

A comparative treatment efficacy study of conventional therapy and mode deactivation therapy (MDT) for adolescents with conduct disorders, mixed personality disorders, and experiences of childhood trauma

Joan Swart and Jack Apsche

Walden University

Abstract

Mode Deactivation Therapy (MDT) was developed based on the cognitive theory of Prof. Aaron Beck, and incorporated elements from Dialectical Behavior Therapy (DBT), Acceptance and Commitment Therapy (ACT), and mindfulness with the novel change effect process—Validation, Clarification, and Redirection (VCR)—that is the crux of the mode deactivation concept. MDT has the objective to overcome shortcomings of other cognitive-behavioral therapies in the treatment of adolescents with trauma-based multiple Axis-I conditions and Axis-II personality constellations that have proved difficult to treat. As the most recent of more than 20 MDT research studies to be reported, this study confirms the effectiveness of MDT in treating this population. A sample of 143 participants were treated at an inpatient facility and randomly assigned to an experimental MDT group or a standard Cognitive-Behavioral Therapy (CBT) (Treatment as Usual, TAU) group. Across the assessment measures applied, MDT achieved a higher than 40% average improvement from baseline at treatment completion. An average improvement of 5% was reported for the TAU group. Results are consistent with previous studies and provide evidence of the validity and utility of MDT to treat adolescents with behavior problems cost-effectively.

Keywords

mode deactivation, MDT, adolescent, conduct disorder, cognitive-behavioral, substance abuse, aggression, childhood abuse, trauma, personality disorder, contextual therapy

Mode Deactivation Therapy (MDT) is a Cognitive-Behavioral Therapy (CBT) derivative that was developed to overcome specific problems in the treatment of adolescents with dysfunctional behavior. This population typically has a history of abuse that developed into DSM Axis-I disorders such as Conduct and Oppositional Defiant Disorder, mood disorders, PTSD, and comorbid substance abuse, and Axis-II disorders that are commonly a constellation of personality disorder criteria. The MDT theoretical framework leans heavily on the shoulders of the work done by Prof. Aaron Beck in the areas of negative automatic thoughts and cognitive schemas. Elements of Dialectical Behavior Therapy (DBT), Acceptance and Commitment Therapy (ACT), and mindfulness were combined with a novel change effect component to provide effective treatment for adolescents with behavioral problems. The Validation-Clarification-Redirection step is the crux of MDT and based on the concepts of awareness, validation, and acceptance of problems and their roots, rather than disputing them. In the 15 years or so that MDT has been practiced, about 20 developer-conducted and independent research studies, including the current study, consistently provided evidence of the effectiveness of MDT in treating this adolescent population.

■ Literature review

In the work done by Aaron Beck, he focused on negative automatic thoughts as the initiating mechanism of dysfunctional behavior (Beck, 2005). The automatic thoughts are activated by a trigger that can be associated with underlying experience-based core beliefs. Although he initially concentrated on the study of depression, a broad variety of adolescent behavior problems are also widely associated with cognitive schemas that act as coping mechanisms in response to chronic distress. Such beliefs commonly result in

poor regulation of affect and impulses, somatization, low self-esteem, dysfunctional attachments, guilt, shame, and dysfunctional worldviews. According to Luxenberg, Spinazzola, and Van der Kolk (2001), these are the results of extreme deprivation during childhood and represent a complex adaptation to trauma. Based on extensive field work, they devised the DESNOS symptomatology, and arranged a list of 27 symptoms associated with disorders of extreme stress not otherwise specified (DESNOS) into seven categories (see Table 1 on page 24): Dysregulation of (a) affect and impulses, (b) attention or consciousness, (c) self-perception, (d) perception of the perpetrator, (e) relations with others; (f) somatization, and (g) systems of meaning. This constellation of symptoms was found to be very consistent and statistically correlated with PTSD. Among groups with different types of trauma, and early and late onset of symptoms, it was found that children below 14-years who experienced high-magnitude interpersonal violence endorsed the most DESNOS items. In fact, “the younger the age of onset of the trauma, the more likely one is to suffer from the cluster of DESNOS symptoms, in addition to PTSD” (Van der Kolk, Roth, Pelcovitz, Sunday, & Spinazzola, 2005, p. 395). Therefore, such interpersonal trauma that is prolonged and first occurs at an early age, can have significant effects on psychological functioning beyond PTSD symptomatology.

Childhood abuse also has an impact on personality development with constellations of personality traits common among adolescent abuse victims. Different personality constellations have been identified in this context. The first is a four-array classification with Internalizing Dysregulated, High Functioning Internalizing, Externalizing Dysregulated, and Dependent as distinct personality constellations with statistically different diagnostic and adaptive functioning (Bradley, Heim, & Westen, 2005). These

groups represent different in- or outwards expressions as a response to childhood trauma, which is meaningful in determining the underlying belief schemas. A second personality cluster classification, devised by Blagov, Bradley, and Westen (2007), also has four diagnostic groupings that resemble the clinical concept of neurotic styles instead of internalizing and externalizing dimensions of behavior, namely depressive, hostile-competitive, obsessive, and hysterical. Even with a sub-threshold personality pathology it is possible to identify developing dysfunctional personality traits and clusters that can be associated with a belief schema that resulted from early abuse and neglect. Identifying and differentiating between personality prototypes are important in good case conceptualization as different treatment needs are likely required. The personality constellations are after all representations of belief schemas shaped by prolonged and complex interpersonal trauma that is likely to have occurred in the home.

The work of Prof. Aaron Beck pioneered the development of Cognitive-Behavioral Therapy (CBT), which formed the basis of the MDT approach. A number of CBT studies showed poorer outcomes for Axis-I disorders with comorbidity on Axis-II (Vallis, Howes, & Standage, 2000; Kuyken, Kurzer, DeRubeis, Beck, & Brown, 2001; Wölwer, Burtscheidt, Redner, Schwarz, & Gaebel, 2001), especially at follow-up (Chambless & Tran, 1997). Mode Deactivation Therapy (MDT) was developed with these shortcomings in mind, and applied a new approach—Validation, Clarification, and Redirection (VCR)—with traditional CBT principles and elements of DBT, ACT, and mindfulness to provide an evidence-based effective treatment for adolescents with behavior problems and complex psychopathology.

What are schemas?

Among adolescents with behavioral problems, early maladaptive schemas related to childhood trauma are likely underlying their emotions, their poor ability to direct it appropriately, and a dysfunctional expression thereof. Early maladaptive schemas are self-defeating, core themes or patterns that develop and are reinforced with distressful life events, and is later activated only by the anticipation of events of a similar nature (Martin & Young, 2010). These schemas develop when a child's core emotional needs are consistently not met. These needs are (1) safety and stability through secure attachments, (2) a sense of autonomy, competence, and identity, (3) freedom to express valid needs and emotions, (4) spontaneity, and (5) realistic limits and self-control (Young, Klosko, & Weishaar, 2003). When a familiar distressful event is encountered or anticipated, these early maladaptive schemas are internalized or externalized and expressed as a behavioral style that is reminiscent of the personality styles discussed above, namely depressive, hostile-competitive, obsessive, or hysterical. Young et al. (2010) further defines a “schema mode” as an emotional state that is associated with a given schema and can change frequently or be very persistent. The schema therapy approach is modelled on the idea that addressing these modes is more effective than referring to the schemas that underlie them

when dealing with patients with many different and varying schemas. However, the need to better manage more intense and persistent modes was recognized, which led to the development of the “mode deactivation” concept.

What is mode deactivation?

When an event is encountered or anticipated that the adolescent recalls as traumatic, unconscious cognitions activate an associated fear response, which evokes thoughts that are aligned with the core belief system. Each time a similar event is experienced, the core belief system is reinforced and becomes more entrenched. This mode activation causes responses of the physiological system, affective schema (emotional component), and behavioral schema (expressed behavior). The level of motivation that is evoked, determines the response to eliminate the threat by aggression (attack), or escape from the fear in a non-contact form (avoid).

Mode deactivation is the intervention by which a mode is deactivated before it culminates in an aggressive act or other forms of emotional dysregulation. This intervention takes place in one of four areas, namely the orienting schema or core beliefs, the perception that a fear response is required, physiological system, and anticipation and avoidance of triggers. Instead of disputing cognitions and their underlying core beliefs as wrong or inaccurate—therefore attempting to treat the diagnosis and not the underlying issues—the need was recognized to identify and deactivate the problematic modes through an understanding of the associated core belief system and the beliefs → fears → avoids schema mode.

What is MDT and how was it developed?

With an objective to overcome the shortfalls of cognitive and behavioral therapies in treating the adolescent population with behavioral problems and complex psychopathologies who are considered difficult-to-treat, the theoretical framework and methodology of Mode Deactivation Therapy (MDT) was developed. Elements from Dialectical Behavior Therapy (DBT), Acceptance and Commitment Therapy (ACT), and mindfulness were combined with a mode deactivation process that are unique to MDT. The two main conceptual distinctions of MDT are the following:

- Problematic schema modes and the core beliefs that underlie them are accepted and validated as a reasonable and realistic coping response to adverse life experiences. Cognitions and beliefs are therefore not disputed as dysfunctional, but recognized as an integral part of the adolescent that must be explored and understood in order to consider functional alternative beliefs that would relieve distress and are better suited to achieving life goals.
- Mode deactivation recognizes the need to understand and manage a broader process than simply treating the cognitive and behavioral symptoms without exploring underlying beliefs and their origins. As part of the case conceptualization process problematic emotions and behaviors are

Table 1. DESNOS categories

1. Alteration in regulation of affect and impulses	d. Suicidal preoccupation
a. Affect regulation	e. Difficulty modulating sexual involvement
b. Modulation of anger	f. Excessive risk-taking
c. Self-destructive	
2. Alterations in attention or consciousness	
a. Amnesia	
b. Transient dissociative episodes and depersonalization	
3. Somatization	d. Conversion symptoms
a. Digestive system	e. Sexual symptoms
b. Chronic pain	
c. Cardiopulmonary symptoms	
4. Alterations in self-perception	d. Shame
a. Ineffectiveness	e. Nobody can understand
b. Permanent damage	f. Minimizing
c. Guilt and responsibility	
5. Alterations in perception of the perpetrator	
a. Adopting distorted beliefs	
b. Idealization of the perpetrator	
c. Preoccupation with hurting perpetrator	
6. Alterations in relations with others	
a. Inability to trust	
b. Revictimization	
c. Victimizing others	
7. Alterations in systems of meaning	
a. Despair and hopelessness	
b. Loss of previously sustaining beliefs	

Source: Luxenberg, Spinazzola, & Van der Kolk, 2001, p. 375.

paired with specific fears, avoids, triggers, and ultimately the core belief that is activated in the chain reaction.

By identifying how a real or anticipated situation triggers fears and avoids by activation of the core beliefs, the most appropriate intervention can be conceptualized. As already mentioned, the intervention is planned at the orienting schema level by considering functional alternative beliefs in the specific situation, by addressing the perception of fear, or to anticipate and avoid triggers. Through the case conceptualization, a specific intervention for each problem presentation is developed and planned. It is implemented in the Validation, Clarification, and Redirection (VCR) step, a method that is unique to MDT. Herein, beliefs and their corresponding behaviors are validated as reasonable given the patient's life experiences, and further elucidated where necessary. Functional alternative beliefs, healthy alternative thoughts, functional alternative compensatory strategies, and functional reinforcing behaviors are identified in collaboration with the patient, who commit to consider and test the new-found alternatives.

Why is MDT relevant for adolescents with behavioral problems?

As already referenced, adolescents with a background of abuse and neglect are likely to present with complex comorbid disorders and personality constellations that are both externally and internally manifested and firmly entrenched. These expressions include violent and aggressive behavior, opposition to authority, suicidality, and comorbid substance,

and is considered to be one of the most difficult and recalcitrant populations to treat effectively (Alexander, Waldron, Robbins, & Neeb, 2013). It is widely known that the main reasons for this treatment resistance are an unwillingness to accept anyone who resembles authority, denial that there is a problem that can (and should) be addressed, and a deeply entrenched core belief system that supports the dysfunctional behavior. By validating the adolescent's core beliefs and encouraging awareness and acceptance rather than judging and disputing them as being fundamentally wrong, an atmosphere conducive to understanding and mutual respect is created. This approach, which is at the crux of the MDT methodology, has proven to be effective in building a strong patient-therapist alliance in a short time. As previously explained, almost all of the adolescents in this population have multiple DSM Axis-I and Axis-II conditions, including personality disorders that are often deemed as “untreatable” as their pervasive problems and propensity to resist or drop out of treatment interfere with therapy (Dingfelder, 2004). The MDT case conceptualization is highly individualized and collaborative by jointly exploring and pairing each problem behavior with its associated trigger, fears, avoids, and core belief, thereby allowing the therapist to identify and prioritize treatment interfering elements in the treatment plan. Thus, it is the validation concept in the VCR step, pairing behaviors with their underlying core beliefs, and specific individualized and collaborative case conceptualization process in MDT that smooth the path of the working alliance, or collaborative bond, between therapist and adolescent and improve responsiveness to treatment.

Table 2. Most recent MDT research studies

No.	Year	Authors	Sample	N	Comment
1	2011	Thoder & Cautilli	Family, residential, sex offenders	39	Independent study
2	2011	Murphy & Siv	Residential, CD and PTSD	20	Independent study
3	2012	Apsche, Bass, & Backlund	Family, residential, CD and aggression	84	
4	i.p.	Swart & Apsche	Family, residential, CD/PTSD, aggression	84	

What has literature already demonstrated about the efficacy of MDT?

In 2010, Apsche, Bass, and DiMeo prepared a comprehensive meta-analysis of MDT studies—individual and family-based—that had been conducted and published at the time. Twenty empirical studies with a combined 458 participants were selected and used for this purpose. The meta-analysis concluded:

“This finding supports the notion that Mode Deactivation Therapy as a superior form of cognitive behavioral therapy addresses not just the acting out behavior, but internal states as well. MDT had a large effect size in all areas of the CBCL and STAXI. As symptoms of externalizing disorders are addressed, internalizing disorders can

be addressed. The results of this data—from the [pre- and post-treatment CBCL and STAXI] assessments—confirm the hypothesis that MDT reduces internalizing disorders. It further supports the idea that these internalizing disorders are the behavioral function of the reduced externalizing disorders. Thus, as symptoms of externalizing disorders decrease, internalizing disorders may appear as co-morbid behavioral issues.” (p. 180).

Therefore, the meta-analysis confirmed the following:

1. MDT consistently outperforms standard cognitive-behavioral treatments for adolescents with complex trauma-related DSM Axis-I and Axis II constellations that are inwardly or outwardly expressed in dysfunctional ways.
2. CBCL and STAXI results after MDT treatment were consistently and statistically significant lower when compared with baseline pre-treatment scores.
3. Two-year post-treatment follow-up results indicated a less than 7% reoccurrence of aggressive behavior and less than 4% of sexual offending. Various studies found the base rates for adolescent violent recidivism at around 30% and above 10% for sexual recidivism at a follow-up period of between two and three years (Olver, Stockdale, & Wormith, 2009; Salekin, 2008; Carpentier & Proulx, 2011).

Since the meta-analysis, two independent studies were done, which confirmed the conclusions of previous studies that MDT consistently achieved better treatment outcomes than treatment as usual and delivered impressive results compared to the pre-treatment baseline of the adolescent sample (Thoder & Cautilli, 2011; Murphy & Siv, 2011). Subsequently, two other larger family-based MDT studies by the author also confirmed the same positive results (Apsche, Bass, & Backlund, 2012; Swart & Apsche, in press). The specifics of the most recent MDT research studies are summarized in Table 2 above.

In conclusion, family-based and individual MDT continues to demonstrate great potential for the treatment of adolescents with behavioral problems and complex psychopathologies and should be proliferated in practice to manage this costly problem better. The current study provides yet an additional resource that corroborates the efficacy of MDT.

Research method

This was a randomized controlled treatment research study comparing MDT and CBT in a residential treatment facility. Data were collected at pre-treatment and post-treatment stages. Participants were male adolescents who were mandated to treatment. The participant characteristics are described in Table 3 on the left.

Participants

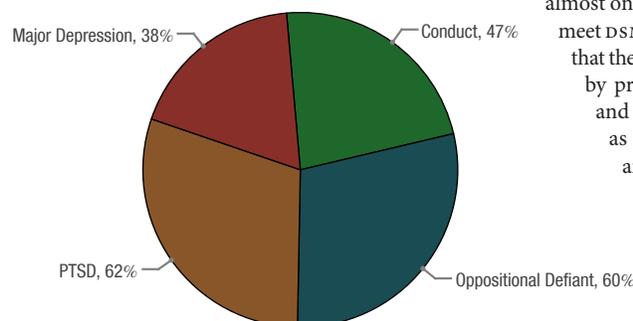
All participants who were received on a rolling basis at the functional treatment clinic in Virginia were legally mandated by the court or Department of Youth and Family Services (DYFS) to receive treatment. As such, they were not allowed to discontinue or withdraw from treatment. They were informed and consented to participating in a research study at intake. The 143 adolescent male participants were randomly assigned to the MDT treatment group or the control group that received a standard CBT treatment. Inclusion criteria were (1) adolescent males between 14- and 17-years, (2) problems with aggression, conduct, and opposition that are not considered “severe” or to present an imminent high level of risk, and (3) functioning within the “normal” range of intelligence and no active psychotic symptoms. The participant profile is given in Table 3.

On average and in general, all participants were diagnosed with Conduct Disorder (CD), Oppositional Defiant Disorder (ODD), or mood disorders. Almost all experienced some form of childhood abuse, while nearly two-thirds presented with symptoms of Posttraumatic Stress Disorder (PTSD). Personality disorders, ranging across DSM categories of borderline, antisocial, narcissistic, dependent, and avoidant criteria, were common. A sizable number of participants (54%) were diagnosed with mixed personality disorder. The diagnostic breakdown is indicated in Figure 1 below. There is little doubt that severe childhood adversity increases risk of early onset behavioral, mood, and personality disorders co-occurring with PTSD (Brady & Back, 2012). Furthermore, Kerig and Becker (2012) reported that almost one-third of boys in detention settings

meet DSM criteria for a diagnosis of PTSD and that their delinquent behaviors are underlain by problems with emotional processing and regulation, cognitive processes such as hostile attributions and alienation and interpersonal processes such as antisocial peers, negative dyadic relationships, and negative social exchanges. Childhood cumulative trauma is also positively linked with symptom complexity (Cloitre, Stolbach, Herman, Van der Kolk, Pynoos, Wang, & Petkova, 2009), and dimensional symptom

Table 3. Participant profile (N = 143)

Diagnostic - axis 1	
Conduct	47%
Oppositional defiant	60%
PTSD	62%
Major depression	38%
Diagnostic - axis 2	
Borderline	31%
Antisocial	25%
Narcissistic	22%
Dependent	27%
Avoidant	29%
Mixed	54%
Ethnicity	
African American	51%
European American	45%
Latin American	4%
Age	
14-year	10%
15-year	10%
16-year	50%
17-year	30%
Abuse history	
Physical	52%
Sexual	50%
Neglect	80%
Emotional/verbal	85%

**Figure 1.** Participant diagnostic axis-1 profile

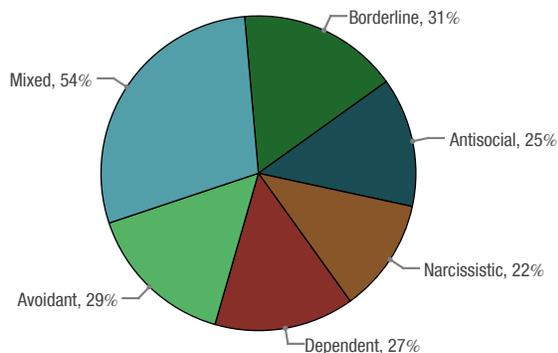


Figure 2. Participant diagnostic axis-2 profile

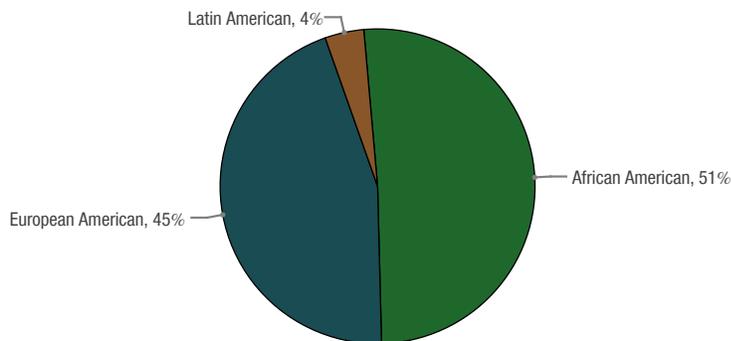


Figure 3. Participant racial and ethnic profile

models (Asmundson, Frombach, McQuaid, Pedrelli, Lenox, & Stein, 2000). As expected, a high presence of DESNOS criteria (see Table 1 on page 24) is found among the adolescent sample, which indicates that dysfunctional behavioral expressions are preceded by inappropriate schemas that are the coping mechanism in response to childhood trauma. The complex comorbidity of the adolescents' psychopathology, including comorbid DSM Axis-I and Axis-II conditions, are also typical of early abuse or neglect.

The diagnostic DSM Axis-II profiles illustrated in Figure 2 above are also typical of the personality constellations that are associated with distressed youth. All participants have comorbid Axis-I and Axis-II conditions, while more than one-half (54%) of the sample qualify for a mixed personality diagnosis, with the others satisfying clinical criteria in relatively equal percentages for Borderline, Antisocial, Narcissistic, Dependent, and Avoidant Personality Disorders respectively. This relatively spread-out and clustered personality diagnoses in the participant sample are typical among adolescents who experienced childhood abuse and neglect. As discussed previously, it is expected that personality constellations generally tend to orientate into different dimensions of internalizing and externalizing expressions (Bradley, Heim, & Westen, 2005; Blagov, Bradley, & Westen, 2007). Although such schemas likely have a single fundamental orientation, it may also be expressed in the opposite direction as a fear response or an avoidance reaction. To clarify further: A distressing internalizing state can be externalized as a dysfunctional behavior such as verbal or physical aggression. This level

of complexity in the adolescent population with behavioral problems is suitably addressed in MDT by the case conceptualization whereby a deeper understanding is created of the internal-external dynamics and applied in the VCR process, as described before. Figure 2 above illustrates the variety and level of overlap of personality disorders in the participant sample.

The demographic profile of the participants are only indicated in terms of racial and ethnic profile (Figure 3), and age (Figure 4). African Americans formed the largest group by a small margin (51%), ahead of European Americans (45%), and a small representation of Latin American participants (4%).

According to the age profile in Figure 4, one-half of the participants were 16-year-olds, with smaller numbers of 17-year-olds (30%), 14-year-olds and 15-year-olds at 10% respectively.

Figure 5 indicated the history of abuse that the participants were subjected to. A high number experienced emotional/verbal abuse (85%) and/or neglect (80%), while about one-half had a history of physical (52%) or sexual (50%) abuse. From the breakdown we can reach the conclusion that at least two-thirds, but possibly as many as 90% of the participants, have been subjected to three or more types of abuse. As previously explained, these profiles are associated with PTSD symptoms, personality disorders, and regulation, internalizing and externalizing problems, which is the adolescent population that MDT was specifically developed to treat.

In summary, the salient points of the profile information are that the male adolescents, 14- to 17-year-old, present with multiple overlapping DSM Axis-I

and Axis-II disorders and personality constellations that are likely a result of prolonged domestic-related trauma. This seems to be a population that is most in need of an effective treatment, and yet another MDT study is hereafter analyzed to confirm the positive treatment outcomes previously reported.

Research design

The participants, who were all mandated for treatment, were randomly assigned to the MDT experimental group or the CBT control group, depending on the therapist availability at their time of intake, which happened on a rolling basis at the continuously functioning residential facility. Participants were assessed at intake with the Child Behavior Checklist (CBCL), State-Trait Anger Expression Inventory (STAXI-2), Behavioral Rating Scale (BRS), Compound Core Belief Questionnaire (CCBQ), and MDT Fear Assessment instruments. The BRS used in this study was a simple frequency and duration reported data card recorded by staff. Supervisors did 3 one-hour behavior reliability checks per day for inter-rating reliability, which was 95%. The CCBQ and Fear Assessment questionnaires are specific to the MDT methodology and consist of 96- and 60-item multiple choice questions respectively. Adherence to treatment integrity for each respective approach was monitored by supervisors by observation, review of the case conceptualization, and a compliance checklist. The same assessment measures were again administered after treatment completion. All the participants were mandated for treatment and could therefore not drop out before completion, but they consented to participate in the research.

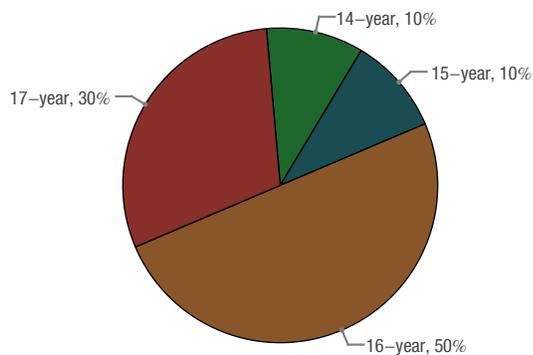


Figure 4. Participant age distribution

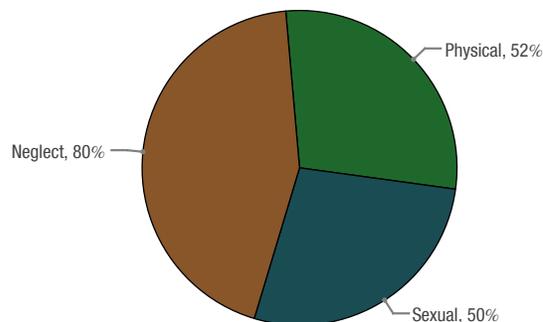


Figure 5. Participant childhood abuse experience

Table 4. MDT versus TAU pre- and post-treatment results

Variable	Items	Intake				Posttreatment				Differential			
		MDT		CBT		MDT		CBT		MDT		CBT	
		M	SD	M	SD	M	SD	M	SD	M	SD	M	SD
STAXI-2	44												
Anger in		48.7	6.1	47.2	9.1	31.5	7.0	46.1	10.0	15.2	6.8	1.3	11.1
Anger out		49.1	7.2	48.1	8.7	30.7	9.0	45.2	9.7	8.2	7.5	3.1	10.3
Anger exp index		50.1	8.1	49.2	8.4	30.1	8.0	45.9	12.2	20.0	10.1	9.3	12.3
CBCL	96												
Internalize		76.7	10.1	75.1	7.1	49.1	7.1	71.5	10.1	26.6	7.3	3.6	9.1
Externalize		77.4	9.4	76.6	12.2	48.1	9.2	73.4	9.4	29.3	8.1	3.1	10.1
Total		77.6	8.2	75.9	9.4	43.6	8.3	72.5	10.3	33.8	9.3	3.3	10.3
Fear ass.	60	180.0	10.2	176.0	11.2	109.0	10.1	172.0	10.3	71.0	12.1	3.0	11.4
CCBQ	96	186.0	12.0	141.0	10.0	101.0	9.3	138.0	6.7	85.1	10.7	5.1	12.3
BRS		24.0	2.0	23.0	4.0	3.0		20.0		21.0		3.0	

Results

The details of the respective MDT and CBT group results at pre- and post-treatment for all the assessment measures are given in Table 4 above. At a first glance, it is already evident that MDT outperformed CBT by a statistically significant margin across all measures. The pre-treatment baseline scores for MDT and CBT respectively were quantitatively similar, which means that an outcome comparison is valid. MDT outcomes showed a consistent and substantial improvement when compared with baseline pre-treatment scores. MDT post-treatment scores were better than at pre-treatment with a mean of 3 times standard deviation (SD), while CBT post-treatment scores did not improve significantly (mean of 0.1 times standard deviation).

The Cohen's *d* effect sizes are indicated in Table 5 below. Cohen's *d* is defined as the difference between two means (experimental and control group) divided by the standard deviation for the data:

Cohen (1988) defined effect sizes as small (0.2–0.5), medium (0.5–0.8), and large (0.8 and above). Effect sizes measure the magnitude of a treatment effect and are independent of sample size, therefore emphasizing the size of the difference rather than confounding this with sample size, which is especially useful in social science research studies as it often has limited samples sizes.

Overall, the MDT effect sizes are on average 17 percentile points higher than the CBT effect sizes, which is an indication of the significance of the MDT outcome change. The mean *d* for MDT is 1.79—considered a large effect size with a 96.3 percentile standing and 77.2 percent of non-overlap—while the mean *d* for CBT is 0.79—considered a medium effect size with a 78.7 percentile standing and 47.0 percent of non-overlap. The most significant treatment effects are found in the STAXI-2 and BRS scores, while the internalizing and externalizing problem scales have the least significant treatment effects, although still large for MDT (87 and 89 percentile standings respectively). Although all

reasonable effort was taken to ensure that the BRS rating is valid and reliable, it remains a subjective variable that is based on therapist observation, interpretation, and recording of patient behavior. The three broad-band scores—internalizing, externalizing, and total problems—were considered with the CBCL. The internalizing scale is comprised of items from the Withdrawn, Somatic Complaints, and Anxious/Depressed scales, while the externalizing scale consists of items from the Delinquent and Aggressive Behavior domains. The CBCL, as a caregiver-reported measure, is susceptible to measurement bias—especially when comparing youths from different developmental stages and ethnic groups—and is therefore expected to generate a wider distribution of scores. The Anger Expression Index (AX), Anger Control-Out (AX-O), and Anger Control-In (AX-I) scales were used with the STAXI-2 measurement. AX is the overall measure of total anger expression as the expression of angry feeling toward other persons or objects in the environment, or by suppressing these feelings. AX-O reflects the patient's

Table 5. Cohen's *d* effect sizes

Variable	Cohen's <i>d</i> effect sizes	
	MDT	CBT
STAXI-2		
Anger in	1.84	0.80
Anger out	1.85	0.78
Anger exp index	1.86	0.79
CBCL		
Internalize	1.15	0.61
Externalize	1.26	0.63
Total	1.79	0.62
Fear ass.	1.36	0.81
CCBQ	1.44	0.79
BRS	1.91	0.91

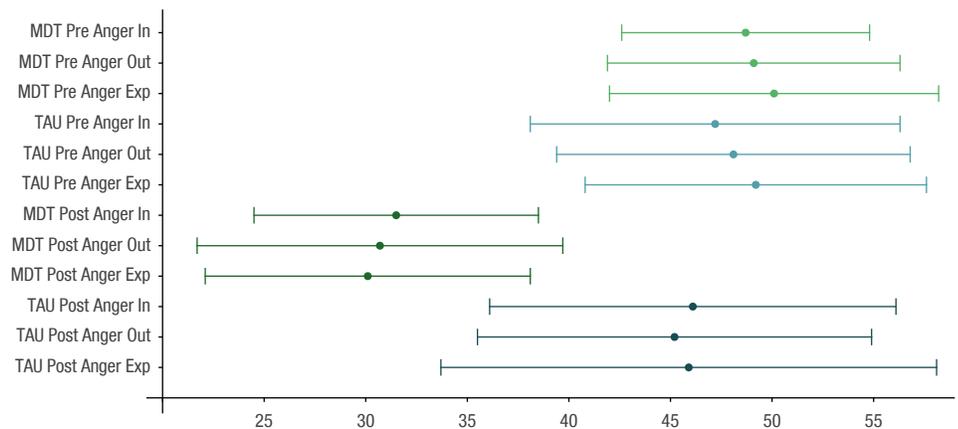


Figure 6. STAXI results comparison

control of angry feelings by preventing the expression of anger toward other persons or objects in the environment, while AX-1 measures the control of suppressed (inwardly directed) angry feelings by calming down or cooling off (Spielberger, 1999). The STAXI-2 is a self-report measure, and therefore response bias could occur. Nevertheless, the result patterns—as indicated by the large effect size—remain sufficiently significant and consistent to support outcome results. Figures 6 to 9 are graphical chart representations in terms of the SD-mean bars of MDT and CBT pre-and post-treatment results for all measures. Pre-treatment results are indicated by bars on the left side of each chart, and post-treatment results are indicated by bars on the right side. Hereby a quick and easy visual illustration is made of MDT and CBT comparisons, pre- and post-treatment comparisons, and confidence levels of each in terms of standard deviations.

Figure 6 displays results of the STAXI-2 in terms of the three scales that were used, namely Anger Expression Index (AX), Anger Control-In (AX-I), and Anger Control-Out (AX-O). As expected with a randomly assigned and relatively large sample size, and indeed the case in general with pre-treatment scores, MDT and CBT (TAU) mean and standard deviations are similar. Whereas the CBT post-treatment scores cluster shows an insignificant change from the pre-treatment scores, MDT shows a marked improvement. Standard deviations remained approximately similar. On average, STAXI scores for MDT improved by 37.6%, and those for CBT 5.0%.

The CBCL results comparison paints a picture that is almost the same as the STAX results. Again, MDT and CBT (TAU) pre-treatment scores are statistically alike. The average CBT treatment change was insignificant at 4.4%, while the average MDT improvement was 39.2%, with the CBCL total problem showing the largest change at 43.7%. Standard deviations again remained largely the same.

The Compound Core Belief Questionnaire (CCBQ) and Fear Assessment questionnaire are two MDT specific instruments with 96-item and 60-item four-point Likert scale self-report questions respectively. The Fear Assessment pre-treatment scores for the MDT and CBT (TAU) groups are similar, but the CCBQ pre-treatment scores differ significantly (24%). The difference is in the same order as a one-point response shift, but cannot be explained and is noted as an anomaly. For both the fear assessment and CCBQ, CBT scores improved by 2.3% and 2.1% respectively, while the corresponding changes for MDT are 39.4% and 45.7%. Standard deviations again remained roughly the same across pre- and post-treatment measurements.

The means for the MDT and CBT (TAU) groups differ by a single point on the pre-treatment Behavior Rating Scale (BRS). Standard deviations are not available for post-treatment results, but a similar treatment change effect is observed than with other measures. On average, the CBT group improved by 13%, which is the largest change measure for this group, but is possibly an effect of the relatively small baseline number. Reported events of aggressive behavior was almost eliminated by completion of treatment of the MDT group, which represents an 87.5% reduction compared to before treatment.

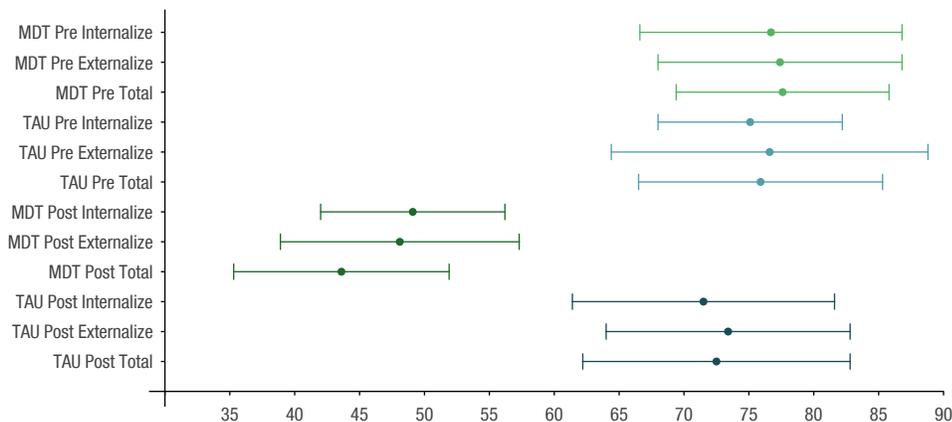


Figure 7. CBCL results comparison

Discussion

A consistent and significant improvement is observed across all assessment measures for the MDT experimental group. An overall treatment change effect of 45% was achieved—39% if the BRS score change is excluded—which represents more than four standard deviations. It is undisputable that this is a statistically significant positive outcome in improving patients' conditions by MDT in all dimensions, such as aggressive behavior, internalized problems, fears, and dysfunctional beliefs. In comparison, the CBT group experienced on average only very small changes, less than 5% or one-half of a standard deviation, which implies a significant statistical overlap. It is also important that the MDT improvements were consistent, and seems repeatable in the context of results from previously published MDT research studies. The results are even more meaningful and substantial if seen in the context of an adolescent population that is widely considered as difficult-to-treat, but with large direct and indirect cost implications. Together with the results already available in the literature, the validity and utility of the MDT seem conclusive. Adolescents with internalized and externalized behavior problems, complex trauma-related psychopathologies including developmental disorders and PTSD and comorbid multiple personality disorder traits, are effectively treated with the MDT methodology that is individualized and specialized for this purpose. Consistent outcome results and statistically significant improvements that appear

to be durable, contribute to the evidence that MDT is a valid and reliable treatment method with high utility for adolescents with dysfunctional behavior.

Conclusions and implications

In general very little is known about the components that bring about treatment change effects in psychotherapy. Given the consistent and significant positive results that MDT research studies have proven, it would be meaningful to explore the effect of individual components during the treatment process. A carefully designed component analysis could isolate the Validation-Clarification-Redirection (VCR) step that is unique to the MDT methodology to determine the effect and functioning of its change mechanism. Such a deeper understanding would be very useful for the proliferation and refinement of MDT, as well as for other psychotherapies and other populations in general.

An update and reanalysis of the MDT meta-analysis will also add value by increasing the combined research studies and corresponding total sample size. The addition of recent and independent results will contribute to the empirical evidence that MDT is *ultra omne dubium* (beyond all doubt) an effective cognitive-based treatment for problem adolescents that is deserving of wider practical significance. The proposed component analysis study and meta-analysis will set the stage for a multi-center, independent, controlled MDT trial for adolescents with behavioral problems.

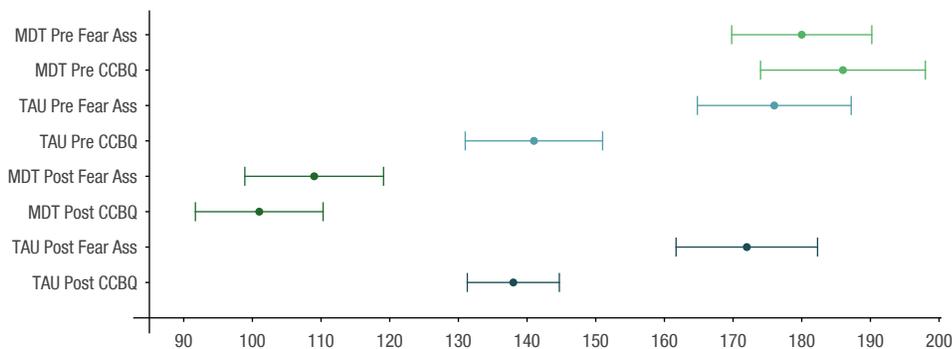


Figure 8. CCBQ and fear assessment results comparison

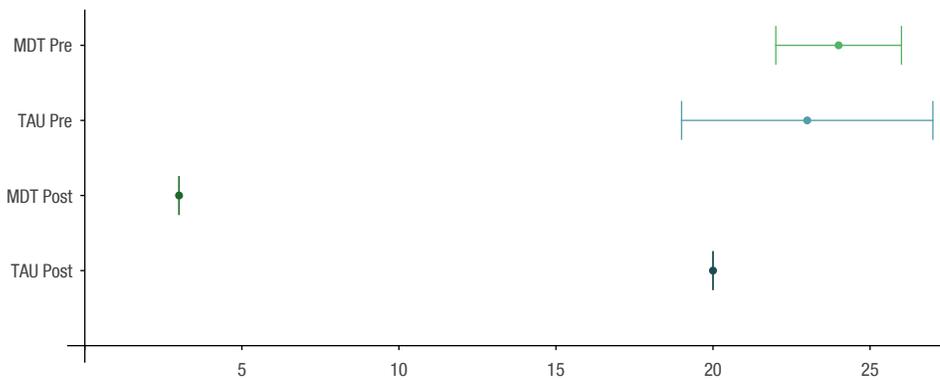


Figure 9. BRS results comparison

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Author contact information

Jack Apsche, Ed.D., ABPP

School of Psychology
College of Social and Behavioral Sciences
Walden University
155 Fifth Ave. South, Suite 100
Minneapolis, MN 55401
Email: jack@aol.com

Joan Swart, Psy.D.

58 Foxglove Street
Paarl
South Africa.
Email: joan@forensic-psychology.net
Phone: +27-78-999-9999