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Alcohol Behavioral Couple Therapy: In-Session Behavior, Active Ingredients and Mechanisms of Behavior Change

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1.0 Introduction

Alcohol use disorders (AUDs) are among the most common psychiatric diagnoses in the United States, with one-year prevalence estimates of 13.9% among adults (Grant et al., 2015), and considerable health, economic, and social costs (Sacks, Gonzales, Bouchery, Tomedi, & Brewer, 2015; Yi, Chen, & Williams, 2006). The scientific basis for treating AUDs has expanded rapidly in the past 30 years and several behavioral treatments have demonstrable efficacy (McCrady & Epstein, 2013).

Alcohol Behavioral Couple Therapy (ABCT) is an empirically supported treatment for AUDs (McCrady & Epstein, 2015; McCrady, Epstein, Cook, Jensen, & Hildebrandt, 2009; Schumm, O'Farrell, Kahler, Murphy, & Muchowski, 2014). Findings from randomized clinical trials of ABCT suggest that the treatment results in significant reductions in patient alcohol consumption and improvements in couple functioning (e.g., McCrady et al., 2009; McCrady, Epstein, Hallgren, Cook, & Jensen, 2016; Schumm et al., 2014) in both male and female patients with AUD, drawn from the community or veterans populations, even though the interventions remained standardized across populations. Research also has found that ABCT leads to improvements in the partner's alcohol use (Green, McCrady, Epstein, & Labouvie, 2005; Kuenzler & Beutler, 2003), and partner relationship satisfaction (Vedel, Emmelkamp, & Schippers, 2008). Effect sizes generally are in the medium range. For example, McCrady et al. (2009) reported effect sizes of $d = .59$ for percent days abstinent, and $d = .79$ for percent days heavy drinking for ABCT compared to individual cognitive behavioral therapy over a one year period of follow-up.

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ABCT combines three major elements: (a) cognitive behavior therapy (CBT) to target the identified patient's drinking; (b) CBT to enhance significant other (partner) skills to support patient behavior change; and (c) behavioral couple therapy to enhance relationship functioning. Typically, both partners attend all sessions; across studies treatment has ranged from 12-20 sessions.

Clinical research has moved increasingly from a sole focus on efficacy and effectiveness to studies of active ingredients and mechanisms of behavior change (MOBC) in treatment. Studying the mechanisms that underlie effective treatments should result in better understanding of the key ingredients in treatment, which, in turn should lead to briefer, more efficacious treatments that are easier to disseminate.

ABCT includes four hypothesized active ingredients (McCrary & Epstein, 2015): (a) cognitive-behavioral, alcohol-focused patient interventions, (b) cognitive-behavioral, alcohol-focused partner-related interventions (c) relationship enhancement, and (d) common therapeutic factors. These active ingredients, in turn, are hypothesized to affect four putative MOBC: (a) patient and partner motivation, (b) patient coping skills, (c) partner support for patient change efforts, and (d) more positive and less negative relationship behaviors. The hypothesized model underlying ABCT is depicted in Figure 1. To date, no research has tested the hypothesized relation of active ingredients to MOBCs and to treatment outcomes of ABCT.

The limited research examining MOBC in ABCT has tested pre- to post-treatment changes in behavior based on self-report measures, and suggests that partners attending ABCT learn skills to support abstinence of the identified patient, and that these partner skills are associated with better patient drinking outcomes (e.g. O'Farrell & Fals-Stewart, 2000). Research also suggests that ABCT results in increased relationship satisfaction in couples (e.g. McCrary, Stout, Noel, Abrams, & Nelson, 1991), that there is a positive association between dyadic behaviors and drinking outcomes (McCrary, Hayaki, Epstein, & Hirsch, 2002), and that improved relationship functioning leads to reductions in drinking (O'Farrell, Murphy, Stephan, Fals-Stewart, & Murphy, 2004). However, the literature on MOBC in ABCT is lacking in two ways. First, research to date has not tested the temporal order of changes to determine whether changes in hypothesized MOBC occur *prior* to changes in drinking. A second limitation is that, with the exception of our earlier examination of "we-language" using the current study sample (Hallgren & McCrary, 2016), no study has used observations of actual behavior during treatment to study MOBC in ABCT. However, other researchers have examined partner speech in single Motivational Interviewing (MI) sessions where a partner was present. MI is a treatment that helps clients resolve ambivalence about change through clinician differential reinforcement of "change talk" (statements related to changing a problem behavior) versus "sustain talk" (statements related to continuing or sustaining the problem behavior). Studies have found in single MI sessions with a partner present that partner statements of encouragement and support, advice, change talk, and sustain talk were associated with higher levels of patient change talk (Manuel, Houck, & Moyers, 2012) and lower levels of sustain talk (Apodaca, Magill, Longabaugh, Jackson, & Monti, 2013). However, these partner verbal behaviors were unrelated to drinking outcomes,

and the treatment was not couple therapy per se. Together, these findings suggest the study of in-session patient and partner speech might be helpful in examining MOBCs in ABCT.

1.1 Purpose

The global aims of this study were to: (a) describe therapist behavior, and patient and partner language during ABCT sessions and (b) test a proposed causal model linking active ingredients of ABCT as measured by therapist behaviors, MOBC as measured by in-session patient and partner language, and alcohol use outcomes. Using a time-lagged model in which therapist, patient, and partner behaviors were coded both in session 1 and session 8 or 9, we tested most of the hypothesized MOBC model for ABCT illustrated in Figure 1 (patient coping skills measures were not available). Briefly, we tested four predictions: (a) therapist behaviors in-session would predict later patient drinking, (b) therapist in-session behaviors would predict later in-session patient and partner behaviors, (c) patient and partner in-session behaviors would predict later patient drinking, and (d) patient and partner in-session behaviors would mediate the relationships between therapist in-session behaviors and later patient drinking. Given that this is the first study to test linkages between therapist and patient/partner behaviors in ABCT, our hypotheses were necessarily general. We did expect, however, that Partner Interventions would increase partner Advice and Alcohol-Specific Support, and that Couple Interventions would increase patient and partner General Support and Collaboration, and decrease Contemptuousness.

2.0 Material and Methods

2.1 Participants

Participants were patients and partners from four randomized clinical trials of ABCT conducted by the first author for which audio recordings were available: (a) the “PACT” study (McCrady et al., 1986), conducted in Rhode Island from 1979-1983 (15 male and 4 female patients and their partners); (b) the “Men’s” study (McCrady, Epstein, & Hirsch, 1999), conducted in New Jersey from 1989-1994 (90 male patients and their partners); (c) the “Women’s Treatment I” study (McCrady et al., 2009), conducted in New Jersey from 1996-2002 (50 female patients and their partners); and (d) the “Women’s Treatment II” study (McCrady et al., 2016), conducted in New Jersey from 2003-2009 (59 female patients and their partners). Although 218 heterosexual dyads were included in the four original studies, the analytic sample included 188 dyads (86 male; 102 female patients) that had at least one treatment session (i.e., session 1 or session 8/9) audio-recorded and coded by trained raters. Figure 2 summarizes sources of attrition. For session 1, 12 session tapes were inaudible; for the mid-treatment session, 12 session tapes also were inaudible, and the audio-recording was missing for an additional 16 participants. By mid-treatment, 70 couples had discontinued treatment.

Patients met criteria for DSM-III, DSM-IV, or DSM-IV-R alcohol abuse or alcohol dependence and consumed alcohol within the 30-60 days before the baseline assessment. Neither individual in the couple could meet criteria for current non-alcohol substance dependence with physiological dependence (other than nicotine dependence), current psychotic disorder, or significant cognitive impairment. Partners with AUDs were excluded

in the PACT and Men's studies. A small proportion (15%) of male partners in Women's I and Women's II met criteria for AUD. All couples were in committed heterosexual relationships and both partners had to be willing to attend treatment. Couples were recruited from the community and other treatment agencies.

Mean patient age was 43.5 years ($SD=10.3$) and 45.7% of patients were male. Mean partner age was 44.1 years ($SD=11.4$). Most couples were married (85.1%); the rest were living together but not married (7.4%), committed to the relationship but not living together (3.7%), separated (2.7%), or unknown (1.1%). The majority of the patients and partners identified as White (91.5% and 90.4% respectively); the second most common race was Black/African American (4.3% and 3.7% for patients and partners, respectively). Patients had a mean of 33.9 percent days abstinent (PDA; $SD = 29.9$) within the 90 days before their last drink prior to the baseline interview.

2.2 Measures

2.21 Treatment Integrity Rating System – Couples Version (C-TIRS, <http://casaa.unm.edu/download/C-TIRS.pdf>)—The C-TIRS (Brovko et al., 2013; Hallgren et al., 2016) was developed to assess treatment integrity/fidelity of ABCT (McCrary et al., 2009) and was used in this study to assess therapist behavior in session 1 and session 8 or 9. The C-TIRS has 37 items designed to assess therapists' delivery of the four ABCT active ingredients: a) 17 cognitive behavioral-patient interventions (e.g., self-management planning, drink refusal skills, decisional matrix), b) two partner interventions (e.g., reinforcement for abstinence), c) seven couple interventions (e.g., communication training), and d) 10 "common factors" in therapy (e.g., therapeutic alliance). Additionally, the C-TIRS includes one item to rate overall treatment manual adherence. For each item, coders assigned quantity ratings (how much the therapist delivered each intervention during the session, rated on a 1-5 scale where 1 = "not at all," 2 = "a little," 3 = "somewhat," 4 = "considerably, and 5 = "extensively") after listening to the full treatment session. According to criteria outlined by Cicchetti (1994), ICCs for the quantity scales indicated good inter-rater agreement for the CBT-patient interventions subscale ($ICC=.72$); fair agreement for the partner interventions subscale ($ICC=.49$), couple interventions subscale ($ICC=.59$), and the overall adherence item ($ICC=.50$); but poor agreement for the common factors subscale ($ICC=.28$) (see Table 1). Because of the low reliability of the common factors scale, it was not included in subsequent analyses. Detailed psychometric information on the C-TIRS can be found in Hallgren et al. (2016).

2.22 System for Coding Couples' Interactions in Therapy – Alcohol (SCCIT-A, <http://casaa.unm.edu/download/SCCIT-A.pdf>)—The SCCIT-A (McCrary et al., 2013; Owens, McCrary, Borders, Brovko, & Pearson, 2014) was adapted for this study from the Motivational Interviewing Scale for Significant Others (MISO, Apodaca, Manuel, Moyers, & Amrhein, 2007) and used to code patient and partner verbal behaviors. The SCCIT-A includes codes that were derived from the MISO, and was adapted to code both patient and partner verbal behaviors. The MISO and SCCIT-A built on previous laboratory studies of interactions in couples with AUD (e.g., Jacob & Krahn, 1988). In these early studies couples interacted on structured tasks in the laboratory, and their behaviors were

coded using an abbreviated version of the Marital Interaction Coding System. Although specific behaviors were coded in these studies, codes were collapsed into four categories: positivity, negative, congeniality, and problem-solving. The MISO and SCCIT-A refined these categories by including more specific dysfunctional behaviors described by Gottman & Gottman (2015) such as contempt, separating alcohol-related from general interactions, and including change talk and sustain talk, behaviors originally identified as mechanisms of change in MI but tested as MOBCs in CBT as well. For the present study, only codes that related to proposed MOBC of ABCT were examined. Although the SCCIT-A was based on a coding system for motivational interviewing, the SCCIT-A developed to be used across a variety of couple interactions and was not specific to coding behaviors consistent with principles of motivational interviewing. For example, in ABCT giving advice is not considered a negatively-valenced behavior.

One behavior code was assigned to each patient and partner utterance. In addition, a global assessment of patient and partner behaviors across the whole session were coded on a 1-5 scale (from 1 = “low” to 5 = “high”); higher ratings reflected more of the related behaviors. SCCIT-A codes were used to assess in-session patient and partner behaviors during session 1 and session 8 or 9. All verbal behaviors in sessions 1 and 8 or 9 were coded, including three global and 11 behavior codes for the patient, and four global and 11 behavior codes for the partner. All codes and descriptive data can be found in Table 2.

Patient and partner behaviors were coded to reflect giving of general information, discussing drinking, motivational language (change talk and sustain talk), positive and negative behaviors toward the partner, and neutral language. To control for overall number of utterances by the patient or the partner and to decrease bias in analyses (Holsclaw, Hallgren, Steyvers, Smyth, & Atkins, 2015), each behavior code was converted to a proportion of the total number of utterances by the speaker for that session. According to Cicchetti’s (1994) guidelines, three patient behavior codes were in the excellent range (ICCs from .75 to .91), four were in the good range, three were in the fair range, and one was in the poor range. One partner behavior code was in the excellent range, six were in the good range, one was in the fair range, and three were in the poor range. In general, codes with poorer reliability had lower frequencies of the behaviors and less variability, suggesting that poor reliability in some variables may have been attributable to restricted range. Table 2 provides specific ICCs and codes included/ex eluded from the analyses.

In addition to coding each utterance, global patient and partner behaviors also were rated for the session to capture the overall interaction between the patient and partner (three global ratings of patient behavior toward the partner: general support, collaboration, and contemptuousness; four global ratings of partner behavior toward the patient: alcohol-specific support, general support, collaboration, and contemptuousness). According to Cicchetti’s (1994) guidelines, the reliabilities of four global ratings were in the good range (ICCs from .64 to .73) and three were in the fair range (ICCs from .41 to .56).

Although all verbal utterances were coded, only specific codes that corresponded to hypothesized MOBC (with fair to excellent inter-rater reliability) were the focus of this study and were operationalized as: (a) *motivation*: patient and partner change and sustain

talk, (b) *partner support for patient change*: alcohol specific support (global), encourage/support general and alcohol-specific, advice; (c) *positive behaviors*: general support, collaboration; and (d) *negative behaviors*: contemptuousness, confront. Because of the poor reliability of codes for partner sustain talk, patient and partner encourage/support general, and partner alcohol-specific encourage/support, these variables were not included in the analyses.

2.23 Daily Drinking Logs—Within treatment drinking data were collected by self-recording cards completed daily by patients on which they recorded each alcoholic beverage they consumed. Number of drinks per day was not always available, so for purposes of this study, each day was dichotomously coded as abstinent or drinking. Partners also recorded patient daily drinking as none, light, moderate, or heavy. If patient data were missing, partner or Timeline Followback (Sobell & Sobell, 1996) data were used to create a more complete record of within treatment drinking. Daily drinking logs correlate significantly with partner drinking reports and retrospective TLFB data (McCrary, Epstein, & Hirsch, 1999), and discrepancies between patient and partner reports may be in the direction of either partner reporting more frequent drinking. Data were aggregated as PDA from session 1 to session 8 or 9, and PDA from session 8 or 9 to end-of-treatment.

2.24 Timeline Followback Interview—The Timeline Followback (Sobell & Sobell, 1996) was used at baseline and at each follow-up interview to collect daily pretreatment and post-treatment drinking data. As with the DDLs, patient data were used whenever possible; partner reports were substituted if patient data were unavailable. PDA was the primary variable derived from the interview. PDA was arcsine transformed to improve the distributional properties of the variable and transformed values were used in all analyses.

2.3 Procedures

2.31 Treatment—Audio recorded sessions of ABCT were selected from the four original clinical trials. Although the specificity of the ABCT treatment manuals evolved somewhat over the period of time that these original trials were conducted (e.g., increased use of handouts and worksheets), core elements of the treatment remained stable. The treatment was manual-guided and common core elements across studies included functional analysis, skills training, partner support, partner coping with drinking situations, reciprocity enhancement, communication and problem solving, and assignment of homework. Although ABCT includes some motivational enhancement strategies (e.g., decisional balance) and behaviors commonly studied in MI were coded in the study, ABCT does not use a motivational interviewing approach or teach couples skills related to motivational interviewing. For the first three studies (PACT, Men's, Women's I), all treatment was delivered in a conjoint format. For Women's II, couples were randomly assigned to ABCT or a blend of ABCT and individual treatment sessions (McCrary et al., 2016). In this blended condition, the couple was seen together for session 1, the woman then received five sessions of individual therapy; the couple therapy resumed in session 7 and continued to the end of treatment. Treatment ranged in planned length from 12 (Women's II) to 17 (PACT and Men's study) to 20 sessions (Women's I). On average, PACT participants attended 13.9 (81.76%) of sessions; Men's study participants attended a mean of 10.7 (62.94%) of

sessions; Women's I participants attended a mean of 12.4 (61.90%) of sessions; Women's II participants receiving ABCT attended a mean of 7.8 (65%) of sessions, and Women's II participants in the blended treatment attended a mean of 9.5 (79.17%) of sessions.

2.32 Selection of Treatment Sessions—A major goal of the study design was to create a time-ordered sequence of observations that mapped onto the hypothesized causal relationships between active ingredients and hypothesized MOBC (as recommended by Kazdin & Nock, 2003), between patient/partner behaviors and patient drinking outcomes. Selection of treatment sessions for coding was based on theoretical and practical considerations. The first treatment session was selected for coding as it represented the initial therapeutic intervention and thus provided a baseline of within-treatment behavior for the couple. The first treatment session included initial rapport building, a rationale and introduction to the treatment, feedback on the results of the assessment, and an introduction to self-recording.

A session in the middle part of the planned treatment was selected to allow sufficient exposure to treatment for patient and partner behaviors to have changed, so that the temporal relationship between session 1 therapist behavior and changes in patient/partner behavior could be tested, and so that the temporal relationship between patient/partner behaviors and later drinking also could be assessed. Not all therapy sessions were recorded for all studies, so availability of session recordings was another significant driver of the selection of the “mid-treatment” session. Additionally, because conjoint therapy did not resume until session 7 in the Blended condition of Women's II, we wanted to allow for more exposure to conjoint therapy before assessing whether patient and partner behaviors were changing over time. Thus, session 8 was coded for the PACT, Men's, and Women's II studies, and session 9 for the Women's I study. The mid-treatment session included a focus on learning alternatives to drinking, interventions to enhance positive exchanges in the couple, drink refusal skills, and the partner's role in drink refusal. In the women's studies, some communication exercises also were included in the mid-treatment session.

2.33 Selection, Training, and Monitoring Of Coders—Coders were six psychology graduate students (one student was replaced during the study, keeping a complement of 6 coders at all times) who were trained in all study procedures and the two coding systems over an approximately five-month period. Coders read the coding manuals, practiced coding with non-study tapes, and had their coding reviewed in weekly coder meetings to provide greater clarity when needed. During training, discrepancies in codes were discussed and the coding manuals were refined. Weekly coder meetings were held throughout the study to discuss coder questions, practice coding sections that were particularly problematic, and clarify decision rules for coding. About 11.6% of recordings ($N = 33$) were selected for reliability analyses. Selection of reliability sessions was counterbalanced across studies and session type (session 1 versus session 8 or 9). Throughout the study, the 33 reliability recordings were rated by all six coders (yielding 198 sets of codes for the reliability analyses) to assess the reliability of the full coding team; coders were blind to whether a recording was being coded for reliability. Single-measures absolute-agreement ICCs were calculated periodically for the reliability recordings and problematic codes were identified

through this process. The single-measures estimate is a conservative estimate of inter-rater reliability that allows for generalizability of reliability across the full sample of double- and single-coded sessions (Hallgren, 2012). For further details of training in the coding systems see Hallgren et al. (2016) and Owens et al. (2014).

2.34 Preparation of Session Recordings for Coding—All audio recordings were digitized and then transcribed. Recordings deemed inaudible by transcriptionists were reviewed by a coder. If there still was ambiguity about the viability of the recording, a second coder reviewed the recording. Final decisions to discard recordings as inaudible were made in weekly staff meetings.

2.35 Coding Session Recordings—To arrive at the final codes for analysis, two different raters reviewed each session recording. The first coder had two tasks. First, while listening to the session, he/she “parsed” what the patient and partner said into discrete utterances that represented units of speech that could be assigned a single code with the SCCIT-A. Within one turn of speech the patient’s or partner’s speech might be parsed into one or several utterances. While parsing, the coder also corrected transcription errors. The second coder listened to the full session twice, referring to the appropriate session of the treatment manual and taking detailed notes while listening. After the first pass through the session, he/she assigned C-TIRS and SCCIT-A global codes. During the second pass, the coder assigned SCCIT-A behavior codes to each parsed patient and partner utterance.

2.4 Data Analytic Approach

2.41 Defining Windows of Observation for Drinking Variables—We standardized windows of observation because study procedures and length of treatment varied across studies. Figure 3 provides a graphical representation of the study design and windows of observation. The baseline window of observation was defined as the 90 days prior to the last drinking day before the baseline interview (“pre-treatment PDA”). The number of days from the baseline interview back to the last pre-treatment drinking day was calculated (“days back”). Session 8/9 PDA (“mid-treatment PDA”) was defined as the mean weekly PDA from session 1 to the coded mid-treatment session. If a couple discontinued treatment prior to mid-treatment, we defined their mid-treatment session as the median number of weeks to the mid-treatment session for couples who had continued in treatment (median = 10). “End-of-treatment PDA” was defined as the mean PDA from the mid-treatment point to the end of treatment or 26 weeks after session 1, whichever came first. “Follow-up PDA” was defined as the mean monthly PDA from 27 to 52 weeks after session 1.

2.42 Covariates—Based on preliminary analyses revealing significant associations with the outcome variables (see Supplemental Table 1), three covariates were used in all primary analyses: patient gender (1 = male, 2 = female), pre-treatment PDA ($M = 33.93$, $SD = 29.89$), and number of days back to the last day of pre-baseline alcohol use ($M = 9.32$, $SD = 15.74$; range: 0-109). Although there were some differences in drinking outcomes across studies, this difference was almost completely conflated with patient gender, so we used patient gender rather than study as a more parsimonious covariate. The baseline or session 1 value of the dependent variable of interest also was entered as a covariate in all analyses.

2.43 Analytic Strategy—Hierarchical multiple regression was used for all analyses. For all analyses, covariates were entered in the first block, and the independent variables of interest (i.e., therapist behaviors, patient behaviors, or partner behaviors) were entered in the second block. In three separate models, mid-treatment PDA, end-of-treatment PDA, and follow-up PDA were each regressed on session 1 behaviors (therapist, patient, partner). In two separate models, end-of-treatment PDA and follow-up PDA were regressed on mid-treatment session behaviors (therapist, patient, partner). Each of these models only predicted patient drinking based on prior within-session behaviors (and additional covariates), thus preserving the temporal ordering described in the ABCT model (see Figure 1). Reporting of results focuses on significant changes in R^2 for independent variables entered after covariates.

3.0 Results

3.1 Describing In-Session Behavior

3.11 Patient and Partner Behavior—Our first aim was to describe patient, partner, and therapist behavior during ABCT sessions. Table 2 provides detailed information on patient and partner behaviors during the sessions. In session 1, a mean of 313.85 utterances was coded ($SD = 136.77$, range = 28-738, $n = 169$); in the mid-treatment session a mean of 316.78 utterances was coded ($SD = 136.99$, range = 74-767, $n = 115$). The most frequent behavior codes included providing information about one's self, the partner, the patient's drinking, the relationship, or making neutral comments indicating attention to the conversation.

In terms of *motivation* as an MOBC of specific interest, almost 10% of patient utterances were change talk (mean of 7.37% in session 1 and 6.01% in the mid-treatment session) or sustain talk (mean of 2.97% in session 1 and 1.50% in the mid-treatment session). Overall, patient change talk and sustain talk decreased from session one to mid-treatment. Patients expressed almost 2.5 times as much change talk as sustain talk in session 1 and about four times as much change talk as sustain talk in the mid-treatment session. Partners had a lower frequency of change talk about the patient's drinking in the sessions that decreased from session 1 to mid-treatment (2.95% in session 1 and 1.25% in the mid-treatment session). Partner sustain talk was not examined due to low reliability of the code.

Global ratings of *partner support for change* during the sessions revealed that partners provided good overall alcohol-specific support (mean global rating of 4.05 in session 1 and 3.97 in the mid-treatment session on a five-point scale). However, partners gave specific advice very infrequently, albeit at a higher rate in mid-treatment (0.69% of session one utterances and 1.69% of utterance in the mid-treatment session). In terms of *positive behaviors*, partners gave moderately good general support to the patients (mean global rating of 3.47 in session 1 and 3.60 in the mid-treatment session). Patients were slightly lower in providing support to their partners (mean global rating of 3.17 in session 1 and 3.37 in the mid-treatment session). Partners and patients were moderately collaborative in working together in the sessions (mean ratings of 3.72 [partner] and 3.54 [patient] in session 1 and 3.83 [partner] and 3.76 [patient] in the mid-treatment session).

In terms of *negative behaviors*, partners and patients were below the scale mid-point on expressions of contemptuousness toward each other (mean ratings of 2.37 [partner] and 2.45 [patient] in session 1 and 2.20 [partner] and 2.26 [patient] in the mid-treatment session). Confront codes also occurred at a low frequency (mean frequency of 1.66% [partner] and 1.35% [patient] in session 1 and 1.20% [partner] and 0.98% [patient] in the mid-treatment session).

3.12 Therapist Behavior—Therapists were rated as “somewhat” to “considerably” on general adherence to the prescribed content and structure of the therapy sessions (mean rating of 3.70 in session 1 and 3.34 for the mid-treatment session on a five-point scale, see Table 1). Therapist ratings were between “a little” and “somewhat” for how much they used the cognitive behavior therapy components (mean rating of 2.71 in session 1 and 2.69 for the mid-treatment session) and the partner interventions (mean rating of 2.75 in session 1 and 2.71 for the mid-treatment session), and between “somewhat” and “considerably” for the couple-specific interventions (mean rating of 3.31 in session 1 and 3.34 for session 8/9).

3.2 Linking In-Session Behavior with Alcohol Use Outcomes

Our second aim was to test a model linking active ingredients of ABCT as measured by therapist behaviors, MOBC as measured by in-session patient and partner language, and alcohol use outcomes (see Figure 1). In the subsequent sections we describe patient drinking outcomes and test whether these drinking outcomes were predicted by therapist behaviors and within-session patient and partner behaviors, then test whether patient and partner language was predicted by therapist behaviors. Because most models yielded nonsignificant results, a summary of predictors, outcomes, changes in R^2 , and significance levels for all analyses is provided in Table 3. Supplemental tables 1–7 provided detailed results.

3.21 Drinking Outcomes—Average PDA aggregated across the four trials increased substantially from pre-treatment ($M = 33.93$, $SD = 29.89$, $n = 186$) to mid-treatment ($M = 76.60$, $SD = 26.75$, $n = 183$), $t(180) = 17.48$, $p < .001$, $d = 1.32$. PDA continued to increase from mid-treatment to the end of treatment ($M = 87.90$, $SD = 21.02$, $n = 142$), $t(141) = 7.40$, $p < .001$, $d = .62$, but then decreased after treatment ($M = 74.79$, $SD = 32.20$, $n = 160$), $t(129) = -4.61$, $p < .001$, $d = -.42$.

3.22 Do Therapist Behaviors Predict Subsequent Drinking Outcomes?—To examine the effects of therapist behaviors on drinking outcomes (the “c” path in Figure 1), we conducted two sets of hierarchical multiple regression analyses. In the first set of analyses, covariates (patient gender dummy coded as 0 = female, 1 = male; days back; pretreatment PDA) were entered in block 1, and the three therapist behavior codes from session 1 were entered in block 2. In addition to examining the unique predictive effects of each therapist behavior, we examined the change in R^2 to indicate the amount of unique variance accounted for by therapist behaviors as a set. As shown in Supplemental Table 1, session 1 therapist behaviors accounted for between 0.6% and 2.2% of variance in PDA across the three timeframes. Session 1 therapist behaviors did not significantly predict mid-treatment PDA, end of treatment PDA or follow-up PDA, either as a set or as individual predictors (Supplemental Table 1).

In the second set of analyses, blocks 1 (covariates) and 2 (session 1 therapist behaviors) were the same, and the three therapist behavior codes from the mid-treatment session were entered in block 3 to predict end of treatment PDA and follow-up PDA. Thus, we examined whether mid-treatment therapist behaviors, while controlling for first session therapist behaviors, predicted patient PDA. Mid-treatment therapist behaviors did not significantly predict PDA outcomes in either model as a set or as individual variables (see Supplemental Table 2), only accounting for 0.3% and 1.8% of the variance in patient PDA at the end of treatment and follow-up, respectively (Supplemental Table 2).

3.33 Do Therapist Behaviors Predict Subsequent In-Session Patient and Partner Behaviors?—To examine the effects of therapist behaviors on patient and partner in-session behaviors (the “ a_{patient} ” and “ a_{partner} ” paths in Figure 1, respectively), each specific behavioral code (3 patient codes, 3 partner codes) as well as each global code (3 patient codes, 4 partner codes) from mid-treatment session was regressed onto the same three covariates as well as the same behavioral or global code from the first session in block 1 and therapist behaviors from session 1 in block 2. For example, patient change talk from the mid-treatment session was regressed on patient gender, days back, pre-treatment PDA, and patient change talk from session 1 in block 1, and then regressed on session 1 therapist behaviors in block 2. Therapist behaviors accounted for between 0.6% and 6.0% of the variance in patient and partner behaviors above and beyond the effects of covariates (see Supplemental Table 3), but as a set, therapist behaviors did not account for a significant portion of variance in any of the patient and partner behaviors at mid-treatment (Supplemental Table 3).

3.34 Do In-Session Patient and Partner Behaviors Predict Subsequent Drinking Outcomes?—To examine the effects of patient and partner behaviors on patient drinking outcomes (the “ b_{patient} ” and “ b_{partner} ” paths in Figure 1, respectively), we conducted hierarchical multiple regression analyses. In all models, patient gender, days back, and pre-treatment PDA were entered as covariates in block 1. In the first set of analyses, patient behavior codes, partner behavior codes, patient global ratings, and partner global ratings from session 1 were entered as predictors of drinking outcomes in separate models. Supplemental Table 4 shows the results of patient and partner behavior codes predicting drinking outcomes. Session 1 patient behavior codes accounted for 1.8% of the variance in mid-treatment PDA, 7.0% of the variance in end of treatment PDA, and 1.6% of the variance in follow-up PDA. As a set and individually, patient behavior codes did not account for a significant portion of variance in any of the drinking outcomes above and beyond the effects of covariates. Session 1 partner behavior codes accounted for 0.6% of the variance in mid-treatment PDA, 4.8% of the variance in end of treatment PDA, and 2.4% of the variance in follow-up PDA. As a set and individually, partner behavior codes did not account for a significant portion of variance in any of the drinking outcomes above and beyond the effects of covariates (Supplemental Table 4). Supplemental Table 5 shows the results of session 1 patient and partner global ratings predicting drinking outcomes. Patient global ratings accounted for only 1.1%, 2.3%, and .1% of the variance in mid-treatment, end of treatment, and follow-up PDA, respectively. Partner global ratings accounted for 1.2%, 5.1%, and .4% of the variance in mid-treatment, end of treatment, and follow-up PDA,

respectively. None of these effects were significant (as a set or individually) (Supplemental Table 5).

In the second set of analyses, blocks 1 and 2 were the same, but block 3 included the patient behavior codes, partner behavior codes (see Supplemental Table 6), patient global ratings, and partner global ratings from mid-treatment session (see Supplemental Table 7). Patient behavior codes at the mid-treatment session accounted for 10.3% of the variance in end of treatment PDA and 3.7% of the variance in follow-up PDA. Patient sustain talk at the mid-treatment session ($\beta = -.33, p = .002$) was significantly and negatively associated with end of treatment PDA. Partner behavior codes at mid-treatment session accounted for 3.9% of the variance in end of treatment PDA and 3.8% of the variance in follow-up PDA. Partner advice at the first session ($\beta = -.23, p = .029$) was significantly and negatively associated with follow-up PDA (Supplemental Table 6). Patient global ratings at the mid-treatment session accounted for 5.4% of the variance in end of treatment PDA and 6.6% of the variance in follow-up PDA. Patient contemptuousness at the first ($\beta = -.35, p = .049$) and mid-treatment ($\beta = -.37, p = .037$) sessions were significantly and negatively associated with follow-up PDA. Partner global ratings at mid-treatment session accounted for 2.1% of the variance in end of treatment PDA and 3.7% of the variance in follow-up PDA; none of these effects approached significance (Supplemental Table 7).

3.4 Do Patient and Partner In-session Behaviors Mediate the Relationships between Therapist Behaviors and Subsequent Patient Drinking?

Mediational models examining the indirect effect of patient and partner behaviors were not tested due to the lack of significant associations between therapist behaviors and patient or partner behaviors (i.e., the “a” paths)

4.0 Discussion

4.1 Summary of Findings

The goal of this study was to test characterize within-session behavior in ABCT, and test hypothesized MOBC by studying in-session therapist behavior and patient and partner language. Although the study of in-session therapist behavior and client language has characterized research on motivational interviewing, there is no comparable body of research on couple therapy approaches to alcohol treatment. Therapists, on average, delivered the elements of ABCT at an adequate level. The analysis of in-session language revealed that patients and their partners spent most of their time in sessions providing information about the patient’s drinking, as well as general information about their lives and about each other. Patients expressed more desire to change (“change talk”) than desire to continue to drink (“sustain talk”) and partners generally expressed less change talk than patients. Not unexpected, given that these were couples willing to come to treatment together, rates of negative behavior were relatively low, and partners were high on providing support to the patient related to drinking. We also observed changes in patient and partner language consistent with what would be expected in couple therapy: patients increased their supportive language and giving of advice to their partners, and decreased confrontation and expressions of contempt. Partners increased in providing advice to their partners and

decreased confrontation from the beginning to the middle of treatment. Across the four clinical trials, participant drinking improved.

However, the hypothesized model of ABCT was not supported. No therapist behaviors in either the first or mid-treatment session predicted later patient or partner behaviors or PDA at any time point. Consistent with the ABCT model, some patient and partner behaviors were negative predictors of subsequent drinking. Specifically, higher levels of partner advice in the first session predicted poorer post-treatment drinking outcomes. At mid-treatment, more patient sustain talk and more patient contemptuousness toward the partner predicted poorer drinking outcomes at end of treatment, but this effect was not maintained at follow-up. These significant findings must be interpreted with great caution, given that for some of the analyses there was an overall lack of significant changes in R^2 accounted for by covariates and baseline values of patient behaviors.

4.2 How Do We Understand the Results?

Overall, the results suggest that patients and partners change their verbal behavior in ways consistent with a conjoint approach to treatment and some of their behaviors were related to subsequent drinking outcomes in ways consistent with the ABCT model, but these changes had no detected relationship to what the therapists were doing in the sessions. Therapist behaviors were unrelated to proximal or distal drinking outcomes. However, patients' drinking improved and thus, we are left with a puzzle: empirical support for the efficacy of ABCT is good and we seem to be focusing on meaningful variables in treatment, but this initial test of within-session behavior did not yield greater insights about ABCT's MOBCs.

There are a number of possible explanations for the non-significant findings. First, although we assessed therapist delivery of CBT-specific interventions, we did not have data about patients' use of CBT skills and did not code in-session verbal behaviors reflecting use of CBT skills. It may be that the positive impact on drinking outcomes is solely because of client use of CBT-specific skills. However, previous studies have shown an added benefit of partner involvement compared to individually-focused alcohol treatment (e.g., McCrady et al., 2009), suggesting that partner involvement makes a unique contribution to positive outcomes. Second, it is possible that the present study design was not optimal for testing MOBC. The two coded sessions were several weeks apart in time, most changes in drinking occurred in the early weeks of treatment, and the content of the first and mid-treatment session were quite different, so it is possible that the design did not allow us to detect more subtle changes in therapist and partner interactions, or that behavior during one 90-minute session might not influence behavior many weeks later. Third, it also is possible that the verbal behaviors coded in session were not most responsible for behavior change. Rather, it could be that in-session verbal behavior is less important than behavioral changes outside the treatment session. Finally, it could be that the active MOBC in ABCT have less to do with the specifics of the therapy, and have more to do with the initial decision to seek treatment together, the patient's knowledge that the partner is willing to be supportive, and the partner's awareness that the patient is trying to change. Future research may aim to test these alternative hypotheses in light of the non-significant results found here.

Methodologically, the coders were confronted with a complex set of tasks, and although the reliability of most codes was at least in the “fair” range (Cicchetti, 1994), there was sufficient error in the coding system that the detection of small effects would have been difficult. Research on individual change has shown substantial changes in drinking immediately after a patient seeks treatment (e.g., Clifford & Davis, 2012; Epstein et al., 2005); ABCT may be effective for similar reasons.

4.3 Study Strengths and Limitations

The study had several limitations, including the variable reliability of the coding systems, the relative racial/ethnic homogeneity of the study sample, the insufficient number of couples in which both partners had an AUD to examine possible differences in interaction and MOBCs, observation of behavior in only two sessions, session-level rather than utterance-level ratings of therapist behavior, a large number of analyses and consequent increased risk of Type I error, and the use of only one outcome variable (PDA). We also elected to combine the four studies for analyses, recognizing that other approaches such as meta-analysis could be used to address study aims. Given low statistical power associated with meta-analytic mediation tests with only four studies, however, we selected to use MRA pooling cases to reduce Type II error. However, the study also had considerable strengths. The sample size was large for a within-treatment coding study, and had a good representation of male and female patients. It is the first study of in-session behavior in ABCT and is one of very few studies of in-session behavior in behavioral couple therapy for any presenting problem. The study was based on an articulated conceptual model, and is the first to use a time-ordered design to test MOBC in ABCT. The tests of MOBC were based on four RCTs, and used a well-validated measure of drinking outcomes. Thus, the study was designed in accordance with the criteria for testing MOBC as outlined by Kazdin and Nock (2003).

4.4 Conclusions and Future Directions

ABCT is an empirically supported treatment approach (McCrady et al., 2016) and findings from the present study suggest that couples entering ABCT change their interactions with each other in positive ways. Future analyses with the current data may focus in more detail on specific aspects of patient and partner language, particularly change talk, because previous studies have suggested that change language is important in conjoint sessions (Apodaca et al., 2013; Manuel et al., 2012). Research also suggests that language may differ systematically by gender, and a more detailed analysis of the structure and function of within-session language across roles (e.g., patient, partner) and genders may also further clarify the impact of within-session behavior on drinking outcomes in ABCT. Future research could look at more proximal relationships among patient, partner, and therapist language within a session, changes in behavior outside the therapy session, as well as within treatment behavior and MOBC for couples in which both partners have an AUD.

Supplementary Material

Refer to Web version on PubMed Central for supplementary material.

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Highlights

- Couples receiving therapy for alcohol use disorders express motivation to change
- Partners are supportive of change efforts
- Patient contemptuousness toward their partner predicts poorer drinking outcomes
- Therapist behaviors do not predict changes in patient or partner behaviors
- Therapist behaviors do not predict drinking outcomes

Figure 1. Hypothesized Model of Active Ingredients and Mechanisms of Change in Alcohol Behavioral Couple Therapy (ABCT). Patient coping skills were not assessed in the present study. Therapist common factors were not tested due to low reliability of the subscale.

Figure 2. Participant Flow and Sources of Attrition. WTPI = Women's Treatment Study I, WTPII = Women's Treatment Study II.

Figure 3.
Timeline of Drinking Measures

Table 1.**C-TIRS Quantity Ratings - Descriptive Statistics and Overall Scale Reliability**

Active Ingredients	Session 1 Mean (SD)¹	Session 8/9 Mean (SD)	ICC²
Cognitive Behavior Therapy Components	2.71 (0.49)	2.69 (0.61)	.72
Partner Components	2.75 (0.85)	2.71 (0.94)	.49
Couple-Specific Components	2.56 (0.63)	2.96 (0.63)	.59
Common Therapeutic Factors	3.31 (0.50)	3.26 (0.52)	.28
General Adherence	3.70 (0.76)	3.34 (0.98)	.50

¹Values are means of 1-5 ratings for each treatment element contributing to the scale.

²Values are two-way, single-measures, consistency intra-class correlations.

Table 2.

SCCIT-A Descriptive Statistics and Reliability of Global Ratings and Behavior Codes

Rating or Code	Session 1 Mean (SD)	Session 8/9 Mean (SD)	Group ICCs
Patient			
Global Ratings			
Patient General Support	3.17 (0.78)	3.37 (0.90)	0.626
Patient Collaboration	3.54 (0.95)	3.76 (0.95)	0.673
Patient Contemptuousness	2.45 (1.09)	2.26 (1.01)	0.630
Behavior Codes for MOBC testing and Description			
Giving Advice *	0.34 (0.67)	0.68 (0.90)	0.564
Confront	1.35 (3.11)	0.98 (2.41)	0.754
Change Talk *	7.37 (4.51)	6.01 (3.89)	0.707
Sustain Talk *	2.97 (2.46)	1.50 (2.66)	0.734
Behavior Codes for Description Only			
Giving Information-General *	10.68 (6.05)	16.28 (6.46)	0.911
Giving Information-Drinking-Related	2.36 (2.30)	1.90 (2.09)	0.536
Discuss-Self -General *	25.89 (10.54)	32.96 (12.82)	0.414
Discuss-Self -Drinking-Related *	24.16 (8.63)	16.00 (8.18)	0.796
Direct *	0.32 (0.52)	0.49 (0.62)	0.523
Follow/Neutral	18.22 (8.83)	15.65 (8.48)	0.652
Behavior Code Excluded for Poor ICCs			
Encourage/Support-General *	0.35 (0.50)	0.57 (0.70)	0.361
Partner			
Global Ratings			
Partner Alcohol-Specific Support	4.05 (0.68)	3.97 (0.71)	0.410
Partner General Support	3.47 (0.76)	3.60 (0.87)	0.522
Partner Collaboration	3.72 (0.95)	3.83 (0.98)	0.546
Partner Contemptuousness	2.37 (1.07)	2.20 (1.06)	0.629
Behavior Codes for MOBC testing and Description			
Giving Advice *	0.69 (0.87)	1.69 (1.84)	0.686
Confront	1.66 (3.36)	1.20 (3.00)	0.755
Change Talk *	2.96 (2.94)	1.25 (1.62)	0.512
Behavior Codes for Description Only			
Giving Information-General *	18.84 (8.10)	24.96 (8.86)	0.746
Giving Information-Drinking-Related *	14.08 (8.08)	9.20 (7.26)	0.682
Direct *	0.57 (0.79)	0.96 (1.09)	0.624
Follow/Neutral	17.65 (10.00)	16.39 (9.29)	0.604
Behavior Codes Excluded for Poor ICCs			

Rating or Code	Session 1 Mean (SD)	Session 8/9 Mean (SD)	Group ICCs
Encourage/Support -General	0.63 (1.09)	0.77 (1.05)	0.380
Encourage/Support- Drinking *	1.60 (2.19)	1.13 (1.58)	0.371
Sustain Talk *	0.62 (0.84)	0.30 (0.64)	0.274

Note.

* Significant change from session 1 to session 8/9. Global ratings were coded on a Likert-type scale from 1 to 5. Descriptive statistics for behavior codes are based on percentages of partner/patient utterances for each code. Table adapted from Owens et al. (2014)

Table 3.

Summary of Predictors, Outcomes, Changes in R^2 , and Significance Levels

	Corresponding Figure 1 path	Predictor	Outcome	R^2	P	Supplemental Table #
c		S1 Therapist Behavior	Mid-treatment PDA	.02	.21	1
		S1 Therapist Behavior	End of treatment PDA	.01	.87	
		S1 Therapist Behavior	Follow-up PDA	.01	.61	
		S8/9 Therapist Behavior	End of treatment PDA	.00	.96	2
		S8/9 Therapist Behavior	Follow-up PDA	.02	.63	
		S1 Therapist Behavior	Mid-treatment patient change talk	.06	.12	
a_{patient}		S1 Therapist Behavior	Mid-treatment patient sustain talk	.01	.78	3
		S1 Therapist Behavior	Mid-treatment patient confront	.02	.60	
		S1 Therapist Behavior	Mid-treatment patient general support	.04	.28	
		S1 Therapist Behavior	Mid-treatment patient collaboration	.04	.27	
		S1 Therapist Behavior	Mid-treatment patient contemptuousness	.06	.11	
		S1 Therapist Behavior	Mid-treatment partner change talk	.01	.85	
a_{partner}		S1 Therapist Behavior	Mid-treatment partner advice	.02	.71	
		S1 Therapist Behavior	Mid-treatment partner confront	.02	.48	
		S1 Therapist Behavior	Mid-treatment partner alcohol-specific support	.01	.85	
		S1 Therapist Behavior	Mid-treatment partner general support	.02	.52	
		S1 Therapist Behavior	Mid-treatment partner collaboration	.01	.91	
		S1 Therapist Behavior	Mid-treatment partner contemptuousness	.03	.34	
b_{patient}		S1 Patient Behavior	Mid-treatment PDA	.02	.27	4
		S1 Patient Behavior	End of treatment PDA	.04	.21	
		S1 Patient Behavior	Follow-up PDA	.02	.45	
		S1 Patient Global Ratings	Mid-treatment PDA	.01	.49	5
		S1 Patient Global Ratings	End of treatment PDA	.02	.40	
		S1 Patient Global Ratings	Follow-up PDA	.00	.98	
		S8/9 Patient Behavior	End of treatment PDA	.10	.02	6
		S8/9 Patient Behavior	Follow-up PDA	.04	.29	
		S8/9 Patient Global Ratings	End of treatment PDA	.05	.14	
		S8/9 Patient Global Ratings	Follow-up PDA	.07	.09	7

Corresponding Figure 1 path	Predictor	Outcome	R ²	P	Supplemental Table #
b_{partner}	S1 Partner Behavior	Mid-treatment PDA	.01	.73	4
	S1 Partner Behavior	End of treatment PDA	.05	.10	
	S1 Partner Behavior	Follow-up PDA	.02	.27	
	S1 Partner Global Ratings	Mid-treatment PDA	.01	.61	5
	S1 Partner Global Ratings	End of treatment PDA	.05	.16	
	S1 Partner Global Ratings	Follow-up PDA	.00	.96	
	S8/9 Partner Behavior	End of treatment PDA	.04	.29	6
	S8/9 Partner Behavior	Follow-up PDA	.04	.26	
	S8/9 Partner Global Ratings	End of treatment PDA	.02	.71	
	S8/9 Partner Global Ratings	Follow-up PDA	.04	.45	7

Note: Results reflect total variance accounted for after controlling for covariates described in manuscript. Therapist behavior includes CBT interventions, partner interventions, and couple interventions. Patient behavior includes behavioral codes for change talk, sustain talk, and confront. Partner behavior includes behavioral codes for change talk, advice, and confront. Patient global ratings include general support, collaboration, and contempt. Partner global ratings include global ratings include alcohol-specific support, general support, collaboration, and contempt. See supplemental tables for complete results including the effects of individual covariates.