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# A Novel Application in the Study of Client Language: Alcohol and Marijuana-related Statements in Substance-Using Adolescents during a Simulation Task

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## Abstract

The current study explored whether laboratory-based techniques can provide a strategy for studying client language as a mechanism of behavior change. Specifically, this study examined the potential of a simulation task to elicit healthy talk, or self-motivational statements in favor of healthy behavior, related to marijuana and alcohol use. Participants ($N$ = 84) were adolescents reporting at least 10 lifetime substance use episodes recruited from various community settings in an urban Pacific Northwest setting. Participants completed the Adolescent Simulated Intoxication Digital Elicitation (A-SIDE), a validated paradigm for assessing substance use decision making in peer contexts. Participants responded to four types of offers in the A-SIDE: 1) marijuana, 2) food (marijuana control), 3) alcohol, and 4) soda (alcohol control). Using a validated coding scheme adapted for the current study, client language during a structured interview assessing participants' response to the simulated offers was evaluated. Associations between percent healthy talk (PHT: calculated by dividing the number of healthy statements by the sum of all substance-related statements) and cross-sectional outcomes of interest (previous substance use, substance use expectancies, and behavioral willingness) were explored. The frequency of substance-related statements differed in response to offer type; rate of PHT did not. PHT was associated with behavioral willingness to accept the offer. However, PHT was not associated with decontextualized measures of substance use. Associations between PHT and global expectancies were limited. Simulation methods may be useful in investigating the impact of context on self-talk and to systematically explore client language as a mechanism of change.

### Keywords

change talk; adolescents; alcohol; marijuana; simulation task

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## Introduction

Multiple theoretical perspectives identify the importance of client language on behavior (e.g., Bem, 1972; Ellis, 1976; Meichenbaum, 1977). Miller and Rollnick (2004) state "language is the presumed medium of change in all 'talk therapy'" (p. 300) and in-session language is thought to reflect a number of underlying psychological processes. Recently, considerable research has been dedicated to better understanding client language, or verbal statements about a target behavior, as a mechanism of behavior change. When considering current behavior, a person may offer language anywhere along a spectrum where, on one end, they make statements that favor maintaining the status quo and, on the other, they make statements that support making a change. When an individual is ambivalent, they presumably will offer statements for both change and maintenance. These two dimensions of client language are often defined as change talk (CT), or self-motivational statements favoring healthy behavior change, and its counterpart, sustain talk (ST: also known as counterchange talk). Although mostly studied within substance use intervention settings using motivational interviewing (MI: Miller & Rollnick, 2013), these measures of client language seems to act as a mechanism of change in other therapeutic modalities (Lombardi, Button, & Westra, 2014; Moyers et al., 2007) and other behavioral outcomes, such as gambling (Hodgins, Ching, & McEwan, 2009) and anxiety (Lombardi et al., 2014).

There is empirical support that greater CT predicts greater reductions in post-treatment substance use (Amrhein, Miller, Yahne, Palmer, & Fulcher, 2003; Moyers et al., 2007; Moyers, Martin, Houck, Christopher, & Tonigan, 2009); however, inconsistent findings have been noted (Magill et al., 2014). In a recent pilot study attempting to examine the causal role of hypothesized mechanisms of change by experimentally disaggregating the components of MI, limited support for CT as a mechanism of change was reported (Morgenstern et al., 2012). Given the mixed evidence for client language as a mechanism of behavior change, the concept of a conditional model wherein categories of client language may be more effective under certain conditions or contexts has been raised (Magill et al., 2015).

One such condition may be setting. To date, the vast majority of studies on dimensions of client language have occurred in treatment settings where change is the objective (at least from the researcher/clinician perspective). However, considerable behavior change occurs outside of the therapeutic milieu (Epstein et al., 2005; Willenbring, 2007). Therefore, it is important to gain an understanding of client language across multiple settings and conditions. For example, in other settings, such as prevention contexts, health behavior *change* may not always be the goal. Instead, sometimes promoting maintenance of low risk behavior is the target. In fact, the overreliance of many health behavior theories on behavior change fail to address behavior maintenance (either before an unhealthy behavior manifests or after a pro-health change has been established) as an important component of health promotion (Rothman, 2000). Thus, the traditional constructs of CT and ST may require modification to address the differences in prevention contexts or other settings where behavior change is not the stated purpose. An initial examination of broader CT and ST definitions suited for the prevention setting demonstrated preliminary reliability and validity of such an approach (Ladd, Tomlinson, Myers, & Anderson, 2016). The modified constructs of client language consisted of healthy talk, or statements promoting reductions in or

abstinence from alcohol and drugs, and its counterpart, unhealthy talk. Not only may definitions of client language appropriate to non-treatment settings be useful for studying client language in multiple health service settings, but it also may expand the scope of the study of such mechanisms as they occur outside of treatment, an important aspect for studying mechanisms of change (Nock, 2007).

Another potential shortcoming of studying client language as a mechanism of behavior change exclusively in intervention settings, whether considered during prevention or treatment, is that client language is assessed decontextualized from the proximal decision-making process (i.e. during a therapy or prevention session), and thus is captured through reflective, reasoned self-exploration. However, the prototype-willingness model (Gerrard, Gibbons, Houlihan, Stock, & Pomery, 2008; Gibbons & Gerrard, 1995) posits two pathways towards risk behavior—the traditional path of planned, reasoned action and a non-deliberative, social reaction pathway. In this second pathway, behavioral willingness (BW), or the openness to engaging in a behavior given the opportunity to do so (Pomery, Gibbons, Reis-Bergen, & Gerrard, 2009), is a proximal variable embedded within the social context. BW is predictive of subsequent behavior in individuals with limited experience with the target risk behavior (Andrews, Hampson, & Peterson, 2011; Gerrard et al., 2006) and offers unique prediction of behavior beyond behavioral intention (Gibbons, Gerrard, Blanton, & Russell, 1998). With maturation and relevant experience, the reasoned pathway grows in influence; adolescents are particularly susceptible to the social reaction pathway when it comes to initiating and establishing risk behaviors such as substance use (Anderson, Garcia, & Dash, 2016). Additionally, the therapeutic setting is inherently noisy (e.g., therapist effects, individual differences) and limits the empirical rigor with which client language can be studied.

One potential viable methodology to overcome some of the limitations in the study of client language is laboratory simulation. Laboratory simulations can serve as analogs to naturalistic behavior and provide measures to test theory with greater sensitivity and control (Anderson, Duncan, Buras, Packard, & Kennedy, 2013; Anderson & Parent, 2007). Simulations can assess behavior embedded in various contexts, such as those involving one's peers, improving the study of contextualized decision making. In terms of studying client language, think-aloud paradigms in response to simulated scenarios reliably and validly elicit language related to a range of psychological topics (Zanov & Davison, 2010), as do interviews following simulation exposure (Anderson et al., 2013). Using simulation methods to study client language as a mechanism of behavior change has yet to be explored.

Although sacrificing some ecological validity, laboratory paradigms may offer some unique advantages in the study of client language. There is a need to enhance the experimental rigor with which mechanisms of change research is conducted (Morgenstern et al., 2012; Nock, 2007); if participant language consistent with CT and ST can be elicited in response to a laboratory simulation, it may offer an opportunity to experimentally manipulate variables associated with client language. Such experimental control is difficult to establish in the noisy therapeutic environment and can significantly contribute to the existing research that has relied on associational mediation analyses rather than experimental manipulation (Spencer, Zanna, & Fong, 2005). Additionally, such paradigms could allow more rigorous

study of baseline characteristics related to expression of different categories of client language. Pre-existing client characteristics have not been examined extensively, despite the recognition such variables are likely influential in the expression of CT and ST (e.g., Magill et al., 2015).

The current study examined the potential of a specific simulation task, the Adolescent Simulated Intoxication Digital Elicitation (A-SIDE), to elicit self-directed statements supporting healthy behavior in response to social decision-making contexts. Anderson and colleagues (Anderson et al., 2014; Anderson & Parent, 2007) developed and demonstrated the utility of the A-SIDE, a paradigm in which participants view scenes simulating typical substance (alcohol or marijuana) offers from peers and report their BW to accept such offers. BW to use substances was correlated with concurrent substance use, drinking motives, and marijuana expectancies (Anderson et al., 2014). The A-SIDE provides one avenue for examining substance-related client language outside the therapeutic context; thus, the goal of the current investigation was to explore whether adolescents provide spontaneous language based on modified constructs of CT and ST adapted to settings where health behavior change may not be the context for conversation. The modifications of CT and ST in the present study were consistent with recent research examining the role of client language in prevention settings where the desired outcome may or may not be behavior change based on the individual's current risk level (Ladd, Tomlinson, Myers, & Anderson, 2016). We hypothesized that the simulation would evoke statements promoting healthy and unhealthy substance use from participants and rates of healthy and unhealthy talk would be greater during substance use offers compared to non-substance control offers.

As a preliminary investigation of individual characteristics that may influence the expression of verbal behavior related to substance use, the current study also aimed to examine the role of client language on the decision-making process by testing relationships between client language and: a) relatively distal variables of decision-making, specifically previous substance use and global substance-related expectancies and b) a more proximal measure of decision-making, BW. The definitions of client language employed in the current study have been associated with baseline alcohol use in a group drug and alcohol prevention setting (Ladd et al., 2016). For the present investigation, we hypothesized that healthy talk would be negatively associated with previous substance use. We also hypothesized that healthy talk in response to specific situations would be negatively correlated with positive substance-related cognitions, specifically global self-reported use expectancies. For the test of contextually-based language and measures of decision-making processes, we expected that healthy talk would be negatively associated with BW, given previous research showing greater motivation reduces the relative weight of non-deliberative factors (Olson & Fazio, 2004).

## Method

### Participants

The current study utilizes data from the initial validation study for the A-SIDE (Anderson et al., 2014). Adolescent participants ($N = 84$), recruited from high schools, community centers, and substance use treatment programs in the US Pacific Northwest, reported a minimum of 10 lifetime alcohol and/or marijuana use episodes. Exclusions included current

psychosis, social anxiety disorder, or an eating disorder, given potential biases against social interactions or the consumption of food in these conditions. Among the 83 participants for whom demographic data were available, participants ranged from 14 to 18 ($M$ = 16.9, $SD$ = 0.8) years of age, commonly self-identified as female ($n$ = 50; 60.2%) and White ($n$ = 66; 79.5%). Twenty-seven participants met DSM-IV-TR criteria for a substance use disorder (32.5%) and 21 (25.3%) were currently in some form of substance use treatment.

## Procedure

Participants were recruited from the community via fliers and presentations encouraging interested individuals to contact research staff about a study investigating adolescent decision making around substance use. Parental consent and youth assent were obtained for all participants. Only participants who completed study measures and tasks during two assessment sessions (roughly three weeks apart) were included in these analyses. All study procedures were approved by the relevant IRB. During the first assessment, participants completed a battery of self-report questionnaires collecting demographic, lifetime and recent substance use, and substance-related cognition data. During the second assessment, participants completed the ASIDE protocol (Anderson et al., 2014). Participants were oriented to the task via training vignettes and then instructed to imagine they were actually in the simulated scenarios. Participants responded to 12 video scenes, presented in random order, representing four types of offers from peers: 1) marijuana (MJ), 2) chips/candy (food), 3) alcohol, and 4) soda. Food served as a MJ control, and soda served as an alcohol control. For additional details on the development and validation of the A-SIDE, see Anderson and Parent (2007) and Anderson et al. (2014).

After viewing all 12 scenes, participants were queried about their thoughts and feelings in response to each scene in a structured interview conducted by a same-gender research assistant designed to assess social information processing and decision-making. The interview consisted of a set of questions that were repeated for each scene, thereby providing a relatively uniform opportunity to provide verbal statements across participants and scenes. Some sample items from the interview include: “Tell me what you think is going on here” and “What do you want to have happen? Why?” Participants’ responses were audio-recorded and transcribed for coding. Due to legal and ethical considerations, audio recordings were kept for a minimal amount of time and were destroyed immediately after transcription.

## Measures

**Healthy and Unhealthy Talk—**Participant language was rated by four trained coders using the Client Language Easy Rating Coding System (CLEAR: Glynn & Moyers, 2012). Adapted from the Motivational Interviewing Skill Code (Miller, 2000), the CLEAR system is designed to categorize client language into three categories. Due to the nature of the study (i.e. verbal behavior was not elicited in the context of behavior change) and of the sample (a wide range in terms of use from experimental to heavy), we modified the traditional constructs of CT and ST slightly. Change talk was re-conceptualized as healthy talk, or statements promoting reductions in or abstinence from alcohol and drugs. The counterpart of healthy talk was coded as unhealthy talk, or statements promoting or supporting alcohol and

drug use. Neutral statements captured statements that did not fall into the healthy or unhealthy categories. The adapted CLEAR system is relatively simple compared to other behavioral coding systems, while still providing an important summary variable similar to percent change talk, which has been linked to behavior and has been reported previously (e.g., Barnett et al., 2014; Moyers et al., 2009). This summary variable, called percent healthy talk (PHT) for the current study, was calculated using the number of healthy and unhealthy statements in a scene with the following formula:

$$\mathrm{PHT} = (\#\,\text{of healthy statement} / [\text{sum of healthy} + \text{unhealthy statements}]) * 100$$

A higher PHT indicates a greater number of statements in favor of pro-health behavior relative to the total number of substance-related statements. A single target behavior was adopted for the current study and was defined as reducing/abstaining from alcohol and illicit drug use, which did not vary from one type of scene to another. Examples of healthy talk include: “I don’t want to smoke. Ever.” and “I’m not that big a fan of beer”; examples of unhealthy talk include: “Drinking with more people can be fun” and “I would probably smoke it because it was offered to me.” Example of neutral statements include: “I’d probably eat the chips” and “I’d ask them more about this new boy who played basketball.”

Coder training occurred through several steps. First, coders reviewed the coding manual as a group. Next, coders were oriented to the individual codes and practiced identifying healthy talk, unhealthy talk, and neutral statements using worksheets containing examples of client language. Finally, coders coded practice transcripts and discussed discrepancies as a team. On an ongoing basis, coders rated the same set of randomly-selected transcripts to minimize coder drift; coders were blind to which transcripts were included within the reliability sample ($n$ = 19; 23% of the sample). As mentioned previously, ethical and IRB considerations precluded the coding of audio recordings. Thus, all coding occurred from the written transcripts.

**Behavioral Willingness—**BW to accept the offer in each scene was rated by research staff with no training on the CLEAR system based on the participants’ response to the question, “What do you want to have happen in this scenario?” This BW measure has been associated with concurrent alcohol and marijuana use in adolescents (Anderson et al., 2014). BW was dichotomized as yes (1) or no (0) and summed across the three scenes of the same offer type (e.g., beer, hard liquor = alcohol; candy, chips = food), resulting in a possible range of 0–3 for each offer type. Each scene was rated by two raters; interrater agreement was acceptable ($\kappa$ = 0.82). On average ($SD$), participants accepted 1.2 (1.1) alcohol offers and 0.6 (1.0) marijuana offers.

**Alcohol Expectancies—**Alcohol expectancies were assessed using the Adolescent Alcohol Expectancy Questionnaire (AEQ-A), a self-report measure assessing global expectancies independent from contextual factors on seven subscales: global positive changes, social behavior enhancement, cognitive-behavioral enhancement, sexual enhancement, cognitive-behavioral impairment, increased arousal, and relaxation/tension-reduction (Brown, Christiansen, & Goldman, 1987). These scales have demonstrated

acceptable reliability and validity (Brown et al., 1987); reliability was acceptable in the current sample ($\alpha$s = .72–.87). Items were rated on a five point Likert scale (1 = disagree strongly to 5 = agree strongly).

**Marijuana Expectancies—**Marijuana expectancies were assessed via the Adolescent Marijuana Effects Expectancy Questionnaire (MEEQ-A), a self-report measure similar to the AEQ-A modified for marijuana expectancies (Aarons, Brown, Stice, & Coe, 2001). The MEEQ-A consists of six subscales: cognitive/behavioral impairment, sexual facilitation, perceptual-cognitive enhancement, global negative effects, craving/physical effects, and relaxation/tension reduction. These scales have demonstrated acceptable reliability and validity (Aarons et al., 2001); reliability was acceptable in the current sample ($\alpha$s = .69–.87). Items were rated on a five point Likert scale (1 = disagree strongly to 5 = agree strongly).

**Substance Use—**The Customary Drinking and Drug Use Record, Lifetime Version (CDDR) provided information on frequency of lifetime and past month substance use (Brown et al., 1998). Participants reported a wide range of lifetime (alcohol: $M$ = 169.3, $SD$ = 268.6; marijuana: $M$ = 231.2, $SD$ = 651.0) and past month (alcohol: $M$ = 5.1, $SD$ = 6.3 days/month; marijuana: $M$ = 6.2, $SD$ = 11.1 days/month) use episodes.

## Analyses

To compute indices of client language, behavioral code counts from individual scenes were averaged across each of the four offer types (e.g., mean across three MJ offer scenes; mean across three food offer scenes). In the event that data were missing for two or more scenes of a given offer, that offer type was treated as missing (missing data comprised less than 1% of the total sample, $n$ = 1 for alcohol offers and $n$ = 1 for marijuana offers). To explore whether the defined categories of client language were evoked in response to the simulation, descriptive statistics of client language codes were examined. As a test of discriminant validity, paired samples $t$-tests comparing mean counts of client language in response to each substance and its control counterpart (i.e. alcohol offers versus soda offers and marijuana offers versus food offers) were used to test whether expression of client language differed by offer type. Three client language variables were examined in this manner: count of healthy talk statements, count of unhealthy talk statements, and PHT.

Ordinary least squares regression modeling was utilized to explore the validity and utility of client language in response to the A-SIDE. For all subsequent analyses, only the primary client language variable of interest, PHT, was examined based on recommendations that testing the effect of a composite variable of client language are preferable (Magill et al., 2014). Separate regression models were conducted with lifetime and past 30 day use as the predictor variable and PHT as the dependent variable. These models were conducted individually by substance (previous alcohol use was used to predict PHT in response to alcohol offers, previous MJ use was used to predict PHT in response to MJ offers). The seven alcohol expectancies categories were entered simultaneously as predictors of PHT in response to alcohol offers in a multiple regression model; the six marijuana expectancies scales were tested in a separate multiple regression model with PHT during MJ offers as the dependent variable. For each set of expectancies, multicollinearity did not appear to be an

issue as demonstrated by variance inflation factor (VIF) values all below three (mean VIF for the seven alcohol expectancies scales = 2.27, mean VIF for the six marijuana expectancies scales = 1.95). Finally, a similar regression framework was used to examine associations between PHT and BW by substance with BW entered as the predictor and PHT in response to the relevant substance offer as the dependent variable. All analyses were conducted using Stata SE, 14th edition (StataCorp, 2015).

## Results

### Behavioral coding reliability

Interrater reliability was assessed using individual-measures absolute agreement intraclass correlation coefficients (ICCs). Based on the guidelines recommended by Cicchetti (1994), ICCs less than .4 = poor reliability, .4–.59 = fair reliability, .6–.74 = good reliability, and greater than .75 = excellent reliability. For the current study, fair reliability was observed for unhealthy talk (ICC = .57), good reliability for healthy talk (ICC = .71), excellent reliability for neutral statements (ICC = .91), and total number of codes (ICC = .91). These estimates are comparable to previous coding studies of CT and ST, and considerably better than a previous study using the CLEAR coding system (Glynn & Moyers, 2010). Notably, reliability was excellent for the primary variable of interest, PHT (ICC = .86).

### Participant language in response to A-SIDE

A descriptive summary of client language counts by offer type is provided in Table 1. From the results of the paired samples *t*-tests, substance offer scenes had a greater number of both healthy and unhealthy substance-related statements compared to control offers (Table 1).

These results support our hypothesis that the laboratory paradigm would elicit healthy and unhealthy talk from participants. However, the client language summary variable, PHT, did not differ from substance offer scenes to control offer scenes. Counts of healthy and unhealthy talk were positively correlated across alcohol and marijuana offer scenes, $r = 0.45$, $p < .001$ and $r = 0.40$, $p < .001$, respectively. A similar relationship was noted for PHT, $r = 0.40$, $p < .001$.

### Associations between client language and previous substance use and self-reported expectancies

Given the relative lack of healthy and unhealthy talk in the control conditions, associations among client language and concurrent substance use were examined in the alcohol and MJ scenes only. PHT was not significantly associated with past month or lifetime frequency of either alcohol or MJ use (Tables 2 and 3, respectively). The omnibus test for the effect of alcohol expectancies on PHT in response to alcohol offer scenes was not significant, and none of the categories of alcohol expectancies reached statistical significance (Table 2). Marijuana expectancies were significantly associated with PHT in response to MJ offers (Table 3). Examination of the individual effects suggests this finding was largely driven by sexual facilitation expectancies, such that greater sexual facilitation expectancies were associated with lower PHT.

### Associations between client language and behavioral willingness

Consistent with the relevant study hypothesis, BW was negatively associated with PHT for alcohol and MJ. Specifically, greater BW to accept alcohol offers was associated with less PHT in response to the alcohol scenes, $B = -19.77$, $SE = 1.49$, 95% CI = −22.74, −16.80, $R^2 = 0.69$, $p < .0001$. Similarly, greater BW to accept MJ offers was associated with less PHT in response to the MJ scenes, $B = -22.31$, $SE = 1.33$, 95% CI = −24.95, −19.67, $R^2 = 0.78$, $p < .0001$.

## Discussion

The current laboratory-based task was shown to elicit self-motivational language. These paradigms, such as the simulated decision-making task used in the present study, may provide useful techniques for elucidating change processes through verbal behavior while allowing for more rigorous empirical control. Previous investigations of client language have failed to account for the unplanned, non-intentional aspects of decision making around drugs and alcohol posited by dual-process models (Gerrard et al., 2008), thereby potentially limiting the utility of client language in predicting behavior in the moment. Importantly, the rates of substance-related statements, both healthy and unhealthy, were significantly higher in response to substance offers than control offers, suggesting specificity for these categories of client language. Although overall counts of healthy and unhealthy talk varied by substance offer scene and control offer scene, the pairwise comparisons for PHT did not differ significantly (although for PHT this only represents roughly 25% of cases for alcohol and 40% of cases for marijuana due to lack of any substance-related statements in the majority of control scenes). PHT is a ratio with higher values indicating more healthy talk relative to all substance-related language. Taken in context with the observed differences in frequency counts of healthy and unhealthy talk, the lack of effect of offer type on PHT suggests that while the *absolute* frequency of substance-related statements varies by context, the *relative* frequency of healthy statements across contexts may be more stable within individuals.

The use of laboratory simulations to elicit participant language also provides additional control in terms of the stimuli presented to individuals. Although losing some ecological validity compared to client language elicited in therapeutic settings (e.g., the impact of empathy on expression of client language), this provides a method by which to further understand the pre-existing characteristics associated with the expression of different categories of client language. One of the only studies to examine pretreatment factors and client language found that measures of pretreatment motivation and in-session CT were only minimally related and likely to represent distinct constructs of motivation to change (Hallgren & Moyers, 2011). The findings of the current study also found minimal associations between baseline characteristics and PHT. Previous substance use was not associated with PHT, with only a substance-specific finding emerging for marijuana expectancies, such that marijuana expectancies were associated with PHT in response to marijuana offers only. The direction of the negative association between marijuana sexual facilitation expectancies, a positive expected result of use, and PHT is consistent with the concept that client language is important in behavior change. This substance-specific effect

suggests that perhaps the relative influence of the deliberative and non-deliberative paths to adolescent decision making may vary based on the particular agent or context. Due to the heterogeneity in the current sample (e.g., in terms of substance use, severity of use), it is difficult to make definitive statements regarding the lack of associations between these cross-sectional measures of client language and use. Future research is needed to examine empirical and theoretical relationships between an individual's use history and other pretreatment factors and in-session verbal behavior.

Unlike baseline variables, PHT was associated with BW in this investigation. BW is thought to be the final pathway to non-deliberative substance use, particularly in peer contexts (Anderson et al., 2016; Gerrard et al., 2008; Jackson et al., 2014). The significant relationship between PHT and BW is consistent with previous dual-process research indicating that one's reflections on reasons and expectations for use (i.e. the planned, intentional pathway) and one's response to contextual factors (i.e. the non-deliberative pathway) in a given situation are related (Gibbons et al., 1998). The significant negative association between PHT and BW was in the expected direction based on theory and previous findings (Magill et al., 2014; Moyers et al., 2009); providing initial support for the utility of measuring PHT as it relates to decision making. In conjunction with the nonsignificant findings in terms of an association between PCT and previous use, client language in specific situations may not be related to static indicators of use aggregated across contexts. BW may be a better measure for capturing more nuanced aspects of behavior related to client language and individual decisions to use or not in a given situation (Anderson et al., 2014; 2016). However, this finding should be interpreted with caution due to the cross-sectional nature of this analysis.

A major strength of the current study is that it represents a preliminary test of a novel strategy for examining the role of client language in substance use engagement. While this work suggests the feasibility of laboratory paradigms for eliciting and studying healthy and unhealthy talk, a number of limitations of the current study must be acknowledged. These analyses were largely exploratory in a relatively small, ethnically homogeneous adolescent sample. In addition, client language coded in this study came from a structured interview, where questioning could influence the content of responses. The current analyses relied on cross-sectional data, limiting our ability to make statements about subsequent behavior change or maintenance. Additionally, the current measure of healthy and unhealthy talk represent slightly modified constructs of CT and ST adapted to reflect a setting where behavior change may not be the basis for discussion, or possibly even relevant in the case of current non-use or non-risky use. Although in the acceptable range, the reliability for unhealthy talk was lower than the other categories of client language, perhaps reflecting some ambiguity in terms of unhealthy behavior in a sample where behavior change is not the context for discussion. Finally, the unitary measure of healthy talk may have been overly broad; some research suggests that specific domains of CT (e.g., commitment statements such as "I will cut back on my drinking" versus preparatory statements such as "It might be good to quit drinking") are better predictors of use outcomes (Amrhein et al., 2003; Baer et al., 2008).

Simulation paradigms can provide a number of advantages for capturing client language in nonclinical settings. These tasks allow for real-time assessment of decision making embedded within important situational contexts, possibly providing a richer, more nuanced understanding of client language. The study of client language in non-therapeutic environments allows for assessment of change language in populations not actively thinking about changing, providing a method for assessing client language during the full spectrum of behavior change, often restricted in treatment-seeking or at-risk populations (Morgenstern et al., 2012). Of note, the current sample included a wide range of individuals in terms of their substance use. PHT may serve different purposes based on where someone is in terms of their use (e.g., healthy talk may be different in someone considering entering treatment versus someone with limited use experience deciding whether to continue experimental use). Although the current study included both treatment-seeking and non-treatment-seeking individuals, we were unable to examine if clinical status had a differential effect on PHT due to issues of statistical power. The current study may offer a strategy for future research to examine moderators of the effect of client language across the full range of individuals engaging in substance use.

Laboratory simulation paradigms are promising and offer the potential for greater rigorous understanding and experimental control during examinations of client language as a mechanism of behavior change. Future research should determine whether client language elicited during a laboratory task is associated with subsequent behavior change using longitudinal studies. In addition to the basic science applications, the use of simulations to elicit client language associated with real-life behavior could augment prevention and intervention efforts. Attempts to develop event-specific prevention strategies (e.g., Neighbors et al., 2012) and provide tailored web-based interventions (e.g., Voogt, Kuntsche, Kleinjan, Poelen, & Engels, 2014) have shown promise for computerized interventions in changing substance-related cognitions and reducing hazardous use in young people. Computerized interventions could be made more interactive via the inclusion of simulations, or the ecological utility of a clinical assessment could be enhanced by helping clients to put themselves in high-risk situations. For example, understanding when or under what circumstances adolescents are more or less likely to promote healthy or unhealthy behavior could lead to the development of tailored prevention and intervention efforts based on responses to the simulation. Using this information, feedback for individuals could be generated and additional simulation work could be used as practice for risky situations and maintenance of situations where the adolescent is likely to have a health promotion outlook. Further research is needed to explore the utility of laboratory tasks designed to elicit verbal behavior for research and clinical purposes; the current study represents a tentative, but promising step in this direction.

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**Table 1**

Descriptive statistics for client language by offer type ($N = 84$).

| Variable | Mean (SD) Count | | *t** | *df* | *p* |
|---|---|---|---|---|---|
| | **MJ** | **Food** | | | |
| Healthy talk | 8.1 (3.3) | 0.4 (1.3) | 19.6 | (82) | <.001 |
| Unhealthy talk | 3.2 (3.2) | 0.3 (1.0) | 8.6 | (82) | <.001 |
| PHT (%) | 69.0 (29.1) | 57.2 (43.3) | 1.4 | (20) | 0.18 |
| | **Alcohol** | **Soda** | | | |
| Healthy talk | 7.3 (4.1) | 0.7 (2.0) | 13.9 | (82) | <.001 |
| Unhealthy talk | 4.2 (2.9) | 0.5 (1.7) | 11.5 | (82) | <.001 |
| PHT (%) | 60.2 (26.2) | 56.1 (41.6) | 0.8 | (32) | 0.44 |

Note.

*Results represent results of paired t-tests comparing substance offer scenes to their relevant control offer scene. PHT = percent healthy talk.

**Table 2**

Three regression models examining different predictors of PHT in alcohol offer scenes ($n$ = 83).

| Predictor | *B* | *SE* | (95% CI) | $R^2$ | *p* |
|---|---|---|---|---|---|
| AEQ-A scales | | | | 0.11 | 0.254 |
| Global positive effects | 0.37 | 0.61 | (−0.84, 1.58) | | 0.548 |
| Social behavior enhancement | −0.33 | 0.50 | (−1.34, 0.67) | | 0.510 |
| Cognitive-behavioral enhancement | −1.24 | 0.78 | (−2.80, 0.32) | | 0.118 |
| Sexual enhancement | 0.64 | 1.18 | (−1.72, 3.00) | | 0.589 |
| Cognitive-behavioral impairment | 0.20 | 0.41 | (−0.62, 1.02) | | 0.628 |
| Increased arousal | −0.86 | 1.12 | (−3.08, 1.37) | | 0.446 |
| Relaxation/tension-reduction | −0.76 | 0.72 | (−2.20, 0.68) | | 0.298 |
| Lifetime alcohol use | 0.00 | 0.01 | (−0.02, 0.02) | 0.00 | 0.959 |
| Past 30 day alcohol use | −0.40 | 0.48 | (−1.35, 0.55) | 0.01 | 0.404 |

*Note*: Each of the three predictor classes (AEQ-A scales, lifetime alcohol use, and past 30 day alcohol use) were entered into separate regression models, with the dotted lines indicating separate models. CI = confidence interval, PHT = percent healthy talk, AEQ-A = Adolescent Alcohol Expectancy Questionnaire.

**Table 3**

Three regression models examining different predictors of PHT in marijuana offer scenes ($n$ = 83).

| Predictor | *B* | *SE* | (95% CI) | $R^2$ | *p* |
|---|---|---|---|---|---|
| MEEQ-A scales | | | | 0.19 | 0.010 |
| Cognitive-behavioral impairment | 0.41 | 0.44 | (−0.46, 1.28) | | 0.347 |
| Sexual facilitation | −1.38 | 0.63 | (−2.63, −0.12) | | 0.032 |
| Perceptual-cognitive enhancement | −0.16 | 0.74 | (−1.65, 1.32) | | 0.827 |
| Global negative effects | 0.77 | 0.53 | (−0.28, 1.83) | | 0.149 |
| Craving/physical effects | 1.02 | 0.94 | (−0.86, 2.90) | | 0.284 |
| Relaxation/tension-reduction | 0.14 | 0.58 | (−1.02, 1.30) | | 0.810 |
| Lifetime marijuana use | 0.00 | 0.00 | (−0.01, 0.01) | 0.00 | 0.903 |
| Past 30 day marijuana use | −0.47 | 0.28 | (−1.03, 0.08) | 0.04 | 0.095 |

*Note*: Each of the three predictor classes (MEEQ-A scales, lifetime marijuana use, and past 30 day marijuana use) were entered into separate regression models, with the dotted lines indicating separate models. CI = confidence interval, PHT = percent healthy talk, MEEQ-A = Adolescent Marijuana Effects Expectancy Questionnaire.