GENERAL RESPONSIVITY AND EVIDENCE-BASED TREATMENT: INDIVIDUAL AND PROGRAM PREDICTORS OF TREATMENT OUTCOMES DURING ADOLESCENT OUTPATIENT SUBSTANCE ABUSE TREATMENT

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Liana R. Taylor
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Examining Committee Members:

Matthew L. Hiller, PhD., Advisory Chair, Department of Criminal Justice
Steven Belenko, PhD., Department of Criminal Justice
Caterina Gouvis Roman, PhD., Department of Criminal Justice
David Festinger, PhD., External Reviewer, Treatment Research Institute

ABSTRACT

Since it was first articulated, the Risk-Need-Responsivity model (RNR; Andrews, Bonta, & Hoge, 1990) has been extensively researched and is regarded as an empirically supported model for providing effective correctional treatment. It is comprised of three core principles: the risk principle, which provides direction for who should receive treatment; the need principle, which identifies intermediate treatment targets; and the responsivity principle, which states how treatment programs should be structured. The RNR model is purported to be relevant for all offender populations, including female offenders (Dowden & Andrews, 1999a), juvenile offenders (Dowden & Andrews, 1999b), violent offenders (Dowden & Andrews, 2000), and sexual offenders (Hanson, Bourgon, Helmus, & Hogdson, 2009). Yet, the majority of RNR research has examined the risk and need principles, and the responsivity principle remains understudied. The responsivity principle includes two sub-principles: general and specific (Andrews, & Bonta, 2010). The current research explored the general responsivity principle, which states that programs should use theoretically relevant models for individual change, specifically cognitive-behavioral and cognitive-social learning models (Andrews & Bonta, 2010). The following techniques are consistent with these models: "role-playing, modeling, repeated practice of alternative behaviors, cognitive restructuring to modify thoughts/emotions, skills building, or reinforcement" (Andrews & Bonta, 2010, p. 50). Despite empirical support, the RNR model has received minimal application to juveniles, and it has not been widely tested in the substance abuse treatment context. Additionally, it is not clear whether adherence to the RNR model is relevant for reducing substance use

outcomes in youth. Adolescent substance abuse treatment programs were designed to address substance use among juveniles, and have been widely researched to determine their effectiveness; yet their effectiveness remains understudied among juvenile offenders. These studies include examinations of specific treatment interventions used, such as Multisystemic Therapy. Many of these interventions are considered to be "evidence-based treatment" (EBT), but there is a wide variety of repositories that classify interventions as "evidence-based" with varying criteria used to classify them. The juvenile drug treatment court model (JDTC) was specifically developed to address substance use and crime among juvenile offenders; however, findings from empirical studies have not demonstrated a strong treatment effect. To address these gaps in the literature, secondary analyses were conducted on data collected from 132 adolescent outpatient substance abuse treatment programs (AOPs) and 10 juvenile drug treatment courts nationwide. This research was an application of the general responsivity principle in the AOP and JDTC context to determine the impact of responsivity adherence on the odds of rearrest and substance use severity. The analyses also included an examination of evidence-based treatment (EBT) in both samples to determine the influence of EBT use scores on the odds of rearrests and substance use severity scores. To examine the AOP sample, multilevel models were used to examine the individual- and program-level impact of responsivity adherence and EBT use. To examine the JDTC sample, multivariate analyses were used to examine the individual-level impact of responsivity adherence and EBT use. Overall, responsivity adherence was not significantly associated with rearrests among AOP participants**,** nor was it significantly associated with substance

use severity scores. Additionally, the odds of rearrest were significantly greater among individuals who received interventions with a higher EBT use score; though, there was no association between the average EBT use scores across programs and the odds of rearrest. There was no significant association between individual- and program-level EBT use scores and substance use severity. Among JDTC participants, an increase in responsivity adherence was associated with an increase in the odds of rearrest and substance use severity. A similar association emerged between EBT use scores and both outcomes, wherein increases in EBT use scores were significantly associated with an increase in the odds of rearrest and substance use severity. The results of the analyses suggest the need for further specification of both general responsivity adherence and "evidence-based" treatment for use in future research and theory; specifically, further elaboration of the general responsivity-adherent techniques and clear criteria for classifying interventions as "evidence-based treatment." The findings also imply that certain types of treatment interventions are more compatible with the JDTC model than other interventions. Additional analyses suggest the possibility that general responsivity adherence and evidence-based treatment may not be unique constructs. Future research may benefit through exploring evidence-based treatment as a criterion for adherence to the general responsivity principle.

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CHAPTER 1: INTRODUCTION

Statement of the Problem

The high prevalence of substance use among United States youth is a public health concern (Winters, Botzet, & Fahnhorst, 2011). According to the 2012 National Survey on Drug Use and Health, 6.9 percent of youth surveyed between the ages of 12 and 17 were classified as having a substance use disorder (Substance Abuse and Mental Health Services Administration, 2013). Although the prevalence among adolescents in the general population is high, the estimated prevalence of substance use disorders is even higher among juvenile offenders. In a review of the literature, Chassin (2008) reported an estimate of 25-67% of juvenile detainees met the criteria for a substance use disorder. For these reasons, juvenile justice program planning has emphasized the ways to reduce substance use and the odds that youth will stay involved in the justice system. These efforts have led to the incorporation of general community-based substance abuse treatment programs, like outpatient treatment programs, and the development of court-based treatment programs, such as juvenile drug treatment court (JDTC).

The Risk-Need-Responsivity Model

The Risk-Need-Responsivity (RNR; Andrews, & Bonta, 2010; Andrews, Bonta, & Hoge, 1990) model was developed to guide correctional programs in reducing recidivism. To date, it has been applied primarily to adult programming, yet it may be useful for juvenile programming. The RNR model is comprised of three core principles: risk, need, and responsivity. Andrews and colleagues (2010; 1990) state that adherence to these principles will increase correctional program effectiveness for reducing

recidivism. The *risk principle* indicates "who" should receive treatment, and the *need principle* indicates "what" should be included as primary treatment targets. The *responsivity principle* provides guidance for "how" treatment should be delivered and includes two subtypes, general and specific. *General responsivity* states that the treatment structure should be based on theoretically relevant models that elicit change in individuals, and that cognitive-behavioral and cognitive-social learning models are best suited to accomplish this. *Specific responsivity* states that the style and mode of treatment should match the individual's characteristics (Andrews & Bonta, 2010; Andrews, Bonta, et al., 1990), for example providing gender-responsive or trauma-informed treatment (Andrews, & Bonta, 2010).

The RNR model has been examined extensively among adult populations, but the majority of the research has focused on the risk and need principles, while the responsivity principle has received comparatively little empirical focus (Polaschek, 2012). To date, there is still uncertainty regarding what "adherence" to the responsivity principle would look like in practice (Polaschek, 2012), although Andrews and colleagues (2010; 1990) provided a list of techniques that are considered responsivity-adherent, namely "…modeling, reinforcement, role playing…" (p. 50).

Research shows adolescent substance abuse treatment to be effective for reducing both recidivism (Farabee, Shen, Hser, Grella, & Anglin, 2001) and substance use (Williams, Chang, & Addiction Centre Adolescent Research Group, 2000). Yet most studies have examined the wider substance-involved adolescent population and more studies are needed to understand the effect of outpatient substance abuse treatment on

juvenile offenders. Application of the RNR model to adolescent substance abuse treatment programs would expand upon our knowledge in several ways: (a) research on adolescent substance use programs; (b) application of the RNR model to juvenile programs; and (c) application of the RNR model to substance use programs.

Juvenile Drug Treatment Courts

Juvenile drug treatment courts (JDTCs), which primarily use the outpatient treatment modality, were developed to address substance use and criminal behavior among justice-involved youth. This treatment model combines court-supervision and substance abuse treatment (NDCI, 2003; Rossman, et al., 2004). Since the first JDTC commenced in the 1990s, the model has spread throughout the nation. As of 2009, there were 476 JDTCs in operation (National Drug Court Institute, 2011). Nevertheless, research examining JDTC effectiveness is lagging and inconclusive. For example, Mitchell, Wilson, Eggers, and MacKenzie (2012) conducted a meta-analysis of JDTCs and found a very small effect on recidivism. Additionally, Latessa, Sullivan, Blair, Sullivan and Smith (2013) conducted process and outcome evaluations for nine JDTCs and reported that JDTC participants were less likely to engage in substance use than the comparison group. They also observed an increase in substance use among JDTC participants and their counterparts.

Evidence-Based Treatment

Additionally, both adolescent outpatient programs (AOPs) and JDTCs may employ evidence-based treatment interventions (EBTs) such as Multisystemic Therapy and Multidimensional Family Therapy. EBTs are interventions that have received

considerable empirical study and appear to be effective in achieving target outcomes. The interventions vary in their format; for example, some incorporate the family in the treatment process, while others focus on the individual. Some interventions target one problem area, such as substance use, while others provide comprehensive treatment. Although these interventions have been examined extensively, the majority of studies focus on the general substance-involved adolescent population, and comparatively few have examined their effect on juvenile offenders. Further, few have examined the impact of JDTCs when EBTs are used in treatment.

Despite the widespread use of adolescent outpatient programs and JDTCs, and the extensive research available on the RNR model among adult programs, only four studies have directly applied the RNR model to substance abuse treatment, two of which applied the model to drug treatment court. In reviewing the literature, there were no studies found that applied the RNR model to AOPs.

The Current Study

The current study, therefore, explored these gaps regarding the application of the RNR model to juvenile substance abuse treatment programs by examining adherence to the general responsivity principle and EBT use in the context of AOPs and JDTCs. Among AOPs, responsivity adherence and EBTs were examined at the individual- and at the program-level, and among JDTCs, responsivity adherence and use of EBTs were examined at the individual-level.

This research was conducted using secondary analyses on a data set collected by Chestnut Health Systems under a contract with the Center for Substance Abuse

Treatment (CSAT). The data set included required data elements that each program collected as specified in the request for proposals under which they received CSAT funding. Ives, Chen, Modisette, & Dennis (2010) analyzed an earlier version of this data set, and compared service receipt and substance use among JDTC and AOP participants. To date, these data have not been examined within the context of the RNR model. The data for the current study included 132 adolescent outpatient treatment programs serving 8,140 participants and 10 juvenile drug treatment courts serving 1,176 participants who were 18 years old and younger. The data set builds on previous iterations, which began in 2002. As a result, it included data collected from 2002-2011.

The majority of data was collected via the *Global Appraisal of Individual Needs* (GAIN) instrument, which is a comprehensive biopsychosocial interview conducted with participants by program staff (Dennis, White, Titus, & Unsicker, 2008). The GAIN includes the Diagnostic and Statistical Manual IV (DSM-IV-TR; American Psychological Association, 1994) criteria for substance abuse and dependence. As required by CSAT funding, the GAIN was collected at the client's intake and at three and six months following treatment entry; and some sites collected an optional nine and twelve month follow-up assessment. In addition to the information retrieved using the GAIN, the data set also included extensive information regarding the treatment interventions participants received, which allowed for the identification of participants who received treatment that adhered to the responsivity principle, as well as those who received EBTs.

This research examined the following research questions using multilevel models and individual-level multivariate regression models:

Research Question 1: For youth in the AOP sample, when controlling for participant characteristics known to be empirically associated with recidivism (e.g., criminogenic needs), is adherence to the general responsivity principle at the individual- and program-level related to recidivism or substance use severity during the six month period following AOP program entry?

Research Question 2: For youth in the AOP sample, when controlling for participant characteristics known to be empirically associated with recidivism (e.g., criminogenic needs), are evidence-based interventions at the individual- and program-level related to recidivism or substance use severity during the six month period following AOP program entry?

Research Question 3: For youth in the JDTC sample, when controlling for participant characteristics known to be empirically associated with recidivism (e.g., criminogenic needs), is general responsivity adherence at the individual-level associated with recidivism or substance use severity during the six month period following JDTC program entry?

Research Question 4: For youth in the JDTC sample, when controlling for participant characteristics known to be empirically associated with recidivism (e.g., criminogenic needs), is the use of evidence-based interventions at the individual-level associated with recidivism or substance use severity during the six month period following JDTC program entry?

Implications for the current study include direction for further specification of the responsivity principle and classification for evidence-based treatment. This could in turn

provide guidance for treatment providers in selecting the most appropriate treatment interventions. Additionally, the findings could potentially help direct policy regarding funding for research, particularly the provision of funding to help increase the knowledge pertaining to responsivity adherence and evidence-based practice.

CHAPTER 2: ADOLESCENT SUBSTANCE ABUSE TREATMENT

Introduction

Due to the high prevalence of adolescent substance use, it is considered a public health issue (Winters et al., 2011). Since the dramatic increase in juvenile substance use in the 1990s, nationwide prevalence continues to fluctuate. The Substance Abuse and Mental Health Administration's (SAMHSA) National Survey on Drug Use and Health in 2010 showed that 9.5% of youth surveyed reported recent use of an illicit substance (SAMHSA, 2013). In 2007, SAMHSA's Treatment Episode Data Set reported that of the 1.8 million treatment admissions reported, 11% were adolescents (SAMHSA, 2009).

Substance use can have consequences that persist throughout a youth's life. For example, marijuana use is associated with poor school performance and a lower likelihood of graduation. Consequences of continued use can extend into adulthood (Bender, Tripodi, Sarteschi, & Vaughn, 2011).

Juvenile substance use is associated with delinquent behavior, and the prevalence of substance use is particularly high among juvenile offenders (Henderson, Young, Jainchill, Hawke et al., 2007; National Institute on Drug Abuse, NIDA, 2012; Prinz and Kerns, 2003). For example, when examining a random selection of 1,829 male and female juveniles at a detention center, McClelland, Elkington, Teplin, and Abram (2004) reported that half of the detainees had one or more substance use disorders.

Increasingly more efforts are being made to reduce substance use and delinquency among youth. This has resulted in many program types, such as outpatient treatment, intensive outpatient treatment, residential treatment, drug treatment courts, and therapeutic communities. Often, these programs interlink with the juvenile justice

system, either through referrals to community treatment programs or within correctional facilities. Few adolescent substance abuse treatment programs are designed to address clients involved with the juvenile justice system.

The current chapter will review these efforts with a particular emphasis on substance use among juvenile offenders, followed by a description of treatment interventions included in the data set that was analyzed in this research. The chapter will conclude with a description of one such effort to reduce both delinquency and substance use, the juvenile drug treatment court, which combines court supervision and substance abuse treatment.

Juvenile Justice System

For the majority of the 20th century, the juvenile justice system (JJS) was designed to be therapeutic rather than punitive (Beck, Travis, & Ramsey, 2007). This approach was intended to include individualized evaluations to provide more comprehensive rehabilitation (Holsinger, 2011). Due to concern over increasing juvenile crime and violence in the late 1980s (Willison, Mears, Shollenberger, Owens, & Butts, 2009), as well as the realization that many juvenile facilities were exploiting the juveniles rather than treating them (Holsinger, 2011), the JJS underwent dramatic changes. As it stands, the JJS is not a system per se, as the procedures vary across jurisdictions. Jurisdictions also vary on their view of the purpose of the juvenile justice system as rehabilitative or punitive (Holsinger, 2011).

Similar to the increase in juvenile crime, there was an increase in juvenile substance use in the mid-1990s (NIDA, 2009). Many studies of adolescents involved in substance use have noted an intersection between JJS involvement and substance use.

For example, many adolescents participating in substance abuse treatment were referred by the JJS (Chassin, 2008). This places the JJS in a unique position to be able to assist adolescents involved in substance use.

The majority of jurisdictions do include screenings for substance use, but the estimated prevalence of unmet treatment needs among juvenile offenders and the wider adolescent substance-involved population is high (Chassin, 2008). Using the National Survey of Substance Abuse Treatment Services, Mark, Song, Vandivort, Duffy, Butler et al. (2006) reported that 93.1% provided services to juveniles involved in the juvenile justice system but only 39.4% offered programming specifically designed to address their needs. Henderson, Young, Jainchill, Hawke et al. (2007) reported that the estimate for juveniles in the juvenile justice system that are in need of substance abuse treatment is 60%.

Due to the high prevalence of substance use among juvenile offenders, it is important to sort through the plethora of available adolescent treatment programs (Deas, & Clark, 2009) provided through the JJS and in the community to determine which are the most appropriate and effective for juvenile offenders. As factors contributing to substance use and delinquency may overlap, substance abuse treatment may also help to reduce recidivism (Chassin, 2008).

Adolescent Outpatient Substance Abuse Treatment

Characteristics of substance-involved juvenile offenders. Prinz and Kerns (2003) reported that early substance abuse is associated with various types of drug-related offenses, such as drug possession. Substance-involved youth are at a higher risk of problems in other areas of their life, including risk of involvement in the juvenile justice

system (Nissen, & Merrigan, 2011). Many substance-involved juvenile offenders also have co-occurring mental health issues and difficulty in school (Chassin, 2008; Kloos, Weller, Chan, & Weller, 2009; Robertson, Dill, Husain, & Undesser, 2004; Schubert, Mulvey, & Glasheen, 2011; Thornberry et al., 2004; Wise,). When examining treatment need among 401 juvenile offenders in Illinois, Johnson, Cho, Fendrich, Graf et al. (2004) noted that 32% dropped out of school; 58% lived in a single parent household; 41.7% reported more than ten prior arrests; 33.5% reported peer substance use; 39.7% reported substance use onset before the age of ten; and 68.1% were classified as having a treatment need. Of the juveniles in the sample with a treatment need, only 48% received treatment services (Johnson et al., 2004).

Many substance-involved juvenile offenders report early onset of substance use (Hu, Davis, & Kandel, 2006; Huizinga, Loeber, & Thornberry, 1993; Kandel, Kiros et al., 2004; NIDA, 2014; Prinz, & Kerns, 2003). Hawkins, Herrenkohl, Farrington, Brewer et al. (2000) reported that early onset was a strong predictor of violence. Prinz and Kerns (2003) examined early onset among 189 male and female juvenile offenders, and approximately 79% reported that their initiation of substance use occurred before the age of 13.

Effectiveness studies. There are many treatment options available, but the estimated high prevalence of substance use among juvenile offenders (Chassin, 2008) indicates that improving the effectiveness of these programs is also needed. To guide the process of providing more effective treatment to substance-involved adolescents, NIDA (2014) provided a monograph explicating the *Principles of Adolescent Substance Use Disorder Treatment* (Table 1). This guide listed thirteen principles, and provided

answers to frequent questions regarding adolescent substance use and abuse and summaries of evidence-based practices. The monograph noted the importance of early identification of adolescent substance use (Principle 1), as early substance use is associated substance use disorders in adulthood. Additionally, external pressure for adolescents to participate in substance abuse treatment may be effective for adolescents to receive the assistance they need (Principle 4). Due to the underdeveloped prefrontal cortex, adolescents are unable to accurately assess the risks of substance use and make well-informed decisions. Accordingly, external pressure, including legal and relational influence, is beneficial for adolescents due to their limited ability to understand their need for treatment. Further, NIDA highlights the need for family and community involvement in treatment (Principle 8), and the importance for the family to be engaged in the treatment process and provide support for the adolescent. Similarly, incorporating support from other social influences, such as the school and peers, may be beneficial for the adolescent's treatment (NIDA, 2014).

Tripodi and Bender (2011) conducted a systematic review of the literature pertaining to experimental and quasi-experimental studies of substance abuse treatment for juvenile offenders. Interventions included in the studies were Triple Modality Social Learning, Multisystemic Therapy, Assertive Continuing Care, Multidimensional Treatment Foster Care, basic residential treatment, group therapy, and treatment as usual. They found that overall substance abuse treatment for juvenile offenders had a small to moderate effect on marijuana and alcohol use. They also noted Multisystemic Therapy among the most effective interventions, and individual-based and family-based interventions had a small to moderate effect (Tripodi & Bender, 2011).

Table 1

NIDA's Principles for effective substance abuse treatment

1. Adolescent substance use needs to be identified and addressed as soon as possible
2. Adolescents can benefit from a drug abuse intervention even if they are not addicted to a drug
3. Routine annual medical visits are an opportunity to ask adolescents about drug use
4. Legal interventions and sanctions or family pressure may play an important role in getting adolescents to enter, stay in, and complete treatment
5. Substance use disorder treatment should be tailored to the unique needs of the adolescent
6. Treatment should address the needs of the whole person, rather than just focusing on his or her drug use
7. Behavioral therapies are effective in addressing adolescent drug use
8. Families and the community are important aspects of treatment
9. Effectively treating substance use disorders in adolescents requires also identifying and treating any other mental health conditions they may have
10. Sensitive issues such as violence and child abuse or risk of suicide should be identified and addressed
11. It is important to monitor drug use during treatment
12. Staying in treatment for an adequate period of time and continuity of care afterward are important
13. Testing adolescents for sexually transmitted diseases like HIV, as well as hepatitis B and C, is an important part of drug treatment.

Note. Adapted from "Principles of adolescent substance use disorder treatment: A research-based guide," National Institute on Drug Abuse, 2014, Washington, DC: National Institute on Drug Abuse.

The Drug Abuse Treatment Outcome Studies for Adolescents (DATOS-A) was designed to examine the effect of substance abuse treatment on juvenile crime and substance use. This study included a sample of 1,167 adolescents in substance abuse treatment, of which 681 were under criminal justice supervision (CJS) and 486 were not under criminal justice supervision (non-CJS; Farabee, Shen, Hser, et al., 2001). Participants were admitted to either residential treatment, outpatient drug-free, or short-

term inpatient treatment (Delaney, Broome, Flynn, & Fletcher, 2001). The results showed a significant reduction in the frequency of arrests among the criminal justice sample, dropping from 54% of the sample to 24% at follow-up. Additionally, the findings showed the rate for arrests neither increased nor decreased for non-CJS sample, remaining at 13% of the sample from baseline to follow-up. In regards to drug-related illegal activity, both the criminal justice and non-criminal justice samples experienced a significant reduction (from 68% of the CJS sample to 27% and from 49% of the non-CJS sample to 22%). The findings also showed a significant reduction in substance use from baseline to follow-up among the CJS sample (from 100% of the sample to 70%) and the non-CJS sample (from 100% of the sample to 75%). The authors noted that the large reduction in crime among the CJS sample might be due to the higher percentage of arrests at baseline among the CJS sample as compared to the non-CJS sample (Farabee, Shen, Hser, et al., 2001).

Webb, Burleson, and Ungemack (2002) reported findings from the Cannabis Youth Treatment Project, which was a quasi-experimental study that focused on the reduction of marijuana use among adolescents. Six hundred adolescents participated in the study, of which 71% were CJS. A larger reduction was found in substance use frequency among CJS adolescents as compared to those who were non-CJS, though criminal justice involvement was not a significant predictor of substance use frequency. Although, the substance use frequency was higher at baseline for CJS youth as compared to non-CJS youth (Webb, Burleson, & Ungemack, 2002).

In the Cannabis Youth Treatment (CYT) Study, Dennis et al. (2004) included two trials when examining interventions. Trial one included Motivational Enhancement

Treatment with five sessions of cognitive-behavioral therapy (MET/CBT5), Motivational Enhancement Treatment with twelve sessions of cognitive-behavioral therapy (MET/CBT12), and Family Support Network (FSN). Trial two included MET/CBT5, Adolescent Community Reinforcement Approach (ACRA), and Multidimensional Family Therapy (MDFT). Results of the comparison between FSN, MET/CBT5, and MET/CBT12 showed that all three interventions were effective in reducing substance use. They also examined recovery, which involved "living in the community…and reporting no substance use, dependence or problems in the past month (*p*. 205)" at the time of the follow-up interview. By the end of trial one 22% of FSN participants, 28% of MET/CBT5 participants, and 22% of MET/CBT12 participants were in recovery. By the end of trial two 19% of MDFT participants, 34% of ACRA participants, and 23% of MET/CBT5 participants were in recovery at the time of follow-up. The results also concluded that MET/CBT5 and MET/CBT12 were among the most cost-effective interventions for juveniles who abuse substances.

Evidence-Based Treatment

There is a wide range of treatment interventions used to address adolescent substance use and criminal behavior. Yet, the effectiveness of these interventions remains unclear because many of these studies lack methodological rigor (Deas & Clark, 2009). Efforts are being made to compile a list of empirically-supported interventions, which are known as "evidence-based," and can be found in a number of different repositories (Taxman, & Belenko, 2012), such as Blueprints for Healthy Youth Development, which was developed by the University of Colorado's Center for the Study and Prevention of Violence (2014), the Office of Justice Programs' Crime Solutions

(2014), the National Council of Juvenile and Family Court Judges (2011), and the Washington State Institute for Public Policy (2006).

For the purpose of the current research, SAMHSA's repository of treatment interventions, the National Registry of Evidence-based Programs and Practices (NREPP), was used to classify interventions in the current analyses. Although NREPP does not classify interventions as being "evidence-based" or "non-evidence-based," it does include ratings according to the strength of the studies evaluating the interventions' effectiveness, the *quality of research.* The interventions are rated by independent reviewers using the following NREPP techniques: "reliability of measures," "validity of measures," "intervention fidelity," "missing data and attrition," "potential confounding variables," and "appropriateness of analysis." Each technique is scored on a scale ranging from zero to four, with zero being the lowest and four being the highest. Each reviewer is trained on the use of the rating system for the techniques (SAMHSA, 2014).

Treatment interventions. The following interventions were included in the data set used in this research and in the studies reviewed on the NREPP website. The interventions are either family-based, non-family-based interventions, or a hybrid of both family- and non-family-based treatment. A brief overview of the interventions is included in Appendix C.

Family-based interventions. The family is one of the most influential social systems in an adolescent's environment. As such, it is important for adolescent treatment programs to involve the family/caregiver in the substance abuse treatment process (Alarid, Montemayor, & Dannhaus, 2012; Bertrand, Richer, Bruenelle et al., 2012; Brannigan, 2003; Hogue & Liddle, 2009). Family engagement in treatment increases

adolescent length of stay in treatment as well as the retention of positive outcomes gained from treatment. Interventions that include family involvement can range from updates on the adolescent's progress in treatment to including the family/caregiver as a core participant in the treatment process (Brannigan, 2003). The following provides descriptions of family-based interventions that have been reviewed on the NREPP website and have also been classified as evidence-based treatment (EBT) in other repositories such as Blueprints for Violence Prevention (2014) and Crime Solutions (OJP, 2014) and are included in the GAIN data set.

Multisystemic Therapy. Multisystemic Therapy (MST) is a comprehensive family-based treatment intervention developed to treat substance use and delinquency among substance-involved juveniles (Henggeler, Clingempeel, Brondino, & Pickrel, 2002). MST was developed using empirical research, and studies have been conducted to test its effectiveness. For example, using random assignment, Henggeler, Pickrel et al. (1996) found that 98% of families participating in MST remained in treatment for the entire duration while 78% of the families in the comparison group received neither mental health nor substance abuse treatment in the five months following referral. Additionally, Henggeler, Clingenpeel et al. (2002) tested the long-term effects of MST using a four-year follow-up period. This examination was an extension of a randomized controlled study comparing outcomes of adolescents who received MST services and those who received usual services. The authors found some support for MST's long-term effectiveness with respect to interpersonal crimes, although they did not find this effect with property crimes. Participants of MST experienced significantly higher rates of

abstinence from marijuana than the control group, but there was no significant difference between the groups in their rate of cocaine abstinence (Henggeler et al., 2002).

Family Support Network. The Family Support Network (FSN) treatment model provides comprehensive treatment that addresses the adolescent's substance abuse and familial relationships. FSN combines Motivational Enhancement Therapy with 12 sessions of Cognitive Behavioral Therapy (MET/CBT12) and parent education. The effectiveness of this model was explored in the CYT study described above.

Multidimensional Family Therapy. Multidimensional Family Therapy is a family-based treatment system designed to address adolescent substance use and related behavioral issues (Liddle, Dakof, Turner, Henderson, & Greenbaum, 2008). Austin, MacGowan, and Wagner (2005) conducted a systematic review of family-based treatments. The authors examined Brief Strategic Family Therapy (BSFT), Family Behavior Therapy, Functional Family Therapy, MDFT, and MST using guidelines developed by Wagner and Kassel (1995) and Williams et al., (2000) for effective substance abuse treatment. They found that all of the programs were mostly consistent with the guidelines, and MDFT and BSFT appeared to be the most effective. Further, MDFT was associated with significant changes in substance use during treatment and had a large effect on substance use at the post-treatment, six month, and twelve month follow-up periods (Austin, MacGowan, & Wagner, 2005).

Non-family-based interventions. Only two non-family-based interventions that are included in the GAIN data set were also reported as having a strong evidence-base using NREPP techniques. These interventions were not specifically designed for

adolescents, but they have been relatively effective among adolescents involved in substance use.

Motivational Interviewing. Motivational interviewing (MI) is a short-term intervention intended to strengthen an individual's motivation for change. It is most appropriate for clients who are hesitant to change, as motivation cannot be created in individuals who do not already have some motivation to change (Miller & Rollnick, 2009). Jensen, Cushing et al. (2011) present a meta-analysis of 21 independent studies of MI used in adolescent substance abuse treatment. Findings showed small, but significant effect sizes. Significant effect sizes continued at later follow-ups but larger effect sizes were found during the six month follow-up period as compared to later follow-ups. Nevertheless, Jensen and colleagues (2011) suggested that MI should be used as treatment for adolescent substance abuse. Using an adaptation of MI, Austin, Kilgour, and Williams (2011) examined motivation change among high-risk New Zealand male offenders. The authors measured motivation before and after the program and found motivation significantly increased. Subsequent follow-up showed that the change was maintained for 3-12 months after program completion.

Motivational Enhancement/Cognitive-Behavioral Therapy.[1] Motivational Enhancement / Cognitive-Behavioral Therapy is a blend of two interventions, Motivational Enhancement Therapy (MET) and Cognitive-Behavioral Therapy (CBT). The various forms of MET/CBT include two sessions of MET and differ by the number of CBT sessions included, with the most common being MET/CBT5 and MET/CBT12, though MET/CBT7 is also used. MET/CBT5 includes five sessions of CBT, MET/CBT7

[1] Specifically, MET was rated by NREPP reviewers. The CYT study, which was reviewed by NREPP included MET/CBT; though the NREPP reviews were for other interventions (See the Methods Chapter). MET/CBT is currently under review.

includes seven sessions of CBT, and MET/CBT12 includes twelve sessions of CBT. The model is intended to be a short-term intervention that aims to strengthen the clients' motivation to change and teach them skills to help achieve that change (Dennis et al., 2004; Diamond et al., 2002).

Mixed Interventions. Finally, there were two interventions included in the data set that are not specifically family- or non-family-based. These interventions incorporate the family in the treatment process; however, the family is not the primary focus of treatment.

Adolescent Community Reinforcement Approach. The Adolescent Community Reinforcement Approach (ACRA) is a behavioral intervention intended to help youth engage in prosocial activities and behaviors in place of problematic behaviors. The intervention also includes assistance given to the caregiver to encourage their adolescent's abstinence. ACRA was also shown to be one of the most cost-effective interventions as compared to MET/CBT5 and MDFT. Smith, Godley, Godley, & Dennis (2011) also examined the impact of ACRA participation, though they specifically compared the impact on adolescents and emerging adults. The results showed that approximately 46% of adolescents were abstinent from substance usage at follow-up, while approximately 32% of emerging adults were abstinent (Smith et al., 2011).

Chester Bloomington Treatment Manual. Chester Bloomington's Treatment Manual (CBTM) combines multiple strategies from evidence-based practices. The purpose of the treatment is to increase a participant's motivation to change, improve their environment, and equip them with the skills to help them change (Godley et al., 2010; Godley, Risberg, Adams, & Sodetz, 2002). Treatment uses individual, group, and family

sessions. In a randomized study conducted by Godley et al. (2010), CBTM and MET/CBT were examined in their effect on adolescent substance use. Participants were randomly assigned to CBTM with Assertive Continuing Care (ACC), CBTM without ACC, MET/CBT7 (MET with 7 sessions of CBT) with ACC, or MET/CBT7 without ACC. Over 90% of adolescents were examined for follow-up at three months, six months, nine months, and twelve months following treatment admission. Assessments were conducted using the Global Appraisal for Individual Needs (GAIN). Treatment effect was assessed based on abstinence from substance use, substance use problems, and recovery status. The average percentage of days abstinent increased in all treatment conditions, and the increase was higher among participants of CBTM as compared to participants of MET/CBT7. This difference occurred for both conditions of CBTM (with ACC and without ACC), though the effect sizes were small (Godley et al., 2010).

Juvenile Drug Treatment Court

Juvenile drug treatment court model. The drug treatment court model (JDTC) is known as a problem-solving court, which breaks away from the traditional court model and provides a specialized focus on the nexus between substance use and crime (Hora, 2002). Drug treatment courts provide court-supervised substance abuse treatment to offenders. Originally, the drug treatment court model was developed for adult offenders. However, when the model was applied to juvenile offenders, to form the juvenile drug treatment court, modifications were needed to make the treatment model appropriate for juvenile offenders. To further this effort, the Bureau of Justice Assistance (BJA) organized a panel comprised of researchers, practitioners and educators who developed a list of 16 key components, or strategies, intended to guide the planning and operation of

juvenile drug treatment courts (see Appendix A). These strategies are tailored to juvenile offender needs (National Drug Court Institute [NDCI], 2003).

Overall, JDTCs provides court-supervised substance abuse treatment in a non-adversarial environment, and for that reason the prosecution and defense work together in the best interest of the client. Additionally, the drug court judge works with the prosecution and defense to form the drug court team, and holds regular status hearings with the juveniles. During these status hearings, the judge is able to build a supportive, structured relationship with the juvenile and holds the juvenile accountable for compliance or noncompliance. These status hearings allow an opportunity for the judge to express concern for the juvenile's well-being and serve as a prosocial, consistent presence in the juvenile's life (NDCI, 2003; Rossman, et al., 2004).

Further, JDTCs provide case management and monitor the individual's progress in substance abuse treatment as well as participation in other ancillary services depending on need. JDTCs use behavior modification to help participants abstain from substance use and learn prosocial behavior. This occurs through the provision of rewards for compliance and treatment progress, such as praise, and graduated sanctions for noncompliance, such as detention (Monchick, Scheyett, & Pfeifer, 2006; National Association of Drug Court Professionals, 1997; NDCI, 2003).

JDTC effectiveness. Despite the rapid expansion of juvenile drug treatment courts, empirical evidence for their effectiveness remains inconclusive. Rodriguez and Webb (2004) noted that a number of effectiveness studies are limited due to methodological problems. Fortunately, JDTC evaluations have been increasing in recent years. One such study was reported by Latessa and colleagues (2013), in which they

conducted outcome and process evaluations of nine JDTCs across the United States, and examined the JDTCs' effect on recidivism and social functioning. The process evaluations examined the JDTCs' capacity and content. Capacity referred to the JDTCs' ability to provide EBTs to participants, and content referred to the JDTCs' and referral agencies' adherence to the principles of risk, need, and responsivity (expanded in Chapter 3). The JDTCs and their referral agencies were classified as "highly effective," "effective," "needs improvement," and "ineffective," and the programs were classified similarly using an overall assessment. Results revealed that only two programs were classified as "effective," four were classified as "needs improvement," and three were classified as "ineffective." The process evaluations also revealed that the majority of JDTCs were not adhering to BJA's 16 key components for JDTCs (Latessa et al., 2013).

The outcome evaluations showed that fewer participants in the JDTCs completed treatment as compared to participants in the comparison group, 60% and 63%, respectively. Official data showed that outcomes were worse for JDTC participants during and after treatment as compared to youth on probation. Self-report of substance use showed an increase among both JDTC participants and the comparison group following treatment and probation completion. However, JDTC participants had a lower likelihood of substance use than the comparison group, 63% and 84%, respectively. Similarly, JDTC participants evidenced lower alcohol use compared to youth on probation, 78% and 83%, respectively (Latessa et al., 2013). This evaluation marks a major step in JDTC evaluations and the use of more rigorous methodology.

In a recent meta-analysis, Mitchell et al (2012) reported approximately 35% of the JDTC evaluations examined (approximately 12 out of 34 evaluations) could be classified

as more rigorous, which demonstrates that a growing number of JDTC evaluations are using stronger methodology. Previous reviews and studies are noted below.

Recidivism. The primary outcome of interest in the majority of JDTC studies is recidivism. In a review of published and unpublished evaluations of drug treatment courts, Belenko (2001) examined findings from 28 adult drug treatment courts, 7 JDTCs and 1 family court, and noted areas of difficulty when evaluating JDTCs. Areas of difficulty included limitations regarding programs' information systems and their typically small caseloads. It was also noted that reviews were conducted shortly after implementation, and as a result, it was impossible to draw more certain conclusions regarding their impact. Although, findings showed a during-program rearrest rate that ranged between 10% and 16%, rearrest data were only available for three of the JDTCs reviewed. One JDTC reported that 11% of its participants had at least three rearrests during the six month period following admission and 46% of the comparison group had three or more rearrests during this period (Belenko, 2001).

More recent systematic reviews and meta-analyses have summarized the findings of JDTC studies, and these results continue to show inconsistencies between studies as well as a small treatment effect. In the aforementioned meta-analysis conducted by Mitchell et al., (2012), the researchers examined 153 evaluations of driving while under the influence (DWI) courts, and adult and juvenile drug treatment courts, of which 34 were evaluations of JDTCs. The authors found a small treatment effect among JDTCs on recidivism: an effect comparable to a "reduction in recidivism from 50% to approximately 43.5%" (Mitchell et al., 2012, *p*. 69).

Substance abuse. Other studies of JDTC effectiveness have examined the impact of program participation on substance use. Similar to the impact on recidivism, the effect remains inconclusive due to the shortage of rigorous studies, and because the extant studies have produced mixed findings. For example, Rodriguez and Webb (2004) reported substance use outcomes and did not find a significant difference in marijuana use between JDTC participants during treatment and juvenile offenders on standard probation. The findings did show that JDTC participants were statistically more likely to test positive for cocaine (Rodriguez, & Webb, 2004). In their follow-up, Gilmore, Rodriguez, & Webb (2005) also found that JDTC participants were more likely to test positive for substance use during treatment than the comparison group; but these findings could be due to the closer supervision to which JDTC participants were subjected. This closer supervision provided a greater chance of detecting a positive urine test result (Gilmore et al., 2005).

MacMaster, Ellis, & Holmes (2008) reported the use of random urinalysis screens to test for substance use during treatment, and found a very low frequency of positive drug tests among JDTC participants. Ruiz, Stevens, Fuhriman, Bogart, & Korchmaros (2009) used four scales to measure substance use: the Substance Dependence Scale, the Substance Abuse Scale, Substance Problem Scale, and the Substance Frequency Scale. They found that all four substance use scales decreased over time and did not vary by gender (Ruiz et al., 2009). Unfortunately, neither study included a comparison group in their analysis; as a result, it is difficult to determine whether these decreases were due to JDTC participation or other factors.

JDTCs and EBTs. Recent studies have explored the effect of JDTCs when evidence-based interventions are included in treatment. Unfortunately, the studies examining the use of evidence-based interventions in JDTCs have been examined only by Henggeler and colleagues (2006, 2007, 2012).

In their initial study, Henggeler and colleagues (2006) looked at the effect of JDTCs on recidivism and substance use when augmented by evidence-based treatment interventions. They compared family court (FC), drug treatment court (DC), drug treatment court with Multisystemic Therapy (DC/MST), and drug treatment court with Multisystemic Therapy and Contingency Management (DC/MST/CM). The total sample consisted of 161 participants who were randomly assigned to one of the four aforementioned conditions. Participants were assessed at three time periods: pre-treatment, four-months post-intake, and twelve months post-intake. Substance use was measured through self-report and urinalysis tests. Recidivism was measured through self-report and official arrest data. Overall, participants of drug treatment court evinced lower rates of recidivism and substance use than FC participants. Youth in DC, DC/MST and DC/MST/CM reported reduced substance use as compared to youth in FC. Overall, the results showed drug treatment court had a stronger effect on substance use than FC, and the effect was stronger when evidence-based interventions were incorporated into the services. Findings from self-report showed a reduction among drug treatment court participants in delinquent acts, though official records did not show a significant difference (Henggeler et al., 2006).

Halliday-Boykins et al. (2010) examined the trajectories of substance use, specifically marijuana use, among 118 JDTC participants using the data collected by

Henggeler et al. (2006). Results showed that participants could be separated into two trajectories: responders and nonresponders. Those who fell into the "responders" trajectory tested negative early in the treatment process and continued to demonstrate low usage during the follow-up period. While those who fell into the "nonresponders" trajectory continued to test positively for marijuana use during their first six months in treatment. Self-report showed continued use for approximately ten days per month through the remaining follow-up period. Approximately 51% of participants were classified as responders and approximately 49% of participants were classified as nonresponders. Examination of the distinction between these groups showed that use of illicit substances by the caregiver increased the likelihood that the participant would use marijuana (Halliday-Boykins et al., 2010).

Conclusion

Despite the prevalence of substance use among juvenile offenders, program effectiveness for addressing this population continues to be understudied. While there are numerous treatment interventions employed in adolescent outpatient treatment, the quantity and quality of many effectiveness studies for these interventions remain inconsistent. It is difficult to determine which interventions are the most effective and which components contribute to that effectiveness. As such, it is important to gain a better understanding of the effect these programs have on juvenile offender substance use and recidivism.

It is possible that the effect of treatment interventions in adolescent outpatient programs could be due to adherence to the principles of effective correctional treatment. The Risk-Need-Responsivity model (RNR; Andrews, & Bonta, 2010; Andrews, Bonta, et

al., 1990) has been applied to correctional treatment programs. In their explanations of the model (discussed more fully in the next chapter), Andrews and colleagues (2010; 1990) suggested that it can be applied to any type of program and with any offender type. They suggested that adherence to the Risk-Need-Responsivity model increases the reduction of recidivism (Andrews, & Bonta, 2010; Andrews, Bonta, et al., 1990).

The current study examined the impact of general responsivity adherence and the use of EBTs in AOPs on treatment outcomes. This study applied the general responsivity principle to the treatment interventions used in AOPs. General responsivity adherence was applied at the individual-level and then at the program-level to determine if individual-level impact varied across programs. Similarly, individual-level evidence-based treatments were examined to determine their impact on recidivism and substance use, and whether individual-level impact of EBTs varied across programs. General responsivity adherence and the use of EBTs were also examined at the individual-level in JDTCs, as the treatment population frequently overlaps between JDTCs and AOPs. The next chapter discusses the RNR model in-depth, with a specific emphasis on the general responsivity principle and its potential relevance in substance abuse treatment.

CHAPTER 3: CORRECTIONAL TREATMENT AND RISK-NEED-RESPONSIVITY

Introduction

At the time when the Risk-Need-Responsivity (RNR) model was first articulated, rehabilitative programming had been called into question. Many researchers and criminal justice practitioners, and politicians embraced the idea that "nothing works" and the "get-tough-on-crime" perspective (Cullen & Gendreau, 1989). Despite these widespread beliefs, research on offender treatment programs continued (Davidson, & Seidman, 1974; Lipsey, 1989, as cited in Andrews & Bonta, 2010; Gendreau, & Ross, 1979; Ross, & McKay, 1978), and this research was used as the basis for the RNR model (Andrews & Bonta, 2010). Although a significant amount of research using the RNR model has been conducted (Andrews, & Bonta, 2010; Andrews, Zinger, et al., 1990; Bonta, & Andrews, 2007; Dowden, & Andrews, 1999a, 1999b; B. Lovins, Lowenkamp, & Latessa, 2009; Lowenkamp, Latessa, & Holsinger, 2006; Polaschek, 2012; Thanner, & Taxman, 2003), there are gaps remaining on the responsivity principle and the RNR model's application to substance abuse treatment. Accordingly, the current research is a focused application of the responsivity principle to adolescent substance abuse treatment both in adolescent outpatient substance abuse programs and in juvenile drug treatment courts. The current chapter provides a brief overview of research examining effective correctional programming. Next, a description of the RNR model and the empirical evidence supporting the model is provided with a particular focus on the responsivity principle. Following this, an overview of the criticisms for the RNR model will be given. This

chapter will conclude with the research questions and hypotheses that were examined in this research.

Effective correctional programming

Amongst the researchers who claimed rehabilitation programs were ineffective, were Whitehead and Lab (1989), who conducted a meta-analysis on 50 studies of juvenile rehabilitation programs that were classified as five intervention types: nonsystem diversion programs, system diversion, community corrections-oriented, institutional or residential treatment, and novel/specialty interventions. Using the phi coefficient, they found little positive effect on recidivism, and some programs were even associated with the reoccurrence of delinquency (Whitehead, & Lab, 1989). Their findings were challenged by Andrews, Zinger et al. (1990), who examined 45 of the studies examined by Whitehead and Lab (1989), as well as 35 adult programs. Rather than looking at treatment programs as a whole, they separated them into four categories: criminal sanctions, inappropriate correctional treatment, appropriate correctional service and unspecified service. The results showed that correctional programs could reduce recidivism by as much as 30%. Findings also showed that criminal sanctions had a negative relationship with recidivism and appeared to increase it by seven percent. Andrews, Zinger et al. (1990) also found that inappropriate treatment had a similar effect on recidivism as criminal sanctioning by increasing recidivism by six percent.

These findings suggested that one could not make a general statement regarding the effectiveness of correctional programming. When examining effectiveness, one must examine each program, its components, and identify which components are necessary for reducing recidivism. Resultantly, Andrews, Bonta, and Hoge (1990) developed the RNR

model, which helped articulate a set of principles for effective correctional programming, and compared treatment programs to sanctioning programs in their effect on recidivism. The findings helped build support for the idea that correctional programs can reduce recidivism, and that sanctioning programs may be ineffective (Andrews et al., 1990).

The Risk-Need-Responsivity Model

The Risk-Need-Responsivity model was first described by Andrews, Bonta, and Hoge in 1990. Their article was followed the same year with a meta-analysis which provided support for their thesis (Andrews, Zinger et al., 1990). The article and supporting meta-analysis suggested that particular elements are needed for a correctional program to be effective in reducing recidivism. The authors proposed that each program must adhere to the *Risk Principle*, the *Need Principle*, the *Responsivity Principle*, and *Professional Discretion*. Each principle articulates specific elements that increase program effectiveness (Andrews et al., 1990). This model is subsumed within the Psychology of Criminal Conduct (PCC), which was developed in the 1980s by Andrews and Bonta (Andrews, & Bonta, 2010; Ogloff, & Davis, 2004). PCC posits that there are individual differences in the tendency to commit crime, and variations in criminal behavior can be predicted using social and personality psychological perspectives (Ogloff & Davis, 2004). Within PCC, the RNR model provides guidance for how correctional programs should be structured to reduce reoffending (Andrews & Bonta, 2010).

The original RNR model. Although their paper and meta-analysis in 1990 were the first to describe the RNR model, both were the culmination of years of work, looking at factors related to recidivism and characteristics of correctional programs (Andrews & Bonta, 2010). Since the RNR model's development, it has been studied repeatedly by

Andrews and colleagues (1990, 1999a, 1999b, 2007, 2010) and other researchers (Lovins, Lowenkamp, & Latessa, 2009; Lowenkamp, Latessa, & Holsinger, 2006; Polaschek, 2012; Thanner & Taxman, 2003). While the RNR model has been expanded to include other factors that are considered essential in effective treatment, such as program delivery and staff practices, the risk, need, and responsivity principles have remained the core principles of the model (Andrews, Bonta, & Wormith, 2011).

The *Risk Principle* provides guidance for who should be targeted for correctional treatment (Andrews, & Bonta, 2010; Andrews, Bonta, et al., 1990). "Risk" is defined as the relative likelihood someone will recidivate. The risk principle includes both prediction of an individual's risk of reoffending and matching their risk level to the appropriate level of treatment (Ogloff & Davis, 2004). Programs often target offenders who are "low-risk," possibly because they are perceived as more cooperative or because the program will be more likely to show positive outcomes. Yet, the research evidence suggests that low-risk offenders should receive low-intensity treatment or no treatment at all. When low-risk offenders participate in higher intensity treatment, there is a higher chance of iatrogenic effects, possibly due to exposure to individuals who are higher risk or by separating the individuals from the prosocial networks/activities that could otherwise help them to remain low-risk. Although higher risk offenders may be more difficult to work with, the risk principle indicates that correctional programs will have the greatest possible effect on recidivism and public safety if they target higher risk offenders (Andrews, & Bonta, 2010; Andrews, Bonta, et al., 1990; Marlowe, Festinger, Dugosh, Lee, & Benasutti, 2007). Thus, high-intensity programs should be reserved for high-risk offenders as they are more likely to benefit from treatment (Andrews, & Bonta, 2010;

Andrews, Bonta, et al., 1990). In their initial articulation of the RNR model, Andrews, Bonta, and Hoge (1990) demonstrated that there were minimal positive effects when high-risk offenders were placed in low-intensity programs. In their subsequent meta-analyses, findings showed significant reductions in recidivism when high-risk individuals participated in high-intensity programs (Andrews, & Bonta, 2010; Andrews, Bonta, et al., 1990; Dowden, & Andrews, 1999a, 1999b, 2000).

The key for effective correctional programming is not just for whom, but also "what" correctional programs should target during treatment. When determining an individual's risk level, one must determine which characteristics increase their chance of recidivism. These characteristics are "risk factors." They can be static, meaning they do not change over time or can only change in one direction (e.g., age, criminal history, and gender), or they can be dynamic, meaning they can change over time in any direction (Andrews & Bonta, 2010; Andrews, Bonta et al., 1990; Ogloff & Davis, 2004). Both types of risk factors significantly predict recidivism; but static risk factors are limited in their usefulness for planning effective correctional programming because they do not provide guidance regarding treatment targets. For example, a correctional program cannot alter an individual's age or race, and by focusing treatment on static risk factors, an individual's risk level has two possibilities, unchanging or increasing. Consequently, a person who is classified as "high-risk" will always be classified as "high-risk" (Andrews & Bonta, 2010; Andrews, Bonta et al., 1990).

The *Need Principle* highlights the importance of dynamic risk factors, and demonstrates that one's risk of recidivism can change when dynamic risk factors are changed. Dynamic risk factors, which are also known as "needs," provide correctional

programs with the appropriate targets for treatment (Andrews & Bonta, 2010). Antisocial attitude, for example, is positively associated with one's risk of recidivism, and mediates the influence of school, family, and peers on recidivism (Andrews, Bonta et al., 1990). A reduction in antisocial attitude is associated with a reduction in the risk of recidivism (Andrews, Bonta, et al., 1990; L. Simourd, & Andrews, 1994). Thus, if correctional programs target dynamic risk factors, e.g., antisocial attitude, there is a higher chance that they can reduce an individual's risk level (Andrews, Bonta et al., 1990).

However, not all dynamic risk factors have the same effect on recidivism. Andrews and colleagues (2010, 1990) have suggested two types of dynamic risk factors: criminogenic and noncriminogenic needs. Criminogenic needs are dynamic risk factors that, when changed, result in noteworthy reductions in the chance of recidivism. Noncriminogenic needs are dynamic risk factors that, when changed, result in minimal or no reductions in the chance of recidivism. This evidence suggested that for treatment to effectively reduce recidivism, programs must target criminogenic needs. The need principle states that programs should predominantly target criminogenic needs (Andrews & Bonta, 2010; Andrews, Bonta et al., 1990; Ogloff & Davis, 2004). Correctional programs vary in their level of adherence to the need principle, and may target noncriminogenic needs like self-esteem and mental health issues. Although these needs may be beneficial for the psychological well-being of the offender, addressing them is not likely to result in a reduction in recidivism unless criminogenic needs, such as antisocial peers, are the primary focus of treatment (Andrews & Bonta, 2010; Andrews, Bonta et al., 1990; Ogloff & Davis, 2004).

Andrews and colleagues (2010, 1990) identified which needs are criminogenic, and consequently, are the most important targets for correctional programming. These needs are referred to as the "Big Four" and the "Central Eight," and empirical evidence shows that they have the greatest influence on recidivism (Andrews & Bonta, 2010). The Central Eight are antisocial attitude, antisocial personality, antisocial behavior, antisocial peers, use of leisure time and recreation, school and/or employment, substance abuse, and family and/or marital factors. The Big Four are antisocial attitude, antisocial personality, antisocial behavior, and antisocial peers, which have the strongest effect on recidivism. The authors propose that if the ultimate goal of a correctional program is to reduce recidivism, it must have intermediate targets that are associated with criminality. The measure of program "success" will depend upon the program's ability to change these targets in a prosocial direction (Andrews & Bonta, 2010; Andrews, Bonta et al., 1990).

The third and least understood core principle is *Responsivity*, which suggests that the structure of the program must be matched to the learning style of the offenders in treatment to bring about prosocial change. This principle addresses how treatment should be delivered (Andrews & Bonta, 2010). There are two types of responsivity, general and specific. *General Responsivity* suggests that the overall structure of the program must be based on a theoretically-relevant model that effects change in the individual. Andrews and colleagues (2010, 1990) suggested that cognitive-behavioral and cognitive-social learning models coincide with the general responsivity principle because they target behavior and thinking patterns.

Specific responsivity suggests that the mode and style of treatment should be matched to specific offender characteristics, such as learning deficits, mental health,

history of abuse, housing problems, and cultural background. This includes gender-responsive strategies (i.e., treatment responsive to the needs of women), culturally sensitive treatment (i.e., treatment that factors in the role of ethnicity and culture), and treatment that is adjusted to the offender's learning needs. Under RNR, the main focus of treatment should be criminogenic needs, but many noncriminogenic needs may need to be considered for responsivity purposes, as well (Andrews & Bonta, 2010; Andrews, Bonta et al., 1990; Ogloff & Davis, 2004). For example, many female offenders have a history of sexual, physical, and emotional abuse (Bloom, Owen, Covington, & Raeder, 2002; Wisdom, Hoffman, Rechberger, Seim, & Owens, 2009). Although treatment for abuse is not targeting a specific criminogenic need, it does play a role in a women's ability to be fully engaged in treatment (Taylor, & Hiller, forthcoming).

The current RNR model. Since it was first presented, the RNR model has expanded. The expansions to the model were due to criticisms and growing empirical evidence that provided guidance for modifications to the principles. Although risk, need, and responsivity remain at the core of the RNR model, expansions include both clarifications to these principles, as well as additional principles and domains. These expansions widen the scope of consideration when providing RNR programming. Additional domains include structured assessment, program delivery, staff practices, and organizational factors (Andrews, Bonta, & Wormith, 2011). For example, "structured assessment" refers to the types of assessment tools used and the areas that are examined. "Staff practice" refers to the staff skills that will aid in delivering of better treatment. The "organizational principles" demonstrate the importance of organizational support for

RNR adherence (Andrews, Bonta, & Wormith, 2011). Once fully expanded, the model has 18 principles. A summary of the updated model can be found in Table 2.

Table 2

Expanded Risk-Need-Responsivity Model

Principle	Statement
Overarching principles	
1. Respect for the person	Services are provided in an ethical, legal, just, moral, humane, and decent manner.
2. Theory	Use a general personality and cognitive social theory, including criminal behavior (make use of a psychology of criminal conduct). Behavior reflects genetic predispositions in combination with the personal, interpersonal, and community-based density of rewards and costs for criminal and noncriminal alternative actions. In the immediate situation of action, supports may be actively mediated by the person, interpersonally mediated, and/or be relatively automatic, intrinsic, and unconscious.
3. Human Service	Introduce human service delivery rather than relying on the severity of the penalty.
4. Crime Prevention	The theoretical and empirical base of RNR-based human service should be disseminated widely for purposes of enhanced crime prevention throughout the justice system and beyond (e.g., general mental health services).
RNR	
5. Risk	Match the level of service to the offender's risk to reoffend. Work with the moderate and higher risk cases (risk principle). Keep low-risk cases out of intensive correctional services thereby avoiding interference with existing strengths and/or increased association with higher risk others.

Table 2 *(Continued)*

Principle	Statement
5. Risk	Match the level of service to the offender's risk to reoffend. Work with the moderate and higher risk cases (risk principle). Keep low-risk cases out of intensive correctional services thereby avoiding interference with existing strengths and/or increased association with higher risk others.
6. Need	Assess criminogenic needs and target them in treatment. Criminogenic needs (dynamic risk factors) are characteristics of people and/or their circumstances that signal reward–cost contingencies favorable to criminal activity relative to noncriminal activity. The Central Eight risk/need factors are antisocial associates, antisocial cognitions, antisocial personality pattern, history of antisocial behavior (a static risk factor), substance abuse, and circumstances in the domains of family–marital, school–work, and leisure–recreation.
7. Responsivity	Maximize the offender's ability to learn from a rehabilitative intervention by providing cognitive-behavioral treatment and tailoring the intervention to the learning style, motivation, abilities, and strengths of the offender.
a. General	Use cognitive-social learning methods to influence behavior.
b. Specific	Modify strategies in accordance with the strengths, motivations, readiness to change, personality, mental status, learning ability, learning style, circumstances, and demographics of individual cases.
Structured assessment	
8. Assess RNR	Use structured and validated instruments to assess risk, need, and responsivity.

Table 2 *(Continued)*

Principle	Statement
9. Strengths	Assess personal strengths and integrate them in interventions
10. Breadth	Assess specific risk, need, responsivity factors as well as noncriminogenic needs that may be barriers to prosocial change but maintain a focus on the RNR factors.
11. Professional discretion	Deviate from the RNR principles for specified reasons.
Program delivery	
12. Dosage	Engage higher risk cases and minimize dropout from programs that adhere to RNR.
Staff practices	
13. Relationship skills	Relationship skills include warmth, respect, and being collaborative.
14. Structuring skills	Structuring skills include modeling, reinforcement, skill building, problem solving, cognitive restructuring, and other validated structuring strategies.
Organizational	
15. Community-based	Services that adhere to RNR are more effective when delivered in the community although institutional or residential services that adhere to RNR can also reduce recidivism.

Table 2 *(Continued)*

Principle	Statement
16. Continuity of service	Provide services and ongoing monitoring of progress.
17. Agency management	Managers select and train staff according to their relationship and structuring skills, provide clinical supervision according to RNR, ensure that there are organizational mechanisms to maintain the monitoring, evaluation, and integrity of assessments and programs.
18. Community linkages	The agency within which the program is housed will maintain positive relationships with other agencies and organizations.

Note. Adapted from "The Risk-Need-Responsivity (RNR) Model: Does Adding the Good Lives Model Contribute to Effective Crime Prevention?" D.A. Andrews, J. Bonta, & J.S. Wormith, 2011, *Criminal Justice and Behavior, 38*(7), *p*. 738.

Adherence to the RNR model. When examining the extent to which a program's implementation is consistent with the RNR model, Andrews and colleagues (2010, 1990) refer to the level of "adherence" to the principles. Essentially, the concept of adherence pertains to how closely a program is following the principles of the RNR model. For example, do programs provide high-intensity treatment to high-risk participants (an indicator of adherence to the risk principle)? Do programs target criminogenic needs (an indicator of adherence to the need principle)? In their meta-analyses, Andrews and colleagues (1990, 1999a, 1999b, 2000) used proxies to measure adherence to RNR principles because they were restricted to the information provided in the primary studies. Andrews and colleagues (1990, 1999a, 1999b, 2000) could not always gauge adherence to the RNR model using the descriptions provided by the original authors of the studies; therefore, they developed techniques to determine adherence. For example, Dowden and Andrews (1999a) measured adherence to the risk

principle by assessing whether the majority of female participants who entered a correctional program had a criminal history. They measured adherence to the need principle by using a difference score between the number of criminogenic and noncriminogenic needs targeted. They measured adherence to the general responsivity principle by determining whether programs used cognitive-behavioral and cognitive-social learning techniques, specifically "modeling, role-playing, reinforcement, and graduated practice…" (Dowden & Andrews, 1999a, p. 442).

In primary studies, risk has been measured using the Salient Risk Score (Lovins, Lowenkamp, Latessa, & Smith, 2007), Statistical Information on Recidivism Scale (Wormith, & Olver, 2002), and study-specific composite measures using factors such as age of first conviction and prior arrests (Hanley, 2006; Lowenkamp, & Latessa, 2002). Risk has also been measured using the Level of Service Inventory-Revised and the Level of Service/Case Management Inventory, both of which may also be used to measure need (Andrews et al., 2012; Holliday, Heilbrun, & Fretz, 2012; D. J. Simourd, 2004). Thus far, adherence to the responsivity principle has been measured as whether a program used cognitive-behavioral or cognitive-social learning models (Thanner & Taxman, 2003).

Empirical Evidence for the RNR Model

After Martinson's (1974) report and the dominance of the "nothing works" rhetoric, many researchers (Garrett, 1985; Gendreau, & Ross, 1987; Izzo, & Ross, 1990; Losel, & Koferl, 1989; Whitehead, & Lab, 1989) investigated treatment effectiveness. These investigations were, generally, in the form of narrative reviews of offender treatment literature. In the 1980s, researchers began to use meta-analysis (Glass, McGraw, & Smith, 1981) to examine offender treatment research (Gendreau, &

Andrews, 1990); and it has become the primary method of exploring adherence to the RNR model.

Early offender treatment research studies provided support for the development of the RNR model, though they were not conducted specifically with the goal of testing the model. It was generally a summation of the offender treatment literature, and meta-analyses of effectiveness studies. Some studies did not support the overall effectiveness of offender treatment programs (as cited in Gendreau and Andrews, 1990, p. 175); but others showed programs were effective with certain caveats (Gendreau & Ross, 1987; Losel & Koferl, 1989). Others compared treatment components (Garrett, 1985; Izzo & Ross, 1990), and another meta-analysis simply stated that offender treatment programs were ineffective (Whitehead & Lab, 1989).

However, Andrews, Zinger et al. (1990) conducted a meta-analysis that compared criminal sanctions to three categories of rehabilitation programming. Since this was a meta-analysis, they were limited by the information provided in the primary studies, and they were restricted to proxies of the aforementioned principles. Although this was a preliminary test of the model, this study provided evidence in favor of rehabilitation programming. Findings showed that rehabilitation programs were more effective than criminal sanctions and that sanctioning programs may actually have iatrogenic effects (Andrews, Zinger, et al., 1990).

In this meta-analysis, programs were not separated according to the type of treatment provided; therefore, substance abuse treatment programs were not separated from other types of programs. However, the programs were classified as appropriate service, inappropriate service, unspecified service, and criminal sanctions. Programs

were classified as appropriate if they "included (1) service delivery to higher risk cases, (2) all behavioral programs (except those involving delivery of service to lower risk cases), (3) comparisons reflecting specific responsivity-treatment [considerations], and (4) nonbehavioral programs that clearly stated that criminogenic need was targeted and that structured intervention was employed" (Andrews, Zinger et al., 1990, p. 379). They were classified as inappropriate if they "included (1) service delivery to lower risk cases and/or mismatching according to a need/responsivity system, (2) nondirective relationships like dependent and/or unstructured psychodynamic counseling, (3) all milieu and group approaches with an emphasis on within-group communication and without a clear plan for gaining control over procriminal modeling and reinforcement, (4) nondirective or poorly targeted academic and vocational approaches, and (5) scared straight" (Andrews, Zinger et al., 1990, p. 379). Programs were placed in the sanctioning category if they were "imposed at the front end of the correctional process and not involving deliberate variation in rehabilitative service (e.g., restitution, police cautioning versus regular processing, less versus more probation, and probation versus custody)" (Andrews, Zinger et al., 1990, p. 379). Programs classified as unspecified were "a residual set for those comparisons involving treatments that we could not confidently label appropriate or inappropriate" (Andrews, Zinger et al., 1990, p. 380). They used the phi coefficient to measure effect size (Andrews, Zinger et al., 1990).

One of Andrews and colleagues' (1990) criticisms of the Whitehead and Lab (1989) study was that correctional programs were grouped into one category. The results of the meta-analysis conducted by Andrews, Zinger et al. (1990) showed a strong correlation between the types of treatment provided and the magnitude and direction of

the phi coefficient. The results showed that programs in the appropriate service category (i.e., adhered to the risk, need, and responsivity principles) had a significantly greater mean phi coefficient than the other three categories. Moreover, they showed that appropriate and unspecified services were more effective than both inappropriate services and criminal sanctions. Both criminal sanctions and inappropriate services may increase recidivism, and the difference between providing inappropriate services or criminal sanctions is negligible given that both may have a harmful effect (Andrews, Zinger et al., 1990).

Since this initial examination, Andrews and colleagues (Dowden & Andrews, 1999a, 1999b, 2000) have applied their model to specific populations. Results showed that the principles of RNR had a stronger effect on juvenile recidivism than other previously identified factors (Dowden & Andrews, 1999b). These findings similarly showed that the RNR principles were relevant for reducing female offender recidivism (Dowden & Andrews, 1999a). The model has also been applied to violent offenders (Dowden, & Andrews, 2000) and sexual offenders (Hanson, Bourgon, Helmus, & Hodgson, 2009). These results suggested that adherence to the RNR principles can result in reductions in recidivism, regardless of the population. In regards to violent offending, significant reductions occurred when the general responsivity and need principles were followed. Although not significant, adherence to the risk principle also showed reductions in violent reoffending (Dowden & Andrews, 2000). Similarly, when examining sexual offenders, Hanson et al. (2009) found the largest reduction in both sexual and general recidivism when the principles of RNR were followed.

Yet, the RNR model remains understudied among juveniles and in the context of substance abuse treatment. For example, to date, only two studies have applied the RNR model to juvenile drug treatment courts (Gutierrez, & Bourgon, 2009; Latessa et al., 2013). Gutierrez and Bourgon (2010) conducted a meta-analysis that applied the full RNR model to adult and juvenile drug treatment courts. The authors classified treatment quality using adherence to the RNR principles , and found that adherence was minimal, as only one drug treatment court adhered to two principles, while thirteen adhered to one principle, and eleven did not adhere to any principles. The authors did not identify to which principles these drug treatment courts adhered. Although, they did note that the drug treatment courts that adhered to at least one principle showed a greater reduction in recidivism than those that did not adhere to any (Gutierrez & Bourgon, 2009). In the aforementioned evaluation of JDTCs (see Chapter 2), Latessa et al. (2013) reported that most of the JDTCs included in the evaluation did not adhere to the principles of risk, need, and responsivity.

A review of the literature revealed that the RNR model has not been explored in primary studies of adolescent outpatient treatment programs (AOPs). Prendergast, Pearson, Podus, Hamilton, and Greenwell (2013) did conduct a meta-analysis in which they applied the RNR model to adult and juvenile substance abuse treatment programs. They examined the effect of adherence on recidivism and substance use. Their findings supported previous studies that showed that adherence to the principles is effective in reducing recidivism; although, the results did not show an effect on substance use (Prendergast et al., 2013).

Only one other study has applied the RNR model to substance use outcomes. Wooditch, Tang, and Taxman (2014) examined outcomes among adult substance-involved probationers who participated in a randomized clinical trial comparing a "seamless-probation treatment process" (p. 282) and standard probation with community treatment. The analyses specifically examined the association between criminogenic needs and the number of days of substance use and criminal activity among probationers during the six to twelve month period following treatment entry. The researchers found that changes in multiple criminogenic needs (e.g. criminality among family members) reduced criminal activity. However, they also found that the only significant predictor of substance use among criminogenic needs was leisure time and recreational activities. As many AOPs treat juveniles with a criminal history, it is important to further understand the relevance of RNR in adolescent outpatient substance abuse treatment regarding recidivism and substance use outcomes.

Risk Principle. The risk principle has been extensively researched and is well-supported by the scientific literature. For example, Andrews and Dowden (2006) conducted a meta-analysis using 230 studies and found moderate support for the risk principle. They found a stronger effect among female offenders and juvenile offenders. The authors also found a stronger effect when programs adhered to the need and responsivity principles (Andrews and Dowden, 2006).

Lowenkamp, Latessa, and Holsinger (2006) examined adherence to the risk principle among 13,676 adult offenders in 97 programs using meta-analysis. The authors examined the principle in two studies. The first study used 3,782 offenders in 53 programs, and these offenders were compared to individuals on parole or those who

otherwise did not participate in treatment. The second study included 3,056 offenders in 44 programs, who were compared to offenders on standard probation. The results of the analyses showed that higher risk offenders should receive a higher intensity of treatment for a longer period of time (Lowenkamp, Latessa, & Holsinger, 2006). The risk principle has also been examined among female offenders (B. Lovins, Lowenkamp, Latessa, & Smith, 2007) and sex offenders (B. Lovins et al., 2009), and support has been found for it with these populations.

Need Principle. In 2008, Andrews provided a 15-year update on the state of empirical evidence for the RNR model. When examining the need principle, he summarized the research that compared the effect sizes of criminogenic and noncriminogenic needs on recidivism. The noncriminogenic need with the highest effect size was physical activity, with a phi coefficient of .18; and the criminogenic need with the highest effect size was family process, with a phi coefficient of .29. The criminogenic need with the lowest effect size was substance abuse, with a phi coefficient of .11. Additionally, Wong and Hare (as cited in Ogloff & Davis, 2004, p. 233) supported the assertion that criminogenic needs should be the focus of correctional treatment. They reported that empirical evidence suggests targeting noncriminogenic needs without also treating criminogenic needs is not likely to reduce recidivism and may actually increase offending (Ogloff, & Davis, 2004).

Responsivity Principle. Although the RNR model has been heavily researched, the responsivity principle remains understudied (Andrews, & Bonta, 2010; Polaschek, 2012; Vieira, Skilling, & Peterson-Badali, 2009). Covell and Wheeler (2011) stated that the research is limited regarding the execution of the principle in a real world setting;

though, Polaschek (2012) did note a growing body of research on the principle. Andrews and colleagues (1990, 1999a, 1999b, 2007, 2010) have tested the principle in conjunction with the risk and need principles, though never separately, and demonstrated that programs using cognitive-behavioral or cognitive-social learning models are more effective than programs using other treatment models (Andrews, & Bonta, 2010; Landenberger & Lipsey, 2005; Lipsey, Chapman, Landenberger, 2001).

Thanner and Taxman (2003) also examined the responsivity principle in conjunction with the risk principle. Although it is impossible to identify the unique effect of responsivity adherence, the results did show small-to-moderate effect sizes for cognitive-behavioral treatment compared to the traditional system. A treatment effect was also found when risk level was taken into account. High-risk offenders benefited from the high-intensity, cognitive-behavioral programming compared to those in the control group; and moderate-risk offenders did worse in high-intensity, cognitive-behavioral programming as compared to their counterparts in the traditional system. Due to the small sample size,[2] most of these relationships were not statistically significant. Only the difference in the mean number of arrests between high-risk offenders in the treatment and control groups was significant (Thanner & Taxman, 2003).

Most of the knowledge regarding the responsivity principle is restricted to descriptions (Kennedy, 2001; Looman, Dickie, & Abracen, 2005) and calls for more research in the area (Andrews et al., 2011; Polaschek, 2012). The few studies that solely examined the responsivity principle were primarily descriptive, and identified specific responsivity factors in need of further research (Kennedy, 2001; Looman, Dickie, &

[2] 120 participants, of which 60 participants were assigned to the treatment group and 60 participants in the control group.

Abracen, 2005). For example, Looman, Dickie, and Abracen (2005) identified responsivity factors to consider in sexual offender treatment, and highlighted factors such as hostility, intellectual functioning, and deviant arousal. Yet, there are few studies exploring and testing the principle.

General Responsivity. The general responsivity principle states that treatment should be structured to facilitate individual change, specifically using cognitive-behavioral and cognitive-social learning models. The studies that provide support for the general responsivity principle (Izzo, & Ross, 1990; Landenberger, & Lipsey, 2005; McGuire et al., 2008) did not specifically explore the general responsivity principle, although they did examine cognitive-behavioral programs. For example, Izzo and Ross (1990) demonstrated a stronger treatment effect for juvenile correctional programs when a cognitive component was included in treatment. Although, when comparing probationers participating in structured, cognitive-behavioral treatment with nonparticipants, McGuire, Bilby, Hatcher et al. (2008) did not find a significant difference in reconviction rates. They also observed a stronger treatment effect for higher risk participants of the program (McGuire et al., 2008).

Landenberger and Lipsey (2005) conducted a meta-analysis to examine the effects of cognitive-behavioral therapy (CBT) on recidivism. The sample was comprised of 58 experimental and quasi-experimental studies, of which 17 included juvenile offenders and 41 included adult offenders. Although the results did show positive effects for CBT programs, several moderator variables were also identified, including risk level, implementation integrity, and anger management and relational treatment elements.

Once these moderators were included, there was no significant difference between CBT and non-CBT programs (Landenberger & Lipsey, 2005).

General responsivity in substance abuse treatment. Cognitive-behavioral therapy and cognitive-social learning models have been explored within the substance abuse treatment literature. Magill and Ray (2009) conducted a meta-analysis of 53 studies of substance-involved adults that used random assignment. They found a significant treatment effect, albeit small, for CBT. A stronger effect was found amongst participants who received CBT as compared to the controls who did not receive treatment. Unfortunately, the treatment effect was not long-term and decreased at both the six to nine month and twelve month follow-ups (Magill & Ray, 2009). Dutra, Stathopoulou, Basden et al. (2008) conducted a meta-analysis of 34 randomized controlled studies, of which 13 were cognitive-behavioral and two were cognitive-behavioral with contingency management. The highest effect sizes were among the studies that included cognitive-behavioral and contingency management therapy, and a low-to-moderate effect sizes were found for cognitive-behavioral therapy. Approximately 27% of participants receiving cognitive-behavioral therapy abstained from substance use (Dutra et al., 2008).

Specific responsivity. The specific responsivity principle states that treatment should address individual factors that may impact an individual's treatment progress, i.e. learning disabilities, history of abuse, and cultural needs. Overall, specific responsivity factors have been explored more than general responsivity, though most of these studies were not in the context of the specific responsivity principle. Still, they do provide direction for future studies of the principle. For example, Ives, Chen, Modisette and Dennis (2010) examined treatment needs among juveniles in drug treatment court and

adolescent outpatient treatment, and identified a large number of treatment needs among the participants. Approximately 29% in both groups experienced symptoms of depression, and 45% in both groups experienced symptoms of conduct disorder. In addition, about 50% had a history of victimization, and approximately 30% reported being homeless or running away in their lifetime. Although this study was not an examination of the specific responsivity principle, many of the needs identified are factors that would be addressed under the principle.

Kennedy (2001) identified motivation, learning deficits, and gender as potential factors that may interfere with response to treatment. Olver, Stockdale, and Wormith (2011) conducted a meta-analysis of factors that impact attrition from mental health treatment. They examined the relationship between treatment responsivity indicators, among many other factors, and attrition. Results showed that most of the responsivity indicators were strongly associated with attrition across all programs, specifically disruptive behavior, negative treatment attitudes, denial, motivation, and treatment engagement. Many responsivity indicators also predict attrition from sexual offender programs (e.g. denial, negative treatment attitude, motivation, treatment engagement/change) and treatment engagement/change predicted attrition from domestic violence programs, though this effect disappeared when outliers were excluded from the analyses for domestic violence programs (Olver et al., 2011).

Further, Hubbard and Pealer (2009) examined specific responsivity factors; and though they did not find program success contingent on the absence of these needs, they did find that individuals with more responsivity needs benefited from treatment less. Specifically, factors such as personality traits and self-esteem did not have an effect on

cognitive distortions and antisocial attitudes on their own; but when individuals possessed more than one factor, a cumulative effect was noted (Hubbard, & Pealer, 2009).

Specific responsivity in substance abuse treatment. Through a review of the literature, Belenko and Dembo (2003) identified treatment needs for adolescents with substance use problems that can be classified as specific responsivity factors. For example, they reported a high frequency of mental health disorders, including anxiety, antisocial personality, and disruptive behavior disorder (Belenko, & Dembo, 2003).

Wilson and Levin (2005) conducted a review of the literature and reported that attention-deficit/hyperactivity disorder can have adverse effects on substance use disorders and may hinder treatment engagement. Belenko and Dembo (1993) also reported the occurrence of learning disabilities among youth with substance use problems. Although they stated that it was difficult to determine the frequency of learning disabilities among youth with substance use problems, they did note that research does show a correlation between the two though it is difficult to determine the nature of the relationship. They also reported the importance of cultural sensitivity, and that treatment may need to be adjusted accordingly (Belenko & Dembo, 2003).

Gender has also been explored extensively in the substance abuse treatment literature, and it is clear that men and women have differing clinical needs (Ashley, Marsden, & Brady, 2003; Bloom, 1999; Wisdom et al., 2009). Accordingly, researchers state that treatment should be modified to meet the unique needs of women (Bloom, & Covington, 1998; Grella, 2008; Tuchman, 2010). When these modifications have been made, results show improved retention (Ashley et al., 2003; Claus et al., 2007) and

positive outcomes (Ashley et al., 2003; Baird, 2008; Covington, Burke, Keaton, & Norcott, 2008; Hall, Prendergast, Wellisch, Patten, & Cao, 2004). For example, Covington et al., (2008) examined two trauma-informed, gender-responsive treatment programs. Results showed that treatment completers had lower substance use and less severe depression (Covington et al., 2008).

Criticisms of RNR

Although the RNR model is generally supported, it has also been criticized. Many of the criticisms are from Ward and colleagues (Ward, Melser, & Yates, 2007; Ward, & Stewart, 2003; Ward, Yates, & Willis, 2012), who have developed a strengths-based model for correctional programming, the Good Lives Model (GLM). Their main criticism asserts that the RNR model does not take into account human rights, autonomy, motivation, and the promotion of well-being. Resultantly, they developed GLM to incorporate these elements, hence, they view GLM as the superior model. The debate between both groups has occurred through a series of publications starting in 2003.

Andrews, Bonta, & Wormith (2011) stated that when their model was criticized by Ward et al. (2003), they allowed other researchers to respond to the criticisms and weigh in on the utility of the RNR model. Aside from a brief response (Bonta, & Andrews, 2003) and a small notation in their book, *Psychology of Criminal Conduct* (Andrews & Bonta, 2010), they chose to remain silent because they wanted to allow others to analyze the value of the RNR model. Nevertheless, they published an article in 2011 responding to the criticisms at length. They defended the RNR model by examining it alongside GLM to determine whether GLM enhances RNR as GLM proponents claim (Andrews, Bonta, & Wormith, 2011). Although they did not address each criticism in

their response, they provided clarification and expansions on the model. The debate has continued with articles published by Ward, Yates, and Willis (2012), Wormith, Gendreau, and Bonta (2012), and Gannon and Ward (2014).

The major take-away from their exchange and the research at large is that more research is needed on the Risk-Need-Responsivity model. Andrews, Bonta, and Wormith (2011) acknowledged that there were areas of the RNR model that were not clearly defined. One such area is the responsivity principle. More research is needed on the responsivity principle and its practical application in treatment (Polaschek, 2012). As such, the current research contributes to filling this gap in the research by examining the effect of the general responsivity principle. This research helps set the stage to better understand the principle. Andrews, Bonta, and Wormith (2011) acknowledged that the responsivity principle has remained underdeveloped. As a result, this research adds to the empirical evidence for the practical understanding of the general responsivity principle in adolescent outpatient substance abuse treatment programs and juvenile drug treatment courts.

The Current Study

To date, the majority of research examining the RNR model has focused on the risk and need principles, and there continues to be limited empirical research for the general responsivity principle. There have only been two studies that applied the RNR model to substance abuse treatment programs. Similarly, understanding of substance abuse treatment effectiveness for juvenile offenders continues to lag, along with a clearer understanding of the impact of EBTs. The current study explored general responsivity adherence and the use of EBTs, at the individual- and program-level, in the context of

adolescent outpatient treatment programs. As substance-involved adolescents are also admitted to juvenile drug treatment courts, general responsivity adherence and the use of EBTs were examined in the context of JDTCs. Although drug courts typically have small caseloads, the number of JDTC programs across the nation has been increasing since the first implementation of a JDTC in the 1990s. As of 2012, there were 500 JDTC in operation (CrimeSolutions.gov, 2014). With the increased number of operational JDTCs, it will be important to look into the "black box" of JDTC effectiveness or ineffectiveness. Therefore, the current research will help to contribute to the knowledge regarding the effectiveness of JDTCs. The following research questions and hypotheses were explored:

Research Question 1: For youth in the AOP sample, when controlling for participant characteristics known to be empirically associated with recidivism (e.g., criminogenic needs), is adherence to the general responsivity principle at the individual- and program-level related to recidivism or substance use severity during the six month period following AOP program entry?

Hypothesis 1a. The odds of rearrest will be lower among AOP participants who received interventions with a higher number of responsivity-adherent techniques during the six month period following program entry than participants who received interventions with fewer responsivity-adherent techniques, even after controlling for participant characteristics.

Hypothesis 1b. AOP participants who received interventions with a higher number of responsivity-adherent techniques will have a lower average substance use frequency score during the six month period following program entry than

participants who received interventions with fewer responsivity-adherent techniques, even after controlling for participant characteristics.

Hypothesis 1c. The odds of rearrest will be lower among AOP participants in programs with higher average responsivity-adherent scores than participants who were in programs with lower average responsivity-adherent scores.

Hypothesis 1d. Substance use severity will be lower among AOP participants in programs with higher average responsivity-adherent scores than participants who were in programs with lower average responsivity-adherent scores.

Research Question 2. For youth in the AOP sample, when controlling for participant characteristics known to be empirically associated with recidivism (e.g., criminogenic needs), are evidence-based interventions at the individual- and program-level related to recidivism or substance use severity during the six month period following AOP program entry?

Hypothesis 2a. The odds of rearrest will be lower among AOP participants who received interventions with higher EBT use scores in the six month period following program entry than participants who received interventions with lower EBT use scores, even after controlling for participant characteristics.

Hypothesis 2b. AOP participants who received interventions with higher EBT use scores will have a lower average substance use severity score in the six month period following program entry than participants who received interventions with lower EBT use scores, even after controlling for participant characteristics.

Hypothesis 2c. The odds of rearrest will be lower among AOP participants in programs with higher average EBT scores than participants who were in programs with lower average EBT use scores.

Hypothesis 2d. Substance use severity scores will be lower among AOP participants in programs with higher average EBT scores than participants who were in programs with lower average EBT use scores.

Research Question 3. For youth in the JDTC sample, when controlling for participant characteristics known to be empirically associated with recidivism (e.g., criminogenic needs), is general responsivity adherence at the individual-level associated with recidivism or substance use severity during the six month period following JDTC program entry?

Hypothesis 3a. The odds of rearrest will be lower among JDTC participants who received interventions with a higher number of responsivity-adherent techniques during the six month period following program entry than participants who received interventions with fewer responsivity-adherent techniques, even after controlling for participant characteristics.

Hypothesis 3b. JDTC participants who received interventions with a higher number of responsivity-adherent techniques will have lower average substance use severity scores during the six month period following program entry than participants who received interventions with fewer responsivity-adherent techniques, even after controlling for participant characteristics.

Research Question 4: For youth in the JDTC sample, when controlling for participant characteristics known to be empirically associated with recidivism (e.g., criminogenic

needs), is the use of evidence-based interventions at the individual-level associated with recidivism or substance use severity during the six month period following JDTC program entry?

Hypothesis 4a. The odds of rearrest will be lower among JDTC participants who received interventions with higher EBT use scores in the six month period following program entry than participants who received interventions with lower EBT use scores, even after controlling for participant characteristics.

Hypothesis 4b. JDTC participants who received interventions with higher EBT use scores will have a lower average substance use severity score in the six month period following program entry than participants who received interventions with lower EBT use scores, even after controlling for participant characteristics.

CHAPTER 4: METHODS

File Used for Secondary Data Analysis

To examine the hypotheses, a subset of the 2011 Center for Substance Abuse Treatment (CSAT) Global Appraisal of Individual Needs (GAIN) Data Set was used. These data were originally collected by Chestnut Health Systems (CHS) under contract with CSAT (see Ives et al., 2010 for additional information). The data are from programs funded by CSAT between 2002 and 2011. GAIN data are available to researchers for secondary analysis by request. Researchers must follow a specific process for gaining access to the data, which includes submitting an abstract describing the proposed study, a timeline for completion, research questions and hypotheses, an analytic plan, and a list of variables needed for the proposed analyses. The GAIN Coordinating Center (GCC) approves the abstract and then sends it to the treatment program liaisons who choose whether to consent to the use of the data provided by their program in the proposed study.

The GAIN data were collected to fulfill the Government Performance and Results Act of 1993 (Public Law 103-6), which specifies the required data that must be collected by treatment providers who receive funding from CSAT and other federal agencies. The *Global Appraisal of Individual Needs* incorporates these reporting requirements, and adolescent treatment providers receiving CSAT funding are required to administer the GAIN to participants at baseline (i.e., program intake), and again three and six months after baseline (Dennis et al., 2008).

The GAIN is a well-validated, biopsychosocial assessment tool that can be self-administered or administered via interview. It was first developed in 1993 and includes the following sections: *background*, *substance use*, *physical health*, *risk behaviors and*

disease prevention, *mental and emotional health*, *environment and living situation*, *legal*, and *vocational*. The scales and subscales in the GAIN can assist with participant placement decisions and treatment planning, as well as measure outcomes (e.g., substance use and illegal activity) (GCC, 2013). The GAIN also incorporates items based on the Diagnostic and Statistical Manual IV (DSM-IV-TR; American Psychiatric Association, 2000) symptoms for depression, anxiety, attention-deficit/hyperactivity disorder, conduct disorder, and substance dependence. A follow-up version of the GAIN was developed for administration every 90 days following baseline. It measures participant progress, substance use, criminal involvement, and social functioning over the previous 90-days (Dennis et al., 2008). When used twice (i.e., three months and six months post-baseline), the assessment accounts for the behavior 1-90 days after baseline, and 91-180 days following baseline, respectively.

The GAIN has been administered and validated across multiple groups, including adolescents (12-17 years of age), young adults (18-25 years of age), and adults (26+ years of age), males and females, African Americans, Caucasians, Hispanics, Asians, Alaskan/Native Americans, and individuals of mixed race, as well as participants in different levels of care and treatment settings. As of April 2013, the GAIN had been administered to over 27,000 individuals (GCC, 2013).

The GAIN file used in the current study also included data extracted from treatment program records by GCC staff. This included information about the type of participants' intervention while in treatment, level of care, treatment recommendations, and the number of treatment sessions attended.

Participants

The master GAIN data file includes both adolescent and adult treatment program participants. Programs provide treatment through a variety of modalities, including outpatient treatment, therapeutic community, and residential treatment. For the current study, only youth who participated in adolescent outpatient (AOP) substance abuse treatment and juvenile drug treatment courts (JDTC), which often incorporate an outpatient model of care, were examined.

Adolescent outpatient treatment programs. The AOP sample consisted of 132 programs. All of the programs were CSAT grantee sites from across the nation. These programs were designed to improve substance abuse treatment in the community using various approaches, such as treatment needs identification, the use of the GAIN to inform treatment plans, and the provision of aftercare.

Adolescent outpatient treatment participants. The initial AOP sample included 12,587 participants; however, to ensure consistency across sites in the definition of "juvenile" (i.e., ages 18 and under), individuals over the age of 18 were eliminated from the file, leaving 11,761 participants. Not all AOP programs focused exclusively on youth involved in the juvenile justice system; therefore, those individuals who were not justice system-involved were also excluded from the analyses. This resulted in a final analytic sample of 8,140 participants. As shown in Table 3, the majority of participants were male (78.4%) and between the ages of 13 and 17 years (98.9%). The largest proportion of AOP participants was Caucasian (38.6%). The majority of participants began using substances prior to the age of 15 years (83.1%). Additionally, at the time of the baseline

assessment, 90.0% were in school during the previous 90 days and 52.5% lived in a single-parent home.

Table 3

AOP and JDTC Participant Demographics

	AOP Sample	JDTC Sample
Gender		
Male	78.39%	72.25%
Female	21.61%	27.75%
12-17 years of age	98.92%	98.35%
Race/Ethnicity		
African American	16.43%	10.58%
Caucasian	38.57%	22.16%
Hispanic	28.51%	53.34%
Asian	0.79%	0.43%
Multi-racial	13.71%	11.88%
Other	2.00%	0.61%
In School during the previous 90 days	89.97%	90.00%
Single parent home	52.54%	52.17%
First use of a substance before the age of 15	83.10%	85.47%

Table 3 *(Continued)*

	AOP Sample	JDTC Sample
Five or more previous arrests	18.4%	12.7%
Completed the 3-month follow-up	7,238	1,037
Completed the 6-month follow-up	6,263	949

Note. AOP = adolescent outpatient; JDTC = juvenile drug treatment court.

All programs collected the GAIN at baseline (i.e., treatment intake), and three and six months post-baseline. Treatment providers could also administer an optional nine and twelve month follow-up interview.[3] As shown in Table 3, a total of 7,238 participants completed the three month assessment and 6,263 participants completed the six month assessment. The GAIN was administered orally by program staff for the majority of AOP participants at baseline (97.1%), three months (95.1%), and six months (93.3%). The remaining participants either self-administered the GAIN or a non-staff member administered it orally.

Outcome measures (described below) came from the three and six month post-baseline GAIN interviews. To maximize sample size, anyone who completed either the three or six month assessments were included in the analyses. This resulted in a total of 7,961 participants (97.8% of the baseline sample) available for the analyses. Analyses showed the demographic composition of those completing the three month follow-up or the six month follow-up interviews did not significantly differ from baseline distributions. Therefore, an attrition bias was not evident.

[3] Grantee sites could also administer a follow-up at nine months (n=476, 6.5% of youth in the programs) and twelve months (n=3,266, 44.5% of youth in the programs).

The majority (91.6%) of the AOP participants were exposed to one of the following interventions (see Appendix B-Table 47 for a description of each): Multisystemic Therapy (MST), Motivational Interviewing (MI), Motivational Enhancement/Cognitive-Behavioral Therapy (MET/CBT), Family Support Network (FSN), Seven Challenges (7C), Multidimensional Family Therapy (MDFT), Brief Strategic Family Therapy (BSFT), Cognitive Behavioral Therapy (CBT), Dialectical Behavior Therapy (DBT), Adolescent Community Reinforcement Approach (ACRA), and Chestnut Health Systems-Bloomington Outpatient and Intensive Outpatient Treatment Manual (CBTM).

Juvenile drug treatment court programs. The JDTC sample included ten programs. Four were initially funded by CSAT in 2005 (i.e., Laredo, TX; San Antonio, TX; Belmont, CA; Pontiac, MI). Five were funded in 2006 (San Jose, CA; Austin, TX; Peabody, MA; Detroit, MI; Philadelphia, PA), and one was funded in 2010[4] (San Rafael, CA).

Juvenile drug treatment court participants. The JDTC participant sample included 1,188 participants. Like the AOP sample, participants over the age of 18 were removed from the data file, leaving a total of 1,176 participants for the analyses. As shown in Table 3, the majority of JDTC participants was male (72.3%), between the ages of 13 and 17 (98.4%) and Hispanic (53.6%). Approximately 89.7% were in school during the 90 days prior to their baseline assessment. The majority (53.8%) lived in a single-parent home, and 82.5% reported their first substance use occurred before 15 years old.

[4] The timing of these sites is due to the start of three JDTC grant programs.

As required by CSAT funding, the GAIN was collected by staff at baseline, and three and six months post-baseline.[5] The GAIN was administered orally by a staff member for the majority of JDTC participants at intake (97.1%), three months (95.1%), and six months (93.3%). The remaining participants either self-administered the GAIN or a non-staff member administered orally.

As shown in Table 3, a total of 1,037 participants completed the three month assessment and 949 participants completed the six month assessment. Like the AOP sample, all individuals who completed at least one of the follow-up interviews were included in the analyses. This resulted in a total of 1,153 (98.0%) JDTC participants. The demographic composition of those completing follow-up interviews did not significantly differ from the baseline distribution. Therefore, an attrition bias was not evident.

Most JDTC participants (90.3%) received one of the following treatment interventions (see Appendix B-Table 47 for descriptions): Multisystemic Therapy (MST), Motivational Interviewing (MI), Motivational Enhancement/Cognitive-Behavioral Therapy (MET/CBT), Family Support Network (FSN), Seven Challenges (7C), Multidimensional Family Therapy (MDFT), Brief Strategic Family Therapy (BSFT), Cognitive Behavioral Therapy (CBT), Dialectical Behavior Therapy (DBT), Adolescent Community Reinforcement Approach (ACRA), and Chestnut Health Systems-Bloomington Outpatient and Intensive Outpatient Treatment Manual (CBTM).

[5] JDTC sites had the option to administer follow-ups at nine months (n=60, 5% of youth who entered the programs) and twelve months (n=274, 23% of youth who entered the programs).

Measures

The AOP and JDTC samples were analyzed separately. In the AOP analyses, outcomes were specified at the individual-level (level-1), and independent variables were specified at both the individual- (level-1) and program- (level-2) levels. In the JDTC analyses, the outcomes and independent variables were examined only at the level of the individual. The following sections provides the operational definitions of the dependent variables, substance use severity and rearrests, and the independent variables, general responsivity adherence and evidence-based treatment usage, as well as the control variables.

Dependent variables. The outcomes, rearrest and substance use, were based on self-reported data collected via the GAIN.

Rearrest was operationalized as a dichotomous variable, which captured whether the participant was arrested during the six month period following program admission (0 = No, 1 = Yes).[6] A total of 14.7% of AOP participants and 14.5% of JDTC participants were rearrested in the 90 days following their baseline assessment. Data from the six month assessment showed that 12.8% of AOP participants and 12.8% of JDTC participants were rearrested during the 91-180 days post-baseline assessment interval. Combining the rearrest data from both follow-up GAIN assessments showed a total of 28.0% AOP and 26.9% of JDTC participants were rearrested during the six months following program entry.

[6] Rearrested for the following crimes: 1. Vandalism or property destruction; 2. Receiving, possessing or selling stolen goods; 3. Passing bad checks, forgery or fraud; 4. Shoplifting; 5. Larceny or theft; 6. Burglary or breaking and entering; 7. Motor vehicle theft; 8. Robbery; 9. Simple assault or battery; 10. Aggravated assault or battery; 11. Forcible rape; 12. Murder homicide or non-negligent manslaughter; 13. Arson; 14. Driving under the influence; 15. Drunkenness or other liquor law violation; 16. Possession, dealing, distribution or sale of drugs; 17. Prostitution, pimping, or commercialized sex; 18. Probation or parole violations; and 19. Illegal gambling.

Substance use severity was scored as a composite variable similar to the Addiction Severity Index (McGahan et al. 1986; McLellan et al., 1980), which is a biopsychosocial instrument commonly used with criminal justice-involved samples (see also Taxman et al., 2007 and Hiller et al., 2010). The index included whether the participant reported illicit use of a substance, the proportion of days the participant had used a substance in the previous 90 days, the number of days of use for specific drugs, consequences from use, and heavy substance use (the number of days of inebriation and the number of days in which the individual was under the influence of a substance for the majority of the day). Scoring ranged from zero to one, with a higher score indicating higher levels of substance use severity (GCC, 2013). The Cronbach's alpha for this variable was 0.79, showing high internal consistency (Cronbach, 1951).

As shown in Table 4, for the AOP participants, the average substance use severity score at the three month assessment was 0.113 (*SD* = 0.135), and the median score was 0.033. At the six month follow-up, the average substance use severity score was 0.110 (*SD* = 0.138), and the median score was 0.024. Among JDTC participants, the average substance use severity score at three months was 0.061 (*SD* = 0.105), and the median score was 0.006. At six months, the average substance use severity score was 0.054 (*SD* = 0.103), and the median score was 0.003. The distributions of the substance use severity scores were significantly skewed; therefore, a square-root transformation was applied to the substance use severity score at both the three and six month assessment periods. Following the transformation, an average of both square root transformed variables was created to reflect use across the entire six months following baseline.

Table 4

Means and Standard Deviations for Substance Use Severity for AOP and JDTC Participants

	Sample	
GAIN Administration	**AOP**	**JDTC**
Baseline interview	0.102 (*SD* = 0.125)	0.128 (*SD* = 0.134)
Three month Interview	0.113 (*SD* = 0.135)	0.061 (*SD* = 0.105)
Six month interview	0.110 (*SD* = 0.138)	0.054 (*SD* = 0.103)
Three and Six Month Combined (Square Root)	0.244 (*SD* = 0.21)	0.152 (*SD* = 0.178)

Note. AOP = adolescent outpatient; JDTC = juvenile drug treatment court.

A paired samples *t-test* was used to analyze the difference between substance use severity score at baseline and the six month combined average for both AOP and JDTC samples. The results showed there was a significant difference in substance use severity score for AOP participants, $t(7959) = 109.373$, $p < .001$ and JDTC participants, $t(1152) = 53.349$, $p < .001$, over time.

Independent variables. The independent variables of primary interest were responsivity adherence and evidence-based treatment usage.

Individual (level-1) responsivity adherence. Responsivity adherence was first scored as an ordinal scale variable ranging from zero to six at the level of the individual. Scores were assigned based on the intervention a participant received during treatment. The scoring of the *responsivity adherence* measure was based on the types of therapeutic

techniques used in each intervention (e.g., MET/CBT, Seven Challenges) (Appendix D-Table 48). Andrews and Bonta (2010) state that the following six techniques are consistent with cognitive-behavioral and cognitive-social learning models, and therefore, adhere to the responsivity principle: role-playing, modeling, repeated practice of alternative behaviors, cognitive restructuring to modify thoughts/emotions, skills building, and reinforcement. Manuals for each of the interventions were reviewed and scored according to the number of responsivity-adherent techniques present in the intervention structure. Scores ranged from zero (no responsivity-adherent techniques used) to six (all responsivity-adherent techniques used). As shown in Table 5, the majority of interventions included at least one technique (77%), and four interventions included all six techniques. As detailed information was not available, ten interventions (e.g., DYC) could not be scored as adhering or not adhering to the responsivity principle and were classified as, "unspecified." These interventions, therefore, were excluded from the responsivity adherence analysis. Based on the intervention received, each participant received an individual (level-1) score on the responsivity measure, which was group mean centered for the AOP analyses. For example, as shown in Table 5, participants who had the ACRA/ACC intervention received a score of five.

Table 5

Responsivity Scores for Treatment Interventions

Intervention	**Responsivity Score**
Adolescent Community Reinforcement Approach /Assertive Continuing Care (ACRA/ACC)	5
Brief Strategic Family Therapy (BSFT)	4
Chester Health System's Treatment Manual (CBTM)	4

Intervention	Responsivity Score
Cognitive Restructuring (CR)	1
Dialectical Behavioral Therapy (DBT)	6
Family Support Network (FSN)	6
Functional Family Therapy (FFT)	3
Motivational Enhancement Therapy/Cognitive Behavioral Therapy (MET/CBT)	6
Other Cognitive Behavioral Therapy (CBT)	6
Other Motivational Interviewing (MI)	0
Other Psychoeducational Therapy	0
Seven Challenges (7C)	1
Other Twelve Step Approaches	0
Unspecified Interventions	
Dynamic Youth Community, Inc. Treatment Manual (DYC)	U
Group-Based Outpatient Treatment for Adolescent Substance Abuse	U
Multidimensional Family Therapy (MDFT)	U
Multisystemic Therapy (MST)	U
Other Case Management	U
Other Family Therapy	U
Other Group Therapy	U
Other Individual Therapy	U
Other Student Assistance Programs/School-based programs	U
Other Treatment	U

Note. AOP = adolescent outpatient; JDTC = juvenile drug treatment court.

Program (level-2) responsivity adherence. Individual-level responsivity adherence scores were aggregated within each program to develop the program-level (level-2) measure of responsivity adherence. As shown in Table 6, analyses showed there was little variation in program-level responsivity adherence. The largest percentage of programs provided interventions with an average of five responsivity-adherent techniques (48.5%), and seven programs (5.3%) were scored as "unspecified." The slope of individual-level responsivity adherence, therefore, was held constant in the AOP models and the program-level variable was not centered in the analyses.

Table 6

Responsivity Adherence for AOP Programs

Responsivity Adherence	**Programs (N=132)**
0	0
1.00 - 4.96	9
5.00	64
5.01 -5.73	5
6.00	47
Unspecified	7

Note. AOP = adolescent outpatient. Unspecified AOP programs were not included in the analysis.

Individual (level-1) evidence-based treatment use. The variable reflecting evidence-based treatment use was based on SAMHSA's National Registry of Evidence-Based Programs and Practices (NREPP, 2013) scoring. This classification was used in the current research because it is on an interval scale, which increases statistical power

and provides a clearer base of comparison between interventions. This system was preferred over other systems, such as the Blueprints for Healthy Youth Development (2014), which classifies programs as either "promising" versus "model," or CrimeSolutions.gov (Office of Justice Programs, 2014), which classifies interventions as "effective," "promising," versus "not effective." Other repositories list recommended interventions without systematically scoring them for effectiveness. For example, the National Council of Juvenile and Family Court Judges developed the Adolescent-Based Treatment Database, which includes a list of recommended interventions for JDTCs. The National Institute on Drug Abuse (2012) also provides a list of recommended substance abuse treatment interventions for both adults and juveniles. The majority of interventions included in the data set (see Table 8) had been previously examined and rated by trained NREPP reviewers. For this research, the *Quality of Research* rating was used for each intervention, which classifies studies based on the integrity of the research methods used to evaluate the intervention.

NREPP reviewers are selected based on their qualifications and trained in the use of the NREPP Quality of Research scoring method. Minimum requirements state that potential reviewers must have a doctoral degree and "a strong background and understanding of current methods of evaluating prevention and treatment interventions," (NREPP, 2014b). Once reviewers are selected, they participate in a two-part webinar (NREPP, 2014b). Training includes a mock review, and the raters are mentored by *Quality of Research* staff (NREPP, personal communication, January 15, 2014).

Interventions are assigned to an NREPP reviewer according to his or her qualifications, experience, and knowledge of topics relevant to the study. Two reviewers

are selected for each intervention, and each conducts an independent evaluation of the study reporting on its effectiveness. A Review Coordinator (RC) then compares their ratings. When there are discrepancies between reviewers on their ratings, the RC arranges a discussion between them to facilitate a consensus rating.

The quality of research rating takes into consideration the reliability of the measures used, the validity of the measures, treatment fidelity, missing data/attrition, confounding variables, and the appropriateness of the data analyses. The final rating for each technique is an average of the reviewers' individual scores, and the overall rating for each outcome is an average across the studies that examined each particular outcome (NREPP, 2014a). Each criterion is rated on a scale ranging from zero to four, with four as the highest score. The final ratings are posted to the NREPP website (NREPP, 2014b). More information regarding NREPP rating procedures appears in Appendix E.

The majority of treatment interventions included in the GAIN dataset used for this research were previously rated separately for effectiveness for substance use and recidivism outcomes by NREPP reviewers (see the NREPP website). For the current study, scores for substance abuse and recidivism were averaged into a single rating. Interventions previously rated by NREPP reviewers included 7C, ACRA, BSFT, CBTM, DBT, FSN, MDFT, MI, and MST. MET/CBT was included as a component (but not separate) in studies rated by NREPP; therefore, this intervention's rating is based on studies that also involved other interventions. ACC was designed for use with ACRA; and the unique contribution of ACC could not be determined because effectiveness studies examining ACC combined it with ACRA. Therefore, these interventions were combined in the analyses and the NREPP rating for ACRA was used. Finally, though

NREPP reviewers previously rated MI, the studies they reviewed did not include adolescent samples. MI studies that included adolescent samples, therefore, were rated for this research by the investigator.

"Summon," the Temple University Libraries' search engine, was used to locate studies for the remaining interventions that had not already been used by NREPP reviewers. Searches were limited to articles from scholarly, peer-reviewed publications. NREPP's submission techniques were used in the final selection of studies for review (see Table 7). Studies for FFT, MI, and CBT using adolescent samples were identified and scored. However, studies that met the NREPP submission criteria were not located for CR and DYC, and these interventions received a zero on the EBT scale, because no evidence existed for these.

Table 7

NREPP Treatment Intervention Eligibility Criteria

To be eligible for NREPP review, an intervention must meet the following minimum requirements:

1. The intervention has produced one or more positive behavioral outcomes ($p \leq .05$) in mental health or substance abuse among individuals, communities, or populations. Significant differences between groups over time must be demonstrated for each outcome.

2. Evidence of the positive behavioral outcome(s) has been demonstrated in at least one study using an experimental or quasi-experimental design. Experimental designs include random assignment of participants, a control or comparison group in addition to the intervention group, and pre- and posttest assessments. Quasi-experimental designs include a control or comparison group and pre- and posttest assessments but do not use random assignment. Studies with single-group, pretest/posttest designs do not meet this requirement.

Table 7 (*Continued*)

3. The results of these studies have been published in a peer-reviewed journal or other professional publication (e.g., a book volume) or documented in a comprehensive evaluation report. Comprehensive evaluation reports must include the following sections or their equivalent: a review of the literature, theoretical framework, purpose, methodology, findings/results (with statistical analysis and *p* values for significant outcomes), discussion, and conclusions. Information must be included to enable rating of the six Quality of Research techniques. 4. Implementation materials, training and support resources, and quality assurance procedures have been developed and are ready for use by the public.

Note. Adapted from National Registry of Evidence-Based Programs and Practices. (2014b). SAMHSA's National Registry of Evidence-Based Programs and Practices.

To learn how to rate the interventions, a representative from NREPP provided the reviewer training materials to the investigator. To ensure the ratings for this research were conducted in a manner consistent to their guidelines, seven randomly selected studies for interventions rated by NREPP reviewers were examined and scored by the investigator. A list of the studies scored by the investigator and NREPP reviewers is included in Appendix F. Consistency between the investigator's ratings and NREPP's ratings was assessed using an intraclass correlation in SPSS 22 (IBM Corporation, 2013). The intraclass correlation obtained was 0.762. Once consistency was established, the investigator then rated the studies for CBT, FFT, and MI studies (see Appendix G).[7] Table 8 shows the final rating for each intervention supplied either by NREPP or through the investigator's ratings of those not reviewed by NREPP.

[7] EBT analyses were also run with the interventions that received a 0 excluded. These results can be found in APPENDIX J

Table 8

NREPP Classification for Interventions

Intervention	EBT Rating[a]
Adolescent Community Reinforcement Approach/Assertive Continuing Care	3.30
Brief Strategic Family Therapy	3.00
Chester-Bloomington Treatment Manual	3.70
Cognitive Restructuring	0.00
Dialectical Behavioral Therapy	3.30
Dynamic Youth Community, Inc. Treatment Manual	0.00
Dynamic Youth Community, Inc. Treatment Manual	0.00
Family Support Network	3.70
Functional Family Therapy	3.42[b]
Group-Based Outpatient Treatment for Adolescent Substance Abuse	0.00
Motivational Enhancement Therapy/Cognitive Behavioral Therapy	3.60
Multidimensional Family Therapy	3.43
Multisystemic Treatment	3.03
Other Case Management	0.00
Other Cognitive Behavioral Therapy	3.75[b]

Table 8 (*Continued*)

Intervention	EBT Rating[a]
Other Family Therapy	0.00
Other Group Therapy	0.00
Other Individual Therapy	0.00
Other Motivational Interviewing	2.75[b]
Other Psychoeducational Therapy	0.00
Seven Challenges	2.80
Other Student Assistance Programs/School-based programs	0.00
Other Treatment	0.00
Other Twelve Step Approaches	0.00

Note. EBT = evidence-based treatment. [a]A rating of zero indicates that there was no rating on the NREPP website or no studies available for review that met the eligibility techniques. [b]EBT rating was not included on the NREPP website and the rating was conducted by the investigator for the purpose of this research.

Program (level-2) evidence-based treatment use. This variable was the individual-level EBT use score aggregated within programs. Similar to the level 2 responsivity variable, little variation among AOP programs in EBT use was observed (see Table 9). Therefore, the slope of the individual-level evidence-based treatment variable was held constant in the analyses, and the program-level variable was not centered

Table 9

Frequency of EBT Score across AOP Programs

Average EBT Score	Programs (N = 132)
0.00 - 0.88	3
1.31 - 1.93	6
3.08 - 3.29	5
3.30	64
3.31 - 3.57	6
3.60	40
3.66 - 3.70	4

Note. EBT = evidence-based treatment.

Control variables. The following demographic variables were included as statistical control variables, including age, race, gender, arrest history, education, criminality among peers, first use of a substance before the age of 15, living in a single parent home, and illegal activity in the home. All were assessed at baseline and treated as individual-level (level-1) predictors.

All controls were selected based on the literature review that showed they often were found to be related to recidivism and substance use. Age was measured as a categorical variable (<11 years of age = 0, 11-12 years of age = 1, 13-14 years of age = 2, 15-16 years of age = 3, 17-18 years of age = 4). Three nominal variables were used in the current study to capture race/ethnicity: Hispanic (= 1, other = 0), African American (= 1, other = 0), and Caucasian (= 1, other = 0). Gender (0 = female, 1 = male) was measured on a categorical scale. Self-reported arrest history was a categorical variable,

where 1 = lifetime history of 5 or more arrests and 0 = fewer than 5 arrests. Educational status reflected whether participants were in school during the previous 90 days (1 = not attending school, 0 = attending school). Illegal activity in their home (0 = no illegal activity in the home, 1 = illegal activity in the home) and whether the participant was living in a single-parent home (0 = not living in a single parent home, 1 = living in a single parent home) were also included in the analyses. Age of first substance use was coded as 0 (first use occurred at the age of 15 or older) or 1 (first use occurred under the age of 15). Finally, criminality among peers (0 = no criminality among peers, 1 = criminality among peers) was treated as a categorical variable. Criminality among peers was a composite of the following questions: 1) "Of the people you have regularly worked or gone to school with, would you say that none, a few, some, most or all of them were involved in illegal activity?" 2) "Of the people you have regularly socialized with, would you say that none, a few, some, most or all of them were involved in illegal activity?"

To control for criminogenic risk, the crime-violence scale (Conrad, Conrad, Dennis, Riley, & Funk, 2011) − which was administered as a part of the GAIN instrument − was used. This scale has been shown to be predictive of recidivism (White, 2005; White, Funk, White, & Dennis, 2003). It is the sum of the number of volatile behaviors an individual used when responding to conflict and criminal activity in the previous year (Conrad, Riley, Conrad, Chan, & Dennis, 2010), and had a Cronbach's alpha level of 0.90 (Cronbach, 1951). White and colleagues (2003) collapsed this scale into a categorical measure of risk, in which a score of 0 through 2 = Low-risk, a score of 3 through 6 = Medium-risk, and a score of 7 through 31 = High-risk. This categorical

variable was used in the analyses to operationalize criminogenic risk as used in previous studies conducted by Andrews and colleagues (2010).

Analytic Plan

Missing data. Listwise deletion was used to address missing data. An analysis of missing data revealed that less than 5% of cases were missing for the majority of variables used in the analyses. However, 30% of AOP cases and 25% of JDTC cases were missing on the arrest outcome. A comparison between those who reported rearrests during the follow-ups and those who were missing (among the AOP and JDTC samples) revealed that those who reported rearrest and those who did not report rearrest were relatively similar (see Appendix H).

Additionally, participants who received "unspecified treatment" were excluded from the responsivity adherence analyses. This resulted in a loss of 795 AOP participants (9.78%) and 104 JDTC participants (8.9%).

Regression assumptions. The regression assumptions were examined prior to final analyses. To examine multicollinearity in the multilevel AOP models, correlations were used. Additionally, the individual-level responsivity adherence and EBT use variables were group-mean centered. Subsequent analyses using HLM did not indicate that there was multicollinearity in the models. To examine multicollinearity in the JDTC models, the variance inflation factor and tolerance were used. These indicated that there was no multicollinearity in the models. Additionally, normality in the variables were examined, and variables displaying skew or kurtosis were corrected using transformations. Heteroskedasticisty was found in the AOP and JDTC substance use severity models. Heterogeneous models were examined in HLM, and were compared to

the homogeneous models using chi-square. The preferred model was then reported. Bootstrapping was used in the JDTC models to correct for heterogeneity.

Univariate analyses. Frequencies and measures of central tendency were calculated to evaluate normality of independent and dependent variables at both level-1 and level-2. As previously mentioned, significant skew in the average substance use severity score was addressed using a square root transformation for each follow-up interview, prior to creating the average score, reflecting the full six months following baseline. Additionally, the responsivity adherence and EBTs variables were skewed for both samples. The skew in these variables are addressed in the limitations section of the final chapter of this research.

Bivariate analyses. Preliminary examination of relationships included crosstabulations and chi-square, one-way ANOVA, and t-tests, as appropriate. Specific relationships were examined between responsivity adherence, EBT usage, control variables, and outcomes. Correlations were also included to examine the association between control variables prior to their inclusion in the models.

Multilevel modeling. Individual- and program-level responsivity adherence and EBT usage were tested in the AOP sample using Hierarchical Linear Modeling 7 (Raudenbush & Bryk, 2002). As rearrest was a dichotomous variable, EM Laplace estimation was used, which provided a deviance statistic for each model. These deviance statistics were used in the model comparisons. Raudenbush, Yang, and Yosef (2000) reported that the EM Laplace estimation technique provides accurate estimates for two-level Bernoulli models.

Furthermore, each measure of substance use severity was subjected to a test for homogeneity of variance to ensure that the regression model assumption was not violated. HLM uses a chi-square test to examine whether there is heterogeneity in the model at the individual-level. This analysis indicated that the assumption was violated in each model. Heterogeneous models[8] were also analyzed using responsivity and EBT use to predict the heterogeneity in their respective models. These models were compared to the homogenous models using deviance statistics and a chi-square test. A significant chi-square test indicated that there was a difference between the models. The model with the lower deviance statistic was preferred, and the results of the preferred model are reported.

AOP model building. AOP participants were examined at level-1 (N = 8,140) and AOP programs were examined at level-2 (N = 132). Due to the strong correlation between responsivity and EBT variables, $r(10803)=0.813$, $p < .001$, responsivity and EBT models were analyzed separately. The models predicted each outcome (rearrests and substance use severity) separately ($r(5734)=0.130$, $p < .001$) (see Table 10 and Table 11). To avoid an inflated Type 1 error, an alpha level of .01 was used to examine statistical significance.

AOP Responsivity Model A. First, null models (without independent variables) were analyzed to examine the variance in rearrests and average substance use severity among AOP programs. Variance remained to be explained in both predictors, as expected, and model building began.

[8] Heterogeneous models could not be analyzed with groups comprised of fewer than 10 cases. As such, 2 programs (n=8) were dropped from the substance use severity analyses.

AOP Responsivity Model B. The control variables were added to the first level of the models to predict each outcome. Because variance in both outcomes remained to be explained, model building continued.

AOP Responsivity Model C. To address Hypotheses 1a and 1b, "*AOP participants who received interventions with a higher number of responsivity-adherent techniques will have better outcomes during the six month period following program entry than participants who received interventions with fewer responsivity-adherent techniques, even after controlling for participant characteristics*," responsivity adherence was added to the models as a group-mean centered variable at the individual-level. Thus, the models included the control variables and responsivity adherence to predict each outcome. The slope for responsivity adherence was held constant.

AOP Responsivity Model D. As variance remained to be explained, model building continued by adding the level-2 variable. To address Hypotheses 1c, and 1d, "*AOP participants in programs with higher average responsivity-adherent scores will have better outcomes than participants who were in programs with lower average responsivity-adherent scores*," responsivity adherence was added to the second level of the models as an uncentered variable. The first level included the control variables and the group-mean centered responsivity adherence variable predicting each outcome. The slope for responsivity adherence held constant.

Table 10

AOP Responsivity Adherence Model Building

	AOP Model B	AOP Model C	AOP Model D
Level-1			
Sociodemographic Factors	X	X	X
Responsivity Adherence	--	X	X
Level-2			
Responsivity Adherence	--	--	X

Note. AOP = adolescent outpatient program; X = Included in the model; -- = Not included in the model.

AOP EBT Model A. A null model was analyzed for each outcome, rearrests and substance use severity, to test whether they varied significantly between the AOP programs. Because significant variance remained to be explained in each outcome, as expected, model building began.

AOP EBT Model B. The control variables were added to the first level of each model. Because variance remained to be explained in each outcome among AOP programs, model building continued.

AOP EBT Model C. To address Hypotheses 2a and 2b, "*AOP participants who received interventions with higher EBT use scores in the six month period following program entry will have better outcomes than participants who received interventions with lower EBT use scores, even after controlling for participant characteristics*," the EBT use variable was added to the first level of the models as a group-mean centered variable. Therefore, the models included EBT use and the controls predicting each outcome. The slope for the EBT use was held constant.

AOP EBT Model D. To address Hypotheses 2c and 2d, "*AOP participants in programs with higher average EBT use scores will have better outcomes than participants who were in programs with lower average EBT use scores*," the aggregate EBT use variable was added as a level-2 predictor as an uncentered variable. The independent variables at the individual-level included the control variables and the group-mean centered EBT use variable to predict each outcome. The slope of EBT use was held constant.

Table 11

AOP EBT Model Building

	AOP Model B	**AOP Model C**	**AOP Model D**
Level-1			
Sociodemographic Factors	X	X	X
Evidence-Based Interventions	--	X	X
Level-2			
Evidence-Based Interventions	--	--	X

Note. AOP = adolescent outpatient program; X = Included in the model; -- = Not included in the model.

AOP model fit. The deviance statistic was used to compare model fit between AOP models. A deviance statistic can be a positive or negative number, and while it cannot be directly interpreted, the deviance statistic of one model can be compared with the deviance statistic in another model (Snijders & Bosker, 1999). The model with the lower deviance statistic has a better fit to the data and is the preferred model. If the deviance statistics being compared are negative, the lower negative number is considered

to have the better fit to the data (e.g., a deviance statistic of -100 has better fit than a deviance statistic of -50) (Scientific Software International Incorporate, 2014).

Multivariate regression modeling. Due to the small number of JDTC programs ($N = 10$), JDTC analyses focused only on the individual-level impact of responsivity adherence and EBT use on treatment outcomes among JDTC participants. JDTC models were examined using Stata 13 (StataCorp, 2013). The Levene's Test for Homogeneity revealed that the assumption of homogeneity of variance was violated in the substance use models. Thus, bootstrapping was used to correct for heterogeneity.

JDTC model building. Because responsivity adherence and EBT use were correlated, $r(1067) = 0.796$, $p < .001$, responsivity adherence and EBTs were analyzed in separate models. The dependent variables, rearrest and substance use severity, were also examined separately ($r(872) = 0.427$, $p < .001$) (see Table 12 and Table 13). A series of linear and logistic regressions were used, with an adjusted alpha level of .01 to control for inflated Type I error.

JDTC Responsivity Model A. The model tested whether the control variables predicted the outcome (i.e., recidivism or substance use).

JDTC Responsivity Model B. To address Hypotheses 3a and 3b, "*JDTC participants who received interventions with a higher number of responsivity-adherent techniques will have better outcomes during the six month period following program entry than participants who received interventions with fewer responsivity-adherent techniques, even after controlling for participant characteristics*," responsivity adherence was added to each model. Therefore, these models included the control variables and responsivity adherence to predict each outcome.

Table 12

JDTC Responsivity Model Building

	JDTC Model A	JDTC Model B
Level-1		
Sociodemographic Factors	X	X
Responsivity	--	X

Note. JDTC = juvenile drug treatment court; X = Included in the model; -- = Not included in the model.

JDTC EBT Model A. The model tested whether the control variables predicted the outcome (i.e., recidivism or substance use).

JDTC EBT Model B. To address Hypotheses 4a and 4b, "*JDTC participants who received interventions with higher EBT use scores will have better outcomes in the six month period following program entry than participants who received interventions with lower EBT use scores, even after controlling for participant characteristics*," EBT use was added to the models as an independent variable. This model included the control variables and EBT use to predict each outcome.

Table 13

JDTC EBT Model Building

	JDTC Model A	JDTC Model B
Level-1		
Sociodemographic Factors	X	X
Evidence-Based Interventions	--	X

Note. JDTC = juvenile drug treatment court; X = Included in the model; -- = Not included in the model.

JDTC model fit. The Bayesian Information Criterion (BIC) was used to compare JDTC models for their fit to the data. BIC is a measure of model fit and used to determine the preferred model; and it automatically adjusts for model complexity. A BIC can be either positive or negative. Although the number obtained is not interpretable, the model with the lower BIC is better fitting to the data and the preferred model (Long, 1997; Long, & Freese, 2006; Raftery, 1995). One can determine the degree of difference between models using guidelines provided by Long and Freese (2006). Using the following absolute differences between models, one can determine the strength of the differences between models: 0 to 2 suggests a weak difference; 2 to 6 indicates a positive difference; 6 to10 indicates strong difference; and a difference that is greater than 10 suggests a very strong difference between models.

CHAPTER 5: RESULTS

This research examined two samples, participants in adolescent outpatient programs (AOP) and participants in juvenile drug treatment court (JDTC). As described in the preceding chapter, these samples were examined separately for the impact of general responsivity adherence and evidence-based treatment (EBT) on rearrests and substance use severity. The AOP analyses used multilevel modeling to examine the individual- and program-level effects of responsivity adherence and EBT usage on rearrest and substance use severity. A total of 132 level-2 (program) units were available for analysis, and as shown below in the null models, there was significant variation in both rearrest and substance use severity across AOP programs. Only 10 programs were available for the JDTC analyses, too few for multilevel modeling. Thus, these analyses used multivariate logistic and linear regression, where only individual characteristics were used to predict the outcomes. This chapter describes the results of these analyses, beginning with the AOP sample and then the JDTC sample. It concludes with a summary of the overall findings.

Adolescent Outpatient Programs

Univariate analyses. Analyses began with an examination of normality across each variable. This examination revealed that responsivity adherence and EBT use scores were skewed (see Table 14). Although the responsivity scores could range from zero to six, among the AOPs the responsivity scores ranged from one to six, with a mean of 5.50 (*SD* = 0.692). Similarly, the EBT use scores could range from zero to four, but the AOP EBT use scores ranged from 0 and 3.75, and the mean EBT use score was 3.24 (*SD* = 0.892). The skew in both variables is addressed in the limitations.

Table 14

Descriptive Statistics for Responsivity Adherence and EBT Use among AOP Participants

Variables	N	Min	Max	M	SD	Skew
Responsivity Adherence	7,341	1	6	5.498	0.692	-2.669
EBT Use	8,115	0.00	3.75	3.239	0.892	-3.225

Note. AOP = adolescent outpatient; X = Included in the model; -- = Not included in the model; EBT = evidence-based treatment.

Bivariate Analyses. Preliminary examination of responsivity adherence and EBT use, and rearrests and substance use severity were conducted with Pearson correlation coefficient. Analyses revealed only weak associations between responsivity adherence and EBT use with rearrests and substance use severity.

More specifically, Pearson correlation indicated a weak but statistically significant positive association between responsivity adherence and rearrests, $r(5113) = 0.05$, $p < .001$. Even though the chi-square test was significant, $\chi^2(4, N = 5115) = 39.05$, $p < .001$, there was no discernible pattern among the distribution of rearrests and responsivity adherence techniques (see Table 15). For example, 66.7% of AOP participants who scored three on responsivity were rearrested; whereas, 23.1% of AOP participants who received a one on responsivity were rearrested.

Table 15

Rearrests and Responsivity Adherence for AOP Participants

	Rearrested		
Responsivity Score	**No**	**Yes**	***n***
0	--	--	0
1	76.92%	23.08%	63
2	--	--	0
3	33.33%	66.67%	25
4	72.73%	27.27%	123
5	68.01%	31.99%	2,999
6	74.77%	25.23%	3,967
Average score	5.50	5.42	

Note. AOP = adolescent outpatient. *N* of AOP participants = 5,115. *N* of AOP programs = 127.

The relationship between responsivity adherence and substance use severity was a significant, but weak, negative association, $r(7177) = -.259$, $p < .001$. As shown in Table 16, there was no discernible pattern between responsivity adherence and substance use severity. For example, the lowest average substance use severity score was observed among AOP participants who received responsivity scores of one and four (0.164). The highest observed substance use severity score was among AOP participants who scored a five on responsivity adherence.

Table 16

Substance Use Severity and Responsivity Adherence for AOP Participants

Responsivity Score	Substance Use Severity
0	--
1	0.164
2	--
3	0.326
4	0.164
5	0.352
6	0.169

Note. AOP = adolescent outpatient. *N* of AOP participants = 7,177. *N* of AOP programs = 127.

As shown in Table 17, a weak, negative correlation was found between EBT use and rearrests, $r(5713) = -0.024$, ns, though the association was not statistically significant. Although, there was a significant chi-square, $\chi^2(8, N = 5715) = 117.837$, $p < .001$; but there was no discernible pattern among the distribution of rearrests and EBT use. The highest percentage of individuals who were rearrested received interventions with an EBT use score of 3.42 (66.67%). The lowest percentage of individuals who were rearrested received interventions with an EBT use score of 3.43 (14.93%).

Table 17

Rearrests and EBT Use among AOP Participants

	Rearrested		
EBT use score	**No**	**Yes**	***n***
0.00	69.21%	30.79%	541
2.80	78.43%	21.57%	62
3.03	81.82%	18.18%	30
3.30	68.01%	31.99%	2999
3.42	33.33%	66.67%	25
3.43	85.07%	14.93%	189
3.60	77.55%	22.45%	3391
3.70	58.35%	41.65%	567
3.75	74.26%	25.74%	132
Average score	3.22	3.17	

Note. AOP = adolescent outpatient; EBT = evidence-based treatment. *N* of AOP programs = 127.

Similarly, there was a significant, but weak, negative association between EBTs and substance use severity, $r(7934) = -0.05, p < .001$. As with the responsivity adherence scores, there was no consistent pattern between EBT use and substance use severity score (see Table 18). The highest average substance use severity score was found among those with an EBT use score of 3.43 (0.417), and the lowest score was found among those with an EBT use score of 3.03 (0.103).

Table 18

Substance Use Severity and EBT Use for AOP Participants

EBT Use Score	Substance Use Severity
0.00	0.233
2.80	0.163
3.03	0.103
3.30	0.352
3.42	0.324
3.43	0.417
3.60	0.171
3.70	0.160
3.75	0.152

Note. AOP = adolescent outpatient; EBT = evidence-based treatment. *N* of AOP participants = 7,936. *N* of AOP programs = 127.

Multilevel Modeling. To test the study hypotheses, analysis of the AOP sample was conducted using multilevel modeling in Hierarchical Linear Modeling 7 (Raudenbush & Bryk, 2002). Responsivity adherence and EBT use were examined at both the individual- (level-1) and program- (level-2) level, along with sociodemographic factors (specified at level-1). Analyses followed the order described in Tables 10 and 11. This involved a progression from testing null (or unconditional models) to determine whether outcomes varied among programs, to the examination of specific hypotheses in subsequent models. The first model included only sociodemographics (level-1) as predictors, then either responsivity adherence or EBT use was added as a level-1 predictor, and this culminated in the final model where either responsivity adherence or

EBT use was added as a level-2 predictor. The following sections first review findings for responsivity adherence and then for EBT use.

Responsivity adherence. The first research question addressed responsivity adherence among the AOP sample: "*For youth in the AOP sample, when controlling for participant characteristics known to be empirically associated with recidivism (e.g., criminogenic needs), is adherence to the responsivity principle at the individual- and program-level related to recidivism or substance use severity during the six month period following AOP program entry?*" As preliminary analyses showed there was little variation across programs in responsivity adherence (see Table 6), its slope was held constant during the multilevel analyses. Overall, neither individual- nor program-level responsivity adherence was significantly associated with the odds of being rearrested.

Rearrests. Two hypotheses (1a and 1c) proposed there would be a significant association between responsivity adherence and rearrests. The first hypothesis (1a) stated, "*The odds of rearrest will be lower among AOP participants who received interventions with a higher number of responsivity-adherent techniques during the six month period following program entry than participants who received interventions with fewer responsivity-adherent techniques, even after controlling for participant characteristics.*" This hypothesis was addressed in Model C in Appendix I- Table 54. As shown below, the results from the analyses did not support this hypothesis, as responsivity adherence was not significantly associated with rearrests.

The second of these hypotheses (1c) stated, "*The odds of rearrest will be lower among AOP participants in programs with higher average responsivity-adherent scores than participants who were in programs with lower average responsivity-adherent*

scores." This hypothesis was addressed by Model D in Table 20, and the results of the analyses did not support it. Neither individual- nor program-level responsivity adherence were significantly associated with rearrests.

As shown in Table 19, findings from Model A, the null model, confirmed that there was significant variation in rearrests among the AOP programs ($p < .001$). Therefore, model building began by adding sociodemographic factors as individual-level predictors of rearrests (Model B). The inclusion of these variables reduced the variance among AOP programs, indicating that they helped to account for some variation in rearrests among AOP programs. Significant variation remained ($p < .001$), and model building continued with the addition of responsivity adherence as a level-1 predictor (Model C). The inclusion of responsivity adherence increased the amount of explained variation in rearrests among AOP programs. However, findings of this model showed there was not a statistically significant association between level-1 responsivity adherence and rearrest. As significant variation in rearrests remained to be explained ($p < .001$), program-level responsivity adherence was added to the final model (Model D, see also Table 20). With this addition, the variation among AOP programs decreased below that of Model B and Model C, but significant variation remained between AOP programs in this outcome measure ($p < .001$). It appeared that the combination of sociodemographic factors and program-level responsivity-adherence accounted for more variation in rearrests among AOP programs than sociodemographic factors alone and the combination of sociodemographic factors and individual-level responsivity adherence.

Table 19

Summary of Model Fit for HLM Models Predicting Rearrests among Participants in Adolescent Outpatient Programs

Models[a]	Variance	χ^2	df	*p*
Model A	0.4991	677.8676	125	$p < .001$
Model B	0.3938	541.6656	125	$p < .001$
Model C	0.3959	543.3423	125	$p < .001$
Model D	0.3928	543.7024	124	$p < .001$

Note. N of AOP participants = 4,699. *N* of AOP programs = 126.

[a] Model contents are described in Table 10.

For brevity, the findings for each model are described below, but only Model D is presented in its entirety (see Table 20). The tables for Models B and C are in Appendix I. After verifying that there was significant variance to be explained for rearrests during the six month period following treatment entry (Model A), control variables were added to the model at the individual-level (Model B). The control variables were uncentered, and the results indicated that gender (OR = 1.388, CI = 1.114-1.729), risk level (OR = 1.378, CI = 1.258-1.510), and arrest history (OR = 1.537, CI = 1.237-2.910) were significantly associated with rearrests during the first six months of treatment (see Appendix I-Table 53). Specifically, the odds of rearrest were 38.8% greater for males than females, and an increase in risk level was associated with a 37.8% increase in the odds of rearrest. Additionally, reporting five or more previous arrests was associated with a 53.7% increase in the odds of rearrest.

Responsivity adherence was added to the model at the individual-level as a group-mean centered variable (Model C). The results showed the same pattern among the

control variables: gender (OR = 1.395, CI = 1.114-1.746), risk level (OR = 1.378, CI = 1.257-1.510), and arrest history (OR = 1.529, CI = 1.227-2.904) were significantly associated with rearrests during the first six months of treatment (see Appendix I-Table 54). However, individual-level responsivity adherence was not significantly associated with rearrests.

Responsivity adherence was added to the model as an uncentered level-2 variable (Model D). The pattern among the control variables remained similar to the previous models: gender (OR = 1.393, CI = 1.093-1.775), risk level (OR = 1.377, CI = 1.253-1.514), and arrest history (OR = 1.528, CI = 1.226-2.903) were significantly associated with rearrests during the first six months of treatment (see Table 20). As in the previous model, individual-level responsivity adherence was not significantly associated with rearrests. Likewise, program-level responsivity adherence was not significantly associated with rearrests.

Table 20

Factors Predicting Rearrests (Responsivity Model D)

	B	**SE**	**Odds Ratio**	***p***
Level-1				
Intercept	-1.405	0.926	0.245	ns
Gender	0.332	0.124	1.393	$p < .01$
Age	-0.124	0.064	0.884	ns
Illegal activity in the home	-0.049	0.104	0.952	ns
School	0.127	0.138	1.135	ns

Table 20 *(Continued)*

	B	SE	Odds Ratio	*p*
Race/Ethnicity				
African American	0.287	0.141	1.332	ns
Caucasian	0.058	0.145	1.060	ns
Hispanic	0.126	0.135	1.134	ns
Illegal activity among peers	0.105	0.112	1.111	ns
Arrest History	0.424	0.112	1.528	$p < .001$
Risk Level	0.320	0.048	1.378	$p < .001$
Single parent home	0.120	0.086	1.128	ns
First use of a substance before the age of 15	0.176	0.133	1.192	ns
Responsivity	-0.295	0.187	0.744	ns
Level-2				
Responsivity	-0.076	0.149	0.927	ns

Note. N of adolescent outpatient participants = 4,699. *N* of adolescent outpatient programs = 125. Deviance statistic = 13681.701. Number of parameters = 16. Variance component = 0.3928.

The comparison between models indicated that Model D was the best fitting (or preferred) model – with a deviance statistic of 13681.701 (see Table 21). Model C was the next best fitting model, which had a deviance statistic of 13682.207. Models C and D were compared using a chi-square test, and there was no significant difference between the models. This suggested that both models were comparable in their fit to the data. However, there was a statistically significant difference between both Models B and C, and Models B (13687.890) and Model D, suggesting that there was a significant

improvement in the model fit when responsivity adherence was included at the individual- and/or program-level.

Table 21

AOP Responsivity Model Comparison Predicting Rearrests

Model Comparison		χ^2	***p***
Model B Deviance: 13687.890	Model C Deviance: 13682.207	5.682	$p < .05$
Model B Deviance: 13687.890	Model D Deviance: 13681.701	6.189	$p < .05$
Model C Deviance: 13682.207	Model D Deviance: 13681.701	0.506	ns

Note. AOP = adolescent outpatient. N of AOP participants = 4,699. N of AOP programs = 126.

Substance use severity. As with rearrests, two hypotheses (1b and 1d) stated that there would be an association between responsivity adherence and substance use severity. The first hypothesis (1b) stated, "*AOP participants who received interventions with a higher number of responsivity-adherent techniques will have a lower average substance use frequency score during the six month period following program entry than participants who received interventions with fewer responsivity-adherent techniques, even after controlling for participant characteristics*." This hypothesis was analyzed using Model C (see Appendix I-Table 55), and was not supported by the analyses, as responsivity adherence was not significantly associated with substance use severity score.

The second of these hypotheses (1d) stated, "*Substance use severity will be lower among AOP participants in programs with higher average responsivity-adherent scores than participants who were in programs with lower average responsivity-adherent*

scores." This hypothesis was examined using Model D, and was not supported by the analyses (see Table 23). Neither individual- level nor program-level responsivity were significantly associated with substance use severity score.

These analyses began with an examination of the variance in substance use severity score among AOP programs (Model A) and a test of homogeneity of variance at level-1 (see Table 22 for a summary of variance across models). This test indicated that there was heterogeneity in the model. Accordingly, a heterogeneous model was analyzed with responsivity adherence predicting level-1 variance. Using a chi-square test, the heterogeneous model was compared to the homogeneous model and there was a significant difference between the models, with the heterogeneous model being preferred. The heterogeneous null model showed significant variation among AOP programs in substance use severity score ($p < .001$).

Table 22

Accounting for Variation in Substance Use Severity Score among AOP Programs for the Responsivity Models

Models[a]	**Variance**	χ^2	**df**	***p***
Model A	0.0313	6285.8980	125	$p < .001$
Model B	0.0303	6383..8880	125	$p < .001$
Model C	0.0303	6229.3816	125	$p < .001$
Model D	0.0260	5159.2074	124	$p < .001$

Note. AOP = adolescent outpatient. *N* of participants = 4,699. *N* of AOP programs = 125.
[a] Model contents are described in Table 10.

Model building began with the introduction of uncentered control variables at the individual-level (Model B). The test for homogeneity of variance indicated that there was heterogeneity in the model ($p < .001$), and a heterogeneous model was examined with responsivity adherence predicting level-1 variance. The comparison between the homogeneous and heterogeneous models showed that there was a significant difference between the models ($p < .05$), and the heterogeneous model was preferred. Thus, the heterogeneous model was examined (see Appendix I-Table 55), and the variance in substance use severity score decreased. While these sociodemographic factors did account for some variance in substance use severity score, significant variation remained among AOP programs.

Individual-level responsivity adherence was centered around the group mean and included in the analyses (Model C). As in the previous model, the results of the homogeneity test of level-1 variance revealed heterogeneity in the model. Model C was analyzed with responsivity adherence predicting level-1 variance, and the heterogeneous model was compared to the homogeneous model using the chi-square test. This comparison showed that there was a significant difference between the models, and the heterogeneous model was preferred. The heterogeneous model was examined (see Appendix I-Table 56) and the variance in substance use severity score remained unchanged among AOP programs. Therefore, significant variation remained among programs ($p < .001$).

Model building continued with the inclusion of the aggregate, uncentered responsivity adherence variable at level-2 (Model D). The test for homogeneity of variance at level-1 revealed heterogeneity, and this model was analyzed allowing for

responsivity adherence to predict heterogeneity. The heterogeneous model was compared to the homogeneous model, and the chi-square test showed a significant difference between the models. As the heterogeneous model was preferred, the results of this model are reported (see Table 23). These results indicated a larger reduction in the variance in substance use severity score among AOP programs, which suggested that program-level responsivity adherence contributed to variance in substance use severity score among AOP programs. Overall, it appeared that sociodemographic factors, and individual- and program-level responsivity adherence contributed to the variance in AOP programs. Program-level responsivity adherence provided a larger contribution to the variance in substance use severity scores, though these combined factors did not fully account for the variation in substance use severity scores among AOPs, and significant variation remained to be explained.

For simplicity, findings for Models B and C are described below and their tables can be found in Appendix I. Only Model D is presented in its entirety (see Table 23). Model building began with an examination of the association between uncentered sociodemographic variables at the individual-level (Model B) and substance use severity score, with responsivity adherence predicting level-1 variance. The results of the heterogeneous model showed that gender (b = 0.017, $p < .001$), age (b = 0.015, $p < .001$), risk level (b = 0.021, $p < .001$), living in a single-parent household (b = 0.014, $p < .001$), illegal activity among peers (b = 0.029, $p < .001$), and first use of a substance before the age of 15 (b = 0.027, $p < .001$) were significantly associated with substance use severity score during the first six months of treatment (see Appendix I-Table 55). Specifically, males were associated with a 0.017 higher substance use severity score, and older

participants were associated with a 0.015 higher substance use severity score. Living in a single parent home was associated with a 0.014 higher substance use severity score. Illegal activity among peers was associated with a 0.029 higher severity score, and an increase in risk level was associated with a 0.021 increase in substance use severity score. Likewise, participants whose first use of a substance occurred before the age of 15 were associated with a 0.027 higher substance use severity score.

Model building continued with the addition of responsivity adherence, as group-mean centered variable, at the individual-level (Model C). The results of the heterogeneous model showed the same pattern among the control variables as in the previous model: gender (b = 0.018, $p < .001$), age (b = 0.015, $p < .001$), risk level (b = 0.022, $p < .001$), living in a single-parent household (b = 0.014, $p < .01$), illegal activity among peers (b = 0.029, $p < .001$), and first use of a substance before the age of 15 (b = 0.029, $p < .001$) were significantly associated with substance use severity score during the first six months of treatment (see Appendix I-Table 56). Individual-level responsivity adherence was not significantly associated with substance use severity score.

The aggregate responsivity adherence scale was added to level-2 (Model D). The results of the heterogeneous model showed the same pattern among the control variables: gender (b = 0.018, $p < .001$), age (b = 0.015, $p < .001$), risk level (b = 0.022, $p < .001$), living in a single-parent household (b = 0.014, $p < .01$), illegal activity among peers (b = 0.029, $p < .001$), and first use of a substance before the age of 15 (b = 0.029, $p < .001$) were significantly associated with substance use severity score during the first six months of treatment (see Table 23). Neither individual-level nor program-level responsivity were significantly associated with substance use severity score.

Table 23

Factors Predicting Substance Use Severity Score (Responsivity Model D)

	B	SE	*p*
Level-1			
Intercept	0.680	0.263	ns*
Gender	0.018	0.005	$p < .001$
Age	0.015	0.004	$p < .001$
Illegal activity in the home	0.013	0.006	ns
School	0.009	0.008	ns
Race/Ethnicity			
African American	-0.004	0.010	ns
Caucasian	0.000**	0.006	ns
Hispanic	-0.005	0.009	ns
Illegal activity among peers	0.029	0.005	$p < .001$
Arrest History	0.012	0.008	ns
Risk Level	0.022	0.003	$p < .001$
Single parent home	0.014	0.005	$p < .01$
First use of a substance before the age of 15	0.029	0.006	$p < .001$
Responsivity	-0.009	0.007	ns
Level-2			
Responsivity	-0.094	0.048	ns

Note. N of participants = 4,699. N of AOP programs = 126. Variance component = 0.0260. Deviance statistic = -4353.341. Number of estimated parameters = 18.

[a] Coefficient does not round to three decimal places.

*$p < .05$.

As noted in Table 24, the lowest deviance statistic was found among the heterogeneous control model (-4368.413), which suggested that it had the best model fit to the data. The chi-square test revealed that the control model was significantly better fitting than both Model C (-4334.884) and Model D (-4353.341). This suggested that including responsivity adherence did not improve model fit.

Table 24

AOP Responsivity Model Comparison Predicting Substance Use Severity Score

Model Comparison		χ^2	***p***
Model B Deviance: -4368.413	Model C Deviance: -4334.884	33.529	$p < .001$
Model B Deviance: -4368.413	Model D Deviance: -4353.341	15.072	$p < .001$
Model C Deviance: -4334.884	Model D Deviance: -4353.341	18.457	$p < .001$

Note. N of participants = 4,699. N of AOP programs = 127.

Evidence-based treatment. The second research question asked, "*For youth in the AOP sample, when controlling for participant characteristics known to be empirically associated with recidivism (e.g., criminogenic needs), are evidence-based interventions at the individual- and program-level related to recidivism or substance use severity during the six month period following AOP program entry?*" Preliminary analyses revealed that there was little variation in EBT use among AOP programs (see Table 9). Consequently, the slope of the EBT scale was held constant in the analyses. As shown below, EBTs at the individual-level were significantly associated with rearrests; and EBTs at the program-level were not significantly associated with the odds of being

rearrested. Likewise, neither individual- not program-level EBTs were significantly associated with substance use severity score.

*Rearrests***.** Two hypotheses (2a and 2c) proposed that there would be a significant association between EBT usage and rearrests. The first hypothesis (2a) stated, "*The odds of rearrest will be lower among AOP participants who received interventions with higher EBT scores in the six month period following program entry than participants who received interventions with lower EBT scores, even after controlling for participant characteristics*." This hypothesis was analyzed using Model C (see Appendix I-Table 57), and was partially supported by the findings. The results indicated that individual-level EBT use score, but not program-level EBT use score, was significantly associated with rearrests.

The second hypothesis (2c) stated, "*The odds of rearrest will be lower among AOP participants in programs with higher average EBT scores than participants who were in programs with lower average EBT scores*." This hypothesis was examined by Model D (see Table 26), and was not supported by the results. The provision of EBTs at the program-level was not significantly associated with rearrests, though the association between individual-level EBTs and rearrests remained statistically significant.

To analyze the association between EBTs and rearrests among AOP participants, model building began with an examination of the variance in rearrests among AOP programs (Model A; see Table 25 for a summary of variation across models). Due to the significant variation that remained to be explained ($p < .001$), model building began with the addition of uncentered sociodemographic variables at the individual-level (Model B). The results showed a decrease in the variance in rearrests, but significant variation

remained to be explained ($p < .001$). Accordingly, model building continued with the inclusion of EBTs at the individual-level as a group-centered variable (Model C). This resulted in an increase in the variation among AOP programs, and significant variation remained to be explained ($p < .001$). Subsequently, an aggregate EBT variable was included at the program-level (Model D), and the variation reduced below the observed variation in Model C, though it remained above the variation noted in Model B. Significant variation remained to be explained ($p < .001$), which suggested that while sociodemographic factors and certain types of treatment interventions did account for some of the variation in rearrests among AOP programs, they did not fully account for it. Other factors may have contributed to the variance in rearrests among AOP programs.

Table 25

Accounting for Variation in Rearrests among AOP Programs for the EBT Models

Models[a]	**Variance**	χ^2	**df**	***p***
Model A	0.4873	696.3836	128	$p < .001$
Model B	0.3822	555.6479	128	$p < .001$
Model C	0.3833	556.7956	128	$p < .001$
Model D	0.3832	558.8627	127	$p < .001$

Note. AOP = adolescent outpatient; EBT = evidence-based treatment. *N* of participants = 5,233. *N* of AOP programs = 129.

[a] Model contents are described in Table 11.

For simplicity, Model B and C are described below and their tables are included in Appendix I. Model D is described in its entirety below (see Table 26). As significant variation in rearrests remained to be explained among AOP programs in the null model (Model A), uncentered control variables were added at the individual-level (Model B).

The results showed a similar pattern among the sociodemographic factors as the control model is the responsivity analyses (see Appendix I-Table 53). Therefore, EBT usage was group-mean centered and included at the individual-level (Model C). The results demonstrated a similar pattern amongst the control variables as in Model B: gender (OR = 1.480, CI = 1.225-1.787), arrest history (OR = 1.550, CI = 1.270-1.892), and risk level (OR = 1.339, CI = 1. 229-1.457) were significantly associated with rearrests (see Appendix I-Table 57). Furthermore, evidence-based treatment (OR = 0.857, CI = 0.775-0.949) was significantly associated with rearrests. The odds of rearrest will be 14% lower for individuals who received a higher EBT use score than the average EBT use score in their program.

Finally, EBT usage was added to the model as an uncentered level-2 variable (Model D). The results showed gender (OR = 1.579, CI = 1.222-1.791), arrest history (OR = 1.550, CI = 1.267-1.895), risk level (OR = 1.338, CI = 1.227-1.459), and individual-level EBTs (OR = 0.858, CI = 0.767-0.960) continued to be significantly associated with rearrests (see Table 26); though, there was no association between program-level EBT use and rearrests.

Table 26

Factors Predicting Rearrests (AOP EBT Rearrest Model D)

	B	SE	Odds Ratio	*p*
Level-1				
Intercept	-1.641	0.859	0.194	ns
Gender	0.391	0.097	1.479	$p < .001$
Age	-0.143	0.063	0.866	ns*
Illegal activity in the home	-0.032	0.100	1.968	ns
School	0.085	0.139	1.088	ns
Race/Ethnicity				
African American	0.226	0.163	1.254	ns
Caucasian	0.031	0.124	1.031	ns
Hispanic	0.100	0.138	1.106	ns
Illegal activity among peers	0.169	0.092	1.185	ns
Arrest History	0.438	0.103	1.550	$p < .001$
Risk Level	0.291	0.044	1.338	$p < .001$
Single parent home	0.105	0.084	1.111	ns
First use of a substance before the age of 15	0.170	0.128	1.185	ns
EBT	-0.153	0.057	0.858	$p < .001$
Level-2				
EBT	-0.037	0.226	0.963	ns

Note. AOP = adolescent outpatient; EBT = evidence-based treatment. *N* of participants = 5,233. *N* of AOP programs = 129. Variance component = 0.3832. Deviance statistic = 15257.463. Number of estimated parameters = 16.

*$p < .05$.

A comparison of model fit indicated that Model D had the lowest deviance statistic, 15257.463, which suggested it was the preferred model (see Table 27). Although the chi-square test showed there was no significant difference between Model C (15257.567) and Model D or between Model B (15263.343) and Model D. Although there was a significant difference between Model B and Model C, and Model D was significantly better fitting than Model C. This suggested that including EBTs at the individual-level significantly improved the model, but the inclusion of program-level EBTs did not significantly affect model fit.

Table 27

AOP EBT Model Comparison Predicting Rearrests

Model Comparison		χ^2	***p***
Model B Deviance: 15263.343	Model C Deviance: 15257.567	5.776	$p < .05$
Model B Deviance: 15263.343	Model D Deviance: 15257.463	5.880	ns
Model C Deviance: 15257.567	Model D Deviance: 15257.463	0.105	ns

Note. AOP = adolescent outpatient; EBT = evidence-based treatment. *N* of participants = 5,233. *N* of AOP programs = 129.

Substance use. To examine the association between EBT use and substance use severity, two hypotheses (2b and 2d) were analyzed. The first hypothesis (2b) stated, "*AOP participants who received interventions with higher EBT scores will have a lower average substance use severity score in the six month period following program entry than participants who received interventions with lower EBT scores, even after controlling for participant characteristics*." This hypothesis was examined using Model

C (see Appendix I-Table 58), and there was no significant association between EBT use and substance use severity.

The second hypothesis (2d) stated, "*Substance use severity scores will be lower among AOP participants in programs with higher average EBT scores than participants who were in programs with lower average EBT scores*," and was analyzed using Model D (see Table 29). This hypothesis was not supported by the results, as there was no significant association between individual- or program-level EBT use and substance use severity.

The inquiry into the association between EBT use and substance use severity began with an examination of the variance in substance use severity score among AOP programs (see Table 28). This began with an examination of a null model, which included a test of homogeneity of level-1 variance. This test indicated that there was heterogeneity in the model. Therefore, the model was analyzed with evidence-based treatment predicting level-1 variance. The chi-square comparison between the homogeneous model and the heterogeneous model revealed that there was a significant difference between the models, and the heterogeneous model was preferred. Accordingly, the results of the heterogeneous model were examined, and significant variance remained to be explained among AOP programs ($p < .001$).

Table 28

Accounting for Variation in Substance Use Severity Score among AOP Programs for the EBT Models

Models[a]	Variance	χ^2	df	*p*
Model A	0.0309	12991.6815	127	$p < .001$
Model B	0.0298	6780.3612	127	$p < .001$
Model C	0.0298	6789.0555	127	$p < .001$
Model D	0.0300	6812.3844	126	$p < .001$

Note. AOP = adolescent outpatient; EBT = evidence-based treatment. *N of* participants = 11,714. *N* of AOP programs = 128.

[a] Model contents are described in Table 11.

Model building began with the addition of uncentered sociodemographic factors (Model B) at the individual-level. Homogeneity of variance at the individual-level was examined in the model. The results showed heterogeneity at level-1, hence the model was analyzed with EBTs predicting level-1 variance. A comparison between the homogeneous model and the heterogeneous model indicated that there was no significant difference between the models. The results of the homogeneous model were analyzed, and showed a reduction in the variance in substance use severity score among AOP programs. Yet, significant variation remained among programs ($p < .001$).

Consequently, model building continued with the addition of group-mean centered EBTs at the individual-level (Model C). The test for homogeneity of level-1 variance indicated that there was heterogeneity in the model. Hence, the model was analyzed with EBTs predicting level-1 variance. A comparison between the homogeneous and heterogeneous models demonstrated that there was a significant

difference between the models, and the heterogeneous model was preferred. The results of the heterogeneous model were analyzed, and showed that the variation in substance use severity score did not change among AOP programs. As significant variation remained to be explained among AOP programs ($p < .001$), model building continued.

The aggregate EBT use variable was added, uncentered, at the program-level (Model D). The test for homogeneity of level-1 variance showed heterogeneity in the model, and the model was analyzed with EBTs predicting level-1 variance. A comparison between the homogeneous model and the heterogeneous model indicated that there was a significant difference between the models ($p < .05$), and the heterogeneous model was preferred. The results evinced that there was a slight increase in the variation among AOP programs, though it was lower than the variation observed in Model A. Significant variation remained to be explained among AOP programs ($p < .001$), which suggests that sociodemographic factors and EBTs did not fully account for the variation among AOP programs.

All models are described below, and the tables presenting the results for Models B and C are included in Appendix I. The results of Model D are presented below in Table 29. Once variation in substance use severity score was verified, the control variables were added to the model, uncentered, at the individual-level (Model B). The results of the homogeneous model showed that gender (b = 0.019, $p < .001$), age (b = 0.015, $p < .001$), risk level (b = 0.022, $p < .001$), living in a single-parent household (b = 0.015, $p < .001$), illegal activity among peers (b = 0.031, $p < .001$), and first use of a substance before the age of 15 (b = 0.025, $p < .001$) were significantly associated with substance use severity score during the first six months of treatment (see Appendix I-Table 58).

Older age was associated with a 0.015 increase in substance use severity score. Males were associated with a 0.019 increase in substance use severity score. An increase in risk level was associated with a 0.022 increase in substance use severity score, and living in a single parent home was associated with a 0.015 increase in substance use severity score. Having friends involved in illegal activity was associated with a 0.031 increase in substance frequency score. First use of a substance under the age of 15 years was associated with a 0.025 increase in substance use severity score.

Evidence-based treatment was added to the model at the individual-level (Model C). The results of the heterogeneous model showed that gender (b = 0.019, $p < .001$), age (b = 0.015, $p < .001$), risk level (b = 0.022, $p < .001$), living in a single-parent household (b = 0.015, $p < .001$), illegal activity among peers (b = 0.031, $p < .001$), and first use of a substance before the age of 15 (b = 0.025, $p < .001$) were significantly associated with substance use severity score during the first six months of treatment (see Appendix I-Table 59). Individual-level EBT use was not significantly associated with substance use severity score.

Table 29

Factors Predicting Substance Use Severity Score (AOP EBT Substance Use Model D)

	B	**SE**	***p***
Level-1			
Intercept	0.216	0.088	ns*
Gender	0.019	0.005	$p < .001$
Age	0.015	0.004	$p < .001$

Table 29 (*Continued*)

	B	SE	*p*
Illegal activity in the home	0.012	0.006	ns
School	0.011	0.007	ns
Race/Ethnicity			
African American	0.001	0.010	ns
Caucasian	-0.001	0.006	ns
Hispanic	-0.003	0.009	ns
Illegal activity among peers	0.031	0.005	$p < .001$
Arrest History	0.011	0.007	ns
Risk Level	0.022	0.003	$p < .001$
Single parent home	0.015	0.004	$p < .001$
First use of a substance before the age of 15	0.025	0.006	$p < .001$
EBTs	0.002	0.007	ns
Level-2			
EBTs	-0.011	0.026	ns

Note. AOP = adolescent outpatient; EBT = evidence-based treatment; N of participants = 5,233. N of AOP programs = 129. Variance component = 0.0298. Deviance statistic = -4779.290. Number of estimated parameters = 18.

*$p < .05$.

EBT use was added to level-2 as an uncentered variable (Model D). The results of the heterogeneous model showed that gender (b = 0.019, $p < .001$), age (b = 0.015, $p < .001$), risk level (b = 0.022, $p < .001$), living in a single-parent household (b = 0.015, $p < .001$), illegal activity among peers (b = 0.031, $p < .001$), and first use of a substance before the age of 15 (b = 0.025, $p < .001$) continued to be significantly associated with

substance use severity score during the first six months of treatment (see Table 29). Individual- and program-level EBTs were not significantly associated with substance use severity score.

As shown in Table 30, the examination of the deviance statistics across models showed Model D was the best fitting model (-9096.867), though a comparison between Model C (-9096.860) and Model D indicated that there was no statistically significant difference between the two models. Yet, the comparison between Model C (-9096.860) and Model B (-9085.079) demonstrated that there was a significant difference between the two models, and Model C was better fitting to the data. Further, a comparison between Model B and Model D indicated that Model D was preferred, and that the difference between the two models was statistically significant. These model comparisons suggested that there was a statistically significant improvement in the models when EBTs were included at the individual- and/or program-level.

Table 30

AOP EBT Model Comparison Predicting Substance Use Severity Score

Model Comparison		χ^2	***p***
Model B Deviance: -9085.079	Model C Deviance: -9096.860	11.78080	$p < .01$
Model B Deviance: -9085.079	Model D Deviance: -9096.867	11.78736	$p < .01$
Model C Deviance: -9096.860	Model D Deviance: -9096.867	0.00656	ns

Note. AOP = adolescent outpatient; EBT = evidence-based treatment. *N* of participants = 11,714. *N* of AOP programs = 128.

Juvenile Drug Treatment Court

Univariate Analyses. Preliminary analyses demonstrated that the responsivity adherence scores were in a normal range, and the EBT use scores were skewed (see Table 31). Among JDTC participants, responsivity adherence ranged from zero to six, with a mean of 3.584 (*SD* = 2.511). EBT use scores ranged from 0 to 3.75, and the mean was 2.938 (*SD* = 1.025).

Table 31

Descriptive Statistics for Responsivity Adherence and EBT Use Score among JDTC Participants

Variables	N	Min	Max	M	SD	Skew
Responsivity Adherence	1069	0	6	3.584	2.511	-0.628
EBT Use Score	1176	0.00	3.75	2.938	1.025	-2.165

Note. JDTC = juvenile drug treatment court; EBT = evidence-based treatment.

Bivariate Analyses. The analysis of bivariate relationships began with an inquiry into the association between responsivity adherence and rearrests. Pearson correlation coefficient demonstrated a weak but statistically significant positive association between responsivity adherence and rearrests, $r(810) = 0.21$, $p < .001$. Although the chi-square test was significant, $\chi^2(4, N = 810) = 65.108$, $p < .001$, no discernible pattern was found (see Table 32). Forty-two percent of JDTC participants who received a score of five were rearrested; but twelve percent of JDTC participants who received a score of zero were rearrested.[9]

[9] Only one participant scored a one on adherence, and this score level was omitted from this comparison.

Table 32

Rearrest and Responsivity among JDTC Participants

	Rearrest		
Responsivity Score	**No Rearrest**	**Rearrest**	**Total**
0	87.3%	12.7%	336
1	0.0%	100.0%	1
2	--	--	0
3	--	--	0
4	69.6%	30.4%	101
5	57.1%	42.9%	337
6	74.0%	26.0%	272
Average responsivity techniques	3.16	4.36	

Note. JDTC = juvenile drug treatment. *N* of JDTC programs = 9.

The association between responsivity adherence and substance use severity score also was a significant, weak association, $r(1,045) = 0.269$, $p < .001$ (see Table 33). As with responsivity adherence and rearrests, there was no consistent pattern found among the average substance use severity scores and responsivity adherence score. The lowest average substance use severity score was found among participants who scored zero on responsivity adherence (0.078). The highest average substance use severity score was found among participants who scored five on responsivity adherence (0.264).

Table 33

Average Substance Use Severity Score for Each Number of Responsivity Techniques among JDTC Participants

Responsivity Score	Average substance use severity score
0	0.078
1	0.099
2	--
3	--
4	0.151
5	0.264
6	0.123

Note. JDTC = juvenile drug treatment court. *N* of JDTC participants = 1,047. *N* of JDTC programs = 9.

As shown in Table 34, preliminary analyses of the association between EBT use scores and rearrests also was significant but weak, $r(872) = 0.133$, $p < .001$. Although the chi-square test was significant, $\chi^2(7, N = 874) = 86.795$, $p < .001$, there was no consistent pattern observed. For example, the EBT use score of 3.30 corresponded to the highest percentage of rearrests (43.26%); while the EBT use score of 2.75 corresponded to the lowest percentage of rearrests (12.41%).[10]

[10] EBT scores of 2.80 and 3.00 were excluded because only one participant received each of these interventions.

Table 34

Frequency of Rearrests for each EBT Use Score among JDTC Participants

	Rearrests		
EBT use score	**No arrests**	**Arrests**	**Total**
0.00	84.85%	15.15%	111
2.75	87.59%	12.41%	330
2.80	0.00%	100.00%	1
3.00	100.00%	0.00%	1
3.30	56.74%	43.26%	339
3.43[11]	--	--	1
3.60	78.36%	21.64%	230
3.70	69.12%	30.88%	100
3.75	42.11%	57.89%	40
Average EBT use score	2.91	3.18	

Note. JDTC = juvenile drug treatment court. *N* of JDTC programs = 10.

The association between EBT use and average substance use severity indicated a significant, weak association, $r(1,151) = 0.148$, $p < .001$. The results (see Table 35) did not demonstrate a discernible pattern between EBT use score and substance use severity. The highest substance use severity score corresponded to an EBT use score of 3.30 (0.266), and the lowest average substance use severity score corresponded to an EBT use score of 3.00 (0.059).

[11] Participant was missing on rearrest variable.

Table 35

Average Substance Use Severity Score for Each EBT Use Score among JDTC Participants

EBT use score	Average substance use severity score
0.00	0.100
2.75	0.075
2.80	0.099
3.00	0.059
3.30	0.266
3.60	0.107
3.70	0.152
3.75	0.214

Note. JDTC = juvenile drug treatment court; EBT = evidence-based treatment. *N* of JDTC participants = 1,153. *N* of JDTC programs = 10.

Multivariate Regression Models. Individual-level multivariate analyses were analyzed using Stata (StataCorp, 2014). Responsivity adherence and EBT usage were examined separately (along with sociodemographic factors) to determine their association with rearrests and substance use severity. The following sections first review the findings for responsivity adherence, followed by EBT use.

Responsivity adherence. The following research question was explored in regards to responsivity adherence in the context of JDTCs using two hypotheses (3a and 3b), "*For youth in the JDTC sample, when controlling for participant characteristics known to be empirically associated with recidivism (e.g., criminogenic needs), is responsivity adherence at the individual-level associated with recidivism or substance*

use severity during the six month period following JDTC program entry?" Overall, as shown below, an increase in responsivity adherence score was significantly associated an increase in the odds of rearrest (see Table 36) and an increase in substance use severity (Table 38).

Rearrests. The first hypothesis (3a), "*The odds of rearrest will be lower among JDTC participants who received interventions with a higher number of responsivity-adherent techniques during the six month period following program entry than participants who received interventions with fewer responsivity-adherent techniques, even after controlling for participant characteristics,*" was analyzed using Model B (see Table 36), and was not supported by the results. Specifically, an increase in responsivity adherence score was associated with an increase in the odds of rearrest.

To explore rearrests, analyses began with an examination of the influence of the control variables (Model A). This model accounted for 13.4% of the variance in rearrests, which suggested that participant sociodemographics helped to account for the variance in rearrests. As variance remained to be explained, model building began with the inclusion of responsivity adherence (Model B). This model accounted for 20.9% of the variance in rearrests, which indicated that responsivity adherence accounted for some of the variance in rearrests among JDTC participants. The majority of variance in rearrests remained, which suggested that factors other those included in the model might have accounted for the variance (see Table 37).

Model building began with the sociodemographic factors (Model A; see Appendix I-Table 60), and only arrest history (OR = 2.634, CI = 1.606-4.320) and first use of a substance before the age of 15 (OR = 2.203, CI = 1.340-3.620) were significantly

associated with rearrests (see Appendix I-Table 60). Specifically, the odds of rearrest was 163.4% greater among individuals who reported five or more previous arrests than among individuals who reported four or fewer previous arrests. Similarly, the odds of rearrest was 120.3% greater among individuals who reported their first use of a substance under the age of 15 years than those whose first use occurred after the age of 15.

Responsivity adherence was subsequently added (Model B), and the results indicated that arrest history (OR = 1.899, CI = 1.204-2.994), risk level (OR = 1.366, CI = 1.088-1.715), and first use of a substance before the age of 15 (OR = 2.566, CI = 1.262-5.216) continued to be significantly associated with rearrests (see Table 36). Gender (OR = 1.973, CI = 1.207-3.223) also became significantly associated with rearrests, and the odds of rearrest was 97.3% greater for males than females. Furthermore, responsivity adherence (OR = 1.292, CI = 1.169-1.428) was significantly associated with rearrests during the six month period following treatment entry. Specifically, an increase in one responsivity adherent technique was associated with a 26.3% increase in the odds of rearrest following treatment entry; but the effect size for responsivity adherence was only 0.053.

Table 36

Factors Predicting Rearrests (JDTC Responsivity Rearrest Model B)

	B	SE	Odds Ratio	*p*
Level-1				
Intercept	-4.106	0.695	0.016	$p < .001$
Gender	0.679	0.250	1.973	$p < .01$
Age	0.098	0.167	1.103	ns
Illegal activity in the home	0.230	0.238	1.258	ns
School	0.201	0.312	1.222	ns
Race/Ethnicity				
African American	-0.652	0.543	0.521	ns
Caucasian	-0.776	0.391	0.460	ns*
Hispanic	0.355	0.320	1.426	ns
Illegal activity among peers	0.123	0.258	1.130	ns
Arrest History	0.641	0.232	1.899	$p < .01$
Risk Level	0.312	0.116	1.366	$p < .01$
Single parent home	0.023	0.171	0.977	ns
First use of a substance before the age of 15	0.942	0.362	2.566	$p < .01$
Responsivity	0.256	0.051	1.292	$p < .001$

Note. JDTC = juvenile drug treatment court. *N* of JDTC participants = 810. *N* of JDTC programs = 9. Variance = 0.217. Wald statistic = 83.37, $p < .001$. Mean VIF = 1.34.

*$p < .05$.

The Bayesian Information Criterion (BIC) was used to compare Model A and Model B (see Table 37). The results showed that Model A, the sociodemographics

model, was the best fitting to the data (-4479.140). The difference between both models (343) suggested that there is a strong improvement in model fit when responsivity adherence was excluded from the model.

Table 37

JDTC Responsivity Model Comparison Predicting Rearrests

Models	Variance	BIC
Model A	0.134	-4479.140
Model B	0.217	-4135.653

Note. JDTC = juvenile drug treatment court. *N* of JDTC participants = 810. *N* of JDTC programs = 9.

Substance use severity. The second hypothesis (3b) stated, "*JDTC participants who received interventions with a higher number of responsivity-adherent techniques will have lower average substance use severity scores during the six month period following program entry than participants who received interventions with fewer responsivity-adherent techniques, even after controlling for participant characteristics*," and was analyzed using Model B (see Table 38). The results of the analyses did not support this hypothesis. Similar to the rearrests models, an increase in responsivity adherence score was associated with an increase in substance use severity score.

The examination of substance use severity began with a test of the association between the control variables and substance use severity (Model A). The control model accounted for 16.13% of the variance in the substance use severity score among JDTC participants. This suggested that sociodemographic factors contributed to the variance in substance use severity score, but did not fully account for it. As such, model building

began with the addition of responsivity adherence (Model B). Although this model accounted for 24.05% of the variance in substance use severity score among JDTC participants, suggesting responsivity adherence contributed to the variance, the majority of the variance remained to be explained (see Table 39).

The control variables were examined first (Model A; see Appendix I-Table 61). The results indicated that age (b = 0.030, $p < .001$), African American (b = -0.067, $p < .001$), gender (b = 0.068, $p < .001$), illegal activity among peers (b = 0.031, $p < .01$), five or more previous arrests (b = 0.084, $p < .001$), risk level (b = 0.031, $p < .001$), and first use of a substance before the age of 15 (b = 0.040, $p < .01$) were significantly associated with substance use severity score (see Appendix I-Table 61). Specifically, older participants were associated with a 0.030 higher substance use severity score. African Americans were associated with a 0.067 lower substance use severity score and males were associated with a 0.068 higher substance use severity score. Having peers involved in illegal activity was associated with a 0.031 higher substance use severity score and reporting five or more previous arrests was associated with a 0.084 higher substance use severity score. An increase in risk level was significantly associated with a 0.031 increase in substance use severity score, and earlier first use of a substance before the age of 15 was significantly associated with a 0.040 higher substance use severity score.

When responsivity adherence was included in the model (Model B), age and first use of a substance before the age of 15 ceased to be significantly associated with substance use severity score at the adjusted alpha level (see Table 38); though, they remained significantly association with substance use severity score at the conventional alpha level ($p < .05$). African American (b = -0.089, $p < .001$), gender (b = 0.087, $p <$

.001), illegal activity among peers (b = 0.038, $p < .001$), arrest history (b = 0.061, $p < .01$), and risk level (b = 0.032, $p < .001$) continued to show the same trend in their association with substance use severity score. Contrary to expectations, responsivity adherence score was significantly associated with substance use severity (b = 0.020, $p < .001$); however, the results showed that an increase in one responsivity-adherent technique was associated with a 0.020 increase in substance use severity score. The partial correlation indicated that responsivity adherence had a 0.080 effect size.

Table 38

Factors Predicting Substance Use Severity Score (JDTC Responsivity Substance Use Model B)

	B	**SE**	***p***
Level-1			
Intercept	-0.139	0.038	$p < .001$
Gender	0.087	0.013	$p < .001$
Age	0.020	0.009	ns*
Illegal activity in the home	0.031	0.015	ns*
School	0.026	0.017	ns
Race/Ethnicity			
African American	-0.089	0.020	$p < .001$
Caucasian	-0.013	0. 016	ns
Hispanic	0.013	0.013	ns

Table 38 *(Continued)*

	B	SE	*p*
Illegal activity among peers	0.038	0.010	$p < .001$
Arrest History	0.061	0.022	$p < .01$
Risk Level	0.032	0.006	$p < .001$
Single parent home	-0.005	0.010	ns
First use of a substance before the age of 15	0.044	0.018	ns*
Responsivity	0.020	0.002	$p < .001$

Note. JDTC = juvenile drug treatment court. *N* of participants = 1,047. *N* of JDTC programs = 9. Variance = 0.2433. Wald statistic = 600.16, $p < .001$. Mean VIF = 1.37.
*$p < .05$.

The BIC was used to compare Model A and Model B (see Table 39), and the comparison showed that Model A was the best fitting model (-8208.628). The difference between both models (714) suggested that there was a strong improvement in the model when responsivity adherence was excluded from the model.

Table 39

JDTC Responsivity Model Comparison Predicting Substance Use Severity

Models	Variance	BIC
Model A	0.1613	-8208.628
Model B	0.2405	-7494.120

Note. JDTC = juvenile drug treatment court. *N* of JDTC participants = 1,067. N of JDTC programs = 9.

Evidence-based treatment. To examine EBTs in the context of JDTCs, the following research question was explored using two hypotheses (4a and 4b), "*For youth*

in the JDTC sample, when controlling for participant characteristics known to be empirically associated with recidivism (e.g., criminogenic needs), is the use of evidence-based interventions at the individual-level associated with recidivism or substance use severity during the six month period following JDTC program entry?" The results demonstrated a statistically significant, positive association between EBT use and rearrests (see Table 40), and a statistically significant, positive association between EBTs and substance use severity (see Table 42).

Rearrests. The first hypothesis (4a), "*The odds of rearrest will be lower among JDTC participants who received interventions with higher EBT scores in the six month period following program entry than participants who received interventions with lower EBT scores, even after controlling for participant characteristics*," was examined using Model B (see Table 40), and was not supported by the results. Contrary to expectations, EBT use score was not significantly associated with rearrest using the adjusted alpha level ($p < .01$), though it was significant under the conventional alpha level ($p < .05$). Additionally, an increase in EBT use score was associated with an increase in the odds of rearrest.

To examine rearrests among JDTC participants, model building began with an examination of the impact of the sociodemographic factors (Model A). This model accounted for 13.4% of the variance in rearrests among JDTC participants. Model building continued with the inclusion of EBTs (Model B), and this model accounted for 17.0% of the variance in rearrests. This suggested that EBT use contributed to the variance in rearrests (see Table 41). Nevertheless, sociodemographic factors and EBT use did not fully account for the variance in rearrests among JDTC participants.

Model building began with the inclusion of the sociodemographic factors as predictors of rearrest (Model A), and the results can be found in Appendix I-Table 60. As variance remained to be explained, EBT use was included (Model B), and there was a similar pattern among the control variables: arrest history (OR = 2.349, CI = 1.433-3.849), risk level (OR = 1.344, CI = 1.130-1.599), and first use of a substance before the age of 15 (OR = 2.223, CI = 1.281-3.857) remained significantly associated with rearrests (see Table 40). Although the EBT use scale (OR = 1.721, CI = 1.330-1.227) was not significantly associated with rearrests using the adjusted alpha level ($p < .01$), it was significantly associated with rearrests at the conventional alpha level ($p < .05$). The odds ratio demonstrated a positive association between EBT use and rearrest; specifically an increase in EBT use score was associated with a 72.1% increase in the odds of rearrest. The effect size for EBTs was 0.026.

Table 40

Factors Predicting Rearrests (JDTC EBT Rearrest Model B)

	B	**SE**	**Odds Ratio**	***p***
Level-1				
Intercept	-5.194	0.800	0.006	$p < .001$
Gender	0.558	0.201	1.747	$p < .01$
Age	0.234	0.145	1.263	ns
Illegal activity in the home	0.175	0.217	1.191	ns
School	0.296	0.290	1.345	ns

Table 40 (*Continued*)

	B	SE	Odds Ratio	*p*
Race/Ethnicity				
African American	-0.310	0.422	0.733	ns
Caucasian	-0.553	0.312	0.575	ns
Hispanic	0.508	0.267	1.663	ns
Illegal activity among peers	0.076	0.204	1.079	ns
Arrest History	0.854	0.236	2.349	$p < .001$
Risk Level	0.296	0.103	1.344	$p < .01$
Single parent home	0.062	0.171	1.064	ns
First use of a substance before the age of 15	0.799	0.302	2.223	$p < .01$
EBTs	0.543	0.132	1.721	ns*

Note. JDTC = juvenile drug treatment court; EBT = evidence-based treatment. *N* of participants = 812. *N* of JDTC programs = 10. Variance = 0.170. Wald statistic = 123.92, $p < .001$. Mean VIF = 1.32.

*$p < .05$.

A comparison of model fit using the BIC indicated that Model B (-4495) had the best fit to the data (see Table 41). Further, the difference between Model A (-4479.140) and Model B, a difference of 16, suggested that the model was strongly improved by the inclusion of EBT use.

Table 41

JDTC EBT Model Comparison Predicting Rearrests

Models	Variance	BIC
Model A	0.134	-4479.140
Model B	0.170	-4495.101

Note. JDTC = juvenile drug treatment court; EBT = evidence-based treatment. *N* of participants = 812. *N* of JDTC programs = 10.

Substance Use. The second hypothesis (4b), "*JDTC participants who received interventions with higher EBT scores will have a lower average substance use severity score in the six month period following program entry than participants who received interventions with lower EBT scores, even after controlling for participant characteristics*," was examined using Model B (see Table 42), and it was not supported by the results. Specifically, an increase in EBT use score was significantly associated with an increase in substance use severity score.

Model building for substance use severity began with an examination of the control variables (Model A). This model accounted for 16.13% of the variance in substance use severity score, indicating that sociodemographic factors accounted for a portion of the variance. Thus, model building continued and EBT use was included (Model B). This model accounted for 18.54% of the variance in substance use severity score, which suggested that while EBTs contributed to the variance in substance use severity score, the combination of sociodemographic factors and EBTs did not fully account for the variance (see Table 43). Other factors may have contributed to the variance in substance use severity.

The results of Model A can be found in Appendix I-Table 61. When EBTs were added to the model (Model B), the results demonstrated a similar pattern among age (b = 0.036, $p < .001$), African American (b = -0.62, $p < .001$), gender (b = 0.075, $p < .001$), illegal activity among peers (b = 0.030, $p < .01$), arrest history (b = 0.078, $p < .001$), risk level (b = 0.032, $p < .001$), and first use of a substance before the age of 15 (b = 0.041, $p < .01$), which were significantly associated with substance use severity score (see Table 42). Additionally, evidence-based treatment (b = 0.029, $p < .001$) also appeared to be significantly and positively associated with substance use severity score. An increase in EBT use score was associated with a 0.029 increase in substance use severity score; though, the effect size was 0.029.

Table 42

Factors Predicting Substance Use Severity (JDTC EBT Substance Use Model B)

	B	**SE**	***p***
Level-1			
Intercept	-0.197	0.038	$p < .001$
Gender	0.075	0.011	$p < .001$
Age	0.036	0.008	$p < .001$
Illegal activity in the home	0.031	0.012	ns*
School	0.024	0.019	ns
Race/Ethnicity			
African American	-0.062	0.018	$p < .001$
Caucasian	-0.001	0.019	ns
Hispanic	0.020	0.018	ns

Table 42 (*Continued*)

	B	SE	*p*
Illegal activity among peers	0.030	0.010	$p < .01$
Arrest History	0.078	0.016	$p < .001$
Risk Level	0.032	0.007	$p < .001$
Single parent home	-0.006	0.010	ns
First use of a substance before the age of 15	0.041	0.015	$p < .01$
EBTs	0.029	0.005	$p < .001$

Note. JDTC = juvenile drug treatment court; EBT = evidence-based treatment. *N* of participants = 810. *N* of JDTC programs = 10. Variance = 0.1854. Wald statistic = 605.68, $p < .001$. Mean VIF = 1.35.

*$p < .05$.

When comparing the BIC for both models, findings suggested that Model B was the better fitting model (see Table 43). As the difference between Model A and Model B was 24, the BIC suggested there was a strong improvement in the model when EBT usage included.

Table 43

JDTC EBT Model Comparison Predicting Substance Use Severity Score

Models	Variance	BIC
Model A	0.1613	-8208.628
Model B	0.1854	-8232.702

Note. JDTC = juvenile drug treatment court; EBT = evidence-based treatment. *N* of participants = 810. *N* of JDTC programs = 10.

Conclusion

The current analyses were used to examine the influence of responsivity adherence and EBT use on rearrests and substance use severity in AOPs and JDTCs. The AOP sample was analyzed using multilevel models, and the JDTC sample was analyzed using multivariate logistic and linear regression models.

Analyses first showed there was significant between-program variation in the dependent variables (i.e. rearrest, substance use) for AOP programs. Sociodemographic factors and responsivity adherence partially explained the variance in both rearrests and substance use severity, but significant variation remained among the AOP programs. Similarly, sociodemographic factors and EBTs partially explained the variation in rearrests and substance use severity, but significant variation remained to be explained.

Overall, the results did not support the hypotheses that higher responsivity adherence would be related to lower rearrests and substance use severity among juvenile justice-involved in AOP programs (see Table 44). Examined at both individual- and program-levels, responsivity adherence was not associated with rearrests (see Table 20). Responsivity adherence, however, was related to average substance use severity during the six months following treatment entry (see Table 23), but this was in the opposite direction as predicted.

Analyses for the hypotheses that higher levels of EBT use would be related to low rates of rearrest and substance abuse partially supported this. More specifically participants who experienced higher levels of EBT use were significantly less likely to be rearrested, but this was not true for program responsivity. Programs with higher responsivity scores were not different from those with lower scores in terms of the

proportion of youth rearrested in the six months following baseline (see Table 26). EBT usage was unrelated to substance abuse as both individual- or program-level predictors (see Table 29). These findings partially supported hypothesis 2a, but not 2b-2d (see Table 44).

Because only ten JDTC programs were available for analysis, only individual-level predictors were examined. A series of logistic and linear regressions showed sociodemographic factors and responsivity adherence predicted rearrests and substance use only a small amount of variance was explained by them. For example, an increase in responsivity adherence technique was associated with an increase in the odds of rearrest (see Table 36). The same was true for substance use, with greater adherence associated with a greater likelihood of being rearrested in the six months following baseline (see Table 38). Therefore, the analyses failed to support the direction predicted in the hypotheses (3a and 3b) about the association between responsivity adherence and rearrests and substance use (see Table 44).

Similarly, when EBT use was introduced, it explained only a small proportion of the variance was explained, and findings were opposite of what was expected. Higher EBT use scores predicted higher rates of rearrest and drug use. This was opposite of what was expected in hypotheses 4a and 4b (see Table 44).

Table 44

Summary of Findings for Research Questions and Hypotheses

Research Questions and Hypotheses	Findings
Adolescent Outpatient Programs	
Research Question 1: For youth in the AOP sample, when controlling for participant characteristics known to be empirically associated with recidivism (e.g., criminogenic needs), is adherence to the responsivity principle at the individual- and program-level related to recidivism or substance use severity during the six month period following AOP program entry?	
Hypothesis 1a: The odds of rearrest will be lower among AOP participants who received interventions with a higher number of responsivity-adherent techniques during the six month period following program entry than participants who received interventions with fewer responsivity-adherent techniques, even after controlling for participant characteristics.	Not supported
Hypothesis 1b: AOP participants who received interventions with a higher number of responsivity-adherent techniques will have a lower average substance use frequency score during the six month period following program entry than participants who received interventions with fewer responsivity-adherent techniques, even after controlling for participant characteristics.	Not supported
Hypothesis 1c: The odds of rearrest will be lower among AOP participants in programs with higher average responsivity-adherent scores than participants who were in programs with lower average responsivity-adherent scores.	Not supported

Table 44 *(Continued)*

Research Questions and Hypotheses	Findings
Adolescent Outpatient Programs	
Hypothesis 1d: Substance use severity will be lower among AOP participants in programs with higher average responsivity-adherent scores than participants who were in programs with lower average responsivity-adherent scores.	Not supported
Research Question 2: For youth in the AOP sample, when controlling for participant characteristics known to be empirically associated with recidivism (e.g., criminogenic needs), are evidence-based interventions at the individual- and program-level related to recidivism or substance use severity during the six month period following AOP program entry?	
Hypothesis 2a: The odds of rearrest will be lower among AOP participants who received interventions with higher EBT use scores in the six month period following program entry than participants who received interventions with lower EBT use scores, even after controlling for participant characteristics.	Partially supported
Hypothesis 2b. AOP participants who received interventions with higher EBT use scores will have a lower average substance use severity score in the six month period following program entry than participants who received interventions with lower EBT use scores, even after controlling for participant characteristics.	Not supported
Hypothesis 2c. The odds of rearrest will be lower among AOP participants in programs with higher average EBT use scores than participants who were in programs with lower average EBT use scores.	Not supported

Table 44 *(Continued)*

Research Questions and Hypotheses	Findings
Adolescent Outpatient Programs	
Hypothesis 2d. Substance use severity scores will be lower among AOP participants in programs with higher average EBT use scores than participants who were in programs with lower average EBT use scores.	Not supported
Juvenile Drug Treatment Courts	
Research Question 3: For youth in the JDTC sample, when controlling for participant characteristics known to be empirically associated with recidivism (e.g., criminogenic needs), is responsivity adherence at the individual-level associated with recidivism or substance use severity during the six month period following JDTC program entry?	
Hypothesis 3a. The odds of rearrest will be lower among JDTC participants who received interventions with a higher number of responsivity-adherent techniques during the six month period following program entry than participants who received interventions with fewer responsivity-adherent techniques, even after controlling for participant characteristics.	Opposite of prediction
Hypothesis 3b. JDTC participants who received interventions with a higher number of responsivity-adherent techniques will have lower average substance use severity scores during the six month period following program entry than participants who received interventions with fewer responsivity-adherent techniques, even after controlling for participant characteristics.	Opposite of prediction

Table 44 (*Continued)*

	Findings
Juvenile Drug Treatment Courts	
Research Question 4: For youth in the JDTC sample, when controlling for participant characteristics known to be empirically associated with recidivism (e.g., criminogenic needs), is the use of evidence-based interventions at the individual-level associated with recidivism or substance use severity during the six month period following JDTC program entry?	
Hypothesis 4a. The odds of rearrest will be lower among JDTC participants who received interventions with higher EBT use scores in the six month period following program entry than participants who received interventions with lower EBT use scores, even after controlling for participant characteristics.	Opposite of prediction
Hypothesis 4b. JDTC participants who received interventions with higher EBT use scores will have a lower average substance use severity score in the six month period following program entry than participants who received interventions with lower EBT use scores, even after controlling for participant characteristics.	Opposite of prediction

CHAPTER 6: DISCUSSION

This research sought to apply a theoretical framework (Risk-Need-Responsivity model) conceived for adult correctional rehabilitation programming to juvenile justice samples as few have done so in the past. The Risk-Need-Responsivity (RNR) model has received substantial empirical support (Andrews & Bonta, 2010), but it has not been widely applied to substance abuse treatment studies. This research addressed this gap in the RNR literature. Furthermore, too little is known about the effectiveness of outpatient substance abuse treatment (AOP) for juvenile offenders – a statement that holds true also for juvenile drug treatment court (JDTC; Latessa et al., 2013; Mitchell et al., 2012).

It was hypothesized that applying the RNR model to AOPs and JDTCs may help to explain conditions under which these types of programming might reach goals for reducing recidivism and substance use among young offenders. Therefore, this research examined both the individual- and program-level influence of adherence to the RNR responsivity principle on individual rearrests and substance use severity in 132 AOPs. As the JDTC sample only included ten programs, the association between responsivity adherence and both rearrests and substance use severity were examined only at the individual-level.

The programs examined in this study incorporated various treatment interventions in their structure. These interventions, in turn, varied in their design and level of empirical support (evidence base). There are a variety of methods for classifying interventions as evidence-based treatment (EBT) or non-evidence-based. However, these systems vary in the number of interventions classified and the criteria used in these classifications. The current research used SAMHSA's NREPP classification to examine

whether the individual-level treatment effect was enhanced when the treatment intervention had stronger empirical support – a higher EBT use score – and whether AOP programs that had greater use of EBTs had better outcomes. The associations between the use of EBTs and rearrests and substance use severity were examined only at the individual-level among JDTC participants.

The current chapter provides an overview of the findings from these analyses, starting with responsivity adherence and followed by EBT use. These findings will be placed in the context of the state of the current knowledge, and followed by a discussion of their implications and possible future directions for research. The pattern of results found among sociodemographic factors will also be reviewed. The chapter will conclude with a discussion of the strengths and limitations of this research.

Responsivity

Rearrests. Recidivism is the primary outcome examined in studies that test the Risk-Need-Responsivity model. For the current study, recidivism was measured using a dichotomous variable capturing whether an individual was rearrested during the six month period following treatment entry. Responsivity adherence was measured at the individual-level using an ordinal scale summing the number of techniques meeting responsivity criteria included in a treatment intervention's structure. The variable was aggregated to the program-level to reflect the mean responsivity score for each program.

As seen in Table 15 and Table 32, there was no discernable bivariate pattern between rearrests and responsivity adherence techniques among AOP and JDTC participants, respectively. For example, the lowest frequency of rearrests was found among AOP participants who received interventions with one responsivity-adherent

technique, and JDTC participants who received interventions that did not include responsivity-adherent techniques (23.08% and 12.7%, respectively). The highest frequency of rearrests was found among AOP participants with a score of three on responsivity adherence (70.6%), and JDTC participants with a five (42.9%).[12] However, the results can be explained partially by the number of participants in each level. For example, only 25 AOP participants scored three but 2,999 scored five. This was also reflected in the low correlation between rearrests and responsivity adherence for both AOP, $r(5,113) = 0.05$, $p < .001$, and JDTC participants, $r(810) = 0.21$, $p < .001$. Although distributional properties likely influenced these findings, more of it, as noted later, could relate to inadequacies in way the responsivity principle was articulated and the measure of it in this study.

The multilevel analyses among AOP participants did not demonstrate a significant association between individual- or program-level responsivity adherence and rearrests. The examination of the relationship between responsivity adherence and rearrests among JDTC participants indicated a different pattern of findings. That is, there was a significant positive association between responsivity adherence and rearrest where a higher responsivity score was associated with an increase in the odds of rearrest. This contradicted the direction hypothesized.

Although further exploration will help to clarify the relationship between responsivity adherence and recidivism (Andrews & Bonta, 2010), a number of factors may account for the unexpected findings in the current research. Most notable among these is the way interventions were classified according to how they were supposed to be

[12] Only one JDTC participant received an intervention with one criterion, and was excluded for the purpose of this comparison.

implemented, rather than their actual implementation. Analyses could not control for implementation fidelity. Implementation fidelity and actual adherence to the intervention model were not examined because they were not part of the data set examined. Because this was an analysis of a secondary data set of information collected between 2002 and 2011, it was not possible to conduct observations or any other measure of implementation integrity. Lowenkamp, Latessa and Smith (2006) stated that absent, poor, or incorrect implementation can reduce a program's treatment effect. Using meta-analytic data, Andrews and Dowden (2005) noted an association between program integrity and recidivism, with greater integrity increasing treatment effectiveness as evidenced by reductions in recidivism. More specifically, they observed the positive influence of program integrity only among programs that adhered to the RNR model (phi coefficient = .21). Gendreau and Goggin (1996) reported that implementation fidelity could also potentially affect a program's sustainability. For the current study, a similar pattern could have emerged among well-implemented programs adhering to RNR, but this simply could be determined. Therefore, although findings were opposite to that expected, this could be due to the fact that some, possibly most, of the programs adhered to the "paper model" of the intervention, but in truth failed to implement with any kind of fidelity. In light of the literature that shows that treatment staff turnover is common, training and cross-training is limited, and treatment integrity protocols are absent from most programs, this is an obvious direction in which future research should develop.

Substance use. To date, the RNR model and its association with substance use has been explored only twice (Prendergast, Pearson, Podus et al., 2013; Wooditch, Tang & Taxman, 2014). Therefore, the current analyses expanded this area of empirical

inquiry. To do this, an individual-level measure of the average substance use severity during the six months following baseline was used.

Bivariate analyses, however, failed to demonstrate a clear pattern, with only a weak correlation between responsivity adherence and substance use severity for AOP participants, $r(7,177) = -.259$, $p < .001$, and JDTC participants, $r(1,045) = 0.269$, $p < .001$. AOP participants with the lowest average substance use severity score received interventions with a one or four on responsivity adherence, and JDTC participants with the lowest substance use severity (0.078) received interventions with a zero on responsivity adherence.[13]

Neither individual- nor program-level responsivity adherence was significantly associated with substance use severity score. This could be due to the lack of specification for responsivity adherence. This may have hindered the ability to observe the potential role that responsivity adherence could play in reducing substance use severity score. Cognitive-behavioral therapy has been frequently cited as an effective model for treating substance use and abuse (Barry & Petry, 2009). As Andrews and Bonta (2010) asserted that the CBT model is consistent with the responsivity principle, one would expect that adhering to the responsivity principle could effect a reduction in substance use and abuse.

The findings among AOP participants supports recent studies that did not show an association between responsivity adherence and substance use outcomes. However, as there have been few studies exploring the RNR model in this context, better operationalization and measurement of responsivity adherence will be needed in future research. Andrews and Bonta (2010) provided few details regarding the implementation

[13] This result should be taken cautiously due to the low number of treatment interventions with zero criteria.

of responsivity adherence in treatment practice. The current research helped to contribute to this knowledge by examining whether the number of responsivity-adherent techniques aids in the reduction of substance use severity score. The absence of an association does not negate the possibility of an association, but rather suggests that an influence of responsivity adherence and substance use severity may be more complex.

Among JDTCs, the findings demonstrated a significant positive association between responsivity adherence and substance use severity score ($p < .001$), which indicated that an increase in responsivity-adherent techniques was associated with an increase in substance use severity score. It is possible that the combined commitments of the treatment interventions provided and those of the JDTC model were too much for the JDTC participants to manage. This could have served as a trigger for continued substance use. As stated, the JDTC model combines court-supervision with substance abuse treatment (NDCI, 2003). The court-supervision aspect includes frequent status hearings, case management, and the use of behavior modification. In addition to the requirements of the JDTC, participants must engage in the obligations of their substance abuse treatment intervention. As responsivity adherence includes six potential techniques, interventions with more responsivity-adherent techniques received a higher score. Therefore, JDTC participants who received interventions with more responsivity-adherent techniques may have received more treatment commitments than those receiving interventions with fewer responsivity-adherent techniques. It is possible that, in the case of JDTC participation, the addition of responsivity-adherent treatment interventions could have resulted in the depreciation of the potential benefits of responsivity adherence. It could be more beneficial for JDTCs to incorporate treatment

interventions that may complement the demands of the JDTC model rather than add to it. Among JDTC participants, the adage that "less is more" may be appropriate.

Implications. This research began the exploration of responsivity specification by looking at the number of responsivity-adherent techniques that treatment interventions included in their design. Treatment interventions could have a maximum of six techniques. There was no distinction made regarding which techniques were included in the treatment models. Based on the description of responsivity adherence, one could surmise that the presence of one technique could result in lower recidivism, or that all techniques are needed. One could also infer that some techniques may be more effective than other techniques. This examination provided the opportunity to determine if the number of responsivity-adherent techniques determines responsivity adherence, and if an increasing number of techniques are associated with a stronger treatment effect.

Theory. The key conclusion from these results regarding the responsivity principle is the need to specify what it means to "adhere to the responsivity principle." As it stands, the listing of techniques is broad. In *Psychology of Criminal Conduct*, Andrews and Bonta (2010) state, "…one should use social learning and cognitive-behavioral styles of service to bring about change. These powerful influence strategies include modeling, reinforcement, role playing, skill building, modification of thoughts and emotions through cognitive restructuring, and practicing new, low-risk alternative behaviors over and over again…" (p. 50). Yet, they did not elaborate on these techniques. They did not state whether all techniques, some techniques, or only one technique is necessary for responsivity adherence. They also did not state whether programs should include cognitive-behavioral therapy (CBT) or cognitive-social learning

(CSL) components or if programs should include the full "name-brand" CBT or CSL. Even in their expanded model, responsivity is described as follows, "Maximiz[ing] the offender's ability to learn from a rehabilitative intervention by providing cognitive behavioral treatment and tailoring the intervention to the learning style, motivation, abilities, and strengths of the offender," (Andrews, Bonta, & Wormith, 2011, p. 738). They described the responsivity principle as, "Us[ing] cognitive-social learning methods to influence behavior," (Andrews, Bonta, & Wormith, 2011, p. 738). Both descriptions are incomplete and do not provide guidance on how adherence to the responsivity principle would be implemented in practice.

The techniques, as described by Andrews and Bonta (2010), may be too broad to guide treatment practice, and may need to be clarified. These definitions may simply need better conceptualization, as well as direction on how they all relate to one another and the responsivity principle. Perhaps, further elaboration regarding why these specific techniques are recommended could help to provide a better understanding of the responsivity principle and its practical application. For example, the authors include "skills building" in their list of responsivity-adherent techniques, but what type of skills should be built during programming? Is there a minimum for the level of expertise needed or the number of skills needed? Similarly, they included "repeated practice of alternative behaviors," yet they did not provide dosage recommendations. How frequently should these alternative behaviors be practiced and over what period?

On the other hand, the responsivity principle may not be relevant to adolescents. Much of the research concerning adolescent substance abuse treatment notes the importance of family interventions (Alarid, Montemayor, & Dannhaus, 2012; Bertrand,

Richer, Bruenelle et al., 2012; Brannigan, 2003; Hogue & Liddle, 2009). Consequently, family interventions may be more effective among adolescents than treatment interventions that adhere to the responsivity principle. An additional possibility is that the responsivity principle may need to be modified to fit juvenile offenders. The RNR model was developed using adult research. Therefore, the six techniques listed by Andrews and Bonta (2010) may need to be specified to include the most relevant techniques for juveniles.

Practice. Although the findings from the responsivity analyses were conflicting between the AOPs and JDTCs, they still offer implications for practice. As noted, the association between responsivity adherence and both outcomes may be more complex than simply adding the number of responsivity adherent techniques. One issue addressed by Andrews, Bonta, and Wormith (2011) is the overmanualization of treatment using the RNR model. A similar issue could arise with the responsivity principle, specifically due to the lack of specification for implementing the principle. Among the AOPs, the findings suggest that the number of techniques included in treatment does not necessarily increase treatment effect.

An additional implication is the possible incongruence between the responsivity principle and JDTCs. The results demonstrated a negative association between responsivity adherence and treatment outcomes among JDTC participants. The JDTC model incorporates a highly structured model for participants. Those interventions with a higher responsivity adherence score included more techniques, and JDTC participants receiving those interventions had worse outcomes. Therefore, JDTCs may not need to incorporate responsivity-adherence in their model, but rather may need to focus on those

interventions that are more compatible with the JDTC model. The National Council of Juvenile and Family Court Judges developed a list of potential interventions for inclusion in JDTCs (National Council of Juvenile and Family Court Judges, 2011). Interventions, such as MET/CBT, 7C, and MST were included in their listing of effective interventions. This could be a good resource for JDTC staff who are interested in incorporating potentially effective treatment interventions.

It is also possible that JDTC programs were violating the risk principle, which could have resulted in the conflicting findings. As previously stated, the risk principle states that higher intensity programs should be reserved for higher risk offenders (Andrews & Bonta, 2010). JDTC programs are relatively intensive interventions, with participants receiving biweekly status hearings, along with a case manager and receiving substance abuse treatment. Yet, these programs generally target first time drug offenders (NDCI, 2003). Therefore, individuals who may be low risk are being placed into a program with high intensity. This could have undermined the ability of the analyses to capture an effect from responsivity adherence. If JDTCs in the sample were violating the risk principle, it is possible that involvement in these programs did more harm than good, as seen in the Cambridge-Somerville Youth Study (Cabot, 1950; Powers & Witmer, 1951).

Additionally, practitioners could consider incorporating adherence to the specific responsivity principle. While adherence to the general responsivity principle could be effective, it is also be important for practitioners to address specific responsivity considerations. One criticism that Andrews and Bonta (2011) had addressed was the accusation that the RNR model is manualized. However, the authors asserted that the

RNR model is not meant for providing manualized treatment. In addition to addressing risk and needs, treatment providers should also address specific responsivity factors that could impede treatment engagement. The current analyses did not include an examination of whether specific responsivity factors were being addressed. Yet, it is possible that to fully understand responsivity adherence, one must consider both general and specific responsivity adherence. As such, when seeking to improve adherence to the responsivity principle, practitioners should go beyond providing the six techniques listed by Andrews and Bonta (2010) and address specific responsivity factors, as well.

Policy. The policy implications of the current study include funding for research that can help clarify the responsivity principle. Grants could be given to researchers seeking to specify the criteria for adherence to the responsivity principle, explore the relevance of the responsivity principle to juveniles, and help increase accountability to ensure implementation fidelity for responsivity adherence. Future policy implications include funding for programs that adhere to the responsivity principle. This could serve as an incentive for programs that are providing responsivity adherent interventions to continue or improve adherence to the principle, and it could be an incentive for programs that are not providing responsivity adherent interventions to incorporate them.

Future Directions for Research. Further research should include comparisons between the techniques proposed by Andrews and Bonta (2010). Certain techniques or certain combinations of techniques may be more effective than other techniques or combinations. This could be similar to the circumstance found when examining the effect of correctional programs on recidivism. Rather than looking at treatment programs as a whole, it was necessary to categorize programs as appropriate, inappropriate,

unspecified, and sanctioning (Andrews, Zinger Hoge et al., 1990). It may be necessary to pull apart the techniques proposed as "responsivity-adherent," rather than looking at the principle as a whole. The effect of individual techniques or interactions between these techniques may help to clarify the responsivity principle. It will be essential to explore this through experimental and quasi-experimental studies, meta-analyses, observations, interviews, and reviews of the existing literature. As it stands, a listing of six techniques without further elaboration does not provide much guidance regarding what is needed for responsivity adherence in practice. A repetitive critique of the principle is the lack of clarity regarding the practical application of the responsivity principle in real world settings (Polasheck, 2012). Due to the loose specification of responsivity adherence, it appeared that most interventions in the data set could be considered as adhering to the principle (elaborated further in the Limitations).

Further, these conflicting findings may have occurred because the analyses did not account for an interaction between the risk and need principles. While the analyses did account for risk, they did not explore an interaction. In a similar vein, it is possible that responsivity works best in concert with the risk and need principles. For example, Thanner & Taxman (2003) found an interaction between risk and responsivity. Specifically, high-risk offenders benefited from high-intensity, cognitive-behavioral programming compared to their counterparts in the control group. Further research would benefit from an examination of the combination and interaction between these principles. Bonta and Andrews (2007) proposed a similar idea, where they found that adherence to two or three principles increased the effectiveness of treatment interventions.

Evidence-based Treatment

Rearrests. The analyses also examined the association between EBT use scores and rearrests among AOPs and JDTCs. EBT use score was measured as an interval scale at the individual-level using NREPP ratings for treatment interventions and ratings conducted by the investigator using NREPP criteria. These scores were aggregated to the program-level to reflect the provision of EBTs in each program.

As seen in Table 17 and Table 34, there was no discernible bivariate pattern in the association between EBT use scores and rearrests among AOP and JDTC participants. For example, AOP participants who received interventions with an EBT use score of 3.43 had the lowest percentage of rearrests (14.93%), those who received interventions with an EBT use score of 3.42 had the highest percentage of rearrests (66.67%). Similarly, JDTC participants who received interventions with an EBT use score of 2.75 had the lowest percentage of rearrests (12.41%), while JDTC participants who received interventions with an EBT use score of 3.75 had the highest percentage of rearrests (57.89%). These results could be explained, in part, by the distribution of participants at each level of the EBT use scores. For example, only 25 AOP participants received interventions with an EBT use score of 3.42, while 3,391 AOP participants received a score of 3.60. Similarly, 40 JDTC participants received interventions with an EBT use score of 3.75, and 330 JDTC participants score of 2.75. This was also reflected in the absence of a significant correlation between EBT use scores and rearrest for AOP participants, $r(5713) = -0.024$, ns, and the low correlation between EBT use scores and rearrests for JDTC participants, $r(872) = 0.133$, $p < .001$. Although the distribution across EBT use levels may have

influenced the findings, the measurement of EBT use (as explained below) also may have been a factor.

Further analyses among AOPs demonstrated that there was a significant negative association between individual-level EBT use scores and rearrests. This association persisted even with the addition of program-level EBT use scores, though there was no significant association between program-level EBT use scores and rearrests. The results of the EBT analyses among JDTCs were different from those found among the AOP sample, as there was a significant positive association between EBT use scores and rearrests using the conventional alpha level ($p < .05$), though not under the adjusted alpha level ($p < .01$). The association demonstrated that an increase in EBT use score was associated with an increase in the odds of rearrest, which was the opposite of the direction hypothesized.

While the findings among the AOPs partially supported the expectation that higher EBT use scores would be associated with a reduction in recidivism, the findings among the JDTCs did not support this expectation. As the treatment interventions were added to the JDTC structure, it is possible that certain types of interventions work best with the JDTC model. Previous studies examining the use of EBTs in JDTCs specifically examined MST and contingency management (Henggeler et al., 2006). JDTCs that incorporated these interventions were compared to traditional JDTC treatment and family court, and the results demonstrated an increase in JDTC effectiveness when these interventions were included. As previously mentioned, certain treatment models may complement the demand inherent in the JDTC structure. For example, contingency management in substance use treatment is the provision of tangible rewards in the

presence of abstinence from substance misuse (Petry, 2011). Further, while MST is an intensive treatment intervention, it incorporates the family in the treatment process and the MST therapist tailors the intervention to the unique needs of the juvenile and family (Henggeler, 2001; Schoenwald, Brown, & Henggeler, 2000). Thus, is possible that the effectiveness of EBTs in JDTCs may be dependent on the structure of the intervention included.

Substance use. Similarly, the analyses included an examination of the association between EBT use scores and substance use severity score, and as shown in Table 18 and Table 35, there was no discernible pattern observed. Among AOPs, participants who received interventions with an EBT use score of 3.03 had the lowest substance use severity score (0.103), and AOP participants who received treatment interventions with an EBT use score of 3.43 had the highest substance use severity score (0.417). Among JDTCs, participants who received interventions with an EBT use score of 3.30 had the lowest substance use severity score (0.059), and participants who received interventions with an EBT use score of 3.30 had the highest substance use severity score (0.266). As noted with rearrests, the varying distribution of participants across EBT use levels may have influenced these bivariate findings. Additionally, the absence of a clear pattern may have been due to the low correlation between EBT use and substance use severity for both AOP participants, $r(7934) = -0.05, p < .001$, and JDTC participants, $r(1,151) = 0.148, p < .001$.

Multilevel analyses showed that individual-level and program-level EBT use scores were not significantly associated with substance use severity score among AOPs. Among JDTCs, there was a significant positive association between EBT use scores and

substance use severity score. An increase in EBT use score was associated with an increase in substance use severity score.

The absence of significant associations regarding EBT use scores among AOPs could be due to incorrect or inconsistent implementation of the treatment interventions across individuals, as incorrect implementation may muddle a program's treatment effect (Lowenkamp, Latessa, & Smith, 2006). However, there was no way to control for implementation fidelity in the analyses or to verify the methods in which the treatment interventions were implemented to the individuals in the sample.

Additionally, the JDTC results contradicted the findings from recent studies that indicated a stronger effect among JDTCs using EBTs than those without (Henggeler et al., 2006). The hypotheses stated that substance use severity scores would be lower among JDTC participants receiving interventions with higher EBT use scores, but this was not the case. However, as mentioned, this could be due to incongruence between the obligations of JDTC structure and the treatment interventions participants received. Those programs with higher EBT use scores could have been incompatible with the JDTC model and commitments. This topic should be explored further to determine which treatment interventions could be more compatible with JDTCs.

Implications. Many treatment interventions have been classified as "evidence-based," but this classification appears to be largely subjective. Repositories, such as the Blueprints for Healthy Youth Development, provide directions regarding effective interventions, but the techniques are not consistent across repositories and they vary in the number of interventions evaluated. One repository that has been widely accepted is National Registry of Evidence-based Programs and Practices (NREPP). The

interventions reviewed by NREPP are evaluated based on the quality of the research used to examine them, as well as their readiness for dissemination. The current research classified interventions as evidence-based using the NREPP's techniques for the *quality of research*, on a scale of 0 to 4.00.

Theory. While evidence-based treatment is, by definition, classified using empirical support, clarification of the "evidence-base" may benefit from a theoretical basis. As stated, the criteria used to classify interventions vary by the repositories in which lists are found, or the perspective of the individuals referring to interventions as "evidence-based." For example, NREPP (2014) classifies interventions based on the quality of the research and treatment readiness. Blueprints for Healthy Youth Development (2014) considers "intervention specificity, "evaluation quality," "dissemination readiness," and a "sustained positive impact." As such, EBT classification for juvenile substance abuse treatment may benefit through the use of an EBT theory to drive how interventions are classified. This may help to reduce the number of repositories with varying criteria and varying interventions that are classified as "evidence-based."

Practice. The multilevel analyses of AOPs did not demonstrate a significant association between EBT use scores and treatment outcomes. However, the JDTC analyses demonstrated a significant, positive association between EBT use scores and treatment outcomes. The odds of rearrest were greater among individuals who received interventions with higher EBT use scores, and these individuals had higher substance use severity scores. The inconsistency between the AOP EBT analyses and the JDTC EBT analyses could be due to the addition of the JDTC model in the assistance juveniles

received. As mentioned, the JDTC model combined court-supervision with substance abuse treatment. Therefore, the JDTC model and the treatment interventions received could have been incompatible. As noted, further research should include an examination of the interventions incorporated in the JDTC model, to determine which are best for participants.

Policy. The policy implications of the EBT analyses are similar to those suggested for responsivity adherence. Government funding could be provided to improve EBT research. Specifically, this funding could help to develop a classification system for evidence-based treatment interventions and to expand Crimesolutions.gov to ensure that it is more comprehensive in the interventions classified.

Future policy implications could include the provision of funding to treatment providers that use evidence-based treatment and to provide accountability to ensure that the interventions are implemented with fidelity. This accountability could include more detailed reporting on types of interventions provided to ensure that they are evidence-based.

Future Directions for Research. Further exploration could use the repository provided by The Office of Justice Programs (CrimeSolutions.gov). These interventions are classified according to the strength of the research evaluating their effectiveness, as well as their effect size. While this repository could not be used for the current research, due to the small number of interventions included in the data set that were classified, it does provide a viable option for future evaluations of EBTs.

It is also possible that there was a contrast between AOP and JDTC analyses due to the control for program-level impact included in the AOP analyses. This data set only

included a small number of JDTC programs (N = 10), thus multilevel modeling was not used. As the JDTC analyses were conducted at the individual-level, the JDTC programs could have provided an unknown influence on the results. Future research exploring the impact of EBTs among JDTCs should include a larger number of JDTC programs with a larger number of participants. This could allow for multilevel analyses of program-level and individual-level influence of EBT use scores.

Sociodemographic Factors

Rearrests. While sociodemographic factors did contribute to the variation in rearrests among AOP programs, they did not fully account for it. The results demonstrated the same pattern of associations, between the sociodemographic factors and rearrests, across all AOP models. Gender was significantly associated with rearrests, with the odds of rearrest greater for males than for females (1.393-1.538). This result coincides with Cottle et al.'s (2001) meta-analysis that being male has been associated with higher recidivism. The odds of rearrest were greater for individuals classified as higher risk (1.338-1.379) than those classified as lower-risk. This supports the research pertaining to the risk principle, which states that individuals at a higher risk level are more likely to be rearrested (Andrews & Bonta, 2010; Andrews, Bonta, Hoge et al., 1990). The odds of rearrest were higher for individuals reporting five or more previous arrests (1.528-1.686) than for individuals with fewer previous arrests. This coincides with the meta-analysis conducted by Cottle et al. (2001) which showed previous delinquent behavior and a higher number of previous arrests were associated with recidivism.

Similarly, sociodemographic factors accounted for a portion of the variation in rearrests among JDTC participants (13.4%). Among the factors significantly associated with rearrests was risk level, which was significantly associated with rearrests across all models. The odds of rearrest were greater among individuals at a higher risk level, 1.344-1.366. Arrest history was also significantly associated with rearrests across all models (1.899-2.634). Among JDTC participants, first use of a substance before the age of 15 was significantly associated with rearrests across all models (2.223-2.506); therefore, the odds of rearrest were greater among individuals whose first use of a substance occurred before the age of 15.

Substance use. Among AOPs, findings demonstrated that sociodemographic factors contributed to the variation in substance use severity score, though these characteristics did not fully account for the variation, and significant variation remained. Yet, with the progression of models analyzed, the pattern of findings showed that numerous characteristics remained significantly associated with substance use severity scores. Specifically, in all models, gender was significantly associated with substance use severity, with males associated with a substance use severity scores ranging from 0.017 to 0.019 higher than females. This pattern contradicts previous findings that have shown that female adolescents are more likely to develop substance use dependence (Kloos, Weller, Chan, & Weller, 2009).

Age remained significantly associated with substance use severity scores across all models. Older participants were significantly associated with a higher substance use severity scores, though, this could be an artifact from an analysis of juveniles. Younger

juveniles have not had the time to develop a more severe substance use pattern, which could have resulted in lower severity scores.

As expected, higher risk level was associated with higher substance use severity scores. Individuals classified as higher risk were associated with a higher substance use severity scores ranging from 0.021 and 0.022. Living in a single parent household was consistently associated with a higher substance use severity scores across models (0.014 and 0.015). Illegal activity among peers was consistently associated with substance use severity scores across models (ranging from 0.029 and 0.031). Individuals who had peers that were involved in illegal activity also had higher substance use severity score than those who did not have peers involved in illegal activity. Similarly, individuals with illegal activity in their home were associated with higher substance use severity score, ranging from 0.012-0.013, than individuals who did not have illegal activity in their home. The association between illegal activity in the home and substance use severity score was consistent across models, though it should be noted that this association was significant at the conventional alpha level ($p < .05$) rather than at the adjusted alpha level ($p < .005$).

First use of a substance before the age of 15 was significantly associated with substance use severity scores across models. Individuals who reported that their first use of a substance occurred before the age of 15 had higher substance use severity scores than those whose first use occurred after the age of 15. Earlier age of onset was associated with increase in substance use severity ranging from, 0.025 to 0.029.

Among JDTC participants, sociodemographic factors accounted for 16% of the variance in substance use severity scores. Gender, illegal activity among peers and risk

level showed the same pattern of association with substance use severity scores as they did among AOP participants. Similarly, age and first use of a substance before the age of 15 were significantly associated with substance use severity scores, but they ceased to be significant under the adjusted alpha level ($p < .01$) after responsivity adherence was included in the model, although they remained significant under the conventional alpha level ($p < .05$).

Other characteristics were significantly associated with substance use severity scores among the JDTC sample that were not significant among the AOP sample. Specifically, across all JDTC models, African American participants were associated with lower substance use severity scores than other participants. The reduction ranged from 0.062-0.089. Additionally, reporting five or more previous arrests was associated with higher substance use severity scores across all models, as compared to reporting fewer previous arrests. This increase ranged from 0.041-0.084.

Responsivity Adherence and EBTS

The analyses also suggested the possibility of overlap between responsivity adherence and evidence-based treatment. As noted previously, there was a significant correlation between both variables; therefore, they were analyzed separately. Additional analyses included a comparison between responsivity adherence classification and EBT use score for each intervention in the data set (see Appendix K-Table 68). The scores on each variable were remarkably similar for numerous interventions. For example, ACRA/ACC included five responsivity-adherent techniques and also received an EBT use score of 3.3. FSN included all six responsivity-adherent techniques and received an EBT use score of 3.7. There were also some interventions with contradictory scoring; for

instance, MDFT could not be classified on responsivity adherence, yet it received a 3.43 EBT use score.

Further analyses (see Appendix K-Tables 69 and 70) included crosstabulations between responsivity adherence and EBT use score. The chi-square test was significant among the AOP sample, $\chi^2(24, N = 7341) = 23406.708$, $p < .001$, and the JDTC sample, $\chi^2(28, N = 1069) = 4262.343$, $p < .001$. These analyses showed some congruency between responsivity adherence classification and EBT use score. For example, among AOP participants, the majority of participants (98.4%) received interventions classified as including one responsivity-adherent criterion and an EBT use score of 2.80. Additionally, all of the interventions classified as having six responsivity-adherent criteria also received an EBT use score 3.60 and above. Similarly, among JDTC participants, all of the interventions that met five responsivity-adherent criteria also received an EBT use score of 3.30. However, 99.0% of JDTC participants who received an intervention that met four responsivity-adherent criteria also received an intervention with an EBT use score of 3.70. Although there were some deviations, the majority of interventions that were classified on responsivity adherence received comparable EBT use scores.

Theory. The theoretical implications include the possible merge between responsivity adherence and evidence-based treatment, particularly by including evidence-based treatment as a criterion for responsivity adherence. The responsivity principle states that the program structure should be based on a theoretically relevant model that effects change in the individual. A modification to this principle could be the addition of "an empirically-supported model," particularly with a large effect size.

Practice. In treatment, this could mean careful consideration of both the responsivity principle and EBTs when selecting treatment interventions and choosing interventions that are empirically supported and are consistent with the responsivity principle. Although the responsivity principle has not been fully specified yet, the six techniques provide a starting point in selecting responsivity-adherent interventions. As mentioned, CrimeSolutions.gov considers research methodology and effect size. This classification system could be used to determine which interventions are empirically supported. Although it is not a comprehensive list, it may expand as more research is conducted to determine the best methods of classifying treatment interventions as "evidence-based."

Future directions for research. To date, responsivity adherence and EBTs have not been simultaneously explored in one study. While the two areas were analyzed separately, their significant correlation suggests the possibility that there may be conceptual overlap between responsivity adherence and EBTs. As such, future research should explore the possible congruence between responsivity adherence and EBTs. It is possible that the inclusion of EBTs as a criterion for the responsivity principle could help to provide some clarification for responsivity adherence.

Program Variation

Finally, the results demonstrated significant remaining variation between AOP programs. Therefore, while taking into account the factors that could have contributed to the variation between programs in rearrests and substance use severity, there was still significant variation between programs in their treatment effect. As such, other factors that were not considered in the models may have contributed to this variation.

This could possibly be due to the inclusion of only program-level responsivity adherence and EBTs in the models. The inclusion of more contextual factors in the models could help to provide clarification on the factors that account for the wide range in effectiveness among AOP programs. For example, locale, the aggregated risk level, and the proportions of various racial/ethnic groups could all help to contribute to the variation in treatment effectiveness. Additionally, other organizational factors could have contributed to the effectiveness or noneffectiveness of AOP programs, including the qualifications of program staff, stakeholder support, and political climate.

Future directions for research. This could be explored in the future by including a wider range of contextual factors in multilevel models, as well as the use of qualitative methods. For example, through interviewing staff and examining the treatment manuals guiding the programs. Additionally, interviews with key stakeholders, and an examination of the political climate around the time of the data collection could also help to provide insight into program effectiveness. Further research could also include an examination of staff turnover and staff training.

Strengths of Current Study

One strength of the current research was the breakdown of the responsivity principle by examining the number of responsivity-adherent techniques. To date, adherence to the responsivity principle has been described as the use of cognitive-behavioral or cognitive-social learning models. This study expanded on the topic of responsivity adherence by examining whether the number of responsivity-adherent techniques corresponded to a reduction in recidivism and substance use. This helps to encourage the dialogue pertaining to responsivity adherence beyond a broad statement of

"cognitive-behavioral treatment or cognitive-social learning models" to the specific techniques classified as "responsivity-adherent."

Another strength was the application of the responsivity principle to substance abuse treatment and substance use outcome. As mentioned, the risk-need-responsivity model has only been applied to the substance abuse treatment context four times, two of which were in the drug treatment court context and it has only been examined in reference to its association with substance use outcome twice (Prendergast, Pearson, Podus et al., 2013; Wooditch, Tang & Taxman, 2014). To date, the focus of the RNR model has been recidivism outcomes. This study expanded on the empirical research regarding treatment outcome, to determine if the RNR model, specifically the responsivity principle, is associated with substance use outcomes.

An additional strength of the current research was the use of a scale classifying treatment interventions in regards to their evidence-base. As it stands, many interventions have been classified as evidence-based subjectively, without the use of a scale. By using NREPP scale in the current study, the majority of interventions in the data set were categorized in a way that had been previously validated by independent reviewers. This helped to provide more reliability to the measurement and classification of each intervention. Moreover, previously interventions were simply compared with other interventions without taking into account the strength of the evidence supporting them. This research will contribute the dialogue regarding EBTs through the use of an interval scale to determine if higher EBT use scores were associated with a reduction in substance use severity or rearrests.

Limitations of the Current Study

One limitation to this research is the short follow-up period. A six month follow-up period is frequently cited as a limitation in previous JDTC effectiveness studies. Due to attrition (largely due to programs that opted out of the optional nine and twelve month follow-up), using data from the six month period following treatment provided the largest proportion of participants with the longest follow-up period.

Similarly, another limitation due to the absence of follow-ups could be potential inaccuracy in the treatment outcomes. Eighteen percent of AOP participants and twenty-seven percent of JDTC participants only had a three or six month follow-up; therefore, their outcomes only represent the one follow-up period rather than both. Additionally, individuals who were in custody at the time of the assessment period may not have received a follow-up. Although this would have been a small number, these individuals may have been at a higher risk level than those who were not in custody.

Additionally, the data set did not include information regarding implementation fidelity. As the data were collected between 2002 through 2011, this information would not have been available equally across programs had the information been collected during the research period. Interventions were classified in their responsivity adherence based on how the interventions were structured, but not according to their implementation. As such, implementation integrity may have had an unknown influence on the findings.

Similarly, the data set did not include data that captured the court processes included in JDTCs, for example number of court sessions participants attended, urinalyses, sanctions, and rewards. As such, these analyses could only capture the

treatment aspect of JDTCs. However, measures of responsivity adherence in JDTCs should measure adherence in the substance abuse treatment as well as the court process.

Additionally, the data set did not include reconviction as an outcome measure. As such, the analyses were limited to the sole use of rearrest as the recidivism outcome. This could have impacted the findings, as rearrest may be a more accurate measure of police contact, rather than sole criminal behavior. On the hand, reconviction is a narrower measure of recidivism, as it occurs later in the adjudication process. For this same reason, however, reconviction may be too narrow for measuring criminal behavior and it could also capture other factors such as decision-making in the adjudication process. Consequently, the absence of a reconviction may not necessarily equate to the absence of involvement in criminal behavior. In a monograph providing guidance for the evaluation of juvenile justice programs, the Bureau of Justice Assistance (1989) stated that recidivism measures should be the closest to the behavior of interest. As such, rearrest may still be the best measure of recidivism for the purpose of the current research as many other factors could influence the presence of a reconviction.

The classification method for responsivity adherence may also be a limitation. Due to lack of previous specification for the responsivity principle, the analyses included a new method of operationalization. While this aided in a more objective examination of the principle, it could have resulted in an over-inclusive variable. This could have limited the ability to distinguish between programs that could truly be classified as adhering to the responsivity principle and those that could not.

Similarly, this also limited the dispersion of the variable. Most of the AOP cases were clustered on five responsivity-adherent techniques, and there was no representation

for interventions with three responsivity-adherent techniques or zero techniques. Additionally, fewer participants received interventions with lower responsivity-adherent scores. Similarly, only one JDTC participant received an intervention with one responsivity adherent technique, and there were no JDTC participants who received interventions with two or three techniques. The majority of JDTC participants received intervention meeting four to six techniques. This may have limited the ability of the responsivity adherence variable to fully measure the influence of responsivity adherence on rearrests and substance use severity.

Further, there was a ceiling effect on the responsivity adherence variable. This variable was structured using the criteria for responsivity adherence put forth by Andrews and Bonta (2006). This resulted in a maximum score of six for each intervention. It is possible that the interventions may have included other techniques that could be consistent with the responsivity principle that were not included in the operationalization of responsivity adherence. Therefore, the interventions in the data set were unable to improve upon this early specification.

Additionally, there were a number of interventions that could not be classified as adhering or not adhering to the responsivity principle. These were removed from the responsivity analyses, and as a result, any potential insight that could have been gained by including them in the models was lost. As noted above, the responsivity principle may need to be modified for juvenile offenders. Two empirically supported interventions, Multisystemic Therapy and Multidimentional Family Therapy, were classified as unspecified. Therefore, the models were not able to capture any potential direction these models may have contributed to responsivity specification.

There were similar limitations for the EBT variable. The majority of interventions were rated by trained NREPP reviewers, and three interventions were rated by the investigator. Although inter-rater consistency was examined prior to the final ratings, these ratings did not undergo the same rigorous check that NREPP ratings receive. Therefore, these ratings may not have been as reliable as those provided by NREPP.

Similar to responsivity adherence, there was a lack of dispersion across the EBT variable, with the majority of AOP participants clustered on interventions with an EBT use score of 3.60 and the majority of JDTC participants clustered on interventions with an EBT use score of 3.30. This may have diminished the ability for the models to fully measure the association between EBT use score and rearrests and substance use severity. Similarly, the analyses used different programs from those rated in the NREPP reviews. Therefore, the methods used at the sites in the data set may have varied from those used in the studies rated by NREPP. As such, the score provided by NREPP may not have been fully captured by those interventions included in this study.

There was also a ceiling effect for the EBT variable. The NREPP classification system was used in the analyses; therefore, interventions could only receive a maximum EBT use score of 4.00. By default, the EBT use score did not take into account other factors that could have improved empirical support, for example, replication of treatment structure or generalizability.

The NREPP ratings examine the quality of the research, and do not include the effect size. As such, an intervention could include highly rated methodology, with a small effect size. While the high rating might suggest empirical support, the effect size

could show that the intervention may not be as effective for its particular outcome. Therefore, those interventions that received a 3.75 on the NREPP ratings may not have comparable effects on their respective outcomes. This limited the current analyses as the EBT use score may not have been able to truly distinguish between interventions with a stronger evidence-base from those with a weaker evidence-base.

Finally, this study may be limited in its generalizability to the wider adolescent substance abuse treatment population. The programs included in the data file responded to funding solicitations with the aim of improving treatment. As such, these programs may have been more motivated for improving their program than the typical AOP programs and JDTCs.

Conclusion

Few studies, to date, have examined the impact of responsivity adherence and EBTs among AOPs or JDTCs. The majority of research examining the RNR model has focused on the risk and need principles, and there continues to be limited empirical research on the responsivity principle. Similarly, many studies of adolescent outpatient substance abuse treatment focus on the general substance-involved adolescent population and comparatively fewer have conducted a focused examination of treatment for juvenile offenders. In addition, most drug treatment court research focuses on adult programs, and comparatively fewer examine the effectiveness of JDTCs. Even fewer have explored the effect of EBTs in outpatient treatment for juvenile offenders or JDTCs. The current study explored all three areas simultaneously by examining responsivity adherence and the use of EBTs in AOPs for juvenile offenders to observe their effect on recidivism and

substance use. The analyses were applied to JDTCs to help move the research forward on JDTC effectiveness.

Overall, the findings help to demonstrate the need for further specification and research on the responsivity principle, as well as the need for more rigorous classification of treatment interventions as "evidence-based." Despite the emergence of certain unexpected results, the findings support the potential use of the RNR model and EBT classification in AOPs and JDTCs, following the improvement of these methods of classification.

REFERENCES

Alarid, L.F., Montemayor, C.D., & Dannhaus, S. (2012). The effect of parental support on juvenile drug court completion and postprogram recidivism. *Youth Violence and Juvenile Justice, 10*(4), 354-369.

American Psychiatric Association. (1994). *Diagnostic and Statistical Manual Of Mental Disorders DSM-IV* (4th ed.). Arlington, VA: American Psychiatric Association.

Andrews, D.A., & Bonta, J. (2010). *The Psychology of Criminal Conduct* (5th ed.). New Providence, NJ: Matthew Bender & Company, Inc.

Andrews, D.A., Bonta, J., & Hoge, R.D. (1990). Classification for effective rehabilitation. *Criminal Justice and Behavior, 17*(1), 19-52.

Andrews, D.A., Bonta, J., & Wormith, J.S. (2011). The Risk-Need-Responsivity (RNR) model: Does adding the Good Lives Model contribute to effective crime prevention? *Criminal Justice and Behavior, 38*(7), 735-755.

Andrews, D.A., & Dowden, C. (2006). Risk principle of case classification in correctional treatment: A meta-analytic investigation. *International Journal of Offender Therapy and Comparative Criminology, 50*(1), 88-100.

Andrews, D.A., Guzzo, L., Raynor, P., Rowe, R.C., Rettinger, L.J., Brews, A., & Wormith, J.S. (2012). Are the major risk/need factors predictive of both female and male reoffending?: A test with the eight domains of the Level Of Service/Case Management Inventory. *International Journal of Offender Therapy and Comparative Criminology, 56*(1), 113-133.

Andrews, D.A., Zinger, I., Hoge, R.D., Bonta, J., Gendreau, P., & Cullen, F.T. (1990). Does correctional treatment work - A clinically relevant and psychologically informed metaanalysis. *Criminology, 28*(3), 369-404.

Ashley, O.S., Marsden, M.E., & Brady, T.M. (2003). Effectiveness of substance abuse treatment programming for women: A review. *American Journal of Drug and Alcohol Abuse, 29*(1), 19(35).

Austin, A.M., Macgowan, M.J., & Wagner, E.F. (2005). Effective family-based interventions for adolescents with substance use problems: A systematic review. *Research on Social Work Practice, 15*(2), 67-83.

Austin, K.P., Kilgour, G., & Williams, M.W.M. (2011). The effectiveness of motivational interviewing with offenders: An outcome evaluation. *New Zealand Journal of Psychology, 40*(1), 55-67.

Babor, T.F., Hofmann, M., DelBoca, F.K., Hesselbrock, V., Meyer, R.E., Dolinsky, Z.S., & Rounsaville, B. (1992). Types of alcoholics, i: Evidence for an empirically derived typology based on indicators of vulnerability and severity. *Archives of General Psychiatry, 49*(8), 599-608

Baird, C. (2008). Treating women with children: What does the evidence say? *Journal of Addictions Nursing, 19*(2), 83-85.

Barry, D., & Petry, N.M. (2009). Chapter eight - cognitive behavioral treatments for substance use disorders. In M. M. Peter (Ed.), *Evidence-based addiction treatment* (pp. 157-174). San Diego: Academic Press.

Beck, V.S., Travis, L.F., & Ramsey, R.J. (2007). Juvenile specialty courts. In M. D. McShane & F. P. Williams (Eds.), *Youth violence and delinquency: Monsters and myths* (pp. 49-66). Westport, CT: Praeger Publishers.

Belenko, S. (2001). Research on drug courts: A critical review - 2001 update: The National Center on Addiction and Substance Abuse at Columbia University.

Belenko, S., & Dembo, R. (2003). Treating adolescent substance abuse problems in the juvenile drug court. *International Journal of Law and Psychiatry, 26*(1), 87-110.

Bender, K., Tripodi, S.J., Sarteschi, C., & Vaughn, M.G. (2011). A meta-analysis of interventions to reduce adolescent cannabis use. *Research on Social Work Practice, 21*(2), 153-164.

Bertrand, K., Richer, I., Brunelle, N., Beaudoin, I., Lemieux, A., & Ménard, J.-M. (2013). Substance abuse treatment for adolescents: How are family factors related to substance use change? *Journal of Psychoactive Drugs, 45*(1), 28-38.

Bloom, B. (1999). Gender-responsive programming for women offenders: Guiding principles and practices. *Forum on Corrections Research, 11*(3), 22-27.

Bloom, B., & Covington, S.S. (1998). Gender-specific programming for female offenders: What is it and why is it important? La Jolla, CA: The Center for Gender and Justice.

Bloom, B., Owen, B., Covington, S.S., & Raeder, M. (2002). Gender-responsive strategies: Research, practice, and guiding principles for women offenders. Washington, DC: National Institute of Corrections.

Bonta, J., & Andrews, D.A. (2003). A commentary on Ward and Stewart's model of human needs. *Psychology, Crime & Law, 9*(3), 215-218.

Bonta, J., & Andrews, D.A. (2007). Risk-Need-Responsivity model for offender assessment and rehabilitation: Her Majesty the Queen in Right of Canada.

Brannigan, R. (2003). Treating teens: A guide to adolescent drug programs. Washington, DC: Drug Strategies.

Bronfenbrenner, U. (1979). *The Ecology of Human Development: Experiments By Nature and Design*. Cambridge, Mass: Harvard University Press.

Cabot, P. S. (1940). A long-term study of children: The cambridge-somerville youth study. Child Development, 11(2), 143-151.

Chassin, L. (2008). Juvenile justice and substance use. *The Future of Children, 18*(2), 165-183.

Claus, R.E., Orwin, R.G., Kissin, W., Krupski, A., Campbell, K., & Stark, K. (2007). Does gender-specific substance abuse treatment for women promote continuity of care? *Journal of Substance Abuse Treatment, 32*(1), 27-39.

Conrad, K.J., Conrad, K.M., Dennis, M.L., Riley, B.B., & Funk, R. (2011). Validation of the Crime And Violence Scale (CVS) to the Rasch Measurement Model, GAIN Methods Report 1.2.

Conrad, K.J., Riley, B.B., Conrad, K.M., Chan, Y.-F., & Dennis, M.L. (2010). Validation of the Crime And Violence Scale (CVS) against the Rasch Measurement Model including differences by gender, race, and age. *Evaluation Review, 34*(2), 83-115.

Cottle, C.C., Lee, R.J., & Heilbrun, K. (2001). The prediction of criminal recidivism in juveniles. *Criminal Justice and Behavior, 28*(3), 367-394.

Covell, C.N., & Wheeler, J.G. (2011). Application of the responsivity principle to treatment of sexual offense behavior. *Journal of Forensic Psychology Practice, 11*(1), 61-72.

Covington, S.S., Burke, C., Keaton, S., & Norcott, C. (2008). Evaluation of a trauma-informed and gender-responsive intervention for women in drug treatment. *Journal of Psychoactive Drugs*, 387-398.

Cronbach, L.J. (1951). Coefficient alpha and the internal structure of tests. *Psychometrika,* 16(3), 297–334.

Dakof, G.A., Godley, M.D., & Smith, J.E. (2011). The Adolescent Community Reinforcement Approach and Multidimensional Family Therapy *Clinical manual of adolescent substance abuse treatment*. Alexandria, VA: American Psychiatric Publishing.

Davidson, W.S., & Seidman, E. (1974). Studies of behavior modification and juvenile delinquency: A review, methodological critique, and social perspective. *Psychological Bulletin, 81*(12), 998-1011.

Deas, D., & Clark, A. (2009). Current state of treatment for alcohol and other drug use disorders in adolescents. *Alcohol Research & Health, 32,* 76-82.

Dennis, M.L., Godley, S.H., Diamond, G., Tims, F.M., Babor, T., Donaldson, J., . . . Funk, R. (2004). The Cannabis Youth Treatment (CYT) study: Main findings from two randomized trials. *Journal of Substance Abuse Treatment, 27*(3), 197-213.

Dennis, M.L., White, M., Titus, J.C., & Unsicker, J. (2008). Global Appraisal Of Individual Needs (GAIN): Administration guide for the GAIN and related measures (5 ed.). Bloomington, IL: Chestnut Health Systems.

Diamond, G., Godley, S.H., Liddle, H.A., Sampl, S., Webb, C., Tims, F.M., & Meyers, R. (2002). Five outpatient treatment models for adolescent marijuana use: A description of the Cannabis Youth Treatment interventions. *Addiction, 97*, 70-83.

Dowden, C., & Andrews, D.A. (1999a). What works for female offenders: A meta-analytic review. *Crime & Delinquency, 45*(4), 438-452.

Dowden, C., & Andrews, D.A. (1999b). What works in young offender treatment: A meta-analysis. *Forum on Corrections Research, 11*(2), 21-24.

Dowden, C., & Andrews, D.A. (2000). Effective correctional treatment and violent reoffending: A meta-analysis. *Canadian Journal of Criminology, 42*(4), 449-468.

Dutra, L., Stathopoulou, G., Basden, S.L., Leyro, T.M., Powers, M.B., & Otto, M.W. (2008). A meta-analytic review of psychosocial interventions for substance use disorders. *The American Journal of Psychiatry, 165*(2), 179-187.

Farabee, D., Shen, H., Hser, Y.-I., Grella, C.E., & Anglin, M.D. (2001). The effect of drug treatment on criminal behavior among adolescents in DATOS-A. *Journal of Adolescent Research, 16*(6), 679-696.

Farrington, D.P., Jolliffe, D., Loeber, R., Stouthamer-Loeber, M., & Kalb, L.M. (2001). The concentration of offenders in families, and family criminality in the prediction of boys' delinquency. *Journal of Adolescence, 24*(5), 579-596.

Fazel, S., Doll, H., & Långström, N. (2008). Mental disorders among adolescents in juvenile detention and correctional facilities: A systematic review and

metaregression analysis of 25 surveys. *Journal of the American Academy of Child & Adolescent Psychiatry, 47*(9), 1010-1019.

GAIN Coordinating Center. (2011). *2011 Horizontal Summary Analytic CSAT GAIN Data Set*.

GAIN Coordinating Center. (2013). Global Appraisal of Individual Needs (GAIN) overview. from http://www.gaincc.org/_data/files/About_GAIN/GAIN_Overview.pdf

Garrett, P. (1985). Effects of residential treatment of adjucated delinquents: A meta-analysis. *Journal of Research in Crime and Delinquency, 22*(4), 287-308.

Gendreau, P., & Andrews, D.A. (1990). Tertiary prevention - what the meta-analyses of the offender treatment literature tell us about what works. *Canadian Journal of Criminology-Revue Canadienne De Criminologie, 32*(1), 173-184.

Gendreau, P., & Ross, R.R. (1979). Effective correctional treatment: Bibliotherapy for cynics. *Crime & Delinquency, 25*(4), 463-489.

Gendreau, P., & Ross, R.R. (1987). Revivification of rehabilitation: Evidence from the 1980s. *Justice Quarterly, 4*(3), 349-407s.

Gilmore, A.S., Rodriguez, N., & Webb, V.J. (2005). Substance abuse and drug courts: The role of social bonds in juvenile drug courts. *Youth Violence and Juvenile Justice, 3*(4), 287-315.

Glass, G.V., McGraw, B., & Smith, M.L. (1981). *Meta-Analysis in Social Research*. Beverly Hills: Sage.

Godley, S.H., Garner, B.R., Passetti, L.L., Funk, R.R., Dennis, M.L., & Godley, M.D. (2010). Adolescent outpatient treatment and continuing care: Main findings from a randomized clinical trial. *Drug and Alcohol Dependence, 110*(1–2), 44-54.

Godley, S.H., Meyers, R.J., Smith, J.E., Karvinen, T., Titus, J.C., Godley, M.D., . . . Kelberg, P. (2001). *The Adolescent Community Reinforcement Approach for Adolescent Cannabis Users* (Vol. 4). Rockville, MD: Center for Substance Abuse Treatment, Substance Abuse and Mental Health Services Administration.

Godley, S.H., Risberg, R.A., Adams, L., & Sodetz, A. (2002). CHS Treatment Manual: Bloomington's Outpatient & Intensive Outpatient Treatment Model. Bloomington, IL: Chestnut Health Systems.

Grella, C.E. (2008). From generic to gender-responsive treatment: Changes in social policies, treatment services, and outcomes of women in substance abuse treatment. *Journal of Psychoactive Drugs, S5*(5), 327-343.

Gutierrez, L., & Bourgon, G. (2009). Drug treatment courts: A quantitative review of study and treatment quality. Ottawa: Public Safety Canada.

Hall, E.A., Prendergast, M.L., Wellisch, J., Patten, M., & Cao, Y. (2004). Treating drug-abusing women prisoners: An outcomes evaluation of the forever free program. *Prison Journal, 84*(1), 81-105.

Halliday-Boykins, C.A., Schaeffer, C.M., Henggeler, S.W., Chapman, J.E., Cunningham, P.B., Randall, J., & Shapiro, S.B. (2010). Predicting nonresponse to juvenile drug court interventions. *Journal of Substance Abuse Treatment, 39*(4), 318-328.

Hamilton, N.L., Brantley, L.B., Tims, F.M., Angelovich, N., & McDougall, B. (2001) Family support network for adolescent cannabis users. *Cannabis Youth Treatment Series: Vol. 3*. Rockville, MS: Center for Substance Abuse Treatment.

Hanley, D. (2006). Appropriate services: Examining the case classification principle. *Journal of Offender Rehabilitation, 42*(4), 1-22.

Hanson, R.K., Bourgon, G., Helmus, L., & Hodgson, S. (2009). The principles of effective correctional treatment also apply to sexual offenders. *Criminal Justice and Behavior, 36*(9), 865-891.

Henderson, C.E., Young, D.W., Jainchill, N., Hawke, J., Farkas, S., & Davis, R.M. (2007). Program use of effective drug abuse treatment practices for juvenile offenders. *Journal of Substance Abuse Treatment, 32*(3), 279-290.

Henggeler, S.W. (2001). Multisystemic Therapy. *Residential Treatment For Children & Youth, 18*(3), 75-85.

Henggeler, S.W., Clingempeel, W.G., Brondino, M.J., & Pickrel, S.G. (2002). Four-year follow-up of Multisystemic Therapy with substance-abusing and substance-dependent juvenile offenders. *Journal of the American Academy of Child & Adolescent Psychiatry, 41*(7), 868-874.

Henggeler, S.W., Halliday-Boykins, C.A., Cunningham, P.B., Randall, J., & Shapiro, S.B. (2006). Juvenile drug court: Enhancing outcomes by integrating evidence-based treatments. *Journal of Consulting and Clinical Psychology, 74*(1), 42-54.

Henggeler, S.W., Pickrel, S.G., Brondino, M.J., & Crouch, J.L. (1996). Eliminating (almost) treatment dropout of substance abusing or dependent delinquents through

home-based multisystemic therapy. *The American Journal of Psychiatry, 153*(3), 427-428.

Holliday, S.B., Heilbrun, K., & Fretz, R. (2012). Examining improvements in criminogenic needs: The risk reduction potential of a structured re-entry program. *Behavioral Sciences & the Law, 30*(4), 431-447.

Holsinger, K. (2011). Youth in the juvenile justice system *Juvenile justice* (pp. 24-43): John Wiley & Sons, Inc.

Hora, P.F. (2002). A dozen years of drug treatment courts: Uncovering our theoretical foundation and the construction of a mainstream paradigm. *Substance Use & Misuse, 37*(12-13), 1469-1488.

Hu, M.-C., Davies, M., & Kandel, D.B. (2006). Epidemiology and correlates of daily smoking and nicotine dependence among young adults in the United States. *American journal of public health, 96*(2), 299-308.

Hubbard, D.J., & Pealer, J. (2009). The importance of responsivity factors in predicting reductions in antisocial attitudes and cognitive distortions among adult male offenders. *The Prison Journal, 89*(1), 79-98.

Huizinga, D., Esbensen, F.-A., & Weiher, A.W. (1991). Are there multiple paths to delinquency? *The Journal of Criminal Law and Criminology (1973-), 82*(1), 83-118.

Hunt, G.M., & Azrin, N.H. (1973). A Community-Reinforcement Approach to alcoholism. *Behaviour Research and Therapy, 11*(1), 91-104.

IBM Corp. (2013). IBM SPSS Statistics For Windows (Version Version 22.0). Armonk, NY: IBM Corp.

Ives, M.L., Chen, Y.-F., Modisette, K.C., & Dennis, M.L. (2010). Characteristics, needs, services, and outcomes of youths in juvenile treatment drug courts as compared to adolescent outpatient treatment. *Drug Court Review, 7*(1), 10-56.

Izzo, R.L., & Ross, R.R. (1990). Meta-analysis of rehabilitation programs for juvenile delinquents. *Criminal Justice and Behavior, 17*(1), 134-142.

Jensen, C.D., Cushing, C.C., Aylward, B.S., Craig, J.T., Sorell, D.M., & Steele, R.G. (2011). Effectiveness of Motivational Interviewing interventions for adolescent substance use behavior change: A meta-analytic review. *Journal of Consulting and Clinical Psychology, 79*(4), 433-440.

Johnson, T.P., Cho, Y.I., Fendrich, M., Graf, I., Kelly-Wilson, L., & Pickup, L. (2004). Treatment need and utilization among youth entering the juvenile corrections system. *Journal of Substance Abuse Treatment, 26*(2), 117-128.

Kandel, D.B., Kiros, G.-E., Schaffran, C., & Mei-Chen, H. (2004). Racial/ethnic differences in cigarette smoking initiation and progression to daily smoking: A multilevel analysis. *American Journal of Public Health, 94*(1), 128-135.

Kennedy, S.M. (2001). Treatment responsivity: Reducing recidivism by enhancing treatment effectiveness *Compendium 2000 on effective correctional programming*. Ottawa, Ontario: Correctional Service Canada.

Kloos, A., Weller, R., Chan, R., & Weller, E. (2009). Gender differences in adolescent substance abuse. *Current Psychiatry Reports, 11*(2), 120-126.

Landenberger, N., & Lipsey, M. (2005). The positive effects of cognitive–behavioral programs for offenders: A meta-analysis of factors associated with effective treatment. *Journal of Experimental Criminology, 1*(4), 451-476.

Latessa, E.J., Sullivan, C., Blair, L., Sullivan, C.J., & Smith, P. (2013). Final report outcome and process evaluation of juvenile drug courts: Center for Criminal Justice Research, University of Cincinnati.

Liddle, H.A. (1999). Theory development in a family-based therapy for adolescent drug abuse. *Journal of Clinical Child Psychology, 28*(4), 521.

Liddle, H.A. (2002). Multidimensional Family Therapy for adolescent cannabis users (Vol. 5). Rockville, MD: Center for Substance Abuse Treatment, Substance Abuse and Mental Health Services Administration, Center for Substance Abuse Treatment.

Liddle, H.A. (2010a). Multidimensional Family Therapy: A science-based treatment system. *Australian & New Zealand Journal of Family Therapy, 31*(2), 133-148.

Liddle, H.A. (2010b). Multidimensional Family Therapy: A science-based treatment system for adolescent drug abuse. *SUCHT, 56*(1), 43-50.

Liddle, H.A., Dakof, G.A., Parker, K., Diamond, G.S., Barrett, K., & Tejeda, M. (2001). Multidimensional Family Therapy for adolescent drug abuse: Results of a randomized clinical trial. *American Journal of Drug & Alcohol Abuse, 27*(4), 651.

Liddle, H.A., Dakof, G.A., Turner, R.M., Henderson, C.E., & Greenbaum, P.E. (2008). Treating adolescent drug abuse: A randomized trial comparing Multidimensional Family Therapy and Cognitive Behavior Therapy. *Addiction, 103*(10), 1660-1670.

Liddle, H.A., & Hogue, A. (2001). Chapter 11 - Multidimensional Family Therapy for adolescent substance abuse. In F. W. Eric & B. W. Holly (Eds.), *Innovations in Adolescent Substance Abuse Interventions* (pp. 229-261). Oxford: Pergamon.

Long, J.S. (1997). *Regression Models For Categorical and Limited Dependent Variables*. Thousand Oaks, CA: Sage Publications.

Long, J.S., & Freese, J. (2006). *Regression Models For Categorical Dependent Variables Using STATA* (2 ed.). College Station, TX: Stata Press.

Looman, J., Dickie, I., & Abracen, J. (2005). Responsivity issues in the treatment of sexual offenders. *Trauma, Violence & Abuse, 6*(4), 330-353.

Losel, F., & Koferl, P. (1989). Evaluation research on correctional treatment in West Germany: A meta-analysis. In H. Wegener, F. Losel & J. Haisch (Eds.), *Criminal Behaviour And The Justice System: Psychological Perspectives.* New York: Springer.

Lovins, B., Lowenkamp, C.T., & Latessa, E.J. (2009). Applying the risk principle to sex offenders. *The Prison Journal, 89*(3), 344-357.

Lovins, L.B., Lowenkamp, C.T., Latessa, E.J., & Smith, P. (2007). Application of the risk principle to female offenders. *Journal of Contemporary Criminal Justice, 23*(4), 383-398.

Lowenkamp, C.T., & Latessa, E.J. (2002). Evaluation of Ohio's community based correctional facilities and halfway house programs. Cincinnati, Ohio: University of Cincinnati.

Lowenkamp, C.T., Latessa, E.J., & Holsinger, A.M. (2006). The risk principle in action: What have we learned from 13,676 offenders and 97 correctional programs? *Crime & Delinquency, 52*(1), 77-93.

Lurigio, A.J. (2011). Co-occurring disorders: Mental health and drug misuse handbook of evidence-based substance abuse treatment in criminal justice settings. In C.

Leukefeld, T. P. Gullotta & J. Gregrich (Eds.), (Vol. 11, pp. 279-292): Springer New York.

MacMaster, S.A., Ellis, R.A., & Holmes, T. (2008). Combining drug court with adolescent residential treatment: Lessons from juvenile and adult programs. *Residential Treatment For Children & Youth, 23*(1-2), 45-60.

Magill, M., & Ray, L.A. (2009). Cognitive-behavioral treatment with adult alcohol and illicit drug users: A meta-analysis of randomized controlled trials. *Journal of studies on alcohol and drugs, 70*(4), 516-527.

Mark, T.L., Song, X., Vandivort, R., Duffy, S., Butler, J., Coffey, R., & Schabert, V.F. (2006). Characterizing substance abuse programs that treat adolescents. *Journal of Substance Abuse Treatment, 31*(1), 59-65.

Marlowe, D.B., Festinger, D.S., Dugosh, K.L., Lee, P.A., & Benasutti, K.M. (2007). Adapting judicial supervision to the risk level of drug offenders: Discharge and six month outcomes from a prospective matching study. *Drug and Alcohol Dependence, 88*, S4-S13.

Martinson, R. (1974). What works? - Questions and answers about prison reform. *The Public Interest, 35*, 22-54.

McClelland, G.M., Elkington, K.S., Teplin, L.A., & Abram, K.M. (2004). Multiple substance use disorders in juvenile detainees. *Journal of the American Academy of Child & Adolescent Psychiatry, 43*(10), 1215-1224.

McGuire, J., Bilby, C.A.L., Hatcher, R.M., Hollin, C.R., Hounsome, J., & Palmer, E.J. (2008). Evaluation of structured cognitive–behavioural treatment programmes in reducing criminal recidivism. *Journal of Experimental Criminology, 4*(1), 21-40.

Miller, W.R., & Rollnick, S. (2009). Ten things that Motivational Interviewing is not. *Behavioural and Cognitive Psychotherapy, 37*(02), 129-140.

Mitchell, O., Wilson, D.B., Eggers, A., & MacKenzie, D.L. (2012). Assessing the effectiveness of drug courts on recidivism: A meta-analytic review of traditional and non-traditional drug courts. *Journal of Criminal Justice, 40*(1), 60-71.

Monchick, R., Scheyett, A., & Pfeifer, J. (2006). Drug court case management: Role, function & utility. Alexandria, VA: National Drug Court Institute.

Mulder, E., Brand, E., Bullens, R., & van Marle, H. (2011). Risk factors for overall recidivism and severity of recidivism in serious juvenile offenders. *International Journal of Offender Therapy and Comparative Criminology, 55*(1), 118-135.

National Association of Drug Court Professionals. (1997). Defining drug courts: The key components. . Washington, DC: National Association of Drug Court Professionals.

National Drug Court Institute. (2003). Juvenile Drug Courts: Strategies in practice. Washington, DC: Bureau of Justice Assistance, Office of Justice Programs, US Department of Justice.

National Institute on Drug Abuse. (2012). *Principles of drug abuse treatment for criminal justice populations: A research-based guide*. Bethesda, MD: National Institute on Drug Abuse.

National Institute on Drug Abuse. (2014). Principles of adolescent substance use disorder treatment: A research-based guide. Washington, DC: National Institute on Drug Abuse.

National Registry of Evidence-Based Programs and Practices. (2014a). January 2014 QOR Reviewer Training: Substance Abuse and Mental Health Services Administration.

National Registry of Evidence-Based Programs and Practices. (2014b). SAMHSA's National Registry of Evidence-Based Programs and Practices. from http://www.nrepp.samhsa.gov/Index.aspx

Nissen, L.B., & Merrigan, D. (2011). Helping substance-involved young people in juvenile justice be successful: Conceptual and structural foundations of The Reclaiming Futures Model. *Children and Youth Services Review, 33, Supplement 1*(0), S3-S8.

Office of Juvenile Justice and Delinquency Prevention. (2012). OJJDP Statistical Briefing Book. from http://www.ojjdp.gov/ojstatbb/crime/qa05101.asp?qaDate=2010

Ogloff, J.R.P., & Davis, M.R. (2004). Advances in offender assessment and rehabilitation: Contributions of the Risk–Needs–Responsivity approach. *Psychology, Crime & Law, 10*(3), 229-242.

Olver, M.E., Stockdale, K.C., & Wormith, J.S. (2011). A meta-analysis of predictors of offender treatment attrition and its relationship to recidivism. *Journal of Consulting and Clinical Psychology, 79*(1), 6-21.

Polaschek, D.L.L. (2012). An appraisal of the Risk–Need–Responsivity (RNR) model of offender rehabilitation and its application in correctional treatment. *Legal and criminological psychology, 17*(1), 17.

Powers, E., & Witmer, H. L. (1951). An experiment in the prevention of delinquency: The cambridge-somerville youth study. New York: Columbia University Press

Prendergast, M., Pearson, F., Podus, D., Hamilton, Z., & Greenwell, L. (2013). The Andrews' principles of Risk, Needs, and Responsivity as applied in drug treatment programs: Meta-analysis of crime and drug use outcomes. *Journal of Experimental Criminology, 9*(3), 275-300.

Prinz, R.J., & Kerns, S.E.U. (2003). Early substance use by juvenile offenders. *Child Psychiatry & Human Development, 33*(4), 263-277.

Prochaska, J.O., DiClemente, C.C., & Norcross, J.C. (1992). In search of how people change: Applications to addictive behaviors. *American Psychologist, 47*(9), 1102-1114.

Raftery, A.E. (1995). Bayesian model selection in social research. *Sociological Methodology, 25*, 111-163

Raudenbush, S.W., & Bryk, A.S. (2002). *Hierarchical linear Models: Applications and Data Analysis Methods* (Vol. 1.). Thousand Oaks: Sage Publications.

Raudenbush, S.W., Yang, M.-L., & Yosef, M. (2000). Maximum likelihood for generalized linear models with nested random effects via high-order, multivariate LaPlace approximation. *Journal of computational and Graphical Statistics, 9*(1), 141-157.

Robertson, A., Dill, P., Husain, J., & Undesser, C. (2004). Prevalence of mental illness and substance abuse disorders among incarcerated juvenile offenders in Mississippi. *Child Psychiatry and Human Development, 35*(1), 55-74.

Rodriguez, N., & Webb, V.J. (2004). Multiple measures of juvenile drug court effectiveness: Results of a quasi-experimental design. *Crime & Delinquency, 50*(2), 292-314.

Ross, R.R., & McKay, H.B. (1978). Behavioural approaches to treatment in corrections: Requiem for a panacea. *Canadian J. Criminology, 20*, 279-295.

Ruiz, B.S., Stevens, S.J., Fuhriman, J., Bogart, J.G., & Korchmaros, J.D. (2009). A juvenile drug court model in Southern Arizona: Substance abuse, delinquency, and sexual risk outcomes by gender and race/ethnicity. *Journal of Offender Rehabilitation, 48*(5), 416-438.

Schoenwald, S.K., Brown, T.L., & Henggeler, S.W. (2000). Inside Multisystemic Therapy: Therapist, supervisory, and program practices. *Journal of Emotional and Behavioral Disorders, 8*(2), 113-113.

Schoenwald, S.K., Henggeler, S.W., Brondino, M.J., & Rowland, M.D. (2000). Multisystemic Therapy: Monitoring treatment fidelity. *Family Process, 39*(1), 83-103.

Schubert, C.A., Mulvey, E.P., & Glasheen, C. (2011). Influence of mental health and substance use problems and criminogenic risk on outcomes in serious juvenile offenders. *Journal of the American Academy of Child & Adolescent Psychiatry, 50*(9), 925-937.

Scientific Software International Inc. (2014). Use of deviance statistics for comparing models. Lincolnwood, IL: Scientific Software International, Inc.

Simourd, D.J. (2004). Use of dynamic risk/need assessment instruments among long-term incarcerated offenders. *Criminal Justice and Behavior, 31*(3), 306-323.

Simourd, L., & Andrews, D.A. (1994). Correlates of delinquency: A look at gender differences. *Forum on Corrections Research, 6*, 26-31.

Smith, D.C., Godley, S.H., Godley, M.D., & Dennis, M.L. (2011). Adolescent Community Reinforcement Approach outcomes differ among emerging adults and adolescents. *Journal of Substance Abuse Treatment, 41*(4), 422-430.

Snijders, T., & Bosker, R. (1999). Multilevel analysis: An introduction to basic and advanced multilevel modeling, 1999: Sage, London.

Squire, B. (2005). Multi-Systemic therapy: Beyond offending behaviour. *Criminal Justice Matters, 61*(1), 22-23.

StataCorp. (2013). Stata Statistical Software: Release 13. College Station, TX: StataCorp LP.

Substance Abuse and Mental Health Services Administration. (2014). Quality of Research. 2014, from http://www.nrepp.samhsa.gov/ReviewQOR.aspx.

Substance Abuse and Mental Health Services Administration. (2009). Treatment Episode Data Set (TEDS) Highlights - 2007: National Admissions to Substance Abuse Treatment Services. Rockville, MD: Substance Abuse and Mental Health Services Administration.

Substance Abuse and Mental Health Services Administration. (2013). Results from the 2012 national survey on drug use and health: Summary of national findings *NSDUH Series H-46*. Rockville, MD: Substance Abuse and Mental Health Services Administration.

Taxman, F.S., & Belenko, S. (2012). *Implementing Evidence-Based Practices in Community Corrections and Addictions Treatment*. New York: Springer.

Taylor, L.R., & Hiller, M.L. (forthcoming). *Are There Gender Differences in Treatment Engagement among Probationers in a Modified Therapeutic Community?*

Thanner, M.H., & Taxman, F.S. (2003). Responsivity: The value of providing intensive services to high-risk offenders. *Journal of Substance Abuse Treatment, 24*(2), 137-147.

Thornberry, T.P., Huizinga, D., & Loeber, R. (2004). The causes and correlates studies: Findings and policy implications. *Juvenile Justice Journal, 9*(1), 3-19.

Tripodi, S.J., & Bender, K. (2011). Substance abuse treatment for juvenile offenders: A review of quasi-experimental and experimental research. *Journal of Criminal Justice, 39*(3), 246-252.

Tuchman, E. (2010). Women and addiction: The importance of gender issues in substance abuse research. *Journal of Addictive Diseases, 29*(2), 127-138.

United States Congress, 1993. Government Performance and Results Act of 1993. Public Law 103-62 (August 3). 107 STAT. 285.

Vieira, T.A., Skilling, T.A., & Peterson-Badali, M. (2009). Matching court-ordered services with treatment needs: Predicting treatment success with young offenders. *Criminal Justice and Behavior, 36*(4), 385-401.

Wagner, E.F., & Kassel, J.D. (1995). Substance use and abuse. In R. T. Ammerman & M. Hersen (Eds.), *Handbook of Child Behavior Therapy in the Psychiatric Setting* (pp. 367-388). New York: Wiley.

Ward, T., Melser, J., & Yates, P.M. (2007). Reconstructing the Risk–Need–Responsivity model: A theoretical elaboration and evaluation. *Aggression and Violent Behavior, 12*(2), 208-228.

Ward, T., & Stewart, C. (2003). Criminogenic needs and human needs: A theoretical model. *Psychology, Crime & Law, 9*(2), 125.

Ward, T., Yates, P.M., & Willis, G.M. (2012). The Good Lives Model and the Risk-Need-Responsivity model a critical response to Andrews, Bonta, and Wormith (2011). *Criminal Justice and Behavior, 39*(1), 94-110.

Webb, C.P.M., Burleson, J.A., & Ungemack, J.A. (2002). Treating juvenile offenders for marijuana problems. *Addiction, 97*, 35-45.

White, M. (2005). Predicting violence in juvenile offenders: The interaction of individual, social, and environmental influences. *Offender Substance Abuse Report, 5*, 83-90.

White, M., Funk, R., White, W., & Dennis, M.L. (2003). Predicting violent behavior in adolescent cannabis users: The GAIN-CVI. *Offender Substance Abuse Report, 3*, 67-69.

Whitehead, J.T., & Lab, S.P. (1989). A meta-analysis of juvenile correctional treatment. *Journal of Research in Crime and Delinquency, 26*(3), 276-295.

Williams, R.J., Chang, S.Y., & Addiction Centre Adolescent Research Group. (2000). A comprehensive and comparative review of adolescent substance abuse treatment outcome. *Clinical Psychology: Science and Practice, 7*(2), 138-166.

Willison, J.B., Mears, D.P., Shollenberger, T., Owens, C., & Butts, J.A. (2009). Past, present, and future of juvenile justice: Assessing the policy options (APO) Final Report. Washington, DC: Urban Institute.

Wilson, J.J., & Levin, F.R. (2005). Attention-Deficit/Hyperactivity Disorder and early-onset substance use disorders. *Journal of Child and Adolescent Psychopharmacology, 15*(5), 751-763.

Winters, K., Botzet, A., & Fahnhorst, T. (2011). Advances in adolescent substance abuse treatment. *Current Psychiatry Reports, 13*(5), 416-421.

Wisdom, J.P., Hoffman, K., Rechberger, E., Seim, K., & Owens, B. (2009). Women–focused treatment agencies and process improvement: Strategies to increase client engagement. *Women & Therapy, 32*(1), 69 - 87.

Wooditch, A., Tang, L.L., & Taxman, F.S. (2014). Which criminogenic need changes are most important in promoting desistance from crime and substance use? *Criminal Justice and Behavior, 41*(3), 276-299.

Wormith, J.S., Gendreau, P., & Bonta, J. (2012). Deferring to clarity, parsimony, and evidence in reply to Ward, Yates, and Willis. *Criminal Justice and Behavior, 39*(1), 111-120.

Wormith, J.S., & Olver, M.E. (2002). Offender treatment attrition and its relationship with risk, responsivity, and recidivism. *Criminal Justice and Behavior, 29*(4), 447-471.

APPENDIX A

Table 45

Juvenile Drug Treatment Court Strategies

The Strategies
1. Collaborative Planning - Engage all stakeholders in creating an interdisciplinary, coordinated, and systemic approach to working with youth and their families.
2. Teamwork- Develop and maintain an interdisciplinary, non-adversarial work team.
3. Clearly Defined Target Population and Eligibility Techniques - Define a target population and eligibility techniques that are aligned with the program's goals and objectives.
4. Judicial Involvement and Supervision - Schedule frequent judicial reviews and be sensitive to the effect that court proceedings can have on youth and their families.
5. Monitoring and Evaluation - Establish a system for program monitoring and evaluation to maintain quality of service, assess program impact, and contribute to knowledge in the field.
6. Community Partnerships - Build partnerships with community organizations to expand the range of opportunities available to youth and their families.
7. Comprehensive Treatment Planning - Tailor interventions to the complex and varied needs of youth and their families.
8. Developmentally Appropriate Services - Tailor treatment to the developmental needs of adolescents.
9. Gender-Appropriate Services - Design treatment to address the unique needs of each gender.
10. Cultural Competence - Create policies and procedures that are responsive to cultural differences and train personnel to be culturally competent.
11. Focus on Strengths - Maintain a focus on the strengths of youth and their families during program planning and in every interaction between the court and those it serves.
12. Family Engagement - Recognize and engage the family as a valued partner in all components of the program.
13. Educational Linkages - Coordinate with the school system to ensure that each participant enrolls in and attends an educational program that is appropriate to his or her needs.

Note. Adapted from "Juvenile Drug Courts: Strategies in practice," National Drug Court Institute, 2003, Washington, DC: Bureau of Justice Assistance, Office of Justice Programs, US Department of Justice, *p*. 10.

Table 45 *(Continued)*

The Strategies
14. Drug Testing - Design drug testing to be frequent, random, and observed. Document testing policies and procedures in writing.
15. Goal-Oriented Incentives and Sanctions - Respond to compliance and noncompliance with incentives and sanctions that are designed to reinforce or modify the behavior of youth and their families.
16. Confidentiality - Establish a confidentiality policy and procedures that guard the privacy of the youth while allowing the drug treatment court team to access key information.

Note. Adapted from "Juvenile Drug Courts: Strategies in practice," National Drug Court Institute, 2003, Washington, DC: Bureau of Justice Assistance, Office of Justice Programs, US Department of Justice, *p*. 10.

APPENDIX B

Table 46

Treatment interventions received by AOP and JDTC participants

Intervention	AOP	JDTC
Family-based interventions		
Adolescent Community Reinforcement Approach/Assertive Continuing Care	37.4%	28.9%
Brief Strategic Family Therapy	0%	0.1%
Chester-Bloomington Treatment Manual	1.5%	8.6%
Family Support Network	4.4%	0%
Functional Family Therapy	0.2%	0%
Multidimensional Family Therapy	1.9%	0.1%
Multisystemic Treatment	0.4%	0%
Other Family Therapy	0.4%	0%
Non-family-based interventions		
Cognitive Restructuring	0.02%	0%

Note. AOP = adolescent outpatient. JDTC = juvenile drug treatment court.

Table 46 *(Continued)*

Intervention	AOP	JDTC
Dialectical Behavioral Therapy	0%	0.2%
Dynamic Youth Community, Inc. Treatment Manual	0%	0.7%
Group-Based Outpatient Treatment for Adolescent Substance Abuse	0%	7.1%
Motivational Enhancement Therapy/Cognitive Behavioral Therapy	50.4%	20.0%
Other	1.8%	0.7%
Other Case Management	1.8%	0%
Other Cognitive Behavioral Therapy	1.6%	4.3%
Other Group Therapy	0.4%	0.1%
Other Individual Therapy	0.5%	0.1%
Other Motivational Interviewing	0%	28.1%
Other Psychoeducational Therapy	0.03%	0%
Other Student Assistance Programs/School-based programs	0.6%	0%

Note. AOP = adolescent outpatient. JDTC = juvenile drug treatment court.

Table 46 *(Continued)*

Intervention	AOP	JDTC
Other Twelve Step Approaches	0.009%*	1.1%
Seven Challenges	0.9%	0.1%

Note. AOP = adolescent outpatient. JDTC = juvenile drug treatment court.

APPENDIX C

Table 47

Descriptions of Treatment Interventions

Interventions		Description
Family-based		
	Brief Strategic Family Therapy	An intervention designed to address substance use and related behaviors. The intervention includes 3 guiding principles: The family as a system, patterns of interaction, and a practical plan that targets the patterns of interaction. The treatment intervention is intended to be integrated into the family.
	Family Support Network	Provides comprehensive treatment that addresses the adolescent's substance abuse and familial relationships. Combines MET/CBT12 with parent education. The intervention also includes therapeutic home visits, referral to community services, and case management.
	Functional Family Therapy	Targets high risk adolescents. FFT focuses on the family as a system, and considers various factors such as the family's environment, financial status, and inter-relationships. The clinical protocol is the treatment plan, which outlines treatment targets in each stage of treatment.

Table 47 *(Continued)*

Interventions	Description
Multidimensional Family Therapy	MDFT is a family-based treatment system designed to address adolescent substance use and related behavioral issues. The intervention is an integration of substance abuse treatment and family therapy, and uses a multi-systems approach to address the adolescent's needs and the needs of the family.
Multisystemic Treatment	A comprehensive family-based treatment intervention developed to treat substance use and delinquency among substance-involved juveniles. Emotional and behavioral issues must be resolved within the context of the child's social environment. Focuses on changing juvenile risk factors for delinquency and substance use, and empowering the adolescent's caregiver(s) with the skills needed to properly parent the child.
Other Family Therapy	Unknown

Table 47 *(Continued)*

	Interventions	Description
Non-Family-Based		
	Cognitive Restructuring	Cognitive restructuring (CR) is a form of cognitive therapy that focuses on changing an individual's thoughts. CR theory suggests that an individual's thoughts mediates learning, and thus, affects their behavior and feelings. Through modification of an individual's thoughts, beliefs and behaviors will change. The therapist models healthy coping strategies and the client practices these strategies when maladaptive thoughts occur.
	Dynamic Youth Community, Inc. Treatment Manual	Substance abuse treatment program for adolescents and young adults that incorporates "educational programs, advocacy, community services, and family involvement." Provides outpatient and residential treatment.
	Group-Based Outpatient Treatment for Adolescent Substance Abuse	Unknown
	Motivational Enhancement Therapy/Cognitive Behavioral Therapy	A blend of two interventions, Motivational Enhancement Therapy (MET) and Cognitive-Behavioral Therapy (CBT). The model is intended to be a short-term intervention that aims to strengthen the clients' motivation to change and teach them skills to help achieve that change.
	Other	Unknown

Table 47 *(Continued)*

Interventions	Description
Other Case Management	Unknown
Other Cognitive Behavioral Therapy	CBT focuses on the connection between thoughts, feelings, emotions, behavior, and the environment. The therapist and client work together and develop a plan to address maladaptive thoughts and behaviors.
Other Group Therapy	Unknown
Other Individual Therapy	Unknown
Other Motivational Interviewing	A short-term intervention intended to strengthen an individual's motivation for change. MI assumes personal autonomy and helps an individual to tap into their own reasons for change.
Other Psychoeducational Therapy	Unknown
Seven Challenges	Seven Challenges is a relationship-based program that helps youth overcome substance abuse and motivate them to make prosocial behavioral changes. The model helps the adolescents to see their substance-using choice as a health decision. The intervention is composed of seven steps that help them to make decisions and commitments to change. The intervention uses a cognitive/emotional decision-making process, and helps the adolescents to think for themselves so they can be empowered to make productive choices.

Table 47 *(Continued)*

	Interventions	Description
	Other Student Assistance Programs/School-based programs	Unknown
	Other Twelve Step Approaches	Unknown
Mixed Interventions		
	Adolescent Community Reinforcement Approach / Assertive Continuing Care	A behavioral intervention intended to help youth engage in prosocial activities and behaviors in place of problematic behaviors. It is based on the operant-conditioning model, and the social systems approach, whereby counselors work with the adolescent, the caregivers, and the community.
	Chester Health System's-Bloomington Treatment Manual	Combines multiple strategies from evidence-based practices. The purpose of the treatment is to increase a participant's motivation to change, improve their environment, and equip them with the skills to help them change. Treatment uses individual, group, and family sessions.

APPENDIX D

Table 48

Responsivity techniques and treatment interventions

Treatment Interventions	Role-playing	Modeling	Repeated practice of alternative behaviors	Cognitive restructuring	Skills building	Reinforcement
ACRA/ACC	X	X	X	--	X	X
BSFT	--	--	X	X	X	X
CBTM	X	--	X	X	X	--
FSN	X	X	X	X	X	X
FFT	--	--	X	X	X	--
CR	--	--	--	X	--	--
DBT	X	X	X	X	X	X
MET/CBT	X	X	X	X	X	X
CBT	X	X	X	X	X	X
MI	--	--	--	--	--	--
7C	--	--	--	--	X	--

Note. X = Indicates the technique is present in the structure of the treatment intervention. -- = Indicates the technique was missing from the structure of the treatment intervention.

APPENDIX E

Table 49

NREPP Quality of Research Rating Techniques

Reviewers use a scale of 0.0 to 4.0, with 4.0 being the highest rating given.

1. Reliability of Measures

Outcome measures should have acceptable reliability to be interpretable. "Acceptable" here means reliability at a level that is conventionally accepted by experts in the field.

0 = Absence of evidence of reliability or evidence that some relevant types of reliability (e.g., test-retest, interrater, interitem) did not reach acceptable levels.

2 = All relevant types of reliability have been documented to be at acceptable levels in studies by the applicant.

4 = All relevant types of reliability have been documented to be at acceptable levels in studies by independent investigators.

2. Validity of Measures

Outcome measures should have acceptable validity to be interpretable. "Acceptable" here means validity at a level that is conventionally accepted by experts in the field.

0 = Absence of evidence of measure validity, or some evidence that the measure is not valid.

2 = Measure has face validity; absence of evidence that measure is not valid.

4 = Measure has one or more acceptable forms of technique-related validity (correlation with appropriate, validated measures or objective techniques); OR, for objective measures of response, there are procedural checks to confirm data validity; absence of evidence that measure is not valid.

3. Intervention Fidelity

The "experimental" intervention implemented in a study should have fidelity to the intervention proposed by the applicant. Instruments that have tested acceptable psychometric properties (e.g., inter-rater reliability, validity as shown by positive association with outcomes) provide the highest level of evidence.

0 = Absence of evidence or only narrative evidence that the applicant or provider believes the intervention was implemented with acceptable fidelity.

2 = There is evidence of acceptable fidelity in the form of judgment(s) by experts, systematic collection of data (e.g., dosage, time spent in training, adherence to guidelines or a manual), or a fidelity measure with unspecified or unknown psychometric properties.

Note. Adapted from National Registry of Evidence-Based Programs and Practices. (2014b). SAMHSA's National Registry of Evidence-Based Programs and Practices.

Table 49 *(Continued)*

4 = There is evidence of acceptable fidelity from a tested fidelity instrument shown to have reliability and validity.

4. Missing Data and Attrition

Study results can be biased by participant attrition and other forms of missing data. Statistical methods as supported by theory and research can be employed to control for missing data and attrition that would bias results, but studies with no attrition or missing data needing adjustment provide the strongest evidence that results are not biased.

0 = Missing data and attrition were taken into account inadequately, OR there was too much to control for bias.

2 = Missing data and attrition were taken into account by simple estimates of data and observations, or by demonstrations of similarity between remaining participants and those lost to attrition.4 = Missing data and attrition were taken into account by more sophisticated methods that model missing data, observations, or participants, OR there were no attrition or missing data needing adjustment.

5. Potential Confounding Variables

Often variables other than the intervention may account for the reported outcomes. The degree to which confounds are accounted for affects the strength of causal inference.

0 = Confounding variables or factors were as likely to account for the outcome(s) reported as were the hypothesized causes.

2 = One or more potential confounding variables or factors were not completely addressed, but the intervention appears more likely than these confounding factors to account for the outcome(s) reported.

4 = All known potential confounding variables appear to have been completely addressed in order to allow causal inference between the intervention and outcome(s) reported.

6. Appropriateness of Analysis

Appropriate analysis is necessary to make an inference that an intervention caused reported outcomes.

0 = Analyses were not appropriate for inferring relationships between intervention and outcome, OR sample size was inadequate.

2 = Some analyses may not have been appropriate for inferring relationships between intervention and outcome, OR sample size may have been inadequate.

4 = Analyses were appropriate for inferring relationships between intervention and outcome. Sample size and power were adequate.

Note. Adapted from National Registry of Evidence-Based Programs and Practices. (2014b). SAMHSA's National Registry of Evidence-Based Programs and Practices.

APPENDIX F

Table 50

Interrater reliability for treatment intervention studies

Study	NREPP Rating	Investigator Rating
Dennis, Godley et al. (2004)	3.70	3.80
Liddle, Rowe et al. (2009)	3.60	3.42
Slesnick, Prestopnik et al. (2007)	3.0	2.35
Monti, Colby, Barnett, et al. (1999)	3.40	2.58
Stevens, S. J., Schwebel, R., & Ruiz, B. (2007)	2.30	2.17
Bernstein, Bernstein et al. (2005)	3.30	3.50
Henggeler, Melton, Smith et al. (1993)	3.10	2.65

Note. NREPP = National Registry of Evidence-Based Programs and Practices.

APPENDIX G

Table 51

Research Ratings for Treatment Intervention Studies

Intervention	Study	Outcome	Rating
CBT	Hendriks, van der Schee, & Blanken, (2011)	Frequency of cannabis use	3.75
		Number of property and violent crimes committed in the previous 90 days	
FFT	Sexton & Turner (2010)	Criminal behavior	3.50
	Slesnick & Prestopnik (2009)	Substance use	3.33
		Delinquent behaviors	
MI (Adolescents)	McCambridge & Strang (2004)	Substance use	2.33
	Stein, Lebeau, Colby et al. (2011)	Substance use	3.17

Note. CBT = cognitive-behavioral therapy; FFT = functional family therapy; MI = motivational interviewing.

APPENDIX H

Table 52

Missing Data Comparison

	AOP			JDTC		
	Reported	**Missing**	**P**	**Reported**	**Missing**	***p***
Gender			ns			$p < .05$
Male	78.3%	79.9%		70.4%	77.8%	
Female	21.7%	20.1%		29.6%	22.2%	
Age			$p < .01$			ns
Under 11 years	0.0%	0.0%		1.7%	1.3%	
11-12 years	1.2%	0.6%		1.7%	1.3%	
13-14 years	15.8%	14.2%		20.5%	21.2%	
15-16 years	55.3%	54.0%		64.3%	63.6%	
17-18 years	27.6%	31.2%		13.5%	13.9%	

Note. AOP = adolescent outpatient; JDTC = juvenile drug treatment court. Despite statistical significance, the small differences between those who reported rearrest and those who did not suggests that the analyses was were biased by missing data. Analyses were likely overpowered due to the large sample size

Table 52 *(Continued)*

	AOP			JDTC		
	Reported	**Missing**	**P**	**Reported**	**Missing**	***p***
Race/Ethnicity						
African American	15.6%	17.7%	$p < .05$	8.5%	17.5%	$p < .001$
Caucasian	39.6%	37.2%	ns	23.2%	21.9%	ns
Hispanic	28.2%	28.6%	ns	54.8%	50.0%	ns
In School during the previous 90 days	91.3%	89.1%	$p < .01$	90.4%	88.9%	ns
Single parent home	52.0%	53.1%	ns	50.9%	56.6%	ns
First use of a substance before the age of 15	83.2%	82.3%	ns	86.2%	84.2%	ns
Risk			ns			ns
Low	34.9%	34.9%		38.6%	34.1%	
Medium	26.3%	27.0%		22.2%	27.8%	
High	38.7%	38.1%		39.2%	38.1%	
Illegal activity among peers	68.4%	66.9%	ns	71.5%	67.2%	ns

Table 52 (*Continued)*

Note. AOP = adolescent outpatient; JDTC = juvenile drug treatment court. Despite statistical significance, the small differences between those who reported rearrest and those who did not suggests that the analyses were were biased by missing data. Analyses were overpowered due to the large sample size

Table 52 *(Continued)*

	AOP			JDTC		
	Reported	**Missing**	***p***	**Reported**	**Missing**	***p***
Substance use among peers	78.5%	76.7%	$p < .01$	81.1%	77.2%	ns
Illegal activity in the home	23.2%	24.1%	na	20.4%	17.5%	ns
Positive discharge status	60.5%	63.5%	$p < .05$	46.5%	41.1%	ns
Five or more previous arrests	17.0%	21.4%	$p < .001$	12.6%	12.9%	ns
Has a three month follow-up	97.0%	69.5%	$p < .001$	96.3%	64.6%	$p < .001$
Has a six month follow-up	95.7%	31.2%	$p < .001$	96.5%	35.1%	$p < .001$
Length of stay equal to or less than 180 days	78.2%	82.3%	--	61.0%	67.5%	--
Substance Use Severity (Baseline)			$p < .001$			ns
Low	19.9%	23.3%		17.5%	15.2%	
Medium	51.0%	50.7%		45.3%	49.0%	
High	29.1%	26.0%		37.2%	35.8%	

Note. AOP = adolescent outpatient; JDTC = juvenile drug treatment court. Despite statistical significance, the small differences between those who reported rearrest and those who did not suggests that the analyses was were biased by missing data. Analyses were overpowered due to the large sample size.

APPENDIX I

Table 53

Factors predicting rearrests (AOP Responsivity Rearrest Model B)

	B	SE	Odds Ratio	*p*
Level-1				
Intercept	-1.833	0.268	0.081	$p < .001$
Gender	0.328	0.112	1.538	$p < .01$
Age	-0.117	0.064	0.972	ns
Illegal activity in the home	-0.042	0.103	1.003	ns
School	0.118	0.136	1.246	ns
Race/Ethnicity				
African American	0.288	0.165	1.415	ns
Caucasian	0.059	0.140	1.073	ns
Hispanic	0.126	0.130	1.136	ns
Illegal activity among peers	0.101	0.108	1.087	ns
Arrest History	0.430	0.111	1.686	$p < .001$
Risk Level	0.321	0.047	1.379	$p < .001$
Single parent home	0.124	0.086	1.171	ns
First use of a substance before the age of 15	0.180	0.133	1.235	ns

Note. AOP = adolescent outpatient. *N* of AOP participants = 4699. *N* of AOP programs = 126. Variance component = 0.3937. Deviance statistic = 13687.890. Number of estimate parameters = 14.

Table 54

Factors predicting rearrests (AOP Responsivity Rearrest Model C)

	B	SE	Odds Ratio	*p*
Level-1				
Intercept	-1.815	0.270	0.163	$p < .001$
Gender	0.333	0.115	1.395	$p < .001$
Age	-0.123	0.064	0.884	ns
Illegal activity in the home	-0.050	0.101	0.951	ns
School	0.126	0.137	1.134	ns
Race/Ethnicity				
African American	0.287	0.166	1.332	ns
Caucasian	0.056	0.140	1.058	ns
Hispanic	0.126	0.131	1.134	ns
Illegal activity among peers	0.105	0.110	1.111	ns
Arrest History	0.425	0.112	1.529	$p < .001$
Risk Level	0.321	0.047	1.378	$p < .001$
Single parent home	0.157	0.070	1.129	ns
First use of a substance before the age of 15	0.175	0.133	1.191	ns
Responsivity	-0.300	0.174	0.741	ns

Note. AOP = adolescent outpatient. *N* of AOP participants = 4,699. *N* of AOP programs = 126. Variance component = 0.3959. Deviance statistic = 13682.207. Number of estimate parameters = 15.

Table 55

Factors predicting substance use severity score (AOP Responsivity Substance Use Model B)

	B	SE	*p*
Level-1			
Intercept	0.187	0.026	$p < .001$
Gender	0.017	0.005	$p < .001$
Age	0.015	0.004	$p < .001$
Illegal activity in the home	0.013	0.006	ns*
School	0.008	0.008	ns
Race/Ethnicity			
African American	-0.003	0.009	ns
Caucasian	-0.001	0.007	ns
Hispanic	-0.004	0.009	ns
Illegal activity among peers	0.029	0.005	$p < .001$
Arrest History	0.014	0.008	ns
Risk Level	0.021	0.003	$p < .001$
Single parent home	0.014	0.005	$p < .01$
First use of a substance before the age of 15	0.027	0.005	$p < .001$

Note. AOP = adolescent outpatient. *N* of AOP participants = 4,699. *N* of AOP programs = 126. Variance component = 0.0303. Deviance statistic = -4368.413. Number of estimated parameters = 16.

*$p < .05$.

Table 56

Factors predicting substance use severity score (AOP Responsivity Substance Use Model C)

	B	SE	*p*
Level-1			
Intercept	0.180	0.027	$p < .001$
Gender	0.018	0.005	$p < .001$
Age	0.015	0.004	$p < .001$
Illegal activity in the home	0.013	0.006	ns
School	0.009	0.008	ns
Race/Ethnicity			
African American	-0.004	0.010	ns
Caucasian	-0.000[a]	0.006	ns
Hispanic	-0.005	0.009	ns
Illegal activity among peers	0.029	0.005	$p < .001$
Arrest History	0.012	0.008	ns
Risk Level	0.022	0.003	$p < .001$
Single parent home	0.014	0.005	$p < .01$
First use of a substance before the age of 15	0.029	0.006	$p < .001$
Responsivity	-0.009	0.007	ns

Note. AOP = adolescent outpatient. *N* of AOP participants = 4,699. *N* of AOP programs = 126. Variance component = 0.0303. Deviance statistic = -4334.884. Number of estimated parameters = 17.

[a] coefficient does not round to three decimal places.

Table 57

Factors predicting rearrests (AOP EBT Rearrest Model C)

	B	SE	Odds Ratio	*p*
Level-1				
Intercept	-1.764	0.247	0.171	$p < .001$
Gender	0.392	0.096	1.480	$p < .001$
Age	-0.143	0.062	0.866	ns*
Illegal activity in the home	0.033	0.100	1.968	ns
School	0.086	0.139	1.089	ns
Race/Ethnicity				
African American	0.226	0.161	1.254	ns
Caucasian	0.031	0.123	1.031	ns
Hispanic	0.100	0.135	1.105	ns
Illegal activity among peers	0.170	0.090	1.185	ns
Arrest History	0.438	0.102	1.550	$p < .001$
Risk Level	0.292	0.043	1.339	$p < .001$
Single parent home	0.106	0.083	1.112	ns
Age of first use	0.170	0.127	1.185	ns
EBTs	-0.154	0.052	0.857	$p < .01$

Note. AOP = adolescent outpatient; EBT = evidence-based treatment. *N* of AOP participants = 5,233. *N* of AOP programs = 129. Variance component = 0.3833. Deviance statistic = 15257.567. Number of estimated parameters = 15.
*$p < .05$.

Table 58

Factors predicting substance use severity score (AOP EBT Substance Use Model B)

	B	SE	*p*
Level-1			
Intercept	0.181	0.026	$p < .001$
Gender	0.019	0.005	$p < .001$
Age	0.015	0.004	$p < .001$
Illegal activity in the home	0.012	0.006	$p < .005$
School	0.011	0.007	ns
Race/Ethnicity			
African American	0.001	0.010	ns
Caucasian	-0.001	0.006	ns
Hispanic	-0.004	0.009	ns
Illegal activity among peers	0.031	0.005	$p < .001$
Arrest History	0.011	0.007	ns
Risk Level	0.022	0.003	$p < .001$
Single parent home	0.015	0.005	$p < .001$
Age of first use	0.025	0.006	$p < .001$

Note. AOP = adolescent outpatient. *N* of AOP participants = 11,714. *N* of AOP programs = 128. Variance component = 0.0298. Deviance statistic = -4777.626. Number of estimated parameters = 16.

Table 59

Factors predicting substance use severity score (AOP EBT Substance Use Model C)

	B	SE	*p*
Level-1			
Intercept	0.182	0.026	$p < .001$
Gender	0.019	0.005	$p < .001$
Age	0.015	0.004	$p < .001$
Illegal activity in the home	0.012	0.006	ns
School	0.011	0.007	ns
Race/Ethnicity			
African American	0.001	0.010	ns
Caucasian	-0.001	0.006	ns
Hispanic	-0.003	0.009	ns
Illegal activity among peers	0.031	0.005	$p < .001$
Arrest History	0.011	0.007	ns
Risk Level	0.022	0.003	$p < .001$
Single parent home	0.015	0.004	$p < .001$
Age of first use	0.025	0.006	$p < .001$
EBTs	0.002	0.007	ns

Note. AOP = adolescent outpatient; EBT = evidence-based treatment. *N* of AOP participants = 5,233. *N* of AOP programs = 129. Variance component = 0.0298. Deviance statistic = -4779.128. Number of estimated parameters = 17.

Table 60

Factors predicting rearrests (JDTC Rearrest Model A)

	B	SE	Odds Ratio	*p*
Level-1				
Intercept	-3.177	0.611	0.042	$p < .001$
Gender	0.445	0.192	1.560	ns*
Age	0.161	0.127	1.174	ns
Illegal activity in the home	0.122	0.195	1.129	ns
School	0.200	0.285	1.221	ns
Race/Ethnicity				
African American	-0.374	0.357	0.688	ns
Caucasian	-0.368	0.327	0.692	ns
Hispanic	0.464	0.259	1.591	ns
Illegal activity among peers	0.066	0.225	1.068	ns
Arrest History	0.968	0.252	2.634	$p < .001$
Risk Level	0.276	0.111	1.318	ns*
Single parent home	0.008	0.144	1.008	ns
Age of first use	0.790	0.254	2.203	$p < .01$

Note. JDTC = juvenile drug treatment court. *N* of JDTC participants = 812. *N* of JDTC programs = 9. Variance = 0.056. Wald statistic = 86.86, $p < .001$. Mean VIF = 1.33.

*$p < .05$.

Table 61

Factors predicting substance use severity score (JDTC Substance Use Model A)

	B	SE	*p*
Level-1			
Intercept	-0.087	0.034	ns
Gender	0.068	0.011	$p < .001$
Age	0.030	0.009	$p < .001$
Illegal activity in the home	0.028	0.015	ns
School	0.017	0.016	ns
Race/Ethnicity			
African American	-0.067	0.018	$p < .001$
Caucasian	0.009	0.015	ns
Hispanic	0.017	0.015	ns
Illegal activity among peers	0.031	0.011	$p < .01$
Arrest History	0.084	0.017	$p < .001$
Risk Level	0.031	0.006	$p < .001$
Single parent home	-0.011	0.009	ns
Age of first use	0.040	0.014	$p < .01$

Note. JDTC = juvenile drug treatment court. *N* of JDTC participants = 1,047. *N* of JDTC programs = 9. Variance = 0.1613. Wald statistic = 306.48, $p < .001$. Mean VIF = 1.36.

APPENDIX J

Table 62

Factors Predicting Rearrests among AOP Sample When Interventions Classified as Zero Were Excluded from the Analyses (Model C)

	B	SE	Odds Ratio	*p*
Level-1				
Intercept	-1.904	0.270	0.149	$p < .001$
Gender	0.331	0.112	1.393	$p < .01$
Age	-0.115	0.064	0.891	ns
Illegal activity in the home	-0.044	0.103	0.957	ns
School	0.127	0.136	1.136	ns
Race/Ethnicity				
African American	0.287	0.165	1.332	ns
Caucasian	0.066	0.141	1.068	ns
Hispanic	0.155	0.130	1.168	ns
Illegal activity among peers	0.126	0.101	1.134	ns
Arrest History	0.480	0.107	1.581	$p < .001$
Risk Level	0.313	0.045	1.368	$p < .001$
Single parent home	0.141	0.088	1.151	ns
Age of first use	0.200	0.135	1.221	ns
EBTs	-1.238	1.136	0.290	ns

Note. AOP = adolescent outpatient; EBT = evidence-based treatment. N of AOP participants = 4,824. *N* of AOP programs = 127. Variance component = 0.3913. Deviance statistic = 14016.534. Number of estimate parameters = 15.

Table 63

Factors Predicting Rearrests among AOP Sample When Interventions Classified as Zero Were Excluded From the Analyses (Model D)

	B	SE	Odds Ratio	*p*
Level-1				
Intercept	-0.872	1.968	0.418	ns
Gender	0.330	0.119	1.392	$p < .01$
Age	-0.116	0.064	0.891	ns
Illegal activity in the home	-0.044	0.105	0.957	ns
School	0.128	0.139	1.136	ns
Race/Ethnicity				
African American	0.289	0.167	1.335	ns
Caucasian	0.069	0.144	1.072	ns
Hispanic	0.155	0.136	1.167	ns
Illegal activity among peers	0.126	0.101	1.134	ns
Arrest History	0.457	0.107	1.579	$p < .001$
Risk Level	0.313	0.046	1.337	$p < .001$
Single parent home	0.140	0.088	1.150	ns
Age of first use	0.457	0.107	1.221	$p < .001$
EBT Use	-1.232	1.202	0.292	ns
Level-2				
EBT Use	-0.872	1.968	0.741	ns

Note. AOP = adolescent outpatient; EBT = evidence-based treatment. *N* of AOP participants = 4,824. N of AOP programs = 127. Variance component = 0.3882. Deviance statistic = 14016.082. Number of estimate parameters = 16.

Table 64

Factors Predicting Substance Use Severity among AOP Sample When Interventions Classified as Zero Were Excluded From the Analyses (Homogeneous Model C)

	B	SE	*p*
Level-1			
Intercept	0.184	0.026	$p < .001$
Gender	0.018	0.005	$p < .001$
Age	0.015	0.004	$p < .001$
Illegal activity in the home	0.013	0.006	ns*
School	0.007	0.008	ns
Race/Ethnicity			
African American	-0.005	0.009	ns
Caucasian	-0.000	0.006	ns
Hispanic	-0.005	0.009	ns
Illegal activity among peers	0.029	0.005	$p < .001$
Arrest History	0.013	0.008	ns
Risk Level	0.022	0.003	$p < .001$
Single parent home	0.014	0.005	$p < .01$
Age of first use	0.027	0.006	$p < .001$
EBTs	-0.000	0.039	ns

Note. AOP = adolescent outpatient; EBT = evidence-based treatment. *N* of AOP participants = 4,824. *N* of AOP programs = 127. Variance component = 0.0303. Deviance statistic = -4447.389. Number of estimate parameters = 16.

*$p < .05$

Table 65

Factors Predicting Substance Use Severity among AOP Sample When Interventions Classified as Zero Were Excluded From the Analyses (Homogeneous Model D)

	B	SE	*p*
Level-1			
Intercept	2.196	0.438	$p < .001$
Gender	0.018	0.005	$p < .001$
Age	0.015	0.004	$p < .001$
Illegal activity in the home	0.013	0.006	ns*
School	0.007	0.008	ns
Race/Ethnicity			
African American	-0.005	0.009	ns
Caucasian	-0.000	0.006	ns
Hispanic	-0.006	0.009	ns
Illegal activity among peers	0.029	0.005	$p < .001$
Arrest History	0.013	0.008	ns
Risk Level	0.022	0.003	$p < .001$
Single parent home	0.014	0.005	$p < .01$
Age of first use	0.027	0.006	$p < .001$
EBT Use	-0.000	0.039	ns
Level-2			
EBT Use	-0.589	0.126	$p < .001$

Note. AOP = adolescent outpatient; EBT = evidence-based treatment. *N* of AOP participants = 4,824. *N* of AOP programs = 127. Variance component = 0.0210. Deviance statistic = -4491.391. Number of estimate parameters = 17.

*$p < .05$

Table 66

Factors Predicting Rearrests among JDTC Sample When Interventions Classified as 0 Were Excluded From the Analyses (Model B)

	B	SE	Odds Ratio	*p*
Level-1				
Intercept	-9.593	1.230	0.000	ns
Gender	0.761	0.216	2.140	$p < .001$
Age	0.096	0.156	1.101	ns
Illegal activity in the home	0.183	0.228	1.201	ns
School	0.247	0.315	1.280	ns
Race/Ethnicity				
African American	-0.712	0.462	0.491	ns
Caucasian	-0.895	0.333	0.409	$p < .01$
Hispanic	0.542	0.285	1.719	ns
Illegal activity among peers	0.142	0.215	1.153	ns
Arrest History	0.591	0.248	1.805	ns*
Risk Level	0.320	0.109	1.378	$p < .01$
Single parent home	-0.077	0.179	0.926	ns
Age of first use	0.926	0.324	2.524	$p < .01$
EBTs	1.949	0.314	7.019	$p < .001$

Note. JDTC = juvenile drug treatment court; EBT = evidence-based treatment. *N* of JDTC participants = 753. *N* of JDTC programs = 10. Variance = 0.1396. Mean VIF = 1.35.
*$p < .05$

Table 67

Factors Predicting Substance Use Severity among JDTC Sample When Interventions Classified as 0 Were Excluded From the Analyses (Model B)

	B	SE	*p*
Level-1			
Intercept	-0.421	0.052	$p < .001$
Gender	0.087	0.012	$p < .001$
Age	0.027	0.011	$p < .01$
Illegal activity in the home	0.028	0.013	ns*
School	0.025	0.018	ns
Race/Ethnicity			
African American	-0.080	0.025	$p < .001$
Caucasian	-0.012	0.022	ns
Hispanic	0.024	0.019	ns
Illegal activity among peers	0.038	0.013	$p < .01$
Arrest History	0.067	0.020	$p < .001$
Risk Level	0.033	0.006	$p < .001$
Single parent home	-0.008	0.012	ns
Age of first use	0.038	0.015	$p < .01$
EBTs	0.102	0.052	$p < .001$

Note. JDTC = juvenile drug treatment court; EBT = evidence-based treatment. *N* of JDTC participants = 967. *N* of JDTC programs = 10. Variance = 0.2112. Wald statistic = 536.83, $p < .001$. Mean VIF = 1.37.
*$p < .05$

APPENDIX K

Table 68

Comparison between interventions' responsivity adherence score and EBT use score

Intervention	Sample Totals		Variables	
	AOP	JDTC	Responsivity Score	EBT use score
Family-based interventions				
Brief Strategic Family Therapy	--	1	4	3.00
Family Support Network	463	--	6	3.70
Functional Family Therapy	25	--	3	3.42**
Multidimensional Family Therapy	190	1	U	3.43
Multisystemic Treatment	31	--	U	3.03
Other Family Therapy	36	--	U	0.00
Non-family-based interventions				
Cognitive Restructuring	1	--	1	0.00

Note. AOP = adolescent outpatient; JDTC = juvenile drug treatment court; EBT = evidence-based treatment. Treatment intervention data missing on 25 AOP participants.

Table 68 *(Continued)*

Intervention	Sample Totals		Variables	
	AOP	**JDTC**	**Responsivity Score**	**EBT use score**
Dialectical Behavioral Therapy	--	2	6	3.30
Dynamic Youth Community, Inc. Treatment Manual	--	8	U	0.00
Group-Based Outpatient Treatment for Adolescent Substance Abuse	--	83	U	0.00
Motivational Enhancement Therapy/Cognitive Behavioral Therapy	3488	235	6	3.60
Other Treatment	193	8	U	0.00
Other Case Management	207	--	U	0.00
Other Cognitive Behavioral Therapy	134	50	6	3.75**
Other Group Therapy	26	1	U	0.00
Other Individual Therapy	54	1	U	0.00
Other Motivational Interviewing	--	331	0	2.75**

Note. AOP = adolescent outpatient; JDTC = juvenile drug treatment court; EBT = evidence-based treatment. Treatment intervention data missing on 25 AOP participants.

Table 68 *(Continued)*

Intervention	Sample Totals		Variables	
	AOP	JDTC	Responsivity Score	EBT use score
Other Psychoeducational Therapy	2	--	0	0.00
Seven Challenges	63	1	1	2.80
Other Student Assistance Programs/School-based programs	30	--	U	0.00
Other Twelve Step Approaches	1	13	0	0.00
Mixed Interventions				
Adolescent Community Reinforcement Approach/Assertive Continuing Care	3042	340	5	3.30
Chester-Bloomington Treatment Manual	125	101	4	3.70

Note. AOP = adolescent outpatient; JDTC = juvenile drug treatment court; EBT = evidence-based treatment. Treatment intervention data missing on 25 AOP participants.

Table 69

Crosstabulations of the responsivity adherence and EBT use scores among the AOP sample

	EBT use score							Total
Responsivity Score	**0.00**	**2.80**	**3.30**	**3.42**	**3.60**	**3.70**	**3.75**	
1	1.56%	98.44%	0.00%	0.00%	0.00%	0.00%	0.00%	64
3	0.00%	0.00%	0.00%	100.00%	0.00%	0.00%	0.00%	25
4	0.00%	0.00%	0.00%	0.00%	0.00%	100.00%	0.00%	125
5	0.00%	0.00%	100.00%	0.00%	0.00%	0.00%	0.00%	3,042
6	0.00%	0.00%	0.00%	0.00%	85.39%	11.33%	3.28%	4,085
Total	1	63	3,042	25	3,488	588	134	7,341

Note. AOP = adolescent outpatient; EBT = evidence-based treatment.

$\chi^2(24, N = 7341) = 23406.708, p < .001$.

Table 70

Crosstabulations of the responsivity adherence and EBT use scores among the JDTC sample

	EBT use score							Total
Responsivity Score	**0.00**	**2.75**	**2.80**	**3.00**	**3.30**	**3.60**	**3.70**	
0	2.36%	97.64%	0.00%	0.00%	0.00%	0.00%	0.00%	339
1	0.00%	0.00%	100.00%	0.00%	0.00%	0.00%	0.00%	1
4	0.00%	0.00%	0.00%	0.98%	0.00%	0.00%	99.02%	102
5	0.00%	0.00%	0.00%	0.00%	100.00%	0.00%	0.00%	340
6	0.00%	0.00%	0.00%	0.00%	.70%	81.88%	0.00%	287
Total	8	331	1	1	342	235	101	1,069

Note. JDTC = juvenile drug treatment court; EBT = evidence-based treatment.

$\chi^2(28, N = 1069) = 4262.343, p < .001$.

APPENDIX L

Institutional Review Board Approval

TEMPLE UNIVERSITY®

Office for Human Subjects Protections
Institutional Review Board
Medical Intervention Committees A1 & A2
Social and Behavioral Committee B
Unanticipated Problems Committee

Student Faculty Conference Center
3340 N Broad Street - Suite 304
Philadelphia, Pennsylvania 19140
Phone: (215) 707-3390
Fax: (215) 707-9100
e-mail: irb@temple.edu

Certification of Approval for a Project Involving Human Subjects

Protocol Number:	**21293**
PI:	**HILLER, MATTHEW**
Review Type:	EXEMPT
Approved On:	11-Mar-2013
Approved From:	
Approved To:	
Committee:	B BEHAVIORAL AND SOCIAL SCIENCES
School/College:	LIBERAL ARTS (1800)
Department:	CLA:CRIMINAL JUSTICE (18350)
Project Title:	Evidence-Based Treatment and Responsivity: Individual and Program Predictors of Recidivism During Juvenile Drug Court and Outpatient Substance Abuse Treatment.

The IRB approved the protocol **21293**.

If the study was approved under expedited or full board review, the approval period can be found above. Otherwise, the study was deemed exempt and does not have an IRB approval period.

Before an approval period ends, you must submit a "Continuing Review Progress Report" to request continuing approval. Please submit the form **at least 60 days before the approval end date** to ensure that the renewal is reviewed and approved and the study can continue.

Finally, in conducting this research, you are obligated to submit modification requests for all changes to any study; reportable new information using the Reportable New Informaiton form; and renewal and closure forms. For the complete list of investigator responsibilities, please see the Policies and Procedures, the Investigator Manual, and other requirements found on the Temple University IRB website: http://www.temple.edu/research/regaffairs/irb/index.html

Please contact the IRB at (215) 707-3390 if you have any questions.