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The relationship between baseline drinking status, peer motivational interviewing microskills and drinking outcomes in a brief alcohol intervention for matriculating college students: A replication

Sean J. Tollison, Nadine R. Mastroleo, Kimberly A. Mallett, Katie Witkiewitz, Christine M. Lee, Anne E. Ray, and Mary E. Larimer

University of Washington

Abstract

The purpose of this study was to replicate and extend previous findings (Tollison, Lee, Neighbors, Neil, Olson, & Larimer, 2008) on the association between peer facilitator adherence to motivational interviewing (MI) microskills and college student drinking behavior. This study used a larger sample size, multiple follow-up time-points, and latent variable analyses allowing for more complex models to be tested in a sample with different characteristics than Tollison et al. (2008). Matriculating students who participated in high school sports ($N = 327$) took part in a Brief Alcohol Screening and Intervention for College Students (BASICS) led by peer facilitators trained in Motivational Interviewing. Participants were assessed pre- and immediately post-intervention on contemplation to change, as well as pre-, 5 months and 10 months post-intervention on drinking quantity. Independent coders used the Motivational Interviewing Treatment Integrity scale (MITI, Moyers, Martin, Manuel, & Miller, 2003) to evaluate therapist MI adherence. Contrary to our previous study, results indicated that a higher number of open questions was positively related to increases in drinking, especially for heavier drinkers. Congruent with the previous study, more simple reflections was positively related to increases in drinking. Finally, this study revealed that heavier baseline drinking was associated with more simple reflections. There were no significant results found for changes in contemplation. Results corroborate previous findings that the excessive use of simple reflections may be indicative of counter therapeutic outcomes while raising questions about the relationship between the frequency of open questions and therapeutic outcomes.

Keywords

Motivational interviewing; adherence; brief intervention; alcohol; college students; counselor behavior

Excessive and unsafe college student drinking continues to pose problems on campuses across the country (Johnston, O'Malley, Bachman, & Schulenberg, 2009; Wechsler, Lee, Kuo & Lee, 2000) resulting in negative consequences that may have both short- and long-term detrimental effects (Hingson, Heeren, & Wechsler, 2005; Hingson, Heeren, Zakocs, Kopstein, & Wechsler, 2002; Perkins, 2002). Matriculation into college can result in significant increases in alcohol consumption (Baer, 2002) and high school athletes have been identified as a subgroup at high-risk for following this pattern (Dams-O'Connor,

Martin, & Martens, 2007; Martens, Dams-O'Connor, & Beck, 2006; Turrise, Mallett, Mastroleo, & Larimer, 2006; Turrise, Mastroleo, Mallett, Larimer, & Kilmer, 2007). Further, high school athletes that discontinue organized sports upon matriculation into college have demonstrated similar drinking patterns to those who continue with sports (Turrise, James, Reavy, Larimer, & Kilmer, 2004; Wetherill & Fromme, 2007).

Although alcohol use patterns become more established with time and alcohol-related problems become more frequent, students still engage in little contemplation about changing problematic drinking behavior (Barnett, Goldstein, Murphy, Colby, & Monti, 2006; Vik, Culbertson, & Sellers, 2001). In-person, motivational interventions have been developed to prevent/reduce alcohol use and related problems with the goal of increasing contemplation about changing drinking behaviors in college students (see Larimer & Currence, 2007 for a review). Among brief interventions for college student drinking, the Brief Alcohol Screening and Intervention for College Students (BASICS; Dimeff, Baer, Kivlahan, & Marlatt, 1999) has been designated as a Tier 1 intervention for its demonstrated efficacy in reducing college student drinking (NIAAA, 2002; 2009). However, few interventions have specifically targeted the high-risk population of high school athletes.

A recent randomized controlled trial investigated the efficacy of BASICS, a parent intervention, and a combined BASICS + parent intervention as compared to a control condition in preventing excessive alcohol use in high school athletes transitioning into college (Turrise, Larimer, Mallett, Kilmer, Ray, & Mastroleo et al., 2009). Students in the BASICS + parent condition reported significantly fewer drinks per week, fewer drinks per weekend, lower peak BAC, and fewer alcohol-related problems than students in the parent only and control group at 10 month follow-up. Students in the BASICS only condition reported significantly fewer drinks per weekend than the parent only and control group, and significantly lower peak BAC than the control group (for more detailed results, please see Turrise et al., 2009).

Tier 1 in-person interventions like BASICS often involve the use of motivational interviewing (MI; Miller & Rollnick, 2002), an empirically supported, client-centered therapeutic style used to elicit motivation to change risk behavior. However, the role MI plays in improving outcomes in college drinking interventions is not well established. We have previously demonstrated that adherence and non-adherence to MI strategies as measured by the Motivational Interviewing Treatment Integrity (MITI; Moyers, et al., 2003) coding system is related to readiness to change and drinking outcomes in a BASICS intervention, but our results were limited by small sample size and only a single follow-up measurement of alcohol use post intervention (Tollison et al., 2008). The purpose of the present study is to further elucidate how the use of MI strategies in BASICS influences readiness to change and drinking outcomes by conducting a secondary analysis utilizing data from Turrise et al. (2009). This study had a large sample size, multiple follow-up assessments, and different sampling characteristics as students were screened in based on participation in high-school athletics, not heavy drinking criteria.

Motivational Interviewing For Eliciting Change

Miller and Rose (2009) have proposed a theoretical model to account for the therapeutic effects of MI. In this model, it is hypothesized that MI training results in higher levels of therapist empathy, MI spirit, and implementation of MI consistent methods. These therapist characteristics are hypothesized to be related to increases in client change talk (and decreases in counter change talk), which mediates the relationship between therapist characteristics and client behavior change. Although a growing body of literature has demonstrated that MI-specific factors, especially observable therapist behaviors occurring in

session, may be accounting for behavior change, some of these proposed pathways have yet to be conclusively established through empirical study (Apodaca & Longabaugh, 2009). This is especially the case in the area of college student drinking interventions as there is a dearth of research examining how MI consistent methods observed in session are related to changes in drinking behavior post-intervention. The relationship between in-session therapist behavior and client outcome behavior has become an increasingly important area of study to further explain how MI exerts its effects and inform MI training.

BASICS

Among brief interventions for college student drinking, BASICS has received the most empirical support for its efficacy in reducing alcohol use and related problems. BASICS incorporates personalized feedback to provide education about the physiological and psychological effects of alcohol, correct normative misperceptions about alcohol use, and provide strategies to reduce alcohol use and related harms, all within a MI style. BASICS interventions have demonstrated efficacy for reducing drinking rates, frequencies, and related problems among multiple populations of college drinkers (Borsari & Carey, 2000; 2005; Larimer, Turner, Anderson, Fader, Kilmer, Palmer, et al., 2001; Marlatt, Baer, Kivlahan, Dimeff, Larimer Quigley, et al., 1998; McNally, Palfai, & Kahler, 2005; Murphy, Duchnik, Vuchinich, Davison, Karg, Olson et al., 2001; Murphy, Benson, Vuchinich, Deskins, Eakin, Flood, et al., 2004; Turrissi et al., 2009; White, 2006).

Motivational Interviewing Microskills: Questions and Reflections

In the context of BASICS, providers use MI (Miller & Rollnick, 2002) to facilitate the change process to reduce alcohol use and related harms. MI is client-centered, non-judgmental, and directive to address a specific target behavior (e.g., alcohol use) with the goal of increasing client change talk (i.e., language demonstrating the desire, ability, reason, and need for change) and strengthening commitment to change (Amrhein, 2004; Miller, Moyers, Ernst, & Amrhein, 2003). In multiple reviews, MI has been shown to be an efficacious treatment for various behaviors including alcohol use (Hettema, Steele, & Miller, 2005) and, more specifically, alcohol use in brief intervention formats (Burke, Arkowitz, & Menchola, 2003; Dunn, Deroo, & Rivara, 2001). Guided by four principles (expressing empathy, supporting self efficacy, rolling with resistance, and developing discrepancy), MI providers use specific interviewing skills (open questions, affirming, listening reflectively, and summarizing) to facilitate the exploration of ambivalence and increase change talk in an empathic and collaborative manner (Miller & Rollnick, 2002). The present manuscript focuses on two MI skills, questions and reflections.

Questions

Open questions allow the client to elaborate on his/her experiences and ideas as opposed to closed questions, which can be responded to in a restricted or even terse manner. In the context of a college alcohol intervention, providers can use open questions to allow the student to define relevant topics and bring issues related to problematic use into the conversation. Use of open questions allows for a collaborative process for exploring decision-making and ambivalence related to the target behavior (Gintner & Choate, 2003; Walters & Baer, 2005).

Reflections

In MI, providers use reflective listening to uncover the meaning of client statements and mirror the client's own thoughts and feelings about the target behavior (Miller & Rollnick, 2002). This listening skill is important in providing the client with a broader perspective about his/her own behavior, allows the provider to empathically interact with the client, and

can play a major role in the establishment of rapport. Providers can use reflective listening to demonstrate understanding and develop discrepancy between the participants' behavior and his/her goals (Gintner & Choate, 2003). Reflective listening has been divided into two types of reflections: simple and complex. Simple reflections involve repeating or rephrasing a client's statement, and thus, only reflecting surface level thoughts and feelings back to the client. Complex reflections synthesize information relayed by the client, use metaphor, and involve higher order listening skills to get at the unspoken meaning behind the client's statements. Reflective listening is a crucial aspect of MI, yet one that is very challenging to learn. Unskillful reflective listening can be frustrating for both the client and the provider while also depriving the conversation of direction (Miller & Rollnick, 2002).

Process research in Motivational Interviewing

Process research has begun to evaluate how facilitator or therapist behavior influences client change talk and outcomes. MI-consistent behavior, such as affirming and supporting a client, has been found to be related to positive treatment outcomes while MI inconsistent behavior has been shown to be related to negative treatment outcomes (Daeppen, Bertholet, Gmel, & Gaume, 2007; Moyers, Martin, Christopher, Houck, Tonigan, & Amrhein, 2007; Moyers, Martin, Houck, Christopher, & Tonigan, 2009). There has also been some evidence that the use of other provider behaviors (e.g. questions, reflections, giving information) may also be related to increased client change talk (Moyers & Martin, 2006). Therefore, it is important to investigate how these behaviors relate to treatment outcomes, especially as these are lower-order skills that can be more easily learned by entry-level providers. For example, the use of more open questions has been related to a more positive client-therapist interaction rating while a high number of closed questions has been related to negative client outcomes (Catley, Harris, Mayo, Hall, Okuyemi, Boardman, & Ahluwalia, 2006; Thrasher, Golin, Earp, Tien, Porter, & Howie, 2006). These studies have also demonstrated a higher ratio of reflections to questions was related to positive treatment outcomes, with reflective statements positively associated with client change talk and therapist-client interaction rating.

Evaluating MI process in peer provided brief alcohol interventions

The role of motivational interviewing in changing college student drinking behavior after a brief alcohol intervention has only recently begun to receive attention. Two studies have provided mixed results on the additive effect of MI on outcomes when used with personalized drinking feedback (PDF). One study found that MI did not have an additive effect on outcome (Murphy, Benson, Vuchinich, Deskins, Eakin, Flood et al., 2004) while a later randomized clinical trial (Walters, Vader, Harris, Field, & Jouriles, 2009) found that MI + PDF was more effective at reducing college student drinking than PDF alone, MI alone, and assessment only control. A follow-up study examining in-session processes in these interventions demonstrated that counselor MI-consistent language was related to more change talk in the MI + PDF condition, and change talk in this condition was associated with better drinking outcomes (Vader, Walters, Prabhu, Houck, & Field, 2010). Results have also been mixed about the relationship between the therapeutic style of MI and changes in alcohol use. One study found that reductions in alcohol use were positively related to the student's perception of how empathic the interventionist was (McNally, Palfai, & Kahler, 2005) where as another study demonstrated that interventionist empathy was unrelated to student drinking outcomes after participating in an MI (Feldstein & Forechimes, 2007). Although encouraging, these mixed results are inconclusive about the role of MI in brief interventions for reducing college drinking. They highlight the need for more research to investigate how MI is being implemented in session, identify how MI skill is related to

behavior change, and identify ways to increase MI skill in providers of brief alcohol interventions.

The way in which MI is delivered may be a unique and important element to the change process in addition to content of any intervention (Moyers, Miller, & Hendrickson, 2005; Moyers & Martin, 2006; Moyers et al., 2007). However, becoming proficient and competent at MI is challenging, especially for those with little previous counseling experience (Miller & Mount, 2001). As alcohol interventions targeting college students are often time consuming and costly, using peer facilitators has become an increasingly viable option among universities (Mastroleo, Mallett, Ray, & Turrise, 2008). Although peers have been shown to be as efficacious as professional providers in substance use interventions (Botvin, 1987; Botvin, Baker, Filazzola, & Botvin, 1990; Fromme & Corbin, 2004; Klepp, Halper, & Perry, 1986; Larimer et al., 2001), the fidelity of delivery of these interventions by peer providers could be improved to a higher standard (Fromme & Corbin, 2004; Tollison, et al., 2008). The use of MI microskills is especially relevant to peer providers of brief alcohol interventions for college students. MI microskills are provider behaviors, such as using more open questions than closed questions, more complex reflections than simple reflections, and more reflections than questions (Moyers, Martin, Manuel, Hendrickson, & Miller, 2005). They are the most concrete skills to learn in a therapeutic style that can take some time, training, and experience to achieve competency.

Our prior work (Tollison et al., 2008) examined the relationship between peer provider MI microskills during a BASICS in relation to changes in student drinking behavior after the intervention. The frequency of open questions was related to increases in contemplation shortly after intervention while the reverse was found for closed questions. In addition, the frequency of simple reflections was shown to be positively related to increases in drinking at 3 month follow-up. However, this relationship was attenuated by the use of more complex reflections in the session, suggesting that the counter therapeutic relationship between simple reflections and drinking did not hold if the peer provider also used more complex reflections that convey a deeper meaning and synthesize information about what the student has said. These findings suggest reflective listening may be an especially challenging and important skill to grasp for peer providers of college alcohol interventions. However, this study had multiple limitations to these findings that can be improved upon. First, it was limited in that the sample size was relatively small ($N = 53$) and replication with a larger sample size will reduce the likelihood of spurious relationships as well as improve generalizability of findings. Second, this study only had one follow-up time point; and that time point was only a brief period after intervention (3 months), which provides limited information about how MI variables are associated with changes in drinking over time. Analyses with multiple time points will not only increase confidence in these results if they are similar, but also improve understanding of how these relationships hold up over time. Third, the original study did not examine how baseline drinking rates of student participants may be influencing peer provider behavior. The use of multiple time points will allow for the use of statistical methods that can examine the transactional relationship between student baseline drinking status, peer provider behavior, and student drinking outcomes.

Present Study

The present study seeks to replicate and extend Tollison et al. (2008) in a sample of matriculating students targeted for BASICS because of their high-risk status as high school athletes. By addressing the limitations of the original study, the present study offers the opportunity to increase confidence in how to train peer providers for improving delivery of BASICS. It can also more firmly establish the role of MI in changing drinking behavior to inform hypotheses of future studies using more time consuming and costly research

methods. Based on previous findings, we hypothesized the use of open questions by peer providers would increase and use of closed questions would decrease student contemplation to change drinking shortly after the intervention. We also hypothesized that unskillful reflecting, as depicted by the use of a higher number of simple reflections in the absence of complex reflections, would be associated with increasing drinking trajectories. Because growth curve analyses allow for the examination of correlates with slope intercepts, we will also explore the relationship between baseline drinking status and the use of peer provider MI microskills using this type of analysis.

Method

Participants

Participants included randomly selected incoming first year students at two large public universities participating in a longitudinal randomized clinical trial evaluating the efficacy of two brief interventions (i.e., BASICS and parent intervention) aimed at reducing college student drinking for students who had participated in high school athletics (see Turrisi et al., 2009 for more detail regarding recruitment and interventions). First-year students who participated in high school athletics were selected for this study as both matriculation into college and past status as a high school athlete are identified as risk factors for engaging in problematic drinking patterns during the first year in college. Initially, 4,000 randomly selected first year students were invited to participate in the study and were screened for high school athletic involvement. Of the initial 4,000 students invited, 1,796 (45%) responded to the invitation, consented to participate in the study, and completed the web-based screening assessment. Participants meeting eligibility criteria (i.e., participation in high school athletics) were invited to the larger study. Of note, there were no inclusion criteria related to alcohol use, thus participants included alcohol abstainers, occasional drinkers, and heavy drinkers. Seventy-nine percent of those who completed the screening survey ($N = 1,419$) met athletic eligibility study inclusion requirements, of which 90% ($n = 1,275$) completed the baseline assessment. Of the resulting sample ($M\ Age = 17.92$ years, $SD = 0.39$), 44.4% were male ($n = 566$), 55.6% female ($n = 709$); 4.5% identified as Hispanic or Latino(a); 79.8% identified as Caucasian, 10.1% Asian, 3.7% Multiracial, 2.0% African American, 0.5% Native Hawaiian or Other Pacific Islander, 0.2% American Indian/Alaskan Native, 3.2% Other and 0.4% did not identify race/ethnicity.

Procedure

Students who qualified for the longitudinal study and completed the baseline assessment were randomly assigned to one of four conditions (BASICS + Parent intervention [$n = 342$], BASICS only [$n = 277$], Parent intervention only [$n = 316$], or Control [$n = 340$]). For the present study, only participants randomized to the two conditions with BASICS interventions ($n = 619$) are included. These students were contacted to schedule a BASICS session via phone and/or internet. Due to a lower than expected completion rate (53.7%), only 333 students attended the in-person BASICS (the remainder received mailed BASICS feedback only). Of these, 327 had useable audiotapes. After completion of BASICS, students completed a post-intervention satisfaction questionnaire and 5- and 10-month follow-up surveys. Initial analyses explored the baseline drinking differences of students randomized to the BASICS interventions compared to those who were not and found no significant differences on any drinking and demographic related outcomes (Turrisi et al., 2009). For participants randomized to the BASICS only and BASICS + Parent conditions, results indicated no differences on all outcome variables of interest between participants who received the BASICS intervention vs. those who did not participate in the intervention ($t < 1.96$, $p > .05$). All procedures were reviewed and approved by the Institutional Review

Board on each campus, and treatment of participants was in compliance with American Psychological Association ethical guidelines.

BASICS Intervention

Procedure—BASICS interventions were 45–60 minutes long, and conducted one-on-one with a trained peer facilitator. Sessions were audiotaped to evaluate facilitator adherence. Using MI, the facilitator oriented the participant to a computer-generated personalized feedback sheet, with topics including the participant's drinking pattern, perceived and actual descriptive drinking norms, drinking consequences, alcohol caloric consumption (based on reported typical drinking) and hours of exercise required to burn those calories, and protective behavioral strategies. Participants received a copy of the personalized feedback, a personalized BAC card, a tips sheet (including general BASICS information and information specific to alcohol and athletic performance), and a resource list of addiction services in the area.

Peer facilitator training—BASICS facilitators were trained undergraduate (n=18) or entry-level graduate students (n=3). Participation as a peer facilitator in the randomized trial was based on ability to attain beginning proficiency in Motivational Interviewing (MI) and BASICS. Training was conducted by clinical psychologists and counselors specializing in interventions for college student drinking and consisted of didactic presentations, written materials, videotapes, and interactive exercises to facilitate review of alcohol-related content and MI strategies (Miller & Rollnick, 2002) integral to BASICS (Dimeff et al. 1999). Material was presented during workshops and weekly training meetings over 10 weeks. Supplementary materials on the effects of alcohol on sleep, injury recovery, and dehydration relevant to athletic participation were also provided. Facilitators completed homework assignments, in-class exercises, and received written feedback regarding bi-weekly audiotaped simulated client sessions, which were coded by trained MI coders and reviewed for content by the principal investigators. Upon completion of training and initiation of the interventions, facilitators attended weekly supervisions conducted by the principal investigators and Ph.D. level graduate students in which constructive feedback was provided on recorded sessions.

Coding Procedures

The Motivational Interviewing Treatment Integrity 2.0 (MITI; Moyers et al., 2003) coding system was used to assess peer delivery of MI in the BASICS sessions. Coders were seven undergraduates and one graduate student at the University of Washington. Coders attended an initial training session in the use of the MITI conducted by the first author. Readings (Miller & Rollnick, 2002) and videotapes (Miller, Rollnick, & Moyers 1998) were used to familiarize coders with the clinical method of MI. Coders then proceeded through a series of graded learning tasks such as the parsing of peer facilitator utterances, coding specific behaviors exemplifying MI adherence, and assessing global dimensions of MI spirit and empathy. Competence in one level was required before proceeding to the next learning task (Moyers et al., 2003). After demonstrating an acceptable standard of reliability, coders used the MITI to evaluate a random 20-minute segment of each peer provided BASICS session by tallying behavior counts and providing two global ratings. Weekly coder meetings were held to prevent coder drift and discuss ambiguous decision rules. In addition, a random sample of tapes was coded by all coders to ensure coder reliability throughout the coding process.

Measures

Motivational Interviewing Treatment Integrity (MITI)—The MITI (Moyers et al., 2003) was developed to evaluate entry-level competence in the use of MI, yet be minimally labor intensive relative to other coding systems (Moyers, Martin, et al., 2005). Using the MITI, the frequency of closed and open questions and simple and complex reflections were tallied. In addition, providers are rated on a 7-point Likert-type scale for both Empathy and MI spirit (autonomy, collaboration, evocation). Moyers, Martin, et al. (2005) reported that the inter-rater reliability estimates of the global and behavioral ratings of the MITI were reliable, with 70% of all ratings found to be in the “excellent” range and the global ratings in the “fair” range according to Cicchetti (1994). Usefulness of ICCs in clinical instruments is categorized by Cicchetti (1994) as follows: below .40 = poor, .40 – .59 = fair, .60 – .74 = good, .75 and above = excellent. Inter-rater reliability among the 8 coders on MITI items relevant to this study was “excellent” for closed questions ($ICC = .84$) and open questions ($ICC = .88$), “fair” for simple reflections ($ICC = .55$) and “poor” for complex reflections ($ICC = .30$).

Closed and Open Questions—Closed questions included yes/no questions and questions with restricted answers (e.g., “How many drinks did you have?”). Open-ended questions are questions designed to elicit open-ended responses (e.g., “What happened the next day?”). Coders were instructed to tally each time a closed- or open-ended question was asked. The sums of all closed and open-ended questions were computed for the twenty-minute segment.

Simple and Complex Reflections—Simple reflections included the number of statements made by the facilitator that conveyed understanding or facilitated verbal exchanges, but added very little or no meaning to what the client had said. Complex reflections included the number of statements made by the facilitator that added substantial meaning or emphasis to what the client had said. As with questions, coders tallied simple and complex reflections and their sums were computed and used in the analyses.

Alcohol Use—The Daily Drinking Questionnaire (DDQ; Collins, Parks, & Marlatt, 1985) was used to assess the typical number of standard drinks consumed per week. Participants were asked to indicate number of drinks they consumed on each day of a typical week within the past 30 days. Responses for each day of the week were summed for total number of drinks consumed during a typical week. A standard drink definition was included for all measures (i.e., 12 oz. beer, 10 oz wine cooler, 4 oz. wine, 1 oz 100 proof [1 ¼ oz 80 proof] liquor).

Readiness to Change—The Readiness to Change Questionnaire (Rollnick, Heather, Gold, & Hall 1992) was used to assess readiness to reduce alcohol use behaviors. Participant responses identify the degree to which they are in one of the 3 stages of change defined by Prochaska & DiClemente (1991): Precontemplation (e.g., “I don’t think I drink too much”), Contemplation (e.g., “My drinking is a problem sometimes”), and Action (e.g., “I have just recently changed my drinking habits”). Responses ranged from -2 = strongly disagree to 2 = strongly agree. The four items for each stage of change were averaged creating three readiness to change scales. To replicate Tollison et al. (2008), only the contemplation subscale ($\alpha = .70$) was utilized.

Data Analyses

The goal of the analyses was to replicate previous findings (Tollison et al., 2008) examining the relationships between the use of MI microskills by peer providers to 1) changes in contemplation to change drinking, 2) changes in actual drinking behavior with a larger

sample and more follow-up time points, and 3) explore more complex models taking into account baseline drinking status. To achieve this goal multiple approaches were taken. Descriptive statistics and preliminary correlational analyses were conducted. For the contemplation to change outcome, we were specifically interested in determining whether MI was related to changes in contemplation scores immediately following the BASICS intervention. Hierarchical regression analyses were used to examine this relationship (Cohen, Cohen, West, & Aiken, 2003). In no case did tolerance (values below .16 or .17), variance inflation (values of 6 or 7), or condition indices (above 30) approach problematic levels in the regression analyses (Cohen et al., 2003; Maruyama, 1998). Predictors were mean centered to facilitate interpretation of parameter estimates.

For the drinking outcomes, we incorporated baseline, 5- and 10-month drinking quantity (total drinks per typical week) as indicators in a latent growth curve model with MI microskills incorporated as time-invariant predictors of the latent intercept and slope growth factors. We were particularly interested in how MI microskills related to change in the typical number of drinks consumed, thus our primary parameter of interest was the regression of the linear slope on MI microskills. All models were estimated in Mplus V 5.2 using a full information maximum likelihood estimator with robust standard errors (Muthén & Muthén, 2007), which provides estimates of the variance-covariance matrix for all available data, including those individuals who have incomplete data on some measures. Maximum likelihood estimation is considered to be superior to other methods of handling missing data when data are missing at random (Schafer, 1997). The latent growth curve models were evaluated using multiple indices of model fit: a nonsignificant chi-square statistic, comparative fit index (CFI; > 0.95), and standardized root mean square residual (SRMR; < 0.08) (Hu & Bentler, 1998). The commonly reported Root Mean Square Error of Approximation (RMSEA) was not used because the RMSEA tends to over reject true models when the sample size is small (Hu & Bentler, 1998).

Results

Mean Comparisons of Facilitator Behaviors to MITI Standards

Analyses were conducted to evaluate peer facilitator adherence based on conventional standards described in the MITI manual (Moyers et al., 2003). Table 1 presents the average scores and percentages of peer facilitator skills compared to the standard levels of beginning proficiency and competence. To evaluate proficiency of peer facilitator MI skills, one sample t-tests were used and effect size (d) was calculated (Cohen, 1998). To evaluate differences in frequencies of global ratings and behavior counts, paired sample t-tests were used and effect size (d) was calculated (Cohen, 1998). Analyses revealed that peer facilitators did not, on average, demonstrate beginning proficiency for empathy with scores significantly different than 5.0, $t(326) = -8.47$, $p < .001$, $d = 0.45$. MI spirit was also lower than the conventional criteria for beginning proficiency (5.0), $t(326) = -10.15$, $p < .001$, $d = 0.57$. In addition, a paired-samples t-test revealed that spirit was significantly lower than empathy, $t(326) = 2.31$, $p = .02$, $d = 0.13$. Paired samples t-tests indicated that closed questions were asked by peer facilitators significantly less than open questions, $t(326) = -8.68$, $p < .001$, $d = 0.48$, but peer facilitators made simple reflections more frequently than complex reflections, $t(326) = 5.30$, $p < .001$, $d = 0.30$. On average, peer facilitators achieved beginning proficiency on three of the six quality measures.

Descriptives of Student Drinking

For the purpose of this study, only students who participated in an in-person BASICS intervention and had a useable audiotape are included. Means and standard deviations of contemplation and drinking for this sample are reported in Table 2. On average, students

slightly increased in contemplation to change drinking behavior from baseline to post-intervention. Consistent with the fact that participants were assessed throughout the transition to a high-risk drinking environment (college), participants on average increased their drinking rates from baseline to 5-month follow-up and this increase was maintained at 10-month follow-up.

Correlations between Outcome and MITI Variables

Baseline and post-intervention contemplation were strongly correlated, as were drinking at baseline and 5- and 10-month follow-up. Contemplation was positively correlated with drinking and high correlations between post-intervention contemplation and follow-up drinking assessments were observed. The number of closed questions asked in a session was positively correlated with simple reflections. The number of open questions was positively correlated with drinks per week at 5- and 10-month follow-up, simple reflections, and complex reflections. The number of simple reflections made was positively correlated with post-intervention contemplation, baseline, 5- and 10-month drinks per week, closed questions, open questions and complex reflections. See Table 2 for means and correlations.

Regressions of Contemplation on MITI Variables

Hierarchical regression analyses were conducted to examine changes in contemplation as a function of closed and open questions. Baseline contemplation was included as a covariate at step 1, open questions and closed questions were added at step 2, and their product term was added at step 3. Results provided no support for main effects of either closed questions ($\beta = .07$, $t(1, 245) = 1.35$, $p = .18$, $\Delta R^2 = .005$ or open questions ($\beta = -.001$, $t(1, 245) = -.03$, $p = .98$, $\Delta R^2 = .005$) on changes in contemplation. There was no interaction between closed and open questions for changes in contemplation ($\beta = .09$, $t(1, 244) = .53$, $p = .60$, $\Delta R^2 = .001$).

We used the same approach noted above to examine changes in contemplation as a function of simple and complex reflections. Baseline contemplation was included as a covariate at step 1, simple and complex reflections were added at step 2 and their product term was added at step 3. Results provided no support for main effects of simple reflections ($\beta = .09$, $t(1, 245) = 1.60$, $p = .11$, $\Delta R^2 = .011$), complex reflections ($\beta = .05$, $t(1, 245) = .86$, $p = .39$, $\Delta R^2 = .011$), or an interaction among simple and complex reflections for changes in contemplation ($\beta = .13$, $t(1, 245) = .86$, $p = .39$, $\Delta R^2 = .002$).

Latent Growth Curve Analyses of Drinking and MITI Variables

To examine changes in drinking as a function of closed and open questions we conducted a latent growth curve model with closed and open questions as predictors of the intercept and slope factors. The model provided a reasonable fit to the observed data ($\chi^2(2) = 4.79$, $p = 0.09$, CFI = 0.995, SRMR = 0.02). The results indicated a significant positive relationship between open questions and the linear slope ($B = 0.13$ (SE=.03), $\beta = 0.29$, $p < 0.001$), indicating that following the intervention individuals who were asked more open questions during the BASICS intervention drank significantly more over time. We also examined whether the association between open questions and changes in drinking over time was moderated by baseline drinking status using a random-effects regression model that incorporated the main effects of open questions and the intercept (continuous baseline drinking, as measured by the DDQ), as well as the interaction between open questions and the intercept, as predictors of the linear slope of drinking changes over time. The main effect of open questions in predicting the linear slope was qualified by a significant interaction between the number of open questions and the intercept in prediction of linear slope (B (SE) = 0.02 (0.01), $p = 0.001$). Thus, baseline drinking did moderate the association between the number of open questions and change in drinking over time.

We conducted supplementary analyses to probe this interaction by dividing our sample into heavier and lighter drinkers based on the baseline drinking in this sample (see Aiken & West, 1991). The average DDQ at baseline for those one standard deviation above the mean intercept of DDQ was 9.07 (SD = 6.93) and the average DDQ for those one standard deviation below the mean intercept of DDQ was 0.21 (SD = 0.65). As seen in Figure 1, the interaction was such that more open questions predicted a greater increase in drinking rates among the heaviest drinkers, whereas lighter drinkers did not evince as strong of an association between the number of open questions they received and drinking increases over time.

Finally, a latent growth curve model with simple and complex reflections as predictors of the intercept and slope factors was conducted. The model also provided a reasonable fit to the observed data ($\chi^2(2) = 6.06, p = 0.05, CFI = 0.992, SRMR = 0.02$). The results indicated a significant positive relationship between simple reflections and both the intercept and the linear slope (Intercept: $B = 0.16 (SE=.06), \beta = 0.18, p = .005$; Slope: $B = 0.11 (SE=.03), \beta = 0.22, p < 0.001$). Thus, individuals who were drinking more heavily at baseline received more simple reflections and individuals who encountered more simple reflections during the BASICS intervention drank significantly more over time. Complex reflections were unrelated to intercept or slope of drinking quantity over time. Likewise, baseline drinking did not significantly moderate ($p > 0.48$) the associations between reflections (simple or complex) and changes in drinking over time. Additional models testing for main effects of treatment condition (BASICS vs. BASICS + Parent) and globals (empathy and spirit) as well as moderation effects by these variables on the relationship between predictors and outcomes were tested. As there were no significant results, only hypothesized predictors were included in the models in order to be more congruent and facilitate comparison with the study being replicated (Tollison et al., 2008).

Discussion

This study was designed to replicate and extend the findings of a previous study (Tollison et al., 2008) using a population with different sampling characteristics, a larger sample size, more follow-up time-points, and latent variable methodology to examine the relationship between student baseline drinking rates, in-session peer facilitator MI microskills, and outcome drinking behavior. Based on our previous study, it was hypothesized that a high frequency of open questions asked by peer providers would be related to increases in contemplation to change drinking behavior, closed questions would be related to decreases in contemplation, simple reflections made by peer providers would be related to more drinking post-intervention and the interaction between simple and complex reflections would attenuate the relationship between simple reflections and drinking outcomes. Contrary to the previous study, there was no relationship between either type of question and changes in contemplation. In addition, the frequency of open questions was positively related to heavier drinking after the intervention, particularly among the heaviest drinkers. Replicating findings from our previous work, reflections were unrelated to changes in contemplation post-intervention. The frequency of simple reflections was associated with the counter therapeutic outcome of increases in overall drinking and this relationship was observed for a drinking trajectory using multiple follow-up time points. We did not find that complex reflections attenuated the relationship between simple reflections and drinking outcomes as we did in the previous study nor did baseline drinking status moderate this relationship. In exploring the relationship between baseline drinking and MI microskills, peer providers made significantly more simple reflections with heavier drinkers while no other relationships were found.

This study offered significantly more power to investigate the relationships between MI microskills and student drinking behavior post intervention than our prior work. However, some other important differences should be emphasized. First, as indicated, participants were screened into the primary study (Turrissi et al., 2009) based on high school athletic status because of the lack of research addressing interventions targeted to this high-risk group. Also, most of the students received the baseline survey in the summer before their first year of college, to assess changes in drinking habits upon college matriculation. As most of these students were likely living at home with their parents at the point of baseline assessment, this resulted in lower baseline drinking rates ($M = 3.47$) than in the sample ($M = 8.73$) from Tollison et al. (2008), who completed their baseline assessment after starting college. This also explains how the sample from the present study had lower drinking rates than the national averages observed for U.S. college freshmen ($M = 5.1$; CORE, 2006). Because drinking rates among students often tend to increase in their first year of college (Baer, Kivlahan, & Marlatt, 1995; Capone, Wood, Borsari, & Laird, 2007; Grekin & Sher, 2006; McCabe, Schulenberg, Johnston, O'Malley, Bachman, & Kloska, 2005; White, McMorris, Catalano, Fleming, Haggerty, & Abbott, 2006), this sample had more potential to increase their drinking as they advanced through the study than in the previous study. Finally, the previous study utilized half undergraduate and half graduate student BASICS peer providers, whereas this study used mostly undergraduate peers with little previous clinical experience. This may explain why ratings on global empathy and MI spirit did not average to a level of beginning proficiency across the study.

Peer facilitators met 3 of 6 MITI criteria for beginning proficiency. Notably, they did not meet criteria on global ratings of empathy and MI spirit, and these ratings were slightly lower than providers in Tollison et al. (2008). In terms of behavioral counts, providers met criteria for the percentage of MI adherent statements, open questions, and complex reflections. However, they did not meet criteria for the ratio of reflections to questions.

The findings that open questions were not related to increases in contemplation while being positively related to increases in drinking post-intervention were surprising. The relationship between open questions and drinking outcomes was unlikely related to a difference in the sheer frequency of open questions between studies, as the number of open questions asked by providers in this study ($M = 13.80$) was only slightly higher than the providers ($M = 12.65$) in Tollison et al. (2008). This difference was also unlikely related to poor MI adherence as defined by the MITI as the percent of open questions (out of total number of questions asked), was higher in this study (60.5%) than it was in the previous study (49.4%). Therefore the discrepancy in this result is more likely related to the content of the questions that the providers were asking and the differences in the samples. Although MI prescribes the use of open questions over closed questions, it emphasizes the use of evocative questions to explore ambivalence and elicit change talk (Miller & Rollnick, 2002). Since the providers in this study had less experience with MI, had lower global ratings in empathy and MI spirit, and less clinical experience overall, it is possible that they were effective at implementing the lower level skill of using more open questions than closed questions, but were not effective in utilizing the higher-order skill of asking evocative questions to encourage students to consider changing drinking behaviors. We would expect that empathy and spirit may moderate this relationship such that open questions asked by providers with higher ratings on these global MI traits would be related to less drinking. The data did not support this hypothesis, though this analysis is limited by restricted variability on the global ratings since all providers were trained on these MI traits. Interestingly, the positive relationship between open questions and increased drinking was stronger for heavier drinkers in this study. This is also surprising given the previous study sampled heavier drinkers and it would be expected that heavy drinkers in this study and the sample from the previous study would be similar. It may be possible that students who drink heavily prior to entering college and

whose athletic status makes them part of a higher-risk subgroup are different in their response to intervention strategies than those who are identified as heavier drinkers well into their freshman year of college. These findings further support the need to be strategic with open questions and other MI skills with heavier drinkers as well as take into account their drinking histories. The way facilitators are asking open questions may evoke counter change talk and hinder the change process. These findings also warrant the use of coding methodologies, such as the codes used by Moyers et al., (2009) that examine if the question was about the negative or positive aspects of the target behavior (e.g. alcohol use) to better understand how the strategic use of questions may be influencing change processes.

The finding that the frequency of simple reflections was positively associated with increases in drinking replicated results from Tollison et al. (2008) and supported the two previously discussed hypotheses about this relationship. The first hypothesis is that the repetitive nature of making simple reflections may result in a student becoming frustrated by being parroted by a peer provider. Another possible explanation is that the use of simple reflections with people who already drink or have intentions to drink may be related to the reinforcement of counter change talk, a type of talk that has been shown to be predictive of poor therapeutic outcomes (Moyers et al., 2007; Apodaca & Longabaugh, 2009). When students articulate no desire to change their alcohol use and related behaviors, simple reflections may only mirror these sentiments and actually impede the change process. It is important to note that these hypotheses can only be explored by coding student change talk. The current study extended our prior research by assessing the relationship between participant drinking status and provider behavior. We found that peer providers used more simple reflections when participants were heavier drinkers. Therefore, the counter therapeutic effect of excessive simple reflections may also be related to how peer facilitators respond to heavier drinkers. It is possible that peer facilitators may feel the need to use more reflections to demonstrate understanding and acceptance of the views of heavier drinkers, but may inadvertently reaffirm these viewpoints by simply rephrasing them without evoking any other sentiments for change. Drinking status did not moderate the relationship between reflections and drinking behavior suggesting that the excessive use of reflections is counter therapeutic regardless of baseline drinking levels, peer facilitators just made more of them with heavier drinkers.

Although the analyses of this study allow for a more definitive establishment of the nature of the relationship between in-session peer provider behavior and changes in the drinking behavior, it nonetheless has a number of limitations. Reliability was poor for complex reflections which could have been a major reason there was no relationship between complex reflections and outcome and lack of hypothesized attenuation of the relationship between simple reflections and outcome. This behavior had one of the lowest ICC coefficients in Moyers et al. (2005) and presented a particular challenge in this study with many coders, coding a large number of sessions. As the analyses were correlational in nature, we cannot say that peer facilitator behavior had a causal influence on drinking outcomes. In addition, we are not assessing the proposed meditational component of client change talk essential to the theoretical model regarding use of MI resulting in client behavior change (Apodaca & Longabaugh, 2009; Miller & Rose, 2009). It is difficult to ascertain the nature of the relationship between peer facilitator behaviors and student drinking trajectories and MI microskills are only a set of multiple behaviors needed to test these models. Other limitations are based on the use of the MITI as a psychotherapy process measure when it was intended for use as a tool to evaluate beginning MI proficiency (Moyers, Martin, et al., 2005). Although behavior counts may be informative indices of MI delivery, they do not fully represent how effectively the provider is using MI to increase client change talk and commitment to change. MI is not merely the implementation of OARS, but is also an interaction style that creates an environment conducive to the client's

self-change. Other MI process coding protocols (e.g., MISC, SCOPE) would be more effective at gauging how well a provider employs the strategy and interaction style of MI to facilitate change. Finally, some of the participants in this study were part of a combined intervention group in which their parents were involved in intervention efforts in addition to the participants receiving a BASICS intervention. However, supplemental analyses were conducted to examine the effect of treatment condition, which was not significant. As the combined intervention demonstrated the strongest effect for lower drinking rates post-intervention, especially on total drinks per week, it is important to note that the supplemental parent intervention may play a significant role in the drinking trajectories of students post-intervention in ways not identified in this study.

These findings suggest the importance of including items and measures that assess the content of provider speech in the assessment of MI adherence and competence. In terms of MI training and supervision, the updated MITI 3.0 (Moyers, Martin, Manuel, Miller, & Ernst, 2007) has incorporated changes that allow for a more thorough assessment of some of these content issues. In addition to adding behavioral anchors for global measures, it also includes separate global measures for autonomy, collaboration, and evocation (formerly under the umbrella category of MI spirit) and direction in addition to the global rating for empathy. The Motivational Interviewing Supervision and Training Scale (MISTS: Madson, Campbell, Barrett, Brondino, & Melchert, 2005) may supplement use of the MITI as it contains ratings for addressing ambivalence, rolling with resistance, supporting self-efficacy, and reinforcing and eliciting change talk. Items on these measures allow for a more in-depth picture of what the intervention provider is doing to effectively use MI.

This study reiterates the usefulness of the MITI in assessing peer facilitator use of MI when delivering BASICS with college students. In both this study and our previous study, peer providers met 3 of the 6 criteria for beginning proficiency in the use of MI demonstrating that the MI skills of peer providers could be improved upon. It is becoming more apparent that peer facilitators can effectively learn how to ask open questions and make reflective statements. However, it seems that these lower level skills are not indicative of the effective use of MI to change outcome drinking behavior trajectories. Instead, it may be more important to improve the strategic nature of peer-facilitator inquiries and should take into account the nuances of the students being targeted for intervention both in term of their risk potential for excessive drinking as well as their baseline drinking status. Learning both how to conduct BASICS and how to use MI in BASICS is an incredibly demanding task, especially for entry-level clinical providers. Our results suggest that peer providers may be using more rudimentary skills prescribed by MI without taking into account strategic principles of asking evocative questions to elicit change talk and then selectively reinforcing change talk to increase the likelihood of behavior change. Acquisition of rudimentary skills through supplemental supervision appears to not have any impact on outcome (Mastroleo, Turrise, Carney, Ray, & Larimer, 2010). Because BASICS involves providing information and learning skills to reduce alcohol use and related harms, peer providers could benefit from more focused initial training on the MI strategies most useful for each BASICS component. In addition, rather than emphasizing the use of open questions over closed questions or making a high frequency of reflections, the elicit-provide-elicited model suggested by Miller et al (1998) and the appropriate sequencing of MI skills (open questions, affirmation, reflection, summary) referenced in the MISTS (Madson et al., 2005) should be emphasized as the guiding value behind the interaction between the peer provider and student. Peer providers could also greatly benefit from ongoing supervision that specifically focuses on improving these skills over time as they are less likely to be maintained by providers learning MI for the first time (Miller & Mount, 2001). As beginning providers are more likely to heavily rely on a manualized protocol for intervention delivery, efforts in supervision to increase peer provider awareness of the

underlying meanings behind client statements and provide relevant MI strategies for specific types of interactions or specific types of clients could greatly help peer providers more effectively mesh MI skills with the intervention protocol. The use of additional supervision tools is likely to facilitate the supervision process by providing multiple measures of MI delivery to ensure both adherence and competence with the ultimate goal of improving intervention effectiveness.

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Figure 1. Interaction between open questions and baseline drinking rates, as measured by the Daily Drinking Questionnaire (DDQ), in the prediction of the change in drinking rates over time.

Table 1

Achievement of MI quality benchmarks for competency and beginning proficiency prescribed in the MITI manual

Behavioral Indicator	Competency	Beginning Proficiency	Average rating of peer facilitators
Empathy	6.0	5.0	4.6 (0.86)
Spirit	6.0	5.0	4.5 (0.86)
Reflections to questions ratio	2.0	1.0	0.82 (0.46)
Percent MI-adherent Statements	100%	90%	92.1% (0.23)
Percent complex reflections	50%	40%	46.0% (0.19)
Percent open questions	70%	50%	60.5% (0.20)

Table 2

Means, Standard Deviations, and Zero-order Correlations

Variable	M	SD	1	2	3	4	5	6	7	8	9
1. Baseline contemplation	-0.88	0.78	--								
2. Post-intervention contemplation	-0.81	0.84	.51***	--							
3. Baseline drinks/week	3.47	6.01	.34***	.49***	--						
4. 5-month drinks/week	6.03	8.03	.17*	.43***	.64***	--					
5. 10-month drinks/week	6.56	8.05	.18**	.38***	.62***	.81***	--				
6. Closed questions	9.10	6.49	-.04	.00	-.08	-.03	-.06	--			
7. Open questions	13.79	6.83	.00	.03	.02	.21***	.26***	-.07	--		
8. Simple reflections	9.54	5.98	.04	.12*	.14*	.29***	.30***	.15**	.54***	--	
9. Complex reflections	7.54	4.13	-.02	.11	.03	.09	.12	.06	.16**	.15**	--

Note.

*
 $p < .05$,

**

 $p < .01$,

 $p < .00$