Short- and Long-Term Effects of Within-Session Client Speech on Drinking Outcomes in the COMBINE Study

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ABSTRACT. Objective: There is evidence of a causal chain in motivational interviewing (MI) involving counselor MI-consistent skills, client change language, and outcomes. MI was a key component of the combined behavioral intervention in the Combined Pharmacotherapies and Behavioral Interventions for Alcohol Dependence (COMBINE) Study. Participants in COMBINE were treatment-seeking and medication-seeking, and were required to maintain a period of abstinence before enrollment. Counselors were closely monitored and were temporarily removed from the study for remediation and supervision if their performance fell below threshold. The purpose of this study was to evaluate the MI causal chain among initial-session combined behavioral intervention audio recordings in this unique sample of highly motivated clients and highly monitored counselors. **Method:** Session 1 audio recordings ($N = 254$, 73.5% men) were evaluated using the Motivational Interviewing

Skill Code Version 2.0 with good interrater reliability. Counselor speech was measured using a summary measure of MI-consistent behavior. Client change language was assessed, using change talk and sustain talk. The outcome measure of drinks per week was computed using the COMBINE data set. **Results:** Higher sustain talk was significantly associated with increased drinking during treatment, whereas higher change talk was significantly associated with decreased drinking at the 1-year follow-up. In addition, there were significant indirect effects linking counselor behavior, client speech, and drinking both during treatment and at 1 year. **Conclusions:** Results supported the posited causal chain for MI. Despite somewhat lower variability of counselor behavior and use of a coding instrument that did not capture directional counselor behaviors, counselor behavior, client speech, and drinking outcomes were clearly linked in this unique sample. (*J. Stud. Alcohol Drugs*, 79, 217–222, 2018)

MOTIVATIONAL INTERVIEWING (MI) is an evidence-based, brief intervention widely used to treat alcohol use disorders (Hettema et al., 2005; Lundahl et al., 2010). The theory of MI is rooted in the belief that client ambivalence is an expected and normal part of a behavior change. Skilled MI counselors seek to create an empathic and collaborative environment in which clients can explore the perceived consequences of engaging in a problematic behavior and the potential benefits of avoiding that behavior (Miller & Rose, 2009). To achieve this, MI counselors use key strategies and techniques in an effort to elicit and reinforce client language favoring a target behavior change (referred to as “change talk”) and to soften client language that favors the problematic health behavior (referred to as “sustain talk”).

The link between MI-consistent counselor behaviors and client language is well established. In a secondary analysis of MI-based sessions in Project MATCH (Matching Alcoholism Treatments to Client Heterogeneity), Moyers and Martin (2006) used sequential coding to examine behavior

at the level of individual sequential utterances and found that client change talk was likely to immediately follow MI-consistent counselor speech (MICO), a summary measure that includes counselor reflections, open-ended questions, affirmations, and expressions of support. Follow-up work indicated that change talk was more likely to follow MICO behavior subtypes including reflections of change talk and questions favoring change (Moyers et al., 2009; Rodriguez et al., 2017). Sustain talk was more likely to immediately follow counselor MI-inconsistent speech (MIIN), including advising, confronting, directing, and warning, as well as MICO behavior subtypes including reflections of sustain talk and questions favoring risky health behavior. Subsequent research has largely supported these findings both at the utterance level and at the session level (Barnett et al., 2014; Gaume et al., 2010).

Other work has extended this research to examine the relationships between counselor behaviors, client language, and subsequent treatment outcomes. This work is suggested by a technical hypothesis (Miller & Rose, 2009) positing that counselor behaviors consistent with MI are associated with increased client change talk and reduced sustain talk, which in turn are associated with improved treatment outcomes. This technical hypothesis has garnered some empirical support (Magill et al., 2014; Moyers et al., 2009; Pirlott et al., 2012; Vader et al., 2010). However, although some studies have used detailed psychotherapy process coding to document a relationship between counselor behaviors that are inconsistent with the MI approach and subsequent client sustain talk (Barnett et al., 2014; Moyers et al., 2009), other

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studies have observed that both change and sustain talk may follow MICO behaviors (Apodaca et al., 2016). The relationships among MI skills, client language, and outcomes, then, remains unclear, in part because of measures of counselor behavior that do not take into account the valence of reflections and questions.

Large psychotherapy studies provide an opportunity to evaluate these mixed effects. The Combined Pharmacotherapies and Behavioral Interventions for Alcohol Dependence (COMBINE) Study was a multisite, randomized controlled trial for individuals with alcohol dependence. Eligible participants were randomized to one of nine treatment conditions, including five involving a combined behavioral intervention (CBI). Over the 16-week treatment period, CBI was expected to include between 12 and 20 sessions. The first of these was an open-ended MI intervention that included an exploration of the client's areas of concern, leading into motivational enhancement therapy (i.e., the presentation of personalized assessment feedback in an MI-consistent manner), typically in the second session. Subsequent CBI sessions introduced cognitive-behavioral skills training, with modules selected by the participant, and an emphasis on participation in mutual help groups. The participation of a supportive partner, relative, or friend was also encouraged in later sessions (Miller, 2002). Overall, COMBINE results indicated that all participants reduced their drinking, with a greater effect for those receiving naltrexone and medication management (MM); CBI, MM, and placebo; or CBI, MM, and naltrexone, than those receiving only placebo and MM (Anton et al., 2006). Complete study details are available elsewhere (Anton et al., 2006). CBI used ongoing quality assurance, with counselors temporarily removed from the study for remediation when they performed below threshold levels (Miller et al., 2005). A study examining these CBI quality assurance ratings revealed an effect of counselor empathy, with better outcomes from counselors performing at above-average levels of empathy (Moyers et al., 2016). However, no psychotherapy process coding was performed.

The goal of this study was to apply a detailed psychotherapy process coding system, the Motivational Interviewing Skill Code Version 2.0 (MISC; Miller et al., 2003) to examine the relationships among counselor and client within-session behaviors and subsequent client drinking outcomes in a sample of alcohol-dependent, treatment-seeking individuals from the CBI conditions of the COMBINE Study. We hypothesized that client behaviors would mediate the relationship between counselor behaviors and drinking outcomes.

Method

Participants

All first-session CBI audio recordings were requested from COMBINE sites; 274 tapes were received. Of these,

16 were from later sessions and were eliminated. An additional four recordings were inaudible. Recordings with 254 CBI participants ($M_{age} = 44.8$ years, $SD = 9.9$; 73.5% male; 25.2% ethnic minority) are represented in this analysis. Participants were required to have a current diagnosis of alcohol dependence according to the *Diagnostic and Statistical Manual of Mental Disorders, Fourth Edition* (DSM-IV; American Psychiatric Association, 1994), and to have achieved 4–21 continuous days of abstinence from alcohol immediately before study enrollment. Participants meeting dependence criteria for psychoactive drugs other than alcohol, caffeine, nicotine, or marijuana were excluded. Participants spent on average 4.7 days in inpatient treatment ($SD = 1.6$ days) in the 30 days before screening, had a mean Alcohol Use Disorders Identification Test score of 25.3 ($SD = 1.6$), had a mean age at onset of dependence of 30.8 years ($SD = 10.9$), had mean alcohol dependence score of 5.0 ($SD = 1.3$), and were drinking a mean of 133.3 drinks per week ($SD = 76.6$ drinks) during the baseline period before the mandatory abstinence. Procedures were approved by the local institutional review board.

Combined behavioral intervention

All Session 1 CBI tapes were requested from COMBINE sites. We obtained 254 audible Session 1 CBI audio recordings, representing approximately one third of CBI participants. Sessions were approximately 50 minutes in length. As reported elsewhere (Anton et al., 2006), CBI counselors had at least a master's degree in psychology, social work, or counseling and at least 2 years of experience. CBI counselors underwent training and were required to submit at least two passing tapes before treating clients in the COMBINE Study. Treatment fidelity was continuously monitored throughout the trial.

Measures

Outcome measures were drawn from the Form 90 (Miller & Del Boca, 1994), which applies a Timeline Followback procedure (Sobell & Sobell, 1992) to assess calendar drinking. Alcohol dependence was evaluated using the alcohol dependence measure from the Structured Clinical Interview for DSM-IV (SCID-I; First et al., 2002).

Session recordings were rated using the MISC 2.0. The counselor measure of interest for this study was the summary category of MI-consistent behaviors (MICO), which includes counselor reflections, open-ended reflections, emphasizing client autonomy and choice, affirmations, and supportive statements. MICO was divided by the number of counselor utterances. Unlike more detailed MI process coding systems (e.g., MISC 2.5: Houck et al., 2010; Sequential Code for Observing Process Exchanges [SCOPE]; Martin et al., 2005), MISC 2.0 does not include separate

categories for reflections of change talk, reflections of sustain talk, questions supporting change, or questions supporting the status quo. Client measures of interest were change talk and sustain talk, each divided by the number of client utterances.

Procedures

Coding was performed over approximately 16 months. About 22% of all rated sessions were double coded to assess interrater reliability. Intraclass correlations (ICC model (3,1): Shrout & Fleiss, 1979) were computed, indicating good to excellent reliability (Cicchetti & Sparrow, 1981) for change talk (ICC = .626), sustain talk (ICC = .613), and MICO (ICC = .932). Because of poor interrater reliability of the MISC 2.0 global ratings in this sample, which would limit the validity of any results, these measures are not analyzed in the present study.

Analysis plan

The outcome variable of interest for the present study was the number of drinks per week consumed during the treatment period and at the 1-year follow-up. Drinks per week ranged from zero to 305, with a zero count (i.e., no drinking) for 25.6% of the sample. Because count variables such as drinks per week are not normally distributed, outcome analysis was performed using negative-binomial hurdle regression in Mplus Version 8.0 (Muthén & Muthén, 1998–2017). This multivariate technique simultaneously assesses the negative-binomial and logistic portions of zero-inflated count data. Using this model, within-treatment and 1-year drinks per week were regressed onto change talk and sustain talk, covarying for baseline drinks per week. The covariates gender, age, minority status, readiness to change, the interaction of change talk and sustain talk, and illness duration (i.e., current age – age at onset) were evaluated but did not explain additional variance at either time point. Mediation between MICO, change talk, sustain talk, and drinks per week were assessed using the PROCESS macro (Hayes, 2013) with a serial multiple mediator model (MICO → change talk → sustain talk → drinks per week) with 5,000 bootstrapped samples to obtain bias-corrected confidence intervals (MacKinnon et al., 2004). The serial mediation model was chosen because it is consistent with the relationships described in the literature between MICO and change talk (Moyers et al., 2009; Pirlott et al., 2012) and between both change and sustain talk and outcomes (Magill et al., 2014). In particular, unlike parallel mediation models that require the untenable assumption of no relationship between change talk and sustain talk, the serial mediation model assumes that mediators are interrelated (Hayes, 2013), an assumption consistent with the MI literature on change talk and sustain talk.

Results

Outcome effects

In the negative binomial hurdle model for within-treatment drinks per week, significant effects were detected for baseline drinks per week, sustain talk, and MICO. In the count portion of the model, higher baseline drinks per week was associated with higher drinks per week during treatment (estimate = 0.01; $t = 4.59$, $p < .01$). Higher sustain talk was associated with higher drinks per week during treatment (estimate = 4.10; $t = 2.43$, $p < .025$). Higher MICO was associated with reduced drinks per week during treatment (estimate = -1.66; $t = -2.32$, $p < .025$). No significant effect was observed for change talk (estimate = -1.27; $t = -1.66$, $p = .10$). In the logistic portion of the model, sustain talk was associated with a decreased likelihood of abstinence (i.e., having zero drinks per week) during treatment (estimate = -8.52; $t = -2.23$, $p < .05$). No significant effects were observed for change talk, MICO, or baseline drinks per week (all $p > .12$).

In the negative binomial hurdle model for 1-year drinks per week, significant effects were observed for baseline drinks per week and change talk. In the count portion of the model, higher baseline drinks per week was associated with higher drinks per week at 1 year (estimate = 0.01; $t = 3.34$, $p < .001$). Higher change talk was associated with reduced drinks per week at 1 year (estimate = -2.22; $t = -2.42$, $p < .025$). No significant effects were observed for MICO or sustain talk (all $p > .36$). No significant effects were observed in the logistic portion of the model (all $p > .70$).

Mediation effects

The assumptions of the serial mediation model are consistent with the data in the present study, in that there is a significant correlation between change talk and MICO ($r = .243$, $p < .001$) but no evidence of a relationship between sustain talk and MICO ($r = .08$, $p = .187$). In addition, change talk and sustain talk are correlated ($r = .28$, $p < .001$) and remain so after controlling for MICO ($r = .27$, $p < .001$; $d = .55$).

For the within-treatment period, a significant indirect effect was detected for change talk and sustain talk (estimate = 1.76, 95% CI [0.28, 5.47]). Operating serially through change talk and sustain talk, higher MICO was associated with increased drinks per week during treatment. The individual indirect effects for change talk and sustain talk were not significant.

At the 1-year follow-up, a significant indirect effect was detected only for change talk (estimate = -7.22, 95% CI [-17.38, -1.65]). Operating via change talk, MICO responses were associated with decreased drinks per week at 1 year. Neither the serial indirect effect nor the individual effect of sustain talk was significant.

Discussion

In these data from the COMBINE randomized clinical trial, client change language was significantly associated with drinking. That is, at Session 1, clients with more sustain talk were more likely to drink at higher levels throughout the 16-week treatment period, whereas clients with more change talk were more likely to drink at lower levels at the 1-year follow-up. These results provide additional support for the notion that within-session client speech predicts treatment outcomes. There was evidence of a direct relationship between counselor MI-consistent behavior and outcome, supporting the theorized causal chain for MI both during treatment and 1 year later. Although prior work revealed a relationship between counselor empathy and outcome in COMBINE, the effect could not be reassessed in the present study with any validity because of low inter-rater reliability.

The present study suggests that change talk and sustain talk may exert their effects over different periods: sustain talk, more immediately during treatment, and change talk, in a sustained fashion up to 1 year later. In addition, the serial mediation of change talk and sustain talk during treatment is consistent with the utterance-level relationship between change and sustain talk that has been observed consistently in sequential coding studies (D'Amico et al., 2017; Houck et al., 2015; Moyers et al., 2009). Our data from this large clinical trial indicate that counselors should attend to both change talk and sustain talk, reinforcing the former and softening the latter when it occurs.

The relationship between MI skills and client within-session speech has strong empirical support (Magill et al., 2014). It is worth noting that in the present study these effects were detected despite the close monitoring and supervision CBI counselors received in COMBINE. Counts of MI-consistent behaviors in the present study had relatively low variability, as evidenced by the coefficient of variation for the present study (0.379) relative to those reported for sessions of comparable length in recent clinician training studies (0.464; Moyers et al., 2017) and in secondary analysis of sessions from Project MATCH (0.564; Moyers et al., 2009). The detection of this relationship in the present study, where range seems to have been restricted, speaks to the robustness of the effect.

Why might high MICO be related to both change and sustain talk in the present study? Our MICO summary category was broad and did not differentiate between counselor behaviors that attended to client change talk from those that attended to client sustain talk. Thus, counselor behaviors categorized as MICO could have been eliciting and reinforcing both change and sustain talk. Our results highlight the importance of coding systems that measure the extent to which MI counselors selectively elicit and reinforce client change versus sustain talk.

Effects of client change language are widespread even outside of MI. Such effects at 12 months following treatment were demonstrated not only in MI but also in cognitive behavior therapy and 12-step facilitation in a small study of sessions from Project MATCH (Moyers et al., 2007). In a study of cognitive-behavioral therapy for cocaine use (Aharonovich et al., 2008), higher within-session commitment to change predicted reduced within-treatment cocaine use. Effects have also been demonstrated outside of substance abuse: In cognitive-behavioral therapy for anxiety, client within-session speech is related to counselor behavior (Westra et al., 2012) and predicts end-of-treatment and 1-year outcomes (Lombardi et al., 2014; Westra, 2011). Indeed, MI's theoretical basis in cognitive dissonance (Fazio et al., 1977) and speech act theory (Amrhein, 2004) suggests that change talk and sustain talk are merely special cases of commitment, an indirect form of promise. Studies evaluating the predictive validity of such speech acts in laboratory settings have demonstrated that even in artificial settings, negative commitment predicts a contemporaneous assessment of openness to engaging in unhealthy behaviors (Ladd et al., 2016). Although the effects of within-session change language were initially revealed via MI process research (Miller et al., 1993), and the selective reinforcement of change talk has been proposed as a specific mechanism of action in MI (Miller & Rose, 2009), clearly the relationship between client within-session speech and outcomes is not specific to MI. The present study lends further support to the posited causal chain linking clinician behavior, client behavior, and outcomes, an effect that is likely to be broadly applicable.

Our findings should be considered in light of some study limitations. First, the MISC 2.0 coding system does not differentiate between counselor questions and reflections of change talk versus sustain talk, thereby limiting our ability to understand the precise relationships between the counselor's attempts to evoke and reinforce change talk and subsequent treatment outcomes. In addition, our sample of alcohol-dependent clients seeking treatment was unique in many ways, potentially limiting generalizability. Clients in COMBINE were highly motivated. They enrolled in the study seeking treatment in a medication study. To enroll they had to maintain a period of abstinence before undergoing any study procedures, and were aware of this requirement. Such attributes are less likely to be observed in front-line treatment settings.

In sum, our study findings support the causal chain in MI and highlight the important relationship between client language and within- and post-treatment drinking. More detailed analyses of counselor behaviors, specifically counselors' attention to client change and sustain talk, should be considered to fully understand the relationship between counselor and client speech and client treatment outcomes.

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