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Using Topic Coding to Understand the Nature of Change Language in a Motivational Intervention to Reduce Alcohol and Sex Risk Behaviors in Emergency Department Patients

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Abstract

Objective—To elucidate patient language that supports changing a health behavior (change talk) or sustaining the behavior (sustain talk).

Methods—We developed a novel coding system to characterize topics of patient speech in a motivational intervention targeting alcohol and HIV/sexual risk in 90 Emergency Department patients. We further coded patient language as change or sustain talk.

Results—For both alcohol and sex, discussions focusing on benefits of behavior change or change planning were most likely to involve change talk, and these topics comprised a large portion of all change talk. Greater discussion of barriers and facilitators of change also was associated with more change talk. For alcohol use, benefits of drinking behavior was the most common topic of sustain talk. For sex risk, benefits of sexual behavior were rarely discussed, and sustain talk centered more on patterns and contexts, negations of drawbacks, and drawbacks of sexual risk behavior change.

Conclusions—Topic coding provided unique insights into the content of patient change and sustain talk.

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Conflict of Interest Statement

The authors have no relevant conflicts of interest to disclose.

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Practice Implications—Patients are most likely to voice change talk when conversation focuses on behavior change rather than ongoing behavior. Interventions addressing multiple health behaviors should address the unique motivations for maintaining specific risky behaviors.

Keywords

alcohol; sex risk; HIV; Motivational Interviewing; dialogue coding

1. Introduction

Coding patient language during health behavior counseling is an emerging method for understanding mechanisms responsible for behavior change, a necessary step for improving health behavior counseling [1–3]. The most widely employed system for coding patient language in health behavior counseling is the Motivational Interviewing Skill Code [MISC; 4]. The MISC codes patient language as reflecting either support for changing a target behavior (change talk) or for sustaining it (sustain talk) according to the tenets of Motivational Interviewing [MI; 5, 6–9]. The MISC has been applied primarily to alcohol-focused interventions [6, 10–12], but also to gambling [13], diet and nutrition [14], and sexual risk reduction [15] interventions. A meta-analysis indicated that the number of patient utterances coded as sustain talk and a composite measure of change and sustain talk (e.g., proportion change talk) are significant predictors of behavior change outcomes [16].

Typically, behavior change counseling covers a range of topics including a patient's pattern of behavior, consequences of that behavior and of behavior change, barriers and facilitators of change, and change plans. These topics are not captured in any depth by the MISC or related coding systems. For example, the MISC can code that a patient utterance is a reason to change but does not code the nature of that reason. Reasons to change could include drawbacks of ongoing behavior (e.g., hangovers) or benefits of potential behavior change (e.g., having more energy). They also could involve general appraisals of a behavior as negative or outside of peer norms. Although behavior change interventions can focus on a range of topics, it is unknown the extent to which conversations that focus on certain topics are more likely to involve change vs. sustain talk.

The extent to which certain topics arise during behavior change counseling and are likely to involve change vs sustain talk may differ based on the target behavior under discussion. Interventions that focus on multiple health behaviors are becoming increasingly common [17, 18]. If topics that predominate in change or sustain talk depend on the target behavior, then counseling content can be altered to anticipate the differential importance of specific topics for each behavior. Pairing MISC coding with topic coding may provide important insights into the nature of motivational content across different targeted behaviors.

1.1 Study Aims

This study examined how topics of discussion in a health behavior intervention relate to patient change language across two target behaviors, alcohol use and sex risk. We employed an extension of the Generalized Medical Interaction Analysis System (GMIAS), a conversation coding system that permits detailed investigation of patient-provider interaction

across various topics addressed in medical encounters [19–22]. For this project, we expanded the GMIAS topic coding structure to include a new category and subcategories of topics that capture content typically covered in a health behavior intervention; we refer to this adapted system as the Generalized Behavioral Intervention Analysis System (GBIAS). We applied the GBIAS and the MISC to audio recordings of a brief motivational intervention to reduce risky alcohol use and sexual behaviors with Emergency Department (ED) patients who reported concurrent heavy drinking and sexual behavior that increases risk for HIV infection.

2. Method

Data were drawn from a randomized clinical trial of an MI intervention targeting both alcohol and sex-risk behaviors, which demonstrated efficacy for reducing both behaviors relative to a brief advice control [23]. The project was approved by hospital and university institutional review boards. Patients aged 18–65 were recruited from two community hospital EDs. Eligibility criteria included: 1) total score of 8 (males) or 6 (females) on the Alcohol Use Disorders Identification Test [24] or endorsing at least one episode of binge drinking (5 drinks for males; 4 drinks for females) in the past three months; and 2) engaging in at least one sex-risk behavior in the past three months including consuming alcohol or other drugs prior to or during sex or having condomless sex with a non-steady partner or with a steady partner whose infidelity is questioned or known.

Patients completed screening, informed consent, and baseline assessment while in the ED, and those eligible were randomized to either MI or control. The current study includes only MI patients. One hundred eighty-four patients were randomized to receive MI, of which 168 (91.3%) completed the MI session. For this study, 90 audio recorded sessions were randomly selected for coding. The sample comprised slightly more females (59%) than males. The average age was 28.6 years ($SD = 9.2$). Most had a high school diploma/GED or higher (87%); 81.1% identified as White, 11.1% as Black, 3.3% as American Indian/Alaskan, and 4.4% as multiracial; 12.2% identified as Hispanic/Latino. Participants reported an average of 7.6 drinking days in the last month ($SD = 7.0$), consuming an average of 7.2 ($SD = 5.9$) drinks per drinking day, and having engaged in condomless sex 7.5 times ($SD = 8.1$) in the past month.

2.1 Motivational Interviewing (MI) Intervention

MI sessions were conducted at the hospital by 6 masters- and doctoral-level counselors. Counselors received 20 hours of training including didactic presentations, video and live demonstration, and role-play exercises. Group supervision was provided weekly via review of audiotapes with detailed feedback.

The manualized, one-session MI incorporated open-ended discussion of drinking patterns and sexual behaviors, exploration of pros and cons of drinking and of condom use, and personalized feedback on alcohol use and sexual risk behavior including normative comparisons. For patients interested in change, the objective was to establish goals for (a) reduced drinking or abstinence and (b) increased condom use, knowing the HIV status of

partners, and/or being in mutually monogamous relationships, and then to discuss barriers and facilitators of these changes. Sessions were audio recorded.

2.2 Coding Procedures

Data collection on de-identified and transcribed MI sessions proceeded in three passes, each conducted by a separate rater. During the first pass, transcripts were segmented into utterances defined as completed speech acts (or failed speech acts which received missing value codes); a speech act is an utterance that performs a specific function in communication such as representing a fact, expressing a feeling, or asking for information [25, 26]. Next, speech act and topic codes were assigned to each utterance. A third rater assigned MISC codes. Raters did not have access to participant baseline or outcome data. Coders had access to the full session in which the utterances occurred. They used their knowledge of the conversation preceding and immediately following each utterance to code the utterance's topic and its motivational significance.

Rater training—Raters received approximately 60 hours of training on each of the GBIAS and MISC systems. Training involved (a) didactic overview, including treatment- and coding-related readings, (b) group coding practice with corrective feedback, and (c) individual coding practice with group corrective feedback. Rater proficiency and ongoing project agreement for GBIAS coding was defined as a Cohen's kappa [27] of .80 or above at the integer level of both the speech act and topic coding taxonomies and .65 at the third decimal. Proficiency in the MISC was defined as two-way mixed-effects intraclass correlation coefficients [ICC] [28] of .75 or above.

Coding reliability procedures—Inter-rater reliability and agreement was assessed throughout data collection. After every fifth session was coded, one segment of at least 300 utterances was randomly chosen from the pool of completed interviews and assigned randomly to a second rater for reliability coding. Reliability and agreement statistics were computed, and disagreements were discussed in weekly meetings to achieve consensus.

2.3 GBIAS Coding

The GBIAS assigned each patient and counselor utterance a speech act code and a topic code. We focus here only on the topic coding system. The GBIAS built off of the hierarchical topic coding system in the GMIAS and included integer-level topic codes (e.g., 1.0, 9.0) for the broad categories of *Biomedical*, *Logistics*, *Socializing*, and *Psychosocial* topics with decimal-level codes providing additional specificity (e.g., 9.1 for *Psychosocial – recovery of others in the patient's social network*). For this paper, those codes were aggregated into “other” non-target behavior-focused discussion.

In addition to the non-target behavior-focused topic codes noted above, the GBIAS included a novel taxonomy for hierarchically categorizing topics relevant to behavior change counseling. Whenever alcohol or sex was discussed, topic codes within the category of 2.0 (*Intervention Targeted Behaviors*) were used (see Figure 1), with a separate code specifying whether the target behavior was alcohol or sex. We developed the subcategories of topics within category 2.0 based on the expert opinion of project investigators regarding the topics

that are typically the focus of behavior change counseling. The categories were chosen to be applicable to both alcohol and sex risk reduction. We developed definitions and coding rules for distinguishing between topic categories and then refined these coding rules iteratively in weekly investigator and staff meetings.

Within category 2.0, we defined decimal codes to depict increasing levels of specificity about the topic of the utterance. Coders used the content of the utterance and the context of the conversation in which it occurred to determine the level of specificity at which they could code that utterance. As shown in Figure 1, there were four categories within topic code 2.0 that were captured by the first decimal (2.1–2.4) with 2.5 representing a rarely used category involving purely didactic content (e.g., “Condoms are made of latex”). The second and third decimals provided increasing levels of specificity about the topic of the utterance when such details were present in the utterance itself or were discernible from the surrounding context. Examples of patient utterances for specific 2.0 topic codes are presented in Table 1.

Topic code 2.1 (*Patterns and Contexts*) refers to conversations about a patient’s behavior pattern (how much and how often) including the contexts in which the behavior occurs and including judgments of the behavior (i.e., as positive or negative) and normative comparisons (i.e., comparing one’s drinking to others drinking). Topic 2.2 (*Barriers and Facilitators of Change*) refers to conversation about personal and social/environmental factors that impede or facilitate change, as opposed to conversation about anticipated positive or negative consequences of change, which would be captured in category 2.3 (*Consequences and Motives*). Topic code 2.3 refers to conversation about potential consequences of a target behavior and target behavior change. Codes 2.3 includes second decimal codes for the benefits (2.31) and drawbacks (2.32) of engaging in the target behavior and the benefits (2.33) and drawbacks (2.34) of target behavior change. The third decimal provides greater specificity within each category. For example, code 2.314 applies when a patient says that s/he likes to drink alcohol to reduce sexual inhibition. Many consequences of a behavior change (e.g., saving money from drinking less) can be the converse of the consequences of the target behavior (e.g., spending excessively on alcohol). Whether an utterance was coded as a consequence of behavior change or a consequence of the target behavior itself was determined by the context of the utterance. For an utterance to be coded as a consequence of behavior change, the patient had to be discussing explicitly potential consequences of changing the target behavior.

Each utterance within 2.0 was coded based on *a priori* categories of topics depicted in Figure 1 regardless of whether the utterance referred to the patient’s own behavior. For example, the utterance “Some people act ridiculous when they drink” would be coded as 2.322 (social drawback of drinking) even though the patient is not indicating that they have experienced this particular consequence. The motivational significance of each utterance was captured independently by the MISC code.

2.4 MISC Coding

Patient and counselor utterances were coded with the MISC version 2.5 [30]. Patient utterances were coded for change talk (CT) or sustain talk (ST) in one of seven categories:

Desire, Ability, Reasons, Need, Commitment, Taking Steps, and Other. Utterances received a neutral code if they did not focus on a target behavior or did not have clear motivational significance as either supporting change or sustaining behavior. Utterances could be coded as CT or ST regardless of the topic within the 2.0 category on which they centered. For example, if a patient expressed that a negative consequence of sexual behavior was unlikely to happen, that utterance was coded as ST and given a topic code of 2.32 (*Drawbacks of the Target Behavior*). In this way, CT and ST could arise in the course of discussing any topic within 2.0. Table 1 provides examples of patient utterances about alcohol use or sex risk that received CT or ST MISC codes within each topic; the counselor questions that preceded these utterances are shown to provide context for the utterance since that helps determine topic and MISC coding.

2.5 Coding Reliability

Eighteen tapes were randomly selected for double-coding with the GBIAS, and 19 tapes were chosen for double coding with the MISC. For topic codes, the mean kappas were .80, .72, .67, and .63 at the integer and first, second, and third, decimal levels, respectively. The mean kappa for coding the target behaviors under discussion was .95. For the MISC double coding of patient utterances kappa was .79. These results indicate substantial agreement at all levels of the coding taxonomies applied [30].

2.6 Data Analysis Plan

We first calculated the number of patient utterances coded within the 2.0 topic category that referred to *Patterns and Contexts*, *Barriers and Facilitators*, *Consequences and Motives* (broken down by benefits and drawbacks of the target behavior and of target behavior change), and *Change Planning*. To examine whether specific topics were particularly likely to involve CT or ST, we calculated the proportion of utterances on each topic that received CT, ST, or neutral MISC codes. We then examined the content of CT and ST by calculating the proportions of alcohol and sex risk CT and ST utterances that were given each topic code. Finally, to examine whether the number of utterances on each specific topic code correlated significantly with the number of utterances coded as CT or ST, and whether this differed for alcohol and sex discussions, we calculated partial correlations between topic code and MISC code counts that adjusted for the total number of utterances on each respective target behavior; Spearman rank-order correlations were used due to positive skew on many variables.

3. Results

3.1. Topic Code Frequencies

The second column of Table 2 shows the median number of utterances that received specific topic codes within 2.0 broken down by the target behaviors of alcohol use and sex risk. Overall, a substantially higher number of utterances concerned alcohol use compared to sex. Discussions of sexual consequences of drinking (e.g., increasing sexual pleasure or contributing to regretted experiences) were coded with alcohol use as the target behavior and comprised 2.4% of utterances on alcohol. For both behaviors, the most common topic codes were *Patterns and Contexts* and *Drawbacks of the Target Behavior*.

3.2. Proportion of Topic Codes Receiving CT, ST, and Neutral MISC Codes

The third through fifth columns in Table 2 show how utterances within each topic were coded using the MISC. The median percent of utterances rated as “neutral” ranged from 42.9% to 82.7% across the topics, indicating that most patient talk on a given topic lacked clear motivational content as either CT or ST. For both target behaviors, *Drawbacks of the Target Behavior*, *Benefits of the Target Behavior*, and *Change Planning* were much more likely to be coded as CT than ST. The topic *Drawbacks of Target Behavior Change* was far more likely to involve ST than CT, but utterances on this topic were rare. For alcohol, the topic *Benefits of Target Behavior* was also more likely to involve ST than CT; for sex, this topic was rarely discussed and when discussed was generally neutral.

3.3. Topic Code Composition of the Total CT and Total ST Utterances

Figure 2 shows the percentages of CT and ST utterances that received each topic code. CT for alcohol most often centered on *Drawbacks of the Target Behavior*, with a substantial amount also focusing on *Change Planning* and *Patterns and Contexts*. ST mostly occurred during discussions of *Benefits of the Target Behavior* and *Patterns and Contexts* (e.g., statements indicating satisfaction or lack of concern with current drinking pattern), but it also occurred during discussion of *Drawbacks of the Target Behavior*. CT for sex risk was relatively evenly distributed among the topics of *Patterns and Contexts*, *Drawbacks of the Target Behavior*, and *Change Planning*, but also often involved discussions of the *Benefits of Target Behavior Change*. ST for sex risk centered most often on *Patterns and Contexts* or negation of *Drawbacks of the Target Behavior*. *Drawbacks of Target Behavior Change* was the next most common topic of sex risk ST.

3.4. Correlations between topic code and MISC codes counts

Table 3 shows the partial correlations between the number of patient utterances dedicated to each topic code and the number of utterances MISC-coded as either change or sustain talk, broken down by alcohol and sex, partialing out the total number of utterances dedicated to alcohol or sex, respectively. For both alcohol and sex, number of utterances dedicated to *Barriers and Facilitators*, *Benefits of Target Behavior Change*, and *Change Planning* were significantly positively correlated with number of CT utterances. When sex was the target behavior, the number of utterances dedicated to *Patterns and Contexts* was significantly negatively correlated with number of CT utterances.

When alcohol was the target behavior, only number of utterances dedicated to *Benefits of the Target Behavior* was significantly positively correlated with number of ST utterances, while number of utterances on *Benefits of Target Behavior Change* was negatively correlated with ST. When the target behavior was sex, number of utterances on *Patterns and Contexts* and on *Drawbacks of Target Behavior Change* were significantly positively correlated with number of ST utterances, whereas number of utterances on *Change Planning* was significantly negatively correlated with number of ST utterances.

4. Discussion and Conclusion

4.1 Discussion

This study demonstrated application of the newly developed Generalized Behavioral Intervention Analysis System (GBIAS) to the coding of sessions of an efficacious MI intervention that reduced both alcohol use and sexual risk behaviors [23]. Using the GBIAS, we reliably coded categories and subcategories of topics on which alcohol- and sex-related conversations focused. As described below, topic codes provided novel information about the content of the MI intervention that cannot be provided through MISC coding. Our results elucidate the associations between specific topics and client change and sustain talk (CT and ST, respectively), and reveal potentially important differences in the nature of ST for alcohol vs. sex risk.

A key study question was whether specific topics of discussion around a target behavior were more likely to involve CT or ST and whether that differed based on the behavior discussed. For both alcohol and sex risk, the number of utterances that focused on the topics of *Barriers and Facilitators*, *Benefits of Target Behavior Change*, and *Change Planning* was significantly and positively associated with the number of utterances coded as CT. Thus, counseling sessions that centered more on topics directly related to change contained more CT. Patient discussions of *Benefits of Target Behavior Change* and *Change Planning* were especially likely to involve CT. *Drawbacks of the Target Behavior* was a common topic for both alcohol and sex risk discussions and was coded as CT far more often than ST. However, this topic code was not significantly associated total CT in the session, indicating that greater discussion of drawbacks of a target behavior does not necessarily translate into greater discussion of topics directly related to change such as change planning. Also, *Drawbacks of the Target Behavior* constituted about one fifth of the ST for both alcohol use and sex risk; such utterances typically involved negating potential negative consequences of current behavior. Overall, because sessions often focused heavily on the drawbacks of current behavior, such discussions were important sources of both CT and ST.

Notable differences emerged regarding alcohol vs. sex-risk ST—For alcohol use, number of utterances on *Benefits of the Target Behavior* correlated significantly and positively with number of ST utterances. This topic was more likely to be coded as ST than CT and made up almost half of alcohol ST utterances. By contrast, *Benefits of the Target Behavior* was a very rare topic for sex discussions with more than 50% of sessions not addressing this topic. For sex, number of utterances on *Drawbacks of Target Behavior Change* correlated positively with ST utterances, and this topic made up a substantial portion of sex risk ST. These results suggest that the categories of motivations for sustaining current behaviors may have differential importance for alcohol use compared to sexual behavior. These results also may reflect the fact that MI for alcohol use explicitly asks patients to discuss what they like about drinking, whereas MI for sex risk often focuses more on condom use than on sex itself. Future research should address whether focusing on positive aspects of drinking in alcohol MI is useful and whether sex risk MI would benefit from more discussion of positive aspects of sex.

For both alcohol and sex discussions, utterances on *Patterns and Contexts* were coded as neutral more than three-quarters of the time. However, because these utterances were particularly common, they made up a meaningful proportion of both CT and ST, reflecting that patients could evaluate their behaviors either positively or negatively. For sex but not alcohol discussions, more utterances on *Patterns and Contexts* was associated with less overall CT and more ST, and more utterances about *Change Planning* was associated with less ST. These results suggest that for sex risk, in particular, sessions characterized by high levels of ST and low levels of CT are likely to focus more on current behavior than on possible behavior change. An important question for future research is whether there are counselor techniques that help guide discussion away from describing behavior and towards behavior change even when patients are expressing a high amount of ST.

Limitations—This study was limited to ED patients who are not seeking counseling for either behavior. Also, different results may be found in samples where the relative importance of alcohol vs. sex-risk behaviors may be different, such as in those living with HIV, younger populations, sexual minority populations, and patients seen in other clinical contexts.

4.2 Conclusion

Coding topics in an MI intervention focused on two target behaviors provided unique insights into the content of these discussions. Results suggest that although motivation for change may show commonalities across health behaviors, motivation for not changing may depend on the type of behavior discussed. An important question for future research is whether CT and ST focused on specific topics are more predictive of future behavior change than overall sums of CT and ST across a session. It also will be valuable to determine whether particular counseling techniques are more likely to elicit CT and less likely to elicit ST based on the topic of discussion. Finally, it will be valuable to examine if certain patient characteristics predict how sessions focus on particular topics and to study qualitatively the content of specific topics, such as identifying common barriers to change or the most common benefits of change.

Practice Implications

The current study provides insights counselors can consider when discussing alcohol use and sex. For both behaviors, discussion focusing on potential behavior change and its benefits is likely to include CT and rarely results in ST; therefore counselors may want to guide more discussion toward these topics. Likewise, counselors may consider how much discussion should focus on positive aspects of alcohol use; although such discussion provides valuable understanding of patients' motivations, it also is the greatest source of ST. Furthermore, counselors discussing sex risk should be prepared to address the potential drawbacks of protective sexual behaviors and negation of the risk of ongoing sexual behaviors since these are common sources of ST. Future research can aid further refinement of targeted discussion in multi-target brief intervention by examining which counselor behaviors are most effective in eliciting talk supporting change.

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Highlights

- Greater discussion of drawbacks of a behavior does not predict more change talk
- Discussions of benefits of a behavior change often elicit support for change
- Patient talk supporting behavior change has similar focus for alcohol vs. sex risk
- Talk supporting sustaining a behavior differs in its focus for alcohol vs. sex risk

Figure 1.
Topic coding structure for utterances involving an intervention targeted behavior.

Figure 2.

Boxplots showing the percent of change and sustain talk utterances around alcohol and sex risk, respectively, that were assigned specific target behavior topic codes. P/C = patterns and contexts. B/F = barriers and facilitators. BB = benefits of the behavior. DB = drawbacks of the behavior. BBC = benefits of behavior change. DBC = drawbacks of behavior change. CP = change planning.

Table 1

Topic code examples by MISC category

Topic Code	Example: Patient Talk Coded as Change Talk		Example: Topic Coded as Sustain Talk	
	Counselor Question	Patient Response	Counselor Question	Patient Response
2.1 – Patterns & Context	“When you see that you are drinking more than 97% of men your age, what are your thoughts?”	“... That makes me seem like a lush”	“That means you drink more often than 82% of men your age. What do you think about it?”	“...I only drink occasionally, so I don't think I have a problem with it.”
2.2.1 Barriers to Change	“What obstacles do you maybe see getting in the way of using condoms?”	“I don't think there's any obstacles.”	“What might some of those obstacles [for using condoms] be for you?”	“Sometimes it's hard because there's two people involved and it's their opinion too.”
2.2.2 Facilitators of Change	“What gives you hope that you can cut down on your drinking?”	“...If I drink one day, [my friends] keep an eye on me the next day to see if I drink.”	“So thinking about moving forward with these changes, who do you see as being able to help you out with this?”	“... I mean I don't have many friends who don't drink, so I can't really count on them to support me.”
2.3.1 Benefits of target behavior	“Why hasn't it been so important for you to use condoms?”	“It's hard to think of anything good about not using them right now.”	“What are some of the things that go into that decision not to wear them [condoms]?”	“Well you know mostly it's for them, to keep them happy”
2.3.2 Drawbacks of target behavior	“Can you tell me more about what some of the not-so-good things about drinking are for you?”	“Well, like I said, hangovers are the worst?”	“How does it sit with you, that you could be jeopardizing your health by drinking like this?”	“... I'm taking good care of myself other than the drinking.”
2.3.3 Benefits of target behavior change	“I'm wondering what it might be like for you to make this change.”	“What's gonna feel good is knowing that we had sex and were safe instead of having to go to the doctor.”	“How important do you think it is to protect yourself from getting sick?”	“Honestly, I'm probably only going to live another couple of years anyway, so who cares?”
2.3.4 Drawbacks of target behavior change	“How might [your friends] respond if you shared some of your concerns and your plan with them.”	“...I don't think I would care about what they would say or what they'd think...”	“What's getting in the way of you wanting to make this change [reducing drinking]?”	“...I don't want to be that weird guy in the corner who can't have a drink.”
2.4 Change Planning	“Where does all this leave you sitting as far as having that conversation about getting tested with your partner?”	“Oh, I'm going to have that conversation again with him whether he wants to or not.”	“How are you feeling about your condom use as you move forward?”	“...It's just not something I plan on doing.”

Table 2

Number of Utterances Receiving a Given Topic Code within Alcohol and Sex Risk Discussions and the Median Proportions of Those Utterances Coded as Change Talk, Sustain Talk, or Neutral.

GBIAS topic codes	# of Utterances Median (25 th , 75 th percentile)	Median Proportions of MISC codes with Each Topic		
		% Change talk (alcohol)	% Sustain talk (alcohol)	% Neutral (alcohol)
Alcohol Use				
2.1: Patterns & Contexts	85.5 (61.8, 112.3)	11.7%	6.7%	81.1%
2.2: Barriers & Facilitators	13.0 (1.8, 27.5)	22.1%	11.1%	61.5%
2.31: Benefits of target behavior	40.5 (29.0, 69.0)	5.3%	33.9%	57.9%
2.32: Drawbacks of target behavior	145.5 (104.8, 213.5)	27.2%	4.2%	65.7%
2.33: Benefits of target behavior change	10.0 (4.0, 22.3)	50.0%	0.0%	50.0%
2.34: Drawbacks of target behavior change	0.0 (0.0, 4.0)	0.0%	25.0%	71.4%
2.4: Change Planning	52.0 (19.8, 81.5)	41.5%	3.0%	54.4%
Sex	Median (25 th , 75 th percentile)	% Change talk (sex)	% Sustain talk (sex)	% Neutral (sex)
2.1: Patterns & Contexts	37.0 (23.8, 55.3)	14.6%	7.8%	78.0%
2.2: Barriers & Facilitators	0.0 (0.0, 1.0)	16.2%	12.5%	56.8%
2.31: Benefits of target behavior	0.0 (0.0, 3.3)	0.0%	0.0%	82.7%
2.32: Drawbacks of target behavior	21.5 (11.8, 43.5)	24.2%	8.7%	65.2%
2.33: Benefits of target behavior change	5.0 (0.0, 12.3)	50.0%	0.0%	50.0%
2.34: Drawbacks of target behavior change	3.0 (0.0, 8.0)	0.0%	31.6%	57.7%
2.4: Change Planning	9.0 (2.0, 20.0)	47.1%	0.0%	42.9%

Note. % Change Talk, % Sustain Talk, and % Neutral are the median percentages of each respective topic code that received those MISC Codes.

Table 3

Partial Spearman Correlations between Counts of GBIAS Topic Codes and MISC Codes by Target Behavior

GBIAS topic codes	MISC codes	
<u>Alcohol Use</u>	Change talk (alcohol)	Sustain talk (alcohol)
2.1: Patterns & Contexts	−0.04	0.20
2.2: Barriers & Facilitators	0.35 **	−0.09
2.31: Benefits of target behavior	−0.18	0.30 **
2.32: Drawbacks of target behavior	−0.13	−0.10
2.33: Benefits of target behavior change	0.37 **	−0.23 *
2.34: Drawbacks of target behavior change	−0.06	−0.06
2.4: Change Planning	0.40 ***	−0.05
<u>Sex</u>	Change talk (sex)	Sustain talk (sex)
2.1: Patterns & Contexts	−0.45 ***	0.23 *
2.2: Barriers & Facilitators	0.39 **	−0.08
2.31: Benefits of target behavior	−0.10	0.02
2.32: Drawbacks of target behavior	−0.17	−0.10
2.33: Benefits of target behavior change	0.51 ***	−0.12
2.34: Drawbacks of target behavior change	0.04	0.28 **
2.4: Change Planning	0.51 ***	−0.28 **

Note. Correlations partial out the number of utterances on the given target behavior (i.e., alcohol or sex).

*
p<.05;

**
p<.01;

p<.001