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Confirmatory Factor Analysis and Test-Retest Reliability of the Alcohol and Drug Confrontation Scale (ADCS)

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Abstract

The addiction field lacks an accepted definition and reliable measure of confrontation. The Alcohol and Drug Confrontation Scale (ADCS) defines confrontation as warnings about the potential consequences of substance use. To assess psychometric properties, 323 individual entering recovery houses in U.S. urban and suburban areas were interviewed between 2003 and 2005 (20% women, 68% white). Analyses included test-retest reliability, confirmatory factor analysis, and measures of internal consistency. Findings support the ADCS as a reliable way of assessing two factors: Internal Support and External intensity. Confrontation was experienced as supportive, accurate and helpful. Additional studies should assess confrontation in different contexts.

Keywords

Confrontation; Coercion; Pressure; Social Support; Confirmatory factor analysis

Interpersonal interactions have been hypothesized to influence substance use (Beattie, Longabaugh, Elliott, & Stout, 1993; Matzger, Kaskutas & Weisner, 2005), the probability that an individual will enter treatment (George & Tucker, 1996; Hasin, 1994) and how those who enter treatment respond to it (Goehl, Nunes, Quitkin & Hilton, 1993; Gogineni, Stein & Friedmann, 2001; Marlowe, Merikle, Kirby, Festinger & McLellan, 2001). These interactions can take the form of encouraging substance use, but they can also discourage substance use by expressing concern about negative consequences, requesting the individual change their use, or threatening consequences if changes are not made. Findings on attempts to get others to decrease or stop their use are mixed. Matzger et al. (2005) found pressure from family members to change drinking was associated with more drinking and decreased probability of treatment entry. In contrast, Hasin (1994) and George and Tucker (1996) found social pressure to change drinking was related to increased treatment entry. Brown, O'Grady, Battjes and Katz (2004) developed a measure to assess community support to enter treatment, the Community Assessment Inventory. Support and encouragement from family, extended family, friends and the community were viewed as facilitative of treatment entry by outpatient clients. In terms of treatment outcome, Polcin and Beattie (2007) found that individuals who received pressure to enter treatment from interpersonal sources (e.g., friends and family) and institutions (e.g. criminal justice and social welfare) had outcomes that were similar to other clients. However, Marlowe et al. (2001) found that clients who reported non-familial coercive pressure related to financial problems (e.g. serious debt) had better outcome than other clients.

It is important to sort out the effects of various types of pressure on substance use, treatment entry, and treatment outcome because pressure is commonly reported among individuals entering treatment (Marlowe et al., 2001; Polcin & Weisner, 1999). In particular, threatened consequences from the legal system have been found to be common precipitants to treatment entry (Farabee, Prendergast & Anglin, 1998; Polcin, 2001; Miller & Flaherty, 2000). McLellan (2006) reported that the majority of individuals entering substance abuse treatment in the U.S. do so under some form of institutional coercion. Approximately 59% enter treatment as a result of a mandate from the criminal justice system. Despite being coerced into treatment, outcomes for criminal justice mandated clients are comparable to voluntary clients (Farabee, et al., 1998; Miller & Flaherty, 2000; Polcin, 2001).

Less studied among illicit drug users are the effects of pressure from family, friends and peers. However, alcohol studies using general population samples have found that individuals frequently give and receive pressure designed to decrease drinking. For example, Room, Bondy and Ferris (1996) found that 35% of the general public in Ontario, Canada had commented on a friend's or relative's drinking within the past year, and 15% had suggested the person get help. In a U.S. population study, Room, Greenfield, and Weisner (1991) found that 33% of current drinkers had been pressured by at least one relative to cut down on their drinking. Before entering alcohol treatment, Room (1989) found that a majority of problem drinkers first experience social pressure to cut down their drinking and informally discuss drinking with others.

Confrontation

Confrontation has been used as a term to describe a general style of counseling in which the therapist argues with the client in an attempt to convince them that they have a problem with alcohol or drugs (Miller, Benefield & Tonigan, 1993). These approaches have been shown to be counter-therapeutic and studies have instead found that supportive relationships between clients and counselors are associated with positive outcome (Miller et al., 1995). For example, in the Miller et al. (1993) study, comparison of a motivational interviewing (supportive) style of counseling and one that was more a directive-confrontational resulted in better outcome for the former. However, more recently Moyers, Miller & Hendrickson (2005) found that some behaviors typically viewed as confrontational and therefore inconsistent with a supportive, motivational interviewing style (e.g., warning, raising concern, and giving advice) actually enhanced the therapeutic alliance when delivered from skilled therapists.

One problem in this area of study is that various types of pressures that clients receive have not been well defined and studies use different definitions. In a previous publication (i.e., Polcin, in press a), we offered specific definitions for different types of pressure that individuals with substance abuse problems might experience (e.g., coercion, pressure, and confrontation), including our proposed definition of confrontation that was used in developing the Alcohol and Drug Confrontation Scale (ADCS) (Polcin, Galloway & Greenfield, 2006):

Confrontation - the extent to which individuals are told that they face potential consequences (i.e. "bad things") if they do not make changes to address alcohol or drug problems or make changes to maintain sobriety."

In addition to inconsistent definitions, there are other shortcomings in how investigations of interpersonal pressure and their role in substance use have proceeded. First, most studies have not assessed the effects of pressure from multiple sources. Studies have tended to pick one or two sources (e.g. criminal justice system or family/friends) and documented the prevalence of pressure from that source, how it was associated with treatment entry, and

whether it had a relationship with long-term outcome. Second, pressure has been often conceived as a dichotomous variable, being present or absent in any individual case. Studies have failed to assess how frequency and quantity of pressure from different sources may be important in treatment entry or outcome. Third, existing studies have not assessed the individual's experience of the pressure they receive. To what extent does the individual view the confrontation as helpful or accurate? To what extent does the individual view the confronter as supportive in general and supportive of sobriety in particular? What attributions does the person make about the motivations of the confronter? Answers to these questions would help form a more comprehensive view of confrontation and perhaps provide crucial information about mediators and moderators of the impact of confrontation on outcome.

This paper attempts to bring clarity to the debates about pressure by presenting a new definition of confrontation and a structured way of measuring it using the Alcohol and Drug Confrontation Scale (ADCS) (Polcin, Galloway & Greenfield, 2006). The development of the instrument is described along with preliminary psychometric properties. We then present new psychometric testing that was conducted using test retest reliability, confirmatory factor analysis, and measures of internal consistency. The paper ends with a discussion of the implications of our findings and suggestions for further research.

The Alcohol and Drug Confrontation Scale (ADCS)

The ADCS (Polcin, et al., 2006) was designed as an attempt to address the current gaps and deficiencies in how confrontation has been defined and assessed. Our goal was to provide a valid and reliable way of assessing a supportive definition of confrontation. The ADCS includes 72 items assessing confrontation that participants received from 9 different sources during the past month: spouse/significant other, family, friends, coworkers, sober housing residents, healthcare professionals, mental health professionals, substance abuse professionals, and criminal justice professionals (see Polcin, et al., [2006] for a copy of the instrument and a more complete description). For each of the 9 sources of confrontation there are 8 questions:

1. How many [source] said that bad things would happen to you if you did not make changes to address drug or alcohol problems or if you did not make changes to maintain your sobriety? This variable is measured as a count, with the range for spouse/significant other restricted to 0–1. Responses of 0 resulted in skipping to the next source.
2. How often did your [source] say that bad things would happen to you if you did not make changes? This variable is measured along a 5-point Likert scale assessing how often participants report receiving confrontation during the past month from each source, ranging from “once” to “very often.”
3. Thinking about [source] who said bad things would happen if you did not make changes, how supportive of your sobriety are they? These items are rated along a 5-point Likert scale ranging from “very unsupportive” to “very supportive.”
4. Overall, how supportive is/are your [source] of you? These items are rated along a 5-point Likert scale ranging from “very unsupportive” to “very supportive.”
5. How much do you think [source] were trying to help you when they said that bad things would happen to you if you did not make changes? Responses are measured on a 5-point Likert scale ranging from “not at all” to “completely.”

6. When [source] said that bad things could happen, how accurate do you believe the statements were? Responses are measured on a 5-point Likert scale ranging from “not at all” to “completely.”
7. How emotional did the [source] seem when they said that bad things would happen if you did not make changes? Responses are measured on a 5-point Likert scale ranging from “not at all” to “extremely.” In our piloting of this item in the early stages of development of the ADCS (Polcin et al, 2006) we found participants interpreted “emotional” to mean care and concern rather than harsh or critical.
8. Thinking about the things that [source] said to you, how helpful to your recovery were the statements? Responses are measured on a 5-point Likert scale ranging from “very unhelpful” to “very helpful.”

In the initial testing of the ADCS on a sample of 108 participants entering sober living houses in California, a majority of respondents (60%) indicated that during the past month they received at least one confrontational statement from a family member. Other sources of confrontation that were common included spouse or significant other (56% of those in a significant relationship), friends (44%), substance abuse professionals (40%), other sober housing residents (25%), and criminal justice professionals (19%). Combining all sources together, participants indicated that they received confrontational statements during the past month from an average of 7.6 (8.8) individuals and 2.4 (1.6) different sources (Polcin, et al., 2006). Results indicated that the confrontational statements that respondents received and those who were confronting them were viewed in a positive manner across all sources. Most of the items assessing respondent perceptions of confrontations and confronters had means above 4 on a 5-point scale. Additionally, more frequent confrontation from more individuals and more sources was associated with more favorable views about relationships with confronters ($p < 0.001$) and more favorable views about the confrontations received ($p < 0.001$). This was a remarkably consistent finding across all sources of confrontation (Polcin, et al., 2006).

To further assess the psychometric properties of the instrument we conducted an initial factor analysis on a sample of 179 individuals from the same sample of individuals entering sober living houses (Polcin, Galloway, Bostrom & Greenfield, 2007). Results indicated a clear two factor solution within and across different sources of confrontation.

Scales were labeled “internal support” and “external intensity,” with items loading on the first scale addressing perceptions about supportiveness and helpfulness (i.e., an internal experience) and items loading on the second addressing intensity of confrontational statements (e.g., amount, frequency and tone of confronters). As expected, receipt of confrontation was associated with higher levels of substance use and higher problem severity at entry into the houses (Polcin & Greenfield, 2006), which provided initial support for construct validity. Further evidence for construct validity was obtained at 6-month follow up, when an analysis of 69 residents resulted in significant correlations between internal support confrontation on the ADCS and measures of social support for sobriety (Polcin & Greenfield, 2006).

Purpose

The purpose of the analysis reported here was to conduct a confirmatory factor analysis on the full dataset of 323 individuals entering recovery houses to further validate the factor structure of the instrument and assess whether refinements were necessary. In addition, we planned to assess test-retest reliability of ADCS items within each of the sources of confrontation.

Methods

Sample

Three hundred twenty three individuals with substance abuse problems who were entering residential social model treatment (N=23) or social model recovery homes (N=300) were interviewed during the first week of residence in the facility. All programs emphasized a peer oriented model of recovery that relies heavily on mutual help groups such as Alcoholics and Narcotics Anonymous. For a more complete description of the facilities used in the study see Polcin & Henderson (2008) and Polcin (in press b).

The sample consisted of 20% women, 68% white, 18% African American, 7% Latino and 7% other race. The average age was 38.2 (10.3) and half were not married or in a married like relationship. Referral sources varied, with 27% reporting they were referred from the legal system, 45% from family, friends or self, and 12% from inpatient treatment programs. The proportion meeting 12-month DSM-IV criteria for substance dependence included 51% for alcohol, 46% methamphetamines, 31% for cocaine and 39% for other substances.

Procedures

The analysis reported here was conducted as part of a larger 5-year study titled, “An Evaluation of Sober Living Houses,” (Polcin, in press b; Polcin & Henderson, 2008). In order to maximize generalization of results, all residents who were willing to provide informed consent were invited to participate. The study was approved by the Public Health Institute Institutional Review Board and a federal Certificate of Confidentiality was obtained to further protect confidentiality. The ADCS was administered within the first week of entering the residence and a second administration was conducted within the next three days on a convenience sample of 53 individuals to establish test – retest reliability. Time between administrations was limited to three days to avoid the potential for participants to receive more confrontational statements subsequent to the first administration and report differences based on this rather than reliability of the instrument.

Analysis

Test–retest analysis consisted of simple Pearson correlations. Establishing the factor structure of the instrument was conducted using Mplus statistical software (Muthén & Muthen, 2006) and proceeded through a number of steps. As a first step to exploring the overall factor structure of the ADCS, separate factor analyses were carried out on each of the 9 different sources of confrontation (e.g. family, friend, criminal justice system, peers, etc.). To be included in the factor analysis participants had to report that they received at least one confrontational comment in the last month. Individuals who reported receiving no confrontation could not be entered into the analysis because most scale items asked about participants’ perceptions about confrontational comments they received. The N of 256 for factor analysis of the ADCS was the result of 67 participants indicating that they received no confrontation. All combinations of estimation method (principal axis factoring, maximum likelihood), rotation procedure (orthogonal vs. oblique), and extraction criteria (all factors with eigenvalues > 1 vs. only the first two factors) were explored in order to explore the stability of the factors across sources. However, our primary purpose was to perform analysis of the overall instrument using the average of each item across the 9 sources. A loading of .40 was used as the cutoff.

The first item (number of individuals the respondent reported receiving confrontation from) was not included in the analyses due to its differential range across sources (only a dichotomous variable for the spouse source but an integer ≥ 1 for other sources). All other items took on values between 1 and 5. For each of the 7 items, a given source was included

in the average for a given respondent only if the respondent reported confrontation from that source.

In order to produce a single factor analysis which was intended to represent the average relationships among all confrontation variables (except for the count of the number of sources), an overall factor analysis was performed. For each respondent, the responses to the confrontation items across all of the domains for which the respondent reported 1 or more sources of confrontation. For example, if a given respondent reported 3 sources of confrontation (e.g., Family, Friends, and Mental Health Professionals), each of the 7 overall confrontation items were as the average of the same item across the 3 domains for which confrontation was reported.

The overall factor structure was produced using the average of items across all sources of confrontation in a factor analysis. Principal Axis factoring for estimation was used and a 2 dimensional solution and orthogonal factor rotations were used as the comparison model. The loadings produced from this overall factor solution (produced from the averaged items) were then used in an Exploratory Factor Analysis (EFA) in a Confirmatory Factor Analysis (CFA) framework (as discussed in (Muthén & Muthen, 2006) and fit was compared between models using the Comparative Fit Index (Rigdon, 1996). Mplus software was used for all analyses (Muthén & Muthen, 2006).

Results

Table 1 shows the number of residents receiving confrontational statements during the past month by source and the means and standard deviations of all items within each source. A majority of the sample (58%) reported receiving at least one confrontation from a family member during the past month. Other sources of confrontation that were relatively common were friends (45%) and substance abuse professionals (34%). When asked how many individuals within each source confronted them, the largest number came from other sober living residents (mean = 7.9, s.d. = 9.7). Other sources had substantially fewer numbers of individuals confronting, ranging for an average of 1.8(1.6) (criminal justice) to 3.6(3.7) (friends).

On other items on the ADCS there was more consistency across sources. For example, in terms of frequency of receiving confrontational statements (item 2 in Table 1), means ranged from 2.2(1.4) (criminal justice) to 3.4(1.4) family and spouse; the mean across all sources was 3.0(1.1), indicating “sometimes.” On items assessing how residents experienced confrontational statements we also found marked consistency across sources. For example, helpfulness of confrontation (question 8 in Table 1) had means that ranged from 3.8(1.1) (healthcare professional) to 4.4(0.9) (co-workers). Across all sources combined the helpfulness of confrontational statements was rated 4.0(0.8) on the 5-point scale. On the question assessing support for sobriety (question 3 in Table 1) means ranged from 3.9(0.9) (healthcare) and 3.9(1.2) criminal justice professionals) to 4.6(0.6) (substance abuse professionals). The overall mean was 4.4(0.8) on the 5-point scale. These findings suggest that in general confrontational comments were experienced as supportive and helpful.

When we tested the items of the ADSC with the same individuals at different time points (test-retest reliability), we found marked variation in the correlations across sources (see the bottom of Table 1). Some scales evidenced good reliability, such as healthcare (.86) and mental health (.84) professionals. Confrontation received from personal relationship sources, such as family, friends and peers had test – retest correlations that were more modest, ranging from .58 (family) to .75 (spouse). Most concerning was confrontation from substance abuse professionals ($r = .43$). While still a statistically significant correlation, the

smaller size of the relationship suggests more caution in interpreting confrontation from substance abuse professionals.

Table 2 depicts the results of the factor analysis aggregated across all sources. The first item from the instrument (number of individuals from each source who confronted the participant) was not used in this analysis because it was characterized as a dichotomous variable from spouse (yes/no) and a count variable within other sources. Consistent with previous psychometric work on the ADCS (Polcin et al., 2007), results across all sources yielded a 2-factor solution; factors were labeled “Internal Support” and “External Intensity.”

The items assessing support from confronters (items 2 and 3 in Table 2) and how much the confronter was believed to be motivated by a desire to help (item 4) loaded on the Internal Support factor. Thus, this factor taps into an internal experience about supportiveness of confrontational statements. The other factor, External Intensity, had items that assessed the frequency of confrontation (item 1), intensity of emotion during confrontations (item 6) and impact of confrontations (i.e., extent to which it was perceived as accurate [item 5] and helpful [item 7]). We labeled this factor External Intensity because the items tapped into the individual's view about the strength or potency of statements coming from those confronting them. Things like frequency, emotional intensity, accuracy, and helpfulness can be seen as distinct from the person's sense of supportiveness. Together, the 2 factors accounted for 60% of the variance.

To assess how well the data fit the model generated in the exploratory factor analysis we conducted confirmatory factor analysis. The final row in Table 1 shows the comparative fit indices (CFI) for each source of confrontation and the index for all sources combined (overall). It can be noted that several sources had indices generally considered to be good, $\geq .90$. These included family, friends, and substance abuse and criminal justice professionals. The overall CFI was .90. When we used the Root Mean Square Error of Approximation (RMSEA) (Muthen & Muthen, 2006) to assess the goodness of fit we found these sources had generally good fit, ranging from .05 (family and friends) to .08 (substance abuse and criminal justice professionals). The overall goodness of fit was .06, indicating that data across sources tended to validate the two factor structure of the ADCS. In addition, the overall SRMR (Standardized Root Mean Square Residual) was 0.03, which also indicated that the model fit was adequate. Separate analysis of each source yielded SRMR values ranging from .01 to .07.

Other sources of confrontation (spouse, sober living residents, health care and Mental Health Professionals) had relatively weaker psychometric properties. CFI's for these sources ranged from .80 (sober living residents) to .87 (spouse). Not surprising, these sources also had lower RMSEA values, ranging from .15 (mental health professionals) to .10 (healthcare professionals). Thus, confrontation from these sources was relatively less stable than other sources and the overall fit.

Although we found that our fit indices varied by source, we did find support for the internal consistency of items within sources. Cronbach's alphas were used to assess internal consistency of items within each source and yielded values generally considered acceptable (.65 to .92). The alpha across all sources was .90.

Discussion

Results from the confirmatory factor analysis and test-retest procedures generally support previous psychometric work on the ADCS (i.e., Polcin, et al., 2006; Polcin et al., 2007). Similar to our exploratory factor analysis on a smaller sample, results confirm a two factor solution for the ADCS: Internal Support (IS) and External Intensity (EI). Items loading on

the two scales in the analyses presented here were similar to the initial factor analysis. In both analyses items 2, 3 and 4 loaded on IS and 1, 5 and 6 loaded on EI. Differences included item 8 (helpfulness of confrontational statements), which loaded on IS in the first analysis and EI here. Another difference was that item 5 (how much the source of confrontation was trying to help) loaded nearly the same here but had more disparate loadings in the first analysis. Differences might be attributable to the smaller sample size in the first analysis (Polcin, et al., 2007). In addition, the first factor analysis used observations from baseline and six month follow up. The analysis reported here used a larger sample at baseline only. Thus, the factor structure of the ADCS might change to some degree at follow up time points, which could account for the differences. As described below, additional analyses that depict how the factor structure of the ADCS changes over time is the next step in its development. Finally, although we used the item assessing number of persons confronting the respondent on the first analysis, we decided to eliminate it for the analysis here because spouse was coded as yes/no whereas the other items were coded as on a 5-point Likert scale. Eliminating this item may have affected our results as well.

Examination of the set of items that loaded on IS revealed that confrontation was generally experienced as supportive. For example, respondents indicated that confronters were supportive of their sobriety, supportive of them in general, and motivated by a desire to help.

Part of the reason confrontation was received as supportive may have been due to the sample, which consisted of individuals entering recovery houses within their first week. Confrontational comments may have been experienced as efforts to help them succeed. It is unclear whether these kinds of confrontations would have the same effect on active users in a general population sample. The study by Matzger et al. (2005) suggests that the effects may be different in a general population sample and in fact could be counterproductive. Here one would expect to find lower means on items loading on IS. Confirmation of this hypothesis would of course require studies of the ADCS in a general population sample.

Results of the test-retest indicate that most of the domains of the instrument are reliable over different administrations. The one domain with some concern was confrontation from substance abuse treatment professionals, where there was some inconsistency. Thus, there may be something about confrontation from substance abuse professionals that is unique, and those features may not be well tapped here. For example, Moyers et al. (2005) found that confrontational interactions from substance abuse professionals enhanced the therapeutic alliance only when they evidenced a high level of interpersonal skill. Frequently clients in treatment programs will have multiple interactions with different staff members. If they had interactions with different professionals who varied in their skill level they may have had inconsistent experiences of confrontation that resulted in less stable perceptions over time.

The CFA results for all items across sources lend support for the construct validity of the instrument that adds to previous analyses (i.e., Polcin & Greenfield, 2006). In previous validation analyses we used scales derived from the exploratory factor analysis (EI and IS) and demonstrated initial construct validity through expected correlations with other measures. Higher levels of substance use and problem severity were associated with EI and measures of support for sobriety were associated with IS. Results here add to construct validity by showing that the overall data across sources was well fitted to the 2-factor model generated by exploratory factor analysis procedures.

However, when we examined the goodness of fit measures for individual sources we saw some variation. Family, Friends, Substance Abuse Professionals, Criminal Justice

Professionals showed good fit, while Spouse, Sober Living Residents, Health Care Professionals, and Mental Health Professionals showed relatively weaker fit. Part of the reason for less stability among these four scales is their smaller n for within source analyses. With the exception of criminal justice, sources with higher goodness of fit were those with larger n's. In the absence of larger n's for these sources, interpretation of findings within these sources should be viewed with some caution. However, the overall solution across all sources indicated good fit and thus supported the overall reliability of the ADCS.

Limitations and Need for Further Research

A number of limitations are inherent in our study. First, our sample was largely male and white and results might vary with different participant characteristics. This possibility is supported by a study on cocaine use by Havassy, Wasserman, and Hall (1995) who found that the effects of social support on abstinence varied by race. Although our previous analyses have not found differences in how confrontation is experienced among different racial or gender groups (Polcin, in press a), larger samples might find such differences. Results might also vary in different geographical areas and among clients in different treatment settings (e.g., outpatient programs, therapeutic communities, detoxification programs, professional psychotherapy, etc.).

Experiences of confrontation might also vary at different time points. The next steps in development of psychometric properties of the ADCS will be to examine the factor structure and scale correlates of our sample at 6 and 12 month follow up. For a variety of reasons the factor structure may change. Our sample here consisted of individuals entering residential recovery houses. Thus, the types of confrontational statements studied may have been experienced as attempts to help them succeed in their recovery. At 6 month follow up most of the residents will have left the recovery houses and nearly all will have left at 18 months. It is possible that some might at these later times experience confrontation as criticism or an attempt to control them. There also may be differences in both intensity of confrontation and how such efforts are experienced between those who have relapsed and those who have not. In our earlier study of the correlates of the ADCS (Polcin & Greenfield, 2006) we found that the amount of confrontation (EI) decreased between baseline and 6 months. However, supportiveness (IS) changed very little, indicating confrontational statements continued to be experienced in a positive manner. Whether this will be replicated using this larger sample or at more distant time points (12 and 18 month follow up) remains to be seen. In addition, predictive validity measures are needed to show that when confrontation is experienced as supportive it results in better outcome. The findings here are limited to participants' perceptions about the effects of confrontation rather than measures of behavioral change.

Depicting the course of confrontation, how it is experienced over longer time periods, and the factors with which it correlates is significant for a number of reasons. Treatment providers as well as family, friends, employers and a variety of professionals are in need of guidance about when confrontation is helpful and when it is counterproductive. Confrontation at the start of recovery may have a different impact than confrontation later in recovery or after sustained abstinence has been achieved. Future analyses will inform professionals and others whether confrontation about potential harm helps increase retention while individuals are in treatment and whether it helps those who have relapsed reestablish sobriety more quickly. Additional analyses will also identify other circumstances in which confrontation is associated with undesirable correlates, and hence counterindicated.

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Biographies

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References

- Beattie MC, Longabaugh R, Elliott G, Stout RL. Effect of social environment on alcohol involvement and subjective well-being prior to alcoholism treatment. *Journal of Studies on Alcohol* 1993;54(3): 283–296. [PubMed: 8387616]
- Brown BS, O'Grady KE, Battjes RJ, Katz EC. The Community Assessment Inventory: Client views of supports to drug abuse treatment. *Journal of Substance Abuse Treatment* 2004;27:241–251. [PubMed: 15501377]
- Farabee D, Prendergast M, Anglin D. The effectiveness of coerced treatment for drug-abusing offenders. *Federal Probation* 1998;62:3–10.
- George A, Tucker J. Help-seeking for alcohol-related problems: social contexts surrounding entry into alcoholism treatment or Alcoholics Anonymous. *Journal of Studies on Alcohol* 1996;57:449–457. [PubMed: 8776687]
- Goehl L, Nunes E, Quitkin F, Hilton I. Social networks and methadone treatment outcome: The costs and benefits of social ties. *The American Journal of Drug and Alcohol Abuse* 1993;19:251–262. [PubMed: 8213691]
- Gogineni A, Stein MD, Friedmann PG. Social relationships and intravenous drug use among methadone maintenance patients. *Drug and Alcohol Dependence* 2001;64:47–53. [PubMed: 11470340]
- Hasin DS. Treatment/Self-help for alcohol-related problems: Relationship to social coercion and alcohol dependence. *Journal of Studies on Alcohol* 1994;55:660–666. [PubMed: 7861793]
- Havassy B, Wasserman D, Hall S. Social relationships and abstinence from cocaine in an American treatment sample. *Addiction* 1995;90:699–710. [PubMed: 7795506]

- Marlowe DB, Merikle EP, Kirby KC, Festinger DS, McLellan AT. Multidimensional assessment of perceived treatment-entry pressures among substance abusers. *Psychology of Addictive Behaviors* 2001;15:97–108. [PubMed: 11419236]
- Matzger H, Kaskutas LA, Weisner C. Reasons for drinking less and their relationship to sustained remission from problem drinking. *Addiction* 2005;100:1637–1646. [PubMed: 16277625]
- McLellan, AT. What are the evidence-based administrative practices? Systems issues that impede delivery of effective treatment.. The 11th. International Conference on Treatment of Addictive Behaviors.; Santa Fe, New Mexico. Jan. 2006
- Miller WR, Benefield RG, Tonigan JS. Enhancing motivation for change in problem drinking: A controlled comparison of two therapist styles. *Journal of Consulting and Clinical Psychology* 1993;61(3):455–461. [PubMed: 8326047]
- Miller, WR.; Brown, JM.; Simpson, TL.; Handmaker, NS.; Bien, TH.; Luckie, LF.; Montgomery, HA.; Hester, RK.; Tonigan, JS. What works? A methodological analysis of the alcohol treatment outcome literature.. In: Hester, RK.; Miller, WR., editors. *Handbook of alcoholism treatment approaches: Effective alternatives*. Allyn & Bacon; Boston, MA: 1995.
- Miller NS, Flaherty JA. Effectiveness of coerced addiction treatment (alternative consequences): A review of the clinical research. *Journal of Substance Abuse Treatment* 2000;18:9–16. [PubMed: 10636601]
- Moyers TB, Miller WR, Hendrickson S. How does motivational interviewing work? Therapist interpersonal skill predicts client involvement within motivational interviewing sessions. *Journal of Clinical and Consulting Psychology* 2005;73(4):590–598.
- Muthén, LK.; Muthén, B. Mplus version 4.1. Muthén & Muthén; Los Angeles, CA: 2006.
- Polcin DL. Criminal justice coercion in the treatment of alcohol problems: An examination of two client subgroups. *Journal of Psychoactive Drugs* 1999;31(2):137–143. [PubMed: 10437996]
- Polcin DL. Drug and alcohol offenders coerced into treatment: A review of modalities and suggestions for research on social model programs. *Substance Use and Misuse* 2001;36:589–608. [PubMed: 11419489]
- Polcin DL. Who receives confrontation in recovery houses and when is it experienced as supportive? *Addiction Research and Theory*. (in press a).
- Polcin DL. A model for sober housing during outpatient treatment. *Journal of Psychoactive Drugs*. (in press b).
- Polcin DL, Beattie M. Relationship and institutional pressure to enter treatment: Differences by demographics, problem severity and motivation. *Journal of Studies on Alcohol and Drugs* 2007;68(3):428–436. [PubMed: 17446983]
- Polcin DL, Galloway G, Bostrom A, Greenfield TK. Factor analysis of the Alcohol and Drug Confrontation Scale (ADCS). *Addictive Behaviors* 2007;32:2274–2280. [PubMed: 17270360]
- Polcin DL, Galloway GP, Greenfield TK. Measuring Confrontation during Recovery from Addiction. *Substance Use and Misuse* 2006;41:1–24. [PubMed: 16393732]
- Polcin DL, Galloway GP, Taylor K, Benowitz-Fredericks A. Why we need to study sober Living houses. *Counselor: The Magazine for Addiction Professionals* 2004;5(5):36–45.
- Polcin DL, Greenfield TK. Confrontation about potential harm related to substance use: Changes in and correlates of confrontation in sober living houses. *Therapeutic Communities* 2006;27(3):373–386.
- Polcin DL, Henderson D. A clean and sober place to live: Philosophy, structure, and purported therapeutic factors in sober living houses. *Journal of Psychoactive Drugs* 2008;40(2):153–159. [PubMed: 18720664]
- Polcin DL, Weisner C. Factors associated with coercion in entering treatment for alcohol problems. *Drug and Alcohol Dependence* 1999;54:63–68. [PubMed: 10101618]
- Rigdon EE. CFI versus RMSEA: a comparison of two fit indexes for structural equation modeling. *Structural Equation Modeling* 1996;3(4):369–379.
- Room R. The U.S. general population's experiences of responding to alcohol problems. *British Journal of Addiction* 1989;84:1291–1304. [PubMed: 2597806]
- Room R, Bondy S, Ferris J. Determinants of suggestions for alcohol treatment. *Addiction* 1996;91(5): 643–655. [PubMed: 8935250]

- Room R, Greenfield T, Weisner C. People who might have liked you to drink less: changing responses to drinking by U.S. family members and friends, 1979–1990. *Contemporary Drug Problems* 1991;18(4):573–595.
- Schmidt, L.; Weisner, C. Developments in alcoholism treatment: a ten year review.. In: Galanter, M., editor. *Recent developments in alcoholism*. Vol. 11. Plenum; New York: 1993. p. 369-396.

Table 1

Confrontation item means, standard deviations, test-retest correlations, reliabilities and CFIs

SOURCE QUESTION MEAN (S.D.)	SPOUSE/PARTNER N=63	FAMILY N=189	FRIENDS N=145	COWORKERS N=9	SOBER LIVING RESIDENTS N=91	HEALTHCARE PROFESSIONALS N=39	MENTAL HEALTH PROFESSIONALS N=30	SUBSTANCE ABUSE PROFESSIONALS N=110	CRIMINAL JUSTICE PROFESSIONALS N=60	OVERALL N=256
# of persons Confronting	1.0 (0.0)	3.0 (2.5)	3.6 (3.7)	1.2 (0.4)	7.9 (9.7)	1.9 (1.6)	2.0 (1.5)	3.1 (2.3)	1.8 (1.6)	3.1 (3.0)
How often did (source) say bad things would happen if you didn't make changes ?	3.4 (1.4)	3.4 (1.4)	3.2 (1.3)	3.3 (1.7)	3.1 (1.5)	2.6 (1.6)	3.0 (1.7)	3.3 (1.5)	2.2 (1.4)	3.0 (1.1)
How supportive of your sobriety is (source) ?	4.2 (1.3)	4.5 (1.0)	4.4 (0.9)	4.2 (1.4)	4.5 (0.6)	3.9 (0.9)	4.3 (0.8)	4.6 (0.6)	3.9 (1.2)	4.4 (0.8)
Overall, how supportive is (source) ?	4.2 (1.3)	4.4 (1.0)	4.4 (0.9)	3.8 (1.4)	4.3 (0.7)	3.8 (1.0)	4.1 (1.0)	4.3 (1.0)	3.8 (1.1)	4.3 (0.8)
How much do you think (source) were trying to help you ?	4.0 (1.3)	4.5 (0.9)	4.2 (0.9)	4.3 (1.1)	4.2 (0.8)	3.8 (0.9)	4.0 (1.2)	4.3 (1.0)	3.7 (1.3)	4.2 (0.8)
How accurate do you believe (source) statements to be ?	4.1 (1.1)	4.3 (0.9)	4.2 (1.2)	3.8 (1.5)	4.5 (0.8)	4.3 (0.8)	4.4 (0.9)	4.5 (0.8)	4.4 (1.0)	4.3 (0.8)
How emotional were (source) ?	3.8 (1.2)	3.7 (1.2)	3.4 (1.2)	3.4 (1.7)	3.2 (1.1)	2.8 (1.3)	2.6 (1.5)	3.3 (1.3)	2.6 (1.5)	3.3 (1.0)
How helpful was (source) to your recovery ?	3.9 (1.2)	4.0 (1.0)	4.2 (0.8)	4.4 (0.9)	4.2 (0.8)	3.8 (1.1)	3.9 (1.1)	4.3 (0.9)	4.0 (1.2)	4.0 (0.8)
Cronbach's Alpha	.73	.65	.76	.92	.71	.75	.75	.77	.81	.76
Test / Retest Correlation	.75	.58	.60	.99	.60	.86	.84	.43	.65	--
RMSEA	.14	.05	.05	--	.13	.10	.15	.08	.08	.06
CFI	.87	.97	.98	--	.80	.90	.85	.94	.95	.90

Table 2

Factor Loadings

	FACTOR 1: INTERNAL SUPPORT	FACTOR 2: EXTERNAL INTENSITY
How often did (source) say bad things would happen if you didn't make changes ?	.02	.40
How supportive of your sobriety is (source) ?	.84	.13
Overall, how supportive is (source) ?	.85	.20
How much do you think (source) were trying to help you ?	.47	.45
How accurate do you believe (source) statements to be ?	.25	.48
How emotional were (source) ?	.14	.68
How helpful was (source) to your recovery ?	.22	.62
Eigen Value	2.9	1.3
% Variance	42.1	17.9