Published in final edited form as:

J Consult Clin Psychol. 2014 December ; 82(6): 936–948. doi:10.1037/a0037658.

Individual versus Significant Other-Enhanced Brief Motivational Intervention for Alcohol in Emergency Care

Peter M. Monti,

Center for Alcohol and Addiction Studies School of Public Health Brown University Box G-S121-5
Providence, RI 02912

Suzanne M. Colby,

Center for Alcohol and Addiction Studies School of Public Health Brown University Box G-S121-5
Providence, RI 02912

Nadine R. Mastroleo,

Center for Alcohol and Addiction Studies School of Public Health Brown University Box G-S121-5
Providence, RI 02912

Nancy P. Barnett,

Center for Alcohol and Addiction Studies School of Public Health Brown University Box G-S121-5
Providence, RI 02912

Chad J. Gwaltney,

Center for Alcohol and Addiction Studies School of Public Health Brown University Box G-S121-5
Providence, RI 02912

Timothy R. Apodaca¹,

Center for Alcohol and Addiction Studies School of Public Health Brown University Box G-S121-5
Providence, RI 02912

Damaris J. Rohsenow,

Center for Alcohol and Addiction Studies School of Public Health Brown University Box G-S121-5
Providence, RI 02912

Molly Magill,

Center for Alcohol and Addiction Studies School of Public Health Brown University Box G-S121-5
Providence, RI 02912

Aruna Gogineni²,

Center for Alcohol and Addiction Studies School of Public Health Brown University Box G-S121-5
Providence, RI 02912

Michael J. Mello,

Corresponding Author: Peter M. Monti, Ph.D. Donald G. Millar Distinguished Professor of Alcohol and Addiction Studies, Director, Center for Alcohol and Addiction Studies, Brown University, School of Public Health, Box G-S121-5, Providence, RI 02912, Phone (401) 863-6661, peter_monti@brown.edu.

¹Timothy R. Apodaca's current affiliation: Mercy Kansas City, and Department of Pediatrics, University of Missouri-Kansas City School of Medicine.

²Aruna Gogineni's current affiliation: Anne Arundel County Health Department. 122 Langley Rd, Suite B, Glen Burnie, MD-21060.

³Walter L. Biffl's current affiliation: Denver Health Medical Center, Denver, CO

Alpert Medical School of Brown University and Lifespan Hospitals

Walter L. Biffl³, and

Alpert Medical School of Brown University and Lifespan Hospitals

William G. Cioffi

Alpert Medical School of Brown University and Lifespan Hospitals

Abstract

Objective—Effects of brief motivational interventions (BMIs) for heavy drinkers identified by alcohol-related emergency department (ED) visits are mixed. The successes of including significant others (SOs) in behavioral treatment suggest that involving SOs in ED-delivered BMI might prove beneficial. This study investigated the relative efficacy of an SO-enhanced Motivational Intervention (SOMI) compared to an Individual Motivational Intervention (IMI) to address heavy drinking in emergency care settings.

Method—ED (n = 317) or trauma unit (n = 89) patients were randomly assigned to receive either an IMI or an SOMI and were re-assessed at 6 and 12 months for alcohol consumption, alcohol-related consequences, and perceived alcohol-specific SO support.

Results—GEE analyses showed consistent reductions over time for both alcohol consumption and consequences. At one-year follow up, the average reduction in total drinks consumed per week was greater for patients in the SOMI condition than the IMI condition. In SOMI, 9.4% more patients moved to within the national guidelines for weekly drinking than did IMI patients. Frequency of heavy drinking and negative alcohol consequences showed no differential effects of intervention.

Conclusions—Emergence of a modest treatment effect at 12 months suggests that SO involvement in the SOMI condition may have led to more sustained positive influence on patient drinking than in the IMI condition. Implications and limitations regarding SO involvement in brief treatment are discussed.

Keywords

Emergency care; alcohol; motivational intervention; significant others

Although nearly 18 million adults have been diagnosed as having a current alcohol abuse or dependence disorder, only 1 in 7 reports ever having received any kind of alcohol treatment (Grant et al., 2004; Cohen et al., 2007). 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). Furthermore, alcohol-related ED visits have increased significantly over the past 15 years (Cherpitel & Ye, 2012). Therefore, EDs provide an opportunity for screening and brief intervention for problematic alcohol use. Although it has been over three decades since a WHO Expert Committee first called for the development of methods that could be efficiently applied in primary care settings (World Health Organization, 1980), national goals for a reduction in substance-related ED visits (Healthy

People 2010, U.S. Department of Health and Human Services, 2005) have not been realized (Cherpitel & Ye, 2012).

A recent review (Nilsen et al., 2008) of 14 studies of brief motivational intervention (BMI) in EDs for alcohol indicates that although some studies have found that BMI reduced alcohol consumption, hazardous use of alcohol, and alcohol-related injuries (compared to usual ED care), approximately 35% of the reviewed studies found no effect (e.g. Daeppen, et al., 2007; D'Onofrio, et al., 2008). Also somewhat mixed are the results of a recent meta-analysis (Kaner et al., 2009) of 22 randomized controlled trials in primary care settings that confirmed the benefit of BMI for men but not women. Furthermore, even when positive treatment effects are reported, not all outcome measures are impacted similarly (e.g., Field et al., 2009; Monti et al., 1999). For example, past studies have identified BMI effects (i.e., group differences) in alcohol use but not in alcohol-related problems (Monti et al., 2007); others have found intervention group differences in alcohol-related problems, but not in drinking behaviors (Longabaugh et al., 2001; Monti et al., 1999). These discrepancies in results suggest the need for a more impactful approach.

One possible avenue for enhancing the effects of BMI in emergency care might be to incorporate significant others (SO) into the treatment. Concerned SOs tend to be present soon after hospital admissions, and may be open to supporting their family member/friend's behavior change. SOs can provide positive and/or negative influences on alcohol treatment process and outcome in various ways (Magill et al., 2010). For example, Havassy et al. (1991) found the social network can inhibit drinking; friends or family members can (a) provide feedback that might help motivate the problem drinker to change the drinking behavior; (b) affirm skills of the problem drinker that enhance the probability of successful change; (c) help set treatment goals; and (d) provide support for changes in drinking behavior (Miller et al., 1995a). On the negative side, an alcohol abuser's social network is likely to include other heavy drinkers, and many will drink with their partners (e.g., Fernandez-Pol et al., 1986), which can make reducing alcohol intake or abstinence especially difficult (e.g., Havassy et al., 1991; Hunter-Reel et al., 2010), and can make it challenging to select an appropriate SO for intervention. Nevertheless, there is a basis for including SOs in brief alcohol treatment.

There is a substantial literature establishing the efficacy of SO-enhanced interventions for alcohol problems (e.g., Epstein & McCrady, 1998; McCrady et al., 2009) although including SO's in treatment does not always increase benefits (Monti, et al., 1990). Having family and friend networks that are supportive of alcohol use reduction is predictive of successful change (Longabaugh et al., 1995; Stout et al., 2012), with SO-involved alcohol interventions reliably increasing the likelihood that an at-risk drinker will initiate positive changes (O'Farrell, 1993). In a recent meta-analysis, a clear advantage was found for Behavioral Couples Treatment (BCT) over individual-based treatments for frequency and consequences of alcohol use as well as relationship satisfaction (Powers et al., 2008). Although the benefit of BCT with low severity problem drinkers has been studied less, there is some evidence for lower efficacy with these individuals (Powers et al., 2008).

Miller and Rollnick (2002) support the notion that SOs are a natural support that can reinforce the identified patient's change process. The Motivational Enhancement Therapy Manual created for Project MATCH (MET: Miller et al., 1992) suggests the inclusion of a SO in early treatment sessions to help patients resolve ambivalence regarding change. The premise was that SOs could describe alcohol-related consequences, offer support, comment on the feedback provided by the therapist, and generally contribute opinions that may be more positively received by the patient than if delivered by the therapist. Unfortunately, in Project MATCH only 17% of outpatient and 13% of aftercare MET patients elected to include SOs (Carroll et al., 1998), and only 2% did so in a subsequent study of MET (Miller et al., 2003a). Despite the number of studies examining and supporting BCT and couples treatment for alcohol use disorders, few studies incorporating SOs into motivational interviewing (MI) sessions have been conducted, and to date, such interventions have been delivered almost exclusively in individual format (cf. Cordova, et al., 2001). The efficacy of an enhanced MI that includes both the patient and a SO as a design element is unknown.

Given the low rates of optional SO participation in prior research, any study designed to test the addition of SOs to MI sessions would necessarily have to require that both the patient and SO participate. It is likely that this requirement has been a deterrent to conducting this type of treatment study. Inherent difficulties and the additional work involved in recruiting appropriate SOs who are motivated to participate are indeed challenges. Nevertheless, given that SOs are often present and concerned about the patient in the hospital, recruitment and inclusion of SOs in such a study might be more successful in this "opportunistic setting."

Another variable that may influence outcomes is recruitment site. The efficacy of BMI has been studied most often in the ED, less often in the trauma unit, and very few studies have recruited patients from both sites. These treatment sites are distinct; trauma units treat more severely injured patients and over longer periods of time. Most trauma patients are hospitalized following acute treatment for the trauma; ED patients are not typically admitted to a trauma service. Both settings are appropriate for an opportunistic BMI as both provide a window of opportunity occasioned by a medical event (Field et al., 2010). Since the optimal application and practice of BIs in medical settings has been questioned (Field et al., 2010; Nilsen et al., 2009) this study enrolled patients from both sites.

The objective of this study was to investigate the relative efficacy of a SO-enhanced Motivational Intervention (SOMI) compared to an Individual Motivational Intervention (IMI). Our primary aim was to test the hypothesis that patients who received SOMI would drink less alcohol and suffer fewer alcohol-related consequences in the year following their hospital visit as compared to patients assigned to IMI. Our secondary aim was to test the extent to which SOMI (compared to IMI) led to significant changes in SO behaviors related to patient drinking. Both sets of aims (primary and secondary) incorporated an exploration of the effects of intervention setting (trauma unit vs. ED) without a theoretical basis for hypothesizing any interaction.

Method and Materials

Design

The current study used a two-group randomized controlled additive design comparing two levels of intervention for effects on reducing alcohol consumption and alcohol-related problems during the year after intervention. Use of an urn randomization procedure ensured balance across conditions on the following factors: (a) participant age (≤ 25 versus >25 years); (b) participant score on the Alcohol Use Disorders Identification Test (AUDIT; Saunders et al., 1993; ≤ 15 versus >15); (c) relationship with participating SO (romantic versus non-romantic); (d) participant gender; and (e) participant's injury severity (≥ 4 days in Intensive Care Unit versus <4 days). The IMI and SOMI conditions both received one session of MI incorporating personalized feedback as soon as possible after admission to either the trauma unit or ED at a Level I trauma center in the United States. Both conditions assessed baseline, 6, and 12 month drinking behaviors and problems.

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 AUDIT, (b) had a measured blood alcohol concentration (BAC) $>0.01\%$ according to a biochemical test, 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 or doctoral-level interventionists. After establishing eligibility, interventionists conducted a mini-mental status examination, which is a brief neuropsychological screener that assesses basic cognitive functions including orientation (8 items), memory (2 items), and attention (2 items). The highest possible score was 26 and patients who scored under 18 were not enrolled.

Of 7,332 adult patients on site during shifts, 6,158 patients (84.0%) were screened for eligibility. Of patients screened, 1,269 (21%) met inclusion criteria, of which 518 (41%) agreed to participate and provided informed consent. A total of 751 patients did not consent to participate in the study, with refusal as the primary reason ($n = 576$), followed by discharge prior to consent ($n = 56$), an inability to identify an eligible SO ($n = 46$), unwillingness to include a SO ($n = 20$), impaired per the mini-mental status exam ($n = 12$), and other ($n = 41$). Of those who initially consented, 457 of 518 (88%) completed baseline assessments. Of these, 34 patients were not randomized to condition due to either losing contact, being unable to provide an eligible SO, withdrawing from the study, or other ineligibility reason (see participant flow chart, Figure 1). Another 9 were randomized to a third condition (Assessment Only) which was discontinued early in the study; their data were removed.

Patients ($N = 414$) completed the baseline assessment, on average within 2.8 days ($SD = 5.8$; Max days = 37) from the patient's initial admission. Time to complete baseline assessment was significantly longer for trauma patients (7.8 days, $SD = 7.7$) than ED patients (1.4 days, $SD = 4.3$), $t(404) = 14.1$, $p < .001$. On average, patients completed the baseline assessment

in 49 minutes ($SD = 25$). Of those enrolled, 92 patients (22.2%) were recruited from the trauma unit and 322 (77.8%) from the general ED. Of the 204 patients randomized to receive an IMI, 193 (94.6%) patients received an IMI. Of the 210 patients randomized to receive an SOMI, 169 (80.5%) patients received an SOMI and 15 (7.1%) received an IMI because an eligible SO was unable to participate in the intervention. The total baseline sample size was 406, which included all patients randomized to treatment condition regardless of whether they received treatment as assigned (i.e., intent-to-treat sample) and only excluding the eight participants who either withdrew from the study and withdrew consent for use of their data or those who were later determined to be ineligible for the study (for example, because they had participated already). The size of the data analytic sample for outcome analyses is slightly smaller. While the GEE analyses analyze all available data and accommodate missing data, there were 36 individuals who either had no follow-up data or had one follow-up data point but were missing a baseline covariate. As a result, the sample size for GEE analyses ranged from 370 to 375. The average number of days from baseline assessment to treatment completion was 6.0 days (range = 0 to 46 days). Time to completion was longer for trauma patients ($M=10.9$ days, $SD = 12.1$) than for ED patients ($M=4.8$ days, $SD = 7.0$), $t(375) = 4.25$, $p < .001$. Patients were paid \$50 for their baseline assessment. The university and hospital Institutional Review Boards approved all procedures.

Significant other (SO) recruitment—Each recruited patient was asked to list three individuals who were important to them. Using an adapted version of the Important People and Activities measure (Zywiak, Longabaugh, & Wirtz, 2002; Clifford & Longabaugh, 1991) the patient reported: (a) amount of contact (from “once in the past 6 months” to “daily”); (b) degree of social support (from “not at all supportive” to “extremely supportive”); and (c) maximum number of drinks the SO drinks in a day, for each of their nominees. A SO was deemed eligible if the participant and SO were in contact on 3 or more days a week, the SO was scored as “supportive” or higher on the social support item, and the SO drank fewer than 6 drinks as a maximum per occasion. In instances where the SO drank 6 or more drinks as a maximum, the patient completed the Short Michigan Alcohol Screening Tool (SMAST; Sher & Descutner, 1986; Crews & Sher, 1992) measure for the SO (see Measures). A score of 3 or less on the SO-SMAST met study inclusion criteria. If a SO was excluded on any of the above criteria, this process was repeated with the next most important SO until a SO who met criteria could be identified.

Once an eligible SO was identified, he/she was invited to participate using the same procedures as for the patient. After consent, a SO assessment was completed. SOs were paid \$50 for completing the baseline assessment in both conditions. Most (76.6%) of the first-named SOs were included in the study.

Follow-up Assessments

Patients were mailed a monthly postcard asking them to confirm contact information. Upon returning each card, patients were paid \$10. Telephone and text message reminders also were used throughout the study. Participant follow-up assessments were conducted at 6 and 12 months by trained research assistants masked to intervention condition, and patients were

paid \$100 for each. Interviews were completed in person, except when telephone interview was the only way to obtain the data (e.g., if a participant had relocated); 6.2% of 6-month follow ups and 6.4% of 12-month follow ups were completed by telephone. SO follow-up assessments also were conducted at 6- and 12-month follow ups, for which the SO was paid \$50 for each. Six- and 12-month follow-up rates for participant and SO survey completion were 91.7% and 88.7%, respectively. All follow ups were completed within one month of their due date.

Measures

Demographics

Age, gender, race, ethnicity, employment status, hours per week worked, and marital status were recorded.

Screening Measures

The *AUDIT* has 10 items scored from 0–4; a total score of 8 or more reflects hazardous alcohol use (Conigrave et al., 1995). The *Contemplation Ladder* (Biener & Abrams, 1991) for smoking was previously modified to assess motivation to change drinking behavior in a study of MI in an ED (Becker et al., 1996), with a single 10-item scale ranging from no thought of changing (0) to taking action to change (e.g., cutting down) (10). The *Father/Mother Short Michigan Alcohol Screening Test (F/M-SMAST)*; Sher & Descutner, 1986; Crews & Sher, 1992) was modified to assess patient report of SO drinking history using a cut-score of 4 for excluding SOs.

Outcome Measures

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 calculated for outcome analyses are average drinks per week, and number of heavy drinking days for past 6 months at baseline and follow ups. To compute each drinking outcome from the GF, the median number of drinks in the reported range was used (e.g., 9.5 drinks for the 8–11 range).

Alcohol-related problems were assessed using the Drinker Inventory of Consequences (DrInC), a 50-item questionnaire of adverse consequences in 6 areas: Interpersonal, Physical, Social, Impulsive, Control, and Intrapersonal (Miller et al., 1995b). The DrInC had a past 6-month timeframe and was administered at baseline and both follow ups. The total score (Cronbach's $\alpha = .95$ at baseline) was analyzed to assess treatment effects on adverse consequences of drinking.

Significant other behavior questionnaire (SBQ)—The SBQ (Love et al., 1993) is a 24-item questionnaire that uses a 5-point response scale to measure an alcohol-involved person's perception of the alcohol-specific support that he/she receives from a SO. A corresponding version of the form was used for the SO to rate his/her own behavior. Four factors reflect the extent to which the patient and the SO perceive that the SO punishes patient drinking, supports patient sobriety, supports patient drinking, and withdraws from

the patient in response to his/her drinking. Internal consistency alphas for these subscales in our sample ranged from 0.71 to 0.86 for patient reports and 0.73 to 0.83 for SO reports.

Interventions

The MI sessions, based on the principles of Miller & Rollnick (2002), were conducted by 13 doctoral- and masters-level interventionists. Training and supervision was conducted by author CG. Interventionists read *Motivational Interviewing* (Miller & Rollnick, 2002) and the treatment manual, and received 20 hours of training that included didactic presentations, video- and live-demonstration, and extensive role-play exercises. Group supervision was provided weekly with review of audiotapes and fidelity ratings (for patients, SOs, and therapists) with detailed feedback.

IMI—The manualized, one-session IMI incorporated open-ended exploration of pros and cons of drinking, personalized and printed graphic feedback of alcohol use and consequence assessments, and discussion about patients' alcohol use, associated risky behaviors including drinking and driving, and the consequences of these behaviors. Personalized feedback was generated using patient responses to baseline assessment questions, which were then incorporated into the printed report. This information was confidential and patients were assured the information would not be included in their medical records. The goal was to help patients explore their alcohol use and what they might want to change about their drinking and, for patients interested in change, establishing goals for reduced drinking or abstinence and discussing barriers to these changes.

The intervention included three general phases: build rapport, build motivation, and plan for change. Initially therapists worked to gain a better understanding of the patients' circumstances and developed rapport. This was done through discussing the accident or injury that led to the hospitalization, and/or asking the patient to describe a typical week of drinking. Next, therapists worked to build patient motivation for change by choosing among a variety of strategies: exploring personal cons of drinking; looking forward/looking back; exploring goals and values; and providing personalized feedback. Therapists were trained to adapt to the individual patient needs. All patients were offered a personalized feedback report with normative comparisons. The final phase involved developing a plan for change for those who chose to do so. A list of local resources was provided to all patients.

SOMI—The SOMI sessions contained the same components as the IMI and in addition included strategies intended to facilitate SO interest in enhancing patient motivation and supporting efforts toward change. Goals for the SOMI were for the client and SO to work collaboratively on the drinking problem. The SO was encouraged to express any concerns he/she may have had about the patient's drinking and about the event that precipitated the hospital admission, and to provide input about the patient's behavior and goals. This involved exploring the SO's own perceived pros and cons regarding the patient's drinking, reviewing past efforts to support changes, and preparing for future attempts to aid changes in drinking. Counselors attempted to involve SOs in each component of the MI with specific questions and prompts. For example, once the therapist had exhausted all the potential "good things" about alcohol use from the patient, the SO's perspective was elicited. The focus of

the SOMI was on the patient's alcohol use; the SO's alcohol use was discussed only insofar as it was relevant for the patient. A further objective of the SOMI was to avoid intensifying any antagonism in the dyad about the patient's drinking by focusing on the patient's strengths, the SO's hopefulness about change and signs that things could improve, and efforts to improve communication and increase respectful, supportive interaction. For those SOs who were involved in a romantic relationship with the patient, it was stressed that the session was not designed to be "couples therapy," but rather to focus on the alcohol use of the patient.

Intervention fidelity was measured by coding audiotaped IMI and SOMI sessions using the Motivational Interviewing Skills Code (MISC; Miller et al., 2003b).

Data Analysis Plan

Preliminary analyses—Variables were first checked to ensure that they met distributional assumptions of the statistical analyses to be used. Both patient-reported and SO-reported average drinks per week were positively skewed and kurtotic at each time point. Log transformation was successful in normalizing the distributions for these variables. For interpretability, descriptive statistics are presented based on raw (untransformed) data and d index effect sizes are calculated for all 6- and 12-month outcomes. Attrition analyses compared patients who missed one or both follow ups to those who completed both follow ups on patient demographics (gender, age, race, Hispanic ethnicity), Contemplation Ladder score, past 6-month average drinks per week and number of heavy drinking days, SO gender, past 6-month drinks per week and number of heavy drinking days.

Primary and secondary aims—Because the Trauma and ED presented distinct contexts for the interventions, setting was included as a design factor in all outcome analyses. Tests of primary and secondary hypotheses proceeded in three stages in order to isolate findings related to: (1) any pre-existing baseline differences between conditions and settings; (2) changes that occurred in outcome variables over time (i.e., main effects of time); and (3) tests of intervention condition and setting effects by time as well as the three way interaction of condition, setting, and time. All available data were included in these analyses and all analyses were performed at a significance level of 0.05.

First, chi-square analyses and 2×2 (condition by setting) ANOVAs were used to test for potential baseline differences between the two intervention conditions and the two intervention settings. Second, Generalized Estimating Equations (GEE; Zeger and Liang, 1986) were used to test unconditional change models for each primary and secondary outcome variable over time (baseline, 6 and 12 month follow-up). Third, GEE models examined the effects of intervention condition and setting on primary and secondary outcomes (patient drinking and consequences, and patient and SO SBQ scales). In these models, the main effects coefficients for intervention condition and setting tested whether outcomes differed, on average, over 6- and 12-month follow-ups. The two-way interaction terms for setting and intervention condition by time then tested whether the slope for time, or rate of change, differed by these factors. Lastly, the three-way interaction term for these variables examined whether the time slope by condition differed by the site factor. These

GEE models covaried the baseline value of the respective dependent variable, and all analyses assumed a normal distribution, and used an exchangeable correlation structure.

Results

Participant Characteristics

Patients were primarily male (68.7%), ranged in age from 18 to 70 (M age = 33.1 years, SD = 11.2), and averaged 12.3 years of education (SD = 2.3). The racial distribution of the sample was 67.6% White, 18.7% Black or African American, 13.7% other race or multiracial; 16.3% reported Hispanic ethnicity. The majority of the sample had never been married and was not cohabiting (61.1%); 11.3% were married, 9.6% were cohabiting with a romantic partner, and 18.0% were separated, divorced or widowed. The average baseline AUDIT score was 15.4 (SD = 8.2), and 47.8% of patients reported drinking prior to their admission to the hospital. At baseline patients on average reported drinking 98.0 days (SD = 61.1) over the past 6 months. SOs were primarily female (67.0%) and either romantic partners (39.0%), family members (e.g., parents, children, siblings; 29.3%), friends (29.2%), or other (2.7%). Among the romantic partners, 50.7% were cohabitating partners, 28.7% were non-cohabitating partners, and 20.6% were spouses.

Intervention Integrity

Session ratings indicated that therapists demonstrated high levels of MI-consistent skills (MICO; i.e., complex reflections, affirmations, and open questions; 59% of therapist utterances), and low levels of MI-inconsistent behaviors (i.e., confrontation and warning; < 1% of therapist utterances). On MISC global scores, therapists were rated highly on acceptance (M = 5.2, SD = 1.1, range 2–7), and MI Spirit (M = 4.8, SD = 1.2, range = 1–7) with all therapists meeting proficiency on these (scores ≥ 4). Intraclass correlation coefficients were calculated to determine interrater reliability for each variable measured (using the 20% sample of double-coded tapes). Reliabilities were almost all in the “excellent” or “good” range (MICO = .99, MIIN = .69, Acceptance = .62, MI Spirit = .48), according to criteria established by Cicchetti (1994).

Length of sessions—The average time to complete the IMI was 49.2 minutes (SD = 16.1) and the average to complete the SOMI was 51.4 minutes (SD = 18.0), a nonsignificant difference, $t(365) = 1.24$, $p > .05$.

Preliminary Analyses

Attrition analyses—Patients who completed both follow-up assessments ($n = 337$, 83.0% of total sample) did not differ significantly from patients who had missed a follow up ($n = 69$) on any demographic, baseline alcohol variable, or SO characteristic.

Baseline differences on patient characteristics and alcohol-related variables—Patients in IMI and SOMI did not differ on age, gender, race, Contemplation Ladder score, average drinks per week, number of heavy drinking days, or DrInC score at baseline. Those in IMI were more likely to report Hispanic ethnicity (20.4%) than those in SOMI (12.2%), $\chi^2(1) = 5.02$, $p = .025$.

Compared to ED patients ($n = 317$, 78.1% of the total sample), those recruited from the trauma unit ($n = 89$): were comparable on age, race and ethnicity, but were more likely to be male (79.8% vs. 65.6%); $\chi^2(1) = 6.48$, $p = .011$. Although patients' baseline drinking did not differ by setting, those recruited in the trauma unit report greater motivation to reduce drinking on the Contemplation Ladder ($M = 6.76$, $SD = 3.8$ vs. $M = 5.44$, $SD = 3.6$), $F(1, 402) = 9.38$, $p = .002$. Means, standard deviations, and effect sizes for alcohol-related outcomes are presented by intervention condition, setting, and time in Table 1.

GEE models of changes in alcohol outcome variables over time—Table 2 (top) summarizes the unconditional GEE models examining whether primary outcome variables (drinks per week, heavy drinking days, and DrInC total score) changed significantly over time. With no other factors included in the models, time effects were significant. Negative B-weights indicated a significant decline in all alcohol outcomes over 6- and 12-month follow-up.

Tests of the effects of intervention condition and setting on alcohol outcomes over time—Because intervention condition and setting differences and main effects of time are summarized above, the focus in this section is on the significance of interaction effects involving intervention condition and time, setting and time, and condition, setting, and time.

Average drinks per week (log-transformed)—The GEE model ($N = 370$) identified a significant and negative treatment by time interaction, $B = -0.32$ ($SE = 0.12$), Wald $\chi^2(df=1) = 6.86$, $p = .011$. These results indicate that when averaged across settings, reductions in drinking from baseline to 12-month follow up were greater for the SOMI condition than the IMI condition.

However, there was also a significant and positive effect of setting, $B = 0.32$ ($SE = 0.08$), Wald $\chi^2(df=1) = 16.11$, $p < .001$, and a setting by time interaction that was significant and negative, $B = -0.24$ ($SE = 0.09$), Wald $\chi^2(df=1) = 6.86$, $p = .009$. These results indicate that ED patients reported more drinks per week than trauma patients on average (the main effect of setting), but this effect is mainly accounted for by ED patients drinking more than trauma patients at both follow ups. While the three-way interaction (treatment by setting by time) effect was non-significant, effect size estimates suggest that the treatment effect favoring the SOMI condition over IMI at 12 months was stronger for trauma patients ($d = .21$) than ED patients ($d = .12$).

To determine the clinical significance of the intervention group difference we categorized the patients as to whether they were drinking above or below the U.S. national guidelines of no more than 7 drinks per week for women and no more than 14 drinks per week for men at baseline and at 12-month follow up. Of the 353 patients with 12-month data, 252 (71.4%) were drinking above national guidelines at baseline. Of those initially drinking above the guidelines, 33.6% of participants in IMI ($n = 42$) and 41.7% of patients in SOMI ($n = 53$) were drinking below the national guidelines at 12-month follow up. However in addition, 18 patients in IMI moved from being below the threshold to above it (i.e., had worsened), reflecting 34.0% of IMI patients who at baseline were not drinking above the threshold; in SOMI there were 13 patients who at baseline were not in the problem category but at 12-

month follow up were (reflecting 27.1% of that group). The net effect (number improved minus number worsened) is that 24 participants in IMI (42 minus 18, reflecting 13.5% of those in IMI) and 40 patients in SOMI (53 minus 13, reflecting 22.9% of those in SOMI) showed a clinically meaningful change. The net incremental improvement of SOMI (22.9% minus 13.5%) is 9.4% (95% CI: 1% – 17%). This means that for every 10.6 patients (i.e., $1 / .094$) (95% CI: 5.9 – 100), one will achieve a meaningful clinical improvement from adding SOMI to IMI. Table 3 depicts changes from baseline to follow-up in patients' drinking above the US guidelines for weekly alcohol use by setting and intervention group.

Number of heavy drinking days and DrInC total score—The GEE models for both heavy drinking frequency and negative alcohol consequences (N s from 370 to 375) showed no interaction effects. Thus patients overall reduced their heavy drinking frequency and negative consequences over time (as indicated by the time effect described above). In addition, effect size estimates suggested a similar trend for the intervention by setting by time effects as that reported for average drinks per week. Specifically, there was a small advantage for SOMI at 12 months and this advantage was larger for trauma patients (d for heavy drinking days = .20; d for negative consequences = .18) in contrast to the ED patients (d for heavy drinking days = .06; d for negative consequences = .12).

Tests of Secondary Aims

Means and standard deviations of secondary outcomes are presented by intervention condition, setting, and time in Table 4.

Baseline differences in SO characteristics and SO behavior related to patient drinking—SOs in IMI and SOMI did not differ significantly on gender, race, ethnicity, drinks per week, or heavy drinking days. Regarding SBQ scales, at baseline both patients and SOs in IMI reported more SO support for patient drinking than those in SOMI (Patients: $F(1, 399) = 4.44, p = .036$; SOs: $F(1, 341) = 4.04, p = .045$). **(Outcome analyses controlling for these baseline differences did not change the findings; analyses are presented without the covariates for parsimony.)** Patients' and SOs' other SBQ scores (i.e., SO Withdraws, SO Punishes Drinking, or SO Supports Sobriety) did not differ between IMI and SOMI at baseline. SOs enrolled in the trauma unit and the ED did not differ in terms of demographics or baseline drinking. Patient and SO-reported SBQ scores were comparable in both Trauma and ED settings.

GEE models of changes in SO behaviors over time—Table 4 (bottom) summarizes the unconditional GEE models examining whether patient- and SO-reported SBQ scores changed significantly over time. With no other factors included in the models, time effects were significant. For three out of four SBQ scale scores (i.e., SO supports drinking, SO withdraws, and SO punishes drinking), both patient and SO reports indicated a decrease in these behaviors over time. For the SBQ scale score measuring the extent to which the SO supports the patient's sobriety, patients reported a decrease over time, while SOs reported an increase over time.⁴

⁴Note that these samples do not directly correspond, since fewer SOs were retained throughout the follow up than patients.

Tests of the effects of intervention condition and setting on SO behavior

outcomes. Patient Reports—The GEE models examining interactions of intervention condition, setting and time showed two interaction effects (both setting by time effects) for patient reports of SO behavior in relation to their drinking. There was a significant and negative setting by time effect for **SO supports patient drinking**, $B = -0.33$ ($SE = 0.17$), Wald χ^2 ($df=1$) = 3.97, $p = .046$. Similarly, there was a significant and negative setting by time effect for **SO punishes patient drinking**, $B = -0.43$ ($SE = 0.15$), Wald χ^2 ($df=1$) = 7.99, $p = .005$. Overall, these results suggest that reductions in SO support for patient drinking and punishment of patient drinking were greatest for the ED setting at later (12-month) follow-up. No intervention by time effects were observed.

SO Reports—All four GEE models investigating interactions between intervention condition, setting and time on SO reports of their behaviors related to patient drinking showed no significant interaction effects.

Discussion

The current study examined whether including a concerned significant other in a brief motivational intervention with ED and trauma patients enhances alcohol-related outcomes when compared to an individually-focused BMI. Results revealed consistent reductions over time in average drinks per week, number of heavy drinking days, and alcohol-related consequences. However, many patients continued to drink at hazardous levels across time, both in terms of heavy drinking days and drinks per week. The emergence of a significant treatment effect on average drinks per week at the 12-month follow up is of particular interest. While IMI and SOMI patients reported similar levels of drinks per week at baseline and 6-month follow up, SOMI patients reported less drinking than IMI patients at the one year follow-up. However, there were no corresponding effects of SOMI on heavy drinking days, and drinking remained quite high throughout follow up for patients in both groups.

Intervention effects may need to be considered in the context of intervention setting. Patients recruited from the trauma unit reported fewer drinks per week than ED patients at both the 6- and 12-month follow-ups and these results were consistent with the generally lower report of alcohol-related consequences at follow up in the trauma group. The trauma patients had been more seriously injured than ED patients at baseline, and as a result, may have had a harder time getting alcohol for a longer period of time; this protracted drinking reduction may have had a beneficial effect on their longer-term drinking consequences. Also, the more severe alcohol-related events and injuries among trauma patients may have led to the higher levels of motivation to change their drinking that they reported at baseline (see also Barnett et al., 2002). Perhaps related to these differences, there was some indication that the intervention effect favoring SOMI over IMI for reducing drinks per week at 12-month follow up was stronger in the Trauma setting than in the ED setting. Although our results related to setting are interesting, they must be interpreted with caution because our study was not sufficiently powered to detect a three-way interaction between treatment, setting, and time. While this is an important limitation, the differences we were able to observe underscore the importance of studying both groups of patients in intervention studies as others have suggested (e.g., Field et al., 2010).

The above-mentioned difference between conditions at the 12-month follow up is worthy of discussion. One possibility may be that SOs in the SOMI condition continue to positively influence patients' drinking after the IMI effects wear off. While results from our analysis of the SBQ found no intervention by time effects, support for this interpretation comes from a separate evaluation of within-session processes of the SOMI intervention, in which we found SO verbalizations *during* the intervention session of support for changing drinking were associated with increased levels of commitment to change and decreased levels of resistance from the patient (Apodaca et al., 2013). This could have affected drinking outcomes through the dynamic interactions between patient and SO across the year following intervention. Also consistent with such a delayed intervention effect interpretation is the indication from the Behavioral Couples Treatment (BCT) literature that while BCT results in better relationship functioning immediately after treatment, improved substance use outcomes are often delayed (Powers et al., 2008). Yet another possible interpretation of the 12-month findings is that baseline differences between the two groups on SO support for patient drinking may have given the SOMI condition an advantage (unrelated to the treatment that was received). However, it should be pointed out that eligibility criteria for participation in the study required participants in both conditions to have an available non-problem drinking SO, so this difference is unlikely to be due to selection bias between conditions.

To establish the clinical significance of the intervention group difference in drinks per week we used national weekly drinking guidelines and calculated that of patients in the SOMI group who were originally drinking above the national guidelines, 42% had reduced their drinking to within the guidelines, compared to 34% in IMI. After adjusting for the number of patients who had moved from being below the threshold to above it at the 12-month follow up, we determined that for approximately every 11 patients receiving SOMI, one more would show a clinically meaningful improvement compared to intervention with IMI. Given the likely greater expense of administering SOMI compared to IMI, a cost-effectiveness analysis would be needed to determine whether the additional burden is worth the greater intervention effect, but this analysis was beyond the scope of this study.

Counter to our expectations, results showed no intervention group by time interaction for number of heavy drinking days or drinking-related consequences, although both groups showed reductions in these constructs over time. Given the lack of a control group, we cannot conclude that the intervention conditions were responsible for the reductions in consequences, and similar time effects reflecting reductions in drinking are commonly reported (Blow et al., 2006; Walton et al., 2010; Monti et al., 2007; Nilsen et al., 2008;), reflecting other possible mechanisms of change, including reaction to the precipitating event or to project participation. Continuing to investigate intervention effect differences between minimal contact conditions and more substantive interventions is warranted (Kaner et al., 2013).

An important aspect of this study was the inclusion of measures of SOs' support for and reactions to patient drinking pre- and post-intervention, although we did not find the expected differences between conditions on SO behaviors as noted above. Both intervention groups showed reductions in the extent to which SOs withdrew from the patient when he/she

drank, showed support for patient drinking, and punished patient drinking, with both patient and SO reports indicating a decrease in each of these behaviors over time. It is possible that involving the SO at baseline in both conditions (a commitment on the part of all SOs involving a lengthy initial assessment and follow ups over one year) stimulated change, or that change in the patients' drinking (which occurred in both groups) influenced SO behavior. It is also noteworthy that SOs in this study were chosen by the patient. This may have given SOs in both conditions a sense of increased "responsibility for the patient" – a phenomenon that might further have diluted condition effects.

Also pertinent to the relationship between patients and their SO is our finding on the SBQ scale that measured the extent to which the SO supports the patient's sobriety in which patients reported a *decrease* over time while SOs reported an *increase*. It is important to point out that the samples of patients and SOs do not precisely correspond, as fewer SOs than patients were retained throughout the follow up. It is possible that those SOs who were retained throughout the follow up were more supportive of the patients' sobriety than those who dropped out of the study.

Limitations

An obvious limitation of the present study is that it did not include an assessment-only control group; both groups received treatment. While the best experimental design would have had such a control group, shortly after the initiation of the study there was a new mandate from the American College of Surgeons that all Level I and Level II trauma centers have a mechanism to identify patients with alcohol problems, and that all Level I trauma centers have a mechanism to provide an intervention for patients identified as problem drinkers (American College of Surgeons Committee on Trauma, 2006). Including a control group in the trial would have resulted in withholding treatment that was otherwise mandated and thus would not have been ethical. Further, results of our previous work and that of others has suggested that MI routinely shows effects above and beyond assessment only controls, so the field may have advanced beyond the need for such a control. However, the lack of a natural history or attention-control group precludes us from definitively concluding that reductions in consumption over time (i.e., those not accompanied by group differences) were due to the interventions. On a related point, the assessment battery was both comprehensive and lengthy and may have introduced assessment reactivity that made group differences more difficult to distinguish. Another concern that is also related to the inherent limitations of working in such a clinical setting is the notion that while our personalized feedback report was excluded from the hospital record (due to research confidentiality), in purely clinical practice such would not be the case. Thus, the generalizability of our results to clinical practice may be compromised.

Other limitations involve our SOs. Firstly, generalization of the applicability of the SOMI is necessarily limited by virtue of patients having appropriate SOs to participate. Indeed, 46 of our initially enrolled patients were not able to identify an eligible SO and so were released from the study from the outset. Second, we did not collect follow-up data on SO alcohol use during our study and thus are not able to know whether our treatment had any effect on SO drinking behavior and whether it in turn affected the drinking behavior of our patients. As

the drinking behavior of SOs has been identified as important in the BCT literature as well as in the social support literature (e.g., Beattie et al., 1999; Longabaugh et al., 1995), it is possible that the drinking behavior of our SOs negatively affected the potential impact of our intervention.

Another concern about the SOs in the present study is that they were very heterogeneous, ranging from romantic partners to parents, siblings and friends. It is possible that such heterogeneity contributed to the limited treatment effects, although Fals-Stewart and O'Farrell (2003) found no differences in efficacy between spouse vs. other dyad-focused BCT. At the same time, heterogeneity in SO characteristics (including their level of drinking) reflects the real world implementation of such interventions (e.g., Monti et al., 1990; Monti et al., 2002). One way of maximizing the role of the SOs, whatever their relationship to the patient, might be to better prepare them for treatment, much as is done in traditional couples counseling. Alternatively, one might directly ask them to be supportive or ask them to verbalize their perceptions as suggested by Manuel et al. (2011). The key would be to do this without compromising the opportunistic nature of the intervention – always a challenge when working on the front lines of a busy ED or trauma unit.

A final concern relates to our findings regarding the ED and trauma unit intervention settings. While we found some differences that emphasize the importance of studying both groups of patients, it is unfortunate that this trial fell short of being able to test fully powered moderation effects of setting. Nevertheless, the study was able to illuminate some contextual differences across sites and find an intervention effect despite those differences.

In sum, the modest results of the present study suggest that the inclusion of SOs in BMIs for alcohol is difficult, but worthy of pursuit. While both groups declined significantly over time, a significant and clinically meaningful difference in alcohol volume was found between intervention groups favoring SOMI at 12-month follow up. However, such differences were not found for heavy drinking days or alcohol related consequences. Our findings on drinking volume at the 12-month follow up parallels those of the well-established BCT literature suggesting similar processes may be at play despite the fact that our intervention was quite minimal and clearly distinct from traditional BCT. Though we encountered difficulties that made this multi-site randomized trial challenging, particularly around SO recruitment, involvement, and related measures, we agree with others (e.g., Field et al., 2010) who advocate for further work in this area. Though our findings are modest, they are nonetheless informative. As trauma centers are mandated to implement screening and brief intervention, researchers should continue to identify the contextual factors and patient characteristics that interact to influence positive drinking outcomes. Only then can the impact of the mandate be fully realized.

Acknowledgments

This research was supported by R01AA009892 from the National Institute on Alcohol Abuse and Alcoholism (NIAAA). Peter Monti's contribution to the manuscript was supported by P01AA019072 and K05AA019681. Damaris Rohsenow's contribution was supported by a Senior Career Research Scientist Award from the Department of Veterans Affairs.

The authors wish to thank Tamara Anderson Sequeira, Cheryl Eaton, Sue Sales, Tim Souza, and several research assistants for their assistance with the conduct and analysis of this study. Thanks also go to our interventionists and to the medical staff at Rhode Island Hospital. Finally, the patient triaging assistance of Janette Baird is gratefully acknowledged.

References

- American College of Surgeons Committee on Trauma. Resources for the optimal care of the injured patient. Chicago, IL: American College of Surgeons; 2006.
- Apodaca TR, Gogineni A, Barnett NP, Monti PM. Project ACT motivational interviewing therapist manual. 2006 (available upon request from the first author).
- Apodaca TR, Magill M, Longabaugh R, Jackson KM, Monti PM. Effect of a significant other on client change talk in motivational interviewing. *Journal of Consulting and Clinical Psychology*. 2013; 81:35–46. [PubMed: 23231575]
- Babor, T.; Higgins-Biddle, JC.; Saunders, JB.; Monteiro, MG. AUDIT - The Alcohol Use Disorders Identification Test: Guidelines for Use in Primary Health Care. 2nd ed.. Geneva: World Health Organization; 2001.
- Beattie MC, Longabaugh R. General and alcohol-specific social support following treatment. *Addictive Behaviors*. 1999; 24:593–606. [PubMed: 10574299]
- Becker, B.; Maio, RF.; Longabaugh, R. One for the road: Current concepts and controversies in alcohol intoxication and injury. Denver, CO: Presented at the annual meeting of the Society for Academic Emergency Medicine; 1996.
- Biener L, Abrams DB. The Contemplation Ladder: Validation of a measure of readiness to consider smoking cessation. *Health Psychology*. 1991; 10:360–365. [PubMed: 1935872]
- Blow FC, Barry KL, Walton MA, Maio RF, Chermack ST, Bingham CR, Strecher VJ. The efficacy of two brief intervention strategies among injured, at-risk drinkers in the emergency department: Impact of tailored messaging and brief advice. *Journal of Studies on Alcohol*. 2006; 67(4):568–578. [PubMed: 16736077]
- Carroll KM, Conners GJ, Cooney NL, DiClemente CC, Donovan DM, Kadden R, Zweben A. Internal validity of project MATCH treatments: Discriminability and integrity. *Journal of Consulting & Clinical Psychology*. 1998; 66:290–303. [PubMed: 9583332]
- Cherpitel CJ, Ye Y. Trends in alcohol- and drug-related emergency department and primary care visits: data from four U.S. national surveys (1995–2010). *Journal of Studies on Alcohol*. 2012; 73:454–458.
- Cherpitel CJ. Alcohol use among primary care patients: Comparing an HMO with county clinics and the general population. *Drug and Alcohol Dependence*. 1994; 36:167–173. [PubMed: 7889807]
- Cicchetti DV. Guidelines, criteria, and rules of thumb for evaluating normed and standardized assessment instruments in psychology. *Psychological Assessment*. 1994; 6:284–290.
- Clifford PR, Longabaugh R. Manual for the administration of the Important People and Activities Instrument. Adapted for use by Project MATCH for NIAAA 5R01AA06698-05 Environmental Treatment of Alcohol Abusers, Richard Longabaugh, Principal Investigator. 1991
- Cohen E, Feinn R, Arias A, Kranzler HR. Alcohol treatment utilization: Finding from the National Epidemiological Survey on Alcohol and Related Conditions. *Drug and Alcohol Dependence*. 2007; 86:214–221. [PubMed: 16919401]
- Cohen, J. Statistical Power Analysis for the Behavioral Sciences. second ed.. Lawrence Erlbaum Associates; 1988.
- Conigrave KM, Hall WD, Saunders JB. The AUDIT questionnaire: Choosing a cut-off score. *Addiction*. 1995; 90:1349–1356. [PubMed: 8616463]
- Cordova JV, Warren LZ, Gee CB. Motivational interviewing as an intervention for at-risk couples. *Journal of Marital and Family Therapy*. 2001; 27:315–326. [PubMed: 11436424]
- Crews TM, Sher KJ. Using adapted short MASTs for assessing parental alcoholism: Reliability and validity. *Alcoholism: Clinical and Experimental Research*. 1992; 16:576–584.
- Daepaan J, Guame J, Bady P, Yersin B, Calmes J, Givel J, Gmel G. Brief alcohol intervention and alcohol assessment do not influence alcohol use in injured patients treated in the emergency

- department: A randomized controlled trial. *Addiction*. 2007; 102:1224–1233. [PubMed: 17565563]
- D’Onofrio G, Pantalon MV, Degutis LC, Fiellin DA, Busch SH, Chawarski MC, O’Connor PG. Brief intervention for hazardous and harmful drinkers in the emergency department. *Annals of Emergency Medicine*. 2008; 51:742–750. [PubMed: 18436340]
- Epstein EE, McCrady BS. Behavioral couples treatment of alcohol and drug use disorders: Current status and innovations. *Clinical Psychology Review*. 1998; 18:689–711. [PubMed: 9779329]
- Fals-Stewart W, O’Farrell TJ. Behavioral family counseling and naltrexone for male opioid-dependent patients. *Journal of Consulting and Clinical Psychology*. 2003; 71(3):432–442. [PubMed: 12795568]
- Fernandez-Pol B, Bluestone H, Missouri C, Morales G, Mizruchi MS. Drinking patterns of inner-city Black Americans and Puerto Ricans. *Journal of Studies on Alcohol*. 1986; 47:156–160. [PubMed: 3713178]
- Field CA, Baird J, Saitz R, Caetano R, Monti PM. The mixed evidence for brief intervention in emergency departments, trauma care centers, and inpatient hospital settings: What should we do? *Alcoholism: Clinical and Experimental Research*. 2010; 34:2004–2010.
- Gentilello LM, Rivara FP, Donovan DM, Jurkovich GJ, Daranciang E, Dunn CW, et al. Alcohol interventions in a trauma center as a means of reducing the risk of injury recurrence. *Annals of Surgery*. 1999; 230:1–11. [PubMed: 10400029]
- Grant BF, Dawson DA, Stinson FS, Chou SP, Dufour MC, Pickering RP. The 12-month prevalence and trends in DSM-IV alcohol abuse and dependence: United States, 1991–1992 and 2001–2002. *Drug and Alcohol Dependence*. 2004; 74:223–234. [PubMed: 15194200]
- Greenfield TK, Rogers JD. Alcoholic beverage choice, risk perception and self-reported drunk driving: Effects of measurement on risk analysis. *Addiction*. 1999; 94:1735–1743. [PubMed: 10892011]
- Havassy BE, Hall SM, Wasserman DA. Social support and relapse: Commonalities among alcoholics, opiate users, and cigarette smokers. *Addictive Behaviors*. 1991; 16:235–246. [PubMed: 1663695]
- Hilton ME. A comparison of a prospective diary and two summary recall techniques for recording alcohol consumption. *British Journal of Addiction*. 1989; 84:1085–1092. [PubMed: 2790272]
- Hunter-Reel D, McCrady BS, Hildebrandt T, Epstein EE. Indirect effect of social support for drinking on drinking outcomes: The role of motivation. *Journal of Studies on Alcohol*. 2010; 71:930–937.
- Kaner EFS, Dickinson HO, Beyer F, Pienaar E, Schlesinger C, Campbell F, Heather N. The effectiveness of brief alcohol interventions in primary care settings: A systematic review. *Drug and Alcohol Review*. 2009; 28:301–323. [PubMed: 19489992]
- Longabaugh R, Woolard RF, Nirenberg TD, Minugh AP, Becker B, Clifford PR, Gogineni A. Evaluating the effects of a brief motivational intervention for injured drinkers in the emergency department. *Journal of Studies on Alcohol*. 2001; 62:806–816. [PubMed: 11838918]
- Longabaugh R, Wirtz PW, Beattie MC, Noel N, Stout R. Matching treatment focus to patient social investment and support: 18-month follow-up results. *Journal of Consulting and Clinical Psychology*. 1995; 63:296–307. [PubMed: 7751491]
- Love CT, Longabaugh R, Clifford PR, Beattie M, Peaslee CF. The Significant-other Behavior Questionnaire (SBQ): An instrument for measuring the behavior of significant others towards a person’s drinking and abstinence. *Addiction*. 1993; 88:1267–1279. [PubMed: 8241926]
- Magill M, Mastroleo NR, Apodaca TR, Barnett NP, Colby SM, Monti PM. Motivational interviewing with significant other participation: Assessing therapeutic alliance and patient satisfaction and engagement. *Journal of Substance Abuse Treatment*. 2010; 39:391–398. [PubMed: 20817382]
- Manuel J, Houck JM, Moyers TB. The impact of significant others in motivational enhancement therapy: Findings from Project MATCH. *Behavioural & Cognitive Psychotherapy*. 2011; 40:297–312. [PubMed: 22047637]
- McCrady BS, Epstein EE, Cook S, Jensen N, Hildebrandt T. A randomized trial of individual and couple behavioral alcohol treatment for women. *Journal of Consulting and Clinical Psychology*. 2009; 77:243–256. [PubMed: 19309184]
- McLellan TA, Alterman AI, Cacciola J, Metzger D, O’Brien CP. A new measure of substance abuse treatment. Initial studies of the treatment services review. *Journal of Nervous & Mental Disease*. 1992a; 180:101–110. [PubMed: 1737971]

- McLellan TA, Kushner H, Metzger D, Peters R, Smith I, Grissom G, Argeriou M. The fifth edition of the Addiction Severity Index. *Journal of Substance Abuse Treatment*. 1992b; 9:199–213. [PubMed: 1334156]
- Miller, WR.; Zweben, A.; DiClemente, CC.; Rychtarik, RG. Motivational Enhancement Therapy manual: A clinical research guide for therapists treating individuals with alcohol abuse and dependence. Rockville, MD: National Institute on Alcohol Abuse and Alcoholism; 1992.
- Miller WR, Moyers TB, Ernst D, Amrhein P. Manual for the motivational interviewing skills code (MISC) Version 2.0. 2003b
- Miller, WR.; Rollnick, S. Motivational Interviewing: Preparing People for Change. 2nd ed.. New York: The Guilford Press; 2002.
- Miller WR, Yahne CE, Tonigan JS. Motivational interviewing in drug abuse services: A randomized trial. *Journal of Consulting and Clinical Psychology*. 2003a; 71:754–763. [PubMed: 12924680]
- Miller, WR.; Zweben, A.; DiClemente, CC.; Rychtarik, RG. Project MATCH Monograph Series. Rockville, MD: National Institute on Alcohol Abuse and Alcoholism; 1995a. Motivational Enhancement Therapy manual: A clinical research guide for therapists treating individuals with alcohol abuse and dependence.
- Miller, WR.; Tonigan, JS.; Longabaugh, R. Project MATCH Monograph Series. Vol. 4. Rockville, MD: NIAAA; 1995b. The Drinker Inventory of Consequences (DrInc): An instrument for assessing adverse consequences of alcohol abuse.
- Monti PM, Abrams DB, Binkoff JA, Zwick WR, Liepman MR, Nirenberg TD, et al. Communication skills training, communication skills training with family and cognitive-behavioral mood management training for alcoholics. *Journal of Studies on Alcohol*. 1990; 51(3):263–270. [PubMed: 2342366]
- Monti PM, Barnett NP, Colby SM, Gwaltney CJ, Spirito A, Rohsenow DJ, Woolard R. Motivational interviewing versus feedback only in emergency care for young adult problem drinking. *Addiction*. 2007; 102:1234–1243. [PubMed: 17565560]
- Monti PM, Colby SM, Barnett NP, Spirito A, Rohsenow DJ, Myers M, Lewander W. Brief Intervention for harm reduction with alcohol-positive older adolescents in a hospital emergency department. *Journal of Consulting and Clinical Psychology*. 1999; 67:989–994. [PubMed: 10596521]
- Monti, PM.; Kadden, R.; Rohsenow, DJ.; Cooney, N.; Abrams, D. Treating Alcohol Dependence: A Coping Skills Training Guide. Second Edition. New York: Guilford Press; 2002.
- Nilsen P, Baird J, Mello MJ, Nirenberg T, Woolard R, Bendtsen P, Longabaugh R. A systematic review of emergency care brief alcohol interventions for injury patients. *Journal of Substance Abuse Treatment*. 2008; 35:184–201. [PubMed: 18083321]
- O'Farrell, TJ. Treating Alcohol Problems: Marital and family interventions. New York: The Guilford Press; 1993.
- Powers MB, Vedel E, Emmelkamp PMG. Behavioral couples therapy (BCT) for alcohol and drug use disorders: A meta-analysis. *Clinical Psychology Review*. 2008; 28:952–962. [PubMed: 18374464]
- Saitz R, Palfai TP, Cheng DM, Horton NJ, Dukes K, Kraemer KL, Samet JH. Some medical inpatients with an unhealthy alcohol use may benefit from brief intervention. *Journal of Studies on Alcohol & Drugs*. 2009; 70:426–435. [PubMed: 19371494]
- Saunders JB, Aasland AG, Babor TF, de la Fuente JR, Grant M. Development of the Alcohol Use Disorders Identification Test (AUDIT): WHO collaborative project on early detection of persons with harmful alcohol consumption-- II. *Addiction*. 1993; 88:791–804. [PubMed: 8329970]
- Sher KJ, Descutner C. Reports of paternal alcoholism: Reliability across siblings. *Addictive Behaviors*. 1986; 11:25–30. [PubMed: 3716913]
- Stout RL, Kelly JF, Magill M, Pagano ME. Association between social influences and drinking outcomes across three years. *Journal of Studies on Alcohol*. 2012; 73:489–497.
- The Euroqol Group. Euroqol- A new facility for the measurement of health-related quality-of-life. *Health Policy*. 1990; 16:199–208. [PubMed: 10109801]
- U.S. Department of Health and Human Services. Healthy People 2010: The cornerstone for prevention. 2005. Retrieved from <http://www.healthypeople.gov/Publications>

- Walton MA, Chermack ST, Shope JT, Bingham CR, Zimmerman MA, Blow FC, Cunningham RM. Effects of a brief intervention for reducing violence and alcohol misuse among adolescents: a randomized controlled trial. *JAMA*. 2010; 304(5):527–535. [PubMed: 20682932]
- World Health Organization. Problems related to alcohol consumption, Report of a WHO Expert Committee (Technical Report Series 650). Geneva, Switzerland: World Health Organization; 1980.
- Zywiak WH, Longabaugh R, Wirtz PW. Decomposing the relationships between pretreatment social network characteristics and alcohol treatment outcome. *Journal of Studies on Alcohol*. 2002; 63:114–121. [PubMed: 11925053]

Figure 1. Participant Flow Diagram

Notes: ^aSixteen participants chose to withdraw from the study prior to randomization; their data were excluded from analysis. ^bAn Assessment-Only Control Condition was eliminated early in the study and patients randomized to this condition were removed from all analyses. ^cThree participants withdrew from the study during the follow up period and withdrew consent for use of their data. ^dFive participants withdrew from the study during the follow up period but did not withdraw consent for use of their data.

Table 1
Primary Outcome Measures: Alcohol use and Negative Consequences by Recruitment Site, Condition, and Time^a

	Baseline			6M Follow Up			12M Follow Up			
	N	M	SD	M	SD	d	Lower		Upper	
							95% CI		95% CI	
<u>Drinks/week^b</u>										
Trauma										
IMI	37	33.06	38.8	15.87	27.6		22.33	31.2		
SOMI	27	44.11	56.3	23.86	51.5	-0.20	16.17	25.9	0.21	-6.80
ED							9.31			7.23
IMI	141	40.74	43.7	35.64	45.0		34.74	44.0		
SOMI	145	36.27	35.7	36.40	43.3	-0.02	29.68	39.6	0.12	-4.71
<u>No. of Heavy drinking days</u>										
Trauma										
IMI	37	58.12	60.7	29.45	44.3		42.88	53.0		
SOMI	28	61.98	63.6	34.54	57.4	-0.10	31.80	59.0	0.20	-13.12
ED							11.94			13.52
IMI	142	69.32	59.6	60.41	62.8		59.63	64.0		
SOMI	151	70.32	58.2	61.14	64.8	-0.01	55.53	65.2	0.06	-7.31
<u>DrInC Total</u>										
Trauma										
IMI	37	17.87	12.9	10.16	12.0		9.87	10.9		
SOMI	28	16.46	13.5	8.36	11.6	0.16	7.96	10.0	0.18	-2.33
ED							2.99			2.70
IMI	142	18.86	11.5	15.13	11.8		13.44	12.1		
SOMI	150	17.88	10.5	14.75	11.5	0.03	12.04	10.6	0.12	-1.174
							1.36			1.422

Notes. 6M = 6-Month; 12M = 12-Month; ED = Emergency Department; IMI = Individual Motivational Interview; SOMI = Significant Other included in Motivational Interview; DrInC = Drinkers Inventory of Consequences.

^a All available data were used for calculating means.

^b Analysis conducted on log-transformed variables, raw data presented for interpretability. Bold indicates significant $p < .05$. Effect size .3 = 'small', .5 = 'medium', .8 = 'large' (Cohen, 1988).

Table 2
Time Effects: Unconditional GEE Models of Change in Primary and Secondary Outcomes over Time^a

	N	B	SE	Wald $\chi^2(df=1)$	p
Primary Outcomes^b					
Drinks per week (raw)	406	-4.57	1.25	13.40	.000
Drinks per week (log)	406	-0.14	0.02	56.91	.000
No. heavy drinking days	406	-7.20	1.79	16.15	.000
DrInC Score	406	-3.08	0.29	114.09	.000
Secondary Outcomes					
Patient Report					
Supports drinking	406	-0.19	0.02	60.74	.000
Withdraws	406	-0.16	0.02	60.45	.000
Punishes drinking	406	-0.22	0.02	94.91	.000
Supports sobriety	406	-0.26	0.03	92.76	.000
SO Report					
Supports drinking	352	-0.10	0.02	26.14	.000
Withdraws	352	-0.05	0.02	4.92	.027
Punishes drinking	352	-0.06	0.02	5.22	.022
Supports sobriety	352	0.06	0.02	6.40	.011

Notes. SO = Significant Other; DrInC = Drinkers Inventory of Consequences.

^a All available data were used for calculating means.

^b Analysis conducted on log-transformed variables, raw data presented for interpretability.

Table 3

Percent of Participants Drinking Above the US National Guideline for Weekly Alcohol use at Baseline and 12-month Follow-up by Setting and Intervention Group

	Baseline %	12M Follow Up %
Trauma		
IMI	61.2	51.4
SOMI	74.4	31.0
ED		
IMI	72.2	57.7
SOMI	71.6	52.0

Notes. 12M = 12-Month; ED = Emergency Department; IMI = Individual Motivational Interview; SOMI = Significant Other included in Motivational Interview. US national guidelines recommend no more than 7 drinks per week for women and no more than 14 drinks per week for men.

Table 4
Secondary Outcome Measures: Patient and Significant Other (SO) Reports on SO Behavior Questionnaire (SBQ) by Recruitment Site, Condition, and Time

Baseline			6M Follow Up				12M Follow Up							
N	M	SD	M	SD	d	95% CI	Lower	Upper	M	SD	d	95% CI	Lower	Upper
Supports Drinking: Patient Report														
Trauma														
IMI	28	2.00	0.7	1.58	0.7				1.61	0.7				
SOMI	21	1.48	0.6	1.40	0.9	0.23	0.02	0.45	1.25	0.7	0.53	0.33	0.72	0.72
ED														
IMI	130	1.76	0.6	1.70	0.8				1.33	0.8				
SOMI	129	1.70	0.6	1.50	0.8	0.25	0.15	0.35	1.40	0.8	-0.09	-0.19	0.01	0.01
Supports Drinking: SO Report														
Trauma														
IMI	27	1.98	0.6	1.82	0.7				1.69	0.8				
SOMI	19	1.54	0.6	1.44	0.8	0.52	0.31	0.73	1.25	0.5	0.65	0.45	0.85	0.85
ED														
IMI	110	1.71	0.6	1.67	0.7				1.54	0.7				
SOMI	119	1.66	0.6	1.51	0.7	0.23	0.14	0.32	1.49	0.7	0.07	-0.02	0.16	0.16
Supports Sobriety: Patient Report														
Trauma														
IMI	28	2.51	0.6	1.99	0.8				1.80	0.7				
SOMI	21	2.21	0.8	1.99	0.9	0.00	-0.23	0.23	1.77	0.7	0.04	-0.15	0.23	0.23
ED														
IMI	130	2.27	0.8	2.08	0.9				1.75	1.0				
SOMI	129	2.30	0.7	2.10	0.9	-0.02	-0.13	0.09	1.88	0.9	-0.14	-0.25	-0.02	-0.02
Supports Sobriety: SO Report														
Trauma														
IMI	27	2.65	0.6	2.72	0.7				2.56	0.8				
SOMI	19	2.35	0.8	2.53	1.0	0.23	>-0.01	0.47	2.50	0.9	0.07	-0.17	0.31	0.31

	Baseline				6M Follow Up				12M Follow Up				
	N	M	SD	M	SD	d	95% CI		M	SD	d	95% CI	
							Lower	Upper				Lower	Upper
ED													
IMI	110	2.42	0.7	2.59	0.8				2.60	0.8			
SOMI	117	2.44	0.7	2.60	0.7	-0.01	-0.11	0.08	2.50	0.8	0.13	0.02	0.23
<u>Withdraws: Patient Report</u>													
Trauma													
IMI	29	1.21	0.4	1.08	0.5				1.03	0.5			
SOMI	21	1.25	0.5	0.78	0.5	0.61	0.48	0.75	0.86	0.5	0.35	0.21	0.48
ED													
IMI	131	1.33	0.5	1.15	0.6				1.03	0.7			
SOMI	129	1.31	0.5	1.20	0.7	-0.08	-0.16	<0.01	1.01	0.7	0.03	-0.06	0.11
<u>Withdraws: SO Report</u>													
Trauma													
IMI	27	1.28	0.4	1.35	0.7				1.19	0.5			
SOMI	19	1.37	0.7	1.10	0.8	0.34	0.13	0.55	1.08	0.8	0.18	-0.01	0.36
ED													
IMI	110	1.45	0.7	1.51	0.8				1.45	0.9			
SOMI	119	1.38	0.6	1.37	0.8	0.18	0.07	0.28	1.22	0.8	0.27	0.16	0.38
<u>Punishes Drinking: Patient Report</u>													
Trauma													
IMI	28	1.58	0.7	1.33	0.6				1.43	0.7			
SOMI	21	1.67	0.9	1.11	0.6	0.37	0.21	0.54	1.19	0.8	0.33	0.13	0.53
ED													
IMI	131	1.61	0.8	1.44	0.8				1.18	0.9			
SOMI	129	1.61	0.7	1.39	0.8	0.06	-0.03	0.16	1.15	0.8	0.04	-0.07	0.14
<u>Punishes Drinking: SO Report</u>													
Trauma													
IMI	27	1.95	0.9	1.93	1.0				1.73	0.9			
SOMI	19	1.92	0.8	1.70	0.9	0.25	-0.03	0.51	1.60	1.0	0.14	-0.13	0.40
ED													

	Baseline			6M Follow Up				12M Follow Up			
	N	M	SD	M	SD	d	95% CI		M	SD	d
							Lower	Upper			
IMI	110	1.81	0.8	1.81	0.9				1.78	1.0	
SOMI	120	1.76	0.8	1.71	0.9	0.11	>0-.01	0.23	1.57	0.9	0.22
											0.34

Notes. 6M = 6-Month; 12M = 12-Month; ED = Emergency Department; IMI = Individual Motivational Interview; SOMI = Significant Other included in Motivational Interview. Bold indicates significant $p < .05$. Effect size .3 = 'small', .5 = 'medium', .8 = 'large' (Cohen, 1988).