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Acceptance and relationship context: a model of substance use disorder treatment outcome

Elizabeth V. Gifford, Jennifer B. Ritsher, John D. McKellar & Rudolf H. Moos

VA Palo Alto Health Care System, Center for Health Care Evaluation, Menlo Park, CA, USA

ABSTRACT

Aims This study presented and tested a model of behavior change in long-term substance use disorder recovery, the acceptance and relationship context (ARC) model. The model specifies that acceptance-based behavior and constructive social relationships lead to recovery, and that treatment programs with supportive, involved relationships facilitate the development of these factors. **Design** This study used a prospective longitudinal naturalistic design and controlled for baseline levels of study variables. **Setting and participants** The model was tested on a sample of 2549 patients in 15 residential substance use disorder treatment programs. **Measurements** Acceptance-based responding (ABR), social relationship quality (SRQ), treatment program alliance (TPA) and substance use-related impairment were assessed using interviews and self-report questionnaires. **Findings** TPA predicted ABR and SRQ and, in turn, ABR predicted better 2-year and 5-year treatment outcomes. The baseline-controlled model accounted for 41% of the variance in outcome at 2-year follow-up and 28% of the variance in outcome at 5-year follow-up. **Conclusions** Patients from treatment programs with an affiliative relationship network are more likely to respond adaptively to internal states associated previously with substance use, develop constructive social relationships and achieve long-term treatment benefits.

Keywords Acceptance-based responding, social networks, substance-related disorders, therapeutic alliance, treatment outcome.

Correspondence to: Elizabeth Gifford, Center for Health Care Evaluation, 795 Willow Road (MPD 152), Menlo Park, CA 94125, USA.
E-mail: elizgifford@earthlink.net
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INTRODUCTION

A substantial body of research indicates that different empirically supported substance use disorder (SUD) treatments produce basically comparable results (e.g. Project MATCH) [1]. Hypothesized mechanisms described in specific treatment rationales often fail to capture the critical processes of change [2,3], and common processes strongly influence treatment outcomes [4]. Thus, while evidence about overall treatment efficacy continues to mount [5], our understanding of the curative processes initiated by SUD treatment remains limited.

The current study presents and tests a functional model of common factors contributing to the positive outcome of SUD treatment, the acceptance and relationship context (ARC) model. The primary elements of the ARC model—treatment program alliance (TPA), acceptance-based responding (ABR) and social relationship quality (SRQ)—have all been tied independently to SUD treatment outcomes. We review each of these elements separately and then describe how they interrelate and are conceptualized as components of the overall process of change outlined in the ARC model. We then evaluate the model in a large longitudinal sample of patients in 15 residential treatment programs.

Treatment program alliance (TPA)

TPA is a construct based in the literatures on treatment environments and therapeutic alliance. The social climate of treatment settings [6] predicts a variety of positive outcomes, including more patient satisfaction and a higher likelihood of setting personal goals in treatment [7,8], larger social support networks and more support from family members and friends [9] and more improvement on substance use and mental health problems [10–12]. The patient–therapist relationship also predicts important treatment out-

comes, including proximal outcomes such as treatment engagement and retention [13–15]. Because SUD treatment is delivered primarily in a group format, and patients participate in multiple groups, the salient relationships in SUD treatment programs include a variety of staff members and other patients. Extrapolating from the alliance construct used in individual treatment [16], and integrating this with the social climate construct, alliance in SUD treatment settings includes patients' affinity with this network of relationships which we describe as TPA.

Acceptance based responding (ABR)

A common goal of treatment is to help patients accept cravings, negative affect or other internal stimuli that often drive the use of substances, respond with constructive alternatives to substance use and remain abstinent [17]. In this conceptualization, acceptance is an awareness or acknowledgement of one's internal experiences that makes it possible to respond to these experiences in a constructive fashion. We describe this repertoire of responses as ABR [18–20].

Acceptance is associated with approach coping [21], which predicts better SUD outcomes [22]. Conversely, non-acceptance (i.e. 'denial') is associated with avoidance coping and poorer SUD treatment outcomes [22]. Accordingly, individuals who become aware of and accept these internal states and respond adaptively are likely to have better SUD treatment outcomes [23].

ABR encompasses three constructs that underlie adaptive responding to temptation. The first is approach coping, defined as coping that actively acknowledges and addresses experiences such as temptation, cravings and distress [24]. The second is situational confidence in accepting internal states and remaining abstinent [25]. The third component is a flexible coping repertoire, defined as the use of a range of adaptive cognitive and behavioral alternatives to substance use, while experiencing temptation [26]. These three constructs predict positive treatment outcome [22,27–29] and, integrated into the present model, describe a core functional response: the individual's ability to accept internal stimuli linked previously to using substances and to respond adaptively to them.

Social relationship quality (SRQ)

There is robust evidence that positive social relationships outside treatment can have a profound impact on the course of SUD. Patients without any close friends are more likely to have a deteriorating course of SUD [30] and abstinence-supportive social networks lead to reduced substance abuse [31,32]. We use the term SRQ to describe the individual's network of extra-treatment relationships that can support the changes that may take place in treatment. People with higher-quality networks receive and rely upon more abstinent-specific support from a larger number of close friends.

The acceptance and relationship context (ARC) model

The above three factors (TPA, ABR and SRQ) are related integrally to one another. Studies of treatment process have emphasized the importance of the therapeutic relationship in treatment [33,34] and its connection with acceptance or 'openness to experience' [35–37]. Studies on social context and coping indicate that a constructive relational climate facilitates approach coping, and that both social context and approach coping are related meaningfully to SUD outcomes [6,38,39].

The ARC model is based on these converging findings. The ARC model specifies that supportive, engaging program relationships foster acceptance and appropriate responses to internal states linked to substance use, and thereby produce better SUD outcomes (Fig. 1). ABR also fosters constructive ongoing social relationships.

This study tested the following hypotheses based on the overall model: (a) TPA predicts ABR and SRQ, (b) ABR and SRQ predict less substance use-related impairment (SUI) at 2 years post-treatment, (c) ABR reduces the strength of the direct relationship between TPA and outcomes, (d) the above model generalizes to SUI at 5 years post-treatment and (e) in this 5-year model greater ABR after treatment predicts greater SRQ.

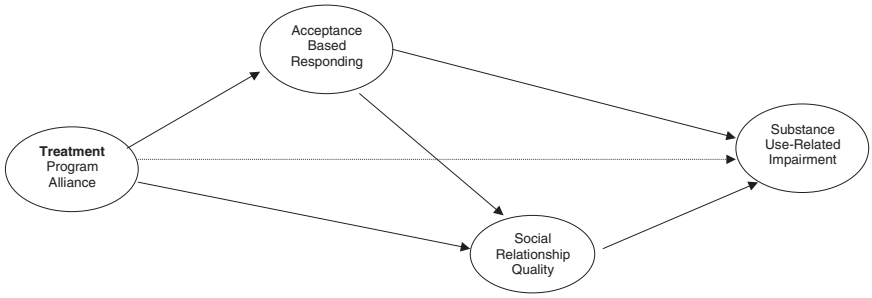

Figure 1 Hypothesized structural model of influence of acceptance and relationship contexts on long-term substance use disorder outcomes. Circles represent latent variables, dotted line indicates mediated path in the theoretical model

METHODS

Participants

The baseline sample was composed of 3698 male patients assessed at intake. A total of 441 of these patients died during the 5-year follow-up interval. A total of 2549 patients, 78% of those who were still alive, completed the 5-year follow-up and constitute the sample on which we focus. Patients' mean age was 42.32 (SD = 9.08), and their mean years of education were 12.74 (SD = 1.74). Only 18.5% were currently married, 44.4% identified themselves as white and 40.2% had been in in-patient substance abuse treatment in the past 2 years.

Patients were treated in one of 15 Veterans Affairs (VA) residential treatment programs. Five of these programs were 12-Step, five were cognitive–behavioral (CB) and five were eclectic in orientation. Twelve-Step programs emphasized 12-Step meetings, psychotherapy groups that focused upon working the steps, meeting with a sponsor and attending meetings. Twelve-Step treatment objectives included acceptance of alcoholic/addict identity, development of a supportive abstinence-oriented social network, awareness of 'slippery' situations including negative feelings (e.g. hunger, anger, loneliness and fatigue) and maintaining abstinence by performing 12-Step activities on a daily basis. CB programs emphasized cognitive and behavioral skills training, participation in CB therapy groups and relapse prevention. CB program objectives included awareness of triggers for using drugs or alcohol, adaptive ways of coping with these triggers and self-efficacy and mastery in temptation situations. Eclectic programs ascribed to a combination of 12-Step and CB goals, including awareness of situations triggering urges and substance use, constructive alternatives to using and social support [40].

Procedures

Research staff independent of the treatment program asked patients to complete a background information form at baseline, a discharge information form at discharge and a follow-up information form at 1-year, 2-year and 5-year follow-ups. All assessments were made at every time-point, except for the TPA measures, which were given at discharge. More detailed descriptions of procedures can be found elsewhere [40].

Measures

TPA indicators

The TPA construct describes the quality of the patient's relationship with, and alliance to, their treatment program. This construct has three indicators: program support, program involvement and the bond between program and patients based on common goals and tasks (a common conceptualization of alliance) [16].

1 Program support was measured using the support subscale from the Community Oriented Program Environment Scale (COPES) [41], which is composed of 10 true–false items (alpha = 0.69). The scale measures staff support for patients and the extent to which patients are helpful and supportive towards other patients. Items include 'patients are given a great deal of individual attention here' and 'the healthier patients here help take care of the less healthy ones'.
2 Program involvement was measured using the involvement subscale from the COPES, which is a 10-item scale that assesses the level of patient involvement with their treatment program (alpha = 0.74). Items include 'patients put a lot of energy into what they do here', and 'there is very little group spirit in this program (false)'.
3 Common program and patient goals were measured using an 11-item scale constructed to assess the fit between program and patient goals, tasks and needs. This scale included three items developed for the current study designed to assess patient–program goal agreement, and eight items adapted from the Patient Satisfaction Questionnaire [42]. Items included: 'To what extent did you and the treatment staff agree on the goals for your treatment?'. Items were rated on a scale of 1–4 (alpha = 0.92).

ABR indicators

ABR has three indicators: self-efficacy or confidence in the ability to remain abstinent while experiencing internal states linked previously to using substances, adaptive cognitive and behavioral strategies employed while accepting the experience of temptation, and approach coping.

1 Situational confidence in accepting and responding constructively to the awareness of internal triggers was measured using 14 items from the Situational Confidence Scale [43], adapted for use with individuals who have alcohol [44] and drug disorders. These items assess patients' confidence that they can control their using/drinking while they are aware of internal states related to difficulty remaining abstinent. Two items highly correlated with the overall score were taken from each of seven subscales, including negative emotional states, negative physical states, positive emotional states, testing personal control, urges and temptations, interpersonal conflict and social pressure (alpha = 0.95). Patients were asked to imagine that they were experiencing one of a variety of temptation states, and asked to rank their confidence (from 0 to 100) that they could remain abstinent; for example, in

situations such as 'If I suddenly had an overwhelming urge to drink/use'.

2 Adaptive responses while accepting the experience of temptation were measured using 15 items that describe cognitive and behavioral alternatives to substance use. Participants were asked to indicate what they do when they experience temptation and want to stop themselves from drinking/using, for example: 'I do something else instead of drinking/using when I need to relax'. The items were taken from the Processes of Change Inventory [26,45]. These items were scored on frequency of occurrence from 1 (never) to 5 (often).

3 Approach coping (alpha = 0.88) was measured with two approach coping subscales of the Coping Responses Inventory (CRI [46]). The 12 items on these two subscales measure positive reappraisal (cognitive) and problem-solving action (behavioral) coping strategies oriented toward approaching stressors. The items were scored 1 (definitely no), 2 (mainly no), 3 (mainly yes) or 4 (definitely yes). Examples include 'Did you know what had to be done and try hard to make things work?'.

SRQ indicators

SRQ refers to the caliber of the social resources available to the individual, and has three indicators.

1 Recovery-related social support was measured with four items adapted from the Social Network Social Influence Scale (SNSIS [47]) to apply to quitting drugs or alcohol (alpha = 0.85), for example: 'My friends provide encouragement in dealing with difficult situations related to quitting drugs or alcohol'. This indicator taps recovery-supportive social influences from friends. The scale ranges from 1 (never) to 5 (often).

2 Friend resources were measured using the Friend Interpersonal Resources Subscale from the Life Stressors and Social Resources Inventory (LISRES [48]; alpha = 0.89). This subscale is the sum of scores on six items on five-point Likert-type scales ranging from 1 (never) to 5 (often). Items include 'Can you count on your friends to help you when you need it?'.

3 Number of friends was measured by asking participants 'how many close friends do you have, people you feel at ease with and can talk to about personal matters?'.

SUI indicators

SUD-related impairment has three indicators: the frequency of substance use, problems stemming from substance use, and emotional distress.

1 Frequency of drug or alcohol use in the past 3 months was reported by participants with five response options for each substance (0 = never, 1 = less than once a week, 2 = 1–3 days a week, 3 = 4–6 days a week, 4 = every day). Separate scores for each substance (e.g. cocaine, methamphetamines, amphetamine, heroin, other opiates, tranquilizers, inhalants, alcohol) and each method of administration (e.g. smoked, injected, ingested) were summed to derive a composite score (alpha = 0.92).

2 Substance use-related problems were measured using a scale developed to assess the negative consequences of alcohol and drug use, including domains such as health, legal, monetary, occupational, intra- and interpersonal and residential problems ([49]; alpha = 0.88). The 18 items are scored on a five-point scale ranging from 0 (never) to 4 (often). Participants are asked 'In the past 3 months, how often have you had any of the following problems or experiences as a result of your drinking and/or drug use?'. Individual items include 'health problems', 'problems with your job', 'legal problems', etc.

3 Emotional distress was measured using 12 items comprising the depression and anxiety subscales from the Brief Symptom Inventory [50,51], summed to create the distressed mood scale ([52]; alpha = 0.93). Each of the 12 items was rated on a five-point scale (0 = not at all to 4 = extremely). For example, participants were asked the extent to which they were distressed or bothered by 'feelings of worthlessness'.

Model specification and evaluation strategy

Structural Equation Modeling (SEM), using LISREL version 8.5 SIMPLIS™ software, was employed to evaluate the model presented in Fig. 1. SEM tests relationships between latent variables that are free of the measurement error associated with individual observed measurement instruments. SEM is particularly well suited for testing complex relationships among model components, including isolating the relationships among different latent variables. We used a common two-step analysis approach [53]. The first step specifies the measurement instruments, or manifest model, in which multiple measures are tested as indicators of each latent variable using confirmatory factor analysis. The second step tests the theoretical model, i.e. the relationships among the latent factors, incorporating all latent variables. Where appropriate, we also conducted subsidiary mediational analyses [54]. Baseline measures of SUD-related impairment, ABR and SRQ were included in all models to control for pre-treatment differences.

Two models were tested, one at 2 years and one at 5 years. As shown in Fig. 2, the 2-year model incorporates a total of 21 indicators and seven latent variables: baseline SUD-related impairment, baseline ABR and baseline SRQ; TPA measured at discharge; ABR and SRQ measured at 1-year follow-up; and SUD-related impairment measured at 2-year follow-up. The initial model based upon outcome at 2 years was then replicated and extended using 5-year

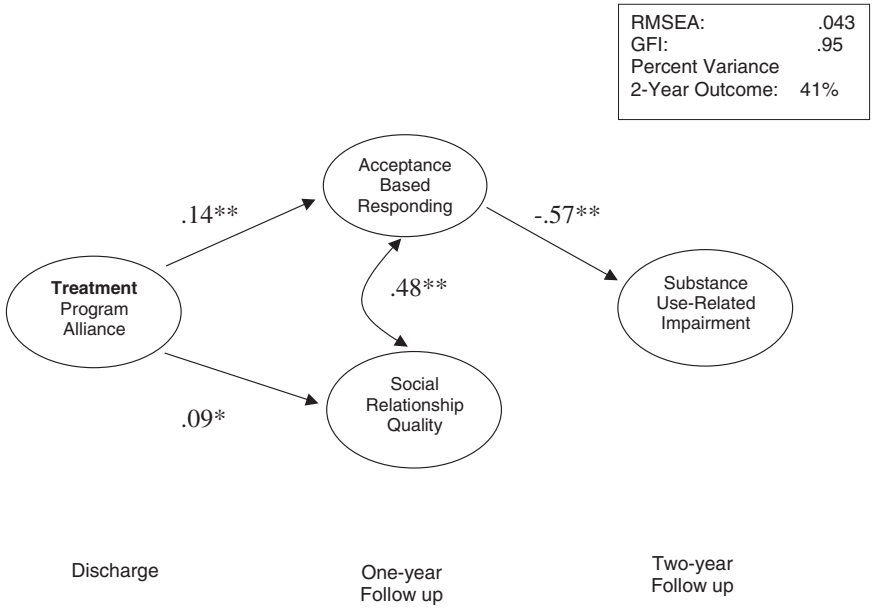

Figure 2 Two-year acceptance and relationship context structural model controlled for baseline values of each latent variable (*n = 2549*), with standardized parameter estimates. Non-significant paths are removed from the hypothesized full model. For path parameters: * *P* < 0.05; ** *P* < 0.01

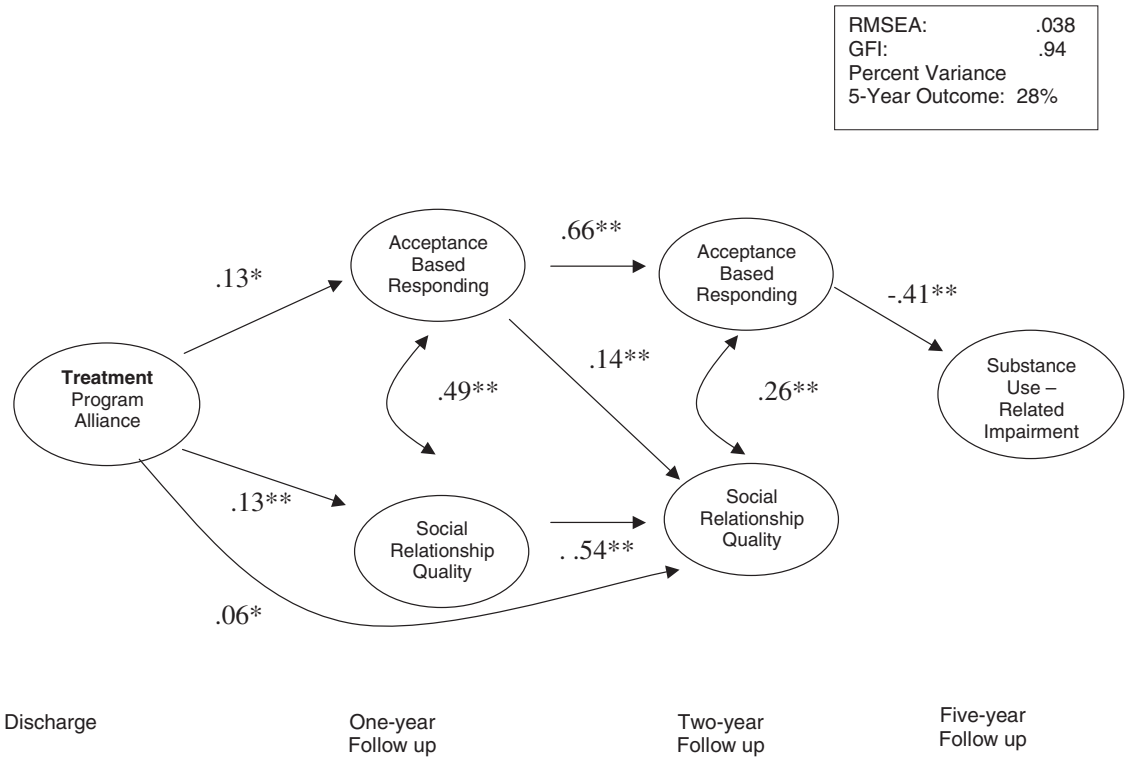

Figure 3 Five-year acceptance and relationship context structural model controlled for baseline values of each latent variable (*n = 2549*), with standardized parameter estimates. Non-significant paths are removed from the hypothesized full model. For path parameters: * *P* < 0.05; ** *P* < 0.01

outcomes. As shown in Fig. 3, the 5-year model uses 5-year SUD-related impairment and includes ABR and SRQ at both 1- and 2-year follow-up. It has a total of 27 indicator variables and nine latent variables.

We assessed model fit using the root mean square error of approximation (RMSEA) and goodness-of-fit (GFI) indices, as these statistics are more sensitive to model fit in large samples than is a χ^2 statistic [55–57].

We conducted the LISREL–SIMPLIS analyses using asymptotic covariance matrices and unweighted least-squares estimates [58–60]. All indicator variables were free to predict themselves at subsequent time-points, with the exception of the TPA variables assessed at discharge. The factor loading for one indicator per latent variable was set to unity to identify the construct's scale of measurement [61].

To handle missing data (8%) we employed multiple imputation (MI), as suggested by Schaefer & Graham [62]. The Markov chain Monte Carlo algorithm was used from the LISREL version 8.5 statistical package and the solution converged after three iterations for both the 2-year and 5-year groups.

RESULTS

Changes across time for indicator variables

The values and significance tests of change across time for the individual indicator variables are found in Table 1. There were significant increases above baseline levels in all three ABR indices at 1 year and 2 years post-treatment. All three SRQ indices showed significant increases from baseline to 1 year post-treatment, and two of these indicators (friend resources and number of friends) also showed significant increases 2 years post-treatment. All three of the SUI indicators were significantly lower at both 2 years and 5 years post-treatment then at baseline.

Multi-sample analysis

To determine whether the relationships specified in the model differed by treatment orientation, we conducted a multi-sample analysis comparing patients seen in the 12-step, CB and eclectic treatment programs. The overall or omnibus analysis indicated a good fit across all three groups [RMSEA = 0.048, confidence interval (CI) 0.046–0.050; GFI = 0.94]. This indicates that the relationships of indicator variables to latent variables (i.e. measurement invariance) and the relationships among the latent variables (i.e. structural invariance) were not significantly different across the three treatment program orientations.

Measurement model and test of the 2-year model

Standardized loadings of indicator variables onto latent variables were obtained at baseline, 1 year, 2 years and 5 years post-treatment, and are shown in Table 2. Baseline ABR and SRQ were modestly positively associated with alliance, and more baseline substance use modestly related to less alliance. The indicator variables were very good measures of the latent constructs in the 2-year model [RMSEA = 0.044 (0.041–0.046); GFI 0.95]. All factor loadings in the measurement model, shown in Table 2, were substantial, statistically significant and in the expected direction. Internal consistency was also high for all factors (alpha: TPA = 0.80, ABR = 0.86, SRQ = 0.77, SUI = 0.77).

A saturated 2-year model was tested and all non-significant paths were removed (i.e. the path between TPA and SUD impairment and the path between SRQ and SUD impairment [59]). The fit of this simplified 2-year model was very good [RMSEA = 0.043 (0.041–0.046); GFI = 0.95]. The 2-year model predicted a total of 41% of the variance in substance use related impairment (Fig. 2).

According to the standards articulated by Baron & Kenny [54], ABR mediated the effect of TPA on SUD-

Table 1 Analysis of variance for changes in baseline, 1-year, 2-year and 5-year indicator variables.

	Baseline mean (SD)	*1-year follow-up mean (SD)*	*2-year follow-up mean (SD)*	*5-year follow-up mean (SD)*	*F-test*
Acceptance-based responding					
Confidence	44.06 (18.25)	45.93**	(19.83)	45.79** (20.27)	12.23
Responses to temptation	29.82 (12.22)	34.35**	(13.24)	33.38** (13.87)	95.84
Approach coping	20.36 (7.90)	23.62**	(7.85)	22.87** (8.12)	145.98
Social relationship quality					
Recovery	7.44 (4.47)	8.10**	(4.48)	7.69 (4.58)	12.99
Support					
Friendship resources	12.92 (5.69)	14.31**	(14.25)	14.25** (5.86)	50.86
Number of friends	2.00 (1.40)	2.25**	(1.41)	2.24** (1.42)	21.90
Substance use-related impairment					
Frequency	8.95 (5.20)	3.32**	(4.43)	2.89** (3.92)	1271.40
Problems	17.76 (11.04)	8.62**	(10.93)	8.19** (11.24)	662.22
Distress	20.08 (11.33)	14.63**	(11.66)	15.26** (12.47)	240.20

**$P < 0.001$ (simple contrasts). Family wise error set to 0.05/9 or 0.005 to correct for multiple analyses.

Table 2 Standardized factor loadings for each measure at each time-point in the model.

	Measurement points				
Measures	*Baseline*	*Discharge*	*1 year*	*2 years*	*5 years*
TPA					
Involve	–	0.74	–	–	–
Support	–	0.77	–	–	–
Common goals	–	0.62	–	–	–
ABR					
Confidence	0.57	–	0.74	0.73	–
Adaptive responses	0.45	–	0.61	0.66	–
Approach coping	0.54	–	0.60	0.51	–
SRQ					
N friends	0.56	–	0.54	0.90	–
Friend resources	0.90	–	0.91	0.63	–
Recovery support	0.72	–	0.78	0.63	–
SUI					
Substance use	0.46	–	–	–	0.58
Substance problems	0.70	–	–	–	0.91
Distress	0.58	–	–	–	0.45

TPA = treatment program alliance, ABR = acceptance-based responding, SRQ = social relationship quality, SUI = substance use-related impairment.

related impairment. A series of mediational analyses showed that ABR directly predicted outcome ($\beta = -0.57$, $t = -16.04$, $P < 0.05$), TPA directly predicted outcome ($\beta = -0.16$, $t = -5.86$, $P < 0.05$) and ABR mediated the effects of TPA on outcome by reducing the relationship between TPA and outcome to non-significance ($\beta = 0.01$, $t = 0.23$, $P > 0.05$), while the path between TPA and ABR ($\beta = 0.10$, $t = 3.92$, $P < 0.05$) and the path between ABR and outcome ($\beta = -0.57$, $t = -15.71$, $P < 0.05$) remained significant. SRQ did not have a direct significant relationship to outcome. However, the statistically significant paths between TPA and SRQ and between SRQ and ABR reflect the importance of SRQ in the overall model.

Test of the 5-year model

The next step in evaluating the conceptual model was to examine the findings at 5 years (Fig. 3). Again, the factor loadings were substantial, statistically significant and in the expected direction (see Table 2); and internal consistency was high for the additional latent variables (alphas: 2-year ABR = 0.86, 2-year SRQ = 0.77, 5-year SUI = 0.77). The 5-year SEM resulted in a very good fit (RMSEA = 0.038, GFI = 0.94), and confirmed the same hypothesized relationships as in the 2-year model. The model accounted for 28% of the variance in 5-year SUD-related impairment.

As in the 2-year model, ABR mediated the effect of TPA on SUD-related impairment. ABR at 2 years directly predicted 5-year outcome ($\beta = -0.41$, $t = -12.52$, $P < 0.05$), TPA directly predicted 5-year outcome ($\beta = -0.15$, $t = -4.49$, $P < 0.05$) and 2-year ABR mediated the effects of TPA on outcome by reducing the relationship between TPA and 5-year outcome by about 50% ($\beta = -0.08$, $t = 2.62$, $P < 0.05$). The paths between TPA and 1-year ABR ($\beta = 0.13$, $t = 4.47$, $P < 0.05$), between 1-year and 2-year ABR ($\beta = 0.67$, $t = 18.27$, $P < 0.05$) and between 2-year ABR and outcome ($\beta = -0.45$, $t = -12.28$, $P < 0.05$) remained significant. Both TPA and 1-year ABR directly predicted higher SRQ 2 years after treatment.

DISCUSSION

The ARC model accounted for a relatively large proportion of variance in both 2-year and 5-year SUD treatment outcomes. Further, most of the hypothesized relationships are as described by the model: TPA predicts ABR and SRQ, ABR predicts better treatment outcomes at 2 years and 5 years post-treatment and ABR predicts better SRQ. The results indicate that treatment programs that provide a supportive, engaging environment, in which patients learn to accept and respond appropriately to internal states linked to using substances and enter into constructive ongoing relationships, produce better long-term outcomes (see also Orford *et al.* [63] for corroborative findings). Contrary to study hypotheses, high-quality social relationships after treatment did not predict treatment outcomes directly. However, SRQ contributes to model fit and is predicted by both TPA and ABR.

ABR relates strongly to long-term treatment outcomes, indicating that the ability to accept and respond adaptively to internal triggers may be a key factor in long-term recovery. This factor also appears to be a general proximal outcome mediating the effect of treatment relationships, as it substantially mediates the direct effects of treatment relationships on outcome. ABR 1 year after treatment predicts supportive relationships 2 years after treatment, indicating that patients who can identify and respond appropriately to internal states such as temptation are also likely to have better social relationships.

Although discussed differently by different orientations, many empirically supported SUD treatments include acceptance-based interventions [64,65]. In 12-Step facilitation (TSF [66]), for example, acceptance is the second topic and the first step. Clients are encouraged to accept that they have a problem in order to take active steps toward recovery. In relapse prevention (RP [17]), patients are taught to accept and 'surf' cravings and urges without engaging in addictive behavior. Motivational interviewing (MI) encourages patients to experience and accept previously disenfranchised aspects of their experience (e.g. to discuss their 'bad' desires to continue using substances), to resolve ambivalence and thereby increase motivation [34]. More recently developed acceptance-based addiction treatments also show promising empirical support [67,68].

The above treatment approaches discuss acceptance in terms of helping patients to become aware of their internal states as a basis for making constructive behavioral choices. This commonality may be based on several widely understood features of addictive behavior. First, negative affect and other conditioned internal states are related to substance use [69]. Secondly, it is unlikely that these states can be completely eliminated [70]. Thirdly, if such states cannot be completely avoided, then patients must learn to accept them and respond differently when they occur [23].

The results confirm the conceptual meaningfulness of the ABR factor, with its components of situational confidence in accepting and responding constructively to the awareness of internal triggers and adaptive coping responses while accepting the experience of temptation. These indicators cohere around the core issue of adaptive responding while accepting the experience of temptation; each measure also speaks to a related aspect of the superordinate behavioral concept [71]. ABR includes (a) identifying or discriminating that there is a problematic state, (b) emitting a practised response class while acknowledging these experiences (a variety of coping responses) and (c) successfully accepting these experiences while remaining abstinent (reinforcing self-efficacy).

ARC is a comprehensive model that includes behavioral constructs, such as ABR, and functional relationships between these constructs and treatment and social relationship environments [71]. As a result, the model has several pragmatic benefits. One benefit is that it provides a common empirical ground for examining the behavior change process across treatment modalities. The present study identified factors related meaningfully to positive outcomes within the pre-existing practices of programs with different treatment orientations. A second benefit is that including environmental factors provides guidance for reproducing these effects. In the present case, we find that a supportive, engaging relational treatment environment contributes to the individual processes that result in better long-term treatment outcomes. A third benefit is that ABR is a behavioral construct [71] that offers practical clinical guidance. According to these results, supportive treatment environments should provide patients with the opportunity to successfully practice accepting previously avoided internal states, such as negative affect, while engaging in approach coping. This process should include identifying unavoidable high-risk internal states, accepting and remaining in contact with these internal triggers without using substances and emitting a variety of alternative adaptive responses while the internal states are occurring.

This study has several limitations. In a naturalistic longitudinal study one cannot eliminate confounds such as maturation or regression to the mean. However, data from other studies indicate that these risks are minimal for our study. While some remission is related to maturation, long-term studies find that treatment more than doubles the average remission rates of treated alcohol-dependent individuals compared with those who do not receive treatment [72]. Statistical regression is also unlikely, as the overall rates of improvement in the current sample are similar to other treatment studies, with approximately 30% of the sample in remission at 5-year follow-up. Among the strengths of the study is its use of a multi-site, real-world clinical sample. However, the sample is limited to men in VA residential programs. Women often incorporate relational strategies in response to stress [73,74], so while there is some reason to anticipate that the model may hold across genders, this remains to be tested. In addition, selection of indicator measures in the present study was constrained by the lack of psychometrically sound measures of acceptance, which remain to be developed.

While the ARC model speaks directly to treatment settings, the processes specified by the model may be applicable to a range of other contexts. Indeed, to some degree the model de-emphasizes the primacy of the professional in determining outcome, emphasizing instead the larger web of relationships that occur within treatment, including relationships with other patients. This suggests that

the change process might occur within a variety of interpersonal environments. For example, ABR may mediate the impact of self-help participation on long-term SUD outcomes [31,75] and/or the impact of religious participation on substance use involvement [76]. A final potential benefit of the ARC model may be its applicability beyond traditional treatment settings.

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