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Does mental status impact therapist and patient communication in emergency department brief interventions addressing alcohol use?



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ABSTRACT

Motivational interviewing (MI) is often incorporated into screening, brief intervention, and referral to treatment (SBIRT) interventions in critical care settings to address alcohol and other drug use. However, cognitive status has been linked to differential response to MI sessions in emergency department (ED) settings. The current study examined one possible explanation for this differential response: whether higher versus lower mental status impacts patient response to clinician statements during MI sessions conducted in an ED. Participants were 126 patients receiving an MI-based single-session alcohol brief intervention, and 13 therapists who provided treatment. Participants completed a mental status exam (MSE) as part of the screening process. Intervention sessions were audio-taped, and transcribed and coded using the Motivational Interviewing Skills Code (MISC 2.0; Miller, Moyers, Ernst, & Amrhein, 2003). The MISC 2.0 coded therapist behaviors that are related to the use of motivational interviewing, and patient language reflecting movement toward (change talk) or away from (sustain talk) changing personal alcohol use. Overall, patients responded in a similar manner to therapist MI behaviors regardless of high versus low level of mental functioning at the time of the intervention. Group differences emerged on patient response to only three specific therapist skills: giving information, open questions, and complex reflection. Thus, the differential effects of SBIRT in critical care settings do not appear to be a result of differences in the therapist and patient communication process.

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1. Introduction

Although nearly 18 million adults have been diagnosed as having a current alcohol use disorder, only 1 in 7 reports ever having received any kind of alcohol treatment (Cohen, Feinn, Arias, & Kranzler, 2007; Grant et al., 2004). At the same time, people with alcohol use problems are likely to be treated in trauma care centers and emergency departments (EDs; Cohen et al., 2007) for problems related or unrelated to their alcohol use. People with alcohol-related problems are overrepresented in ED and primary care settings compared with those in the general population (Cherpitel, 1994) and alcohol-related ED visits have increased significantly over the period from 1995 to 2010 (Cherpitel & Ye, 2012). Therefore, EDs provide an opportunity for screening, brief intervention, and referral to treatment (SBIRT) interventions for problematic alcohol use (Lundahl et al., 2013; Monti et al., 1999; 2007). Since 2005, the American College of Surgeons has required screening and brief

interventions to be administered to patients who test positive for alcohol use in all level I trauma centers (American College of Surgeons, 2010).

Research has consistently indicated the value of conducting brief interventions in the ED setting. Brief interventions can be conducted using a variety of therapeutic techniques, but often are administered using motivational interviewing (MI; Miller & Rollnick, 2013). A review (Nilsen et al., 2008) of 14 studies of brief intervention in EDs for alcohol indicates that the majority of studies (65%) found that brief intervention reduced alcohol consumption, hazardous use of alcohol, and alcohol-related injuries (compared to usual ED care). However, concerns have been recently raised regarding the efficacy of alcohol screening and brief intervention ED settings and potential patient-level moderators of intervention efficacy such as readiness to change, severity of alcohol use, and the type of injury and whether it was directly related to drinking (Field, Baird, Saitz, Caetano, & Monti, 2010). Therefore, although the implementation of brief interventions in the ED shows promise, it is less clear whether or how they may or may not work with individuals with impairment in cognitive function.

The advanced process coding methodology for MI provides the opportunity to examine possible in-session processes that may impact efficacy of MI in the ED setting. Recently, attention has focused on identifying the

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mechanisms by which MI exerts its therapeutic effects, namely the interplay between therapist techniques and patient language (Apodaca & Longabaugh, 2009). Regarding patient language, Miller and Rollnick (2013) define change talk as “any self-expressed language that is an argument for change” (p. 159) and sustain talk as “the person’s own arguments for *not* changing, for sustaining the status quo” (p. 7). Amrhein, Miller, Yahne, Palmer, and Fulcher (2003) first identified patient language during MI was predictive of substance use outcomes, and a recent meta-analysis of 16 trials implementing MI (Magill et al., 2014) found that a composite measure of change talk and sustain talk predicts improved outcomes while sustain talk predicts poorer outcomes. This study also found that therapist use of MI-consistent (MICO; e.g., reflections, affirmations, advice with permission) or MI-inconsistent (MIIN; e.g., confronting, directing) skills can elicit change talk or sustain talk, respectively, findings that were replicated in a subsequent and larger (37 studies) meta-analysis (Romano & Peters, 2016).

Although it has been suggested that cognitive impairment does not lead to a differential response to MI, perhaps due to its brief and focused nature (see Miller & Rollnick, 2013, pp. 346–348), we posit that MI encourages a variety of therapist techniques that may have differential effects in individuals with and without cognitive impairment. MI emphasizes the use of reflections, which are the therapist’s “reasonable guess as to what the person means, and gives voice to this guess in the form of a statement” (Miller & Rollnick, 2013, p. 53). Reflections can be simple (e.g., repeating the words or content of what the patient has stated) or more complex (e.g., reflecting on emotions, use of metaphors). Thus, complex reflections that reflect the patient’s ambivalence about drinking are likely to require more cognitive capacity for the patient to understand and respond to with change talk that represents self-relevant statements of an intrinsic consideration of changing a problematic behavior (Feldstein Ewing, Yezhuvath, Houck, & Filbey, 2014; Houck, Moyers, & Tesche, 2013). Another therapist behavior encouraged in MI is the use of open-ended questions, which cannot be answered with a brief or yes/no response, and thus require the individual to think and develop a more detailed response than a close-ended question (which can be answered yes/no). In contrast, more concrete and directive statements such as close ended questions and giving information may result in more patient change language in individuals with cognitive deficits. Indeed, in their work adapting MI with dually diagnosed patients (substance use and psychotic disorders), Martino, Carroll, Kostas, Perkins, and Rounsaville (2002) recommended that clinicians should use simple and concise language, reflect often, and use summary statements and metaphors that use the client’s own language and statements in order to reduce confusion and enhance motivation to change substance use. Whether these recommendations from dual-diagnosis MI (or DDMI) have a differential impact on client change talk and sustain talk has not been formally evaluated. However, an increased focus and appreciation of client change language as an important mediator of MI efficacy in the past 15 years combined with significant advances in coding and analytic techniques now permit the examination of specific therapist behaviors on client language. For example, examining sequential relationships between therapist behaviors and client language, only affirmations (a compliment or positive comment about the client) has been found to both significantly increase client change talk and significantly decrease client sustain talk the differential impact of (Apodaca et al., 2016).

Taking these considerations regarding which therapist behaviors are most effective in different contexts a step further, it has recently been hypothesized that three neural networks influence the relationship between therapist MI skills and within-session client change (Feldstein Ewing, Filbey, Hendershot, McEachern, & Hutchison, 2011), and subsequent research has implicated the functioning of the left inferior frontal gyrus/anterior insula and superior frontal gyri of self-generated and personal change talk and sustain talk (Feldstein Ewing et al., 2014; Houck et al., 2013). In work with adolescents, increases in activity in the posterior cingulate gyrus and precuneus have been observed when participants listen to personal

change talk from a previous session (Feldstein Ewing et al., 2013), and greater brain response in the bilateral anterior cingulate gyrus has observed when presented with complex reflections versus closed questions (Feldstein Ewing et al., 2016). Therefore, we propose that neuropsychological impairment in any or all of these networks may behaviorally manifest itself in confusion and/or distress during the session, even following the use of skillful MI techniques which reflect the patient’s self-stated reasons for change or consequences of drinking, which in turn will behaviorally manifest itself as sustain talk (preserving the status quo, “I don’t desire/want/need to quit drinking”).

The aim of the current study was to examine whether the patient’s mental status influences the link between specific therapist behaviors (or micro-skills) and patient language. Participants in a study administering a brief intervention utilizing MI in an ED setting completed a mental status exam (MSE) as part of the screening process, and we compared individuals in the lower (low MSE) and upper (high-MSE) quartiles of MSE scores. First, we sought to explore whether low-MSE individuals would have worse drinking outcomes at follow up than high-MSE individuals. Second, as present research on in-session therapist and client behaviors have focused on composites, or groups, of therapist behaviors (MIIN, MICO) hypothesized to facilitate change talk and sustain talk, we hypothesized general classifications of therapist utterances that were MI-consistent (MICO), MI-Inconsistent (MIIN) would not be responded to differentially by the two groups. Third, given the possible link between impaired brain function related to the numerous processes involved in goal-directed behavior change and in-session client language, we hypothesized that differences would emerge in the likelihood of specific, individual therapist behaviors to elicit different types of patient language. Therefore, we hypothesized that more complex (and potentially more confusing and/or psychologically distressing by cognitively impaired patients) therapist micro-skills (specifically complex reflections and open-ended questions) would be followed by less change talk and more sustain talk in low-MSE than in high-MSE participants. In contrast, we hypothesized that more basic (and more concrete and easy to follow by cognitively impaired patients) therapist behaviors (giving information, simple reflections, close-ended questions) would be followed by more change talk in low-MSE than in high-MSE patients. The goal of this line of work is to help clinicians identify the relative importance of choosing among the various therapist behaviors utilized in MI to enact in order to increase patient change talk and reduce patient sustain talk in a manner that is responsive to patient level of cognitive functioning at the time of the intervention.

2. Materials and methods

Audiotapes of MI sessions ($N = 126$) came from a previously completed study that delivered a single individual motivational interviewing session (MI) to address heavy drinking in emergency care (Monti et al., 2014).

2.1. Patients and recruitment

Adult patients (≥ 18 years) in the ED or trauma service were deemed eligible for study inclusion if they met one of three inclusion criteria: a) scored an 8 or higher on the Alcohol Use Disorders Identification Test (AUDIT; Saunders, Aasland, Babor, De La Fuente, & Grant, 1993); b) had a measured blood alcohol concentration (BAC) $> 0.01\%$ according to a biochemical test (completed as part of standard care), or c) if they reported consuming alcohol in the 6 hours prior to the injury resulting in their hospital admission. Patients who did not speak English, had a self-inflicted injury, or were in police custody were excluded. Patients were approached and screened by trained masters-level interventionists. After establishing eligibility, interventionists conducted a mini-mental status examination (described further below), on which the highest possible score was 26. Patients who scored under 18 were not enrolled.

2.2. Intervention

The MI session has been described in detail elsewhere (Monti et al., 2014). Briefly, it was single-session intervention that included seven possible components: describe the accident/injury, typical week of alcohol use, pros and cons of alcohol use, exploring goals and values, personalized feedback on alcohol use, importance and confidence rulers, and a written change plan (for participants who were ready to make a change). The session was guided by a written treatment manual, but was designed to be flexibly tailored in order to allow therapists to meet the circumstances of each participant. The goal of the session was to help patients explore and resolve their ambivalence about changing their alcohol use, with a desired outcome of reducing alcohol use or harm caused by alcohol use.

2.3. Assessments

Participant follow-up assessments (average drinks per week, number of drinking days, number of heavy drinking days, alcohol-related consequences) were conducted at 6 and 12 months by trained research assistants masked to intervention condition. Patients were paid \$100 for each assessment. Significant reductions for both alcohol consumption and consequences were observed at the 6- and 12-month follow-up time points (Monti et al., 2014).

2.4. Measures

Age, gender, race, ethnicity, employment status, hours per week worked, and marital status were recorded using a demographics measure created for the study. Graduated frequency for alcohol (GF; Greenfield & Rogers, 1999) assesses the frequency of drinking at different quantity ranges (12+ drinks, 8–11, 5–7, 3–4, 1–2) and total volume (Hilton, 1989). Drinking variables were average drinks per week, number of drinking days, and number of heavy drinking days for past 6 months at baseline and follow-ups. Alcohol-related problems were measured using the Drinker Inventory of Consequences (DrInC; Miller, Tonigan, & Longabaugh, 1995), a 50-item questionnaire of adverse consequences in 6 areas: interpersonal, physical, social, impulsive, control, and intrapersonal, with scales combined to assess total adverse consequences. The DrInC had a past 6-month timeframe and was administered at baseline and both follow ups. The Mental Status Exam (MSE) was a brief neuropsychological screener developed for use and quick scoring in an ED setting that used items from both the Mini Mental Status Exam (MMSE; Folstein, Folstein, & McHugh, 1975) and the six-item Cognitive Impairment Test (6IT; Brooke & Bullock, 1999). The measure included 8 orientation items from the MMSE (year, month, day of month, day of week, season, current location, city and state; one point each). Items from the 6IT assessed memory (immediate and delayed recall of five components of a memory phrase, adapted in this study to “A hunter/killed/a wolf/at the edge/of the forest;” 10 points total) and attention (two tasks: count down from 20 to one; and the 12 months in reverse; 8 points total). Maximum score on the measure was 26; individuals who scored fewer than 18 points (12 of 1269 participants screened) were excluded from participation.

2.5. Coding therapist and patient language

2.5.1. Measurement

The Motivational Interviewing Skill Code version 2.0 (MISC 2.0; Miller, Moyers, Ernst, & Amrhein, 2003) was used to code the therapist and patient language within sessions in a secondary data analysis (see Apodaca, Magill, Longabaugh, Jackson, & Monti, 2013). The MISC 2.0 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). Each of these three general categories incorporates the therapist sub-codes, or micro-skills that were of particular interest (see Table 2).

Patient language in the MISC is coded as representing movement toward or away from the target behavior change (e.g., reducing harmful use of alcohol). Patient change talk represents language indicating movement toward change, including statements of desire, ability, reasons, need, commitment, and taking steps. Patient sustain talk represents language indicating movement away from change or maintaining the status quo (i.e., continued drinking), was similarly coded, but in the opposite direction.

2.5.2. Preparation of audiotapes for coding

Prior to coding, session tapes were transcribed and then parsed, which involved using transcripts to divide lengthy statements into utterances, defined as a complete thought that ends either when one thought is completed or a new thought begins with the same speaker, or by an utterance from the other speaker.

2.5.3. Process coding: training and supervision

The study raters received roughly 40 hours of training in the MISC coding system by the second author. The training protocol involved graded learning tasks, beginning with simple to increasingly complex identification of therapist and patient behaviors. Raters progressed through a training library of role-play and audiotapes of pilot sessions with actual patients (not included in analyses) until rating proficiency was achieved (an interclass correlation coefficient of .75 or greater). Weekly supervision meetings addressed coder questions, specified decision rules, and provided targeted training on low agreement items.

2.5.4. Coder reliability

In the parent trial, 20% random selection of cases was double-coded to verify inter-rater reliability [$n = 67$ see Apodaca et al., 2013 for details]. Intraclass correlation coefficients [ICCs; two-way mixed, single measure; (McGraw & Wong, 1996)] were calculated for each variable to determine interrater reliability across raters. Reliabilities for all therapist and patient behavior codes ranged from the “good” to “excellent” range, [where .60–.74 = good; .75 or above = excellent; (Cicchetti, 1994)].

2.5.5. Selection of sessions

The primary aim of this study was to examine whether mental status influenced therapist and patient communication. To address this aim, we divided the sample into four quartiles. For analyses, we compared those in the highest quartile (MSE = 24–26; $n = 60$) and the lowest quartile (MSE = 17–23; $n = 66$).

2.6. Analytic plan

Data analysis for the current study was conducted in four steps. First, we conducted repeated measures analysis of co-variance (ANCOVA) on four drinking outcomes (average drinks per week, number of drinking days, and number of heavy drinking days and DrInC summary scores). These models co-varied the baseline values of the respective variables in order to examine whether there were post-intervention differences in outcomes for the low- and high-MSE groups. Second, for both the high and low MSE groups, we examined associations between utterances at the sequential data level, following established procedures (Gaume, Bertholet, Faouzi, Gmel, & Daepfen, 2010; Gaume, Gmel, Faouzi, & Daepfen, 2008; Moyers & Martin, 2006). Specifically, the associations under investigation are transitions between two adjacent utterances. Transition probabilities permit direct interpretation of the overall likelihood of a target behavior once a given behavior has occurred (Moyers & Martin, 2006). Thus, transition values can be read directly as the percent of time a target behavior (such as patient change talk) follows a given behavior (such as therapist complex reflection). We first

conducted transition analyses of the relationship of general categories of therapist behavior (MICO, MIIN) and subsequent patient change talk and sustain talk to be consistent with previous literature (see Dobber et al., 2015; Magill et al., 2014). To examine whether MSE impacts the response to specific and common therapist utterances, we focused on five micro-skills from the general categories of MICO and Other (open and close ended questions, simple and complex reflections, giving information) and their association with patient change talk and sustain talk. Note that the individual therapist subcodes that comprise the MIIN category (advice without permission, confront, direct, raise concern without permission, and warn) occurred too infrequently to calculate reliabilities or to be analyzed individually.

We then used Generalized Sequential Quierier (GSEQ 5.1) software for the analysis of interaction sequences (Bakeman & Quera, 2011). Consistent with our previous work (Apodaca et al., 2016), we computed conditional transition probabilities and observed and expected frequencies, as well as tests of significance (based on observed versus expected cell frequencies, i.e., χ^2 test) and odds ratios, along with corresponding 95% confidence intervals. Therefore, the odds ratio can be interpreted as the ratio of the odds of a given patient utterance (e.g., change talk, versus a patient utterance other than change talk) occurring following some initial therapist utterance (e.g., closed question), divided by the odds of the same utterance following some other therapist utterance (e.g., giving information). For example, an odds ratio of 2.0 would indicate that the odds of change talk occurring is two times greater following a reflection than following some other therapist utterance. Because our focus was on how therapist behaviors impact subsequent patient behaviors, we adopted the approach of Gaume et al. (2008) in which transition probabilities were calculated on the basis of all “same-type transitions.” Specifically, transitions were evaluated with respect to only therapist-to-patient utterances (as opposed to evaluating all other possible transitions such as patient-to-therapist utterances; therapist-to-therapist utterances; and patient-to-patient utterances.)

The third set of analyses were designed to examine our primary hypothesis that various therapist behaviors would be responded to differentially by the low- and high-MSE groups. We examined the difference between the odds ratios of the various utterances between high and low MSE groups by first calculating the log of the odds ratio, taking the absolute value of the difference between the two log odds ratios, computing the standard error of this difference, and using this information to determining the z-score (one tailed due to directional hypotheses) for the difference (Altman & Bland, 2003; McHugh, 2009).

3. Results

3.1. MSE status and alcohol use outcomes

Table 1 contains demographic, session, alcohol use, motivation, and alcohol-related problems for both groups at baseline. Pairwise comparisons at 12 months indicated that the low-MSE group reported significantly higher drinks per week, heavy drinking days, and alcohol-related problems than the high-MSE group ($p < .05$). As can be seen in Fig. 1, repeated measures ANCOVAs (using baseline scores as a covariate) revealed significant MSE status \times Time effects for average drinks per week (panel A; $F_{(1107)} = 4.61, p = 0.03, \eta_p^2 = .04$), number of heavy drinking days (panel B; $F_{(1108)} = 4.67, p = 0.03, \eta_p^2 = .04$) and DRInC summary scores (panel C; $F_{(1108)} = 6.72, p = 0.01, \eta_p^2 = .06$), but not number of drinking days (panel D; $F_{(1108)} = 2.87, p = 0.09, \eta_p^2 = .06$). This suggested that high-MSE participants reported greater reductions in alcohol use and alcohol-related problems over the 12 month follow-up, compared with low-MSE participants.

3.2. In-session processes of low- and high-MSE groups

Descriptive results including the relative frequency of each type of therapist and patient statement per session are presented in Table 2.

Table 1
Demographic information for high and low MSE groups at baseline.

	High MSE (n = 60) mean/N (SD/%)	Low MSE (n = 66) mean/N (SD/%)	Test statistic (t/ χ^2)
Demographics			
Age in years	31.75 (11.21)	36.00 (11.18)	4.50*
Sex			
Male	41 (32.8%)	44 (35.2%)	0.006
Female	19 (15.2%)	21 (16.8%)	
Ethnicity			
Hispanic/Latino	10 (8.0%)	16 (12.8%)	1.20
Not Hispanic/Latino	50 (39.2%)	49 (40.0%)	
Race			
White	42 (33.9%)	37 (29.8%)	1.99
Non-white	18 (14.5%)	27 (21.8%)	
Marital status			
Single	42 (33.6%)	54 (43.2%)	2.99
Married/Live together	18 (14.4%)	11 (8.8%)	
Head/Neck/Spine injury ^a			
No	52 (41.6%)	49 (39.2%)	2.56
Yes	8 (6.4%)	16 (12.8%)	
Days since admission	3.33 (6.78)	3.22 (5.25)	0.01
Session length	51.33 (17.83)	44.95 (12.65)	4.81*
Alcohol use measures			
AUDIT	14.76 (7.96)	15.45 (7.86)	0.48
Drinks per week	31.36 (35.94)	45.95 (46.14)	1.97*
Number of drinking days	86.93 (64.52)	100.30 (64.48)	1.16
Number of heavy drinking days	57.05 (57.86)	77.25(63.89)	1.85
Alcohol-related problems	17.98 (13.13)	19.50 (11.17)	0.70
Contemplation ladder	5.20 (3.77)	6.18 (3.65)	2.20
Addiction Severity Index (ASI)			
Serious family conflict	3.02 (7.64)	2.95 (7.01)	0.002
Medical problems	4.48 (9.16)	3.37 (8.54)	0.495
Psychological problems	6.88 (10.38)	7.62 (11.65)	0.137
Money from employment	1031.41 (2203.5)	1465.00 (4254.82)	0.488
Money spent on alcohol	146.22 (250.64)	151.27 (333.51)	0.008

Note.; AUDIT = Alcohol Use Disorders Identification Test.

* $p < .05$.

^a Self-reported.

Comparing the high and low MSE sessions, therapists exhibited similar amounts of the general (MICO, MIIN) and specific (open and closed questions, simple and complex reflections, giving information) behaviors. Patients verbalized nearly identical percentages of change talk (15% to 17%) and sustain talk (both 6%) in the high and low MSE sessions.

Table 3 shows the conditional probabilities, odds ratios (OR) and 95% confidence intervals for all therapist-to-patient transitions, where the initial event was a therapist utterance and the subsequent event was a patient utterance. The column labeled *conditional probability* (CP) indicates the percentage of the time that a given patient behavior occurred immediately following the given therapist behavior. Using the CP of giving information and change talk as an example, giving information was immediately followed by client change talk 18% of the time in the high MSE group and 24% of the time in the low-MSE group. Regarding the general categories of or both the high- and low-MSE samples, MICO behaviors were more likely than chance to be immediately followed by both patient change talk and sustain talk ($p < .001$). None of the transitions involving MIIN behaviors reached significance. Regarding specific therapist behaviors (micro-skills), the directions of the odds ratios were the same in both the high and low MSE groups. Three differences emerged between the strength of the OR: (1) the

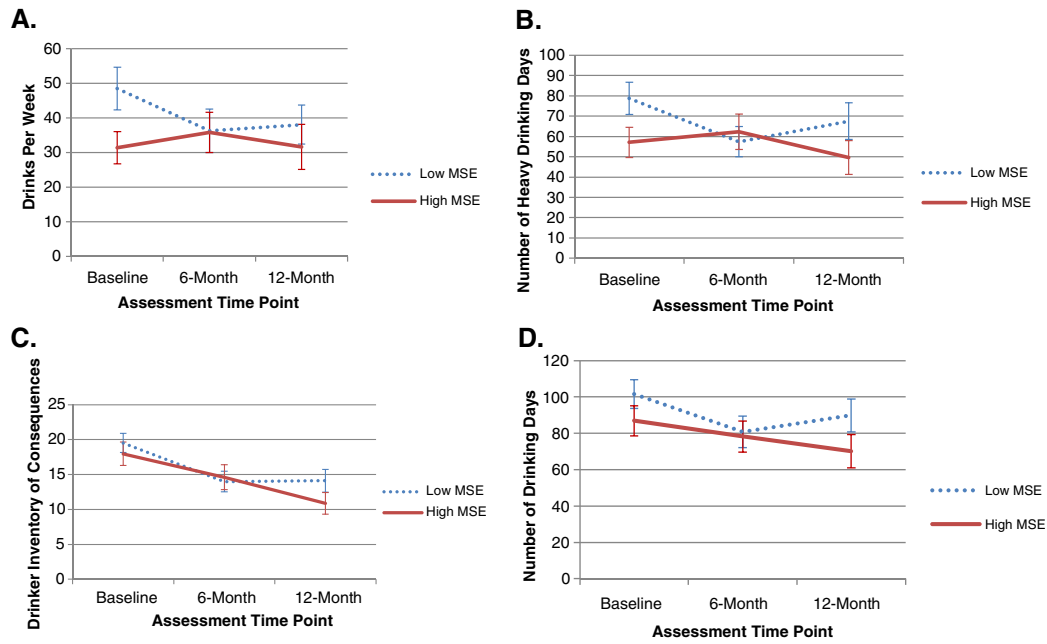


Fig. 1. Changes in alcohol use and consequences in low-MSE and high-MSE groups at baseline, 6- and 12-month assessment.

low-MSE patients exhibited a greater probability of responding to an open-ended question with sustain talk than the high-MSE patients; (2) the low-MSE patients exhibited a greater probability to responding to giving information with change talk than the high-MSE patients; and (3) the low-MSE patients also exhibited a lesser probability of following a complex reflection with sustain talk than the high-MSE patients.

4. Discussion

To our knowledge, this study is the first sequential analysis comparison of therapist and patient behaviors comparing patients with different levels of mental status functioning at the time of a brief intervention. In this study, participants with lower MSE reported worse drinking outcomes than those with high-MSE twelve months following brief intervention in the ED. Although we are not equating the mental status assessed in this study with the cognitive impairment associated with a formal diagnosis of TBI, our findings are consistent with a recent large scale trial (10 sites, 469 patients) which indicated that individuals with TBI who received brief interventions incorporating MI and personalized feedback, and were also delivered in the ED, did not demonstrate reductions in alcohol use at the 12-month follow-up (Zatzick et al., 2014). Regarding in-session therapist and patient language, our second hypothesis was supported in that there was a lack

of observed differences between the two groups on general classifications of therapist utterances (MICO, MIIN). In both the low and high MSE groups, the composite code of MICO was more likely to be followed by change talk and sustain talk, a finding consistent with two recent meta-analyses (Magill et al., 2014; Romano & Peters, 2016). Regarding patient response to specific therapist micro-skills, the majority of our hypothesized pattern of results did not emerge. Therefore, overall the in-session processes in low- and high-MSE sessions were quite similar.

Three notable differences did emerge in the patients' response to specific therapist behaviors. First, for both groups it was less likely than chance that giving information would be followed by change talk; however, this effect was less pronounced in the low-MSE patients (change talk followed giving information 24% of the time) than the high-MSE patients (18%). This is in contrast to a previous study delivering BMIs to college students, in which therapist "giving information" performed as poorly as MIIN behaviors, with change talk occurring only 15% of the time (Apodaca et al., 2016). Therefore, one could surmise that giving information may not a recommended strategy to evoke change talk, but may be more effective with low-MSE patients. This finding is consistent with recommendations for conducting DDMI with dual-diagnosis patients (Martino et al., 2002), in which personalized information should be provided in a clear and concise manner. In this study, information was provided in personalized handouts with

Table 2
Descriptive information of therapist and patient behaviors per session.

	High MSE					Low MSE				
	Frequency	% of total	Range	M	SD	Frequency	% of total	Range	M	SD
Therapist MI-Consistent (MICO)	6188	31%	40–278	119.29	54.70	7315	32%	27–295	132.49	52.23
Open question	1815	9%	9–98	34.83	18.19	1903	8%	6–72	34.45	14.00
Simple reflection	1982	10%	11–98	38.52	22.00	2639	11%	10–139	47.67	23.38
Complex reflection	1756	9%	7–115	33.87	22.57	2024	9%	7–144	36.67	25.83
Therapist MI-Inconsistent (MIIN)	70	0%	0–9	1.20	1.90	64	0%	0–9	1.13	1.84
Therapist other	4338	22%	21–199	83.92	36.23	4582	20%	16–181	83.40	34.82
Closed question	1842	9%	4–83	35.35	19.74	2035	9%	5–84	37.02	18.09
Giving information	1248	6%	5–50	24.58	10.83	1369	6%	3–78	24.93	14.38
Patient change talk	3065	15%	6–167	58.73	34.76	3846	17%	12–144	69.85	30.31
Patient sustain talk	1194	6%	3–79	23.25	14.61	1291	6%	4–94	23.36	17.93

Note. MI = motivational interviewing.

Table 3

Transition analysis of therapist composite codes and micro-skills with patient language and comparison of transition in low- and high-MSE groups.

Initial event → subsequent event	High MSE			Low MSE			z
	CP	OR	95% CI	CP	OR	95% CI	
Therapist composite codes							
MICO → Change talk	.31**	1.53	1.38–1.70	.34**	1.57	1.43–1.73	0.36
MICO → Sustain talk	.11**	1.55	1.33–1.82	.11**	1.60	1.37–1.87	0.28
MIIN → Change talk	.36	1.50	0.81–2.78	.26	.81	0.42–1.57	1.34
MIIN → Sustain talk	.07	.66	0.20–2.14	.04	.44	0.11–1.80	0.54
Therapist micro-skills							
Closed Question → Change talk	.26	0.89	0.79–1.01	.27***	0.80	0.71–0.90	1.22
Closed Question → Sustain talk	.08***	0.79	0.65–0.95	.07***	0.74	0.61–0.89	0.58
Open question → Change talk	.38***	1.81	1.62–2.03	.42***	1.88	1.69–2.09	0.37
Open question → Sustain talk	.10	1.02	0.86–1.22	.11***	1.30	1.11–1.54	1.98*
Simple reflection → Change talk	.26***	0.89	0.78–1.02	.29**	0.90	0.81–1.00	0.13
Simple reflection → Sustain talk	.12***	1.34	1.12–1.60	.12***	1.46	1.25–1.70	0.78
Complex reflection → Change talk	.31***	1.22	1.08–1.39	.34***	1.26	1.13–1.41	0.38
Complex reflection → Sustain talk	.14***	1.56	1.32–1.86	.10	1.16	0.98–1.38	2.40*
Giving information → Change talk	.18***	0.55	0.45–0.68	.24***	0.71	0.61–0.84	1.91*
Giving information → Sustain talk	.07***	0.62	0.45–0.84	.05***	0.52	0.38–0.70	0.47

Note. CP = conditional probability; OR = odds ratio. Significant CP indicate that OR greater than 1.0 reflect a transition between the initial event and the subsequent event that is more likely to occur than chance, and odds ratios less than 1.0 reflect a transition that is less likely to occur than chance. The z-score is the statistic used to compare whether the odds ratios of High and Low MSE differ significantly.

* $p < .05$.

** $p < .01$.

*** $p < .001$.

clear graphs and charts. Second, and consistent with our hypotheses, low MSE patients were more likely to respond to open-ended questions with more sustain talk than high MSE patients. This may have been a result of open-ended questions being more confusing and difficult to interpret for low-MSE patients, as has also been recommended in DDMI. Finally, high MSE patients were more likely to respond to therapist's complex reflections with sustain talk than low MSE patients. This pattern is puzzling and the opposite of what we expected. Perhaps therapist use of complex reflections facilitated more verbal exploration of ambivalence about drinking behaviors in the high-MSE patients than in the low-MSE group (discussing both reasons for and against changing alcohol use). Indeed, impairment in any brain networks may have impaired the low-MSE patients' ability to discuss ambivalence in detail, even in the presence of MI-consistent therapist micro-skills (Feldstein Ewing et al., 2011, 2013; Houck et al., 2013). This finding may also have been a reflection of what the content of the reflections may have been. Clinicians in this trial were trained to selectively reflect change talk back to clients more than sustain talk back to clients. It is possible that the low-MSE clients would respond with change talk (in effect, reflecting back the therapist's reflection) to a greater degree than the high-MSE clients. Of particular relevance is recent work by Barnett et al. (2014) which has shown that a positive reflection (reflecting change talk) was more likely to be followed by change talk, and that negative reflections (reflecting sustain talk) were more likely to be followed by sustain talk.

Despite these few differences, the language exchange in high and low-MSE patients was generally similar, yet the alcohol use outcomes were not. How to explain these findings? A few group differences at baseline are of note. The lower MSE group had shorter sessions, and consumed more drinks per week at baseline than the high MSE group. Therefore, it appears that the lower MSE group may have been a more severe sample, yet spent less time discussing their alcohol use.¹ With

an approach focused on evoking issues with previous drinking and consequences, one would think that there would be more to discuss than less. Perhaps participants with heavier alcohol use prior to the intervention were more likely to have begun to experience impaired cognitive functioning as a result of their heavier drinking. Alternatively, heavier-drinking patients may have been more likely to sustain an injury that impacted their mental status at the time of the intervention. Either scenario provides a reason to believe that this set of patients would receive less benefit from MI, a largely cognitive approach that may have been beyond the patient's ability to process at the time of the intervention.

The findings of this study provided here have clear clinical and training implications. First, clinicians should continue to use general MI-consistent skills, regardless of the patients' mental status level, as these were consistently linked to increased change talk in the sessions. Indeed, MI has appeared to facilitate behavioral planning, problem solving, and change in individuals with moderate to severe brain impairment that have been recruited in previous trials of MI (Bombardier & Rimmele, 1999; Cox et al., 2003; Hsieh et al., 2012). In Project MATCH, neither cognitive impairment or level of cognitive functioning was found to moderate response to motivational enhancement therapy (Longabaugh & Wirtz, 2001). These trials consisted of several (2 to 12) sessions of MI, whereas other single-session interventions incorporating MI have not significantly reduced alcohol use among low-MSE patients (Sander et al., 2012; Tweedly, Ponsford, & Lee, 2012). Therefore, the efficacy of an approach like MI, which encourages personal responsibility for change, may be hindered by deficits in the executive functions of goal planning, problem solving, and implementation of behavioral strategies in a single-session intervention (Medley & Powell, 2010). Therefore, it is possible that multiple sessions are needed rather than one, to facilitate an effective collaborative and for systematic implementation of a plan for change. Other adaptations such as large print cue cards, and using simple and graphic representations of the provided feedback may enhance the effectiveness with this subset of participants (e.g., Bombardier & Rimmele, 1999).

This study had limitations that must be noted. First, this study used a unique measure of mental status designed for ease of use (e.g., no writing and copying as in the MMSE) and quick scoring (e.g., avoiding reverse scored and weighted items as in the 6IT) in the ED. Although other studies have used a modified version of the MMSE in the ED (such as a score of 7 or more of the 10 orientation items; Zatzick et al., 2014), the use of this

¹ Research has indicated that global measures of the therapist and patient may be as, or more, predictive of outcomes. Therefore, we decided to examine whether there were differences in the global ratings of therapist empathy, acceptance and MI Spirit (defined as a combination of collaboration, autonomy, and evocation). However, the reliabilities of these three global scores were rather low (0.29–0.62), precluding them from being a central focus of the manuscript. That said, exploratory analyses revealed that the High and Low MSE therapists did not significantly differ on global ratings of empathy ($t_{(104)} = 1.32, p = .17$), acceptance ($t_{(104)} = .89, p = .37$), and MI Spirit ($t_{(104)} = .01, p = .99$).

measure precludes any comparison of this group to other samples that used these measures. Although participants could have made as many as 8 errors in a variety of areas of cognitive functioning and still received a brief intervention, we acknowledge that the MSE scores may not accurately capture the impairment that may be moderating brief intervention efficacy other trials. It is possible that more severe impairment will influence client's in-session behaviors to a greater degree. Second, the data in these analyses only allow us to examine the immediate probability of change or sustain talk following the most recent therapist statement (lag 1). It remains to be seen whether therapist behaviors may facilitate change or sustain talk in subsequent statements, or the impact of the trajectory of change talk or sustain talk over the course of the session (slope). Furthermore, the type of therapist microskill studied (e.g., open question, reflection) is only a behavioral proxy of cognitive processing complexity, and it is likely that other factors unaccounted for in this study (clarity, length of therapist statement) can influence client language. Second, the clinicians in the trial received extensive MI training and ongoing feedback in group supervision that included listening and coding portions of session tapes. As such, these interventions were very MI adherent, precluding examination of therapist MI-Inconsistent behaviors. It is possible that MIIN exerted a more significant influence in other trials that have used full time staff that did not attain MI proficiency (e.g., Zatzick et al., 2014). In other words, there may be a threshold at which repeated MI-inconsistent therapist utterances result in discord in the session and poor outcomes. Process coding of sessions from real-world effectiveness trials would permit the investigation of this possibility. Third, the parent trial did not collect data on co-morbid psychiatric disorders, precluding a supplemental analysis of psychosis on in-session processes testing some of the recommendations of Martino et al. (2002). That said, the trial also collected data on the nature of the alcohol-related injury, and 40 participants self-reported "head, neck or spine (HNS) trauma" as a result of their alcohol use. In contrast, Zatzick et al. (2014), study which confirmed lifetime TBI by a medical chart review of ICD-9 codes.² Finally, this study used the most current available version of the Motivational Interviewing Skills Code (version 2.0), which classifies questions and reflections without regard to valence (i.e., whether the therapist is reflecting or asking about change talk or sustain talk). A more recent version of the MISC (v. 2.5; Houck, Moyers, Miller, Glynn, & Hallgren, 2010) now differentiate reflections based on the valence: positive, negative, neutral, or both positive and negative (i.e., does the statement reflect change talk, sustain talk, neither, or both). Use of this measure would permit the empirical exploration of what type of reflections are more influential in low and high MSE groups, providing further guidance on how to maximize efficacy of interventions.

5. Conclusion

In sum, individuals with lower mental status functioning do not change alcohol use and alcohol-related problems following a brief intervention utilizing MI. However, the lack of brief intervention efficacy does not seem to be linked to any major differences in self-generated patient language in response to specific therapist micro-skills in MI. By no means conclusive, this study supports the continued use of MI in applications of SBIRT with ED patients, even those with mild impairment of mental status. However, it is left to future research to determine precisely why brief interventions incorporating MI are less effective with this population.

² To approximate the analyses from Zatzick et al. (2014), we also conducted an identical set of comparisons of in session processes of this group versus the participants who did not endorse HNS trauma ($n = 153$). There were no significant differences between the two groups on in-session processes, nor on alcohol use and problems over the 12 month follow-up. Therefore, cognitive functioning rather than dichotomous TBI or trauma indicators may be more relevant to in-session processes and outcomes.

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