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# Therapist Adherence and Competence as Predictors of Client Outcomes in Adolescent Substance Use Treatment

Marita Campos-Melady

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**THERAPIST ADHERENCE AND COMPETENCE AS PREDICTORS OF CLIENT  
OUTCOMES IN ADOLESCENT SUBSTANCE USE TREATMENT**

By

**Marita Campos-Melady**

B.A., Psychology / English, Williams College, Williamstown, MA, 2006  
M.S., Psychology, University of New Mexico, 2008

DISSERTATION

Submitted in Partial Fulfillment of the  
Requirements for the Degree of

**Doctor of Philosophy  
Psychology**

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**July, 2013**

### **Dedication**

I dedicate this project to my mother Rita Campos Melady who made me everything that I am and who is with me always in spirit, as well as my father Eugene P. Melady, and all of the dear friends and family and supporters who helped me along this journey.

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**ABSTRACT**

Central to the debate over the implementation of empirically supported treatments is whether or not therapist skill in delivering these therapies has a measurable, positive relationship with client outcome. The fidelity and skill with which therapists deliver these treatments have been studied under the constructs of therapist *adherence* and *competence*. There has been mixed evidence of the relationship between adherence and competence and client outcomes, that could be due to small sample sizes, potentially inadequate measures for rating therapists' skill, and limited statistical methods. The current study utilized a data set from the Adolescent and Family Treatment (AAFT) project in which 91 therapists provided services to 384 clients at regionally diverse sites. Substance abuse therapists trained to deliver the Adolescent Community Reinforcement Approach (A-CRA) submitted audio-taped therapy sessions to expert raters for review. Measures of adherence and competence derived from these ratings were examined in a Multi-Level Model, for associations with client substance use outcomes at 3, 6 and 12-month follow-up periods. This study found that therapist competence was significantly predictive of decreases in clients' days of substance

use. There was a non-significant trend for adherence being associated with decreased days of substance use as well. Client exposure to A-CRA treatment procedures also predicted decreased substance use across follow-ups, as did the cross-level interaction between A-CRA procedure exposure and therapist competence. Post-hoc analyses found that the number of co-morbid disorders of clients as well as client externalizing behaviors were predictive of therapist competence. This study adds to the evidence that treatment fidelity is associated with better treatment outcomes for clients.

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## **The Effect of Therapists' Adherence and Competence on Client Outcomes in the Adolescent Community Reinforcement Approach to Substance Use Treatment**

Over the past decade the interest in investigating therapist fidelity to treatment protocols both in research and real-world settings has been a focus of research in the dissemination of psychotherapies (Webb, 2012). Researchers are interested in therapist *adherence* to treatment protocols, or the extent to that therapists are engaging in theory-specified techniques (Barber, Foltz, Crits-Christoph, & Chittams, 2004; Sharpless & Barber, 2009). Additionally, studies have focused on the overall skill with which treatment is being delivered; the construct of *competence* in therapy delivery. Both of these factors are central to the establishment of a basic understanding of how research on psychotherapeutic techniques is translated into real-world practice, a fundamental issue in the movement toward Evidence Based Practice (EBP). In fact, research on therapist adherence and competence and their effects on patient outcomes may begin to address some of the issues that have plagued the EBP paradigm since its inception in the field of psychology (Tanenbaum, 2013; Webb, 2012).

### **The History and Importance of Adherence and Competence in the Movement toward Evidence Based Practice**

The history of EBP in psychotherapy has been one fraught with debate. The move toward EBP in psychology perhaps began as early as World War II when psychologists agreed to treat returning veterans under the auspices of the Veteran's Administration. This movement was further cemented at the 1949 Boulder Conference, that incorporated the scientist-practitioner model using the medical language of "mental disease" (Albee, 2000).

Within a decade of this conference, legislation that guaranteed reimbursement for psychology

on par with psychiatrists created the need for psychiatric diagnoses in psychology, and also led to the institution of randomized controlled trials (RCTs) as the gold standard of psychotherapy efficacy research by the National Institute of Medicine (Albee, 2000; Miller, 2006; Williams & Garner, 2002). Essentially this meant that a study needed to include manualized or protocol-based therapies, and disorders based on the *Diagnostic and Statistical Manual of Mental Disorders* (DSM; American Psychiatric Association, 2000) to be eligible for a National Institute of Mental Health (NIMH)-sponsored grant (Goldfried & Wolfe, 1998).

Psychology has increasingly adopted a paradigm of Evidence Based Practice which has emphasized research over clinical knowledge (Albee, 2000; Duncan & Miller, 2007; Miller, 2006). Although EBP is a broad concept of deriving treatment methodologies from the best available evidence provided by multiple sources (Evidence Based Behavioral Practice Project; EBBP, 2013), a standard of “Empirically Supported Treatments” (ESTs) is also increasingly utilized. ESTs have been defined as "clearly specified psychological treatments shown to be efficacious in controlled research with a delineated population" (Chambless & Hollon 1998).

### **Dissemination of Manualized Treatments in the Movement toward EBP and EST**

ESTs are increasingly being exclusively implemented and reimbursed by major sponsors and consumers of psychotherapy (Duncan & Miller, 2007). These manualized treatments in general are contributing significantly to the science and practice of clinical psychology. Specifically, they enhance the internal validity of comparative outcome studies, facilitate treatment integrity and therapists’ technical competence, ensure the possibility of replication, and provide a systematic way of training and supervising therapists in specific

models (Lambert & Ogles, 2004). However, some of the strongest indictments of the manualization of psychotherapeutic treatments are that manualized treatments may have inherently poor effectiveness and external validity, and that there is little evidence to show a direct relationship between the manualization of treatments and improvement in client outcomes in real-world practice (Barber et al., 2008; Duncan & Miller, 2007). This view of manualized treatments characterizes a larger debate in psychology regarding the nature of Evidence Based Practice (EBP), and especially the need for ESTs.

The inclusion criteria for APA's list of ESTs represents a standard for the definition of evidence base in psychology (APA, Society of Clinical Psychology Division 12, 2004). For a treatment to be placed on this list it is currently required that it has been proven efficacious in at least two RCTs in different labs, or in ten single case experimental studies, with patients who fit the DSM criteria for the disorder for which the treatment is to be considered an EST (APA, 2004). A prerequisite for these qualifications is that the treatments in the RCTs have been delivered according to a standardized treatment manual. This final requirement essentially disqualifies non-manualized treatments from being recognized by APA's Division 12 (APA, 2004; Beutler, 2004). Although some consider these standards to be too strict, arguing that they ignore potentially effective therapies that are not well suited to study through RCTs (Tarvis, 2003; Tanenbaum, 2013), others consider them not stringent enough and state a preference for an even stronger research base to consider a treatment empirically supported (Chambless & Ollendick, 2001). Further research into treatment fidelity and what it contributes to client outcomes might advance this debate.

## Resolving the EBP Debate by Studying Treatment Fidelity

One common criticism of this list of ESTs is that it privileges efficacy over effectiveness by favoring RCTs. A recently developed task force is investigating mechanisms for including “practical clinical trials” as part of the evidence for ESTs (Tanenbaum, 2013). Such trials emphasize the inclusion of patients from diverse backgrounds and from clinical settings, and the use of measures of multiple health variables in addition to the psychotherapeutic target (Norcross, 2002). RCTs and the need for standard protocols are still included in the evidence criteria, however. If therapists’ fidelity to protocol-based treatments could be shown to positively impact client outcomes in practice, then the value of research-derived treatments in clinical settings would be more apparent.

Another controversy in the debate about ESTs and Evidence Based Practice is how and to what extent research should be translated into practice: should strict fidelity to a protocol, or the utilization of a specific treatment for a specific diagnosis, always be regarded as more valuable than clinical judgment? Recent studies have shown that a low percentage of practicing clinicians are utilizing EBPs or ESTs, and many who *claim* to be doing so are not actually delivering the treatments as they were studied in supporting research (Lillienfeld et al., 2013; Miller, 2006; Norcross, 2007). Some have proposed that the reason for this lag in the adoption of EBPs by clinicians is the perceived undermining of the role of clinical judgment by manualized treatments (Lillienfeld et al., 2013; Tanenbaum, 2013).

However, even strong proponents of research based practice often include room for clinical discretion. The emphasis on fidelity to an evidence based protocol is tempered by the caution that not every patient responds in the same way to treatment, and that provider experience and judgment may indicate the need for alterations in the treatment protocol

(Kelin, 1999; Peterson, 2004). APA currently defines EBP as “the integration of the best available research with clinical expertise in the context of patient characteristics, culture, and preferences” (2005). This definition clearly leaves room for clinical judgment. One strong proponent of stringent definitions of EBP and EST has stated that clinicians should be encouraged to utilize the case studies of other clinicians using EBPs that have similarities to their own cases (Chambless, 2004).

It seems that all sides in this debate support the use of the best knowledge the field has to offer in the treatment of patients, but the specifics of what defines best knowledge are in dispute. Many of the criticisms of the EBP movement and the translation of research into therapeutic practice center on assumptions that have been largely untested (Addis & Krasnow, 2000; Hayes, 2002; Herschell, McNeil, & McNeil, 2004). Current research in the area of treatment adherence and competence may begin to answer some of these criticisms with evidence.

### **The Current State of Research in Adherence and Competence**

The concepts of adherence and competence may be extremely useful in beginning to bridge the gap between research and practice in psychotherapy. The difference in delivery of psychological treatments as they are tested and developed through research and how they are delivered in practice remains vast, and this can be a detriment to both determining that treatments actually work best, and the perception about evidence based treatments by practitioners (Addis, Wade, & Hatgis, 1999; Gunter & Whittal, 2010). Randomized clinical trials that test the efficacy of medications in the fields of medicine or psychiatry do not need to be concerned either with the amount of active ingredient found in each pill or with the possibility that unintended active ingredients have been included, since the pills' ingredients

are standardized and measured during manufacture (Barber et al., 2004). In contrast, when studying the efficacy or effectiveness of psychotherapeutic interventions, there is concern as to whether the treatment was indeed delivered, whether it was delivered adequately and as intended (treatment integrity), and whether techniques from other treatments were included (treatment discriminability) (Barber et al., 2004).

Examining adherence to treatment protocols also presents the opportunity to effectively study important components of therapist behaviors that constitute best practice. Despite the fact that evidence has accrued in support of specific interventions, the particular mechanisms through that these therapies affect client outcomes remain, in general, poorly understood (Kazdin, 2006). The study of treatment integrity can aid substantially in isolating and understanding which particular elements of treatment differentiate one EST from another, and which are most directly related to patient outcomes (Kazdin, 2006; McLeod, Southam Gerow, & Weisz, 2009).

Mechanisms of change have been described as the factors that drive or explain causative relationships between treatment and outcome. In order to eventually examine mechanisms of change and to understand how specific components of treatment and therapist behaviors affect outcome, treatment components first must be reliably delivered.

**Delivery of active ingredients and theory-specified techniques in practice.** It should be noted that theory-specific factors are not necessarily *exclusively* specific to one given treatment; they may be components that are employed in a number of theoretically similar treatments. Importantly, as theory-driven, manualized therapies have become the standard for empirically-supported research, and as they are being utilized more in practice, the importance of whether therapists are delivering the theory-specified techniques as

intended has increased (Barber et al., 2006). If research shows that a particular therapy is effective as outlined in a protocol, then one would expect clinicians to deliver the treatment in the same fashion to ensure that the effective components are delivered to all clients (Walts, Addis, Koerner, & Jacobson, 1993).

In treatment outcome studies, adherence and competence are monitored to ensure that the treatments being evaluated or compared are indeed representative of their theoretical frameworks, and can be differentiated from other treatment modalities (Perepletchikova & Kazdin, 2005). Dissemination studies rely on measures of adherence and competence to determine the effectiveness of the therapy training (Morgenstern, Morgan, McCrady, et al., 2001).

The issue of whether adherence and competence have a direct effect on client outcomes is still unresolved (Hogue et al., 2010; Webb, 2010). However, recent studies have begun to show that an emphasis on adherence to protocol, as well as competence in delivery of the treatment, can not only increase the validity of research findings as they are implemented in practice, but definitively can differentiate specific treatments for a particular diagnosis in terms of efficacy (Amodeo et al., 2011; Siev & Chambless, 2007).

### **Adherence and Competence in the Measurement of Treatment Integrity**

A great number of research teams have undertaken the creation, validation, and use of adherence and competence scales for a variety of ESTs, such as anxiety and mood disorder treatments and family therapy (Barber et al., 2006; Boswell, 2013; Sharpless & Barber, 2009). Some of the most long-standing and standardized uses of adherence and competence measures come from the field of substance use treatment. In 1998 Carroll and colleagues looked at treatment adherence and competence in the Project MATCH data set (Carroll,

Connors, & Cooney, 1998). This team reported that raters could reliably rate both adherence to treatment protocols and overall therapist skillfulness (competence) as it related to the delivery of a specific treatment (Carroll et al., 1998).

It also has been established that different treatments can be reliably discriminated through ratings of adherence. Using data from the National Institute on Drug Abuse (NIDA) Collaborative Cocaine Treatment Study (CCTS; Crits-Christoph et al., 2001), researchers developed detailed rating manuals to specify the therapeutic techniques comprising each of the four treatments. Raters were then trained to observe and code therapist adherence to the outlined procedures, as well as competence in implementing the procedures. Based on the CCTS data, Barber and colleagues found that, on average, the expert raters reliably rated adherence and competence, and were reliably able to discriminate between individual treatments (Barber, et al., 2004).

Several recent studies have shown that therapist adherence and competence can be reliably rated by both expert raters *and* on-site supervisors when treatments are delivered in a clinical setting (Barber, & Crits-Cristoph, 2012; Boswell et al., 2013); a finding that is important for studies of treatment effectiveness, and overall for implementation in real-world settings (Boswell et al., 2013). Furthermore, these studies have found that the particular system or scale used to rate adherence and competence is important for reliability, especially for clinician supervisors (Dehnag et al., 2012). More detailed scales that focus on theory-specific and protocol-specific behaviors and benchmarks seem to produce higher rater reliability of adherence and competence in general (Webb, 2012).

The research exploring mechanisms of change in Motivational Interviewing (MI; Miller & Rollnick, 2002) seems to bear out this idea, and several coding systems have been

developed and tested over the years for the examination of MI fidelity. Not only has the reliability of MI raters in coding treatment-relevant behaviors been strong (Miller, Moyers, Ernst, & Amrhein, 2008; Moyers et al., 2004), but these ratings also can distinguish MI from other therapies (Carroll et al., 1998) and identify those aspects of therapist behavior most relevant to MI adherence (Moyers, Martin, Manuel, Hendrickson, & Miller, 2005). Previous work in MI treatment fidelity has led to the creation and widespread use of the Motivational Interviewing Treatment Integrity (MITI) scale, that has been shown to have high inter-rater reliability and to capture the factors most theoretically relevant to change in MI (Moyers, 2005). This scale also has been used to measure improvement of therapist skill after training and supervision, and in effectiveness research (Madson & Campbell, 2006; Martino, Ball, Nich, Frankforter, & Carroll, 2008; Thomas & Gergory, 2007). Importantly, this is one of about five commonly used rating scales for MI that has been shown to measure therapist treatment fidelity across a variety of settings. Although all of these scales are MI specific (Madson & Campbell, 2006) and therefore the findings are not generalizable to the measurement of adherence/competence in other treatment modalities, they show that these constructs can be measured based on the theory-specified components of a given therapy, and that this measurement can have clinically important applications.

One study of Motivational Enhancement Therapy (MET) for substance use that was implemented in a community treatment setting utilized intensive training of therapists and supervision, as well as detailed ratings of recorded sample therapy sessions (Martino, Ball, Nich, Frakforter, & Carroll, 2008). In this study, not only did raters show over 81% inter-rater reliability for both competence and adherence, but these ratings demonstrated convergence with *a priori* defined skills important in MI. Moreover, the factors

discriminated between MET therapists and therapists who delivered drug counseling-as-usual in predicted ways, and were significantly related to in-session change in client motivation (Martino et al., 2008). The growing consensus in the research on adherence and competence is that these constructs are discriminable, reliable, and increasingly show a relationship to theoretically relevant components of treatment in manualized therapies (Schoenwald, Scheidow, & Letourneau, 2004). Still, the direct relationship between protocol adherence/competence and client outcomes remains unclear (Barber et al., 2008).

Together these studies show that the reliable measurement of adherence and competence can be achieved through the employment of trained raters (Barber et al., 2004), but the rating scales tend to be developed exclusively for a given treatment or a given study. Even for those treatments in which treatment fidelity has been extensively studied, like MI, multiple rating scales that focus on different aspects of the therapy exist (Madson & Campbell, 2006). The great variety in methods of rating adherence and competence have led to vastly disparate outcomes, so that previous finding of no relationship between fidelity and outcome may not indicate that such a relationship will not be found using a different measure to examine a different treatment (Webb, 2012).

### **Limitations of the Common Analytic Approach to Examining Adherence and Competence**

Widely varying rating procedures are not the only methodological issue that may be contributing to the dearth of robust results linking adherence/competence to client outcomes; inappropriate or limited statistical analyses may be responsible as well. For example, in the meta-analysis by Webb and colleagues (2010), findings from several of the studies reviewed (e.g., Barber et al., 2006, 2008; Hogue et al., 2008; Piper et al., 1991) suggest that the

relationship between adherence or competence and outcome may be nonlinear (e.g., quadratic/curvilinear). A recent study by Hogue and colleagues in 2010 found a curvilinear relationship between adherence and patient outcomes when Cognitive Behavioral Therapy (CBT) was used for adolescent substance use and behavior problems (Hogue, et al., 2010). This effect was actually greater than the linear effect of therapist competence on patient drug use and behavior outcomes in this study (Hogue et al., 2010).

The finding of curvilinear relationships between adherence and client outcomes implies that moderate levels of protocol fidelity may be most beneficial. Specifically in these studies, those therapists with the highest and lowest levels of treatment manual adherence had poorer client outcomes than those with moderate levels of adherence. Hogue and colleagues demonstrated this quadratic relationship for clients receiving either multi-dimensional family therapy or cognitive behavioral individual therapy (Hogue et al., 2008). A second study found that moderate adherence to treatment manuals (rather than very high or low levels of adherence) was particularly predictive of substance use outcomes for clients with low motivation for treatment, or with characteristics generally associated with poor outcome such as co-morbid disorders (Barber et al., 2006). A similar curvilinear relationship between adherence and outcome was found by Barber and colleagues in a study examining substance using clients receiving Expressive Emotive Therapy (Barber et al., 2008). The authors of these various studies explained this curvilinear relationship by theorizing that protocol fidelity and flexibility *and* clinical judgment are important factors in client outcomes (Barber et al., 2008; Hogue et al., 2010; Webb et al., 2010).

The relationship between adherence/competence and outcome may be further complicated by un-examined interaction effects. It appears that in some cases in which the

quadratic relationship between adherence and outcome was found, it was mediated or moderated by a third variable. Several studies have attempted to test the possibility of a third-variable; primarily client motivation or the therapist-client alliance (Wampold, 2001), as accounting for both therapist adherence/competence ratings and client outcome (Barber, Crits-Christoph, & Luborsky, 1996; Trepka, Rees, Shapiro, Hardy, & Barkham, 2004). The study by Barber and colleagues included in the meta-analysis found that there was a quadratic relationship between therapist adherence to individual drug counseling and outcome that was moderated by client motivation (Barber et al., 2006). Findings such as this are beginning to reveal a fascinating and complex landscape of variable interaction in therapy and their potential effects on client outcomes.

Some studies are showing a linear relationship between adherence and client outcomes (Huppert, Barlow, Gorman, Shear, & Woods, 2006; Webb, 2012), and some are finding that a linear relationship exists in certain client populations. Interestingly, one recent study found a curvilinear relationship between adherence and outcome overall, but a linear relationship for adherence in a sub-sample of their clients who were being treated for marijuana use (Hogue et al., 2010).

As research teams undertake new and more precise methodologies for examining the relationship between adherence/competence and outcome variables, a more positive picture for the role of treatment fidelity in effecting desired client outcomes is emerging. In an examination of cognitive therapy for depression, Webb found that when adherence and overall therapist skill and therapeutic alliance were measured across sessions, adherence was predictive of reduction in depressive symptoms and utilization of cognitive therapy skills by clients (Webb, 2012). Furthermore, severity of patient symptoms affected adherence and

measures of therapeutic alliance, which in turn affected outcome measures (Webb, 2012). Webb argued that many of the earlier studies that found no effect of adherence or competence did not control for client variables such as symptom severity (2012).

The role of therapist adherence in client outcomes was examined in a behavioral treatment for panic disorder (Boswell et al., 2013) that utilized a detailed rating scale for adherence and competence based on recorded therapy sessions rated by expert raters. Through the use of multilevel modeling, this study determined not only that adherence and competence were impacted by initial symptom severity, but also that there were interaction effects as well. A relationship between client outcomes post-treatment and therapist adherence and competence was also found (Boswell et al., 2013). Studies like this one imply that a relationship between treatment fidelity and client outcomes may in fact exist, and that the previous dearth of strong findings in this area may be the result of less than ideal methodology.

### **Adherence/Competence with Treatments for Substance Use Disorders**

Although the relationship between adherence/competence and client outcomes remains complex and unclear in the psychotherapy literature overall, in the area of substance use treatments there seems to be considerably more studies that do show a relationship between adherence/competence and positive client outcomes of some type (Webb et al., 2010). For example, Brown and colleagues summarized the literature on substance abuse treatment adherence, pointing out that both adherence and competence often had a strong association with the therapeutic alliance, client belief in the effectiveness of treatment, and client motivation to engage in treatment (Brown, Brown, & Lent, 2008). Barber and team found in several studies that therapist adherence had a strong relationship with client

motivation for treatment, that in turn influenced client outcomes (Barber et al, 2008; Barber, et al., 1996; Barber et al., 2006). One study of therapist training in EBPs found that supervisors' emphasis on treatment adherence and competence for clinicians working under them had a significant impact on clients' treatment outcomes, motivation for treatment, and symptom reduction (Schoenwald, Sheidow, & Chapman, 2009).

In a large multi-site study of marijuana use with 163 participants, adherence and competence were rated on the basis of over 600 taped sessions (Gibbons et al., 2010). Protocol adherence once again showed a curvilinear relationship to patient substance use outcomes, while competence was predictive of other factors related to positive treatment outcomes, such as motivation and therapeutic alliance (Gibbons et al., 2010). A different study by Martino and colleagues discovered that adherence to treatment protocols in MET was correlated in a linear fashion with more clean urine samples from substance using clients (Martino, Ball, Nich, Frankforter, & Carroll, 2008). Another more recent study found that fidelity to MI as measured by the MITI scale was directly predictive of patient cessation of cannabis use after controlling for therapist effects (McCambridge, Day, Thomas, & Strang, 2012). Evidence seems to be accumulating that treatment fidelity has some relationship to positive substance use-related outcomes.

In summary, because of the diversity of rating scales used to measure adherence and competence across studies of substance use and other mental health treatments, as well as the variability in theoretical components emphasized in adherence/competence ratings, it is difficult to generalize findings (McHugh & Barlow, 2012; Webb, 2012). Those rating systems and studies that were able to utilize samples with a greater range of fidelity scores showed stronger relationships between adherence and competence and patient outcomes than

those with smaller sample sizes (Webb et al., 2010; Webb, 2012) or with rating scales with restricted ranges (McHugh et al., 2009). The increasing evidence of a curvilinear relationship between adherence and outcome (McHugh & Barlow, 2012) is also in line with a concept of “flexibility with fidelity” (Kendall, Gosch, Furr, & Sood, 2008), that emphasizes the application of EBPs while considering the needs of the individual patient. This may explain why moderate levels of adherence in some studies were associated with more positive ratings of therapeutic alliance and positive treatment outcomes (Gibbons et al., 2010; Hogue et al., 2008; Webb et al., 2010). At this time it appears that the measurement of both competence and adherence is important in understanding the complex relationship between treatment fidelity and patient outcomes, and that more detailed rating scales that are able to capture greater variability may aid in understanding this relationship for a given treatment protocol.

### **Therapist Ratings in A-CRA: An Example of Adherence and Competence Ratings in a Behavioral Therapy**

The current study examined ratings of therapist adherence and competence and their potential relationship to client outcomes in a sample of adolescent substance using clients. The therapists were trained in and employed the Adolescent Community Reinforcement Approach (A-CRA; See Godley, Garner, Smith, Meyers, & Godley, 2011). A-CRA is a behavioral treatment that is among the most effective and most cost-effective treatments for substance use in adolescents (Dennis et al., 2004). A-CRA is an adaptation of the Community Reinforcement Approach (CRA), a behavioral treatment for adults that entails utilizing “community” (i.e., familial, social, recreational, and occupational) reinforcers to

support change in an individual's substance using behaviors (Hunt & Azrin, 1973; Meyers & Smith, 1995).

CRA in general has a strong evidence base for its efficacy and effectiveness (DeRubies & Crits-Cristoph, 1998; Meyers, Smith, & Lash, 2002; Smith & Meyers, 1995), including being successful with ethnically diverse clients across multiple settings (Smith, Meyers, & Delaney, 1998). A-CRA has been found to be effective in a variety of populations of adolescent substance users, including ethnically and regionally diverse samples, clients in outpatient continuing care after residential treatment, and homeless adolescents with little or no caregiver contact (Garner, Godley, Funk, Dennis, & Godley, 2007; Slesnick, Prestopnik, Meyers, & Glassman, 2007).

A-CRA requires a unique approach to the assessment of therapist adherence and competence because of its structure (Godley, et al., 2001). While A-CRA is a manualized EST, therapists are neither expected to deliver the various procedures in a prescribed order, nor are they required to deliver every possible A-CRA procedure during every session. Instead, therapists are taught to select from a menu of A-CRA procedures, introducing appropriate procedures as clinically indicated (Garner et al., 2009; Godley et al., 2010; Meyers & Smith, 1995).

The sample for this study was drawn from data collected for an ongoing national multi-site training, dissemination, and implementation study of A-CRA. The Substance Abuse and Mental Health Services Administration (SAMHSA) Center for Substance Abuse Treatment (CSAT) funded this Adolescent and Family Treatment (AAFT) project in order to examine the utility of a research-based training model in the implementation of A-CRA and Assertive Continuing Care (ACC; Godley, Godley, Karvinen, Slown, & Wright, 2006) across

sites nationwide. It was based on the idea that training with continued coaching and feedback should produce well-trained clinicians using methods that are both cost effective and measurable (Godley et al., 2011). In an effort to support sustainability, on-site supervisors underwent a certification process as well (Godley, 2011).

In the training model used in this CSAT project, therapists were trained initially in a 2 ½ day workshop on A-CRA, and the equivalent of another full day was spent on training in ACC and the use of the audiotape-uploading and rating system. Subsequently therapists were asked to provide audio-taped recordings of actual therapy sessions for fidelity ratings until they had received ratings of adequate competence on all core A-CRA procedures. Although therapists were instructed to upload all A-CRA sessions, therapists selected the tapes that they wished to be rated toward certification. It would have been implausible to have all treatment sessions rated, as nearly 25,000 sessions were submitted and approximately 13,000 of those were made available on the website for potential rating. During this time period while they were working to achieve certification, therapists also participated in bi-weekly national coaching calls. The calls focused on difficulties the therapists had encountered in implementing A-CRA, and addressed any confusion about the procedures.

The level of detail on specific therapist skills and behaviors that were drawn directly from the A-CRA coding manual in this project was far more comprehensive than could be achieved with a brief and broad adherence/competence coding instrument (Smith, Gianini, Garner, Malek, & Godley, 2013). Moreover, the rating system used to provide fidelity feedback to therapists was derived from the A-CRA coding manual (Smith et al., 2007), and thus offered detailed ratings of specific and observable therapist behaviors that represented

each of the A-CRA procedures, as well as the overall "spirit" of A-CRA. An example of the rating variables may be found in Appendix A.

The adolescent clients themselves also were thoroughly assessed and monitored using the Global Appraisal of Individual Needs (GAIN; Dennis et al., 2002) at intake and at 3, 6, and 12 months (Godley et al., 2011). The data set derived from the GAIN included over 800 variables and 99 scales that covered such areas of life as family and social relationships, school and employment, mental and physical health, community activities, legal issues, and client motivation. To date, there appears to be no study within the substance use area that has related client outcomes to ratings of therapist adherence/competence in a sample that included such a large number of therapists, sites, and clients, and that employed a rigorous and detailed system of session coding.

Garner and colleagues previously used a subset of this AAFT sample of clients and therapists to examine the relationship between the number of A-CRA procedures completed by therapists with each client and client substance use outcomes (Garner et al., 2009). Although the overall number of procedures delivered could be considered a basic measure of therapist adherence, the Garner study did not measure the fidelity to the components of each procedure. Rather, the premise of that study was that treatment retention had long been viewed as a factor in positive client outcomes, but the reason for this was poorly understood. The study found that although longer periods of treatment retention and number of sessions attended in total predicted client outcome, this effect was mediated by exposure to a "treatment dose" of at least 11 different A-CRA procedures. One limitation of this study was that the therapists' own rating of whether an A-CRA procedure was completed was utilized,

rather than using ratings by expert raters. Such a self-report measure may not accurately reflect adherence to the treatment manual (Garner et al., 2009).

### **Current Study and Hypotheses**

The current study conducted a secondary analysis on the AAFT data set, that contained both therapist A-CRA performance ratings and client outcome data based on the GAIN. Variables were created from the rating database that reflected therapists' adherence to the A-CRA manual and their competence in treatment delivery over the time period during which they submitted recorded therapy sessions for review. The A-CRA Procedure Checklist (Appendix A) and the corresponding online rating workbook (Therapist Workbook; Appendix B) were used to give quantitative and narrative feedback to therapists, and were the primary source of therapist data for this project. Multi-level models tested the effect of the adherence and competence variables on client outcomes. These models included two levels of analysis beyond the repeated measures of the intake and four follow-up periods for each client. In these models clients were "nested" within therapists.

Although there was not a hypothesized effect on treatment outcome for therapist procedures "passed" (with a score of "3" or higher on all components) by the therapist at the time they began seeing a client, this construct (Progress toward Certification) was tested as an independent variable nonetheless. Longer time in training or A-CRA skill acquisition conceivably could have affected both adherence to the manual and client outcome. Client outcome variables, that included measures of client substance use and general mental health problems, were selected from the GAIN based on their previous use in studies of A-CRA (Garner, et al., 2009; Godley et al., 2011) and their theoretical saliency to desired client outcomes in A-CRA.

Given that previous literature has shown a potentially curvilinear relationship between therapist adherence and client outcome, it was proposed to examine a quadratic relationship between these variables if a linear model did not fit the data. However, since most studies have shown no relationship or only a weak linear relationship between *competence* and outcome, a linear model was hypothesized as most likely to capture the competence-outcome relationship (Barber et al., 2008; Hogue et al., 2008; Webb, et al., 2010). The relationship between competence and outcome was expected to be stronger in this data set than in other studies' due to the reliance on detailed ratings of competence from which the predictor variable was derived. Since the rating system in the current study captured specific skills core to the A-CRA model, higher ratings were thought likely to predict better client outcomes.

The hypotheses of the proposed study were as follows:

*Hypothesis 1:* Therapist Adherence variables based on "Overall" adherence scores from the A-CRA Procedures Checklist would best predict client outcome variables in a curvilinear rather than a linear model. In other words, very low or very high adherence scores would predict less of a decrease in client Substance Use and Other Mental Health Symptoms, than would moderate scores.

*Hypothesis 2:* Therapist competence variables, derived from the A-CRA Procedures Checklist as an average score for all procedures completed by each therapist with each client they treated, would have a negative relationship to client substance use and other mental health symptoms in a linear model.

## Methods

### Participants

The current study used data drawn from the sample of 2136 clients and 169 therapists who participated in the Adolescent and Family Treatment (AAFT) project. The data used were selected from the clients for whom at least three *rated* therapy tapes were available, and the therapists who worked with those clients who also had at least three clients for whom this was true: a total of 386 clients and 92 therapists. One of the original 33 sites refused to participate, thereby removing two clients and one therapist from the total sample, resulting in the final sample of 384 clients and 91 therapists. A total of 365 clients and their 91 therapists completed the 3 month follow up, 304 clients and 85 therapists completed the 6 month follow up, and 191 clients and 59 therapists completed the 12 month follow-up. These clients and therapists were from 32 regionally-diverse sites in the United States.

Client and therapist participants were selected from the total who participated in the AAFT project based on several criteria: Clients (1) were 18 years old or younger at the time they received treatment; (2) were not impacted by therapist turnover (i.e., they had only one therapist during the course of treatment); (3) had at least three recorded therapy sessions that had been coded by expert raters; (4) were treated by a therapist who had at least three clients who also met these criteria; and (5) were treated by a therapist who had demographic data on record from a previous study. The therapists whose data were utilized in this study were those who treated the eligible clients.

**Client sample.** The client sample was demographically diverse. Clients ranged in age from 12 to 18 years old ( $M=16.2$ ,  $SD=1.4$ ) at the time they received treatment. Client gender was similar to the general population of adolescent clients in treatment for substance

use disorders (NIDA, 2003) with 290 (75.5%) of the sample being male and 94 (24.5%) being female. Of the total sample, 125 (32.6%) of the participants self-identified as Hispanic, 120 (31.3%) as non-Hispanic White, 62 (16.1%) as Mixed Ethnicity, 54 (14.1%) as African American, 14 (3.6%) as Native American, 6 (1.6%) as Asian American, and 2 (.5%) as Other Ethnicity. One client did not respond to the question.

At the time of their enrollment in the larger study, all of the participants in this sample had symptoms consistent with criteria for a substance use disorder in the past year based on items in the Global Assessment of Individual Needs (GAIN; Dennis, 1999). Seventy-two percent of the total client sample reported symptoms consistent with diagnoses of past-year substance dependence, while the remainder had symptoms consistent with a diagnosis of substance abuse. All participants were considered eligible for services as part of this CSAT grant based on substance use problems reported by the juvenile justice system, school authorities, or parents.

Symptoms consistent with a diagnosis of one or more co-morbid psychiatric disorders were reported by 64.5% of the total sample, while 35.4% of the sample did not have symptoms consistent with any non-substance related (co-morbid) disorder (See Table 1). Most adolescents in this study had some involvement with the juvenile justice system (64%). Of the total sample of clients, 219 (57%) had received prior mental health treatment while 163 (42.4%) had not, and two clients had missing data.

**Therapist sample.** Demographic data were available for therapists in this sample based on their participation in a previous study on the AAFT project (Garner et al., 2009). The therapists in the study by Garner and colleagues had volunteered for that project, and thus may not have been a random sample of the entire AAFT project. However this previous

study had a very high participation rate (89%) among randomly recruited therapists working in the AAFT project, so this sample is likely to be representative of the general population of AAFT therapists (Garner et al., 2010). For the current study, of the total sample of therapists whose clients met the inclusion criteria (N=91). Sixty-six therapists were female (72.5%) and 25 (27.5%) were male. In terms of ethnicity, 39 (43.2.9%) identified as Caucasian, 28 (31.1%) as Hispanic, 16 (17.8%) as African American, 3 (3.3%) as Asian, 2 (2.2%) as Multiracial, 1 (1.2%) as Native American/Alaskan, and 1 (1.2%) as Other Ethnicity.

In terms of educational background, 48 (52.7%) had at least a master's degree, 35 (38.5%) had a bachelor's degree, 4 (4.4%) had some college with no degree, 3 (3.3%) had an associate's degree, and 1 (1.1%) had a high school diploma or the equivalent as his/her highest degree. The average number of months therapists reported in the field of substance use treatment was 48.8, with experience in the field ranging from 6 to 60 months. Nine therapists, 11% of the total sample, reported having a history of a substance use disorder.

Therapists in this project attended a 2½ day national A-CRA training workshop, followed by a day-long training on both Assertive Continuing Care and the web-based session tape uploading and rating system, EBTx. Following the training workshops, therapists recorded therapy sessions and uploaded them to a secure web-based system for review by expert raters, as described previously. Therapists selected at least one of their uploaded sessions per week to be rated. They then received numeric and descriptive feedback for each uploaded session that was selected for review by an expert rater. Therapists also participated in 60 minute supervision calls with the national A-CRA trainers at least twice a month throughout the training period. Therapists received a “pass” on an individual A-CRA procedure if they received a rating of at least a "3" (out of 5) on each item

for that procedure (Smith, Lundy, & Gianini, 2007). In order to receive “basic” certification, therapists were required to “pass” nine basic A-CRA procedures on the A-CRA Procedures Checklist (Appendix A). Therapists could then achieve “full” certification by passing eight additional procedures (Godley et al., 2011). During the time in which data for this project were being collected, 82% of therapists in this sample met criteria for basic certification in A-CRA.

## Measures

**Global Appraisal of Individual Needs.** (GAIN; Dennis, 1999; Dennis, Titus, White, Unsicker, & Hodgkins, 2003). Client outcome variables and the independent variable (see below) were primarily derived from the GAIN, which is a full bio-psycho-social measure that integrates scoring and treatment planning information into the assessment. It includes the minimum criteria for alcohol/drug abuse and dependence as listed in the fourth edition of the Diagnostic and Statistical Manual of Mental Disorders (DSM-IV; APA, 1994), as well as many state and government agencies’ required criteria for evaluation when treating adolescents with mental health, behavioral, or family problems (Dennis, 1999).

The content of the GAIN is divided into eight areas: background/treatment, substance use, physical health, risk behaviors, mental health, environment, legal, and vocational. The GAIN items check for major problem areas and the recency of any problems. The GAIN also asks detailed questions about lifetime and current (past 90 days) service utilization, as well as changes in the participant’s cognitive state (e.g., self efficacy to resist alcohol use, resistance to treatment, motivation for treatment). It also includes measures of clinical symptoms (depression, anxiety, etc.) and environmental and social factors that may be relevant to treatment (family composition, history of physical/sexual abuse, education, family history of

substance use) (Dennis, 1999; Dennis et al., 2003). Other GAIN scales provide measures of personal strengths, spirituality, and reasons for and readiness to quit using alcohol and other drugs (Lennox, Dennis, Scott, & Funk, 2006).

The GAIN includes over 100 scales and indices, with most of the scales having two to four subscales. The psychopathology scales consistently fall into four main statistical dimensions across age and level of care: substance problem severity, internal mental distress, external behavior problems, and crime and violence (Dennis, Chan & Funk, 2006).

In terms of the GAIN's psychometric properties, studies with adults and adolescents have found good reliability in test/retest situations on days of use and symptom counts ( $r = .7$  to  $.8$ ), as well as "diagnosis" ( $r = .5$  to  $.7$ ). Self-reports of substance use have been consistent with parents' reports, on-site urine and saliva testing, and laboratory-based urine tests. The latter includes the enzyme multiplied immunoassay technique (EMIT), which is the most commonly utilized urine-based drug test in both legal and workplace settings, and the gas chromatography/mass spectrometry test GC/MS, which is often used to confirm EMIT results (Lennox, Dennis, Ives, & White, 2006).

For the purpose of this study, only a subset of variables from the GAIN was utilized. In the AAFT project the full GAIN was given only at intake, while a version that included only variables of clinical interest (such as substance use, other clinical symptoms, involvement in prosocial activities such as work or school, and justice system involvement) was administered at 3, 6 & 12 month follow-ups. From the initial (intake) GAIN the current study utilized a data set that included the following variables: Client Race, Gender, Client Age, Personal Motivation for Treatment, and Co-morbid Disorders (See Table 1).

Several dependent variables from the GAIN were used in this study, including Days of Alcohol Use in the Past 90 days; Days of Marijuana Use in the past 90 days; Days of Drug Use Other than Alcohol and Marijuana (calculated variable); Days of Emotional Problems (several combined scales); and Days of Other Mental Health Symptoms (calculated variable). These outcome variables were the main outcome measures utilized in previous studies in the AAFT project (Garner et al., 2009; Godley et al., 2010), and were previously shown to account for the vast majority of variance in substance use scales on the GAIN (Lennox et al., 2006). Furthermore, these particular substance use variables had the least missing data and exhibited the most variance from among the substance use scales on the GAIN.

The measure of mental health, Days of Other Mental Health Problems, included the data from the scales, "Days of Emotional Problems Scale" and "Days of Other Mental Health Symptoms". The first of these scales combines non-substance use mental health symptom data from other GAIN scales for mood disturbance and other symptoms. The second scale counts *days* of significant symptoms within the past month in much the same way that the substance use scale "Days of Use" counts the number of days the client has used substances in the past month (Dennis et al., 2003). These two mental health scales have been used in previous research on this data set (Godley et al., 2010) and were available at 3, 6 and 12 months.

### **Therapist Ratings and Scores**

**The A-CRA Procedures Checklist.** Client outcome variables were predicted based on therapist adherence and competence scores (described below) from their rated therapy sessions during the AAFT project. The A-CRA Procedures Checklist (Appendix A); the tool used to rate therapist's A-CRA adherence and competence, outlines the procedures

contained in the A-CRA coding manual (Smith et al., 2007). This manual contains operational definitions of each 1-5 rating possibility: 1 = poor performance, 2 = needs improvement, 3 = satisfactory (passing), 4 = very good, and 5 = excellent performance. Each A-CRA procedure contains specific behaviorally-based requirements for each anchor point on this 5 point scale (Appendix C). Specific guidelines for scoring are outlined for each component of the 17 A-CRA procedures, as well as for general clinical skills (i.e., warm/ understanding, nonjudgmental, maintains session focus, and appropriately active). It also contains two “Overall” ratings that capture adherence to the spirit and theory of A-CRA, and the appropriate use and timing of A-CRA procedures.

The A-CRA Procedures Checklist serves as a therapist guide for conducting sessions, and as the vehicle for receiving ratings. It codifies the ratings for each of the A-CRA procedures that potentially could be utilized during a given session. Since A-CRA consists of a menu of procedures selected by the therapist on the basis of client needs, only a limited subset of the possible procedures is completed each session. But the A-CRA Procedures Checklist also contains ratings for several variables that are rated *each* session: homework (assigned and reviewed), overall adherence to A-CRA (noted above), and general clinical skills.

Each procedure on the checklist is comprised of several specific components, and each of these components is rated when a procedure is used in a session. For example, when completing the "Functional Analysis for Substance Use" procedure, therapists are rated on their: rationale for the procedure, efforts to have the client describe a common episode of substance use, discussion of triggers, clarification of the substance using behavior, discussion

of positive and negative consequences of the substance use, and efforts to tie the gathered information into the general treatment plan.

**Audio-taped therapy sessions.** During their time in the AAFT project, therapists were asked to upload all of their client sessions to a secure website. Prior to certification, therapists selected at least one session per week to be coded. Post-certification, one tape per month was randomly selected for review for each therapist to ensure that treatment fidelity remained high. All ratings were recorded in an online A-CRA coding “workbook” for each therapist, and the data for therapist variables related to A-CRA adherence and therapy delivery competence were derived from these workbooks. The current study utilized the session ratings generated during the certification process only. The number of procedures already “passed” by a therapist at the time that she/he began to deliver therapy to a given client (Progress toward Certification) was used as a therapist-level independent variable. Since therapists’ progress in training could influence their delivery of therapy, progress toward certification was tested for interactions with adherence/competence as an independent variable.

**Expert raters.** A team of expert raters was trained to review the therapists’ taped sessions that were submitted for certification, coding the presence and quality of delivery of the A-CRA procedures. To become an expert rater an individual had to: (1) attend at least one of the 2 ½ day long therapist training workshops for A-CRA, ACC and EBTx, and (2) achieve agreement ratings of at least 80% across a minimum of six procedures for a set of therapy sessions established for this purpose (Godley et al., 2010) and based on the CRA/A-CRA coding manual (Smith, Lundy, & Gianini, 2007). Expert raters also participated in monthly hour-long supervision telephone calls to clarify the rating guidelines. A small study

was conducted in which five expert raters and one of the manual's authors rated both "passed" and "failed" versions of each of the 17 A-CRA procedures (Smith et al., *in press*). The average intraclass correlation coefficient between raters in this data set was calculated as "excellent" at over .75. An example of the rating workbook which illustrated procedures rated for each session can be seen in Appendix B.

### **Creation of Scores for Independent/Predictor Variables**

In the current study, client outcomes were analyzed for their relationship to the Adherence and Competence scores for therapists. Client outcome data were examined in relation to the therapist's scores for the sessions in which a client participated; namely, each independent variable was derived for a therapist-client pair. Both adherence and competence variables were constructed based on scores for a session for a given client and for a given therapist.

**Adherence variable.** The adherence variable for each therapist-client pair was the average of the two ratings for the "Overall" scores from the A-CRA Procedures Checklist. The first Overall score rates therapists on whether they stay within the A-CRA protocol in terms of philosophy, attitude, and objectives. In other words, does the therapist adhere to the principles of behavior therapy? The second Overall score rates the therapist on whether the appropriate A-CRA procedures are introduced in the session at the correct time. Together these "Overall" scores reasonably capture the construct of "adherence", since they reflect whether therapists adhere to the general theory and structure of A-CRA, as well as whether they complete the procedures recommended for that session.

**Competence variables.** Competence ratings for each therapist-client pair were derived based on the ratings of the *quality* of procedures reported on the A-CRA Procedures

Checklist by the expert raters. Each procedure component was rated on a 1-5 quality scale (See Appendices A & B), with each numeric score representing the presence or absence, as well as the quality, of certain measurable and observable therapist behaviors. For example, a rating of "5" on the Homework component called "Assigning Homework" requires that the therapist has helped the client to create a homework assignment that is positive, specific, measurable/observable, and under the client's control. It further states that the homework should be based on the client's input and be relevant to the client's goals, and that the client should be asked to repeat the assignment in his/her own words (Smith et al., 2007).

The average score for each therapist on each procedure with a given client was used as the competence score. For example, if there were six components within a procedure, such as for the Functional Analysis for Substance Use (See Appendices A & B), then the average rating for these six scores represents a competence score for that procedure for that rated session. These scores were then averaged to create a competence variable for each therapist, and for each therapist-client pair. This average reflects the overall quality of A-CRA procedures received by each client.

### **Other Independent Variables**

**Therapist variables.** The number of procedures already "passed" (i.e., a score of '3' or better for each component of the procedure) by a therapist at the time she/he started seeing a client was added to models as part of a secondary analysis. This variable was represented as Progress toward Certification. The purpose was to determine whether this variable added to the explanation of variance above and beyond adherence or competence, or whether increases in adherence/competence adequately accounted for potential effects of therapist progress in training on client outcome.

**Client variables.** It has been suggested in previous studies that the curvilinear relationship observed between therapist adherence and client outcome may be mediated or moderated by client motivation for treatment or the therapeutic alliance (Barber et al., 2006; Hogue et al., 2008; Webb et al., 2010). The GAIN contains a scale that measures client's initial motivation for treatment. Although not a main hypothesis, the GAIN measure of client motivation at intake (Personal Motivation for Treatment) was intended for utilization as a possible explanatory variable in models that included adherence and competence as predictors of client outcome.

The A-CRA Exposure scale was a count at each follow-up of how many unique A-CRA procedures a client had received in treatment at that time. The total count for each client had been found in a previous study to predict client substance use outcomes (Garner et al., 2009), and therefore the A-CRA Exposure variable was used as a predictor variable at the client level.

The Session Count variable, reflecting the total number of A-CRA sessions received by a client by the time of each follow up, was also included as a client level independent variable. Treatment attendance has been previously shown to predict client outcomes (Ruglass, et al., 2012), and including this variable offered the opportunity to test whether treatment sessions attended, or unique procedures received, predicted client outcomes or interacted with adherence/competence.

**Dependent variables.** Outcome variables were based on the GAIN variables for substance use and general mental health at intake, 3, 6, and 12 month follow-ups. The 3-month follow up retained the greater number of participants, while the 12-month follow-up was the most distal and consequently may be the most representative of final client

outcomes. First, change over time was modeled for client variables only in order to examine the pattern of change in variables between these follow ups. In the final models, in which therapist adherence and competence variables were included, scores at intake, 3, 6, and 12 months were treated as repeated measures. Aggregate scores were derived for each of the variables from the GAIN related to two areas of client functioning: Substance Use Outcomes, and Other Mental Health Outcomes. The GAIN outcome variables can be found in Table 2.

### **Data Analytic Strategy**

Multilevel (Hierarchical) Models were constructed in order to examine the relationship between therapist adherence and competence scores and client outcomes. Because all therapists had more than one client, and having a specific therapist could potentially influence client outcomes, clients were "nested" within therapists. In initial analyses, variability in number of therapists per site and lack of variability in therapist rating scores between sites made the use of site as a nested variable implausible. Also, previous studies found no significant site differences in client outcome for this data set (Garner et al., 2009). Additionally, the current study used a 3-level nested model and site would have created a 4<sup>th</sup> level. Consequently the site at which therapists were located was not used as a level of analysis.

The models utilized in this analysis were based on the theory of Multilevel Modeling for prediction and data reduction (Gelman, 2006; Hox, 2002; Raudenbush & Bryk, 2002). Multilevel Modeling is particularly well-suited for this particular data set and research question because of the repeated measures nature of the outcome variables and the nesting of independent variables (Singer & Willet, 2003). Multilevel modeling was used to examine: (a) the presence of variability in adherence/competence between and within therapists, (b)

whether client characteristics (Personal Motivation for Treatment, A-CRA Exposure, Treatment Sessions, and demographic factors) were associated with adherence/competence, (c) whether therapist characteristics (e.g., Progress toward Certification) were associated with Adherence/Competence, and (d) whether variability in adherence/competence was associated with subsequent symptom severity.

The design included two-tiers beyond the repeated measures represented by follow-up data across the four time periods (See Figure 1). Therapist adherence and competence were initially tested in the same linear model. Interaction effects were also examined between levels for significant explanatory variables.

**Construction of predictive models.** Regarding the initial demonstration of variability in outcome variables, two null models (one for Substance Use Days and one for Days of Other Mental Health Problems) were specified to determine the degree of variance in outcome variables.

The formula for the predictive models represents the predicted outcome variable at a given time for a given client treated by a given therapist as the intercept, and accounts for the random variance component between therapists, between clients, within clients and across sessions. This intercept was used as the basis for further comparisons as variables were progressively added to the model variance component within clients (i.e., between sessions; repeated measures). Results from these null models provided estimates of random effects variance components, which indicated the percentage of variance in ratings explained at each level (Tabachnick & Fidell, 2007).

Adherence and Competence were included in a model that contained those client level factors that accounted for significant variance in the previous model. These client level

predictor variables included: Personal Motivation for Treatment, Co-Morbid Disorders, therapist Progress toward Certification, client's A-CRA Exposure (number of procedures completed with each client), Session Count, and symptom severity at intake and each follow up.

## Results

Multilevel regression analyses were conducted in order to test each hypothesis. For each, a null model was created that first tested variance in client dependent variable scores across the intake and four follow-up time periods by client and therapist. Since no hypothesized explanatory variables were included, these models were used as the baseline to compare subsequent models and their explanatory value. The variance of client-level explanatory variables (A-CRA Exposure, Treatment Sessions, Personal Motivation for Treatment) was then examined separately, and those with significant variance were included in explanatory models. Those client-level factors that accounted for significant variance in follow-up scores were retained in the tests of therapist-level explanatory variables. The variance between- and within- therapists of therapist-level variables (Adherence, Competence, and Progress toward Certification) was then examined. Those that were significant were retained for explanatory models in which therapist-level variables were included. All models were designed with client outcomes over time nested within clients nested within therapists.

The first hypothesis stated that Adherence would predict lower client substance use and lower overall mental-health problems in a curvilinear model. The second hypothesis stated that Competence would predict client outcome variables in a linear model. Both Adherence and Competence were first tested in a linear model.

### Client Outcome Variables

The Substance Use Days variable of the GAIN, as previously described in the Measures section, represents days of any substance use in the past 90 days. Client variables were measured at intake (the beginning of treatment), at 3-months (three months after

treatment began), 6 months, and 12 months. The mean number of days of substance use at intake was 24.89 ( $SD = 30.27$ ). The mean number of days of use (in the past 90 days) at each follow-up was: 12.25 ( $SD=21.50$  at 3 months), 11.75 ( $SD=22.55$ ) at 6 months, and 10.40 ( $SD=21.03$ ) at 12 months (See Table 3). An initial general linear model comparing means of Substance Use Days across intake and follow-ups showed a significant decline in substance use overall across the follow-up period, with the largest decline in substance use occurring between intake and the 3-month follow-up  $F(4, 379) = 4.25, p = .013$ . In accordance with previous analyses of outcome data for similar samples from this data set (Garner, Godley, Dennis, Godley, & Shepard, 2010), no significant main effect for client ethnicity or gender on substance use was found in this initial analysis.

The variable Days of Other Mental Health Problems encompasses the data from the emotional problems scales of the GAIN, which as previously described, measures days of clinically significant psychiatric symptoms other than substance use in the past 90 days. The mean number of days of symptoms was as follows: intake  $M = 2.37$  days ( $SD= 1.92$ ), 3-month follow-up  $M = 1.95$  days ( $SD=1.75$ ), 6-month  $M = 1.74$  days ( $SD= 1.53$ ), and 12-month  $M = 1.65$  days ( $SD= 1.14$ ). See Table 3 for a summary of descriptive statistics for dependent variables. An initial general linear model comparing difference in means across intake and follow-ups for Days of Other Mental Health Problems showed no significant difference between time periods  $F(4, 379) = 1.226, p= .289$ . The average number of days of other mental health symptoms decreased over time but this decrease was not significant. Given that this variable was proposed to be examined, variance within and between participants for this variable was nonetheless further explored in the main analysis.

### Client Level Explanatory Variables

Client level variables were selected from this data set as explanatory variables based on their theoretical relevance to the A-CRA procedure or to the client dependent variables. Descriptive statistics for client level explanatory variables can be found in Table 2. Not all clients completed the entire GAIN at intake, and thus missing data often existed in this data set for client-level variables at intake. In multilevel modeling, the parameters are estimated using maximum likelihood estimation. Level 1 (outcome) variable observations which are missing are estimated, but Level 2 observations are deleted in this process. It is noted where this missing data significantly affected a proposed client-level variable. Indices of the relationship between client-level explanatory variables can be found in the coefficient table for the first predictive model (Table 4).

As noted, the baseline substance use scores from the GAIN (represented by the variable Substance Use Days) had a mean of 24.89 days ( $Min=2$ ,  $Max=90$ ,  $SD=30.27$ ). The majority of days of substance use were accounted for by cannabis use and alcohol use. See Table 5 for substances used. The intake (baseline) level of substance use was expected to account for the majority of variance in client substance use at subsequent follow-ups. An initial analysis of Days of Other Mental Health Problems (days in the past 90 in which clients reported significant mental health symptoms) found no significant difference between time periods, and the mixed model for this outcome variable could not be examined.

The A-CRA Exposure variable was the number of unique A-CRA procedures to which each client had been exposed at a given time of measurement. There was no data available for this variable at intake since clients had received no treatment yet, thus making this value 0 for all clients. At the time of the 3-month follow-up (3 months after beginning

treatment), each client had been exposed to an average of 10.8 unique procedures ( $Min=2$ ,  $Max=18$ ,  $SD=3.14$ ). This suggested that the average client had received nearly the “effective dose” of unique procedures found to have the most impact on symptoms in a previous study (Garner et al., 2009). By the 6-month follow-up the mean number of procedures received was 12.93 ( $Min=5$ ,  $Max=19$ ,  $SD=2.94$ ), and the average number of procedures received at the 12-month follow-ups were 13.21 ( $Min=3$ ,  $Max=25$ ,  $SD=3.23$ ) and 13.33 procedures ( $Min=6$ ,  $Max=25$ ,  $SD=2.72$ ), respectively.

A Treatment Sessions variable represented the cumulative number of treatment sessions that a client had received at a given time period. The mean number of sessions clients had received at the 3-month follow-up was 8.5, ( $Min=1$ ,  $Max=25$ ,  $SD=3.87$ ). The average cumulative number of sessions was 14.57 at 6 months ( $Min=3$ ,  $Max=42$ ,  $SD=5.79$ ) and 17.53 at 12 months ( $Min=3$ ,  $Max=47$ ,  $SD=6.95$ ).

The Personal Motivation for Treatment score was used to measure a client’s strength of motivation for treatment at intake. The mean score for this variable was 10.8 out of a possible 20 ( $Min=0$ ,  $Max=18$ ,  $SD=6.04$ ). But as noted, a fair number of clients did not complete the entire GAIN (apparently some agencies did not require it), and this was particularly evident on this variable: less than 25% of clients (92 out of 384 clients) completed this item. Because this variable was to be used as an independent variable and was not a repeated measure, the multilevel analysis offered no advantage in accounting for the missing data.

### **Therapist Level Explanatory Variables**

The Adherence variable was based on the two “Overall” ratings from the A-CRA procedures checklist: (1) stayed within A-CRA protocol as far as philosophy and objectives,

and (2) introduced A-CRA procedures at appropriate times. This score was derived for each therapist by calculating the mean of the two “Overall” scores across all rated sessions included in the study. The mean for Adherence was 3.29 ( $SD=.12$ ; 65.8% adherence). As noted earlier, therapists had to receive at least a score of 3 out of a possible 5 on all parts of a procedure in order to “pass” that procedure as part of their certification process. Since these same standards were applied to these “Overall” scores, therapists in this study could be viewed as having achieved an adequate level of protocol adherence. One might also argue that therapists achieved an adequate level of Competence in the delivery of A-CRA. The Competence score was the average of all scores for a given therapist across all procedures rated. This score did not include the “Overall” ratings used to create the Adherence score, or the “General Clinical Skills” ratings (See A-CRA procedures checklist, Appendix A) as they were not meant to rate skills specific to A-CRA. The mean Competence score for therapists was 3.39 ( $SD=.48$ ) out of a possible 5 (67.8% competence on average).

Therapist’s Progress toward Certification (PTC); namely, the number of procedures passed out of all procedures required for certification, was also examined as a possible explanatory variable. The mean number of procedures passed (with scores of 3 or better on all subscores for that procedure) by a given therapist at the time she/he saw a given client was 9.66 ( $Min=4.32$ ,  $Max=13.65$ ,  $SD=2.21$ ) out of a possible 17 procedures.

**Relationship between explanatory variables.** The correlation between therapist level explanatory variables was first examined. Competence and Adherence were highly correlated ( $r=.68$ ,  $p<.01$ ). Adherence and Competence scores were not significantly correlated with Therapist Progress toward Certification. However, these overall correlations

do not separate within- and between-therapist correlations, which can be significantly different from the overall association (see Baldwin et al., 2007).

### **Construction and Testing of Predictive Models to Address Main Hypotheses**

All data analysis was completed using SPSS 19.0. Syntax was created by the author specifically for this study, based on the mixed models syntax. This was done in order to analyze models with 3-Levels and repeated outcome measures. Syntax was created based on example syntax for similar models (Pugh, 2013; West, Ryu, Kwok, & Cham, 2011).

In each model, first level variables were centered around the group mean for outcomes, while client level and therapist level variables were centered around the grand mean for that variable. Variance accounted for by each model was compared to the previous lower-level model, and only those variables that accounted for significant variance were retained in the 3-level model. In each model clients and therapists were treated as random effects and clients were nested within therapists.

**Construction of explanatory model for client substance use.** First, the intercept only model was created. This model can be found in Model 1 of Table 4. In this model the intercept is based on the dependent variable for the model. First the unconditional linear growth model was created. Each follow-up was numbered 0-3, and created into the Time variable. This model describes the trajectory for the Substance Use Days variable across follow-ups. Specifically an individual's count of Substance Use Days at a specific follow-up assessment was a function of the intercept, slope, and a time-specific (follow-up) residual term, which captures the deviation between an individual's observed data points and that individual's estimated linear trajectory. The intercept was the estimated initial score for Substance Use Days.

In this model, individual (Client Level) intercepts are a function of the mean intake score plus an individual deviation from this mean. Individual substance use trajectories are a function of the mean growth rate and a residual. In the initial null model, the individual client is treated as a Level 2 variable—the model expresses variance between follow-ups and between clients. The coefficients for this model can be found in Table 4. All variance components in this model were significant. Substance Use Days overall decreased significantly across follow-ups ( $B=-7.65$ ,  $SE=.35$   $p<.01$ ).

The second model adds Therapist Level intercepts as a function of the mean intake score plus a deviation from this mean of the average score for each therapist's clients. The proportion of variance in days of substance use at both the between- and within- therapist levels was tested. The estimate of the within-therapist (between client) random variance component was significant ( $B= 42.25$ ,  $SE = 4.19$ ,  $p <.01$ ), indicating that days of substance use varied significantly between clients being treated by the same therapist. The between-therapist random variance component was also significant ( $B=8.71$ ,  $SE = 0.94$ ,  $p > .01$ ), indicating differences in the substance use of clients of different therapists. The significant covariance between the random intercept and slope indicated that clients with higher initial scores experienced larger decreases in Substance Use Days over time (individuals became more similar in their substance use scores over time).

**Repeated measures and client level explanatory model.** Because the growth model analysis indicated that Substance Use Days varied significantly over time, and that clients also varied in their intake Substance Use Days and trajectories, grand mean centered Client Level variables were added to the model. The A-CRA Exposure variable, Treatment Sessions, and Personal Motivation for Treatment were added as covariates to the model. The

fixed and random effects coefficients for this model as well as significant interactions are shown in Table 4.

The regression of the intercepts of ACRA-Exposure was significantly different from zero ( $B=-2.78^*$ ,  $p<.05$ ), and the difference in the residual variance was lower than in the null model. This variable was included in the model that included therapist level explanatory variables. Two variables, Personal Motivation for Treatment and Treatment Sessions, did not have significant regression coefficients (as shown in Model 3 of Table 4) and so were not further utilized in predictive models for substance use.

**Variability in Adherence and Competence.** Before utilizing the Adherence and Competence variables in predictive models, the variance of each was examined. The between- and within- therapists random variance for the adherence and competence models were significantly different from zero. ICCs were calculated as the proportion of variance explained between and within therapists for scores on adherence and competence. The between- clients and between-therapists variance components were divided by the sum of the between- and within- variance components.

The ICCs indicated that there was significant variance in Adherence and Competence at the between- and within-therapist levels as shown in Table 4. These coefficients show that variance exists between therapists performing A-CRA and also within therapists working with different clients, as would be predicted. Variance between- and within- therapists on measures of adherence and competence has been found in previous studies on treatment fidelity (Boswell et al., 2013; Hogue et al., 2008; Schoenwald et al., 2009).

Finally, because clients' Substance Use Days varied between therapists, the Adherence and Competence variables were added to the model. The deviance for this model

was significantly different from the model that included only client-level variables, indicating that the therapist-level variables contributed significantly to explaining variability in client substance use outcomes.

In this final predictive model of substance use outcomes, the effect of Adherence was significant at only the  $p=.10$  level ( $B=1.57$ ,  $SE=0.69$ ),  $p=.089$ . This effect was only a significant fit for the estimated trajectory of client's substance use across follow-ups when a linear fit model was used. This finding indicated that Adherence was weakly associated with client substance use outcomes in a model which included significant client-level outcomes. It did not support Hypothesis 1: that therapist Adherence would best predict client substance use in a quadratic model.

In this final predictive model of client substance use, a significant positive main effect was observed for Competence on Substance Use Days ( $B=-13.32$ ,  $SE=4.49$ ),  $p<.05$ . Competence predicted days of client substance use above and beyond the contribution of client-level variables. This finding supported Hypothesis 2: that therapist Competence would predict client substance use in a linear fashion.

Finally, because A-CRA Exposure increased in level of significance when Therapist Level variables were added to the model, the interaction effect of therapist Competence and A-CRA Exposure was added. This interaction effect explained significant variance in the model at the  $p<.05$  level, ( $B= -6.73$ ,  $SE=1.15$ ,  $p<.05$ ). This indicates that the interaction of A-CRA Exposure and therapist Competence are associated with fewer client Substance Use Days.

**Prediction of Days of Other Mental Health Problems.** The same process described above was used to create a null model for Days of Other Mental Health Problems. In this

model, the variance components related to Days of Other Mental Health Problems across time periods did not vary significantly ( $B = -.02$ ,  $SE = .03$ ,  $CI [-01.42, 01.58]$ ). Although these appeared to decrease over time the variance was not significant. First, a model was constructed in order to examine the variance between follow-up scores on Days of Other Mental Health Problems for each client. In this model there was no significant variability in scores between time periods for this variable, which was consistent with the findings of the previously described general linear model which showed no significant difference in this variable between follow-ups. Because of the lack of variability in the outcome variable itself, planned analyses on the relationship between explanatory variables and days of mental health problems other than substance use could not be carried out.

### **Post-Hoc Analysis: Predictors of Adherence and Competence**

Given that some previous studies have shown that client variables can influence therapist adherence and/or competence (Boswell, et al., 2010; Hogue et al., 2010; Carroll, et al., 2007), and because Competence showed a relationship to client substance use, post hoc models utilizing client variables from this data set to predict therapist Competence scores were tested. This analysis did not include longitudinal data, and so the mixed models function of SPSS was sufficient to complete the analysis.

A predictive model was created and client-level variables that represented constructs similar to those that have been found to predict adherence/competence in other studies were included. These client-level variables included Client CoMorbidity Disorders and Client Externalizing Behaviors. Client CoMorbidity Disorders is a count (including 0) of previously documented comorbid psychiatric disorders (other than substance use) for a given client. Client Externalizing Behaviors represents the tendency of a client to express symptoms

consistent with diagnoses of externalizing disorders (i.e., attention deficit, oppositional defiant, and conduct disorders). These variables were chosen because they were robust, contained little missing data, and were potentially theoretically related to therapist adherence/competence.

The variable Client Externalizing Behaviors was found to have significant variance between clients. Moreover, a significant main effect was observed for Client Externalizing Behaviors on Competence ( $B=-2.01$ ,  $SE 0.99$ ),  $p < .05$ . These findings indicate that the greater the number Externalizing Behaviors for a given client, the poorer his/her therapist's Competence scores were. Both of these effects were strong and imply that client-level variables may be related to the Competence with which therapists deliver A-CRA, which in turn impacts the effect of treatment on reduction in client substance use.

## **Discussion**

Therapist adherence and competence when delivering treatments according to a protocol have become a major focus of psychotherapy process and outcome research. The relevance of these constructs has increasingly come into focus as dissemination, training, and the sustainability of evidence-based treatments in community practice settings have become targets of research (see McHugh & Barlow, 2012). Although a large body of research has shown that the constructs of adherence and competence are reliably measurable (Schoenwald, Scheidow, & Letourneau, 2004; Dehnag et al., 2012), and that client factors (Gibbons et al., 2010; Webb, 2012) and training factors (Boswell et al., 2013) can affect therapists' adherence and competence, associations between these measures of treatment fidelity and client outcomes remain mixed or modest (Webb et al., 2010). Consequently the implications for training therapists in evidence based therapies have remained somewhat unclear.

The sample of therapist, client, and outcome data in the current study provided fertile ground for testing the relationships between adherence and competence and treatment outcomes. The study from which the data was drawn had a high-level of participant retention over all, and the trajectory of client substance use could be predicted with a high degree of confidence as shown across models. Moreover, client substance use in this study decreased significantly between the intake and follow-up sessions, and the overall trajectory of client substance use was a decrease in frequency of use.

### **Client Outcome Variables**

In this study, client substance use was the primary outcome variable of interest. Substance use decreased significantly over time, with the largest drop occurring from the

intake session to 3-month follow up; the first time period during which clients received treatment. Previous studies on this population of clients from the AAFT study have shown the A-CRA treatment to have had a significant effect on substance use outcomes (Garner et al., 2011; Godley et al., 2010), and the pattern found in the current study supports this. Clients also saw a trend in which days of other mental health symptoms seemed to decrease between follow-ups, but this outcome variable did not differ significantly enough between clients to be examined through multilevel analysis.

### **Client Level Explanatory Variables**

Several client-level variables in this study were examined for their relationship to client outcome. The strongest predictor of absolute count of Substance Use Days across follow-ups was Substance Use Days at intake, as would be expected (Tapert et al., 2002). In general, higher baseline levels of substance use predict higher levels at follow-ups across the substance use literature (Brown & Tapert, 2004). In this sample, Substance Use Days at intake also was associated with the magnitude of difference in days of substance use across follow-ups, indicating that higher levels of substance use at baseline also predicted larger *decreases* in substance use over time. This finding is similar to that of previous studies showing that the most severe substance users often had larger decreases in substance use over the course of treatment (McKay & Weiss, 2001; McKellar, Harris, & Moos, 2006; Tiet, 2007). Despite this variable being strongly associated with subsequent changes in substance use, other client- and therapist-level variables also significantly accounted for variance in the explanatory model for substance use.

A previous study utilizing data from the AAFT project found that the number of unique A-CRA procedures a client received affected treatment outcomes. Specifically, when

clients received at least 11 unique A-CRA procedures, they had significantly better substance use outcomes than those who did not. Exposure to A-CRA procedures accounted for more variance in substance use outcomes than number of treatment sessions attended (Garner et al., 2009). The current study seemed to offer further support for the idea that A-CRA exposure in terms of number of unique procedures was more important to positive client substance use outcomes than number of sessions attended. Specifically, the A-CRA Exposure variable significantly predicted decline in client substance use while the Treatment Sessions variable did not.

Although a great deal of literature reports that treatment retention and attendance predict more positive treatment outcomes in general (Ruglass et al., 2012), a growing body of literature is showing that this may be explained by clients receiving the effective components or the “effective dose” of treatment rather than simply being an effect of time spent in treatment (Bertrand et al., 2013; Hein et al., 2012). One recent study with marijuana dependent clients found significant reductions in use over 16 weeks, but there was no significant difference between those who completed either a brief or a 14-session version of cognitive behavioral therapy (Stephens, Roffman, & Curtin, 2013). In the current study, the A-CRA Exposure variable may have been a significant predictor of client substance use at each follow-up because it essentially measured the “dose of treatment” clients had received at that point in time. Those clients with higher session counts may not always have had higher rates of A-CRA Exposure.

Because of the structure of A-CRA, multiple procedures are often completed in a single session, and some procedures are intentionally grouped together in the A-CRA protocol guidelines (Smith et al., in press). It may be that those clients who attended more

sessions but received fewer procedures during those sessions did not have as favorable outcomes as those who received more procedures in fewer sessions. This hypothesis was not tested, but may be of interest in future studies. In fact, those therapists with the highest treatment fidelity scores would by definition deliver several A-CRA procedures in a single session more often than not (Smith et al., in press). Future investigations of treatment fidelity in A-CRA may benefit from an examination of the relationship between number of procedures received, session count, and treatment fidelity.

The other proposed client-level variable, Personal Motivation for Treatment, was of interest because motivation for treatment has been found by some researchers to be a powerful mediator or moderator of treatment on substance use outcomes (Barber et al., 2006; Wampold, 2001), whereas other literature indicates that the effect of baseline treatment motivation has mixed or small effects on overall substance use outcomes (Hallgren & Moyers, 2011; Roffman, Setphens, & Roffman, 2011). Motivation also has been found to be related to therapist treatment fidelity (Hogue et al., 2008) and to the therapeutic alliance, with the latter, in turn, predicting better client outcomes (Barber et al., 2006; Trepka et al., 2004). Unfortunately the current study's Personal Motivation for Treatment variable had a great deal of missing data and low variability between clients. This may have been because some sites had the option of not completing certain sections of the GAIN, and yet the reason for missing data cannot be concluded. The lack of variability may have been due to a limited range of possible responses in the Personal Motivation for Treatment item of the GAIN (Dennis et al., 2002). Future studies may benefit from including robust measures of client motivation *throughout* treatment when examining the relationship of client outcome and therapist treatment fidelity, given that change in expressed motivation over the course of treatment,

rather than baseline motivation, has increasingly been shown to predict more positive substance use outcomes (Moyers, Martin, Houck, Christopher, & Tonigan, 2009).

### **Therapist Level Explanatory Variables**

Although one proposed therapist-level variable, Progress toward Certification, was not significantly predictive of client substance use outcomes, both the Adherence and Competence variables created for this study accounted for significant variance in client substance use trajectories across follow-ups. The Adherence variable, based on the two “Overall” ratings from the A-CRA Procedures Checklist, was highly correlated with Competence. This would be expected, as one of the two ratings which comprised the Adherence variable was based on the rater’s perception of how well therapists adhere to the philosophy and objectives of A-CRA. This might also be reflected in the competence with which therapists carry out A-CRA procedures. Surprisingly, therapist Adherence and Competence were not significantly correlated with therapist Progress toward Certification. This could be due to the particular sample of therapists selected for this study, or the variability of the PTC score.

### **Therapist Adherence and Competence as Predictors of Client Substance Use**

Competence showed a relationship to client substance use across follow-ups in the current study and the relationship between Adherence and outcome showed a promising trend. Although the association between Adherence and outcome was non-significant, the strong association between Competence and substance use in this study offers support for the idea that treatment fidelity and skill in delivery are important for client substance use outcomes.

**Adherence and client substance use.** In a predictive model including both client-level and therapist-level explanatory variables, Adherence predicted the slope of client substance use at the  $p=.10$  level. Although this level of prediction is not a strong one (Albright, 2010), it represents a trend that suggests that Adherence may have an association with client outcomes. Contrary to Hypothesis 1, the model that showed a relationship between Adherence and client substance use was not a curvilinear one, but a linear one. This is in contrast to several previous studies which have demonstrated a significant curvilinear relationship between adherence variables and client outcomes with moderate (but neither very high nor very low) scores predicting favorable client treatment outcomes (Hogue, 2010; Webb, 2010). However, it *is* in line with several other studies which have shown linear relationships between Adherence and client outcomes (Huppert, Barlow, Gorman, Shear, & Woods, 2006; Webb, 2012).

It is possible that differences between the rating measures used to derive the adherence variable in this and other studies is responsible for the discrepant findings. As discussed previously, the rating scales that have been used in the investigation of treatment fidelity are extremely diverse (Cronsbruch et al., 2012; Martin et al., 2004; Sharpless & Barber, 2009) and there does not seem to be a “gold standard”, or even a commonly used measure for treatment fidelity constructs. Most of the measures across different studies use rating scales tailored specifically to the theoretical components most important in the treatment being utilized (Boswell et al., 2013; Madson & Campbell, 2013). Adherence had not previously been investigated for its relationship to client outcome with the measure utilized in this study, the A-CRA Procedures Checklist. Conceivably the behaviorally-anchored ratings in this measure contributed to the finding of a linear trend. This checklist is

thorough in terms of which specific therapist behaviors are measured, and has exacting guidelines for what each point on the 1-5 rating scale represents. It could be the case that the behaviors captured by the current study's "overall" items (Adherence variable) are directly relevant to the effects of the therapy

Additionally, the curvilinear relationship has been explained by researchers as resulting from two extremes that are detrimental; namely, a lack of protocol adherence or an over-reliance on the protocol. In contrast, the ideal situation is one in which the protocol is adhered to in a flexible but faithful manner (Hogue et al., 2010; Webb, 2012). It could be that the Adherence variables reflect the purposeful flexibility which is inherent in A-CRA. In fact, one of the "overall" items encompasses the therapist's selection of relevant procedures. Since A-CRA takes a "menu" approach to procedure utilization rather than dictating which procedures are completed session by session, conceivably the scores that comprise the Adherence variable in the current study capture some of this flexibility. So, a therapist who received a rating of "5" would have potentially demonstrated flexibility by selecting the most relevant procedures for that session. Since some have proposed that one reason for hesitancy on the part of clinicians to adopt EBPs is the perceived lack of room for clinical judgment in manualized treatments, the role of adherent therapist decision-making within treatments like A-CRA should potentially be emphasized (Lillienfeld et al., 2013; Tanenbaum, 2013).

Interestingly, one previous study (Hogue et al., 2010) found a linear relationship between adherence and substance use outcome for marijuana using clients, even though they found a curvilinear relationship between adherence and other client substance use and for other mental health outcomes in general. The vast majority of substance use in the current

study's sample was accounted for by marijuana use. It could be the case that greater adherence is more beneficial when clients are specifically marijuana users, whereas moderate levels of adherence produce better client outcomes for substance use in general. Regardless, since the relationship between adherence and substance use in the current study only represented a positive linear trend, it is premature to draw any conclusions about the effect of A-CRA therapist adherence on substance use.

**Competence.** Hypothesis 2, which stated that Competence would predict client substance use in a linear model, was strongly supported. The Competence variable had a higher degree of variability between therapists (and between clients who shared a therapist) than the Adherence variable. It encompassed many more sub-scores for various procedures than the Adherence variable, and in general may have been a better representation of fidelity to A-CRA. Competence predicted the slope of client substance use across follow-ups at the  $p < .05$  level. It accounted for a greater proportion of the difference in deviance from the observed data of the model's line of fit than client-level variables alone.

This finding is important in that it provides robust evidence for a relationship between treatment protocol fidelity using a highly-structured manualized behavioral treatment and client substance use outcomes. This finding is particularly noteworthy because of the number of previous studies that have found no relationship between therapist competence and client outcomes (Hogue et al., 2007; Webb et al., 2010; Webb et al., 2012). It has been pointed out that the principle behind the utilization of manualized treatments would imply that measures of adherence and competence should reflect those aspects of the therapy which are theoretically most relevant to client outcomes in that therapy's particular paradigm (Barber et al. 2009).

In general, it is difficult to create standardized rating measures for adherence and competence that capture the theoretical components of multiple treatments (Denhag, 2012; Webb, 2012). Because measurement of adherence/competence are often treatment-modality specific, there is a lack of generalizability between studies (Hogue et al., 2007; Webb, 2012). However, this may explain the difference in findings between the current study and previous studies that detected no effect of competence on client outcomes. Since competence in A-CRA had never been examined using data from the A-CRA Procedures Checklist and explored in terms of client substance use outcomes, a departure from previous findings might be predictable. It also may be the case that the more detailed measure of competence used in the current study better captures the construct of competence, thereby allowing its relationship to client substance use to manifest more strongly. Previous studies have cited difficulties in operationalizing competence as one reason for null findings for the relationship between competence and client outcomes, so a more precisely-defined competence variable may allow for improved predictive validity (Hogue et al., 2010).

**Therapist Progress toward Certification.** The lack of significant correlations between Adherence/Competence and therapist's Progress toward Certification is surprising. Progress toward Certification is the number of procedures the therapist had passed at the time she/he submitted a therapy session tape (for scoring) for a given client. Although there was no hypothesized prediction about the relationship of these variables in the current study, one might expect progress toward certification to be related to Adherence and Competence, since those variables were based on the scores that determined whether therapists passed procedures toward their certification. Several factors might explain this lack of a correlation. First, variability in this score was low in this sample. It is also the case that therapists

selected session tapes for coding by expert raters for procedures that they had not yet passed. This data set therefore does not represent a complete view of therapists' performance during the certification process. Since therapists were attempting to pass new procedures, they may have selected (for scoring) their "best" tapes throughout the certification process, thereby reducing the variability in Adherence/Competence based on how many procedures had previously been passed.

**Interaction between Competence and A-CRA Exposure.** The interaction effect of Competence and A-CRA exposure in this study was particularly interesting, in part because there does not seem to be a similar finding in the literature. This interaction was tested because the main effect of A-CRA exposure increased in significance level when therapist-level variables were added to the main explanatory model, and Competence was the only therapist-level variable that accounted for significant variance in the model. This significant interaction effect could potentially reflect a relationship in which clients received more unique procedures when therapists were providing A-CRA more competently, which in turn was associated with better treatment outcomes. This would match with the structure of A-CRA in which completion of relevant procedures, often within the same session, is a part of the skilled delivery of treatment. This interaction also might imply that the effect of A-CRA Exposure on client outcomes is enhanced by competent delivery of treatment. In other words, it is possible that the number of unique procedures received by a client has a greater impact on reduction in substance use when those procedures are competently delivered. While both of these hypotheses make sense in theory, further investigation is needed.

### **Client Variables Predict Competence**

Although the focus of this study was the relationship between therapist Adherence and Competence and client substance use, client factors that might impact treatment fidelity have also been important foci of previous studies in this area (Bateman & Fonagy, 2004; Meehan, Levy, & Clarkin, 2012; Ryle, 2012). Because some studies had shown that client externalizing behaviors and co-morbid disorders were predictive of both poorer substance use outcomes (Bateman & Fonagy, 2004) and lower levels of therapist treatment fidelity (Ryle, 2012), a post-hoc analysis was conducted to examine this relationship in the current data set.

In this sample, more reported externalizing behaviors associated with comorbid disorders on the part of the client were found to predict poorer Competence scores for his/her therapist for the sessions involving that client. This relationship was a fairly strong one, and supports the idea that client factors may impact therapist treatment fidelity (Barber et al., 2006; Miller et al., 2008), which in turn predicts client substance use outcomes. Some studies have estimated that about 60% of all adolescent substance users meet criteria for at least one other mental health diagnosis (Armstrong, 2002; Hovort, 2007); a co-morbidity rate that is similar to the one found in the population of adult substance users who engage in treatment (Armstrong, 2002). Co-morbid diagnoses have been linked with poorer outcomes in terms of reduction in substance use, overall mental health outcomes, and indicators such as hospitalizations and arrests (Swendson et al., 2012). With such high rates of co-morbidity and its detrimental impact on client outcomes, the mechanisms affecting poorer outcomes for those with externalizing behaviors specifically require further investigation.

### **Limitations of the Current Study**

This study had several limitations affecting the therapist sample, client sample, and measures utilized, which might be anticipated and addressed in future research. First, although demographic data were available for the sample of therapists who were selected for this study, it was not linked to any of the other variables in the data set. Therefore, therapist demographic data could not be used in any of the analyses, other than to characterize the sample of therapists. Second, there was not enough variance in the scores or power to examine the impact of client motivation for treatment on substance use outcomes. Motivation sometimes has been found to be a client factor that affects outcomes in substance use treatment, and it also has been found to impact therapist fidelity to various substance use treatment protocols (Martino et al., 2008).

Another limitation is that a full examination of treatment dropout effects on fidelity–outcome relations (see Hedeker & Gibbons, 1997) was beyond the scope of this study. Also, by utilizing case-level Adherence and Competence scores averaged across individual sessions, the possibility of examining change in Adherence and Competence over the course of treatment was precluded. Improvement in fidelity across sessions and cases is thought to be evidence of a “learning curve” in therapist training studies (Crits-Christoph et al., 1998), and these trends may also meaningfully impact client outcomes. The lack of relationship between therapist progress toward certification and adherence and competence in the current study would make such an examination even more informative.

One major argument in the debate over the implementation of manualized treatments has been the idea that high fidelity to treatment protocols may interfere with “non-specific factors” or “common factors” such as therapist’s clinical skills and the therapeutic

relationship (Tanenbaum, 2013). Some recent studies seem to show that high therapist fidelity does not negatively impact client motivation in treatment (Gibbons et al., 2010), and yet that concern has been cited as one reason for lack of adoption of EBTs among clinicians in general (Tanenbaum, 2003). In the current study, the available measure of general clinical skills (i.e., *not* designed to be A-CRA related) did not vary enough between therapists to be utilized as a predictor variable in the multilevel models, and no measure of therapeutic alliance was included in the original study from which the current data set was drawn. It seems likely that a robust measure of therapists' general clinical skills would be theoretically correlated with competence – the skill with which treatment is delivered. One study on the training of therapists in manualized treatments found that those who received higher ratings of clinical skill showed greater improvements in treatment adherence and competence after training (Scott & Biner, 2002). Future studies might examine therapists' general clinical skills and the therapeutic alliance in terms of their impact on client outcomes and relationship to adherence and competence.

Additionally, the *non*-substance use mental health measures were lacking in the current study. The GAIN is not a diagnostic measure, and so mental health symptoms consistent with comorbid diagnoses were used as a proxy for clinical diagnoses. However, the GAIN measures of symptoms are often used in lieu of diagnoses for research or program evaluation purposes (Godley et al., 2011), and DSM diagnoses can be derived from some of these scales (Chestnut, 2011). In terms of outcome variables, the only measure of non-substance use mental health symptoms only measured *days* of significant symptoms rather than the more commonly used variable of symptom severity. Previous studies have shown significant improvements in non-substance use mental health symptoms after A-CRA

(Garner et al., 2007), but there was no way to determine whether the lack of such a trend in this study was related to insufficiencies in the measurements used or due to a floor-effect in which clients reported so few days of significant mental health symptoms that no decrease could be observed. Nonetheless, A-CRA is first and foremost a substance use treatment, and so it is not surprising that skill in delivering the components most important to A-CRA (reflected in the Competence score) had the strongest impact on client substance use.

Finally, it should be noted that the therapy sessions from which the Adherence/Competence variables were derived might not be representative of sessions provided by AAFT therapists as a whole, given the use of selection criteria for participants. Specifically, this study included clients for whom therapists had at least three clients with at least three rated sessions. It might be that those therapists who had submitted at least three session tapes for review toward certification for at least three clients were generally more compliant with the training procedure, and may have had higher fidelity to the A-CRA protocol than the total population of therapists in the AAFT project. Still, there was a sufficient degree of variability in both Adherence and Competence scores between therapists for this variable to be utilized as a predictor variable in the multilevel model including both client- and therapist-variables. The finding of significant variance in Adherence and Competence is in line with previous literature showing that therapist adherence and competence vary between therapists delivering the same protocol, and vary for the same therapist as they deliver treatment to different clients (Boswell et al., 2010; Martino et al., 2008; Miller et al., 2008; Moyers et al., 2004).

### **Strengths of the Current Study**

This study also had significant strengths in terms of the samples of therapists and clients, and the measurements of independent variables. This study seems to have had one of the largest sample sizes among studies to date which have investigated the relationship between Adherence/Competence and client outcomes (Webb, 2012). In terms of the therapists, the sample was very diverse with over half identifying as ethnic minorities. This sample was also regionally diverse, with therapists working in areas across the United States. Therapists in this study had experience and levels of education which were representative of substance use therapists in general (Ball et al., 2002).

Another significant strength of the current study was its focus on the less-researched population of adolescent substance users rather than adults (Armstrong, 2002). Additionally, the sample included an ethnically diverse group of male and female adolescents from areas around the country, and consequently was likely representative of the general population of adolescents seeking treatment for substance use disorders (Roux, 2002). A current of focus in the investigation of effectiveness of ESTs is on utilizing these treatments with clients from diverse backgrounds who are representative of the clinical population (Tanenbaum, 2013). This study also had the strength of a year-long follow-up.

The measures of Adherence and Competence in this study were detailed and robust. These measures have been shown to have high inter-rater reliability in previous studies on the AAFT project from which this data were drawn (Godley et al., 2001, 2010; Smith et al., in press). Adherence and Competence were measured across multiple sessions for each therapist, and the impacts of these constructs were analyzed after controlling for intake levels of client substance use. One of the greatest challenges of disseminating evidence based

treatments is training clinicians to implement them with fidelity, namely, with adequate levels of adherence and competence (McHugh & Barlow, 2010; Decker et al., 2012). In the current study, overall levels of Adherence/Competence in this therapist sample were high, with the average therapist receiving at least passing ratings.

Additionally, this study had the advantage of utilizing data from recorded live therapy sessions coded by highly trained expert raters. In the effort to assure treatment fidelity and understand the effect of higher rates of adherence and competence on client outcomes, independent ratings of audio or video recorded sessions using observer rating scales have become the gold standard (Carroll, 2000; Herschell, Kolko, Baumann, & Davis, 2010). The larger study from which this data set was drawn also had a much higher than average response rate in terms of the number of tapes therapists submitted for ratings (Godley et al., 2011). This may have been due to the online submission and rating system which also ensured that frequent and thorough feedback could be given to a large number of therapists in widespread locations. Finally, the finding of a significant relationship between Competence and client outcome in a robust sample is a significant addition to the treatment fidelity literature.

### **Importance of Current Study Findings and Future Research**

The movement to encourage the use of research-based treatments in real-world clinical practice continues (Sharpless & Barber, 2009; Webb, 2012). Research on treatment fidelity has shown that coding of therapy sessions by expert raters can reliably discriminate the presence of treatment-relevant behaviors in therapists (Carroll et al., 1999; 2007). It has been shown that therapists vary in the degree to which they adhere to treatment protocols (Moyers, 2004) and the skill with which they deliver components of evidence based

treatments (Miller et al., 2008). Dissemination studies currently rely on measures of adherence and competence to determine the effectiveness of therapy training (Morgenstern, et al., 2001). Standardization of training for therapists is increasingly being adopted by major agencies that deliver or fund treatment (Tanenbaum et al., 2013).

However, if the investment in training therapists in EBTs and the encouragement for high levels of treatment fidelity are to have value, then adherence to treatment protocols and competence in the delivery of therapy must be shown to positively impact client outcomes (Duncan & Miller, 2007). Studies have demonstrated that many therapists do not adopt EBTs in practice because of a variety of concerns, including the belief that the investment in learning to competently deliver a research based treatment will not increase positive outcomes for clients beyond treatment as usual (McGovern, et al., 2004; Rieckmann, et al., 2007). The somewhat mixed evidence on the effectiveness of many EBTs in real-world practice has not successfully allayed such concerns (Aarons et al., 2012), and the adoption of treatments shown to be highly efficacious in clinical studies is not widespread (Lillienfeld, 2013). Growing evidence for a relationship between treatment fidelity and client outcomes may impact these beliefs.

However, the substantial variety of evidence based treatments makes investigating the relationship between treatment fidelity and client outcomes a large task. The study of adherence and competence in a given treatment may require somewhat unique measures of fidelity based on the specific theories and mechanisms of change corresponding to a given therapy (Gunter & Whittal, 2010). Although the research on adherence and competence shows many mixed results, or small effects of treatment fidelity on client outcomes (Webb et al., 2010), some recent studies are showing that treatment fidelity variables predict client

outcomes in a variety of treatment modalities, such as CBT, behavioral treatments for panic disorder, and a variety of mood disorder and substance use disorder treatments (Boswell, 2013; Hogue et al., 2010; Webb, 2012).

The current study showed a trend relationship between adherence and reduced client substance use, and thus this relationship should be investigated in future studies with more robust measures of adherence. This study also adds significantly to the growing body of literature showing that Competence in the delivery of manualized treatments predicts positive outcomes for the target of treatment (Webb, 2012). Based on these and other current findings, future research should consider utilizing detailed and behaviorally-anchored measures of fidelity (e.g. Moyers et al., 2005; Smith et al., 2007) when investigating these relationships in order to capture the therapist behaviors most relevant to positive client outcomes (Klonsky, 2009).

This study also offered support to the growing evidence that client factors such as co-morbidity in general, and externalizing behaviors as one particular example, may impact therapist fidelity (Boswell, 2013). Given that studies have shown that more than half of adolescent substance users may have a co-morbid psychiatric disorder or clinically significant symptoms (Grella, Hser, Joshi, & Rounds-Bryant, 2001), understanding the impact of co-morbid disorders on treatment process and outcomes may be essential for providing the best treatments to this population.

Most importantly, the current study found that when therapist competence was measured with a focus on the most theoretically essential components of A-CRA, coded by expert raters, and analyzed in a large sample of diverse clients and therapists, it predicted a reduction in substance use over a 12-month follow-up period. This finding adds strong

support to the idea that treatment fidelity is a truly important component in the delivery of EBTs deserving of further examination.

## Tables

Table 1. *Client Demographic and Intake-Only Variables*

	N	<i>M</i>	<i>SD</i>	<i>Min/Max</i>
Age	384	16.2	1.4	12/18
Race/Ethnicity				
Hispanic	125			
White (non-Hispanic)	120			
Mixed Ethnicity	62			
African American	54			
Native American	14			
Asian American	6			
Other Ethnicity	2			
No-Response	1			
Gender				
Male	290			
Female	94			
Co-morbid Disorders				
	N	Percent		
Neither	140	35.4		
Externalizing Only	83	21.6		
Internalizing only	33	8.6		
Both	128	33.3		

Table 2. Descriptive Statistics for Client Level Explanatory Variables

	<i>N</i>	<i>M</i>	<i>SD</i>	<i>Min/Max</i>
Personal Motivation for Tx	96	10.18	6.04	0/20
A-CRA Exposure Scale				
3-Month	365	10.85	3.14	2/18
6-Month	304	12.93	2.93	5/19
12-Month	189	13.33	2.73	6/25
Session Count				
3-Month	365	8.50	3.87	1/25
6-Month	304	14.57	5.79	3/42
12-Month	189	17.53	6.95	3/47

Table 3. *Descriptive Statistics for Outcome Variables*

	<i>N</i>	<i>M</i>	<i>SD</i>	<i>Min/Max</i>
<b>Substance Use Days</b>				
Intake	384	24.89	30.27	0/90
3-Month	365	12.25	21.50	0/90
6-Month	304	11.75	22.55	0/90
12-Month	191	10.40	21.03	0/90
<b>Days of Other Mental Health Problems</b>				
Intake	383	2.37	1.92	0/90
3-Month	309	1.95	1.75	0/90
6-Month	243	1.74	1.53	0/89
12-Month	141	1.65	1.14	0/90

Table 4. *Multilevel Model for the Prediction of Substance Use*

## Model 1 – Variability in Substance Use across Follow-Ups

Substance Use				
Variable	Coefficient	SE	95% CI	ICC
Fixed Effects				
Intercept	7.65 **	00.35	[03.19, 10.58]	
Covariance Parameters				
Residual	140.88 **	63.7	[128.3, 150.4]	
Client Level	43.25**	03.05	[36.08, 48.05]	.23

## Model 2 – Client Substance Use with Client and Therapist as Factors (Multilevel Model)

Substance Use				
Variable	Coefficient	SE	95% CI	ICC
Fixed Effects				
Intercept	5.20 *	1.04	[-1.53, 9.71]	
Covariance Parameters				
Residual	124.19 **	49.3	[125.6, 161.4]	
Client Level	42.25**	4.19	[34.43, 50.83]	.25
Therapist Level	8.71**	0.94	[02.17, 13.19]	.17

## Model 3 – Client Level Explanatory Variables and Substance Use Outcomes

Variable	Coefficient	SE	95% CI	ICC
Fixed Effects				
Intercept	4.21 **	3.07	[-01.82, 10.25]	
Intake SUD	19.25**	5.02	[09.35, 29.2]	
A-CRA Exposure	-2.78*	.307	[-.32, 03.88]	
Session Count	-.138	.169	[-.471, .196]	
Personal Motivation for Tx	0.46	0.19	[-0.218, 0.617]	
Covariance Parameters				
Residual	102.82 **	30.7	[75.94, 147.13]	
Client Level	34.90**	2.31	[23.61, 53.19]	.25
Therapist Level	5.93**	0.73	[04.19, 7.24]	.14

## Model 4: Therapist and Client Level Explanatory Variables and Substance Use Outcomes

Variable	Coefficient	SE	95% CI	ICC
<b>Fixed Effects</b>				
Intercept	17.94**	3.84	[7.29, 18.49]	
Intake Substance Use	8.43**	2.97	[01.01, 17.89]	
A-CRA Exposure	-6.73**	1.15	[-3.03, 16.82]	
Adherence	1.57	0.69	[00.16, 07.73]	
Competence	-13.32*	4.49	[-22.17 ,6.06]	
Progress Toward Certification	-0.51	3.40	[-7.45, 6.44]	
ACRAExposure* Competence	-2.16*	0.62	[-03.43, 1.01]	
<b>Covariance Parameters</b>				
Residual	86.50 **	4.15	[67.44, 97.09]	
Client Level	26.18**	7.87	[04.36, 47.42]	.23
Therapist Level	6.34**	0.48	[04.34, 08.51]	.19

*Note. Intraclass Coefficients are residual after fixed effects.*

*\*\*p < .01, \*p < .05*

Table 5. *Days of Substance Use in 90-Day period by Substance (Intake)*

	N	Min	Max	Mean	SD
Alcohol	68	0	90	20.41	29.09
Marijuana	66	0	90	47.54	37.45
Cocaine	24	0	89	06.12	18.60
Inhalants	21	0	30	03.09	07.89
Heroin	9	0	90	10.33	29.89
Methadone	12	0	2.0	00.25	00.62
Opioids	33	0	89	10.24	23.17
PCP	8	0	5.0	00.62	01.76
Hallucinogens	30	0	80	09.63	21.33
Benzo.	23	0	89	05.43	18.62
Stimulants	27	0	88	08.55	19.40
Meth.	15	0	88	07.06	22.71
Sedatives	21	0	89	10.23	24.61
Other drugs	18	0	60	04.27	14.06

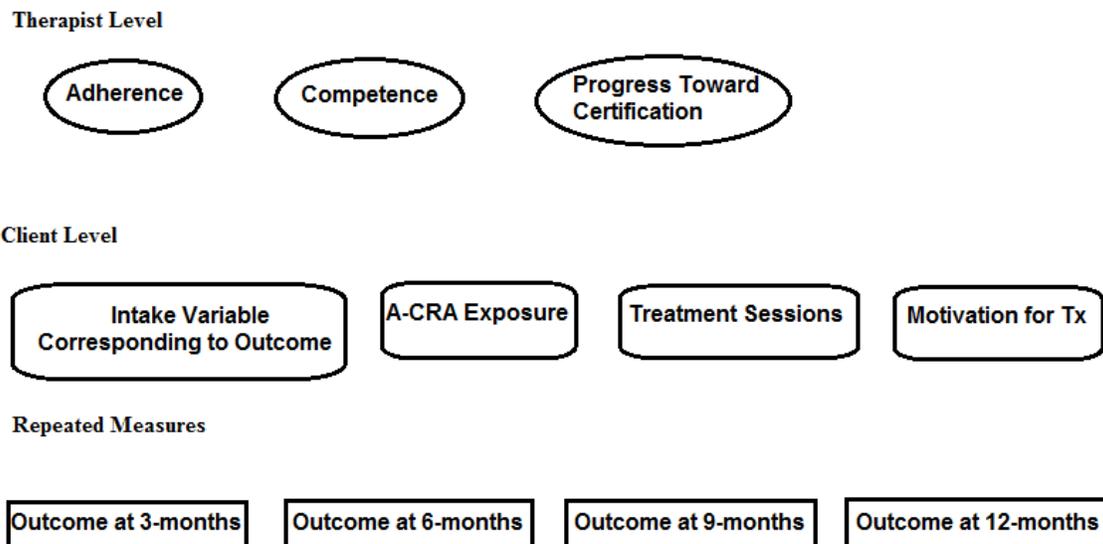
Table 6. *Co-Morbid Disorders and Externalizing Behaviors as Predictors of Competence*

Variable	Competence			
	Coefficient	SE	95% CI	ICC
Fixed Effects				
Intercept	3.41**	.44	[03.07, 03.78]	
Externalizing	-2.01*	.99	[-05.12, -0.61]	
Covariance Parameters				
Residual	8.03**	1.12	[07.80, 09.57]	
Client Level	1.74**	0.18	[01.82, 04.25]	.17
Therapist Level	5.70**	0.74	[02.07, 09.34]	.76

Note. *Intraclass Coefficients are residual after fixed effects.*

\*\* $p < .01$ , \* $p < .05$

## Figures



*Figure 1.* Levels included in the final models and their corresponding variables.

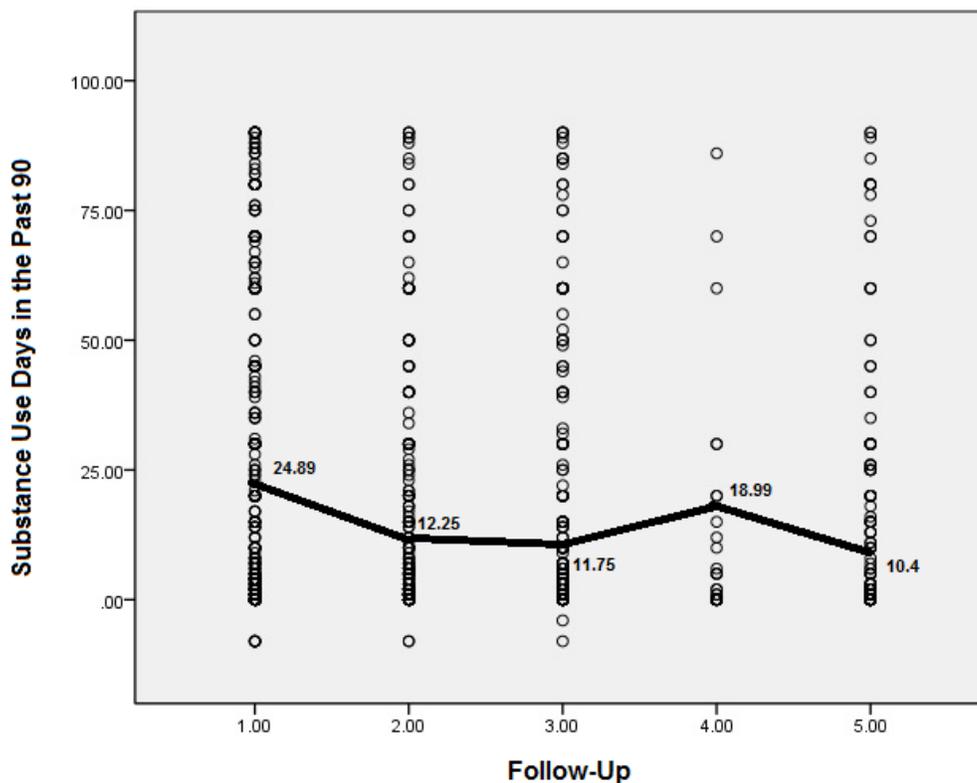


Figure 2. Mean Substance Use Days in Past 90 Days Across Follow Ups

Note. Line indicates mean number of using days for clients at each follow-up period. Scatterplot shows each client's using days at each time period.

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## Appendix A

### A-CRA Procedures Checklist

The A-CRA Procedures Checklist lists all of the A-CRA procedures and the behavioral anchors for each score 1-5.

### A-CRA Procedures Checklist

Therapist: \_\_\_\_\_ Rater: \_\_\_\_\_ Rating: \_\_\_\_\_ Client: \_\_\_\_\_  
 Sess. #/Date: \_\_\_\_\_ / \_\_\_\_\_  
 Date Initials

1 2 3 4 5  
 | | | | |  
 poor needs satisfactory very excellent  
 | | | | |  
 improvement good

Done | Rating

#### Overview of CRA:

1. \_\_\_\_ \_\_\_\_ Described basic objective (help find healthy, reinforcing lifestyle...)
2. \_\_\_\_ \_\_\_\_ Outlined several procedures (communication skills, problem solving)
3. \_\_\_\_ \_\_\_\_ Set positive expectations (describe scientific base)
4. \_\_\_\_ \_\_\_\_ Described duration of treatment (time limited)
5. \_\_\_\_ \_\_\_\_ Started to identify reinforcers

#### Functional Analysis of Substance Using Behavior:

6. \_\_\_\_ \_\_\_\_ Gave rationale
7. \_\_\_\_ \_\_\_\_ Started by asking for description of common episode/behavior
8. \_\_\_\_ \_\_\_\_ Outlined triggers (external; internal)
9. \_\_\_\_ \_\_\_\_ Clarified the using (or non-using) behavior
10. \_\_\_\_ \_\_\_\_ Outlined positive & negative consequences of the behavior
11. \_\_\_\_ \_\_\_\_ Gave examples of how the information would be used

#### FA for Pro-Social (Non-Using) Beh.:

12. \_\_\_\_ \_\_\_\_
13. \_\_\_\_ \_\_\_\_
14. \_\_\_\_ \_\_\_\_
15. \_\_\_\_ \_\_\_\_
16. \_\_\_\_ \_\_\_\_
17. \_\_\_\_ \_\_\_\_

#### Happiness Scale:

18. \_\_\_\_ \_\_\_\_ Provided rationale
19. \_\_\_\_ \_\_\_\_ Gave instructions
20. \_\_\_\_ \_\_\_\_ Reviewed some ratings

#### Treatment Plan/Goals of Counseling:

21. \_\_\_\_ \_\_\_\_ Used Happiness Scale to select goal category
22. \_\_\_\_ \_\_\_\_ Set goal/strategy using guidelines (e.g., specific)
23. \_\_\_\_ \_\_\_\_ Checked on progress of goals

#### Increasing Prosocial Recreation:

24. \_\_\_\_ \_\_\_\_ Discussed importance of satisfying social life
25. \_\_\_\_ \_\_\_\_ Identified reasonable activity (e.g., thru problem-solving or F.A. for Pro-Social Behavior)

26. \_\_\_\_ \_\_\_\_ Planned precisely how to sample the new enjoyable behavior/activity

**Systematic Encouragement:**

27. \_\_\_\_ \_\_\_\_ Identified need & took 1<sup>st</sup> step in session (e.g., locate contact person, make a call)  
 28. \_\_\_\_ \_\_\_\_ Reviewed the experience in next session

**Drink/Drug Refusal Skills:**

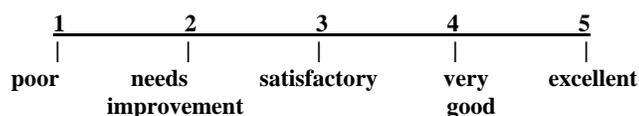
29. \_\_\_\_ \_\_\_\_ Enlisted social support  
 30. \_\_\_\_ \_\_\_\_ Reviewed high-risk situations  
 31. \_\_\_\_ \_\_\_\_ Presented/reviewed options for assertive refusal (e.g., changed subject)  
 32. \_\_\_\_ \_\_\_\_ Role-played (kept brief, reinforced, gave specific feedback, repeated)

**Relapse Prevention:**

33. \_\_\_\_ \_\_\_\_ Administered Functional Analysis for Relapse  
 34. \_\_\_\_ \_\_\_\_ Discussed behavioral chain of events or triggers +/- generated new responses  
 35. \_\_\_\_ \_\_\_\_ Described & set up early warning system

**Sobriety Sampling:**

36. \_\_\_\_ \_\_\_\_ Gave rationale for sampling sobriety (e.g., forces use of other coping strategies)  
 37. \_\_\_\_ \_\_\_\_ Negotiated a reasonable period of sobriety  
 38. \_\_\_\_ \_\_\_\_ Developed a specific plan for maintaining sobriety at least until next session



Done | Rating

**Sobriety Sampling (Continued):**

39. \_\_\_\_ \_\_\_\_ Developed a back-up plan as well  
 40. \_\_\_\_ \_\_\_\_ Reminded client of reinforcers for sobriety

**Communication Skills (Adolescent and Caregiver):**

41. \_\_\_\_ \_\_\_\_ Discussed why positive communication is important  
 42. \_\_\_\_ \_\_\_\_ Described/reviewed the 3 positive communication elements  
 43. \_\_\_\_ \_\_\_\_ Gave examples of good communications/conversations  
 44. \_\_\_\_ \_\_\_\_ Role-played (reinforced, gave specific feedback, repeated)  
 45. \_\_\_\_ \_\_\_\_ Did a reverse role-play

**Problem Solving Skills (Adolescent and Caregiver):**

46. \_\_\_\_ \_\_\_\_ Described/reviewed steps of the procedure  
 47. \_\_\_\_ \_\_\_\_ Conducted CRA problem solving procedure (e.g., defined the problem, brainstormed)

**Caregiver Overview, Rapport Building, and Motivation:**

48. \_\_\_\_ \_\_\_\_ Provided an overview of ACRA (av #1-5)  
 49. \_\_\_\_ \_\_\_\_ Set positive expectations (repeat #3)  
 50. \_\_\_\_ \_\_\_\_ Reviewed research regarding parenting practices

**Adolescent-Caregiver Relationship Skills:**

53. \_\_\_\_ \_\_\_\_ Three positive things  
 54. \_\_\_\_ \_\_\_\_ Relat. Happ. Scale (av. #18-20)  
 55. \_\_\_\_ \_\_\_\_ Daily Reminder To Be Nice

51. \_\_\_\_ \_\_\_\_ Identified CG reinforcers for continued (repeat #5)
52. \_\_\_\_ \_\_\_\_ Kept discussion (about adolescent) positive
56. \_\_\_\_ \_\_\_\_ Comm. Skills work (av.#41-45)
57. \_\_\_\_ \_\_\_\_ Prob Solv skills (av. #46-47)

**Homework:**

58. \_\_\_\_ \_\_\_\_ Assigned Homework (made specific, anticipated obstacles)
59. \_\_\_\_ \_\_\_\_ Reviewed Homework (assessed outcome; modified plan if necessary; reinforced)

**Overall:**

60. \_\_\_\_ \_\_\_\_ **Overall:** stayed within CRA protocol (as far as philosophy & objectives)
61. \_\_\_\_ \_\_\_\_ **Overall:** introduced CRA procedures at appropriate times

**Checklist for Optional Procedure: Job Seeking Skills:**

62. \_\_\_\_ \_\_\_\_ Provided overview
63. \_\_\_\_ \_\_\_\_ Helped generate job categories
64. \_\_\_\_ \_\_\_\_ Generated/followed-up job leads
65. \_\_\_\_ \_\_\_\_ Rehearsed and made phone calls
66. \_\_\_\_ \_\_\_\_ Completed applications
67. \_\_\_\_ \_\_\_\_ Rehearsed interviews
68. \_\_\_\_ \_\_\_\_ Planned for job maintenance/satisfaction

**Checklist for Optional Procedure: Anger Management:**

69. \_\_\_\_ \_\_\_\_ Identify reinforcers to manage anger
70. \_\_\_\_ \_\_\_\_ Assist in recognizing anger
71. \_\_\_\_ \_\_\_\_ Teach taking time to “cool down”
72. \_\_\_\_ \_\_\_\_ Teach fostering empathy
73. \_\_\_\_ \_\_\_\_ Gave adolescent “Anger Management” handout

**General Clinical Skills**

74. \_\_\_\_ Warm/Understanding
75. \_\_\_\_ Non-judgmental
76. \_\_\_\_ Maintains session focus
77. \_\_\_\_ Appropriately active

## Appendix B

### EBTx Rating Workbook

The EBTx Rating Workbook was used by expert raters to code therapists' uploaded session tapes and provide feedback to therapists. Adherence and Competence variables were constructed from data drawn from these workbooks.

	C	D	E	F	G	H	I	J	K	L
1	Certification Status	Pending	Date							
2	Therapist Name	Nicole Langbaum	Client ID							
3	Therapist ID	nlangbaum	Session #							
4	Status	Procedures			DSR 1	DSR 2	DSR 3	DSR 4	DSR 5	DSR 6
5			Item	Short Label	Rating	Rating	Rating	Rating	Rating	Rating
6		Overview of CRA	1	Describe basic objective						
7			2	Outlined several procedures						
8			3	Set positive expectations						
9			4	Described duration of treatment						
10			5	Started to identify reinforcers						
11		Functional Analysis of Substance Using Behavior	6	Gave Rationale						
12			7	Started by asking for description of common episode/behavior						
13			8	Outlined Triggers (external; internal)						
14			9	Clarified the using (or non-using) behavior						
15			10	Outlined positive & negative consequences of the behavior						
16			11	Gave examples of how the information would be used						
17		Functional Analysis for Pro-Social (Non-Using) Behavior	12	Gave Rationale						
18			13	Started by asking for description of common episode/behavior						
19			14	Outlined Triggers (external; internal)						
20			15	Clarified the using (or non-using) behavior						
21			16	Outlined positive & negative consequences of the behavior						
22		Happiness Scale	17	Gave examples of how the information would be used						
23			18	Provided rationale						
24			19	Gave instructions						
25		Treatment Plans/ Goals of Counseling	20	Reviewed some ratings						
26			21	Used Happiness Scale to select goal category						
27			22	Set goal/strategy using guidelines (e.g., specific)						
28			23	Checked on progress of goals						
29		Increasing Prosocial Recreation	25	Identified reasonable activity (e.g., thru problem-solving or F.A. for Pro-Social Behavior)						
30			26	Planned precisely how to sample the new enjoyable behavior/activity						
31		Systematic Encouragement	27	Identified need & took 1st step in session						
32			28	Reviewed the experience in next session						
33		Drink/Drug Refusal Skills	29	Enlisted social support						
34			30	Reviewed high-risk situations						
35			31	Presented/reviewed options for assertive refusal						
36			32	Role-played						
37		Relapse Prevention	33	Administered Functional Analysis for Relapse						
38			34	Discussed behavioral chain of events						
39			35	Described & set up early warning system						
40										

42		<b>Sobriety Sampling</b>	37	Negotiated a reasonable period of sobriety						
43			38	Developed a specific plan for maintaining sobriety at least until next session						
44			39	Developed a back-up plan as well						
45			40	Reminded client of reinforcers for sobriety						
46		<b>Communication Skills</b>	41	Discussed why positive communication is important						
47			42	Described/reviewed the 3 positive communication						
48			43	Gave examples of poor & good communications/conversations						
49			44	Role-played						
50			45	Did a reverse role-play						
51		<b>Problem Solving Skills</b>	46	Described/reviewed steps of the procedure						
52			47	Conducted CRA problem solving procedure						
54		<b>Caregiver Overview, Rapport Building, and Motivation</b>	49	Set positive expectations (repeat #3)						
55			50	Reviewed research regarding parenting practices for adolescent recovery						
56			51	Identified CG for continued work (repeat # 5)						
57			52	Kept Discussion (about adolescent) positive						
58		<b>Adolescent-Caregiver Relationships Skills</b>	53	Three positive things						
59			54	Relationship Happiness Scale (average #18-20)						
60			55	Daily Reminder to be Nice						
61			56	Comm. Skills (average #41-45)						
62			57	Prob Solv skills (average #46-47)						
63		<b>Homework</b>	58	Assigned Homework (made specific, anticipated obstacles)						
64			59	Reviewed Homework (assessed outcome, modified plan if necessary; reinforced)						
65		<b>Overall</b>	60	Overall: staged within CRA protocol (as far as philosophy & objectives)						
66			61	Overall: introduced CRA procedures at appropriate times						
67		<b>Checklist for Optional Procedure: Job Seeking Skills</b>	62	Provided overview						
68			63	Helped generate job categories						
69			64	Generated/followed-up job leads						
70			65	Rehearsed and made phone calls						
71			66	Completed applications						
72			67	Rehearsed interviews						
73		68	Planned for job maintenance/ satisfaction							
74		<b>Checklist for Optional Procedure: Anger Management</b>	69	Identify reinforcers to manage anger						
75			70	Assist in recognizing anger						
76			71	Teach taking time to "cool down"						
77			72	Teach fostering empathy						
78			73	Gave adolescent "Anger Management" handout						
79		<b>General Clinical Skills</b>	74	Warm & Understanding						
80			75	Non-judgmental						
81			76	Maintains session focus						
82			77	Appropriately active						

## Appendix C

### Sample Items from Anger Management Procedure in the A-CRA Coding Manual

#### Anger Management

##### #69 Identify reasons to manage anger:

- 1 = Discussed neither how anger has affected the client's life, nor reasons/methods for managing it
- 2 = Discussed in general terms how anger often interferes with peoples' lives:
- Example: "If people let their anger get the better of them it ends up causing them a lot of trouble."
- 3 = Asked client how anger has caused problems in his/her life. Probed and assisted with examples if necessary:
- Example: "Can you think of any ways in which your anger has affected your life?" Client responded, "I got told to go home from work the other day because I mouthed off to my manager." Therapist reflected, "So you're thinking that maybe you wouldn't have been asked to go home if you hadn't mouthed off?" Client said, "Oh I *know* that's why I was sent home. And I need the money from that job, so it wasn't cool."
- 4 = Both A and B:
- (A) Asked client how anger has caused problems in his/her life. Probed and assisted with examples if necessary, AND
- (B) Discussed the pros/cons of expressing anger:
- Example: "Sounds like you're saying that 'mouthing off' to a manager ends up being a negative thing – right?" Client responded, "That's for sure." Therapist continued, "But I imagine that there are some positive things about getting angry; some things you like about it, or you wouldn't do it. What do you think?" Client replied, "It feels real good at the time, but it doesn't last long. And then you get in trouble afterwards; lots of trouble." Therapist asked, "Can you think of any other pros and cons of expressing anger?"
- 5 = All: A, B, and C:
- (A) Asked client how anger has caused problems in his/her life. Probed and assisted with examples if necessary, AND
- (B) Discussed the pros/cons of expressing anger, AND
- (C) Guided the client so as to see the link between the client's ability to manage anger and his/her treatment goals:

- Example: “Let’s go back to the incident at your job; the one where you were sent home for expressing your anger to your manager. I wonder if it’s worth trying to get your anger under control? It seems to me that if you keep showing your anger to your boss in this way, it’ll interfere with one of your main treatment goals. Do you know what I’m referring to?” Client responded, “Well, I know that I can’t save any money if I don’t have a job. And I can’t get a car if I don’t have any
- money.” Therapist stated, “That’s how it looks to me too. So then if you do start to manage your anger at work, you’ll be able to keep on track as you move toward your goal of getting your own car within the next six months. What do you think?” Client said, “I think that’s a good reason to get my act together.”

### **#70 Assist in recognizing anger:**

- 1 = No time was devoted to helping the client identify high-risk situations for anger or early warning signs of anger building up
- 2 = Either A or B:
- (A) Helped client identify high-risk situations for anger:
- Example: Late night conversations with mom about whether the client’s homework is done, OR
- (B) Helped client identify early warning signs of anger building up:
- Examples: Clenched fist, sweaty palms, racing thoughts
- 3 = All: A, B, and C:
- (A) Helped client identify high-risk situations for anger, AND
- (B) Helped client identify early warning signs of anger building up, both physical (e.g., fast or heavy breathing, tight jaw) and behavioral (e.g., difficulty sitting/standing still; sarcastic remarks), AND
- (C) Explained why it is valuable to be able to recognize the earliest signs of anger building up:
- Example: “Can you think of any reason why it might be helpful to recognize when you’re *just starting* to get a little angry?” Client responded, “Not really.” Therapist replied, “Because it seems to be easier for people to control their anger when they are aware of it just coming on. Most people find that if they wait until they feel like they’re going to explode with anger... then it’s too late to handle it in a constructive way.” Client replied, “Makes sense.”
- 4 = All: A, B, C, and D:
- (A) Helped client identify high-risk situations for anger, AND
- (B) Helped client identify early warning signs of anger building up, both physical and behavioral, AND

- (C) Explained why it is valuable to be able to recognize the earliest signs of anger building up, AND
- (D) Helped client develop a new, healthy response to the early signs of anger:
- Examples: Close eyes and count to 20 slowly, do 10 jumping jacks very quickly, call closest friend
- 5 = All: A, B, C, D, and E:
- (A) Helped client identify high-risk situations for anger, AND
- (B) Helped client identify early warning signs of anger building up, both physical and behavioral, AND
- (C) Explained why it is valuable to be able to recognize the earliest signs of anger building up, AND
- (D) Helped client develop a new, healthy response to the early signs of anger, AND
- (E) Identified obstacles that might interfere with the new response, and came up with solutions:
- Example: Assume that an upset friend was yelling right in the client's face so that the client could not concentrate enough to do his planned healthy response to count to 20 slowly. So instead the client followed his back-up plan; he excused himself and took a quick walk around the block.

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