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Empirical research

Development of a motivational interviewing/acceptance and commitment therapy model for adolescent substance use treatment

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ABSTRACT

Introduction: Current adolescent substance treatment models have important limitations. Motivational interviewing (MI) combined with Acceptance and Commitment Therapy (ACT) may be a promising new approach. The purpose of this study is to develop a manual-standardized MI/ACT intervention for evaluation in future controlled trials.

Methods: Participants were 41 adolescents and young adults (ages 12–26 years) consecutively admitted to an urban adolescent substance treatment program and the six therapists who administered the intervention. The intervention was 12 weeks of individual, outpatient, manual-standardized MI and ACT combined with contingency management and psychiatric consultation as needed. The outcome measures were the Outcome Rating Scale (ORS), patient satisfaction questionnaires, proportion of days used non-nicotine substances, qualitative interviews of therapists and the Session Rating Scale (SRS). Wilcoxon signed-rank and paired *t*-tests were used to determine significant change in pre- and post-intervention measures.

Results: A total of 14 of 23 (61%) youth with pre-intervention ORS scores in the clinical range had end of treatment scores in the non-clinical range and a clinically significant increase of over 5 points. The proportion of youth reaching a week of abstinence was 71% by self-report and 68% by urine drug screen. The proportion of days used at pre-intervention (*Mdn* = 1.0; *IQR* 0.4, 1.0) for those with non-zero pre-intervention use (N = 27) was significantly different at post-intervention (*Mdn* 0.1; *IQR* 0, 1.0) (S= 84, p = 0.0014). The average SRS score was 37.9 (SD = 2.2), indicating a high level of satisfaction.

Conclusion: This study demonstrates the initial feasibility of using an MI/ACT model in adolescent substance treatment. A small-scale, randomized controlled trial of MI/ACT is needed to evaluate the feasibility of larger, controlled trials and to determine the sample size that will be needed for an adequately powered study.

1. Introduction

Current adolescent substance treatment models have significant limitations. First, many adolescents drop out of treatment. For example, a national study of 292 adolescents in outpatient treatment found that 76% did not stay in treatment for at least three months (Galaif, Hser, Grella, & Joshi, 2001). In the Cannabis Youth Treatment study, only 52% of those assigned to 12- to 14-week evidence-based treatments, which included cognitive behavioral therapy (CBT) or multidimensional family therapy, stayed in treatment for at least 90 days (Dennis, Funk et al., 2004). Dynamic factors associated with treatment retention include perceived ability to express oneself openly and honestly, involvement with goal setting, and motivation for change (Orlando, Chan, & Morral, 2003; Shroder, Sellman, Frampton, & Deering, 2009).

Second, few adolescents reach and sustain abstinence. A national study of 1167 adolescents undergoing outpatient or residential treatment found that in the year following treatment: 1) 20.3% drank five or more drinks in a day at least weekly; 2) 43.8% used marijuana at least weekly; and 3) 42.2% used other drugs (Hser et al., 2001). For the evidence-based treatments tested in the Cannabis Youth Treatment Study, fewer than 25% of adolescents had a month of abstinence at the end of treatment and 12-month follow-up (Dennis & Godley, 2004). At best, when CBT was combined with contingency management for clean urine drug screens, 53% of youth achieved four weeks of abstinence during the 14 weeks of treatment (Stanger, Ryan, Scherer, Norton, & Budney, 2015). However, at three-month follow-up, the proportion with abstinence in the CBT plus contingency management

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and CBT alone groups did not differ (Stanger et al., 2015).

Third, there are few models that integrate adolescent treatment for both psychiatric and substance use disorders (Hawkins, 2009; Sterling, Weisner, Hinman, & Parthasarathy, 2010). The lack of integrated treatment models is problematic because 64–82% of youth in substance treatment have a co-occurring psychiatric disorder (Greenbaum, Foster-Johnson, & Petrila, 1996; Grella, Hser, Joshi, & Rounds-Bryant, 2001). Furthermore, youth with co-occurring psychiatric disorders, compared to those without, have worse substance treatment outcomes (Grella et al., 2001). Therefore, feasible models to integrate mental health and substance treatment for adolescents are needed.

Finally, current evidence-based treatments are not frequently adapted into real-world settings. One review concluded: "The negative correlation between scientific evidence and treatment-as-usual could hardly be larger if one intentionally constructed treatment programs from those approaches with the least evidence of efficacy (Miller, Sorensen, Selzer, & Brigham, 2006, p. 25)." There are various explanations for this finding. Three relevant explanations include: a) the belief among clinicians that research fails to answer relevant questions, b) the lack of bidirectional collaboration between researchers and clinicians and c) the fact that many substance treatment models were disseminated without proper stage of development testing (Lamb, Greenlick, & McCarty, 1998; Miller et al., 2006).

An innovative approach may be needed to improve adolescent substance treatment outcomes. Acceptance and commitment therapy (ACT) represents a paradigm shift in its unique reliance or emphasis on the following (Hayes, Strosahl, & Wilson, 2011). First, it is philosophically influenced by functional contextualism and pragmatism. Second, ACT is based on much research concerning verbal behavior that led to the development and analysis of relational frame theory (Hayes et al., 2011). Finally, instead of targeting symptom reduction, ACT uniquely emphasizes psychological flexibility in the service of one's values as the goal of treatment (Hayes et al., 2011).

ACT's innovative focus may address the limitations of current models in the following ways. First, ACT's use of hands-on experiential exercises may engage youth in treatment and reduce premature drop-out (Hayes et al., 2011). Second, a recent meta-analysis of ACT compared to active controls for adult substance use disorders shows a small to medium effect size favoring ACT, especially at post-treatment follow-up (Lee, An, Levin, & Twhohig, 2015). Third, controlled trials of ACT show promise in the treatment of common co-occurring psychiatric disorders such as anxiety, depression, psychosis and trauma (A-Tjak et al., 2015; Strauss, Thomas, & Hayward, 2015; Woidneck, Morrison, & Twohig, 2014). Finally, collaborative approaches such as ACT and motivational interviewing may incorporate factors described above that are positively associated with treatment retention such as ability to express oneself openly, involvement in goal setting and motivation for change (Orlando et al., 2003; Shroder et al., 2009).

This current study explores ACT combined with MI. Few models exist for combining these two approaches although a recent review concludes: "…there is a great opportunity to develop and empirically test a conceptually-coherent combination of MI with ACT (Bricker & Tollison, 2011, p. 14)…" MI is frequently combined with other treatments as a way to engage clients and enhance their readiness for change and has been widely used as a treatment for addiction (Miller W.R, 2012). Common features of both approaches include: a) an attitude of partnership and collaboration, b) acceptance of the clients' autonomy and c) an emphasis on connecting with client values (Bricker & Tollison, 2011; Miller & Rollnick, 2012). On a clinical level, there are several differences including: a) MI's emphasis on language content compared to ACT's emphasis on language process; b) MI's emphasis on open-ended questions, affirmations, reflections and summaries compared to ACT's emphasis on metaphors and experiential exercises; d) philosophical differences on acceptance and willingness, and e) ACT's emphasis on helpful self-disclosure (Bricker & Tollison, 2011). As a result, therapists combining these interventions may face choice points about which modality to emphasize. These choice points are described in more detail in the Methods section below.

This current study uses two approaches that may maximize the treatment model's dissemination into community settings. First, the guidelines for the Stage Model of behavior therapy development were used to pilot-test and refine the manual (Rounsaville, Carroll, & Oaken, 2001). Second, this treatment is the result of a bidirectional partnership between clinicians, consumers, and researchers. Such partnerships are thought to enhance the adaptability of evidence-based treatments for clinical settings (Tai et al., 2010).

Therefore, to create a novel adolescent substance treatment model that might improve care, the current study had the following specific aims: a) to evaluate the feasibility of implementing a manual-standardized MI/ACT intervention for adolescent substance use disorders; b) to evaluate the preliminary outcomes of this intervention; and c) to revise the treatment manual, including session content, outcome measures, fidelity monitoring and training procedures in view of the study findings.

2. Material and methods

Participants were 41 adolescents and young adults (ages 12–26 years) consecutively enrolled in an adolescent substance treatment program in Denver, Colorado, U.S.A., from May 2016 to September 2016. Participants also included six therapists who delivered the substance treatment intervention. This study was approved by the Colorado Multiple Institutional Review Board.

Outcome measures included the following. A clinical interview was used to obtain baseline demographic information and diagnoses using the Diagnostic and Statistical Manual of Mental Disorders, 5th edition (American Psychiatric Association, 2013). Baseline and weekly measures included the following.

a. The Outcome Rating Scale (ORS) measures emotional wellness on a scale of 0 (minimal wellness) to 40 (maximum wellness). Previous research supports the reliability and validity of this measure (Bringhurst, Watson, Miller, & Duncan, 2006; Seidel & Miller, 2012; Seidel, Andrews, Owen, Miller, & Buccino, 2017). For example, in a study of young adults, the ORS demonstrated high internal consistency (Chronbach's alpha = 0.97) and correlation to longer, more comprehensive instruments (Bringhurst et al., 2006). For 12–17 year olds scores below 28 are considered to be in the clinical range, and scores greater than or equal to 28 are considered non-clinical (Seidel & Miller, 2012). For youth 18 years and over, scores below 25 are considered clinical, and those 25 and above are non-clinical (Seidel & Miller, 2012). For the ORS, the Reliable Change Index is considered to be a change of five or more points (Jacobson & Truax, 1991; Seidel & Miller, 2012). That is, an increase from clinical to non-clinical range that includes at least a 5-point difference is considered clinically significant.
b. The Timeline Follow Back Interview (TLFB) measures the number of days substances were used. The TLFB uses anchor points to help youth remember which substances they used and on which day. This approach has been shown to be a reliable and valid way to quantify frequency of substance use for up to 90 days in adolescents (Dennis & Godley, 2004). In this study, only the past seven days were assessed to optimize speed and accuracy of data collection.
c. The Session Rating Scale (SRS) allows youth to provide feedback on treatment (Owen, Miller, Seidel, & Chow, 2016). Scores range from 0 (minimal client satisfaction with the session) to 40 (maximum client satisfaction with the session). Scores less than 36 may be cause for concern (Miller, 2012). Therapists discuss the client's feedback using the SRS to improve technique and address discord early. Such feedback has been shown to reduce treatment drop-out among adolescents (Owen et al., 2016).
d. Point-of-care qualitative urine drug screen (screening for

amphetamine, benzodiazepines, cocaine, marijuana, methamphetamine, opioids) was conducted at intake and weekly follow up sessions.

Qualitative data were also collected. Therapists ($N = 6$) were interviewed individually and as a group to obtain information on the feasibility of the intervention, satisfaction with training procedures and suggestions for manual revision. Finally, comments from youth were elicited from a patient satisfaction questionnaire and from the SRS.

The intervention consisted of 12 weekly individual sessions of manual-standardized MI/ACT. Sessions typically lasted 60 min. Treatment started with a session of MI and a comprehensive evaluation to establish a working diagnostic formulation. Subsequent sessions included additional MI interviews until therapists believed clients had sufficient engagement, focus and change talk. Therapists then implemented the ACT processes, (i.e., values construction, acceptance strategies, defusion techniques, present-moment focus and committed action). When therapists focused on ACT modalities, they were instructed to maintain the spirit of MI including: a) partnership, b) acceptance, c) compassion and d) evocation (Miller & Rollnick, 2012). For example, therapists were instructed to seek client permission before discussing and doing ACT work. If clients demonstrated an increase in sustain talk or ambivalence, therapists reverted back to MI until engagement, focus and change talk were clear again.

While treatment was primarily individual, sessions were adapted for family interventions as needed. Treatment also included point-of-care urine drug testing combined with fishbowl contingency management (Petry & Martin, 2002). In this latter technique, adolescents were rewarded for clean urine drug screens using a positive, intermittent, escalating reinforcement schedule. Therapists adapted the treatment to address co-occurring psychiatric disorders, with psychiatric consultation being used as needed. Therapists provided case management to coordinate systems and arrange follow-up care as needed.

Therapists were two Licensed Clinical Social Workers, one Licensed Professional Counselor, one second-year Masters in Social Work student, and one child and addiction psychiatrist. Therapists received 10 h of ACT training from a co-author (C.E.), who has 18 years of ACT experience, 8 years of experience teaching ACT to doctoral psychology students and attendance at five ACT World Conferences. The initial training was followed by every other week group supervision (with C.E.) in which therapists played audio-recorded sessions and discussed cases. The initial draft of the treatment manual was written by the primary author (C.T.), who is a board-certified child psychiatrist and addiction psychiatrist, attended the trainings mentioned above, and completed advanced training in both motivational interviewing and ACT. Additionally, a co-author (J.T.), who has completed advanced training in both MI and ACT, reviewed monthly audio-recordings to provide unstructured ACT feedback and specific MI feedback using the Motivational Interviewing Treatment Integrity Code 4 (Moyers, Rowell, Manuel, Ernst & Houck, 2016).

Data were analyzed with SAS Enterprise Guide 5.1 (SAS Institute Inc, 2013). Depending on tests of normality, continuous data are presented as means with standard deviation or as medians with interquartile range. Categorical variables are presented as number counts with percent. The earliest non-zero measure available as either the intake or first therapy session was used as the “pre” value. The latest measure (not including a pre-intervention or first session value) was used as the “post” value. ORS scores were analyzed as follows. Difference in the pre- and post- ORS scores was calculated using a paired *t*-test. We evaluated each patient for clinically significant change in ORS scores using previously established clinical cutoffs and a 5-point marker for reliable change. A Pearson product-moment correlation coefficient was calculated to examine the relationship between number of sessions attended and change in ORS. Finally, the within-group effect size of the intervention on ORS scores was measured using Cohen's *d* (Cohen, 1988). TLFB data were analyzed as follows. Only participants reporting use of at least once in the past seven days at pre-intervention were included in measuring change in proportion of days used. Difference in the pre- and post- proportion of days using non-tobacco substances was calculated using a Wilcoxon signed-rank test. The SRS score is presented as a mean of the SRS scores for all sessions. Lastly, the average number of sessions completed per patients is expressed as a mean. Statistical tests were two-tailed and used a p-value of 0.05 to detect statistical significance.

Qualitative data were analyzed as follows. Notes were taken from the interviews of therapists. Repeated themes were noted and used to revise the intervention, fidelity measures, choice of outcome measures and training procedures. Comments from patient satisfaction questionnaires and SRS forms were also organized into recurrent themes.

Table 1
Baseline demographic and clinical characteristics ($N = 41$).

Variable	Value
Age, mean (*SD*) in years	17.0 (2.9)
Gender, % *(N)*	
Female	39 (16)
Male	61 (25)
Ethnicity, % *(N)*	
Hispanic/Latino	19.5 (8)
Not Hispanic/Latino	80.5 (33)
Race, % *(N)*	
African American	12.2 (5)
Caucasian/White	63.4 (26)
Other	24.4 (10)
Substance use disorder diagnoses, % *(N)*	
Cannabis use disorder	83 (34)
Alcohol use disorder	44 (18)
Stimulant use disorder	29 (12)
Opioid use disorder	22 (9)
Hallucinogen use disorder	20 (8)
Other substance use disorder	12 (5)
Psychiatric disorders, % *(N)*	
Major depressive disorder	63 (26)
Generalized anxiety disorder	45 (14)
Attention-deficit/hyperactivity disorder	37 (15)
Conduct disorder	32 (13)
Posttraumatic stress disorder	30 (12)
Social anxiety disorder	17 (7)
Oppositional defiant disorder	10 (4)
Other	24 (10)

3. Results

The baseline and clinical characteristics of the adolescent sample are described in Table 1. Overall, the sample was predominantly male and presented for cannabis use disorder. Many youth presented with a co-occurring psychiatric disorder.

Overall, 54% ($N = 22$) youth were prescribed psychotropic medication. On average, participants attended 7.9 ($SD = 3.6$) sessions. Youth had an average of 1.1 ($SD = 0.7$) family sessions. There was a positive, but not statistically significant, correlation between the number of sessions attended and improvement in ORS($r(31) = 0.26$, $p = 0.157$). There was a significant difference in pre-intervention ORS ($M = 22.5$ $SD = 8.6$) and post-intervention ORS ($M = 29.3$ $SD = 8.8$) ($t_{30} = -5.12$, $p < 0.0001$). According to Cohen's convention for effect size measurement, the intervention had a medium within-group effect size ($d = 0.78$) on ORS scores. The proportion of youth achieving or maintaining ORS scores in the non-clinical range was 74.2% ($N = 23$). A total of 14 of 23 (61%) youth with pre-intervention ORS scores in the clinical range had end of treatment scores in the non-clinical range and an increase of over 5 points. One youth had a decrease of more than five points on the ORS, but both pre- and post-intervention scores were in

the non-clinical range.

The proportion of youth reaching abstinence by self-report for at least one week during treatment was 71%. The proportion producing at least one clean urine drug screen was 68%. The proportion of days used at pre-intervention (*Mdn* 1.0; *IQR* 0.4, 1.0) for those with non-zero pre-intervention use ($N = 27$) was significantly different from post-intervention use (*Mdn* 0.1; *IQR* 0,1.0) (S= 84, $p = 0.0014$). The average SRS score was 37.0 (SD = 2.4). This score indicates that, on average, there was a high level of client satisfaction.

In terms of qualitative data, a consistent theme from all therapist interviews was satisfaction with MI/ACT over the previous treatment model, which relied on classical cognitive behavioral therapy. Aspects of the new model which therapists appreciated included: a) its flexibility to handle co-occurring psychiatric disorders; b) its opportunity for developing creative exercises and metaphors; and c) its consistency with the spirit of motivational interviewing, especially partnership and acceptance. Therapists also appreciated having expert supervision every other week using audio-recorded sessions as part of their ongoing training.

Therapists had the following suggestions: a) incorporate the ACT matrix model into the treatment (Polk & Schoendorff, 2016); b) use more hands-on experiential exercises; c) include more experiential exercises in the initial training of the model; d) include more exercises that can be adapted for family sessions; e) use outcome measures that are quicker to use than the ORS and SRS; f) develop treatment tools in Spanish; and g) have additional training and resources to adapt treatment for clients with intellectual disabilities. Additionally, the clinical team had suggestions for specific ACT fidelity monitoring instruments.

Finally, important themes concerning the treatment experience of the adolescents included appreciation for feeling accepted, helped, respected, supported, understood and welcomed by the therapists. For example, youth had the following things to say about their treatment.

- "They don't judge and they get to know you and help you however you need."
- "It actually helped me stop smoking."
- "Everybody takes the time to listen to my wishes and opinions. They are also very non-judgmental making visits extremely comfortable."
- "I like how my therapist respects and listens to me"
- "How respectful they are and they take time to work with you- really supportive."
- "Have a deep understanding for problems and understands my mindset and path of thinking."
- "I like the friendly environment that all the employees create."
- "It's a safe place you can get your mind off things as well as to receive the help you need"
- "I enjoy coming in and talking about things that usually bother me…"

Youth had the following suggestions for improvement: a) include more hands-on experiential exercises and fewer imagining exercises; b) use different outcome measures; and c) remove language from some exercises that could come across as blaming.

4. Discussion

These data support the initial feasibility of using individual MI/ACT with adolescents presenting for substance treatment. This project has produced a novel manual-standardized treatment, called impACT. This manual-standardized treatment includes guidelines for contingency management, psychotherapy, outcome measures, training and fidelity monitoring. This manual is now ready for Stage 1B testing. Such testing would evaluate the feasibility of a larger controlled trial and determine the sample size that would be needed to have a study with adequate power.

The development of this novel intervention may advance the field of adolescent substance treatment in the following ways. First, a new paradigm may decrease treatment drop out and improve outcomes. Second, this intervention may serve as a model for integrating mental health and substance treatment. Finally, this intervention might be practically disseminated into clinical settings because its development involved a bidirectional partnership between clinicians and researchers, who followed established stages of psychotherapy development (Rounsaville et al., 2001; Tai et al., 2010).

There are various limitations to this current study. First, this study was not a randomized controlled trial. Therefore, it cannot be concluded that the intervention caused the observed clinical improvements. Second, this study used a small sample size and a single site. As a result, random variations in clinical outcomes may have influenced the observed results, and the results of this study may not be generalizable (Seidel & Miller, 2012). Finally, this study did not collect follow-up data after treatment ended. These limitations should be addressed with future research.

5. Conclusions

This study demonstrates the initial feasibility of using an MI/ACT model in adolescent substance treatment. This treatment, called impACT, is available upon request.

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Declaration of interests

The authors have no conflicts of interest to report.

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