

EFFECTIVENESS OF A FEEDBACK-BASED BRIEF INTERVENTION FOR
ALCOHOL USE DISORDERS IN COMMUNITY CARE

By

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ABSTRACT OF THE DISSERTATION

Effectiveness of a Feedback Based Brief Intervention for Alcohol Use Disorders in
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Feedback-based brief interventions for alcohol use have been shown to be highly effective with undergraduate populations. However, there has been little research on their effectiveness with community treatment populations, who typically have higher levels of dependence, comorbidity, and chronicity. The effectiveness of an assessment/feedback brief intervention to reduce alcohol use versus an assessment only condition with no feedback component was investigated in a community treatment setting with patients ($N = 87$) characterized by high levels of long-term dependency on alcohol and drugs, high levels of comorbidity, ethnic diversity, and low socioeconomic status. It was hypothesized that randomization to a condition receiving brief individualized feedback would reduce alcohol consumption and increase motivation for substance use treatment, versus randomization to a condition the same assessment but no feedback. Repeated measures ANOVAs and ANCOVAs were used to examine primary outcome variables obtained from the Addiction Severity Index (ASI; McLellan et al., 1992) of drinking quantity and frequency, and motivation for treatment. Results suggested that participants who received the feedback showed substantial reductions in number of drinking days at

follow-up 30 days post-intervention (i.e. 30 days from the date of the intake). However participants who received the feedback and those who did not did not differ on other outcomes at follow-up, including days of heavy drinking, motivation for treatment, or drug use frequency. Findings may be influenced by the decision to seek help, assessment reactivity, or treatment effects as on nearly all outcome measures participants in both conditions showed greatly improved outcomes at follow-up.

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Introduction

In the past 30 years, there has been substantial research on brief interventions for alcohol use disorders. Brief interventions are thus named because they tend to be substantially shorter than traditional therapy for alcohol use disorders (AUDs), being as short as a single 5-10 minute session, and typically lasting no longer than four sessions (Moyer, Finney, Swearingen, & Vergun, 2002). Brief interventions typically consist of a combination of components such as assessment, advice, feedback, and/or psychoeducation. These minimal interventions typically contain few or none of the elements believed to be therapeutic components of more extended therapies.

Brief interventions have been shown to be highly successful with individuals with AUDs. This finding has been emphasized in several meta-analytic reviews of the literature (e.g. Moyer et al., 2002; Bien, Miller, & Tonigan, 1993). For example, Bien et al. examined clinical trials comparing brief interventions to more extended interventions for AUDs. Bien et al. pointed out that the results of 11 of 13 reviewed trials suggested that participants given a brief interventions showed as much or more reduction in drinking than participants in more extended interventions, such as treatment as usual. Brief interventions for AUDs not only have been effective, but some studies also suggest symptom improvements are lasting. Although extended follow-ups are not typical of brief intervention studies, one study of a brief intervention with problem drinkers (482 men and 292 women) in community-based primary care reported that improvements were maintained at follow-up four years post-intervention (Fleming et al., 2002).

Brief interventions have several advantages that make them appealing to both clinicians and patients. First, brief interventions provide a cost-effective alternative to

more extended treatments, largely without compromising effectiveness. Effect sizes for brief interventions typically range from small to medium, comparable to effect sizes found with more extended treatments (Neighbors, Lewis, Bergstrom, & Larimer, 2006). Brief interventions also provide an excellent opportunity to deliver an effective intervention in settings such as primary care or community mental health centers, where demand is high and resources are limited. Brief interventions also typically require limited training to administer, allowing the intervention to be implemented quickly and by those with little addiction treatment experience.

The minimal nature of brief interventions provides an excellent opportunity to examine components of the intervention to determine those that are necessary or sufficient to create change. As noted, most studies on interventions for AUDs suggest that more sessions do not necessarily translate into more effective treatment (Walters, Bennett, & Miller, 2000). Brief interventions seem to work as well as more extended treatment as long as important “ingredients” are included in the intervention (Bien et al. 1993; Walters et al., 2000).

One element that has been proposed to be a key element in successful brief interventions is the provision of feedback. In brief intervention research, feedback has taken several forms. Feedback typically involves comparing the client’s alcohol consumption with that of similar individuals in the general population. This is known as norms-based feedback, or normative feedback. Norms-based feedback interventions are based on the knowledge that many heavy drinkers overestimate the alcohol use of others. Presumably, such feedback motivates high-drinking individuals to reduce their drinking to be more in line with peers (Borsari & Carey, 2003).

Although normative feedback is by far the most frequently used form of feedback, other forms of feedback also can be used. Feedback-based brief interventions also have included informing that individual of his or her risk for the development of problematic alcohol use and risk of alcohol-related consequences such as intoxicated driving. It also can consist of informative calculations, such as computing alcohol-related caloric intake, peak and average blood alcohol level (BAL), and the average amount of money spent on alcohol per week or per month. Thus, the definition of “feedback” can cover a variety of information shared with the client. The content is based on the provision of personalized information presented to the client by someone (or something—sometimes the deliverer of feedback is a computer), with the goal of increasing the individual’s self-awareness.

Personalized feedback can be powerful. Feedback as brief as five minutes has been shown to result in significantly improved drinking outcomes. In one striking example, Neighbors et al. (2006) gave 214 heavy-drinking college students an assessment of drinking behavior, then created personalized feedback for 108 of these students. Students in the feedback condition viewed the feedback for 1-2 minutes while it was being printed on a computer, and then were given the feedback to take home. In comparison with the assessment-only group, the feedback intervention alone resulted in a significant reduction in drinks consumed per week. Feedback-based interventions also have been shown to result in significant symptom reductions that last as long as three years (Aalto et al., 2001). In addition, feedback appears to create change when administered alone. The results of one study (Walters et al., 2000) suggest that the addition of elements such as psychoeducation and skills training to simple feedback does not provide additional benefit beyond delivering feedback alone. In this study, the

researchers examined 37 moderate to heavy drinking college students randomized into one of three conditions: a classroom-based feedback session with informational and motivational enhancement components, mailed personal feedback alone, and no intervention. The researchers found that at a six week follow-up, the mailed feedback condition lowered their drinks per month, compared with the no intervention control group. Interestingly, the condition given feedback in a classroom setting with the additional components did not show significant reductions in drinking; the authors speculated that the classroom setting may have detracted from the impact of the feedback. This study and others suggest that adding additional elements to feedback brief interventions may not be helpful and may actually detract from the impact of the feedback. In addition, brief interventions that do not involve feedback tend to be less effective than those that do (Walters et al., 2000).

Nearly all of the feedback-based brief intervention research has been conducted with college-age populations. Norms-based feedback in particular has been consistently successful with undergraduate populations, possibly because of certain characteristics of this population that make them more able to be influenced by normative information, such as high overestimations of peer alcohol use (Neal & Carey, 2006) and a high desire to conform to peers.

Given that most of the research on feedback brief interventions has been conducted on undergraduates, it is unclear whether feedback creates change in other populations. As noted, brief interventions generally are a valuable tool for drinkers who end up in primary care or community mental health care centers, given the high demand seen in such care centers. There have been some studies conducted that involve

administering feedback to non-undergraduate populations, typically examining individuals seen in primary care settings (Bien et al., 1993). However, many of these studies (e.g. Drummond, Thom, Brown, Edwards, & Mullan, 1990; Maheswaran, Beevers, & Beevers, 1992) include several other components in the brief intervention, such as psychoeducation or direct advice, making it difficult to discern the true impact of the feedback. As mentioned, the vast majority of studies that administer feedback as an independent intervention have been conducted on college-based populations. However, drinkers who end up in community care are quite different from most undergraduate populations. Problem-drinking undergraduates tend to have binge-drinking and abuse as a problematic pattern, instead of continuous dependent drinking (Ichiyama & Kruse, 1998; Slutske, 2005). On the other hand, drinkers seen in community care tend to be older (and therefore more chronic) drinkers, and have higher rates of comorbidity and problem severity. Drinkers in community care also tend to be of much lower socioeconomic status and education level than undergraduates.

As mentioned above, norms-based feedback interventions may work by reducing distorted norms, which may be more effective for undergraduates who tend to have exaggerated norms (Carey, Borsari, Carey, & Maisto, 2006). This is likely similar to the motivational interviewing concept of developing a discrepancy between one's current state and one's ideal state (Miller & Rollnick, 2002). This reduction in norms hypothesis has been supported by two studies suggesting that reductions in perceived norms did occur after a normative feedback brief intervention, and that such reductions in norms distortions mediated reductions in drinking. These two studies (Neighbors, Larimer, & Lewis, 2004; Neighbors et al., 2006) gave heavy drinking college students ($n = 252$ and

217, respectively) only a computer printout of personalized feedback.

This hypothesis of a reduction in perceived drinking norms also is supported by many other studies confirming that college students have overestimated norms. For example, Kypri & Langely (2003) examined a random sample of 1,564 students of a public university in New Zealand. Participants were between the ages of 16 and 29. Participants were asked to estimate the drinking levels of individuals of the same gender and in a similar age range, and then to report on their own drinking levels. The researchers found that most participants (73% of males and 80% of females) overestimated the true consumption of their peers. In addition, individuals who overestimated the consumption of others were more likely to drink heavily. Similarly, Lewis & Neighbors (2004) examined 225 (115 male) undergraduate students, and McAlaney & McMahon (2007) conducted an internet-based survey of 500 British college students, with both studies finding that the majority of participants overestimated peer drinking. While it is clear from these and several other studies on norm discrepancies that college students tend to overestimate the consumption of peers, it is unclear whether non-undergraduate, more dependent drinkers have similar overestimations. A thorough review of the literature base found no studies examining norm distortions for non-undergraduate adults.

There have been some studies suggesting that interventions focusing on the use of normative feedback can be successful with community-based populations, although studies only have been conducted with individuals who do not meet criteria for alcohol dependence. For example in Aalto et al. (2001), 296 male drinkers seen in primary care were selected based on their heavy use - participants had to consume more than 280

grams of alcohol per week or have a score of 3 or higher on the brief CAGE in order to be included. However, participants who met formal diagnostic criteria for alcohol dependence were screened out of the study. Other studies have been conducted with populations that were not treatment-seeking (e.g. Cunningham, Wild, Bondy, & Lin, 2001). In addition, feedback interventions do not have to consist solely of normative-type feedback. There have been a few studies that provided non norms-based feedback to individuals with more severe drinking problems. These brief interventions typically were conducted in a hospital setting and the key component of feedback was informing the participant about their alcohol-related biological test results.

In one such study (Aalto et al., 2001), individuals entering a Finnish public health clinic were screened for problematic alcohol use. Two hundred ninety-six individuals who had a likelihood of problematic use (a score of 3 or more on the CAGE questionnaire) were randomized to one of three intervention conditions. In one condition, patients received brief intervention sessions at 2, 6, 12, 18, 24, and 30 months; patients in a second condition received brief intervention sessions at 12 and 24 months. Both of these interventions involved components such as advice, psychoeducation, and encouragement to reduce alcohol consumption. In addition, the brief interventions involved a substantial feedback component in which a general practitioner or nurse explained to the patient his or her alcohol-related biological test results, including carbohydrate-deficient transferrin (CDT) levels, mean corpuscular volume (MCV), aspartate aminotransferase (ASAT), alanine aminotransferase (ALAT), and gamma-glutamyl transferase (GGT). The third condition simply received this latter component alone, that is, the explanation of the biological test results. This condition was considered

to be the control group for the study, but also could be considered to be a biological feedback condition. All three conditions had equivalent symptom decrease three years later, as measured by the primary dependent variable of MCV levels. However, significant reductions in self-reported consumption were not seen, which is inconsistent with the reductions seen in MCV levels. In addition, the control group (biological feedback only) showed an increase in ASAT levels at three years. One limitation of the Aalto et al. (2001) study was that participants who were known to have alcohol dependence were purposely screened out of the study (despite needing to have a substantial drinking problem as suggested by a CAGE score of 3 or more to be included).

In another study by Kristenson, Ohlin, Hulten-Nosslin, Trell, & Hood (1983), Swedish males were invited to a city-wide general health prevention program, and during the visit were screened for alcohol use problems. Screening involved a self-report questionnaire, and “a number of laboratory analyses,” such as blood pressure and blood samples. Seven percent of the program attendees, or 585 individuals, were found to have two consecutive elevated (within the top decile of the sample) GGT levels and 475 of these men were included in the final analyses. Participants were randomized to either a control or intervention group. Intervention participants were interviewed by clinicians regarding their drinking history and 76% of them were found to have “hazardous” levels of drinking. Participants in the intervention condition were scheduled for follow-ups once per month, where they were re-assessed and informed of their new GGT levels. Intervention participants completed these follow-up sessions until their GGT levels neared normal levels; the authors did not report data on the number of follow-up contacts participants had. Intervention participants also were offered follow-up contacts with a

physician every three months until participants showed a stable decrease in GGT levels. Participants in the control condition were followed only once per two years, but also received an initial letter informing them of their high liver test results and suggesting that they cut back alcohol consumption. The researchers compared GGT levels in the two conditions 2 and 4 years later and found that all participants' levels had decreased significantly at both time points. However, participants in the control group had nearly 4 times the number of alcohol-related hospital days between 2-5 years follow-up (133 days vs. 482 days total), suggesting that while the feedback may have resulted in reduced drinking as verified by GGT tests, it may not have reduced some alcohol-related consequences.

One limitation of the Kristenson et al. (1983) study is that the control participants were given direct advice to cut back on consumption, and therefore it is difficult to determine whether the advice, feedback, or both were impactful. Feedback and advice often are considered to be separate elements of brief interventions (Bien et al., 1993), although this may be an arbitrary distinction as advice may contain an element of implied feedback.

The Aalto et al. (2001) and Kristenson et al. (1983) studies suggest that feedback alone can be an effective brief intervention. Other studies have been conducted that provide a brief intervention that involves feedback as a substantial component among other elements. These studies, including a study by Brown & Miller (1993), suggest that feedback-based interventions, when administered before treatment, can lead not only to reduced drinking but also to enhanced motivation for treatment. In addition, these studies have been conducted with alcohol-dependent populations, suggesting that feedback-based

brief interventions can work with dependent, treatment-seeking populations.

In the Brown & Miller (1993) study, 28 participants (21 men) entering a residential alcoholism treatment program were given a thorough assessment, including an hour-long interview, self-report measures, and a blood test. Participants were then randomized to receive a motivational intervention or not. The brief motivational intervention was conducted in a second session and focused on the provision of feedback from the client's assessment, including feedback on alcohol consumption levels, biological tests, and scores from self-report measures. On some self-report scores, feedback included comparison of the client's score to normal ranges. The feedback was given in a motivational interviewing style, that is, in a nonconfrontational manner, responding to client comments primarily with reflective listening and empathy.

Brown & Miller (1993) found that participants in the intervention (feedback) condition had significantly reduced drinking at three months follow-up, as measured by standard ethanol content units (defined as one-half of a U.S. fluid ounce of pure ethanol; see Miller, Heather, & Hall, 1991) consumed, compared with the assessment-only condition. In addition, the researchers examined motivation for treatment by using therapist ratings of clients' treatment involvement, and clients' self-reported involvement. They found that therapist ratings of treatment compliance were higher in the condition that had received the motivational intervention, but that client self-reports of treatment participation did not vary by intervention condition. The feedback-based brief motivational intervention had a substantial impact on reducing the drinking of participants entering treatment, as measured three months later. In addition, the intervention had a possible effect on treatment participation.

Some of these motivational interviewing programs that include feedback as a substantial component (e.g. the Drinker's Check-up; Miller & Sovereign, 1989; Miller et al., 1988) have not only resulted in substantial decreases in drinking, but also these decreases in drinking were seen in patients who did not enter treatment subsequently. Therefore, continuing contact with a therapist does not seem to be needed for brief intervention effects to be seen. Brief interventions that provide feedback seem to be sufficient to create substantial change when administered before treatment for individuals who do and do not enter treatment. However, motivational interventions that incorporate feedback, such as the popular Drinker's Check Up, often have been shown to result in significantly higher rates of treatment engagement when administered before the start of treatment (Miller et al., 1988).

Brief interventions are researched infrequently in primary medical care or community mental health hospitals, despite a heightened need in these environments. Brief interventions are especially relevant in primary care environments, where there many individuals present with problematic alcohol use, yet there is often little time to treat them. Many individuals feel stigma upon seeking psychological help, and therefore use primary care as an initial option. In addition, many physiological problems are caused or complicated by high levels of alcohol use, resulting in high levels of primary care usage by individuals with alcohol problems. Brief but effective interventions are highly necessary for these populations, which may be drinking heavily or have AUDs that go unassessed, unnoticed, and untreated.

Determining whether feedback interventions work for alcohol-dependent individuals will help elucidate what elements of brief interviews are effective. Miller and

colleagues (e.g., Bien et al., 1993; Miller & Sanchez, 1994; Yahne & Miller, 1999) have proposed that there are several potential effective elements in brief interventions. Bien et al. (1993) suggested six factors that are common to successful brief interventions: feedback, responsibility (encouraging the client to recognize problem), advice, menu (providing a range of options), empathy, and self-efficacy. This model, known by the acronym FRAMES, is the prevailing model for defining the mechanisms that are effective in brief interventions. Distilling interventions down into few elements, such as feedback, can help determine which of these FRAMES components are necessary and/or sufficient for change. Ideally, one would be able to do a cost-benefit analysis to determine how an intervention could be as brief as possible while still providing maximum benefit.

In addition to examining the effectiveness of a feedback-based intervention for individuals with AUDs who are not undergraduate students, it is also important to examine potential moderators of response to feedback-based brief interventions. Two variables in particular have been suggested as potential moderators of brief interventions - gender and treatment history.

First, some studies have suggested that response to brief interventions may differ by gender. One reviewer of the literature (Chang, 2000) pointed out that many studies have found that the strength of response to different types of brief interventions differs for men and women. Some studies (Sanchez-Craig, Leigh, Spivak, & Lei, 1989; Sanchez-Craig, Spivak, & Davila, 1991) have found that after a brief intervention women showed more reductions in drinking than men. Other studies (e.g. World Health Organization Brief Intervention Study Group, 1996) have suggested that women are more

likely to respond to any sort of minimal intervention, including assessment alone. However, Chang's review included a variety of brief interventions, ranging in content. One brief intervention study (Neighbors et al., 2004) using only normative feedback found that gender was not a moderator of the impact of the intervention. It remains unclear to what extent gender may moderate the influence of different types of brief interventions.

Another potential moderator is a history of failed treatment. Some have suggested that participants who previously have failed to respond to brief interventions will be more likely to fail to respond to subsequent brief interventions (Bien et al., 1993). This is consistent with the idea that there are effective "ingredients" in the intervention, as one can imagine that if the ingredient did not work once, repeated presentation of the same elements is unlikely to have further positive impact.

Despite the lack of evidence on whether feedback is a helpful tool for reducing the drinking of community patients, it is sometimes included as a significant component of cognitive-behavioral treatment protocols for AUDs (e.g. Miller & Muñoz, 2004; Sobell & Sobell, 1993). In addition, the provision of feedback is a significant component of some motivational interviewing (MI) protocols (e.g. Fromme & Corbin, 2004). MI protocols for AUDs use the provision of feedback to "develop discrepancy" between the individual's current drinking state and a desired state of reduced drinking. Presumably, the larger the discrepancy, the more the individual is likely to become motivated to change.

To summarize, an increasing research goal has been to delineate the elements common to effective brief interventions. Feedback appears to be one of these elements

(Bien et al., 1993). In addition, some recent research has suggested that participants may show reactivity to pre-treatment assessments, that is, participants may show symptom reductions in response to assessments alone (Epstein et al., 2005; Sobell & Sobell, 2003). However, to be able to begin to delineate whether feedback has differential therapeutic impact from assessment procedures, it must first be demonstrated that feedback is a viable intervention for a non-undergraduate population that is characterized by a higher level of drinking severity (e.g. more likely to meet dependence criteria, more consequences, higher levels of chronicity).

Therefore, the current study had a primary objective of determining whether the provision of feedback regarding alcohol use would result in decreased drinking quantity and frequency for a non-undergraduate population. Specifically, the current study sought to determine whether giving feedback alone after an intake assessment would result in additional benefit beyond any symptom reductions that may occur in response to the intake assessment alone. Feedback involved providing the individual with information on his or her level of consumption as compared with peers, blood alcohol level calculations, review of current consequences, and information on future risk of a variety of alcohol-related consequences. It was hypothesized that participants who received the assessment plus feedback would show superior outcomes, in terms of lower quantity and frequency of drinking and higher motivational ratings at follow-up compared to participants receiving assessment alone.

If the feedback was found to be an effective intervention for this population, examination of several additional research questions was planned. First, given that participants in the current study were in a hospital clinic and entered treatment quickly

after intake, this study sought to determine whether the feedback-based intervention might work by increasing treatment participation, as would be suggested by some prior research on brief interventions given prior to treatment (Brown & Miller, 1993). Second, given that recent research has suggested that feedback-based interventions work by correcting distorted norms (Neighbors et al., 2004; Neighbors et al., 2006), the current study examined whether a clinical, community-based treatment population would have distorted norms. A final goal was to examine possible moderators of response to a feedback-based intervention. These variables, including gender, motivation levels, and treatment history, have been proposed in the literature as potential moderators of effects of brief interventions.

Method

Participants

Participants came from the substance use treatment clinic at a large public hospital in an urban area of central New Jersey. The clinic currently serves an urban clientele, with a lower socioeconomic status than the state's average. The clinic primarily offers intensive outpatient (IOP) services; all participants entering this clinic and meeting entry requirements were asked to participate. Participants were given a \$10 giftcard to a local store (Target, Walmart, or Stop-n-Shop Grocery) as compensation for participation in study follow-up.

Power calculations were completed using two of the planned dependent variables, the number of days drinking over the past 30 days, and the number of days drinking to intoxication over the past 30 days. An estimate of standard deviation was obtained from published norms on the ASI (McLellan et al., 1992). The norms were broken down by gender, estimates of standard deviation for the current study sample size calculations were taken from males since the current sample is primarily male, and since sample size calculations with male norms provided the more conservative sample size estimates. Four power calculations were completed: a between-subjects two-sample t-test and a within-subjects matched-pairs t-test) were conducted for both selected dependent variables (days drinking in past 30 days, days intoxicated in past 30 days). Of these calculations, the highest sample size estimate resulted from the between-subjects estimate for the dependent variable of number of days drinking in the past 30 days. This calculation was based on the McLellan et al. norms, which suggested that the average number of days drinking over the past 30 days for problematic drinking males was 15

(SD = 8) drinks [females were 17 (SD = 9)]. The power calculation suggested that with a desired power level of .80, and a one-tailed test, 68 participants would be needed to detect a five-drink difference between groups. However, this test was based on an alpha of .05; a test with an alpha of .01 suggested that 108 participants would be needed. While an alpha of .01 is conservative, some tests will be made after correction for multiple comparisons and therefore a reduced alpha may be used. Therefore, 70 participants was considered to be the minimum sample necessary.

Participant flow for the study is illustrated in Figure 1. Prior to scheduling an intake at the IOP, patients are required to complete a brief telephone screening. During this interview the screener asks for the patient's demographics and payment information, and obtains a brief history of lifetime alcohol and drug usage. Participants were individuals scheduled for an intake at the IOP between March 4, 2008 and August 28, 2008. Potential participants needed to have endorsed "alcohol" as having been a drug of use in the past month on the brief screening.¹ Of participants who met this initial criterion, 251 did not complete study consent. The primary reason for not completing study consent was failure to show for IOP intake appointment (199 potential participants²). There were several other reasons consent may not have been completed, including the patient having limited proficiency in English (n = 11), patient was missed because of unavailability of study interviewer (n = 10), refusal to participate in study or stay after for feedback intervention (n = 7), patient denied alcohol use in past month

¹For a small number of participants, a case manager called in the screening information and therefore the patient did not have contact with the clinic before the appointment.

² Several of these participants were rescheduled for a later appointment. Since participants could be rescheduled after study completion, it is unclear how many eventually attended an intake appointment. Patients who were rescheduled while the study was ongoing were included in the study when they attended the intake appointment.

when asked by study interviewer (n = 7), patient did not complete the intake because he/she was in need of immediate medical care or psychiatric care, or because a clinician was unavailable for intake³ (n = 5), patient refused the IOP intake and left facility (n = 3), patient was identified high or intoxicated before the intake (n = 5), patient mistakenly entered the intake prior to completing study consent (n = 1), participant had current psychotic symptoms (n = 1), patient did not have appointment and refused to reschedule (n = 1), patient had individual therapy session with intake counselor instead of full intake (n = 1).

One hundred forty three participants completed the consent procedure. Of these participants, 121 were randomized to an intervention condition. There were many reasons that participants did not complete randomization, including presence of psychotic symptoms at intake (n = 4), participant refused treatment and left during the intake session (n = 3), and participant did not understand English enough to complete feedback module (n = 2), client refused participation (n = 2), participant denied drinking in the past 30 days (n = 2), client was positive for drugs and was referred back to drug court (n = 1), client was deemed inappropriate for treatment at the clinic (n = 1), client did not complete intake because was recently treated (n = 1), client did was cognitively impaired and did not understand feedback module (n = 1), and client was deemed inappropriate for treatment at the clinic for an unknown reason (n = 5).

Of the 121 that were randomized (29 female, 92 male), 87 (71.9%) completed the follow-up and were included in the final analyses. Of these final participants, 20 (22.98%) were female and 67 (77.02%) were male. A chi square test indicated that

³ In the latter case, participants were placed directly in ongoing group therapy and were given an intake assessment at a later time.

participants who were included in the final analyses were more likely to be male than the original sample of 394 identifying as alcohol-only; $\chi^2(1, n = 87) = 4.57, p = .03$; of the 251 participants who were initially eligible but did not enter the study, 91 (36.3%) were female, and 160 (63.7%) were male. Unfortunately, other comparisons between the larger sample of alcohol-only individuals ($n = 251$) and those who entered the study could not be made, as data on these variables (e.g. ethnicity, mandated or not status, etc.) were not available for participants who did not complete the clinic's intake, which was the case for most of the 251 participants who did not enter the study. There were many reasons that participants did not complete the follow-up, but most who did not follow-up were unable to be contacted by phone due to disconnected phone numbers or failure to answer or return calls for follow-up.

Of the final 87 participants, 48 identified as black (55.2%), 19 (21.8%) as white, 16 (18.4%) as white-Hispanic, 2 (2.3%) as Hawaiian/Pacific Islander, and 2 (2.3%) as multiracial. Breaking these racial categories down by gender, the 67 males identified as black (35, 52.2% of males), white (14, 20.9%), white Hispanic (14, 20.9%), Hawaiian/Pacific islander (2, 3%), and multiethnic (2, 3%); the 20 females identified as black (12, 60% of females), white (6, 30%), and white Hispanic (2, 10%).

Approximately half of the participants (54.0%) had current legal involvement, including a pending case, drug court, parole status, Division of Youth and Family Services (DYFS) or family court involvement, or Driving While Intoxicated (DWI)-related license suspension. Participants came from a variety of referral sources, with the largest categories being county corrections programs (35 participants, 40.2%), self-referred/voluntary (29 participants, 33.3%), and Welfare/Social Services (13 participants,

14.9%). (See Table 1 for continuous and Table 2 for categorical descriptors of the final sample of 87 at baseline).

To break the sample down in to even more descriptive categories by race, race was cross-tabbed with gender and mandated status. For the 20 females in the study, the racial/ethnic breakdown was black (12 participants, 60%), white (6, 30%), and white Hispanic (2, 10%). For the 67 males in the study, the racial/ethnic breakdown was black (35, 52.2%), white (14, 20.9%), white Hispanic (14, 20.9%), Hawaiian/Pacific islander (2, 3.0%), and multiethnic (2, 3.0%). For participants who were not mandated to treatment, the racial/ethnic breakdown was black (12, 41.4%), white Hispanic (10, 34.4%), and white (7, 24.1%). For participants who were mandated to treatment, the racial/ethnic breakdown was black (31, 62.0%), white (10, 20.0%), white Hispanic (5, 10%), Hawaiian/pacific islander (2, 4%), and multiethnic (2, 4%). Eight participants (4 black, 3 white, and 1 white Hispanic) had an unknown mandated status and were not included in this breakdown.

Participants who completed the follow-up did not differ significantly from those who did not on any baseline demographic, drinking, or motivational variables. For the entire sample of 121, 70 (57.9%) identified as black, 27 (22.3%) as white, 20 (16.5%) as white Hispanic, 2 (1.7%) as Hawaiian/Pacific Islander, and 2 (1.7%) as multiracial. In terms of legal involvement, 62 participants (51.2%) had current legal involvement. Forty-six participants (38.0%) of the larger sample of 121 were referred from corrections-related programs, 41 (33.9%) were voluntary, 20 (16.5%) were referred by welfare/social services, 2 (1.7) were referred by an EAP, 1 (0.8%) was referred by the IDRC program, and 11 (9.1%) were listed as “other” or “unknown.”

Of the 87 participants who completed follow-up, 37 (42.5%) received the feedback module and 50 (57.5%) did not. A chi-square test indicated that of all participants randomized (121), participants in both intervention conditions (feedback or not) were equally likely to complete follow-up assessment at 30 days.

Patients were not screened out of the study based on drug use status or comorbid psychopathology unless participants were actively psychotic or intoxicated/high at intake. While patients were selected based on having recent alcohol use, 45 (55.6%) reported recent use of illegal drugs at baseline, with marijuana use being most commonly reported (28 participants, 32.1%), followed by crack cocaine (13 participants, 14.9%), cocaine powder (12 participants, 13.8%) and heroin (10 participants, 11.5%). For the final 87 participants, alcohol was considered the primary problematic substance in 40 participants, or 46.6%, with the rest of the participants having a primary drug problem of marijuana/hashish (21, 24.1%), crack cocaine (11, 12.6%), heroin (9, 10.3%), and cocaine powder (6, 6.9%).

Measures

Addiction Severity Index. Primary outcome variables came from the Addiction Severity Index (ASI; McLellan et al., 1992), a semi-structured interview. These variables included drinking quantity and frequency, which was assessed by self-report of drinking behavior over the past 30 days, including the number of days of use and the number of days used to intoxication. The number of drinking days in the past 30 days (NDD) and the number of heavy drinking days (NHD) in the past 30 days were primary outcome variables. The ASI defines heavy drinking days somewhat loosely. Instructions for the ASI instruct interviewers to probe participants with the number of days they “felt the

effects” of alcohol, to estimate the number of days participants achieved intoxication. The manual further stipulates that if further clarification is needed (e.g. the participant may have tolerance or seems to be minimizing use), heavy drinking may be defined by three or more drinks per drinking occasion (University of Pennsylvania/Veterans Administration Center for Studies of Addiction, 1990). The number of days of alcohol problems over the past 30 days was used as a secondary outcome measure. In addition to the alcohol use variables, motivation for change was measured by question 24 of the ASI alcohol subscale, which asks the participant “how important to you now is treatment for your alcohol problem?” Participants can answer on a 5-point scale, where 1 is “not at all,” 2 is “slightly,” 3 is “moderately,” 4 is “considerably,” and 5 is “extremely. Finally, treatment entry was used as a primary outcome that served as a proxy motivational measure. This was measured with a binary variable of whether the participant entered the treatment or not.

The ASI takes approximately one hour to complete and involves questions about the patient’s demographics, medical status, employment status, drug and alcohol use, legal problems, family and social relationships, and psychiatric status. The staff at the substance abuse clinic uses the ASI as an intake interview, thus providing intake ASI data as a study baseline measure. Participants were contacted by research study staff at follow-up 30 days after this first ASI, and for follow-up were administered the drug and alcohol portion of the ASI only. This ASI was completed in-person if the participant was still in treatment at 30 days, but if the participant had completed treatment or dropped out, the participant was contacted by phone to complete the assessment module. The developers of the instrument report that the ASI can be “reliably and validly”

administered via phone, as long as confidentiality is stressed (University of Pennsylvania/Veterans Administration Center for Studies of Addiction, 1990).

The ASI and a self-training manual are available to the public online (Treatment Research Institute, 2006). Both research interviewers read this manual. All other intake clinicians at the hospital substance abuse clinic had been trained in the ASI. One of the research interviewers observed several ASI interviews by intake clinicians prior to the start of the study; this was not possible for the other research interviewer due to confidentiality policies of the hospital. Clinicians at the clinic are required to comply with a statewide monitoring system, in which completion and reporting of standard measures, including the ASI, are required. Therefore, all clinicians at the study site had attended a training program on the use of this statewide monitoring system; training in the ASI was a part of this training program.

The test-retest reliability for the alcohol use subscale of the ASI is high, with an intraclass correlation coefficient of .86 (Drake, McHugo, & Biesanz, 1995). The ASI alcohol subscale also has been shown to have consistently high internal consistency, with alphas ranging from .74-.92 in 12 separate study samples. The ASI alcohol use subscale has been shown to have adequate criterion validity, with correlations between .31 and .59 with the Michigan Alcohol Screening Test (MAST; Gibbs, 1983), and of .50 with the CAGE inventory (O'Brien, 2008). The ASI also has been shown to have high specificity in detecting alcohol abuse and dependence (Mäkela, 2004).

A note about the drinking data is the reliability of the participant's self-report of drinking behavior. Given that clinicians administered the ASI at baseline and research interviewers administered the follow-up ASI, measures were taken to ensure consistency

between interviewers (see above). During the feedback module, participants were asked to re-state the number of days they had drank in the past 30 days (number of days drinking; NDD). While this report was significantly correlated ($p < .001$) with this variable as reported to the intake clinician at $r = .74$ ($n = 55$; including all participants who received feedback), this indicates some inconsistency in self-report of drinking behavior as ideally these reports would be perfectly correlated.

Procedure

Consent procedures were conducted before the clinical intake interview, given that the data from the intake interview were used in the study if the participant consented. Participants met with one of the two study research interviewers and were asked to participate in research that would help determine what interventions work for persons with alcohol use disorders. Participants were then given the consent form and the researcher reviewed the consent form with the participant. Participants then had an opportunity to ask any questions before signing the consent form. All participants completed the consent procedure and brief intervention with one of two research interviewers. Both interviewers had several years experience working with patients with substance dependence and abuse.

At consent, participants were informed that as part of follow-up procedure, study researchers would contact them to collect follow-up data by phone if they were to leave the treatment program. Participants were asked to provide contact information for a family member or friend who could assist in locating the individual at follow-up, if necessary.

A random number list was used to randomize incoming participants to condition.

Participants entering the study were randomized based on the last digit of this random number (odd = feedback, even = no feedback).

All participants were then administered the ASI as part of the intake assessment procedure. The intake interview, including the ASI, was administered by trained clinicians with experience in addictions counseling. There were three clinicians at the clinic who conducted intake interviews during the study. Two of these individuals were licensed social workers (LSWs), and one was a licensed clinical social worker (LCSW). Two of these individuals had certification in alcohol and drug counseling (CADC).

If the participant was randomized to the feedback condition, he or she then received the feedback intervention immediately after the intake interview. Participants who were in the assessment-only condition did not receive such feedback.

All participants were then placed in treatment as deemed appropriate by clinic staff. There were several programs to which the participant could be assigned. Programs to which participants were assigned in the current study included the Women's IOP (5 days per week), the intensive evening program, the standard IOP (either 3 or 5 days per week), partial hospitalization, or once per week outpatient treatment. Aside from the women's-specific 5-day IOP, all programs included both men and women. Percentage of treatment attended was calculated using the patient's report of how many days of treatment he or she attended, as a proportion of how many should have been attended according to the program the participant was assigned to. Table 3 shows the breakdown of therapeutic assignment and the percentages of treatment attended. All of the programs, aside from weekly outpatient therapy, consisted of group-based treatment, loosely based on a twelve-step orientation. Patients at the clinic often entered treatment

quickly, typically within a few days, but occasionally as soon as immediately after the intake interview. There were approximately 14 clinicians who conducted therapy at the clinic, all whom had experience in treating addictions. Approximately one half of the treating clinicians had a graduate degree in social work, and the other half an alcohol and drug counseling certification as their sole clinical credential.

Participants were administered the drug and alcohol portion of the ASI at the 30-day follow-up. All follow-up interviews were conducted by the two study interviewers who administered the feedback modules. While this arrangement was not ideal due to possibly contributing to social desirability effects, resources were not available for separate interviewers to complete the follow-up. Therefore, whenever possible the follow-up was completed by the study interviewer who did not complete the feedback module. If the participant was still in treatment at follow-up, the participant was located while attending treatment and the follow-up interview was conducted in-person. If the participant was no longer in treatment, the participant was contacted by phone for the follow-up. The majority of participants (60; 69.0%) did the follow-up by phone. Broken down by intervention condition, within the feedback condition, 23 of 37 (62.2%) did the follow-up by phone; within the non-feedback condition, 37 of 50 (74%) did the follow-up by phone. A chi square test (using SPSS continuity correction which corrects for overestimates when using 2 x 2 tables) indicated that the two intervention conditions were equally likely to do the follow-up by phone versus in-person, $\chi^2 (1, n = 87) = 1.39, p = .34$.

Since some studies (see Maisto, McKay, & Connors, 1990) have suggested that participants who are intoxicated give less reliable reports than those who are not, all

participants at the clinic were breathalyzed prior to the intake interview and were breathalyzed at random sessions thereafter. Participants with a blood alcohol level (BAL) greater than .05 (50 mg%) were not allowed to participate in the study. Because participants were consented before breathalyzing (breath samples were collected at the intake interview, and consent needed to be complete before intake interview commenced, as information from the interview would be used in the study), if a participant had a BAL greater than .05, his or her study consent was destroyed and the consent procedure was conducted again at a later date if the participant attended a rescheduled intake with a 0.00 BAL. If a participant was intoxicated, he or she was managed appropriately by clinic staff with current clinic procedures (e.g. detoxification or retaining patient until his or her BAL was low enough for dismissal).

Feedback procedure. The feedback was based on feedback modules from several other brief interventions, primarily the drinker's check-up (DCU; Squires & Hester, 2004) and some adaptations of the BASICS program (White et al., 2006). Feedback included a comparison of the participant's drinking to other Americans of that gender, based on the results of a large ($n = 42,706$) national survey of adults (National Alcohol Survey on Alcohol and Related Conditions, [NESARC], 2001), reported in Chan, Neighbors, Gilson, Larimer, & Marlatt (2007). The feedback also gave participants an estimate of the amount of money they would spend on alcohol should they continue to drink in the same quantity and frequency as reported at baseline, and an approximate caloric intake/week based on this same quantity-frequency pattern. Participants were told whether their self-report reflected potentially problematic alcohol consumption (which was the case for most individuals, but participants varied in levels of problem

recognition). Feedback on drug use was not given. The feedback also included a brief review of alcohol-related negative consequences endorsed on the ASI. Tables for calculation of percentiles were taken directly from Chan et al., who provide normative data calculation tables derived from the NESARC survey results. (See Appendix A for feedback script and tables). The feedback module lasted approximately 10-15 minutes.

Feedback was given in person by one of two clinically trained, master's-level students. Both interviewers role-played feedback several times prior to the start of the study to ensure consistency in procedure. Fromme & Corbin (2004) suggested that the credentials and clinical experience of the feedback provider may be unimportant. In the Fromme & Corbin study, both college-age peers and clinicians delivered feedback. The researchers found that substantial reductions in drinking were seen regardless of the credentials of the feedback provider. Other studies have suggested that individuals with a variety of training backgrounds can provide effective brief interventions. For example, in a study by Drummond et al. (1990), patients who received a brief intervention from general practitioners showed equivalent reductions in drinking to patients who were given the intervention by a specialist from an alcohol clinic.

The feedback was delivered in a nonconfrontational and empathic manner, consistent with many brief interventions (Bien et al., 1993; Miller & Rollnick, 2002; Mun, White & Morgan, 2009). The use of this approach is based on studies (Karno & Longabaugh, 2005; Miller, Benefield, & Tonigan, 1993) that have suggested that a confrontational approach on the part of the therapist tends to be correlated positively with client resistance to change.

Prior to the start of the study, treatment program clinicians were briefed on the

nature of the feedback provided in the intervention so that they would be better able to avoid using these types of feedback in the first month of treatment. Clinicians reported that they did not currently use this type of feedback in clinical practice and would continue to not do so.

Data Analysis Plan

Addiction Severity Index (ASI) data and other demographic data were obtained directly by requesting a database from NJSAMS. These data were then edited by hospital staff who selected out individuals who did not participate in the study, in order to protect confidentiality of those who were nonparticipants. Data were then de-identified by the same hospital staff, in which personal identifiers (e.g. social security number, first and last names) were removed from the database and substituted with study identification numbers. Other data, such as the follow-up drug and alcohol ASI, were written down and then later entered into an SPSS database. Data were checked at least twice upon entry.

Most analyses were conducted with repeated-measures ANOVAs. ANCOVAs were conducted with dependent variables on which the two intervention conditions significantly differed at baseline. Mediation and moderation were tested with a regression model following the methods outlined by Frazier, Tix, & Barron (2004).

Results

The distribution of all continuous variables was first examined using Komolgorov-Smirnov tests of normality. The distributions of the dependent variables of the number of days drinking (NDD) alcohol in the past 30 days, number of days drank to intoxication in the past 30 days (number of heavy days; NHD), number of alcohol-related problem days, and the participant ratings of importance of treatment were all significantly non-normal, $p < .001$. Square root, logarithmic, and inverse transformations were attempted but all distributions remained significantly nonnormal, $p < .005$. However, because it has been noted that for sample sizes larger than 30, the parametric tests used below are typically robust to violations of normality (Pallant, 2007), logarithmic transformations were able to reduce the presence of outliers and make the data less likely to violate ANOVA assumptions. In addition, participants in the feedback condition and those in the non-feedback condition differed significantly at baseline on the variables of NDD, $t(85) = 2.00$, $p = .05$; NHD, $t(85) = 2.00$, $p = .05$, and alcohol-related problem days, $t(85) = 2.25$, $p = .03$; with the feedback condition having higher scores on all of these variables. Transforming the data made the two intervention groups no longer significantly different at baseline, allowing for the use of more interpretable repeated-measures ANOVAs rather than ANCOVAs controlling for baseline differences. Therefore, ANOVA analyses on NDD, NHD, alcohol-related problem days, and motivation ratings were conducted on logarithmic-transformed data.

Drinking Behavior

The primary dependent variables examining drinking were quantity-frequency variables over the past 30 days, including NDD and NHD.

It is important to mention that one participant (in the non-feedback condition) reported two jail days at follow-up, and three participants (two in non-feedback, one in feedback) reported hospitalizations at follow-up, lasting from 5 to 14 days. While ideally days missed to treatment due to these reasons would be excluded since the participant would not be able to attend treatment on these days, it was not queried when these days were located in the 30-day period, therefore it was not possible to determine what days overlapped with treatment. Therefore, these participants were included in the subsequent analyses, and all data include the entire 30 day assessment periods.

Hypothesis 1. To test the first hypothesis that participation in the feedback brief intervention would be associated with a reduction in the number of days on which the participants drank, a one-way repeated-measures ANOVA was conducted, crossing the between-subjects variable of condition (feedback v. no feedback) with the within-subjects variable of time (intake and follow-up). The assumption of homogeneity of variances was tested with Levene's test, and was found to be not violated ($p = .19$ for NDD at baseline; $p = .17$ for NDD at follow-up).

Results for the ANOVA using the NDD outcome variable indicated that there was a significant interaction between intervention condition and time, such that participants in the feedback condition showed a greater reductions in drinking from baseline to follow-up than participants in the non-feedback condition, $F(1, 84) = 5.79$, $p = .02$. The effect size as measured by partial eta squared was .070, suggesting a medium effect size. Untransformed means are shown in Table 4.

Hypothesis 2. A second repeated-measures ANOVA was conducted to examine the effect of the feedback on heavy drinking (NHD). Similar to the NDD ANOVA, the

NHD analysis crossed intervention condition (feedback or no feedback) with time (baseline and follow-up). One participant reported 20 days of heavy drinking at baseline, a value which was more than five standard deviations from the sample mean. However, it was deemed important to include this participant, as a participant with this score represents natural variation within this population. To minimize the impact of this outlying score, however, the participant's NHD was changed to 16 (the next highest scores were both 15). Levene's test was used to test for the assumption of homogeneity of variances and this assumption was found to be not violated, $p = .14$ for baseline NHD, $p = .07$ for follow-up NHD. Results of this ANOVA indicated there was not a significant interaction between intervention condition and time, $F(1, 84) = 3.27$, $p = .07$. There was a main effect for time, $F(1, 84) = 32.56$, $p < .001$, suggesting that participants reduced their drinking from baseline to follow-up, regardless of condition. Untransformed and transformed means are shown in Table 5, showing this reduction in drinking from baseline to follow-up. While 54 participants (62.07%) reported heavy days at baseline, only 25 of the 87 (28.74%) participants had any days of heavy drinking at follow-up.

Motivation

Hypothesis 3a. The first motivation analysis examined whether the intervention was associated with an increase over time in participants' self-reported motivation for treatment. This analysis used a variable from the ASI that asked participants how much they felt they needed alcohol treatment at present, rated on a 1-5 scale (1 = not at all, 5 = extremely). This was examined in a repeated measures ANOVA, with time (baseline and follow-up) as the within-subjects variable, and intervention condition as the between-

subjects variable. This variable had no outliers. Levene's test was used to examine the assumption of homogeneity of variances, and this assumption was found to be violated at baseline, $p = .01$, but not at follow-up, $p = .63$.

Results of the ANOVA examining the motivational ratings suggested that participants in the feedback condition and those in the non-feedback condition did not differ on their ratings of motivation from baseline to follow-up, $F(1, 85) = .031$, $p = .86$. There were no main effects for intervention condition or time. Untransformed means are reported in Table 6, and results are illustrated in Figure 2.

Hypothesis 3b. To test whether the brief intervention had an impact on the number of participants who entered treatment following the intake with feedback versus an intake that included assessment only, a chi-square test was conducted. Results using the SPSS continuity correction were used, as this corrects for overestimates that occur when chi square is conducted with 2 x 2 tables. The chi square was nonsignificant, $\chi^2(1, n = 87) = .526$, $p = .47$, suggesting that individuals who received feedback and those who did not receive feedback did not differ in the rates at which they did or did not enter therapy subsequent to the intake interview. Of the 87 participants who completed the follow-up, 21 (24.14%) did not attend any sessions of treatment subsequent to the intake. Within the feedback condition, 7 of 37 (18.9%) participants did not attend treatment after the intake session. In the non-feedback condition, 14 of 50 (28%) participants did not attend after the intake.

Analyses were conducted to examine whether participants in the feedback condition were likely to attend more treatment than those in the assessment-only condition. Based on the modality of treatment that the patient was assigned to, a

percentage was calculated of how many days of treatment the participant attended out of how many they were expected to attend. This variable was calculated using a question at follow-up that asked participants how many days of treatment he/she missed. All participants were included, including those who did not attend any treatment days. An independent samples t-test was used to examine whether the two intervention conditions differed in the percentage of treatment days attended. If a participant left the program at the hospital to attend a substance use treatment program elsewhere, treatment completed at the other facility was counted towards completion of the treatment recommendations made by the intake clinician at the substance abuse clinic. Assignment to treatment level was similar between the two conditions, as can be seen in Table 3. Results indicated that while participants who received feedback tended to complete a greater percentage of treatment days—expressed as a proportion of days attended of those assigned (61.91% of days versus 50.43% for the non-feedback condition), this difference was nonsignificant, $t(85) = 1.32, p = .19$. In addition, it was examined whether participants in the two intervention conditions differed in the number of treatment days attended (without regard to assignment) and the feedback condition was found to have a similar number of treatment days attended ($M = 10.30, SD = 8.66$) as those in the non-feedback condition, ($M = 7.94, SD = 7.09$), $t(85) = 68.26, p = .18$. These results suggest that the feedback did not have a significant impact on the amount of treatment attended. Participants provided many reasons for missing treatment, with the most frequently reported reasons being medical problems/being ill (reported as a primary reason by 8 participants), had to work (reported primary by four participants), and lack of transportation (reported primary by four participants). Only 21 (24.1%) participants attended 100% of recommended

treatment days.

Research Question 2: Amount of treatment completed as a mediator of feedback and outcome

Participants entered treatment shortly after participation in the feedback module, and therefore treatment effects may have obscured the effects of the feedback. To examine this possibility, the dependent variable of NDD at follow-up was regressed on the number of days of treatment attended, controlling for NDD at baseline. It was hypothesized that participants who attended more treatment would show fewer days of drinking at follow-up. The model was significant, $F(2, 86) = 5.56, p = .005$; baseline drinking days and number of treatment days attended were both significant predictors in the model, explaining 27% and 26% of the model variance, respectively.

Given that treatment attendance was related to drinking at follow-up, it was next examined whether treatment effects may have mediated the effect of the feedback brief intervention. This was done by using multiple regression to examine the percent of treatment attended as a possible mediator of the effect of intervention condition on the number of drinking days (NDD) at follow-up.

Intervention condition was dummy coded into 0 (no feedback) and 1 (feedback). Preliminary analyses were conducted to examine the assumptions of multicollinearity (for the independent variables of condition and percent of treatment attended). Normality (of residuals), linearity and homoscedasticity were examined by inspecting residuals plots. The assumption of multicollinearity was examined with SPSS collinearity diagnostics; tolerance was high (.98) suggestive of a lack of multicollinearity. The dependent variable of NDD was logarithmically transformed to increase normality. Visual inspection of

residuals plots (as suggested by Pallant, 2007) suggested that the assumptions of linearity of residuals and homoscedasticity were satisfactorily met. However, the assumption of normal distribution of residuals was deemed to be unmet. Inspection of the Mahalanobis distances indicated no values over the critical value of 13.82, suggestive of a lack of influential outliers (Pallant, 2007). Therefore, the entire sample of 87 cases was used (including participants who had 0% treatment days attended). NDD data were log transformed; significance tests were similar with transformed and untransformed data.

First, NDD at follow-up was regressed on intervention condition. This regression was not significant, $p = .20$. Ideally, to establish mediation, there must first be an effect to mediate; that is, this first pathway must be significant. However, there are some situations when treatment may not appear effective because of the presence of a mediator, and this first pathway may appear nonsignificant (Frazier et al., 2004). Therefore, the test of mediation was continued by regressing the percentage of treatment attendance on intervention condition. This regression was not significant, $p = .19$, suggesting that intervention condition did not influence the percentage of treatment attended. Finally, both NDD at follow-up and percentage of treatment attended were regressed on intervention condition. This regression provides an estimate of the relation between the predictor (intervention condition) and outcome (NDD), controlling for the proposed mediator (percentage of treatment attended). This regression indicated the relationship between intervention condition and NDD was nonsignificant, $p = .38$, when percent of treatment attended was controlled for. The coefficient associated with the relationship between percentage of treatment attended and NDD was significant, $p = .002$. Therefore, while percentage of treatment attended was associated with drinking outcomes (NDD),

intervention condition was not associated with the percentage of treatment attended.

Thus, the percent of treatment attended was not shown to mediate the relationship between intervention condition and NDD at follow-up. Regression results can be viewed in Table 7.

Secondary Analyses

Secondary analyses examined whether the intervention had an impact on drug use, on the number of days participants experienced alcohol-related problems, and on secondary outcomes (including alcohol-related hospitalizations, medical problems, and family conflicts). These analyses were included to explore whether benefits from the feedback intervention would generalize to other problem areas (e.g. drug use), and whether symptom change would be drinking-specific (as might be intuited, as the intervention may work by reducing distorted norms and therefore individuals should directly reduce alcohol consumption to align more with true norms), or if other problem areas would be impacted. It might be argued that a successful brief intervention would need to reduce not only drinking itself but also to reduce related consequences that are usually targeted in treatment and that are typically measures of treatment success. Past research on the impact of brief interventions on secondary outcomes has been inconsistent, with some studies suggesting that brief interventions impact these variables (e.g. Monti et al, 1999; Osilla, Zellmer, Larimer, Neighbors, & Marlatt, 2008) and with other studies suggesting that interventions tend to impact drinking behavior only (e.g. Larimer et al., 2001; Mundt, French, Roebuck, Manwell, & Barry, 2005). These variables were included as secondary analyses because there was not substantial a priori evidence to suggest directional hypotheses. However, given that there have been

inconsistencies in the literature surrounding the effects of different types of brief interventions on drinking-related consequences, these were deemed important variables to explore.

Days of alcohol problems. The number of days participants experienced alcohol-related problems during the 30 days after baseline was examined. There were no outliers for this variable. Komolgorov-Smirnov tests indicated that distributions were significantly nonnormal, $p < .001$. (Logarithmic transformed data were still used as it made the data more normal than previously). Levene's test was used to examine the assumption of homogeneity of variance and was found to be not violated, $p = .61$. Visual inspection of the data indicated satisfactory homogeneity of regression slopes.

An ANCOVA was used to control for baseline differences in alcohol-related problems, which remained even after transforming the data. This ANCOVA revealed that when controlling for baseline number of days of alcohol problems, there was no difference between the two conditions at follow-up in terms of the number of alcohol-related problem days, $F(1, 83) = .27$, $p = .60$. Means are reported in Table 8.

Illegal drug use. Next, it was examined whether the intervention had an impact on likelihood of illegal drug use. First, an exploratory chi square test was conducted, crossing drug use (any illegal drug use at follow up—yes/no) with intervention condition. The SPSS continuity correction was used to correct for overestimations when conducting chi square tests with 2 x 2 tables. This test suggested that participants in the two intervention conditions did not differ in their likelihood of using drugs at follow-up, $\chi^2(1, n = 87) = 1.02$, $p = .31$. However, only eight participants reported any drug use at follow-up.

Combining dependent variables as an index measure of outcome. It is important to mention that for all but one secondary outcome variable results were in the predicted direction, even when nonsignificant. (The exception was number of medical days, on which participants showed no change). That is, on all outcome variables (including alcohol use measures, motivational variables, drug use, and alcohol-related consequences) participants in the feedback condition consistently appeared to have a more improved score at follow-up compared with the non-feedback condition. To further assess whether this directionality was meaningful, the dependent variables of NDD, NHD, perceived treatment importance ratings, and number of alcohol-related problem days were z-transformed. The variable of perceived treatment importance rating was reversed so that directionality was similar to the other outcome variables (i.e., a higher score indicative of a worse outcome). These z-scores were then summed to provide a summary index of outcome variables. The intervention conditions differed in this index score at baseline, with the feedback condition having a higher mean value ($M = .57$, $SD = 2.52$) than the non-feedback condition ($M = -.42$, $SD = 1.80$), $t(85) = 2.14$, $p = .035$. Therefore, the baseline index was used as a covariate in univariate analyses.

Results indicated that when controlling for baseline index score, the feedback condition had a lower index score ($M = -.62$, $SD = .40$) than the non-feedback condition ($M = .46$, $SD = .34$), $F(1, 87) = 4.09$, $p = .049$. These results suggest that participants in the feedback condition had better outcomes at follow-up than the non-feedback condition, as indexed by a combination of NDD, NHD, treatment importance ratings, and number of alcohol problem days.

Psychosocial indicators of treatment success. It was next examined whether the

brief intervention was associated with improvement on psychosocial measures of treatment success for substance abuse, including alcohol-related hospitalizations, days of medical problems, and days of family conflict. Only one participant reported any days of hospitalization due to alcohol use at baseline or follow-up. Therefore, this analysis was not conducted. Repeated-measures ANOVAs were conducted to examine the remaining two variables, number of days of medical problems and days of family conflict, crossing intervention by time (baseline to follow-up).

The distributions for days of medical problems and days of family conflict were significantly non-normal according to Komolgorov-Smirnov tests, $p > .001$. Square root, logarithmic, and inverse transformations were unable to normalize the distributions, with p remaining $> .001$. There were two outliers for the variable of number of days of medical problems, defined as greater than four standard deviations from the mean. However, these scores were not excluded as they were deemed reflective of the natural variance within the sample. The assumption of homogeneity of variance was tested with Levene's tests. These tests indicated that the assumption was not violated for number of days of medical problems, with $ps > .61$. However, the assumption of homogeneity of variance was violated for the variable of number of days of family conflict at baseline, $p = .002$.

The repeated measures ANOVA examining the number of days of medical problems revealed no significant interaction between intervention condition and time, $F(1, 83) = .09, p = .76$. In addition, there were no main effects for intervention condition or time. Untransformed means are reported in Table 9.

The ANOVA for number of days of family conflict revealed no significant

interaction between intervention condition and time, $F(1,84) = 1.48$, $p = .23$. In addition, there were no significant main effects for intervention condition or time. Untransformed means are reported in Table 10.

Research question 3: Estimations of peer use. As mentioned above, studies of feedback conducted with undergraduates have shown that participants often overestimate the drinking levels of peers. It has been proposed that norms-based feedback interventions work by reducing these overestimated norms, triggering the individual to lower his or her drinking to become more consistent with peers. Recent research has supported this hypothesis, as reductions in drinking have been related to reductions in discrepancies (i.e., between what one believes others drink and what one drinks). However, it also has been suggested that undergraduates are more likely to be helped by these norms-based interventions as they may be more likely to have overestimated norms, and to be more motivated to change drinking to be more in line with peers. Therefore, it was important to examine whether participants in the current study had overestimated norms, and whether larger discrepancies were associated with higher levels of drinking.

A correlation analysis was conducted, using only participants who completed the feedback (since part of the feedback involved showing the participant differences between their current drinking and norms of their peers and therefore norms discrepancy information was only available for these participants). A discrepancy variable was calculated by subtracting how much participants believed a person their age and gender drank per occasion from the actual norm. This discrepancy variable was then correlated with the number of days the participant drank in the past 30 days at baseline. Another correlation was run to determine whether overestimations of drinking were correlated

with higher levels of drinking at baseline. Results showed that participants did overestimate consumption of their peers, with a mean overestimation of 4.89 (SD = 7.90) drinks per occasion (n = 55; all participants who received feedback were included, including those who did not complete follow-up). Results revealed that the size of the discrepancy was positively correlated with levels of drinking at baseline, n = 55, r = .30, p = .02. In addition, the size of the discrepancy was positively correlated with the difference between drinking days at baseline and drinking days at follow-up, n = 37, r = .40, p = .01. This finding is consistent with studies on undergraduates, which suggest that reductions in discrepancies are related to reductions in drinking after norms-based brief interventions. However, true mediational tests could not be done given that to establish mediation a temporal relationship is necessary (predictor → mediator → outcome), and the participant estimates of peer usage were only obtained at baseline. Therefore it is unclear whether reductions in norm discrepancies post-feedback are truly related to reductions in drinking in this population.

Research question 4: Moderators

Gender, treatment history, and motivation. To analyze potential moderator variables of gender, treatment history, and perceived treatment importance at baseline, a hierarchical multiple regression model was used. Nominal predictor variables, including gender and treatment condition, were dummy coded (with 0 = female, 1 = male; 0 = no feedback, 1 = feedback). The continuous variables of number of previous alcohol treatment episodes and motivational level at baseline were both z-score transformed, as were the number of drinking days at baseline and the dependent variable of number of drinking days at follow-up. In this model, the predictor and moderator variables were

entered first, and were followed by the product terms formed by multiplying the predictor and moderator variables. Number of drinking days at baseline was included as a covariate. Outliers were defined as being more than four standard deviations from the mean. According to this definition, there were four outliers; three for the treatment history variable and one for the NDD at follow-up variable. Two of these outlying cases were from the feedback condition and two were from the non-feedback condition. However, because these cases were deemed to reflect natural variation within the sample, removal of these outliers may result in a loss of information. Therefore, these outlying cases were included, but to minimize the impact of the cases on the data, the cases were Winsorized by replacing the actual outlying score with the next highest value.

To maximize accurate prediction, variables that are investigated as potential moderators should have an a priori directional hypothesis (Pallant, 2007; Frazier et al., 2004). However, only one of the above variables has a theoretically supported directional hypothesis. That variable is treatment history; in this case it would be predicted that a history of treatment episodes would be associated with a lesser response to the brief intervention (Bien et al., 1993). However, it was deemed important to examine the potential moderators of gender and motivation as well, as past research (e.g. Chang, 2000) has suggested these variables as important potential moderators. From previous research, the directional hypotheses are unclear as results have been inconsistent (Chang, 2000).

Frazier et al. (2004) suggest that researchers avoid individual moderator tests when examining multiple moderators, as this can increase the type I error rate. The authors suggest that all of the potential moderator interactions be included in the second

step of a hierarchical regression, and then the R^2 change and partial correlations can be examined to determine which variables should be further investigated as moderators. This was done for the current study, with the first step including condition, number of days drinking at baseline, gender, baseline motivation rating, and number of previous alcohol treatment episodes. The dependent variable was number of drinking days at follow-up. The second step included the product terms to examine the interactions, including motivation rating, treatment history, and gender; all multiplied by a coded condition variable.

The first step of the model was significant when the predictors of gender, condition, history of alcohol treatment, perceived treatment importance rating at baseline, and NDD at baseline (covariate) were entered, $F(5, 81) = 2.62, p = .03$, explaining 13% of the variance in NDD at follow-up. The model resulted in a nonsignificant change in R^2 of .03 when the interaction terms were entered, $F(3, 78) = .96, p = .42$. Given that this second step did not add predictive value to the model, none of the variables (treatment history, motivational level at baseline, gender) were further investigated as potential moderators. It is important to note that upon examining the partial correlations in the regression results, the only significant partial correlations were baseline number of drinking days (the covariate), $r = .37, p = .001$, and the patient's motivational rating at baseline, $r = -.24, p = .02$. Regression results can be viewed in Table 11. It is important to note that there were only 18 women in the current study, reducing the power for detecting gender as a potential moderator.

An important note about the motivational variable (self-reported ratings) in the regression is that while Fromme & Corbin (2004) found that participants who were

mandated to treatment actually had higher readiness to change than those who were voluntary, results of the current study found the opposite result. Participants who were mandated to treatment reported a significantly lower motivational rating at baseline ($M = 1.84$, $SD = 1.21$) compared with those who voluntarily sought treatment ($M = 3.31$, $SD = 1.61$), $t(77) = 4.59$, $p < .001$. (For this analysis, $n = 78$ because for nine participants it was unclear whether they were mandated or not). Importantly, participants in the Fromme & Corbin study were college students. Mandated participants in the current study were referred after arguably more severe consequences (e.g. DYFS involvement, drug convictions) than mandated undergraduates, who are often referred after underage drinking offenses.

Discussion

The purpose of the current study was to examine whether an assessment and feedback-based brief intervention would result in reduced drinking and increased motivation for treatment in individuals presenting to a community-based substance use treatment clinic. Results of the study suggested that receiving the feedback-based intervention was associated with less frequent drinking at follow-up, as compared with those who were randomly assigned to assessment only without the feedback module. Furthermore, participants in the feedback condition had better outcomes at follow-up than the non-feedback condition, as indexed by a combination of NDD, NHD, treatment importance ratings, and number of alcohol problem days. The feedback did not specifically impact the number of days participants drank heavily (defined as drinking to intoxication or greater than three drinks per occasion). Regardless of intervention condition, participants on average reduced their drinking from baseline to follow-up. The impact of the feedback module appeared to be independent of motivation for treatment. Both those who received the feedback and those who did not were similar on all indicators of motivation, including their ratings of importance of treatment at baseline and follow-up, their likelihood of entering treatment after the intake, and the percentage of treatment days attended. Significant results were found only on the variable of number of drinking days, a finding consistent with the brief intervention literature, which suggests that brief interventions tend to have the highest impact on this drinking variable. For example, in the meta-analytic review by Moyer et al. (2002), the 56 brief interventions included in the review had the greatest impact on measures of alcohol consumption, while other variables (such as alcohol-related consequences) often were

unaffected.

The results of the current study are consistent with previous research on feedback-based brief interventions. Importantly, the results suggest that feedback-based brief interventions can be effective with alcohol-dependent community populations, not just alcohol-abusing undergraduates. It also is possible that a similar mechanism is behind this process for both undergraduates and community treatment populations, in that reductions in norms have been shown to be a mediator of reductions in drinking for undergraduates. Participants in the current study showed highly distorted norms, and higher distortions were positively correlated with higher drinking at baseline. Future studies should examine whether reductions in norms mediate reductions in drinking for more highly alcohol dependent populations. In future studies, it would be ideal to measure whether participants who had large discrepancies between their believed norms and actual norms would report a more realistic belief about peer drinking at follow-up. However, this was not done in the current study because it was assumed social desirability effects would lead the participant to report what she/he had been informed at baseline was the actual norm.

One limitation of the study may be the short study follow-up period of 30 days. This follow-up period was selected to maximize ability to contact participants for follow-up, and because of practical concerns (e.g. the unfunded nature of the study, time constraints). Even with this short follow-up period, many participants had dropped out of treatment and were unable to be located at follow-up, with only 71.9% of participants completing the follow-up. Despite this short follow-up period, participants who received feedback demonstrated a significant decrease in drinking at follow-up, consistent with

previous studies that have demonstrated reductions in drinking shortly after brief intervention (as short as six weeks in Collins, Carey, & Sliwinski, 2002, and Walters, Bennett, & Miller, 2000; to two months in Neighbors et al., 2006, after the intervention). It is also possible that participants continued to reduce their drinking after 30 days. Further studies should examine the duration of reductions in drinking after feedback brief interventions. While effects from brief interventions have been found to be lasting, most studies on brief interventions do not include follow-ups longer than year (Moyer et al., 2002).

It is also important to mention the research on assessment reactivity, which suggests that participants in alcohol treatment often show reductions in drinking in response to pre-treatment assessments. It is quite likely that the intake assessment itself, typically lasting from 1-2 hours, could have created therapeutic change. Indeed, on most outcome measures, all participants showed improvement from baseline to follow-up. To truly measure the effect of the feedback intervention alone, one would have to eliminate this possibility of reactivity to the intake assessment. Unfortunately, most studies on brief interventions include control conditions that are likely not true control conditions, as the participants undergo thorough assessment procedures, detoxification, or even treatment (Moyer et al., 2002). A growing base of research suggests that pre-treatment assessments may create reductions in substance use (Epstein et al, 2005; Sobell & Sobell, 2003). Researchers must be careful, therefore, to consider any patient contact or distributed materials as possibly therapeutic when designing a control condition. One possible way to address this difficult issue is to use retrospective methods to collect data after the brief intervention, such as the Timeline Follow Back (TLFB, Sobell & Sobell,

1996), which has been found to result in reliable and valid reports of alcohol use up to one year prior. However, given that development of personalized feedback relies on obtaining information from the individual, some level of baseline assessment is likely to be necessary.

In addition, participants in the current study entered treatment shortly after completion of the feedback intervention. Given that patients were scheduled into treatment very quickly after they complete their intake interview, the follow-up was completed after most participants had completed some treatment sessions. While this is the most ethical option for investigating the effects of brief feedback-based interventions in chronically dependent individuals, as there is little research on the effectiveness of such interventions with this population, it does not allow for inferences about the effectiveness of the intervention if delivered alone. Results of the current study indicate that treatment may have obscured brief intervention effects, as participants who attended more treatment days had fewer drinking days at follow-up.

There are several additional potential limitations to the current study. Primary outcome data for the current study were derived from self-report, and therefore are susceptible to participants' distortion or inaccurate reporting. Ideally, another form of reporting, such as biological, behavioral, or collateral reports, would have been obtained to gauge the accuracy of drinking reports. However, studies have suggested that obtaining collateral reports from informants does not enhance the validity of the data (Mun et al., 2009; Zweben, Pearlman, & Li, 1988) as self-reports of drinking tend to be highly correlated with collateral reports of the participant's drinking. In addition, the self-report variables for the present study were based entirely on the ASI interview. The

ASI interview carries several limitations itself, including being based on retrospective report and memory of the participant. Some researchers have pointed out that a lack of sufficient training in the ASI administration and scoring procedures can contribute substantially to low test reliability (Mäkela, 2004). There is no way to verify that individuals in the current study were reporting their drinking accurately. However, the measure used in the current study has been shown to have adequate validity. In addition, much research with problematic drinkers has suggested that they are accurate reporters of their drinking behaviors (Babor, Stephens, & Marlatt, 1987). In addition, brief intervention studies, including some that involved feedback (e.g. Miller, Sovereign, & Kreege, 1988) and some that did not (e.g. Manwell, Fleming, Mundt, Stauffacher, & Barry 2000), obtained collateral information that was consistent with participants' self-reports of lower drinking levels at follow-up, suggesting that participants were not misrepresenting their drinking levels to please their interviewer.

In addition, it may be questioned whether individual items from the ASI can be used as primary outcomes measures, given the lack of published data on these individual items. Despite this, several prior studies have used these items as outcome measures (e.g. percent of days abstinent in past 30 days, number of problem days, days drank to intoxication, in Harris, Humphreys, Bowe, Kivlahan, & Finney, 2009). There are published norms for several subcategories of problematic alcohol users (e.g. mandated, incarcerated, pregnant, inpatient populations, McLellan et al. 1992). Several previous studies have shown the variable of number of days used over the past 30 days to decrease with treatment (e.g. Chutuape, Jasinski, Fingerhood, & Stitzer, 2001) including one brief intervention study which found that participants receiving a FRAMES-based brief

intervention showing significant reductions in this variable as compared with a condition receiving advice alone, (Pal, Yadav, Mehta, & Mohan, 2007). Finally, the number of drinks over the past 30 days as reported on the ASI has been shown in previous studies (e.g. Carey, 1997) to be correlated with this variable as assessed by the Timeline Follow Back (TLFB; Sobell, & Sobell, 1996). Taken together these studies suggest that the individual ASI alcohol items have value as an outcome measure, although more psychometric research is necessary.

The number of heavy drinking days (NHD) variable might be especially problematic. While for simplicity this variable was titled “heavy” days in the current study, this variable was obtained by requesting from the patient the number of days the patient “drank to intoxication,” and if an inaccurate answer was suspected by the interviewer (e.g. suspected tolerance or minimization), ASI instructions direct the interviewer to probe for the number of days the participant had three or more drinks on a single occasion. This definition is likely to be an overestimate of the true number of heavy days. Prior studies have used higher thresholds that are specific to gender, typically five to six drinks per occasion for men and four to five for women (e.g. Karlamangla, Zhou, Reuben, Greendale, & Moore, 2006; Rohsenow, Miranda, McGeary, & Monti, 2007). As Dawson & Archer (1993) reported, the definition of heavy drinking of five drinks per occasion for men and four for women has been incorporated into most national surveys. It is unclear how the current study results would be impacted if a higher definition of heavy drinking days had been used.

In addition, social desirability is another concern, given the heavy reliance on self-reports. Apparent symptom reductions may simply be due to participants reporting

more desirable responses in the second interview, possibly because they believe the interviewer is seeking to determine whether treatment “worked.” In addition, since participants in the feedback condition were given norms that are most likely discrepant with the way that they were currently drinking, in the second assessment they might have been likely to report drinking that was in line with these norms.

Given that all participants generally showed improvement from baseline to follow-up, one cannot rule out that these symptom reductions were simply regression to the mean. However, participants in the current study had lower levels of drinking frequency (drinking on approximately 1/3 of days, on average, in the previous month) than typical clinical trials using alcohol-dependent individuals. Therefore, regression to the mean is unlikely, particularly as participants were not selected for particularly high levels of drinking.

Finally, in the current study there was no way to determine participants’ cognitive ability. Participants who chronically abuse alcohol have been known to have cognitive deficits (e.g. Buckman, Bates, & Morgenstern, 2008; Rosenbloom, O’Reilly, Sassoon, Sullivan, & Pfefferbaum, 2005), which may have hurt the ability of participants to comprehend and engage in feedback. In addition, there was no formal screening for psychiatric comorbidity (although participants were referred out if active psychotic symptoms were observed/reported), which may have influenced the participants’ ability to comprehend the feedback. Subjectively, this was to be the case for an extremely small minority of participants in the current study, as participants needed to be cognitively able to complete the intake module to be included in the study, and needed to be deemed capable of participating in and benefiting from treatment in order to enter the clinic’s

program (and therefore the current study). In addition, the majority of participants expressed clear understanding of the feedback, engaging in the feedback by asking questions, commenting, or expressing gratefulness for the information. Most participants made several self-reflective statements throughout feedback, with many of these statements reflecting change talk, e.g. “I have to do something now,” “I’ve really got to stop for my family.” It is recommended that future research examine the extent to which participants process the feedback, and the extent to which the processing contributes to reductions in drinking.

In conclusion, results of the current study suggest the possibility of using brief feedback as a pre-treatment intervention to reduce the frequency of alcohol use. While this type of intervention primarily only has been researched previously on undergraduates, the current study suggests that more research on alcohol-dependent, community treatment populations is warranted, as feedback may be a helpful intervention for this population as well. The feedback intervention is easily implementable, as it is extremely brief and could likely be administered by individuals with minimal training. However, the feedback was not able to reduce alcohol-related consequences or secondary outcomes, and did not appear to increase motivation for treatment. Given the severe nature of this population (e.g. high comorbid drug abuse/dependence, high chronicity, multiple life problems), it is likely that more elements than feedback alone are necessary to create substantial change within this population.

Table 1. *Demographic Characteristics of Sample at Baseline*

	Min	Max	Mean (SD) Feedback	Mean (SD) Non-Feedback	Mean (SD) Total
Age	19	63	39.30 (11.08)	35.38 (11.06)	37.05 (11.17)
Years of education completed	7	20	12.06 (1.94)	11.70 (1.95)	11.85 (1.94)
Annual income	\$0.00	\$62,500	\$2,785 (10,478)	\$528 (1,008)	\$1,488 (6,913)
# of days used alcohol in past 30 days	1	30	11.41 (9.46) ^a	7.82 (7.24) ^b	9.35 (8.40)
# of days used drugs in past 30 Days	0	30	4.59 (8.25)	7.04 (9.99)	6.00 (9.32)
# of prior treatment episodes (alcohol)	0	10	1.19 (2.08)	0.89 (1.44)	1.01 (1.74)

# of prior treatment episodes					
(alcohol)	0	10	1.19 (2.08)	0.89 (1.44)	1.01 (1.74)
# of prior treatment episodes					
(drugs)	0	18	1.48 (3.55)	1.11 (1.63)	1.27 (2.61)
# of years using alcohol	1	46	20.89 (13.34)	19.64 (10.82)	20.17 (11.90)
Motivation rating for alcohol					
treatment	1	5	2.66 (1.68)	2.08 (1.32)	2.33 (1.51)
# of days of psychological problems					
in past 30 days	0	30	6.41 (11.24)	7.78 (11.45)	8.18 (11.60)
# of prior psychiatric treatment					
episodes	0	13	0.89 (2.29)	0.92 (2.23)	0.91 (2.24)

Note. $n = 87$ for all variables except for lifetime number of times treated for drug problems; for this variable $n = 77$ as data for 10 participants were missing. “Previous treatment episodes” includes any period of treatment sought for alcohol or drug problem, including AA or NA attendance. Motivation for treatment could be rated by the participant on a 1-5 scale, with 1 being “not at all,” and 5 being “extremely.” “Days of psychological problems” and “prior psychiatric treatment episodes” include only psychiatric problems participants considered to be not alcohol-related. Raw data prior to transformation and removal of outliers are reported. Only the variable of “number of days used alcohol in past 30 days” was significantly different between intervention conditions, $t(85) = 2.0, p = .05$, as marked by superscript.

Table 2. *Categorical Frequencies of Sample Baseline Characteristics (n = 87)*

Baseline Variable		<i>n</i> (%)	<i>n</i> (%)	<i>n</i> (%)
		Feedback	Non-feedback	Total
Marital Status				
	Married	3 (3.5)	6 (6.9)	9 (10.3)
	Unmarried	34 (39.1)	41 (47.1)	75 (86.3)
	Unknown	0 (0.0)	3 (3.4)	3 (3.4)
Gender				
	Female	12 (13.8)	8 (9.2)	20 (23.0)
	Male	25 (28.7)	42 (48.3)	67 (77.0)
Race/Ethnicity				
	Black	22 (25.3)	25 (28.7)	47 (54.0)
	White	9 (10.3)	11 (12.6)	20 (23.0)
	White Hispanic	6 (7.0)	10 (11.5)	16 (18.4)
	Hawaiian/Pacific Islander	0 (0.0)	2 (2.3)	2 (2.3)

Referral Source	Multiethnic	0 (0.0)	2 (2.3)	2 (2.3)
	Corrections-related programs	13 (14.9)	22 (25.3)	35 (40.2)
	Voluntary/self-referred	13 (14.9)	16 (18.4)	29 (33.3)
	Welfare/Social Services	7 (8.0)	6 (6.9)	13 (14.5)
	Intoxicated Driver Resource Center	0 (0.0)	1 (1.1)	1 (1.1)
	Employee Assistance Program	1 (1.1)	0 (0.0)	1 (1.1)
	Other or unknown	3 (3.4)	5 (5.7)	8 (9.1)
Mandated Status				
	Not mandated	13 (14.9)	16 (18.4)	29 (33.3)
	Mandated	21 (24.0)	29 (33.3)	50 (57.5)
	Unknown	3 (3.4)	5 (5.7)	8 (9.1)

Current Legal
Involvement

Yes	18 (20.7)	29 (33.3)	47 (54.0)
No	18 (20.7)	17 (19.5)	35 (40.2)
Unknown	1 (1.1)	4 (4.6)	5 (5.7)

Employment Status

Employed	12 (13.8)	20 (23.0)	30 (34.5)
Unemployed	23 (26.4)	27 (31.0)	52 (59.8)
Unknown	2 (2.3)	3 (3.4)	5 (5.7)

Note: Chi-square tests indicated no significant differences between intervention conditions in likelihood of belonging to subcategories.

Table 3. *Treatment Attended by Program*

Treatment Program	Feedback n (%)	Non-Feedback n (%)	Total n (%)	Mean % treatment attended (SD)
IOP 5-day	4 (10.8)	7 (14.0)	13 (14.9)	57.69 (41.76)
IOP 3-day	10 (27.0)	12 (24.0)	22 (25.3)	62.69 (38.41)
IEP	9 (24.3)	12 (24.0)	21 (24.1)	60.58 (36.86)
Partial Hospitalization	5 (13.5)	8 (16.0)	14 (16.1)	57.32 (42.52)
Women's IOP 5-day	4 (10.8)	4 (8.0)	5 (5.7)	75.00 (42.42)
Outpatient (1x/week)	2 (5.4)	1(2.0)	3 (3.4)	58.33 (38.19)
Not assigned	3 (8.1)	6 (12.0)	9 (10.3)	6.48 (16.55)

Note. IOP = Intensive Outpatient Program, IEP = Intensive Evening Program. Unassigned participants were those who were not assigned to a therapy modality for various reasons (e.g. case needed to be reviewed before assignment, patient was considering treatment elsewhere).

Table 4. Means from Repeated-Measures ANOVA Examining Number of Drinking Days

		Untransformed Means		Transformed Means	
		Time 1	Time 2	Time 1	Time 2
		(BL)	(FU)	(BL)	(FU)
Number of	Feedback	11.41 (9.46)	1.07 (2.07)	.94 (.40)	.19 (.29)
drinking	(<i>n</i> = 37)				
days per					
month	No				
(NDD)	feedback (<i>n</i>	7.63 (7.20)	2.02 (3.93)	.79 (.38)	.29 (.40)
	= 50)				

Note. BL = baseline assessment, FU = follow-up at 30 days. There was a significant interaction of intervention condition and time, $F(1, 84) = 5.79$, $p = .02$.

Table 5. Means from Repeated-Measures ANOVA Examining Number of Heavy Drinking Days

		Untransformed Means		Transformed Means	
		Time 1 (BL)	Time 2 (FU)	Time 1 (BL)	Time 2 (FU)
Number of heavy drinking days per month (NHD)	Feedback (<i>n</i> = 37)	8.05 (9.97)	.81 (1.94)	.64 (.56)	.14 (.27)
	No feedback (<i>n</i> = 50)	4.59 (6.55)	1.39 (3.37)	.47 (.49)	.21 (.37)

Note. BL = baseline assessment, FU = follow-up at 30 days; heavy drinking days was defined as “feeling the effects of alcohol” or, if a more precise definition was needed (e.g. because of tolerance), three drinks or greater per occasion. There was no significant interaction, but there was a main effect for time, $F(1, 84) = 37.71, p < .001$.

Table 6. Means from Repeated-Measures ANOVA Examining Motivational Ratings

Outcome Variable		Unadjusted Means	
		Time 1 (BL)	Time 2 (FU)
Participant's rating of importance of treatment	Feedback (<i>n</i> = 37)	2.67 (1.68)	3.08 (1.80)
	No feedback (<i>n</i> = 50)	2.08 (1.32)	2.62 (1.70)

Note. Participants were asked to rate importance of alcohol treatment at present. Participants could rate on a scale from 1-5, with 1 being "not at all," and 5 being "extremely." There was no significant interaction and no main effect for this dependent variable.

Table 7. *Summary of Multiple Regression Analysis for Mediation of NDD by Percent of Treatment Attended*

	<i>B</i>	<i>SE B</i>	β	Sig. (<i>p</i>)
Step 1				
NDD on intervention condition	-.100	.078	-.171	.113
Step 2				
Percent of treatment attended on intervention condition	.002	.001	.141	.192
Step 3				
NDD on intervention condition	-.067	.075	-.092	.375
NDD on percent of treatment attended	-.003	.001	.326	.002

Table 8. Means from ANCOVA Examining Number of Days of Alcohol-Related Problems

Outcome Variable		Unadjusted Means		Adjusted Means
		Time 1 (BL)	Time 2 (FU)	Time 2 (FU)
Number of days of alcohol problems	Feedback (<i>n</i> = 37)	11.08 (1.95)	2.19 (1.21)	.14 (.07)
	No feedback (<i>n</i> = 50)	5.08 (1.66)	2.43 (1.03)	.19 (.06)

Note: There was no difference between intervention conditions when controlling for the number of alcohol problem days at baseline, $F(1, 83) = .27, p = .60$.

Table 9. Means from Repeated-Measures ANOVA Examining Number of Days of Medical Problems

Outcome Variable		Unadjusted Means	
		Time 1 (BL)	Time 2 (FU)
Number of days of medical problems	Feedback (<i>n</i> = 36)	5.06 (9.80)	3.63 (9.50)
	No feedback (<i>n</i> = 49)	4.57 (9.75)	3.57 (8.98)

Note. *n* = 85 as two participants were excluded as outliers. There was no significant interaction or main effects for intervention condition or time.

Table 10. Means from Repeated-Measures ANOVA Examining Number of Days of Family Conflict

Outcome Variable		Unadjusted Means	
		Time 1 (BL)	Time 2 (FU)
Number of days of family conflict	Feedback (<i>n</i> = 37)	1.19 (4.96)	1.32 (5.09)
	No feedback (<i>n</i> = 50)	1.55 (5.28)	4.44 (9.55)

Note. There were no significant interaction or main effects for intervention condition or time.

Table 11. Summary of Hierarchical Regression Analysis for Moderator Variables Predicting NDD

	<i>B</i>	<i>SE B</i>	β
Step 1			
NDD at baseline	.365	.116	.390
Gender	.116	.248	.052
Intervention Condition	-.369	.202	-.196
History of alcohol treatment	-.056	.082	-.074
Motivational rating at baseline	-.193	.115	-.206
Step 2			
NDD at baseline	.391	.117	.418
Gender	-.308	.359	-.139
Intervention condition	.187	.445	.099
History of alcohol treatment	-.002	.123	-.003
Motivational rating at baseline	-.204	.116	-.218
Gender X condition	.683	.513	.367
Treatment history X condition	-.193	.172	-.189

Motivation X condition	-0.13	.134	-.010
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Figure 1. Participant Flow

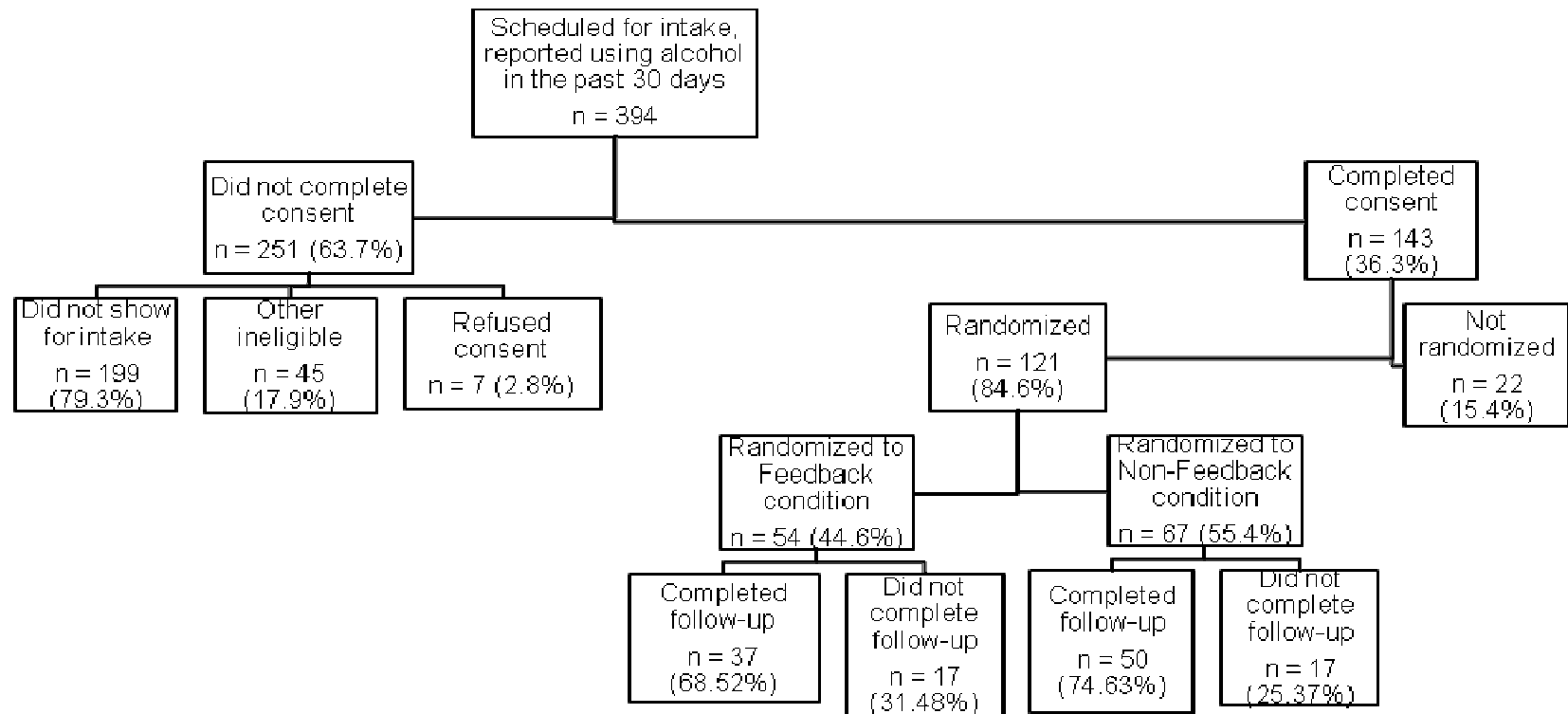
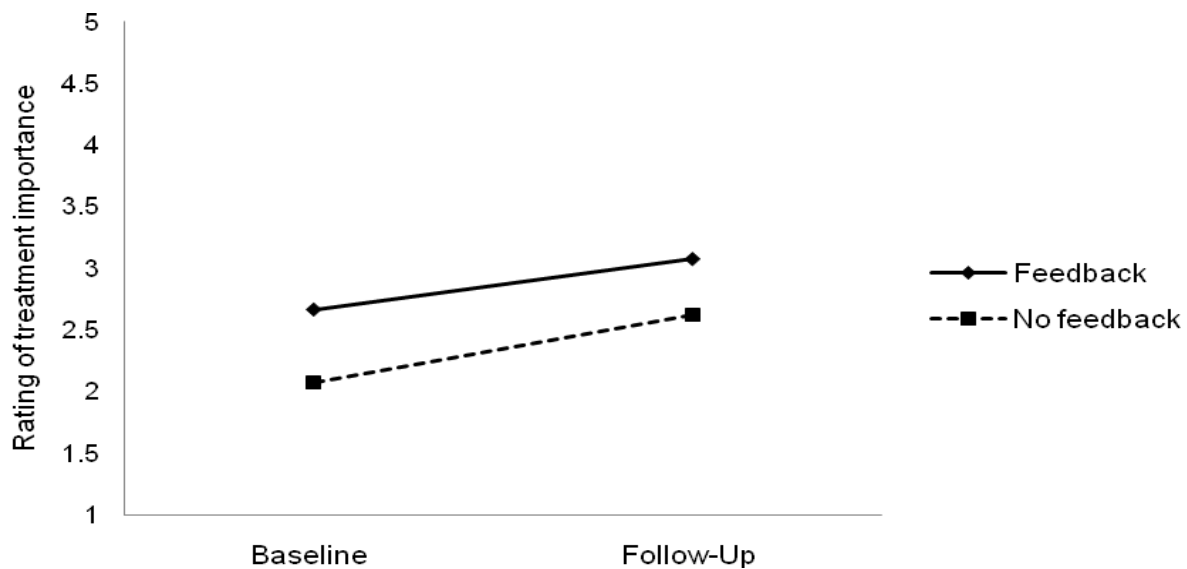


Figure 2. Results of ANOVA examining participant ratings of perceived treatment importance



Note. There was no significant interaction between time and condition, and no main effect for condition. There was a main effect for time, suggesting that all participants increased their ratings of treatment importance across time, $F(1, 85) = 4.76, p = .03$.

Appendix A: Study Consent

Consent for Participation in Clinical Study

Title of study: Effectiveness of a feedback-based brief intervention for alcohol use disorders in community care

Principal Investigator: Blaise Worden, M.S.

You are invited to participate in a study that is being conducted by Blaise Worden, M.S., who is a graduate student in Clinical Psychology at Rutgers University, under the supervision of Dr. Barbara McCrady, Ph.D, and Dr. Elizabeth Epstein, Ph.D.

This consent form provides detailed information about the research study, which a member of the research team will discuss with you. This discussion will explain and review all aspects of this research: its purposes, the procedures that will be performed, any risks of the procedures, possible benefits, and possible alternative treatments. Once you clearly understand the study and all of your questions have been answered, if you wish to participate, you and a member of the research team will be asked to sign this informed consent. You will receive a copy of the consent form to keep as a record.

PURPOSE

The study is about whether or not it is helpful to give people feedback on their alcohol consumption and related consequences. Should you decide to participate, you will be randomly assigned to one of two conditions. In one condition, at the end of your intake interview a researcher will spend approximately 15 minutes briefly reviewing your intake

interview results with you. In the other condition, you will be released after your intake interview. A total of 75-100 men and women will participate in this study.

PROCEDURES/REQUIREMENTS OF PARTICIPANTS

The following may be expected of you during your participation:

- a. Participating in a brief meeting with a research team member immediately after your intake, in which he or she will give you feedback on the information that you provided during the intake interview.
- b. Permission for the researcher to obtain information about you from the New Jersey Substance Abuse Monitoring System.
- b. Participating in one follow-up interview 30 days after your intake, either in person or by phone. If you are still in treatment 30 days after your intake interview, this follow-up interview will be conducted as a routine part of treatment. If you are no longer in treatment, you will be contacted by phone so that a research team member can interview you over the phone. This follow-up interview will take approximately 15 minutes by phone. At the end of this review, you will be asked if you want to provide contact information. This contact information will be kept confidential and will only be used with your permission. Should you provide this contact information, a researcher will contact you a few months from now to ask some brief questions about your drinking. You will be given a \$10 giftcard for your participation in this study, which will be received after completion of the follow-up contact. Any information you provide when they contact you will be kept confidential and will not be shared with your clinician,

hospital staff, any referral source such as an Intoxicated Driver Resource Center, or anyone else outside the research staff.

RISKS OF PARTICIPATION

The primary risks to you are:

- a. Possible discomfort in response to the feedback that is given, should you be randomly assigned to the feedback condition. The probability of experiencing psychological/emotional discomfort varies and depends somewhat on your current emotional well-being. Should you become distressed or experience any discomfort during research interviews or feedback sessions, you should immediately inform the research personnel or your clinician. A Trinitas clinician will be available to talk to you at a cost to you.
- b. Possible breach of confidentiality. To protect against this, only a case number will identify all research records, and all records will be kept in locked files at Trinitas Hospital. If you are deemed to be a danger to yourself or others, or if child abuse is suspected, your records will be released to the appropriate authorities. In these cases you will be informed that your treatment records are being disclosed. All results from the study will be published in aggregate form, with no specific information being revealed that could identify any one individual. Research personnel will have access to your interview records (i.e. intake and follow-up interviews) for research or purposes, but will not have access to your therapy records. Clinicians at Trinitas, including your personal clinician(s), will not have access to data that you provide on questionnaires at follow-up.
- c. This study does not present a foreseeable risk of physical injury.

BENEFITS OF PARTICIPATION

The possible benefits of participation for you are:

- a. Possible better understanding of your behavior.
- b. Possible lifestyle change.
- c. Contributing to knowledge about how to provide the most effective treatments to people with alcohol problems.
- d. Payment for your participation in the research project.

WITHDRAWAL

Your participation in this study is completely voluntary and you may choose to withdraw from the study at any time. If you choose to withdraw from the study, you will not be penalized in any way and you will not lose any benefits to which you were entitled.

However, you would not receive any further payments for study participation if you withdraw from the study. If you decide to discontinue treatment at Trinitas, you will still be asked to complete the follow-up interview by phone. However, the follow-up interview is also voluntary and you may withdraw from participation in the follow-up interview at any time.

NEW FINDINGS

During the course of the study, you will be told about any new information that may affect your willingness to remain in the study. Following your participation in the study, you will get more complete information about the study.

ALTERNATIVES

Your decision to participate or not in this study will not affect your eligibility for treatment services at Trinitas. Should you choose not to participate in the study, you will receive treatment as usual at Trinitas. You will not receive feedback after your intake interview. Alternative treatments are available to you at your own cost, and your therapist can assist you in making a referral to an alternative treatment agency, should you decide not to pursue treatment at Trinitas.

RESEARCH QUESTIONS

Any questions you have about the study should be directed to:

Blaise Worden, M.S., Center of Alcohol Studies, Rutgers, the State University of New Jersey, Piscataway, NJ, 08854-8001, 732-445-6111, ext. 935.

SUBJECT RIGHTS

If you have any questions about your rights as a research subject, you may contact:

Mr. James O'Dea, LCSW

Chief Social Worker at Trinitas Hospital

654 E. Jersey St., Elizabeth, NJ 07206

Phone # (908) 994-7110

Or the IRB Administrator at Rutgers University at:

Rutgers University, the State University of New Jersey

Institutional Review Board for the Protection of Human Subjects

Office of Research and Sponsored Programs

3 Rutgers Plaza

New Brunswick, NJ 08901-8559

Tel: 732-932-0150 ext. 2104

Email: humansubjects@orsp.rutgers.edu

You have been advised of the procedures to be followed, the possible occurrence of discomfort, if any; and of any benefits to be reasonably expected. You have been given the opportunity to ask questions and have had them satisfactorily answered. You are aware that you are free to withdraw from participation in this study at any time. By signing below, you agree to participate in this research study.

Subject Name

Signature of Participant

Date

I have explained the objectives of the study listed above and indicated any known risks to the participant. I have also answered the participant's questions concerning the procedures involved and explained that the participant is free to withdraw from this study at any time.

Signature of Investigator

Date

Signature of Witness

Date

If you have any questions regarding the study, please call the primary investigator,

Blaise Worden, at 732-407-1661. You may also contact:

Jim O'Dea, LCSW

Chief Social Worker, Trinitas Hospital

(908) 994-7110

You may also request study results, which will be provided to you at the completion of the study, estimated for fall of 2008.

If you have a psychiatric emergency, please call Trinitas Hospital's 24-hour psychology emergency crisis line, at 908-351-6684, or call 911.

This human subjects protocol was reviewed and approved by the Rutgers University Institutional Review Board (IRB) for the protection of human subjects on 1/3/08; approval of this form expires on 1/2/09.

Appendix B: Follow-Up Contact Sheet

Approximately 30 days from now, a member of our research staff will attempt to contact you by phone so that we can obtain follow-up information from you.

When you complete this follow-up, you will be given a \$10 giftcard in thanks for your participation.

What phone numbers may we try to contact you at? (*probe for at least one landline number*)

(_____)_____ Work Home Cell Other_____

(_____)_____ Work Home Cell Other_____

(_____)_____ Work Home Cell Other_____

Mail address:

If we are not able to contact you at any of the above numbers, who may we contact who may help us contact you? (*probe for client's mother's contact information first*)

Name: _____

Refused

Phone: _____

Relationship: _____

Name: _____

Refused

Phone: _____

Relationship: _____

Client's condition assignment: _____

Appendix C: Follow-Up Interview

Follow-Up Interview Date: _____ Participant ID: _____

Interviewer: Please record services provided by the treatment program (in program) separately from those provided by other sources (other).

In program/Other

Other

How many days in the past 30 days have you experienced significant medical problems?

Been hospitalized for physical medical problems?

Seen a physician, nurse, nurse practitioner, or physician's assistant for medical care?

How many days in the past 30 days have you been paid for working?

How many days in the past 30 days have you attended an AA or any (alcohol-related) 12-step meeting?

Been in outpatient treatment for an alcohol problem? _____

Probe: did you miss any days? How many?

Been in inpatient treatment for an alcohol problem? _____

How many days in the past 30 days have you attended NA or CA? _____

Been in outpatient treatment for a drug problem? _____

Been in inpatient treatment for a drug problem? _____

How many days in the past 30 have you been incarcerated? _____

How many days in the past 30 have you experienced significant family/social problems? _____

How many days in the past 30 have you been hospitalized for an emotional or psychological problem (not an alcohol or drug problem)? _____

Received outpatient treatment for an emotional or psychological problem (not an alcohol or drug problem)? _____

Appendix D: Feedback Template/Script

Materials needed:

- Client's ASI
- Calculator
- Tables
- Pencil

Hello, how are you? My name is _____. I am here to give you some feedback on the information you provided about your drinking during your intake interview. I am going to tell you about a variety of things, primarily how much you drink in relation to others who are like you. I am not here to tell you whether you should reduce your drinking or not. Most people find the information I'm going to give informative or interesting.

Anything you say here is confidential. This study is unconnected with your treatment at the clinic. Therefore, anything we talk about will not influence your treatment at this clinic. If you have any questions as we go along, feel free to interrupt me. Do you have any questions now?

In your intake interview, you said that you drank on approximately _____ days last month, which would be about _____ days/week. Is that correct? How many drinks would you say you drank on average, on each occasion? [*ask questions to determine approximate average number of standard drinks per per occasion: _____*]

First, I'd like to tell you how your drinking compares to others who are like you. The information I will be giving you comes from a recent large survey of random people across the nation, which asked about 43,000 people about their drinking habits. How many drinks do you think a man/woman your age drinks on a single occasion?

Client's response: _____

Let's take a look.

[see attached table 2, use it to calculate how many drinks a person of their age/gender has per occasion].

more than				
8 drinks				
6 drinks				
5 drinks				
4 drinks				
3 drinks				
2 drinks				
1 drink				
0 drinks				
	the amount you drink	your estimate of how much a person like you drinks	How much a typical person your age and sex ACTUALLY drinks	

[see attached table 1, use it to calculate participant's percentile, circling on the table how much they drink compared with others] This is your percentile. Basically, this means that you drink more than _____ (percent) of people who are your age and sex.

Less than three drinks per day is often considered to be “moderate” drinking, while more than three drinks is typically considered to be “heavy” (Klatsky, 2001). So based on this definition, you would probably be classified as a _____ drinker.

If you are/were a heavy drinker, you are/would be at higher risk for some heart problems (Klatsky, 2001), some forms of cancer—especially throat and mouth cancers (Duffy & Sharples, 1992), liver problems, alcohol poisoning, road injuries, and even injuries related to fire or assault (Greenfield, 2001). In addition, many people gain weight from drinking alcohol. Many drinks have approximately 100 calories. Based on the amount of drinking you reported, you consumed about _____ calories in alcohol alone over the past month, which is equivalent to eating about _____ McDonald's cheeseburgers. You would need to jog for about _____ minutes to burn off this many calories.

I'd also like to talk about blood alcohol level. Your blood alcohol level is a measure of how much alcohol is in your body. Some police officers assess blood alcohol level with a “breathalyzer” when they think a driver may have been drinking. Your blood alcohol level is based on how much alcohol you consume, whether you are male or female, and how much you weigh. Although it is more dangerous to drive when any alcohol is in your system than when you have not drunk, the legal driving blood alcohol level in New

Jersey is .08, which means that it is illegal to drive when you have this much alcohol in your body.

Based on your level of drinking, you are likely to be over this limit on at least _____ day per month.

You stated that you drank approximately _____ drinks per week in the last month. You also estimated that you spent \$_____ on alcohol in the past month. Although drinks may cost you more or less, if each drink cost you about \$3, you would be spending about _____ per week, and _____ per month on alcohol. That would also be _____ per year, if you drank in this pattern year-round. If you are spending this much on alcohol per year, then you are spending about _____% of your total yearly income on alcohol alone.

You also stated that you had problems or consequences related to drinking, including (list any/all consequences) _____

_____.

[Detach tables, give to client.]

Do you have any questions?

What do you think about this feedback?

Bibliography

- Aalto, M., Seppa, K., Mattila, P., Mustonen, H., Ruuth, K., Hyvarinen, H., Pulkkinen, H., Alho, H., & Sillanaukee, P. (2001). Brief intervention for male heavy drinkers in routine general practice: A three-year randomized controlled study. *Alcohol and Alcoholism, 36*(3), 224-230.
- Babor, T. F., Stephens, R. S., & Marlatt, G. A. (1987). Verbal report methods in clinical research on alcoholism: Response bias and its minimization. *Journal of Studies on Alcohol, 48*(5), 410-424.
- Bien, T. H., Miller, W. R., & Tonigan, J. S. (1993). Brief interventions for alcohol problems: A review. *Addiction, 88*(3), 315-335.
- Borsari, B., & Carey, K. B. (2003). Descriptive and injunctive norms in college drinking: A meta-analytic integration. *Journal of Studies on Alcohol, 64*(3), 331-341.
- Brown, J. M., & Miller, W. R. (1993). Impact of motivational interviewing on participation and outcome in residential alcoholism treatment. *Psychology of Addictive Behaviors, 7*(4), 211-218.
- Buckman, J. F., Bates, M. E., & Morgenstern, J. (2008). Social support and cognitive impairment in clients receiving treatment for alcohol- and drug-use disorders: A replication study. *Journal of Studies on Alcohol and Drugs, 69*(5), 738-746.
- Carey, Kate B. (1997). Reliability and validity of the time-line follow-back interview among psychiatric outpatients: A preliminary report. *Psychology of Addictive Behaviors, 11*(1), 26-33.
- Carey, K. B., Borsari, B., Carey, M. P., & Maisto, S. A. (2006). Patterns and importance of self-other differences in college drinking norms. *Psychology of Addictive Behaviors, 20*(4), 385-393.
- Chan, K. K., Neighbors, C., Gilson, M., Larimer, M. E., & Marlatt, G. A. (2007). Epidemiological trends in drinking by age and gender: Providing normative feedback to adults. *Addictive Behaviors, 32*(5), 967-976.
- Chang, G. (2000). Brief interventions for problem drinking and women. *Journal of Substance Abuse Treatment, 23*(1), 1-7.
- Chutuape, M. A., Jasinski, Donald R; Fingerhoo, Michael I; Stitzer, Maxine L. (2001). One-, three-, and six-month outcomes after brief inpatient opioid detoxification. *American Journal of Drug and Alcohol Abuse, 27*(1), 19-44.
- Clifford, P. R., & Maisto, S. A. (2000). Subject reactivity effects and alcohol treatment outcome research. *Journal of Studies on Alcohol, 61*(6), 787-793.
- Collins, S. E., Carey, K. B., & Sliwinski, M. J. (2002). Mailed personalized normative feedback as a brief interention for at-risk college drinkers. *Journal of Studies on Alcohol, 63*(5), 559-567.
- Cunningham, J. A., Wild, T. C., Bondy, S. J., & Lin, E. (2001). Impact of normative feedback on problem drinkers: A small-area population study. *Journal of Studies on Alcohol, 62*(2), 228-233.
- Dawson, D. A., & Archer, L. D. (1993). Relative frequency of heavy drinking and the risk of alcohol dependence. *Addiction, 88*(11), 1509-1518.
- Drake, R. E., McHugo, G. J., & Biesanz, J. C. (1995). The test-retest reliability of standardized instruments among homeless persons with substance use disorders. *Journal of Studies on Alcohol, 56*(2), 161-167.

- Drummond, D. C., Thom, B., Brown, C., Edwards, G., & Mullan, M. J. (1990). Specialist versus general practitioner treatment of problem drinkers. *Lancet*, 336(8720), 915-918.
- Epstein, E. E., Drapkin, M. L., Yusko, D. A., Cook, S. M., McCrady, B. S., & Jensen, N. K. (2005). Is alcohol assessment therapeutic? Pretreatment change in drinking among alcohol dependent females. *Journal of Studies on Alcohol*, 66(3), 369-378.
- Field, A. (2005). *Discovering Statistics Using SPSS*, 2nd Edition. London: Sage.
- Fleming, M. F., Mundt, M. P., French, M. T., Manwell, L. B., Stauffacher, E. A., & Barry, K. L. (2002). Brief physician advice for problem drinkers: Long-term efficacy and benefit-cost analysis. *Alcoholism: Clinical and Experimental Research*, 26(1), 36-43.
- Frazier, P. A., Tix, A. P., & Barron, K. E. (2004). Testing moderator and mediator effects in counseling psychology research. *Journal of Counseling Psychology*, 51(1), 115-134.
- Fromme, K., & Corbin, W. (2004). Prevention of heavy drinking and associated negative consequences among mandated and voluntary college students. *Journal of Consulting and Clinical Psychology*, 72(6), 1038-1049.
- Gibbs, L. (1983). Validity and reliability of the Michigan Alcoholism Screening Test: A review. *Drug and Alcohol Dependence*, 12(3), 279-285.
- Harris, A. H. S., Humphreys, K., Bowe, T., Kivlahan, D. R., & Finney, J. W. (2009). Measuring the quality of substance use disorder treatment: Evaluating the validity of the Department of Veterans Affairs continuity of care performance measure. *Journal of Substance Abuse Treatment*, 36(3), 294-305.
- Ichiyama, M. A., & Kruse, M. I. (1998). The social contexts of binge drinking among private university freshmen. *Journal of Alcohol and Drug Education*, 44(1), 18-33.
- Karlamangla, A., Zhou, K., Reuben, D., Greendale, G., & Moore, A. (2006). Longitudinal trajectories of heavy drinking in adults in the United States of America. *Addiction*, 101(1), 91-99.
- Karno, M. P., & Longabaugh, R. (2005). Less directiveness by therapists improves drinking outcomes of reactant clients in alcoholism treatment. *Journal of Consulting and Clinical Psychology*, 73(2), 262-267.
- Kristenson, H., Ohlin, H., Hulten-Nosslin, M., Trell, E., & Hood, B. (1983). Identification and intervention of heavy drinking in middle-aged men: Results and follow-up of 24-60 months of long-term study with randomized controls. *Alcoholism: Clinical and Experimental Research*, 7(2), 203-209.
- Kypri, K., & Langley, J. D. (2003). Perceived social norms and their relation to university student drinking. *Journal of Studies on Alcohol*, 64(6), 829-834.
- Larimer, M. E., Turner, A. P., Anderson, B. K., Fader, J. S., Kilmer, J. R., Palmer, R. S., Cronce, J. M. (2001). Evaluating a brief alcohol intervention with fraternities. *Journal of Studies on Alcohol*, 62(3), 370-380.
- Lewis, M. A., & Neighbors, C. (2004). Gender-specific misperceptions of college student drinking norms. *Psychology of Addictive Behaviors*, 18(4), 334-339.
- Maheswaran, R., Beevers, M., & Beevers, D. G. (1992). Effectiveness of advice to reduce alcohol consumption in hypertensive patients. *Hypertension*, 19(1), 79-84.

- Maisto, S. A., McKay, J. R., & Connors, G. J. (1990). Self-report issues in substance abuse: State of the art and future directions. *Behavioral Assessment, 12*(1), 117-134.
- Mäkela, K. (2004). Studies of the reliability and validity of the Addiction Severity Index. *Addiction, 99*(4), 398-410.
- Manwell, L. B., Fleming, M. F., Mundt, M. P., Stauffacher, E. A., & Barry, K. L. (2000). Treatment of problem alcohol use in women of childbearing age: Results of a brief intervention trial. *Alcoholism: Clinical and Experimental Research, 24*(10), 1517-1524.
- McAlaney, J., & McMahon, J. (2007). Normative beliefs, misperceptions, and heavy episodic drinking in a British student sample. *Journal of Studies on Alcohol and Drugs, 68*(3), 385-392.
- McLellan, A.T., Kushner, H., Metzger, D., Peters, R., Smith, I., Grissom, G., Pettinati, H. and Argeriou, M., (1992). The fifth edition of the Addiction Severity Index. *Journal of Substance Abuse Treatment, 9*, 199–213.
- Miller, W. R., Heather, N., & Hall, W. (1991). Calculating standard drink units: International comparisons. *British Journal of Addiction, 86*(1), 43-47.
- Miller, W. R., Benefield, R. G., & Tonigan, J. S. (1993). Enhancing motivation for change in problem drinking: A controlled comparison of two therapist styles. *Journal of Consulting and Clinical Psychology, 61*(3), 455-461.
- Miller, W. R., & Munoz, R. F. (2004). *Controlling your drinking: Tools to make moderation work for you*. New York: Guilford.
- Miller, W. R., & Rollnick, S. (2002). *Motivational interviewing: Preparing people for change*. New York: Guilford.
- Miller, W. R., & Sanchez, V. C. (1994). Motivating young adults for treatment and lifestyle change. In G. S. Howard & P. E. Nathan, (Eds.), *Alcohol use and misuse by young adults* (pp. 55-81). Notre Dame, IN: University of Notre Dame.
- Miller, W. R., & Sovereign, R. G. (1989). The check-up: A model for early intervention in addictive behaviors. In T. Løberg, W. R. Miller, P. E. Nathan, & G. A. Marlatt, (Eds.), *Addictive behaviors: Prevention and early treatment* (pp. 219-231). Amsterdam: Swets & Zeitlinger.
- Miller, W. R., Sovereign, R. G., & Krege, B. (1988). Motivational interviewing with problem drinkers: II. The Drinker's Check-up as a preventive intervention. *Behavioural Psychotherapy, 16*(4), 251-268.
- Monti, P. M., Colby, S. M., Barnett, N. P., Spirito, A., Rohsenow, D. J., Myers, M., Woolard, R., & Lewander, W. (1999). Brief intervention for harm reduction with alcohol-positive older adolescents in a hospital emergency department. *Journal of Consulting and Clinical Psychology, 67*(6), 989-994.
- Moyer, A., Finney, J. W., Swearingen, C. E., & Vergun, P. (2002). Brief interventions for alcohol problems: A meta-analytic review of controlled investigations in treatment-seeking and non-treatment-seeking populations. *Addiction, 97*(3), 279-292.
- Mun, E. Y., White, H. R., & Morgan, T. J. (2009). Individual and situational factors that influence the efficacy of personalized feedback substance use interventions for mandated college students. *Journal of Consulting and Clinical Psychology, 77*(1), 88-102.

- Mundt, M. P., French, M. T., Roebuck, M. C., Manwell, L. B., & Barry, K. L. (2005). Brief physician advice for problem drinking among older adults: An economic analysis of costs and benefits. *Journal of Studies on Alcohol*, 66(3), 389-394.
- Neal, D. J., & Carey, K. B. (2006). Developing discrepancy within self-regulation theory: Use of personalized normative feedback and personal strivings with heavy-drinking college students. *Addictive Behaviors*, 29(2), 281-297.
- Neighbors, C., Larimer, M. E., & Lewis, M. A. (2004). Targeting misperceptions of descriptive drinking norms: Efficacy of a computer-delivered personalized normative feedback intervention. *Journal of Consulting and Clinical Psychology*, 72(3), 434-447.
- Neighbors, C., Lewis, M. A., Bergstrom, R. L., & Larimer, M. E. (2006). Being controlled by normative influences: Self-determination as a moderator of a normative feedback alcohol intervention. *Health Psychology*, 25(5), 571-579.
- O'Brien, C. P. (2008). The CAGE Questionnaire for detection of alcoholism: A remarkably useful but simple tool. *JAMA: Journal of the American Medical Association*, 300(17), 2054-2056.
- Osilla, K. C., Zellmer, S. P., Larimer, M. E., Neighbors, C., & Marlatt, G. A. (2008). A brief intervention for at-risk drinking in an employee assistance program. *Journal of Studies on Alcohol and Drugs*, 69(1), 14-20.
- Pal, H. R., Yadav, D., Mehta, S., & Mohan, I. (2007). A comparison of brief intervention versus simple advice for alcohol use disorders in a north India community-based sample followed for 3 months. *Alcohol and Alcoholism*, 42(4), 328-332.
- Pallant, J. (2007). *SPSS Survival Manual*, 3rd Edition. New York: McGraw Hill.
- Rosenbloom, M. J., O'Reilly, A., Sassoon, S. A., Sullivan, E. V., & Pfefferbaum, A. (2005). Persistent cognitive deficits in community-treated alcoholic men and women volunteering for research: Limited contribution from psychiatric comorbidity. *Journal of Studies on Alcohol*, 66(2), 254-265.
- Rohsenow, D. J., Miranda, R. Jr., McGeary, J. E., & Monti, P. M. (2007). Family history and antisocial traits moderate naltrexone's effects on heavy drinking in alcoholics. *Experimental and Clinical Psychopharmacology*, 15(3), 272-281.
- Sanchez-Craig, M., Leigh, G., Spivak, K., & Lei, H. (1989). Superior outcome of females over males after brief treatment for the reduction of heavy drinking. *British Journal of Addiction*, 84(4), 395-404.
- Sanchez-Craig, M., Spivak, K., & Davila, R. (1991). Superior outcome of females over males after brief treatment for the reduction of heavy drinking: Replication and report of therapist effects. *British Journal of Addiction*, 86(7), 867-876.
- Slutske, W. S. (2005). Alcohol use disorders among US college students and their non-college-attending peers. *Archives of General Psychiatry*, 62(3), 321-327.
- Sobell, L. C., Agrawl, S., Sobell, M. B., Leo, G. I., Cunningham, J. A., & Johnson-Young, L. (2003, November). Responding to an advertisement: A critical event in promoting self-change of drinking behavior. Poster presented at the 37th annual meeting of the Association for the Advancement of Behavior Therapy.
- Sobell, L. C., & Sobell, M. B. (1996). *Timeline follow back: A calendar method for assessing alcohol and drug use (Users Guide)*. Toronto: Addiction Research Foundation.

- Sobell, M. B., & Sobell, L. C. (1993). *Problem drinkers: Guided self-change treatment*. New York: Guilford.
- Squires, D. D., & Hester, R. K. (2004). Using technical innovations in clinical practice: The Drinker's Check-Up software program. *Journal of Clinical Psychology, 60*(2), 159-169.
- Treatment Research Institute. (2006). Assessment instruments. Retrieved September 28, 2007, from <http://www.tresearch.org/resources/instruments.htm#manuals>
- University of Pennsylvania/Veterans Administration Center for Studies of Addiction, Philadelphia. (1990, April). *Addiction Severity Index: Manual and question by question guide*. Retrieved April 15, 2009, from the Treatment Research Institute Web site: <http://www.tresearch.org/resources/manuals/ASIQbyQGuide.pdf>
- Walters, S. T., Bennett, M. E., & Miller, J. H. (2000). Reducing alcohol use in college students: A controlled trial of two brief interventions. *Journal of Drug Education, 30*(3), 361-372.
- White, H. R., Morgan, T. J., Pugh, L. A., Celinska, K., Labouvie, E. W., & Pandina, R. J. (2006). Evaluating two brief substance-use interventions for mandated college students. *Journal of Studies on Alcohol, 67*(2), 309-317.
- World Health Organization Brief Intervention Study Group. (1996). A cross-national trial of brief interventions with heavy drinkers. *American Journal of Public Health, 86*(7), 948-955.
- Yahne, C. E., & Miller, W. R. (1999). Enhancing motivation for treatment and change. In B.S. McCrady & E. E. Epstein (Eds.), *Addictions: A comprehensive guidebook*. (pp. 235-249). London: Oxford University Press.
- Zweben, A., Pearlman, S., & Li, S. (1988). A comparison of brief advice and Conjoint Therapy in the treatment of alcohol abuse: The results of the Marital Systems Study. *British Journal of Addiction, 83*(8), 899-916.

Curriculum Vitae

BLAISE L. WORDEN

February 2007 – October 2010	Doctor of Philosophy, Clinical Psychology, Rutgers University
September 2004 - January 2007	Master of Science, Clinical Psychology, Rutgers University
May 1999 – December 2003	Bachelor of Arts, Psychology, University of Wisconsin

PRINCIPAL OCCUPATIONS

September 2004 – May 2009	Graduate Fellow, Rutgers Center of Alcohol Studies, Psychology
June 2009 – Present	Psychology Intern, Greater Hartford Internship Consortium, VA Connecticut Healthcare System/University of Connecticut Medical School/Community Mental Health Associates

PUBLICATIONS

- Badgio, P. & Worden, B. (2007). Cognitive functioning and aging in women. *Journal of Women and Aging, 19*(1), 13-30.
- Green, K., Worden, B., Menges, D., & McCrady, B. (2008). Alcohol Use Disorders. In J. Hunsley & E. Mash (Eds.), *A guide to assessments that work*. New York: Oxford.
- Al-Otaiba, Z., Worden, B. L., McCrady, B. S., & Epstein, E. E. (2008). Accounting for self-selected drinking goals in the assessment of treatment outcome. *Psychology of Addictive Behaviors, 22*(3), 439-443.
- Worden, B. L., McCrady, B. S., & Epstein, E. E. (2008). Assessment reactivity to follow-up in a study of women's treatment for alcohol dependence. *Addictive Behaviors, 33*(6), 831-