66	<1%	0.14
Other	128.75	39.31	64-269	0.99	35%	160.41	47.02	74-380	0.98	35%	0.02
Client Language											
Change talk	55.27	29.22	11-149	0.95	14%	51.25	25.04	6-171	0.87	11%	0.67
Sustain talk	24.44	16.4	0-86	0.95	6%	24.66	13.04	1-66	0.9	5%	0.37
Follow Neutral	92.02	40.46	33-260	0.94	24%	128.44	46.59	48-310	0.94	27%	0.52
Global Ratings											t
Therapist Acceptance	4.39	1.06	2-7	0.32		5.24	1.41	1-7	0.75		5.30***
Therapist Empathy	4.09	1.02	1-6	0.47		5.11	1.33	1-7	0.78		6.76***
Therapist MI Spirit	3.64	1.26	2-7	0.43		4.75	1.57	1-7	0.81		6.08***
Client Self Exploration	4.01	1.27	1-7	0.74		4.08	1.19	1-6	0.70		0.32
Session Length (min.)	46.93	15.17	20-103	n/a	n/a	52.68	11.88	22-94	n/a	n/a	3.13**
Sum utterances/session	374.56	118.46	160-726	n/a	n/a	465.97	124.05	180-929	n/a	n/a	5.82***

N = 90-91 for Study 1 and *N* = 160-161 for Study 2. MICO = MI-Consistent; MIIN = MI-Inconsistent; MI = Motivational Interviewing.

[a]Intraclass correlation coefficients;

[b]Proportion.

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Table 2
Demographic information for total sample and comparison of Study 1 and Study 2

Variable	Total Sample (*n* = 249) Mean/*N* (*SD*/%)	Study 1 (*n*= 91) Mean/*N* (*SD*/%)	Study 2 (*n* = 158) Mean/*N* (*SD*/%)	Test Statistic (t/χ^2)
Demographics				
Age in Years	18.83 (0.81)	19.15 (0.70)	18.64 (0.82)	5.28***
Sex				
Male	154 (61.85)	49 (53.9%)	105 (66.46)	3.89*
Female	95 (38.15)	42 (46.2%)	53 (33.54)	
Race				
White	241 (96.79)	85 (93.4%)	156 (98.73)	5.27*
Non-white	8 (3.21)	6 (6.6%)	2 (1.27)	
Year in school				
Freshmen	153 (61.45)	50 (55.0%)	103 (65.19)	8.15*
Sophomore	79 (32.73)	38 (41.8%)	41 (25.95)	
Upperclassmen	17 (6.83)	3 (3.3%)	14 (8.86)	
Baseline Alcohol Use				
Age at first drink	15.64 (1.40)	15.62 (1.48)	15.66 (1.36)	-0.17
No. drinking episodes [a]	10.59 (5.79)	12.50 (6.15)	9.47 (5.28)	4.02***
Average no. drinks: typical episode[a]	6.58 (3.10)	5.61 (2.57)	7.14 (3.25)	-4.08***
Drinks Per Week	18.04 (12.24)	15.36 (11.07)	19.59 (12.64)	-2.66**
No. HED episodes[a]	6.83 (4.72)	6.28 (4.90)	7.15 (4.61)	-1.41
Peak BAC	0.18 (0.10)	0.16 (0.08)	0.19 (0.10)	-3.03**
Typical BAC	0.10 (0.06)	0.09 (0.05)	0.11 (0.06)	-1.60
No. peak drinks[a]	10.58 (5.22)	8.87 (4.01)	11.56 (5.59)	-4.39***
AUDIT score	11.26 (5.39)	10.89 (5.53)	11.47 (5.32)	-0.814
Alcohol-related Problems	5.36 (3.88)	4.82 (4.06)	5.67 (3.75)	-1.65

Note. HED = heavy episodic drinking; BAC = Blood Alcohol Content; AUDIT = Alcohol Use Disorders Identification Test;

[a] Past month

* $p < .05$.

** $p < .01$.

*** $p < .001$.

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Table 3

Correlations among within-session variables for Study 1

	Therapist Language			Client Language			Global Ratings			
	MICO	**MIIN**	**Other**	**CT**	**ST**	**FN**	**A**	**E**	**MIS**	**SE**
Therapist Language										
MICO	--	.37***	.57***	.66***	.53***	.57***	.15	.34**	.32**	.48***
MIIN		--	.37***	.27**	.23*	.35***	-.24*	-.16	-.26*	.13
Other			--	.55***	.34**	.89***	-.02	.15	.11	.28**
Client Language										
CT				--	.57***	.34**	.27***	.42***	.36***	.56***
ST					--	.21*	.19*	.27***	.26***	.33**
Follow Neutral						--	.03	.03	.06	.23*
Global Ratings										
Therapist Acceptance							--	.69***	.75***	.42***
Therapist Empathy								--	.81***	.57***
Therapist MI Spirit									--	.58***
Client Self-Exploration										--

*Note. N*s range from 90-91

MICO = MI-consistent, MIIN = MI-inconsistent, CT = Change talk, ST = Sustain talk, FN = Follow Neutral, A = Therapist Acceptance, E = Therapist Empathy, MIS = Therapist MI Spirit, SE = Client Self-Exploration.

* p<.05.

** p<.01.

*** p<.001.

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Table 4

Correlations among within-session variables for Study 2

	Therapist Language			Client Language			Global Ratings			
	MICO	**MIIN**	**Other**	**CT**	**ST**	**FN**	**A**	**E**	**MIS**	**SE**
Therapist Language										
MICO	--	-.32***	.19*	.62***	.52***	.45***	.47***	.59***	.56***	.41***
MIIN		--	.26***	-.21**	-.18*	.06	-.61***	-.62***	-.61***	-.33***
Other			--	.10	.26***	.86***	-.17*	-.21**	-.15	-.01
Client Language										
CT				--	.43***	.15	.02	.32**	.26*	.52***
ST					--	.31***	-.04	.22*	.21*	.25**
Follow Neutral						--	.02	.10	.11	.12
Global Ratings										
Therapist Acceptance							--	.79***	.84***	.58***
Therapist Empathy								--	.82***	.64***
Therapist MI Spirit									--	.59***
Client Self-Exploration										--

Note. $N = 158$.

MICO = MI-consistent, MIIN = MI-inconsistent, CT = Change talk, ST = Sustain talk, FN = Follow Neutral, A = Therapist Acceptance, E = Therapist Empathy, MIS = Therapist MI Spirit, SE = Client Self-Exploration.

* $p<.05$.

** $p<.01$.

*** $p<.001$.

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Table 5

Correlations of therapist and client and within-session variables with 6-month drinking outcomes for Study 1 and Study 2

	Study 1					Study 2				
	Drinks per Week	**HED**	**pBAC**	**tBAC**	**Problems**	**Drinks per Week**	**HED**	**pBAC**	**tBAC**	**Problems**
Therapist Language										
MICO	.14	.13	.12	.11	.27*	-.02	.05	-.03	.04	.03
MIIN	.22	.22	.07	-.02	.26*	.08	.07	.12	.07	.03
Other	-.07	-.14	-.01	-.09	.06	.15	.19*	.20*	.18*	.20*
Client Language										
CT	.13	.13	.05	.07	.24	-.07	-.02	-.06	-.02	.15
ST	.26*	.31*	.09	.12	.12	.13	.09	.07	.12	.13
Follow Neutral	.02	-.07	.08	-.06	.07	.11	.20*	.17*	.19*	.15
Global Ratings										
Therapist Accept	-.33**	-.34	-.09	-.03	-.11	-.18*	-.08	-.21*	-.23**	-.11
Therapist Empathy	-.30*	-.23	-.2	-.12	-.01	-.13	-.06	-.15	.19*	-.09
Therapist MI Spirit	-.28*	-.26	-.16	-.06	-.04	-.18*	-.05	-.19*	-.23**	-.11
Client Self-Exploration	-.06	-.05	.00	-.08	.11	-.13	-.08	-.14	-.18*	.01

Note. *N*s range from 62-65 for Study 1 and from 141-143 for Study 2. MICO = MI-Consistent; MIIN = MI-Inconsistent; MI = Motivational Interviewing; HED = Heavy Episodic Drinking; tBAC= Typical Estimated blood alcohol concentration; pBAC= Peak Estimated blood alcohol concentration.

* $p<.05$.

** $p<.01$.

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Table 6

Standardized regression coefficients for the prediction month drinking outcomes from within-session variables

	Study 1					Study 2				
	Drinks per Week	**HED**	**pBAC**	**tBAC**	**Problems**	**Drinks per Week**	**HED**	**pBAC**	**tBAC**	**Problems**
Therapist Language										
MICO	.01	-.03	-.01	.09	.08	-.06	-.07	-.16	-.13	-.12
MIIN	.04	.03	-.03	-.13	-.05	-.01	.01	.04	.08	-.07
Other	-.21	-.20	-.11	-.23	.02	.14*	.14	.20	.14*	.15
Client Language										
CT	-.02	-.02	-.15	-.05	-.17	-.13	-.13*	-.13	-.16*	-.02
ST	.11	.19	.03	.08	-.04	.01	-.08	-.04	-.01	.03
Follow Neutral	.01	-.07	.15	.04	.13	.11	.21	.24*	.29**	-.01
Global Ratings										
Therapist Accept	-.24*	-.20*	-.02	.10	-.13	-.08	.03	-.06	-.20**	-.06
Therapist Empathy	-.27*	-.19	-.14	-.02	-.10	-.08	-.02	-.07	-.19**	-.06
Therapist MI Spirit	-.22	-.17	-.09	.06	-.06	-.14*	-.01	-.10	-.24**	-.07
Client Self-Exploration	-.15	-.17	.01	-.06	-.09	-.12**	-.06	-.11	-.18*	-.05

Note. Ns range from 62-65 for Study 1 and from 141-143 for Study 2.

MICO = MI-Consistent; MIIN = MI-Inconsistent; MI = Motivational Interviewing; HED = Heavy Episodic Drinking; tBAC= Typical Estimated blood alcohol concentration; pBAC= Peak Estimated blood alcohol concentration.

* $p<.05$.

** $p<.01$.