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Group motivational interviewing for adolescents: Change talk and alcohol and marijuana outcomes

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Abstract

Objective—Little is known about what may distinguish effective and ineffective group interventions. Group motivational interviewing (MI) is a promising intervention for adolescent alcohol and other drug (AOD) use; however, the mechanisms of change for group MI are unknown. One potential mechanism is change talk, which is client speech arguing for change. The present study describes the group process in adolescent group MI and effects of group-level change talk on individual alcohol and marijuana outcomes.

Method—We analyzed 129 group session audio recordings from a randomized clinical trial of adolescent group MI. Sequential coding was performed using the Motivational Interviewing Skill Code (MISC) and the CASAA Application for Coding Treatment Interactions (CACTI) software application. Outcomes included past-month intentions, frequency, and consequences of alcohol and marijuana use, motivation to change, and positive expectancies.

Results—Sequential analysis indicated that facilitator open-ended questions and reflections of change talk (CT) increased group CT. Group CT was then followed by more CT. Multilevel models accounting for rolling group enrollment revealed group CT was associated with decreased alcohol intentions, alcohol use and heavy drinking three months later; group sustain talk was associated with decreased motivation to change, increased intentions to use marijuana, and increased positive alcohol and marijuana expectancies.

Conclusions—Facilitator speech and peer responses each had effects on change and sustain talk in the group setting, which was then associated with individual changes. Selective reflection of CT in adolescent group MI is suggested as a strategy to manage group dynamics and increase behavioral change.

Keywords

adolescents; substance use; intervention; group motivational interviewing; change talk; alcohol and marijuana outcomes

Across all races and ethnicities, alcohol and other drug (AOD) use increases during the middle school and high school years in the United States. (Johnston, O'Malley, Bachman, & Schulenberg, 2013; Shih, Miles, Tucker, Zhou, & D'Amico, 2010). During middle school, rates of alcohol and marijuana use triple (D'Amico, et al., 2005). By the time youth reach their senior year most have tried alcohol and marijuana at least once (alcohol = 69%, marijuana = 45%) (Johnston, et al., 2013) and many youth report regular use of these substances (Eaton, et al., 2012). Of note, use is typically not restricted to one substance. Rather, most American adolescents tend towards polysubstance use, meaning that those who are drinking alcohol also tend to be smoking cigarettes and using marijuana (Chung & Maisto, 2006).

One approach that has demonstrated particular promise in helping youth of different ages and races/ethnicities decrease their substance use is motivational interviewing (MI) (Miller & Rollnick, 2012; Rollnick, Miller, & Butler, 2008). The brevity and transportability of this intervention has made it ideal in reaching adolescents across a variety of settings, including juvenile justice, medical clinics, homeless shelters, and schools (Jensen, et al., 2011; Lundahl, Kunz, Brownell, Tollefson, & Burke, 2010). The effectiveness of *individual* MI with at-risk youth has been documented in many studies (e.g., Baer, Garrett, Beadnell, Wells, & Peterson, 2007; D'Amico, Miles, Stern, & Meredith, 2008; Feldstein & Ginsburg, 2006; Spirito, et al., 2011; Walker, Roffman, Stephens, Wakana, & Berghuis, 2006), and recent studies have shown that *group* MI is also a promising intervention for at-risk youth (D'Amico, Hunter, Miles, Ewing, & Osilla, 2013; Engle, Macgowan, Wagner, & Amrhein, 2010; Feldstein Ewing, Walters, & Baer, 2012). However, many questions remain, such as what makes MI “work”; that is, what are the potential mechanisms of action?

A central aspect of MI is to help clients who are ambivalent about a problematic behavior resolve their ambivalence, preferably in the direction of positive changes in their behavior (Miller & Rollnick, 2012). In the last several years, researchers have begun to examine client speech during the MI therapy session as one potential explanation for why behavior may change. Specifically, this work has focused on the quantity or strength of client change talk; change talk is defined as any self-expressed speech that is an argument for change (Miller & Rollnick, 2012).

Studies have examined the change talk that occurs during a session and how a therapist's use of MI may affect change talk and subsequent AOD use (Apodaca & Longabaugh, 2009). Briefly, findings have typically shown that client change talk during a session is associated with reductions in AOD use (Aharonovich, Amrhein, Bisaga, Nunes, & Hasin, 2008; Bertholet, Faouzi, Gmel, Gaume, & Daeppen, 2010; Magill, Apodaca, Barnett, & Monti, 2010; Martin, Christopher, Houck, & Moyers, 2011; Moyers, Martin, Houck, Christopher, & Tonigan, 2009; Vader, Walters, Prabhu, Houck, & Field, 2010; Walker, Stephens, Rowland, & Roffman, 2011), although a few studies have not found this association (e.g., Gaume, Bertholet, Faouzi, Gmel, & Daeppen, 2013; Morgenstern, et al., 2013). In addition, when clients voice sustain talk, or arguments against change, this is associated with greater AOD use (Baer, et al., 2008; Miller, Benefield, & Tonigan, 1993; Moyers, et al., 2007; Vader, et al., 2010), and a lower likelihood of steps toward reducing AOD use, such as change plan completion (Magill, et al., 2010). Most studies in this area have also shown that more MI-

consistent behaviors from the therapist/interventionist, such as open questions and reflective listening, increase change talk from the client (Apodaca, Magill, Longabaugh, Jackson, & Monti, 2012; Daepfen, Bertholet, & Gaume, 2010; Gaume, Bertholet, Faouzi, Gmel, & Daepfen, 2010a; Glynn & Moyers, 2010; Morgenstern, et al., 2013; Moyers & Martin, 2006). In contrast, MI-inconsistent behaviors, such as confrontation or providing unsolicited advice increase sustain talk (Gaume, et al., 2010a; Moyers & Martin, 2006). Preliminary research in interventions that included clients with problem drinking and their significant others suggests that these effects are not limited to clinician behavior. Specifically, significant others' expressions of support for behavior change were positively correlated with client change talk and negatively correlated with sustain talk (Apodaca, et al., 2012; Manuel, Houck, & Moyers, 2012). Thus, MI appears to "work" by increasing client change talk during a session, which is then associated with positive changes in behavior.

Although an understanding of what happens in individual therapy is important, in most adolescent AOD treatment settings, the group format is used to help teens examine and discuss their substance use behavior (Kaminer, 2005; Vaughn & Howard, 2004). Group work is typically conducted because it is economical (French, Zavala, McCollister, Waldron, & Ozechowski, 2008; Sobell, Sobell, & Agrawal, 2009), even though little is known about what may distinguish effective and ineffective group interventions (Engle, et al., 2010). In fact, some research has suggested that group work for youth may have iatrogenic effects—that it can increase risk behaviors, perhaps due to negative peer behavior that may occur during a group session (Arnold & Hughes, 1999; Dishion, McCord, & Poulin, 1999; Dodge, Dishion, & Lansford, 2006). Other researchers have found that working with at-risk youth in a group setting is safe, effective and comparable to working with youth individually (Burlinson, Kaminer, & Dennis, 2006; D'Amico, Hunter, et al., 2013; Kaminer, 2005; Lee & Thompson, 2009; Vaughn & Howard, 2004; Waldron & Turner, 2008). Equivocal findings for adolescent group work may be due, in part, to what actually occurs in the group setting—that is, "the group process." For example, iatrogenic effects may occur in groups where the facilitator is less skilled and does not adequately address sustain talk during the group session. However, the group process is neither well studied nor well understood for either adolescents or adults. One recent study of adult groups for drug counseling found that group participants who had a more positive alliance with their counselor decreased their days of cocaine use the following month. Self-disclosure about the past and degree of participation in the group were not associated with AOD outcomes (Crits-Christoph, Johnson, Gibbons, & Gallop, 2013). In a review of the adolescent group literature, Engle and Macgowan found that only one out of 13 randomized controlled trials of adolescent group work administered any kind of group process measure (Engle & Macgowan, 2009).

The current study focuses specifically on interventions using MI. MI has recently been adapted for use in group settings for both adults (Ingersoll, Wagner, & Gharib, 2006; Velasquez, Stephens, & Ingersoll, 2006; Wagner & Ingersoll, 2013) and adolescents (D'Amico, Houck, et al., 2013; D'Amico, Osilla, & Hunter, 2010; Feldstein Ewing, et al., 2012; Naar-King & Suarez, 2010; Schmiede, et al., 2009). Most published studies on group MI interventions target adults or college students and focus on substance use (Lundahl, et al., 2010); and all but one group MI intervention with adolescents targeted substance use

(Knight, et al., 2003). There is information on *how to* conduct group MI for different behaviors, such as weight loss, intimate partner violence, and aggression, however, this area is still very new; thus, to date, there are no randomized controlled trials of group MI in these areas (Wagner & Ingersoll, 2013).

In brief, there are several important considerations that differentiate group from individual MI. Those considerations include (1) the more complicated interpersonal dynamics of a group setting (e.g., there is a requisite monitoring of between-client conversations that is not present in individual settings), (2) the varying experiences and needs of the participants (e.g., some participants may engage in a high level of substance use whereas others' use may be limited to light experimentation), (3) the need to simultaneously respond to different group needs (e.g., trying to actively maintain the commitment language of one participant while helping another who may not be ready to change), and (4) the need to actively manage the social pressure and peer-based response behaviors that are not a component of individual interventions (e.g., managing increased sustain talk from an otherwise collaborative participant) (Feldstein Ewing, et al., 2012).

Despite these recent advances, little is known about how MI delivered in a group format may affect change talk and sustain talk in this setting, and how change talk in the group may affect subsequent individual behaviors, such as AOD use, healthy eating, or adherence to medication. To date, the research on client speech has been conducted predominantly with young adults and adults in individual-based sessions. There are no change talk studies for adult groups, and there are only two studies that examine change talk with adolescents; both are focused on AOD use: one study assessed change talk and sustain talk among adolescents in an individual setting (Baer, et al., 2008) and one study assessed this type of talk in a group setting (Engle, et al., 2010). Baer and colleagues (2008) conducted a brief individual MI intervention with 54 homeless youth and examined how change talk and sustain talk affected AOD outcomes. Youth who voiced reasons in favor of change were more likely to report abstinence at a one month follow up, whereas reports against change predicted less abstinence at both one- and three-month follow up assessments. The authors did not examine factors during the session (e.g., interventionist behavior) that may have affected change talk or sustain talk.

Only one study has assessed this type of language in an adolescent group setting and examined its association with AOD outcomes. Engle and colleagues examined 19 adolescent group sessions for 108 youth aged 10–19 receiving AOD treatment (Engle, et al., 2010). They specifically assessed positive commitment language (e.g., “I’m quitting for the summer”) and negative commitment language (“I’ll never quit”) and peer reinforcement of this language (e.g., “that’s great”). Correlational data showed that when youth expressed positive commitment language and peer response was also positive (“That’s cool”), teens had better marijuana use outcomes. The more positive and less negative the peer responses, the greater the reduction in marijuana use. Group facilitator empathy was also correlated with more positive commitment language and peer responses to commitment language (Engle, et al., 2010). This study was an important first step in trying to understand the adolescent group process when using MI; however, it was exploratory and had some limitations. For example, they were only able to examine outcomes at the group level, thus,

their total sample size for analysis was 19 (for the number of groups), which limited their power and their ability to find significant associations. Adolescent group process research would be improved through studies that account for the influence of group membership and through analyses that demonstrate adequate power to detect the investigated effects.

Overall, there is a paucity of research on process, group structures and facilitator behavior in reporting on group treatment in general and for adolescent AOD use in particular. The ability to describe group dynamics and the effects of those dynamics on outcomes is crucial to move the field forward. For example, an understanding of specific group dynamics could help clinicians who conduct groups to pinpoint places where iatrogenic effects may be more likely to occur. Overall, knowledge of the group process is important for clinical practice, as it will inform practitioners how to modify their within-session behaviors to improve group treatment outcomes for both adolescents and adults -- not only for AOD use, but across a variety of behaviors.

The current study is innovative as it evaluates 129 adolescent group sessions to understand how facilitator and peer behavior affects change talk in the group setting, and how change talk during group affects an adolescent's individual AOD outcomes. This is the first study to date to use sequential coding to assess adolescent group dynamics by evaluating transition probabilities. Specifically, we used sequential coding to assess audio recordings of group MI sessions for adolescents with a first-time AOD offense; we focused on these youth as they were at-risk, and assessing the group process among at-risk youth can provide an important understanding of how and when iatrogenic effects may or may not occur. We examined the types of facilitator behavior that influenced change talk and sustain talk in the adolescent group setting, and the association of the group's change talk and sustain talk with both mechanism of change measures (e.g., motivation, intentions; Magill & Longabaugh, 2013) and behavioral measures (e.g., use and consequences) three months after youth completed the MI group intervention. In contrast with the sole previous assessment of within-session behaviors in adolescent group MI, we used a multilevel model appropriate for rolling group enrollment in order to examine outcomes at the individual level while also accounting for the adolescent's group membership.

Based on the individual change talk work conducted with young adults and adults, and the two adolescent change talk studies, we hypothesized that facilitator behavior that was MI-consistent, such as asking open-ended questions and providing reflections, would be associated with greater change talk in the group. We further expected that when an adolescent in the group produced change talk that this would be followed by further change talk from other group members (i.e., a high transition probability for CT-CT transitions); similarly sustain talk by an adolescent in the group would be followed by sustain talk from other group members (i.e., a high transition probability for ST-ST transitions). We then hypothesized that greater change talk during the group session would be associated with increased motivation to change, decreased positive beliefs about alcohol and marijuana, decreased intentions to use, and decreased alcohol and marijuana use and consequences at the three-month follow up. We also expected that sustain talk would have the opposite effect on these outcomes; specifically increasing positive beliefs about alcohol and marijuana,

decreasing motivation to change, and increasing alcohol and marijuana intentions, use and consequences.

Methods

Study Overview

This study is a secondary analysis of data collected in a randomized clinical trial (D'Amico, Hunter, et al., 2013). Procedures were approved by the research institution's Internal Review Board and we obtained a National Institutes of Health Certificate of Confidentiality to protect participant privacy. We collaborated with the Council on Alcoholism and Drug Abuse, a nonprofit organization in Santa Barbara, California that operates a Teen Court (TC) for youth with a first time AOD offense.

To determine eligibility for teen court, all youth with a first time AOD offense were screened by TC staff with the GAIN short screener-substance problem subscale (Dennis, Feeney, Stevens, & Bedoya, 2006). Youth that 1) reported greater than 5 days of alcohol or marijuana use in the past 90 days, or 2) reported using substances other than alcohol or marijuana (i.e., cocaine, methamphetamine) more than twice in the past 90 days were referred to treatment and were not eligible for TC. Adolescents who were not deemed in need of more intensive treatment were eligible to participate in TC in lieu of formal juvenile justice processing. As part of TC, youth who had committed a first-time AOD offense were required to attend six alcohol and drug awareness groups, along with other sanctions (e.g., community service). Ninety-five percent of youth completed all sessions within the 90-day required time frame. Adolescents who successfully completed their sentence had the offense expunged from their record.

The alcohol and drug awareness groups occurred weekly. Enrollment to the groups was based on rolling admission—that is, attending session 2 did not require that a teen attended session 1. Teens entered the group sessions based on their time of referral to the program. Teens were randomized to either a usual care (UC) control condition or the MI group intervention called *Free Talk* (FT) (D'Amico, Hunter, et al., 2013; D'Amico, et al., 2010). Youth were eligible for the study if they were 14–18 years old, referred during the study period (January 2009–October 2011) for a first-time AOD offense and agreed to be randomized and complete the study survey instruments. We excluded youth who did not speak and read English well enough to complete the informed consent and self-administered surveys, as well as youth who had multiple offenses or possession of a medical marijuana card. Study refusals (10%) were mostly due to lack of time or transportation to complete a baseline survey before their first group session (see D'Amico et al., 2013 for the CONSORT diagram). No statistically significant demographic differences were observed between study participants and those that refused to participate.

Participants completed a baseline survey before they attended the Teen Court hearing where they received their sentence, and another survey approximately three months after they completed six group sessions or about 180 days from the time of the baseline interview. Participants were compensated \$25 for the baseline survey and \$45 for the three-month follow-up survey.

The Current Study

The current study is based upon examination of the participants' and facilitator's behavior during the *Free Talk* sessions. Usual care participants and sessions were not audio recorded and were therefore excluded from analyses. We coded 135 *Free Talk* sessions. Six sessions were used in coder training; 129 sessions were used for the analyses.

Participants

110 youth participated in the *Free Talk* group sessions. The average age was 16.75 years ($SD=1.02$, range 14 – 18); 65.5% were male, 51.8% were White, 39.1% were Hispanic, and 9.1% were mixed/other race. *Free Talk* group sessions were led by one of five facilitators (all female and white) who were psychology doctoral students with prior at-risk teen work experience. KCO and EJD conducted one group session each to cover for facilitator absences.

Intervention—*Free Talk* group sessions were developed as part of a Stage 1 study (Rounsaville, Carroll, & Onken, 2001) where each group session was iteratively tested to determine feasibility and acceptability of intervention content (D'Amico, et al., 2010). The facilitator manual included a protocol for each session and utilized a MI approach (D'Amico, Hunter, et al., 2013). For example, at the beginning of each session, the facilitator asked the group members to discuss ways to make the group comfortable and safe for one another (e.g., confidentiality, respect for others in the group). MI strategies were used in every session to deliver content (D'Amico, et al., 2010). For example, facilitators asked for permission to share information with the group and after presenting information, asked group members what they thought of the information, and reflected group member statements. Behavioral change tools were utilized throughout the sessions. For example, the facilitator used willingness and confidence rulers, a motivation-building exercise in MI, to facilitate discussions about where teens were in terms of their willingness and confidence to change (or not change) their AOD use. Session content included an interactive discussion of the myths around AOD use (e.g., using alcohol will make me more sociable), the path from no use to experimental use to addiction, effective communication strategies and how AOD use may affect communication, the effects of AOD use on the brain, and the contribution of AOD use on other risk-taking behavior such as unsafe sex and driving under the influence. Sessions lasted 55 minutes and the average group size was 5 adolescents ($mean=4.54$; $SD=1.96$). Facilitators rotated throughout the study delivering 6 to 12 sessions (e.g., 1 to 2 full rotations of the intervention) at one time. Thus, most teens had the same facilitator for all six of their group sessions; however some teens may have had different facilitators depending upon when they rotated into the groups.

Free Talk training and integrity monitoring—Facilitators received 40 hours of MI and *Free Talk* training delivered by two licensed clinical psychologists (EJD and KOC) affiliated with the Motivational Interviewing Network of Trainers (MINT). All *Free Talk* groups were digitally audio recorded. EJD and KOC reviewed recordings and provided one-hour weekly supervision to facilitators. The Motivational Interviewing Treatment Integrity scale (MITI: Moyers, Martin, Manuel, Hendrickson, & Miller, 2005) was used to monitor intervention fidelity and to provide feedback during supervision.

Mechanism of Change measures

Intentions to use—We used two items from the RAND Project ALERT 1990 Survey (Ellickson, Tucker, Klein, & Saner, 2004) to assess intentions to use, “Do you think you will use alcohol/marijuana in the next six months?” with responses rated on a 4-point scale (definitely yes, probably yes, probably no, and definitely no).

Motivation to change—We assessed motivation to change using the 12-item version of the University of Rhode Island Change Assessment Scale (URICA) (Henderson, Saules, & Galen, 2004; Pantalon & Swanson, 2003). We modified the items to ask about ‘using’ rather than ‘drinking’ so that the items were relevant to both alcohol and marijuana users. Responses are coded on a 5-point scale (strongly disagree, disagree, undecided, agree, and strongly agree). The items make up four subscales: pre-contemplation (e.g., “It doesn’t make much sense for me to consider changing my use”), contemplation (e.g., “I’ve been thinking that I might want to change something about my use”), action (e.g., “At times my use causes problems and I’m determined to change”) and maintenance (e.g., “It is frustrating, but I feel my use might become a problem again”). The URICA has shown good internal consistency and strong associations with other change process variables (Soderstrom, et al., 2007). A readiness to change score was computed by subtracting the mean precontemplation subscale score from the sum of the mean contemplation, action and maintenance mean subscale scores¹.

Positive expectancies—Items from the Cognitive Appraisal of Risky Events Questionnaire (CARE) (Fromme, Katz, & Rivet, 1997) were used to assess participants’ expectancies that they would experience positive consequences if they were to engage in heavy drinking (i.e., drinking more than 5 alcoholic drinks; drinking alcohol too quickly; playing drinking games) or marijuana use (i.e., smoking marijuana). The CARE has been found to have adequate internal reliability ($\alpha = .63$ to $.86$), and construct and predictive validity (Fromme & Wendel, 1995; Katz, Fromme, & D’Amico, 2000).

Behavioral Measures

AOD use—Past month frequency of alcohol and marijuana use were assessed using measures from the RAND Adolescent/Young Adult Panel Study (Ellickson, Tucker, & Klein, 2001; Tucker, Orlando, & Ellickson, 2003), which was developed based on established items and scales from Monitoring the Future (Johnston, O’Malley, Bachman, & Schulenberg, 2012) and DSM-IV criteria. Frequency of consumption was assessed by asking “During the past month, how many times [or days] have you tried alcohol [marijuana]?” Respondents were also queried about heavy drinking in the past month by asking how frequently they had drunk “five or more drinks of alcohol in a row, that is, within a couple of hours.” A “drink” was defined as one whole drink of alcohol (not including a few sips of wine for religious purposes).

Consequences from use—Two sets of questions based on DSM-IV criteria addressed whether adolescents had experienced consequences due to alcohol or marijuana use in the

¹We analyzed the URICA both with and without the maintenance scale and results were the same.

past 30 days (Tucker, et al., 2003). There were 6 items for alcohol (e.g., missed school or work, passed out) and 5 for marijuana (e.g., got into trouble at school or home, had difficulty concentrating). Both scales average responses across items that are rated on a 4-point scale (never, 1 time, 2 times, 3 or more times) and are reliable with adolescents ($\alpha = .77$ for marijuana and $\alpha = .81$ for alcohol).

Statistical Analysis

We first provide descriptive statistics (mean, standard deviation) of the change talk and sustain talk scores and the correlations between facilitator behavior and change language at both the individual level and the session level. Next, we relate change and sustain talk to outcomes using a multilevel modeling procedure controlling for baseline covariates including age, gender, race/ethnicity and the baseline measure of the variable of interest. Because of our rolling group design (also called open enrollment) where individuals may join and leave the group at any time, there is no specific 'group' structure of teens at any given session (Morgan-Lopez & Fals-Stewart, 2008; Paddock, Hunter, Watkins, & McCaffrey, 2011). Therefore we used methods to calculate appropriate standard errors that account for this non-independence. To do so, we used a multiple membership model/cross classified model (Browne, Goldstein, & Rasbash, 2001) in which each session was deemed to be a group, and individuals were assigned a weight for each group they attended, such that each person's weights summed to 1.0. For these models we present the parameter estimates from the multilevel model for the prediction of outcomes from separate models for change talk and sustain talk. Estimation of transition probabilities was performed using the General Sequential Quenier (GSEQ 5.1)(Bakeman & Quera, 2009).

Coding Procedure

We used the Motivational Interviewing Skill Code (MISC 2.5; <http://casaa.unm.edu/download/misc25.pdf>) (Houck, Moyers, Miller, Glynn, & Hallgren, 2010) and CASAA Application for Coding Treatment Interactions (CACTI) (Glynn, Hallgren, Houck, & Moyers, 2012) to assess facilitator and teen speech during structured group interventions for AOD use. CACTI was developed as part of a large MI training study (Moyers, Houck, Glynn, & Manuel, 2011) in order to permit sequential coding of digital audio files without the use of transcripts. It has since been applied successfully in several other studies (Barnett, et al., in press; Fischer & Moyers, 2014; Houck, Moyers, & Tesche, 2013). CACTI can be used for sequential coding using any mutually exclusive and exhaustive coding system, such as the MISC 2.5. Each behavior code appears as a button in the CACTI graphical user interface. Coders listen to the recording and when they decide that an utterance corresponds to a particular code, they click with the mouse on the appropriate button. The time, corresponding byte number of the digital audio file, behavior code, and serial position of each utterance is recorded automatically by CACTI in a tab-delimited text file for each session. These files can be combined for subsequent analysis. The application is configured for MISC coding by default, but other coding systems may be substituted by editing a simple XML file (Glynn, et al., 2012). The free, open-source CACTI application and its documentation can be downloaded in a 2 MB ZIP file from <https://ctcsu-player.googlecode.com/files/CACTI.zip>. MISC 2.5 is broadly similar to the SCOPE coding system and introduces several behavior codes from that system, such as reflections of

change talk and sustain talk, as well improvements to facilitate sequential coding. One notable difference from the SCOPE is that in the MISC 2.5, clinician double-sided reflections are split into separate utterances where possible, with one utterance reflecting change talk and the other utterance reflecting sustain talk. These can subsequently be either examined as standalone reflections, or re-combined into double-sided reflections.

Sequential coding allows psychotherapy process coding while retaining the temporal structure of the session. This type of coding is important because it offers a unique opportunity to measure communication patterns during the group, as well as simply counting behaviors. Training of new coders required approximately 40 hours per coder over a six-week period, following training procedures established by Moyers and colleagues (Moyers, et al., 2009). We performed a single coding pass to assess the entire session to measure both facilitator and adolescent speech. Transcripts were not needed.

Six sessions from the study were used for coder training and certification; these sessions were subsequently excluded from all analysis. Bi-weekly coder meetings were held throughout the project to address progress and prevent coder drift. During these meetings coders and their supervisor (JMH) discussed difficult-to-code or unusual session recordings encountered since the previous meeting. Coders also group-coded either gold-standard recordings or sessions already coded by at least one group member. Existing data were not changed, and group codes from these supervision sessions were not retained. Discrepancies during coder meetings were resolved by consulting the MISC manual and by input from an expert supervisor (JMH). Because individual teens were not identifiable in the session recordings, codes for client speech could apply to any teen who attended a given session. Each session was randomly assigned to one of four coders for assessment. To permit assessment of inter-rater reliability, approximately 20% of sessions were randomly selected for double-coding. Double-coding was performed continuously throughout the study to provide an accurate assessment of ongoing reliability. To ensure that the quality of double-coding was equivalent to coding for other sessions, coders were informed that any session they coded could be selected for double coding (Taplin & Reid, 1973) and were masked to the coding pass to which they were assigned (i.e., original code vs. double code).

Results

We coded 129 sessions of our teen court groups for change talk and sustain talk. These sessions were attended by 110 individuals who attended a mean of 5.3 sessions (SD 1.08). For each individual teen, we calculated the mean change talk and sustain talk scores for the sessions that he/she attended. The mean total change talk score was 21.10 (sd 9.62), the mean total sustain talk score was 10.46 (sd 6.60).

Estimates of inter-rater reliability for double-coded sessions were computed using intra-class correlations (Shrout & Fleiss, 1979). Cicchetti and Sparrow (1981) indicate that ICCs between 1.0 and .75 are excellent; between .74 and .60 are good; between .60 and .40 are fair, and .39 and below are poor. ICCs for change and sustain talk were in the excellent range; ICCs for facilitator behaviors were in the good to excellent range. Reliability for the sequence of behaviors was estimated using kappa. Sequential reliability was $k = .67$,

corresponding to 73% agreement between coders on the exact sequence of behaviors. Reliability estimates for all behavior counts of interest are reported in Table 1; pairwise ICCs for all coder pairs are reported in Table 2.

Sequential Results

The term “lag” is used to indicate the relative position of utterances. Lag 0 indicates the first utterance in the series of interest, Lag 1 indicates the second, Lag 2 indicates the third, and so on. For example, in the exchange “(A) [What brings you in today?] (B) [Well, my parents made me come] (C) [but I guess I have been smoking a lot]”, if utterance A is designated as the lag 0 (given) behavior, utterance B would be the lag 1 behavior, and utterance C the lag 2 behavior. If utterance B is the lag 0 behavior, utterance C would be the lag 1 behavior. We assessed only lag 1; that is, the temporally adjacent behaviors. For any given behavior, this allows us to estimate the probability that the next behavior to occur will come from any other behavior assessed by the coding system.

In any large coding sample with varying base rates, some behaviors will occur with much greater or much lower frequency than others. However, transition probabilities can only be computed for behaviors with a sufficient cell frequency (>5 ; Wickens, 1982). As in previous work (Moyers & Martin, 2006; Moyers et al., 2009; Gaume et al., 2010), we combined categories into meta-codes of theoretical interest. For the youth, we combined positive desire, ability, reason, need, commit, taking steps, and other into the Change category, and negative desire, ability, reason, need, commit, taking steps, and other into the Sustain category. All other youth speech is captured by the Neutral category.

For the facilitator, we combined advise without permission, confront, direct, raise concern without permission, and warn into the MI-inconsistent (MIIN) category. We combined advise with permission, affirm, emphasize control, and support into the category sequential MI-consistent (sMICO; Moyers et al., 2009). This differs from the MICO measure defined in the MISC manual in that it omits reflections and open questions, which we wished to examine separately. Because we were interested in the valence of reflections, rather than their complexity, we combined simple and complex reflections of change talk into the Reflect Change talk (RCT) category, and simple and complex reflections of sustain talk into the Reflect Sustain Talk (RST) category. Double sided reflections typically reflect different valences: “You feel like marijuana is really hurting your school work, while at the same time, there are still a lot of things that pot does for you.” Where possible, these double-sided reflections were split into two utterances. For example, “You feel like marijuana is really hurting your schoolwork” is coded as a reflection of CT, and “while at the same time, there are still a lot of things that pot does for you” is coded as a reflection of ST. Consistent with previous research (Moyers, et al., 2009), double-sided reflections that could not be split were combined with neutral reflections (i.e., reflections that did not address change or sustain talk) into a neutral reflection (Ref) category. Open (OQ) and closed questions (CQ) were each examined separately. All other facilitator behaviors (Giving Information, Structure, Reframe, Raise concern with permission) were combined into the Other category. A total of 45,870 transitions were observed in our dataset. The behaviors that occurred with sufficient cell frequency and that were most related to youth change language are presented in a state

transition diagram in Figure 1 (Gaume, Bertholet, Faouzi, Gmel, & Daeppen, 2010b; Moyers, et al., 2009). Table 3 provides examples from the groups of open and closed ended questions, reflections of both change and sustain talk, affirmations and giving information. Table 5 provides the lag-1 transition probabilistic between all metacodes.

The transition matrix deviated significantly from random transitions ($\chi^2(100) = 41489, p < .001$), indicating that the transitions that we observed between behaviors in the present study did not occur at random. During our group sessions, open-ended questions (OQ) and reflections of change talk (RCT) by the group facilitator were more likely than expected by chance to be followed by change talk among the adolescents in the group (OQ OR = 3.46; 95% CI 3.21, 3.73; RCT OR = 6.77, 95% CI = 6.13, 7.48). For example, it was about 7 times more likely for CT to follow a reflection than expected by chance. In the figure, this translates to a transition probability of .33 or a 33% chance of change talk in the group session immediately after a reflection. When the facilitator reflected sustain talk, change talk was suppressed (OR = 0.68, 95% CI = 0.47, 0.99), and these reflections were more likely than expected by chance to be followed by sustain talk (OR = 13.72; 95% CI = 11.15, 16.88). When teens produced change talk, they were significantly more likely than expected by chance to continue with additional change talk (OR = 3.49, 95% CI = 3.19, 3.82). Sustain talk was significantly more likely than expected by chance to be followed by additional sustain talk (OR = 9.25, 95% CI = 7.87, 10.89) and also by change talk (OR = 1.62, 95% CI = 1.36–1.94); however, the odds of continued sustain talk were much higher than the odds for change talk. Finally, teens were less likely than expected by chance to transition to neutral speech after change talk (CT) or sustain talk (ST) (CT OR = 0.10, 95% CI = 0.09–0.12; ST OR = 0.16, 95% CI = 0.13–0.21).

Multilevel models

Results from the multilevel models are shown in Table 4. The parameter estimate represents the expected difference in the outcome variable associated with *a change in one unit of the predictor* (i.e. one additional positive or negative change talk utterance per session). Effects might cumulate over a large number of utterances. For example, given that the mean CT per session was approximately 21 and the standard deviation was about 10, the difference between low and high change talk experienced might be 20 utterances. Thus the expected difference would be 20 times the value of the regression coefficient in Table 4. A parameter of 0.04 therefore represents a predicted difference of 0.8 on the scale of the outcome variable.

Overall, change talk utterances were associated with significant decreases in past 30 day alcohol use, heavy drinking in the past 30 days, and intentions to use alcohol. For example, for alcohol use in the past month, for every 21 CT utterances, there would be an expected difference in the response scale of approximately 1 drink in the past 30 days. There was also a trend for change talk to be associated with lower positive expectancies for alcohol ($p=.059$). Sustain talk was associated with statistically significant reductions in motivation to change, and increased intentions to use marijuana and positive expectancies for alcohol and marijuana. There was a trend for sustain talk to be associated with increased marijuana use in the past 30 days ($p=.081$).

Discussion

The current study takes an important first look at the adolescent group process during a group motivational interviewing intervention. We examined 129 different adolescent group sessions and assessed the effects of the facilitator's behavior on change talk during the group session and how the group process affected adolescents' individual AOD outcomes three months later. Consistent with previous research using individual MI sessions (Gaume, et al., 2010a; Moyers & Martin, 2006; Moyers, et al., 2009), we found that more MI-consistent behavior from the group facilitator, such as asking open-ended questions and providing reflections, increased change talk among the adolescents during the group session. It is important to note; however, that the reflections that increased change talk were specific to change talk; that is, the reflections focused on the adolescent's desire to change. Because sessions were rated using the MISC 2.5 coding system, we were able to capture this behavior for both standalone and double-sided reflections of client speech. For example, if an adolescent expressed, "I like smoking pot but it keeps getting me into trouble", the facilitator's reflection might be "Even though you like getting high, you recognize that if you keep doing it, it's going to keep getting you into trouble", which ends in the direction of change talk. This type of reflection consistently increased change talk. In contrast, if the facilitator reflected only the sustain talk from the adolescent's statement, such as, "you like getting high", then the group was more likely to increase their sustain talk. This is important to understand because both statements accurately reflect the adolescent's situation and what was said; however, one statement is going to be more likely to increase change talk, whereas the other is not. These data shed some light on why some adolescent groups may have iatrogenic effects whereas others do not; specifically, how the facilitator responds to adolescents' ambivalence surrounding their AOD use is crucial in determining the subsequent group response. This is certainly also true for other behaviors; for example, for interventions that address healthy eating. If someone in this type of group were to discuss how much they enjoy eating junk food but know it is not good for them, the facilitator could reflect only the sustain talk by emphasizing that they enjoy eating junk food (which may create an iatrogenic effect in the group) or the facilitator could also reflect change talk and emphasize that although they enjoy eating junk food, they recognize that it's not the best choice for their health (increased likelihood of change talk in the group).

Peer responses in the group were also an important component of the group process. When teens produced change talk during the group session, the group was more likely to continue with additional change talk. The opposite was also true in that when teens produced sustain talk, the group was more likely to continue with additional sustain talk. Thus, youth in the group influenced one another and their subsequent responses during the session.

We also looked at how what occurred during the group affected individual adolescent's AOD positive expectancies, intentions, motivation to change, use and consequences three months after the group ended. Adolescents who were in groups that had more change talk reported lower intentions to use alcohol in the next six months and less drinking and heavy drinking (e.g., 5 or more drinks) in the past month. For example, for every 21 change talk utterances a youth was exposed to across the six group sessions, there was an expected decrease of approximately 1 drink in the past month. There was also a trend in which youth

who experienced more change talk in the groups reported lower positive expectancies for alcohol. In contrast, adolescents who were in groups that had more sustain talk reported greater intentions to use marijuana, less motivation to change and greater positive expectancies for both alcohol and marijuana. There was also a trend for youth in groups with more sustain talk to report greater marijuana use.

Our findings have important clinical implications for treatment of at-risk adolescents in the group setting. Youth who are being treated for AOD use and problems typically come into the group with a variety of experiences, and most youth will likely be in precontemplation or contemplation, meaning that they may not be ready to change their AOD use or may have only just started to think about changing their use. Thus, there is likely to be a great deal of talk in the group session around their use and what they enjoy about it. The facilitator who is trying to address the ambivalence youth may have surrounding their AOD use in the group setting needs to be skilled in understanding how to acknowledge both the reasons that adolescents may not want to change their AOD use while also discussing the reasons for change. If only the reasons for not changing are reflected in the group session, then the group could spiral into a discussion about the benefits of using, which could then lead to iatrogenic effects, such as increased intentions and use. In contrast, acknowledging both sides of AOD use can help youth also discuss why they might want to change their use, which can lead to decreased intentions and use.

From a practical and clinical standpoint, this is a skill that can be trained. In fact, studies with individual clients have shown that when therapists are trained to specifically reflect their client's change talk, and attend less to sustain talk, those clients produce more change talk than when therapists are trained to attend equally to change talk and sustain talk (Glynn & Moyers, 2010; Moyers, et al., 2011). The facilitator's reflections of change talk could influence youth in the group to produce more change talk among themselves, which also influences their peers in the group to continue this change talk, which may lead to reductions in AOD use. Thus, training group facilitators to detect change talk in the group and to differentially reflect those types of statements could be an extremely helpful skill that will pay off in more change talk in the group setting, which could potentially lead to positive behavior change in the future.

One of the key findings from this study is that overall change talk, measured for the entire group, positively affected *individual* outcomes. We were unable to document each specific individual in the group who produced change talk during each session; instead, each group had an overall change talk score and each individual adolescent in that group was assigned that score. Although this is a limitation of the study, it is an important finding as it suggests that youth may not necessarily need to produce all of the change talk by themselves—mere exposure to their peers' change talk in the group could positively affect their subsequent behavior. Future studies should examine this hypothesis more explicitly, for example, by having individual microphones for each youth so that change talk can be documented for each individual in addition to an overall group change talk score to permit assessment of these effects at the level of the individual youth.

Another interesting finding from this study was that all effects of change talk were associated with positive changes for the alcohol outcomes. Change talk did not affect any of the marijuana outcomes even though the estimates were similar; however, sustain talk did affect some marijuana outcomes. One reason for this finding may be because there was a strong perception across many groups that using marijuana was safer than using alcohol. Many teens expressed the perception that marijuana is used medically and so is more “natural” and safer to use compared to drinking alcohol. Further, it was easier for youth to “see” the consequences of drinking versus marijuana. For example, in the group discussions, they talked about doing “really stupid” things while drinking, like “drunk texting” or getting into fights, but they did not associate these types of consequences with marijuana use. In support of this, one recent study found that among higher risk youth, marijuana use is supported and perceived as “normal”, with 90% of these youth voicing positive attitudes toward marijuana use (Sanders, 2012).

Some limitations of this work include that our sample was a group of youth who were mainly Hispanic and White and all youth had a first-time AOD offense. Thus, the generalizability of the data are somewhat limited. It is important to examine change talk across youth of different races and ethnicities so that we can gain an understanding of the influence of culture on client speech in individual and group settings, which could affect the amount of change talk that is produced in any given session, as well as subsequent outcomes. We also only measured outcomes three months after the group ended. A longer follow-up period is needed to assess how the group process may continue to affect adolescents’ AOD use in the long term. Finally, we corrected for multiple membership of therapy groups; however, it was not feasible to correct for facilitator in a similar manner because of the smaller number of facilitators and the additional complexity of the model.

Despite limitations, the current study adds to the burgeoning literature on the adolescent group process and highlights the importance of the facilitator’s ability to produce adolescent change talk in this setting. Findings provide an important first look at how reflections of change talk during the group session can positively affect an adolescent’s AOD use in the short-term. Practitioners can incorporate this skill into their adolescent group sessions and by doing so they will hopefully increase the chances of positive change and decrease the chances of iatrogenic effects.

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Public health significance

In motivational interviewing groups focusing on adolescent alcohol and drug use, use of open-ended questions and reflections of change talk by the facilitator were associated with increased change talk in the group and with positive outcomes at three months. Use of motivational interviewing in groups may help adolescents change their substance use.

Figure 1.

State transition diagram for change and sustain talk. This figure illustrates the transition probabilities for selected behaviors.

Solid arrow = transition to change talk

Dashed arrow = transition to sustain talk

+ = significantly more likely than chance

- = significantly less likely than chance

Table 1

Reliability estimates for coder 1 and aggregated data for coders 2–4

Behavior	α	r	ICC
Change	.946	.898	.897 ^{^^^}
Sustain	.976	.955	.954 ^{^^^}
%CT	.946	.901	.901 ^{^^}
Question	.872	.874	.745 ^{^^}
Reflect	.914	.844	.845 ^{^^^}
Total utterances	.824	.712	.664 ^{^^}

n=21 sessions that were double coded by a primary coder and a second coder.

Note: All ICCs are Shrout & Fleiss ICC(2,1). ICC quality indicated by:

^{^^^} = Excellent,

^{^^} = Good.

%CT = percent change talk, i.e., (CT/(CT+ST))

Table 2

Pairwise reliability estimates

Behavior	Coders 1-2 (n=5)	Coders 1-3 (n=12)	Coders 1-4 (n=4)	Coders 2-3 (n=1)	Coders 2-4 (n=1)	Coders 3-4 (n=2)
Change	.920 ^{^^^}	.878 ^{^^^}	.826 ^{^^^}	.a	.a	.923 ^{^^^}
Sustain	.795 ^{^^^}	.975 ^{^^^}	.954 ^{^^^}	.a	.a	.a
%CT	.556 [^]	.899 ^{^^^}	.938 ^{^^^}	.a	.a	.548 [^]
Question	.800 ^{^^^}	.761 ^{^^^}	.727 ^{^^}	.a	.a	.a
Reflect	.680 ^{^^}	.877 ^{^^^}	.823 ^{^^^}	.a	.a	.554 [^]
Total utterances	.634 ^{^^}	.673 ^{^^}	.725 ^{^^}	.a	.a	.a

Note: N=25 total sessions that were double coded. All ICCs are Shrout & Fleiss ICC(2,1).

- ^^^ = Excellent;
- ^^ = Good;
- ^ = Fair;
- a = unable to compute.

Table 3

Examples of facilitator speech during the group sessions

Category	Example
Open question	What are some of the not so good things that can happen from using alcohol and drugs? What do you think teens like about drinking alcohol?
Closed question	Do you remember the survey you filled out that had questions about your drug and alcohol use? Are there situations when it is easier or harder to say no?
Reflections of change talk	T: When you're drinking, you do things you wouldn't normally do, like just the way you act. F: You would do things you wouldn't normally do and maybe things you would regret. T: For me, if I'm bored at a party, I would just say no. F: So being bored at a party, you would be a hundred percent confident saying no.
Reflections of sustain talk	T: All of your friends are doing it and it is kind of hard not to. F: So it is tough with all of the external pressure of friends and peer pressure. T: Finals, parents, your mind is always focused on it, it's never the good things. It's the bad things because you have to deal with it and it's something you don't want to do. Smoking and drinking just kind of lets you take a break from it. F: It feels like it's going to happen no matter what. It's out of your control, so you feel anxious and stressed about it, to get a break from that you use alcohol and drugs.
Affirmations	You bring up a good point. Those are all really great examples of external triggers.
Giving information	There is a lot of research that shows that when people use alcohol or drugs they have trouble seeing the whole picture around them that includes the consequences of their behaviors. The picture on the right has little to no activity in the brain and that is the fifteen year old who was a heavy drinker.

Note. F = Facilitator; T = Teen.

Table 4
Regression analyses examining the association between change and sustain talk and AOD outcomes

	Predictor					
	Mean Positive Change Talk			Mean Sustain Talk		
	Est	SE	P-Value	Est	SE	P-Value
Substance use						
Alcohol use past 30 days	−0.04	0.02	0.013	0.01	0.02	0.609
Heavy drinking past 30 days	−0.03	0.01	0.030	0.03	0.02	0.216
Marijuana use past 30 days	−0.03	0.02	0.230	0.06	0.03	0.081
Consequences						
Alcohol consequences	0.00	0.00	0.352	0.01	0.01	0.146
Marijuana consequences	0.00	0.00	0.868	0.01	0.001	0.187
Beliefs and motivation						
Intentions to use alcohol	−0.02	0.01	0.036	0.01	0.01	0.573
Intentions to use marijuana	−0.02	0.01	0.139	0.03	0.02	0.040
Alcohol benefit expectancies	−0.03	0.01	0.059	0.05	0.02	0.022
Marijuana benefit expectancies	−0.01	0.01	0.664	0.04	0.02	0.037
Motivation to change	−0.01	0.04	0.861	−0.11	0.05	0.018

Note: Estimates describe the effect of *one* change talk or sustain talk utterance on outcome. The mean total change talk score was 21.10 (sd 9.62), the mean total sustain talk score was 10.46 (sd 6.60)

Table 5

Transition matrix for MISC 2.5 behaviors.

Initial behavior	Subsequent behavior										
	Change	Sustain	Neutral	sMICO	MIIN	OQ	CQ	RCT	RST	Ref	Other
Change	0.20 [*]	0.05 [*]	0.04 [†]	0.10	0 [†]	0.10 [†]	0.04 [†]	0.37 [*]	0.01 [†]	0.03 [†]	0.05 [†]
Sustain	0.12 [*]	0.17 [*]	0.06 [†]	0.06 [†]	0 [†]	0.07 [†]	0.04 [†]	0.04	0.26 [*]	0.09 [†]	0.09 [†]
Neutral	0.01 [†]	0.01 [†]	0.17 [†]	0.12 [*]	0 [†]	0.09 [†]	0.07	0.01 [†]	0 [†]	0.34 [*]	0.17 [*]
sMICO	0.02 [†]	0.01 [†]	0.12 [†]	0.11 [*]	0.01 [*]	0.19 [*]	0.08 [*]	0.04	0.01 [†]	0.13	0.28 [*]
MIIN	0.03 [†]	0.01	0.16 [†]	0.17 [*]	0.06 [*]	0.17	0.05	0.01 [†]	0	0.05 [†]	0.29 [*]
OQ	0.18 [*]	0.05 [*]	0.60 [*]	0.01 [†]	0 [†]	0.07 [†]	0.04 [†]	0 [†]	0 [†]	0.01 [†]	0.03 [†]
CQ	0.09 [*]	0.04 [*]	0.58 [*]	0.04 [†]	0 [†]	0.06 [†]	0.06 [†]	0 [†]	0 [†]	0.03 [†]	0.09 [†]
RCT	0.33 [*]	0.02	0.07 [†]	0.17 [*]	0	0.21 [*]	0.06 [†]	0.05	0.01	0.01 [†]	0.07 [†]
RST	0.06 [†]	0.25 [*]	0.08 [†]	0.11	0	0.20 [*]	0.08	0.06	0.04 [*]	0.02 [†]	0.10 [†]
Ref	0.02 [†]	0.01 [†]	0.32 [*]	0.13 [*]	0	0.23 [*]	0.09 [*]	0.01 [†]	0 [†]	0.04 [†]	0.15 [*]
Other	0.02 [†]	0.01 [†]	0.2 [†]	0.13 [*]	0.01 [*]	0.23 [*]	0.14 [*]	0.02 [†]	0.01 [†]	0.06 [†]	0.17 [*]

Note. Transition matrix gives the probability that if the row category occurs, the very next utterance will come from the column category.

sMICO = sequential motivational interviewing consistent; MIIN = motivational interviewing inconsistent; RCT = reflection of change talk; RST = reflection of sustain talk; Ref = other reflection; Other = give information, raise concern.

* = significantly more likely than expected by chance ($p < .05$);

[†] = significantly less likely than expected by chance ($p < .05$)