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Improvement in Therapist Skills Over Sessions in Brief Motivational Interventions Predicts Client Language and Alcohol Use Outcomes

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Brief motivational interventions (BMIs) are widely used and efficacious interventions that address alcohol misuse in mandated college students. Consistent with motivational interviewing (MI; Miller & Rollnick, 2013) theory, within-therapist improvements in MI-consistent (MICO) skills over time—that is, as a therapist gains skill through repeated practice—may be associated with concurrent increases in client change language and subsequent changes in behavior. This study examined how therapist skill changed over time and whether within-therapist improvement in MICO skills impacted in-session client change language and subsequent alcohol-related outcomes. BMI sessions ($N = 228$) from 2 randomized clinical trials that had led to significant reductions in alcohol use and alcohol-related problems in mandated student drinkers were coded using the Motivational Interviewing Skills Code 2.0 (Miller, Moyers, Ernst, & Amrhein, 2003). In both studies, the BMI consisted of a single 45- to 60-min session. Analyses examined session-by-session changes in therapist MICO skills, client change language, and alcohol use outcomes. Therapist MICO skills improved over time, and there were significant increases in client change language and decreases in client discussion of topics other than personal alcohol use. Among relatively heavy-drinking clients, those treated by a more experienced therapist demonstrated greater reductions in alcohol use; however, this association was not mediated by client change language. Increased experience conducting BMIs improved therapist MICO skills over time, which in turn increased the focus on personal alcohol use during the session. However, it remains unclear how client language predicts behavior change following a BMI.

Keywords: college, mandated students, motivational interviewing, alcohol, therapy process

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Brief motivational interventions (BMIs) generally consist of one to two sessions and incorporate both motivational interviewing and personalized feedback. BMIs are currently the individual intervention with the strongest empirical support for reducing alcohol consumption and alcohol-related problems among college students, with reductions observed for as long as 15 months (Borsari & Carey, 2005; Carey, Carey, Henson, Maisto, & DeMartini, 2011; Carey, Henson, Carey, & Maisto, 2009; White, Mun, Pugh, & Morgan, 2007). Despite their widespread implementation, little is known about how BMIs facilitate behavior change.

Current motivational intervention (MI) theory (Miller & Rollnick, 2013) posits that evoking client *change talk* (CT), defined as "any self-expressed language that is an argument for change" (p. 159), and reducing *sustain talk* (ST), defined as "the person's own arguments for not changing, for sustaining the status quo" (p. 7), during the session increases the likelihood that individuals will change subsequent behavior. Two therapeutic components are hypothesized (Miller & Rose, 2009) to facilitate the evocation of CT: a *technical* component, involving the use of specific therapist MI-consistent (MICO) skills (such as reflections, affirmations, and emphasizing personal responsibility for change) designed to elicit and reinforce client CT and reduce client ST and a *relational* component, which focused on global therapist and client factors (such as therapist empathy and client self-exploration). Recent meta-analyses (Magill, Apodaca, et al., 2018; Magill et al., 2014; Pace et al., 2017) have indicated that MICO skills are positively correlated with both client CT and ST. These relationships would be expected, given that both CT and ST are present when evoking personal ambivalence about changing a behavior. However, these meta-analyses have also indicated that the relationship between in-session client change language and subsequent behavior change is weaker and more variable, which likely contributes to the nonsignificant mediation effects that have been previously found (e.g., Borsari et al., 2015). The current state of the research has been eloquently summarized by Magill and Hallgren (2018) as follows:

> [S]ustain talk was a more consistent predictor of negative outcome than change talk was of positive outcome, and that when positive outcomes are of interest, the proportion of total motivational statements (change talk vs. sustain talk) that are change talk could have optimal predictive validity. (p. 2)

Therefore, it is vital to understand how therapists use MICO skills to strategically and simultaneously evoke and strengthen CT while softening or minimizing ST (i.e., not deepening it) during an MI session (Miller & Rollnick, 2013).

It is not known whether therapist MICO skills improve session-by-session in the context of ongoing supervision and feedback. Most MI training studies to date have focused on enhancing MICO skills and reducing MI-inconsistent (MIIN; e.g., confronting, blaming, lecturing) strategies (Madson, Loignon, & Lane, 2009). A meta-analysis of MI training research (Schwalbe, Oh, & Zweben, 2014) found that therapist use of MICO skills increased immediately following training, but that postworkshop feedback, supervision, or coaching sessions are required to maintain these gains over time. Furthermore, the combination of both feedback and coaching sessions are more effective than coaching alone; without such postworkshop training enhancements, therapists' MICO skills decay within three to six months. However, an unexplored question is whether improvements in therapist MICO skills evoke more client change language over time. In other words, do clients who work with therapists who have become further adept in their use of MICO skills after several sessions (by having more experience because of seeing see more clients) display more change language than other clients who worked with the same therapist in an earlier session? To date, research on improving therapist MI skills has largely ignored the impact of improved MICO skills on client change language. Rather, research has focused on how therapist MICO skills and MIIN strategies can impact client CT and ST. In sequential analyses, which examine the probability of therapist utterances being immediately followed by different types of client language, therapist MIIN strategies are more likely to be followed by ST, and therapist MICO skills are more likely to be followed by both client CT and ST (Apodaca et al., 2016; Gaume, Bertholet, Faouzi, Gmel, & Daeppen, 2010; Gaume, Gmel, Faouzi, & Daeppen, 2008). This pattern has been interpreted as a representation of client change exploration; in other words, therapist MICO skills helped create a discussion where the client may have felt comfortable to discuss what they enjoy about drinking (ST) as well as the problems it has caused (CT). In sum, it is known that therapist MICO skills effectively evoke both CT and ST, highlighting the need to train and supervise therapists to utilize their skills strategically.

Given the inconsistent relationship between CT and ST with behavioral outcomes, there has been increased interest in what has been termed therapist *other*, defined as common therapist utterances that do not fit into the categories of MICO or MIIN (such as giving information, disclosing personal information, or asking closed-ended questions). Client *follow-neutral* (FN) language (i.e., client statements that do not fit into the categories of CT or ST) has also come under examination. Examples include the client asking questions and making statements not related to personal alcohol use, or speaking about other subjects (i.e., "off-topic"). Significant positive correlations between therapist other language and client FN language has been found in adolescents (Davis, Houck, Rowell, Benson, & Smith, 2016), college students (Apodaca et al., 2016; Borsari et al., 2015; Vader, Walters, Prabhu, Houck, & Field, 2010), and adults (Magill et al., 2016; Moyers, Martin, Houck, Christopher, & Tonigan, 2009). The sequential analyses previously referenced have found that therapist other utterances are less likely to be immediately followed by either client Change or ST and more likely to be followed by client FN. Therefore, the unexplored link between therapist other utterances, client FN language, and client behavioral outcomes may also inform MI theory, training, and supervision.

In sum, research indicates that (a) therapist MICO skills do appear to improve in response to training and ongoing supervision; (b) therapist MICO, MIIN, and other differentially evoke specific types of client language (CT, ST, and FN, respectively); and (c) client language during the session inconsistently predicts subsequent outcomes. However, it remains to be determined whether session-by-session improvement in therapist skills results in increased client change language and, in turn, improved prediction of outcomes in the context of a clinical trial. The present study clarifies this issue though the examination of coded session tapes of a single-session BMI from two randomized clinical trials with mandated college students (Borsari et al., 2012; Carey et al., 2009). Therapists conducted multiple single session BMIs (ranging from

10 to 46 sessions), permitting us to examine three aims. Our first aim was to examine whether in-session therapist skills improved over time. We hypothesized that, over time, therapist MICO skills would increase and therapist MIIN strategies and other utterances would decrease. We also hypothesized that, in turn, client CT would increase, and ST and FN would decrease over sessions within therapist.

Our second aim was to determine whether therapist language was associated with concurrent client language (i.e., within the same session) over time as therapists gained experience. We expected that the trajectory of therapist language would be reflected in changes in the language expressed by their clients. Specifically, we hypothesized that MICO skills would be positively associated with (and account for the increases in) CT over time, whereas MIIN strategies would be positively associated with (and account for the increases in) client ST over time, respectively. We also explored the effects of therapist Other utterances on client FN language.

Our third aim was to examine whether therapist and client in-session language was associated with client outcomes related to alcohol use and problems at 6-month follow-up. First, we hypothesized that the degree of improvement in client outcomes would increase over time, within therapist. That is, we expected that clients who received one of the later BMIs offered by a given therapist would demonstrate greater reductions in alcohol use and related problems than clients who had received one of the therapist's earlier BMI sessions. Consistent with the technical component of MI efficacy, we also hypothesized that positive client outcomes (i.e., within therapists, as they completed sessions and gained experience) would be mediated by in-session skills of both therapists (i.e., increases in MICO skills) and clients (i.e., increases in CT and decreases in ST).

Method

Design

This project utilized recorded sessions from two randomized controlled trials with mandated college students who received a BMI following an alcohol-related disciplinary violation. In Study 1, participants were randomly assigned to either a BMI ($n = 99$) or a standard education condition ($n = 99$) that consisted of a session with a CD-ROM program (Carey et al., 2009). Study 2 evaluated stepped care with mandated students (Borsari et al., 2012). All Study 2 participants ($N = 598$) received Step 1, a 15-min brief advice session that included the provision of a booklet containing advice to reduce drinking. Participants were assessed 6 weeks after receiving the brief advice session, and those who continued to exhibit risky alcohol use ($n = 405$) entered Step 2 and were randomized to either BMI ($n = 193$) or assessment-only control ($n = 194$).

Participants and Procedure

Participants in both Studies 1 and 2 were undergraduate students age 18 years and older who violated campus alcohol policy at one of two 4-year, private liberal arts universities in the Northeast. In both studies, students were referred for a mandatory intervention following adjudication by campus judicial affairs staff. Students who declined to participate in the project received treatment as usual. University institutional review boards of both study sites approved all intervention study procedures.

BMI

The format and content of the BMI has been described extensively elsewhere (Borsari et al., 2012; Carey et al., 2009). Briefly, students (henceforth *clients*) met with therapists in private rooms, and the BMI was designed to last approximately 45 min to 60 min. All clients received a personalized feedback report based on information provided by the student during the baseline assessment.

Interventions: Training and Supervision

The three Study 1 therapists completed an average of 30 BMIs each (range = 21–43). In Study 2, the 11 therapists completed an average of 15 BMIs each (range = 2–62). Regarding previous training in MI, none of the three Study 1 therapists had previous MI experience, but seven of the 11 Study 2 therapists had been therapists on a previous trial delivering BMIs to college students (Wood et al., 2010). Study 1 and Study 2 used similar methods to ensure the consistent delivery of the BMI; in both studies, therapists followed a standard manual and received 20 hr of training on MI, including reading, didactic information, and role-play exercises. Therapists completed supervised, full-session role plays until they met the study threshold of competency as judged by the project principal investigators who had developed the intervention manual.

Therapists in both studies then received weekly group supervision using videotape (Study 1) or audiotape (Study 2) review to maintain fidelity to manual content and MI style. Fidelity in Study 1 was evaluated by randomly selecting videotapes of the session (20%) and rating them using a content checklist of 54 items as well as evaluating 10-min segments using the Motivational Interviewing Skill Code 2.0 (MISC 2.0; Miller et al., 2003). Fidelity in Study 2 was monitored by listening to randomly selected BMI sessions in their entirety and providing the therapists with written feedback regarding adherence to protocol and MICO skills, consistent with current recommended approaches to supervision (Miller & Rollnick, 2002). In both projects, supervision included case presentations, review of actual session tapes, and supervisor feedback. This supervision was conducted on a regular basis, with weekly meetings and consultation.

Follow-Up Assessments

Clients in both studies completed follow-up assessments six months after the BMI (Study 1 retention = 73%, Study 2 retention = 89%). Attrition analyses did not find evidence of selective attrition in either study. In Study 1, participation in the BMI was associated with fewer drinks per week and fewer heavy drinking episodes than participation in the standard education. In Study 2, clients in the BMI group significantly reduced the number of alcohol-related problems compared with control, despite no significant group differences in alcohol use.

Self-Report Measures

Demographic information. Clients provided information regarding their gender, age, weight, year in school, and race/ethnicity (see Table 1).

Alcohol use. In both studies, alcohol use outcome variables were obtained using an adaptation (Borsari & Carey, 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. Heavy episodic drinking was measured using a gender-specific question that asked participants to report the number of times that they consumed five or more drinks for males (four or for females) in the last month. This measure also recorded the amount of time spent drinking for each of those episodes to calculate (along with gender and weight) the clients' estimated peak blood alcohol content (pBAC) and typical blood alcohol content (tBAC), using the Matthews and Miller (1979) equation.

Alcohol-related problems. Both studies utilized 1-month recall periods to assess 21 problems derived from the Rutgers Alcohol Problems Index (White & Labouvie, 1989), 12 items from the College Alcohol Survey (Wechsler, Lee, Kuo, & Lee, 2000), and the Young Adult Alcohol Consequences Questionnaire (Kahler, Strong, & Read, 2005). These items were dichotomized and demonstrated good internal consistency at the baseline (α = .83) and 6-month (α = .86) assessments.

Therapist in-session behaviors. The MISC 2.0 (Miller et al., 2003) was used to code the sessions. The MISC 2.0 assesses 19 specific therapist behaviors that fall into three main categories: MICO (affirm, emphasize control, open question, advise with permission, raise concern with permission, simple reflection, complex reflection, reframe), MIIN (advise without permission, raise concern without permission, confront, direct, warn), and other (facilitate, filler, closed question, giving information, support, structure).

Table 1
Client Demographics and Baseline Alcohol Use Variables (N = 228)

Variable	*n* (%)	*M* (*SD*)
Demographic characteristics		
Age (years)		18.82 (.78)
Gender		
Male	135 (59.2)	
Female	93 (40.8)	
Race		
White	220 (96.5)	
Non-White	8 (3.5)	
Ethnicity		
Hispanic	2 (.9)	
Non-Hispanic	224 (98.2)	
Year in school		
First year	142 (62.3)	
Sophomore	72 (31.6)	
Junior	14 (6.1)	
Baseline alcohol use, prior month		
Drinks per week		16.96 (11.59)
Heavy drinking episodes		6.74 (4.84)
Peak BAC		.19 (.10)
Typical BAC		.10 (.06)

Note. BAC = blood alcohol content.

Client in-session behaviors. The MISC 2.0 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 2.0 client language codes (reason, desire, need, ability, commitment, taking steps, other) were used, and the valence of the codes reflected either movement toward change (CT) or away from change (ST). Client utterances not related to drinking behavior were combined to form a separate FN category. Consistent with the MISC 2.0 and previous research (Borsari et al., 2015; Gaume et al., 2010; Vader et al., 2010), the general construct of CT included all seven language codes reflecting movement toward change, and ST included utterances from the same seven categories of language that reflected movement away from change. As recent research has indicated that FN may also be linked to drinking reductions (Apodaca, Magill, Longabaugh, Jackson, & Monti, 2013; Borsari et al., 2018; Davis et al., 2016; Magill et al., 2014; Moyers et al., 2009; Romano & Peters, 2016), we examined changes in the proportion of CT, ST, and FN (with the sum of all three categories used as the denominator) over the sessions. Coding procedures have been described elsewhere (Borsari et al., 2015), and reliabilities ranged from "good" to "excellent" for therapist and client codes (see Table 2) according to guidelines recommended by Cicchetti (1994) and adopted by MI process researchers (Madson & Campbell, 2006).

Data Reduction and Analysis Plan

To ensure an adequate number of data points to examine meaningful change over time within-therapist, we only included therapists who conducted 10 or more BMI sessions. Although the maximum number of BMI session recordings for a single therapist was 62 (Study 2); it was only this one therapist who had greater than 46 session recordings. Thus, we elected to truncate within-therapist sessions at 46 for all data analyses (i.e., later sessions were dropped for the one therapist who had greater than 46 session), including the following statistics for therapist caseload. Therapists at both study sites conducted between 10 and 46 BMI sessions each (240 total sessions: 93 sessions in Study 2, 147 sessions in Study 2). The three therapists in Study 1 averaged 31 (*SD* = 0.62) sessions each, and the seven therapists in Study 2 conducted an average of 15 (*SD* = 13.04) sessions each. BMIs were not recorded for 12 participants, reducing the number of MISC 2.0-coded sessions from 240 to 228 sessions. However, session markers for these 12 sessions were used to ensure the missing sessions were represented in the temporal within-therapist session count.

Study hypotheses were tested using multilevel modeling (MLM) in SPSS Version 20.0 (IBM Corp., 2011) using maximum likelihood estimation and within-therapist error covariance modeled as autoregressive. To examine change over time in the three therapist behavior codes (MICO, MIIN, other, each as a proportion of total therapist utterances), three client language codes (CT, ST, FN, each as a proportion of total client utterances), and five client outcomes at 6-month follow-up (weekly drinks, binge drinking episodes, typical BAC, peak BAC, and alcohol-related problems), we tested a series of 11 two-level models with repeated measures

Table 2
Brief Motivational Interventions (BMI) Session Characteristics and In-Session Therapist Behavior and Client Language Codes

Variable	*M* (*SD*)	Range	ICC	*M* percentage of utterances in session
BMI session characteristics				
Session length (min)	50.16 (13.43)	20.3–103.0		
Sum of therapist utterances	237.96 (67.00)	102–489		
Sum of client utterances	191.41 (67.37)	58–454		
Therapist technical behavior codes				
MICO	89.17 (33.29)	20–184	.97	20.8
MIIN	1.29 (2.51)	0–15	.69	.3
Other	147.51 (47.68)	64–380	.99	34.4
Client language codes				
Change talk	53.23 (26.77)	6–171	.96	12.4
Sustain talk	24.63 (14.62)	0–86	.94	5.7
Follow-neutral	113.58 (48.37)	33–310	.96	26.5

Note. ICC = intraclass correlation coefficients (single measures); MICO = motivational interviewing (MI)-consistent; MIIN = MI-inconsistent.

of the dependent variable (DV) nested within therapists. Level 1 of the MLM estimated each of the DVs (therapist behavior codes for Hypothesis 1; client language codes for Hypothesis 2a; and client 6-month outcomes for Hypothesis 3a [hypotheses to follow]) as a function of consecutive therapist session number (i.e., an ordinal time variable). Level 2 of the model allowed for between-therapist characteristics (described in the following text) to influence the DV.

All analyses controlled for study site (two levels to control for possible site effects) and therapist training level (three levels: postbaccalaureate research assistant [$n = 1$], doctoral student [$n = 8$], postdoctoral fellow [$n = 1$]). The mean number of sessions that each therapist conducted per month during the study period ranged from 0.52 to 4.00 (overall $M = 2.05$, $SD = 1.10$). One therapist completed 16 BMI sessions over just 4 months; whereas another therapist (from the same study site) completed only 12 BMIs over 23 months. Therefore, to control for possible distribution of practice/training effects, which have been shown to impact retention of new skills and information learned (e.g., Miller & Binder, 2002), we also controlled for within-therapist session density (i.e., mean number of sessions per month). That is, past work has indicated that either more concentrated learning (Tsao & Craske, 2000) or distributed learning (i.e., the same content, but presented and practiced over a longer, more spaced out period of time; Rogojanski & Rego, 2013; Storch et al., 2008) can improve memory consolidation and skills retention. To account for potential variability among therapists in the effect of time, we also included the random slopes for time (i.e., within-therapist session number) in all analyses. All continuous covariates and independent variables were converted to standardized (z) scores to aid in interpretation of parameter estimates (regression coefficients).

To determine whether in-session therapist and client language were concurrently associated over time (Hypothesis 2b), as well as whether therapist behaviors and/or client language were associated with client 6-month outcomes over time (Hypothesis 3b), we added the relevant time-varying behavior codes, one at a time, to the models predicting client language codes and client outcomes, respectively. Mediation models for Hypothesis 2b and 3b were only examined for potential mediators and DVs that showed significant change over time; that is, models for which both the a and b paths were significant. The distribution of products test was used to determine the significance of the joint mediated $a \times b$ pathway (see Figure 2b; MacKinnon, Fairchild, & Fritz, 2007; MacKinnon, Lockwood, Hoffman, West, & Sheets, 2002). Specifically, if the 95% confidence interval (CI) for the product of the regression coefficients of the two pieces of the mediated pathway (i.e., $a \times b$) does not include 0, the mediated pathway is statistically significant (MacKinnon, Lockwood, & Williams, 2004).

Results

Change in In-Session Behaviors Over Time

Therapist behavior codes (Hypothesis 1). As is shown in Figure 1a, therapists improved in MI skillfulness over time, as evidenced by the positive association between consecutive within-therapist session number and proportion of MICO skills ($b = 0.455$, $t = 2.73$, $p = .019$; Figure 2b, a path) and the negative association between session number and the proportion of other utterances ($b = -0.438$, $t = -2.77$, $p = .018$). There were no significant changes in proportion of MIIN strategies over time ($b = -0.278$, $t = -1.43$, $p = .181$).

Client language codes (Hypothesis 2a). As is shown in Figures 1b and 2a, clients engaged in relatively more CT ($b = 0.283$, $t = 4.28$ $p = .004$) and ST ($b = 0.313$, $t = 3.77$, $p = .002$) over time (as therapists gained experience). In contrast, the proportion of FN was negatively associated with therapist session number ($b = -0.395$, $t = -4.87$, $p < .001$).

Mediation (Hypothesis 2b). Analyses testing the b paths of the joint-mediated pathways (see Figure 2b) revealed that increases in the proportion of therapist MICO skills significantly predicted concurrent increases in the proportion of client CT ($b = 0.449$, $t = 7.09$, $p < .001$) and ST ($b = 0.396$, $t = 5.00$, $p < .001$), and decreases in the proportion of concurrent client FN ($b = -0.580$, $t = -8.86$, $p < .001$). The distribution of products

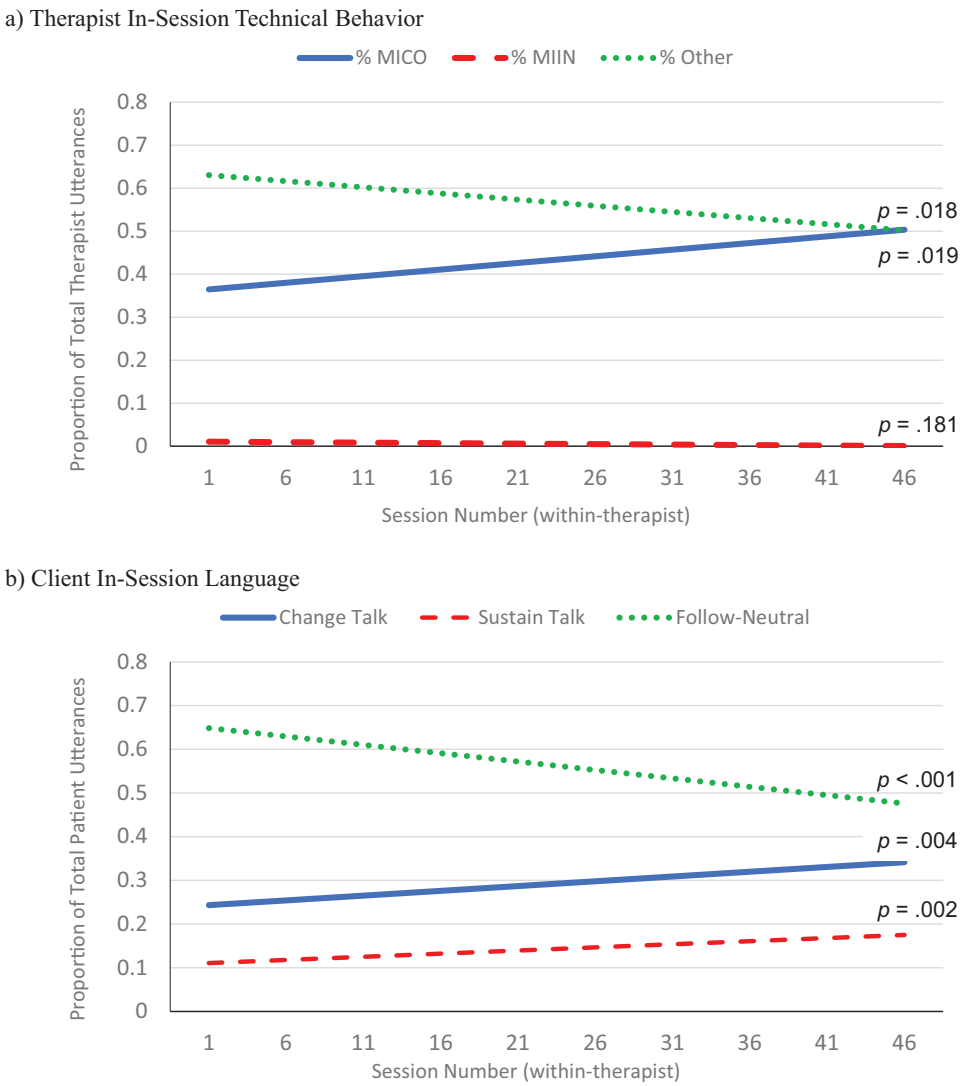

Figure 1. Within-therapist change over time in proportion of therapists' in-session technical behavior codes (Panel a) and proportion of clients' language codes (Panel b). MICO = motivational interviewing (MI)-consistent; MIIN = MI-inconsistent. See the online article for the color version of this figure.

test revealed that increases in the proportion of therapist MICO significantly mediated the relationship between therapist experience (i.e., number of sessions conducted in the trial) and proportional changes in all three client language codes over time: CT (95% CI [0.056, 0.372]), ST ([0.047, 0.334]), and FN ([−0.471, −0.073]).

Change in Clients' Alcohol-Related Outcomes Over Time

Client outcomes at 6-month follow-up (Hypothesis 3a). When controlling for baseline levels of the DV, there were no significant main effects of within-therapist session number on alcohol-related outcomes at 6-month follow-up: weekly drinks ($p = .181$), binge drinking episodes ($p = .199$), peak BAC ($p = .838$), typical BAC ($p = .482$), and new alcohol-related problems ($p = .649$).

However, we found a significant interaction between baseline client severity and increases in therapist experience for tBAC ($b = -0.164$, $t = -2.71$, $p = .007$) and a marginally significant interaction between baseline client severity and increases in therapist experience for weekly drinks ($b = -0.117$, $t = -1.75$, $p = .082$). To clarify the nature of these interactions, we retested the two models with baseline levels of the DV (i.e., weekly drinks or tBAC) centered at one standard deviation above, and then one standard deviation below, their respective means (Edwards & Lambert, 2007; Tein, Sandler, MacKinnon, & Wolchik, 2004). This procedure yielded regression coefficients for clients who were relatively high- and low-level drinkers at baseline, respectively. Among clients with relatively low weekly drinks and tBAC at baseline, therapist experience (session number) did not predict changes in weekly drinks ($b = 0.020$, $t = 0.21$, $p = .834$) or tBAC

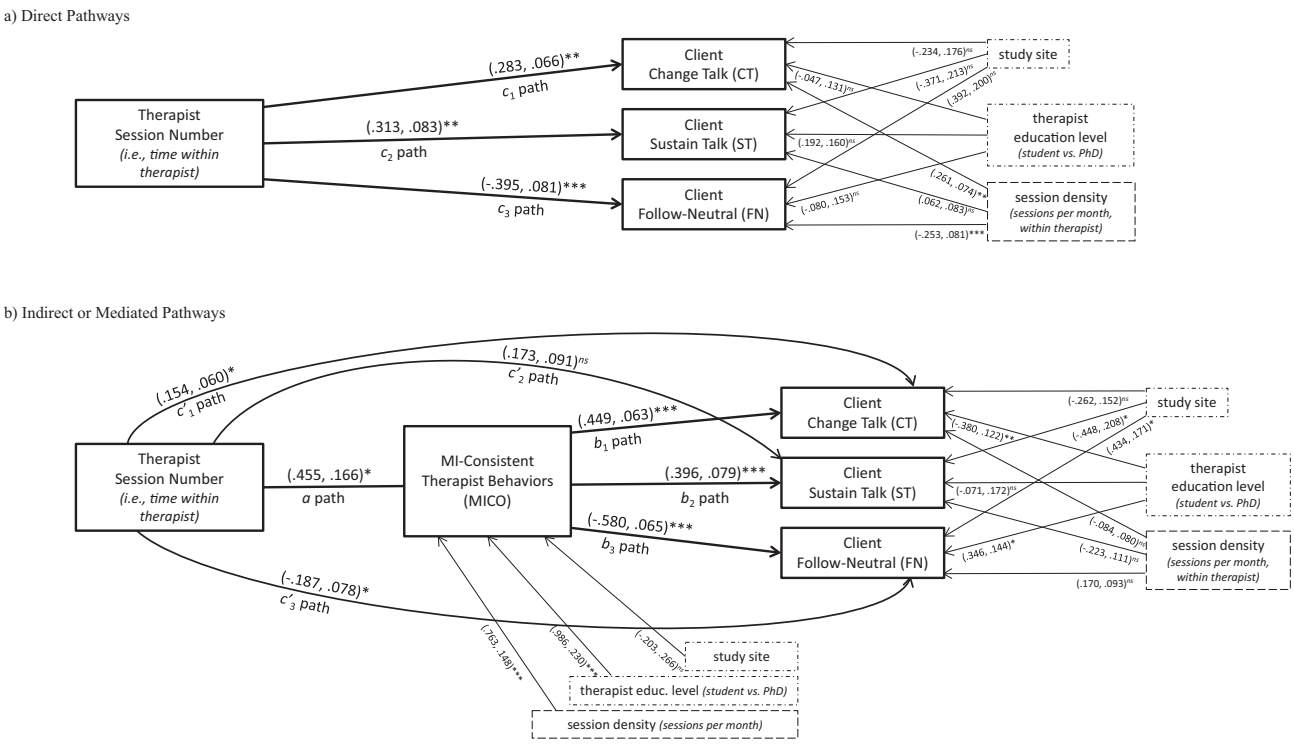

Figure 2. Mediation model for brief motivational intervention (BMI) in-session therapist behaviors and client language. Coefficient *b*s and standard errors appear in parentheses. MI = motivational interviewing. * $p < .05$; ** $p < .01$; *** $p < .001$.

($b = 0.092$, $t = 0.95$, $p = .349$), respectively. Among those with relatively high baseline levels, however, there were significant decreases as a function of therapist experience in both weekly drinks ($b = -0.214$, $t = -2.18$, $p = .031$) and tBAC ($b = -0.236$, $t = -2.39$, $p = .018$) at 6-months (see Figure 3).

Mediation (Hypothesis 3b). To determine whether the changes in therapist and/or client language explained the association between therapist session number and decreases in alcohol use observed among clients with relatively high baseline drinking levels, we examined the effects of each viable mediator on the two alcohol outcomes that were positively associated with therapist session number: tBAC and weekly drinks. Mediation models were tested for all in-session therapist and client language codes that changed over time with therapist experience (i.e., all except MIIN): MICO, other, CT, ST, and FN. None of these in-session language codes significantly predicted change in weekly drinks (all *p*s $> .482$) or tBAC (all *p*s $> .169$) in these samples of clients with relatively high baseline drinking rates.[1]

Discussion

To our knowledge, this is the first effort to simultaneously evaluate changes across multiple sessions in therapist MICO skills, client change language, and client alcohol use outcomes. Findings indicated that therapist MICO skills improved as therapists conducted more sessions and received ongoing supervision and feedback. This improvement in therapist MICO skills also influenced client change language; as expected, increases in MICO skills were significantly associated with increased levels of both CT and ST. Furthermore, improvements in therapist MICO skills were associated with greater reductions in weekly drinking and typical BAC

[1] Research has also examined the strength of the CT and ST utterances rather than the total number or proportion (Amrhein, Miller, Yahne, Palmer, & Fulcher, 2003; Bertholet, Faouzi, Gmel, Gaume, & Daeppen, 2010). In order to examine whether the strength of clients' CT and ST utterances changed over time (i.e., as therapists gained more experience delivering BMI), we created three additional variables incorporating the strength ratings, on a 1 to 5 scale, for all client CT and ST utterances throughout the BMI: (1) the average strength of CT utterances; (2) the average strength of ST utterances; (3) the average strength of CT utterances, multiplied by the frequency of CT utterances; (4) the average strength of ST utterances, multiplied by the frequency of ST utterances; and (5) a combined CT/ST strength score, calculated by subtracting the ST Strength × Frequency variable from the CT Strength × Frequency variable. There were no significant changes in average CT strength ($b = 0.015$, $t(81) = 0.75$, $p = .455$), ST strength ($b = 0.036$, $t(86) = 1.47$, $p = .145$), or the combined score ($b = 7.332$, $t(87) = 1.56$, $p = .122$) as therapists gained experience. This is likely because each of these scores reduces the data in a way that obscures important differences between clients who had relatively high versus low frequencies of CT and/or ST. That said, both CT Strength × Frequency ($b = 16.367$, $t(82) = 2.94$, $p = .004$) and ST Strength × Frequency ($b = 10.758$, $t(80) = 3.30$, $p = .001$) increased as therapists gained experience over time. Furthermore, therapists' MICO significantly predicted both CT Strength × Frequency ($b = 30.309$, $t(152) = 5.35$, $p < .00001$) and ST Strength × Frequency ($b = 14.120$, $t(164) = 4.28$, $p = .00003$) over the sessions, and increases in MICO significantly mediated the increases in CT (95% CI [1.99, 14.70]) and ST (95% CI [0.87, 7.13]) Strength × Frequency over sessions.

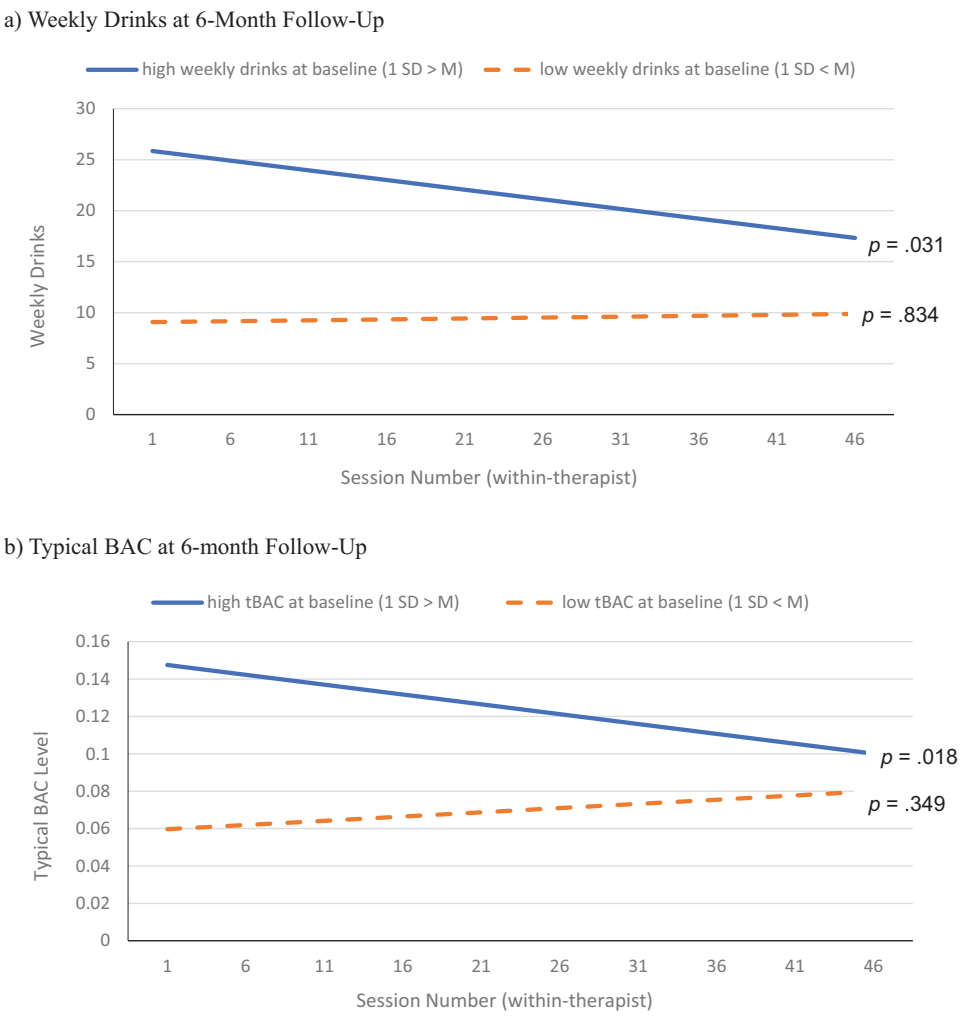

Figure 3. Within-therapist change over time in client outcomes at 6-month follow-up: weekly drinks (Panel a) and typical blood alcohol content (BAC) level (Panel b) for clients with high (1 *SD* > *M*) and low (1 *SD* < *M*) scores at baseline. See the online article for the color version of this figure.

among relatively heavy drinkers. This was unlikely due to regression to the mean, as heavy-drinking clients who worked with a relatively inexperienced therapist reduced their alcohol less than the heavy drinkers who came later in the study. That said, neither therapist MICO skills nor client language mediated the effect of increased therapist experience on client alcohol use. These findings have several implications for the training, supervision, and practice of MI, as well as for the design of future clinical trials.

The therapists in both parent trials received similar initial MI training and participated in weekly supervision for the duration of the trials. Thus, the improvement in therapists' MICO skills is consistent with the MI training literature, which indicates that regular supervision and feedback is the most effective way to enhance skill levels (Madson et al., 2009; Schwalbe et al., 2014). Notably, the proportion of MIIN strategies did not change over time, most likely because these were very infrequent in these BMI sessions (i.e., there was a floor effect), which may speak to the effectiveness of the MI training the therapists received prior to conducting sessions. Also, decreases in the proportion of therapist other utterances (e.g., giving information, disclosing personal information, or asking closed-ended questions) also significantly predicted change over time in in clients' proportion of CT, ST, and FN, with almost identical effect size estimates for each. Thus, therapist MICO skills and other utterances were essentially reciprocal: As a proportion of total therapist utterances, MICO essentially replaced other as therapists gained experience. The most plausible interpretation of these findings is that therapists' increasing MICO skills over time (as opposed to the decreasing other utterances) contributed to keeping the BMI conversations focused on personal alcohol use, a strategy that was emphasized during training and supervision.

The link between therapist and client change language also suggested that MICO skills were effective in evoking client language regarding ambivalence about behavior change. This tendency to stay "on topic" is particularly relevant, given the considerable variability of that is discussed in-session during substance abuse treatment in community settings (Santa Ana et al., 2008), even in the context of a structured MI protocol (Martino, Ball, Nich, Frankforter, & Carroll, 2009). Furthermore, therapist other and client FN behaviors are highly

correlated (Moyers & Martin, 2006) and occur sequentially (Apodaca et al., 2016; Gaume et al., 2008), indicating that a therapist using other may facilitate a reciprocal pattern, or loop, of evoking more "off-topic" client FN. In this study, it seems that increased therapist MICO skills contributed to more "on-topic" conversation of the target behavior (alcohol use), as is shown by increased both CT and ST and decreased levels of FN language. In other words, it is possible that therapists either increased participants' ambivalence about their personal drinking behavior, or explicitly evoked preexisting ambivalence, either or both of which manifested as increases in both CT and ST. The increases in ST observed may have been a result of conducting the single-session BMI with mandated students who did not voluntarily seek out an intervention and therefore were likely to be more defensive (at least early in the session) and not necessarily interested in changing their drinking behavior. As is shown in previous studies, ST may simply represent one side of ambivalence and, depending on when it occurs, could reflect a thoughtful and honest exploration of change (Apodaca et al., 2016; Borsari et al., 2018; Magill, Apodaca, et al., 2018). In fact, increased levels of ST may be indicative of the stated goal of MI to explore and resolve ambivalence.

Therapists' later sessions (with more experience and more supervision) appeared to be more focused on personal alcohol use (more CT and ST, less FN), and these sessions resulted in greater reductions in drinking among heavier drinkers. These findings highlight the importance of continued supervision and monitoring of therapist MI skills, especially when working with individuals exhibiting heavier substance use. Previous research that has linked greater levels of therapist MI experience (i.e., years conducting MI) with improved outcomes among heavier drinkers (Gaume et al., 2016). In contrast, lighter drinkers in the current study demonstrated similar reductions 6 months later, regardless of therapist experience (i.e., early or later session by the therapist). Overall, these findings suggest the importance of including role-plays, practice and observation, and objective feedback (e.g., ratings of MICO skills) when training and supervising therapists in MI, especially when they are working with more at-risk drinkers.

Client language as analyzed in this study did not predict subsequent reductions in alcohol use, contrasting with MI theory and prior research indicating that a higher proportion of CT versus ST predicts positive outcomes (Magill, Apodaca, et al., 2018; Magill et al., 2014). There are several reasons why this may be the case. First, it is possible that change language occurring during certain parts of an MI session may better predict alcohol use. For example, CT occurring when discussing pros and cons of change (Amrhein et al., 2003) or occurring at the end of the session (Bertholet et al., 2010) might be more predictive of outcomes. Second, subtypes of client language may have more utility in predicting change than proportion measures. A recent meta-analysis (Magill, Bernstein, et al., 2018) indicated that reasons to change (e.g., "I want to quit drinking" or "I will lose my job") or not change (e.g., "drinking helps me socialize") were associated with subsequent decreases or increases, respectively, in the target behavior. Third, session structure may have contributed to the observed changes more than the evocation of change language. During the BMIs, the therapists and clients discussed personalized feedback, which by itself has been linked to significant reductions in alcohol use and problems (Walters, 2000; Walters & Neighbors, 2005). Furthermore, reviewing personalized feedback in-session has been linked to higher rates of client CT (Vader et al., 2010). In this context, it is possible that client language does not reflect attention to and processing of that feedback. Instead, how much the participants engages in, or "buys into," the content of the personal feedback may be an intermediary variable (see Magill & Hallgren, 2018) that facilitates a situation in which "whether or not it is evident in overt speech there is a deliberation going on inside" (Miller & Rollnick, 2013, p. 289).

Limitations of the current study suggest several promising avenues for future research. First, the current sample was not culturally or ethnically diverse, warranting the replication of findings in more diverse samples to provide unique opportunities to examine the intersection of therapist MICO skills, client change language, and alcohol-related outcomes. Second, the approaches of Study 1 and Study 2 to supervision were very similar, consisting of weekly meetings and objective session ratings with personalized feedback. As neither study randomized training and supervision experiences, we examined the effect of time and experience on MICO skills, client language, and outcomes (which happened to coincide with ongoing training/supervision). Whereas therapist practice/training was the key independent variable in this study, we did control for between-therapist variability in the "density" of their training experience (i.e., the number of sessions that the therapist conducted per month). Previous research suggests that the distribution of learning (i.e., dense/compact vs. same content and total amount of practice distributed over a longer period) can impact memory consolidation and skills retention (Storch et al., 2008; Tsao & Craske, 2000), but there is not a clear consensus on whether distributed versus consolidated learning is better and for what types of learning. As shown in Figure 2b, therapists with more sessions per month had higher rates of MICO and had clients who produced more change language. Though this is not how we chose operationalized "training effects," we consider this (i.e., training density with less skilled therapists) a compelling direction for future research. Third, therapists in this study were in two highly controlled clinical trials (consistent with the majority of MI process research) and, as a result, demonstrated very few MI-inconsistent skills during the sessions. The therapists did have different previous exposure to MI; therefore, sessions conducted during implementation trials in community clinical settings may be ideal opportunities to better understand the impact of MI training (e.g., reading a manual, receiving a 2-hr seminar or online training) and therapist qualities (e.g., previous experience with MI, number of sessions per week, confidence in MI efficacy) on the adoption of MICO skills and their impact on in-session client language and behavioral outcomes (Darnell, Dunn, Atkins, Ingraham, & Zatzick,

[2] None of the Study 1 therapists had previous training in MI but five of the seven therapists had served as interventionists on a previous MI trial (Wood et al., 2010); therefore, study site could be conceptualized as a proxy for therapist experience. There were no site differences in client CT, ST, or FN (Figure 2a) or therapist MICO behaviors (Figure 2b), indicative of the lack of association between earlier MI experience and in-session language in the current study. Mediation models (Figure 2b in the mediation models) revealed study site and education level differences in FN and sustain talk. ST was predicted by study site only (not by education level), such that Study 1 participants had more ST than Study 2 participants (to be expected from more experienced Study 2 therapists). FN was predicted by both study site and education, such that Study 1 had less FN than Study 2 (counter to what would be expected from more experienced Study 2 therapists). Given that most site effects were nonsignificant, and the conflicting and inconsistent significant results, we thought it beyond the scope of this study to examine moderation effects of study site.

2016; Hallgren et al., 2018).[2] Previous research has indicated that three to four feedback sessions over 6 months are adequate to maintain skills (Schwalbe et al., 2014), but it remains to be seen what the ideal dose of supervision and training is to establish and maintain MI proficiency in community settings.

In conclusion, as therapists conduct more BMI sessions, their MICO skills improve, and these improvements were significantly associated with increased focus on personal alcohol use (CT and ST) and less off-topic conversation (FN). In heavier drinkers, increases in therapist experience were predictive of subsequent reductions in alcohol use; however, client change language did not mediate this relationship. Thus, if change language is what makes MI effective, future research can enhance our understanding of the contexts in which such language is consistently predictive of subsequent behavior change.

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