Mode Deactivation Therapy (MDT) Comprehensive Meta-Analysis

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Abstract

MDT provides an empirically based treatment for adolescents with behavioral problems such as anger, oppositional defiant and sexual and physical aggression (Apsche & DiMeo, 2010). It offers therapists a more efficient and timely intervention that positively effects recidivism rates (Apsche, Bass & Murphy, 2004). Based on Cognitive Behavioral Therapy (CBT) (Beck, 1996), Acceptance and Commitment Therapy (ACT) (Hayes, Strosahl, & Wilson, 1999), Dialectical Behavior Therapy (DBT) (Linehan, 1993) and Functional Analytic Therapy (FAP) (Kohlenberg & Tsai, 1993), MDT has surpassed standards of CBT, DBT and Social Skills Training (SST).This article will review essential MDT studies and present the data in a meta- analysis and Cohen's *d* meta-analysis format.
Keywords: Mode deactivation therapy, meta-analysis, evidenced based practice, Acceptance and commitment therapy.

Introduction

Mode Deactivation Therapy (MDT) is a derivative of Cognitive Behavior Therapy, Acceptance and Commitment Therapy, Dialectical Behavior Therapy, Functional Analytic Psychotherapy and Mindfulness and Meditation from ancient Buddhist practices. Since its earliest conception (Apsche & Ward, 2002) MDT has evolved into a so called "Third Wave Therapy". This evolution has produced what appears to be ever more robust and efficacious results in studies (Apsche & DiMeo, 2010)Apsche & DiMeo (2010) completed a rudimentary meta -analysis including thirty-eight published and unpublished studies on MDT. They included any MDT article with reported data and then examined data from unpublished MDT studies. The results were promising, yet incomplete. That meta-analysis examined all related articles and was, at the time of writing, current and updated. Since that publication, Apsche has completed a large data analysis study that was not included in the Apsche & DiMeo (2010) publication.

In this meta-analysis only MDT studies with N's over seventeen and comprehensive data analysis were examined, as well as the large unpublished study with an N of 143. All previous unpublished studies with smaller N's were not included and were removed for clarity and to not rely on non-published studies or case studies with small data basis. This meta-analysis includes nineteen published and one unpublished MDT studies. The unpublished study includes data for both meta and mediation analysis. The purpose of this study is to examine the overall effectiveness of MDT individual and family groups with a diverse group of male adolescents.

Methods

All published and unpublished MDT studies were evaluated for inclusion. Only studies implementing MDT, in residential and outpatients units, were selected resulting in a total of 20 studies included in the meta-analysis. All the studies included in the meta-analysis are listed in Table 1.

Table 1.

List of Studies

Study	Sample	DV	Design	*N*	*d*
Apsche (unpublished) (2006)	Juvenile sex offenders	Outcomes	PP	143	128
Apsche & Bass (2006a)	Adolescent males with CD/PD	Outcomes	PP	40	1.24
Apsche & Bass (2006b)	Outpatient	Outcomes	PP	30	.92
Apsche & Bass (2006c)	Family	Outcomes	PP	13	
Apsche & Ward Bailey (2004)	Children/Adolescent with Reactive CD or PD who sexually abuse	Outcomes	PP	20	1.16
Apsche & Ward (2002)	Adolescents with Personality Beliefs, Sexual Offending and Aggression	Outcomes	PP	14	1.05
Apsche, Bass & Houston (2006)	Adolescent Males with aggression	Outcomes	PP	20	1.29
Apsche , Bass & Houston (2007)	Family	Outcomes	PP	20	1
Apsche, Bass & Murphy (2004a)	Adolescent male sex offenders with Reactive Disorder	Outcomes	PP	20	.24
Apsche, Bass & Murphy (2004b)	Adolescent males with CD and Sexually reactive Bxs	Outcomes	PP	30	.92
Apsche, Bass & Siv (2006a)	Outpatient	Outcomes	PP	20	1.31
Apsche, Bass & Siv (2005)	Adolescent Males with CD/PD	Outcomes	PP	21	1.51
Apsche, Bass & Siv (2006b)	Suicidal Adolescents with PD/Traits	Outcomes	PP	20	.97
Apsche, Bass & Siv (2006c)	MDT, SST &CBT-two year post tx	Outcomes	PP	21	1.17
Apsche, Bass, Jennings & Siv (2005)	Adolescent males with CD/PD	Outcomes	PP	40	1.20
Apsche, Bass, Jennings, Murphy, Hunter	Adolescent males	Outcomes	PP	21	1.13

&Siv (2005)	with physical /sexual aggression				
Apsche, Bass, Siv & Matteson (2005)	Aggressive adolescent males	Outcomes	PP	20	1.22
Apsche, Bass, Zeiter & Houston (2009)	FMDT, residential, adolescents with CD/Multi Axial	Outcomes	PP	20	.89
Apsche, Siv & Bass (2005)	Adolescents with CD and fire setting bxs	Outcomes	PP	20	.29
Murphy & Siv (2007)	Adolescent residential patients with CD and PD's	Outcomes	PP	20	1.10
TOTAL				**573**	

The selected studies were divided into three categories: Individual, Family, and Replication studies. A separate meta-analysis was conducted for each category. All data was extracted by the first author and an associate. The data was entered and calculated using the Cohen's *d* and Effect Size r methodologies (Cohen, 1988). The present meta-analysis used the DSTAT statistical package for the computation of effect sizes (Johnson, 1993).

Participants

The 21 studies yielded a sample population of 573 male adolescents between the ages of 14 through 17. Participant characteristics included Axes I and II diagnoses, many with co-morbid presentation (Table 2). Conduct disorder (51%), oppositional defiant disorder (42%), and post-traumatic stress disorder (54%) were prevalent among the population. Additionally, 56% of the population presented mixed personality traits. Fifty-four percent of participants were African American, 43% Caucasian, 4% were Hispanic American and one percent are listed as other (mixed race). Ninety percent of participants had experienced all four types of abuse - sexual, physical, verbal, and neglect. Furthermore, 56% had witnessed violence and 24% were parasuicidal. General participant recidivism was less than 7%, and sexual offense recidivism less than 4% after two years post MDT treatment.

Table 2.

Participant Demographic Characteristics

Characteristics	%
Axis I	
Conduct Disorder	51%
ODD	42%
PTSD	54%
Other Secondary	28%
Axis II Beliefs	
Mixed	56%
BPD	38%
NPP	28%
HPD	2%
DPD	30%
APD	20%
Ethnicity/Race	
African-American	52%
Caucasian	43%
Latin	4%
Other	1%
Ages	
14.5	10%
15	18%
16	42%
17	30%
Background	
Experienced 4 types of abuse*	90%
Witnessed Violence	56%
Parasuicidal	24%
Recidivism (Two Years Post-Treatment)	
General Recidivism	< 7%
SO Recidivism	< 4%

N=573

*Sexual, physical, verbal, neglect

Procedure

The meta-analysis measured the effectiveness of MDT on two separate, although similar, adolescent populations - adolescent sexual abusers and adolescents with conduct disorder. In the individual studies the data was gathered and the effect size and Cohen's *d* were calculated using the standard Cohen (1988) methodology:
Cohen's d = $M_1 - M_2 / \sigma_{pooled}$
Where σ_{pooled} = 2 [? (x – m)□ / n]

The effect size r was calculated by the following:

r_{PB} = d (d □ × 4)

The means and standard deviations were computed using the Lipsey & Wilson (1993) calculation methodology. Cohen (1998) defined effect size as small: d= .2, medium: d=. 5 and large: d= .8

Adopting procedures recommended by Rosenthal (1991), each effect size was weighted by sample size, and averaged to yield a grand weighted mean *d* based on 20 studies. Weighting effect sizes by sample size is an unbiased and objective procedure for assigning different weights to studies that vary in statistical power. The grand weighted mean *d* was tested for significance (*d* compared to zero) using a one sample *t* – test, and 95% confidence intervals were calculated. A chi square was also calculated to test for heterogeneity of variance within the set of effect sizes. The heterogeneity test is the basis for a decision on whether or not to search for moderator variables; in case of significant heterogeneity, it would be necessary to disaggregate the effect sizes according to the variables influencing effect size. Finally, to address the file-drawer problem, a fail –safe *N*, as recommended by Rosenthal (1991), was calculated to test for robustness. A robust finding indicates that the probability of a Type I error arising from unpublished, non-significant results is negligible.

Results

The results will be separated into 3 categories; Individual studies, Family Studies and Replication studies. We chose to separate the section because of the three separate meta analysis conducted on the selected articles.

Individual Studies

Table three shows the results of the meta analysis on the individual studies. Cohen's d show large effect sizes with SO- Physical Aggression (1.81) and CD- Physical Aggression (1.85). Total Physical Aggression and Sexual Aggression were also large at 1.86 and 1.94 respectively. Child Behavior Check List (CBCL) scores were also large, yet were smaller than the aggression numbers. CBCL scores measuring internal states were 1.10 and External was 1.25. The total CBCL effect size was 1.78. The State-Trait Anger Expression Inventory (STAXI) scores showed internal expressions of anger were not as controlled as external expressions of anger. With subjects who had the Conduct disordered (CD) diagnosed delegation; STAXI scores for inner control was 1.4. Conversely, the control for outward expression was 1.51. The total Anger effect size expressed by this group was 1.82. STAXI effect size scores for Subjects who had offended sexually (SO) were similar to aggressive CD population. Inner control was 1.0. Outward expression of anger control was 1.10. External aggression was among the largest of all groups at 1.9.

Table 3. *Individual Studies*

Category	Cohen's Standard	d	r	% of Non-overlap
SO- Physical Aggression	Large	1.81	.710	75.3
CD- Physical Aggression	Large	1.85	.679	51.6
Total- Physical Aggression	Large	1.86	.674	48.4
Sexual Aggression	Large	1.94	.774	72.9
CBCL –INT	Large	1.10	.450	70.2
CBCL-EXT	Large	1.25	.551	74.1
CBCL Total	Large	1.78	.581	72.7
CD-STAXI Anger Con In	Large	1.4	.521	66.7
CD-Anger Con Out	Large	1.51	.612	63.2
CD- Anger Ex	Large	1.82	.710	75.1
SO-STAXI Anger Con In	Large	1.0	.428	75.4
SO-Anger Con Out	Large	1.10	.410	50.1
SO-Anger Ex	Large	1.9	.670	79.5
J-SOAP Total	Large	1.89	.721	79.4

N =13

Family Studies

Table four- shows the effect sizes of the studies which looked at the family in treatment using Mode Deactivation Therapy. Of the studies chosen Cohen's d produced large effect sizes on most of the categories. The CBCL effect size for internalization was 1.4 whereas, the externalization size was 1.6. The total effect size for CBCL was 1.5. STAXI scores showed 1.3 effect sizes for internal anger control and its expression. Outward anger control was 1.2. The total effect size for anger and its expression was 1.6. Physical expression of anger was large at 1.4 but, the verbal expression of anger showed a medium effect size (.7). Finally, related to physical aggression; Property aggression also showed a large effect size (1.1).

Table 4. *Family Studies*

Category	Cohen's Standard	*d*	r	% of Non-overlap
CBCL- INT	Large	1.4	.570	51.6
CBCL-EXT	Large	1.6	.625	55.4
CBCL-Total	Large	1.5	.600	53.5
STAXI- Anger Con In	Large	1.3	.545	58.9
STAXI-Anger Con Out	Large	1.2	.514	68.1
STAXI-Anger Ex	Large	1.6	.625	77.4
Behaviors-Physical Aggression	Large	1.4	.513	61.1
Behaviors-Verbal Aggression	Medium	.7	.330	43.0
Property Destruction	Large	1.1	.188	58.9

N=10

Replication studies

Murphy and Siv (2007) provided the data for replication studies. Table five shows the results of the analysis. Replication data was derived from residents in a Residential treatment facility. Physical Aggression had a large effect size of 1.23. Therapeutic holds within the facility showed an effect size of 1.25. CBCL effect sizes for internalization was 1.07 and 1.38 for externalizing behaviors. Total effect size for the CBCL was large (1.33). A matter of note, was the Beck Depression Inventory (BDI) effect size which showed a small size of .28. Also of significant interest was the hand scored, Suicidal ideation questionnaire (SIQHS) size, which showed a medium effect size of .52.

Table 5. *Replication Data (Murphy & Siv, 2007)*

Category	Cohen's Standard	*d*	r	% of Non-overlap
Behaviors- Physical Aggression	Large	1.23	.523	65.3
Behaviors –Therapeutic Holds	Large	1.25	.530	63.8
CBCL- INT	Large	1.07	.472	75.4
CBCL-EXT	Large	1.38	.569	67.1
CBCL-TOTAL	Large	1.33	.554	65.5
BDI	Small	.28	.137	20.1
SIQHS	Medium	.52	.251	33.1

N=20

Table six-a shows graphically the effect size as measured by Cohen's d.

Table 6a. *Effect Size and Cohen's d*

Cohen's *d -Effect size-a*

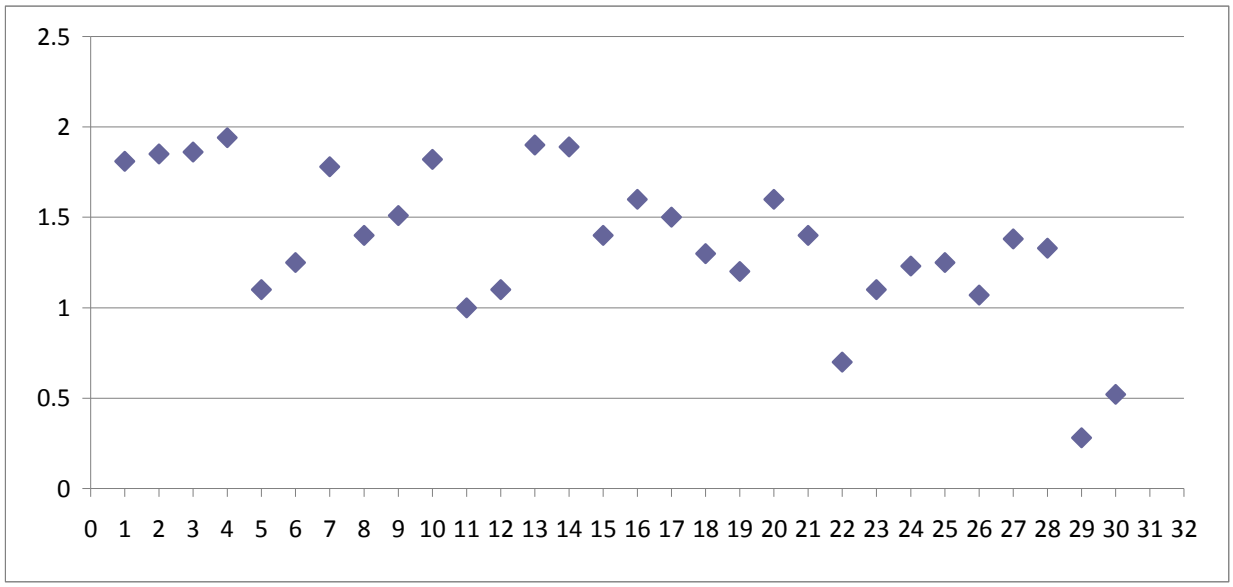

Table six-b shows graphically the effect size calculated **r** scores

Table 6-b. *Effect Size* calculated **r** scores

R scores- Effect Size-b

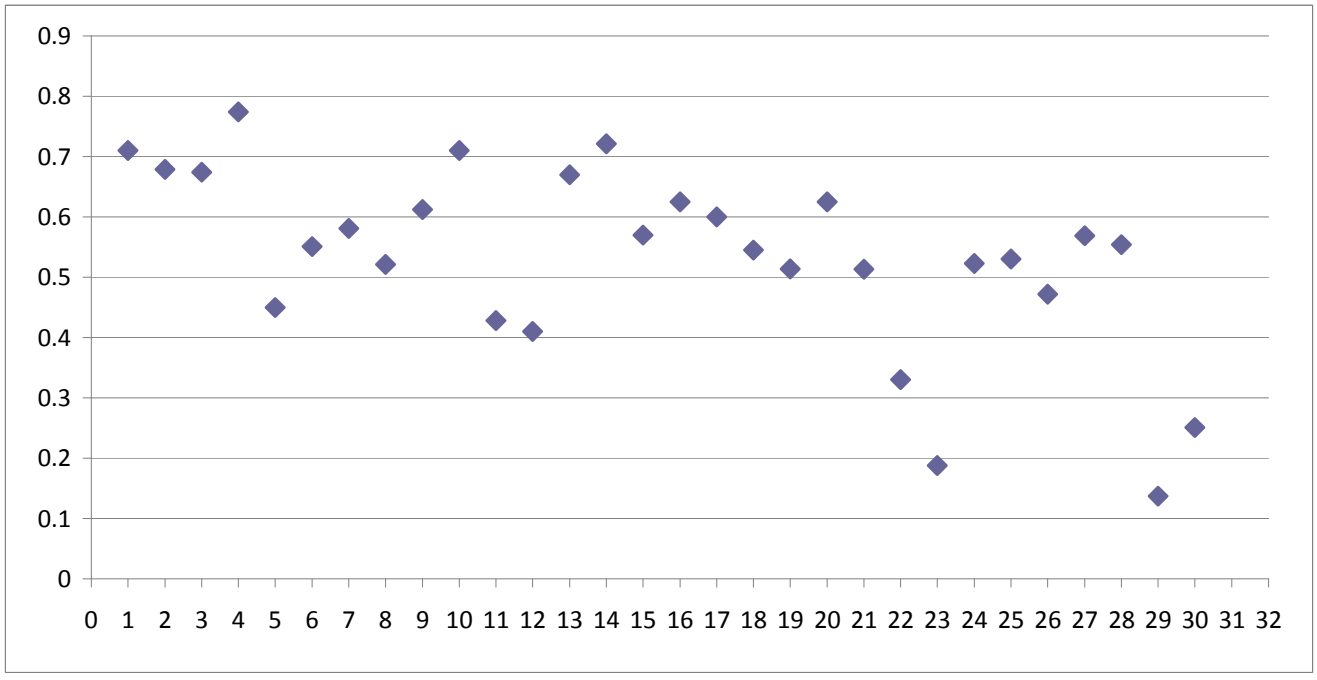

Table 6. *Effect Size and Cohen's d Key*

#	Category
1	SO- Physical Aggression
2	CD- Physical Aggression
3	Total Physical Aggression
4	Sexual Aggression
5	CBCL INT
6	CBCL EXT
7	CBCL Total
8	CD STAXI Anger Con In
9	CD Anger Out
10	CD Anger Ex
11	SO STAXI Anger Con In
12	SO Anger Con out
13	SO Anger Ex
14	JSOAP Total
15	Family CBCL INT
16	Family CBCL EXT
17	Family CBCL Total
18	Family STAXI Anger Con In
19	Family STAXI Anger Con Out
20	Family STAXY Anger Ex
21	Family Behaviors- Physical Aggression
22	Family Behaviors Verbal Aggression
23	Family Behaviors Property Destruction
24	Replication- Physical Aggression
25	Replication- Therapeutic Holds
26	Replication- CBCL INT
27	Replication CBCL EXT
28	Replication CBCL Total
29	Replication BDI
30	Replication SIQHS

Conclusion

There are numerous conclusions to be drawn from the MDT meta-analysis study. First, MDT is an effective-evidenced based methodology with the specific target population of male adolescents. Second, the study validates the MDT hypothesis that adolescent externalizing disorders are the function of adolescent internalizing disorders.

The meta-analysis data demonstrated the effectiveness of MDT with adolescent males, ages 14 through 17. The effect size for the target behaviors, physical aggression for both the conduct groups and the sexual abusing groups, demonstrated a large effect size. While the differences in aggressive behavior were statistically the same for sexually offending juveniles and those who have had histories of conduct disorder, sexual aggression was statistically significant in both populations. This suggests that some aggressive adolescents, like those who have histories of sexual offense may begin to use sex as outward expressions of internal anger states. This work indicated that both the conduct disordered and sexual abusing groups had large effect sizes for their sexual behaviors while in treatment and for two years post-treatment. 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 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.

Physical aggression and property destruction within the family dynamic was observed in the studies focusing on the family. Initial verbal expressions of anger showed medium effect sizes. For this population, verbal expressions of feeling and internal state maybe met with inconsistent family support. MDT addresses this support issue and operates within the family dynamic to increase needed support by the family unit. This is done by teaching family members and youngsters effective ways to engage in dialogue. Its important to note that the entire family is identified client, not just the youngster. Follow-up studies have consistently shown that families who have undergone MDT show less aggression, property destruction and increase in family synchronization.

Within the residential milieu, MDT showed effectiveness with youngsters who continued to act out aggressively. Externalizing behaviors were consistently shown before internalizing behaviors. Replication of treatment shows that MDT is consistently reliable in addressing the externalizing behavior disorders as well as the internalizing behavioral disorders. While addressing internalizing behavioral disorders, it is important to note that although MDT has, in small samples, reduced parasuicidal behavior; it has shown minimal effect on the reduction of symptoms of severely depressed respondents as measured by the BDI-II (29-63) and the SIQHS. Further meta-analyses of MDT treatment studies are warranted to clarify and confirm or disprove this hypothesis.

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