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Coming on strong: Is Responsive Aggression Regulation Therapy (Re-ART) a promising intervention?

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Chapter 2

A meta-analysis of the effectiveness of individually oriented Cognitive Behavioral Treatment (CBT) for severe aggressive behavior in adolescents and young adults⁶



⁶ Hoogsteder, L.M., Stams, G.J.J.M., Figge, M., Changoe, K., Van Horn, J.E., Hendriks, J., & Wissink, I.B. Manuscript submitted for publication.

ABSTRACT: This multilevel meta-analysis, including 8 studies (15 effect sizes) and 218 adolescents and young adults, examined the effectiveness of individually oriented treatment with CBT-elements for adolescents and young adults with severe aggression problems. A large and homogeneous overall effect size was found ($d = 1.49$) indicating consistency across studies. The included studies examined the effect of three interventions, namely, Mode Deactivation Therapy (MDT; 6 studies), Stress-inoculation therapy (1 study), and the Cell-phone program (1 study). This multilevel analysis demonstrated that only few individually tailored interventions have been developed and evaluated, and that half of the included studies used a weak research design. Effective individually tailored interventions for youths with severe aggression problems (who are unsuitable for group treatment) seem scant. There may be added value if group interventions are supplemented with a number of individually tailored evidence-based interventions that make use of CBT-elements and the What Works principles of judicial interventions.

Introduction

Aggression is one of the most frequently occurring behavioral problems in adolescents (Blake & Hamrin, 2007). Adolescents who commit violent crimes have a greater risk of displaying persistent criminal behavior throughout the rest of their lives (Garrido & Morales, 2007), and violent behavior is associated with high societal costs (Cohen & Piquero, 2009). It is important to introduce effective interventions for youths with severe aggression problems (including violence) in order to reduce the negative impact of aggressive behavior (Loeber, Slot, Van der Laan, & Hoeve, 2008). Youths with severe aggression problems often have other behavioral problems and/or have been arrested or convicted. In these youths, aggression problems are frequently related to various criminogenic factors (Andrews & Bonta, 2010), which are sometimes combined with psychiatric problems (Vreugdenhil, Doreleijers, Vermeiren, Wouters, & Van den Brink, 2004). A proportion of youths with severe aggression problems (initially) is unsuitable for group treatment, because group treatment can lead to negative effects. There is empirical evidence showing that – due to deviancy training - adolescents and young adults with severe aggression problems mutually affect one another in a negative way if treatment is delivered in a group (Dodge, Dishion, & Lansford, 2006; McGloin et al., 2008).

This article describes a meta-analysis to determine whether individually oriented cognitive-behavioral interventions for adolescents and young adults with severe aggression problems are effective. It can be assumed that youths displaying deviant behaviors will be more receptive (more responsive) to individually tailored interventions, because these interventions can more easily target the specific criminogenic needs and learning style of the offender, and thus comply with the *What Works* principles of effective judicial interventions (Bonta & Andrews, 2007).

There is empirical evidence showing that interventions that make use of the *What Works* principles have a positive impact on reducing severe aggressive and antisocial behavior in adolescents and (young) adults (Andrews & Bonta, 2010; Bonta & Andrews, 2007). The basic three *What Works* principles of judicial interventions are that the intensity of treatment (frequency and duration) should be tailored to the risk for recidivism (risk principle), the treatment aims should be tailored to the criminogenic risk factors present (the need principle), and the intervention should focus on the motivation, learning style and specific capabilities and limitations of a person, and that there should be a match between the client and the therapist (the responsivity principle; Bonta & Andrews, 2007).

Meta-analyses of interventions targeting antisocial behavior or (mild) aggression of a broad population (e.g., students, nurses, school-age children and adults) have shown that individual treatment is generally more effective than group treatment (DiGiuseppe & Tafrate, 2003; Landenberger & Lipsey, 2005; Lipsey, Landenberger, & Wilson, 2007; McQuire, 2008). However, there is also research showing a positive effect of including group members in treatment, typically resulting in a reduction of aggressive behavior (Lee, Chmelka, & Thompson, 2010; Mager, Milich, Harris, & Howard, 2005).

A large number of studies on the treatment of (severe) aggression problems have shown that applying cognitive behavioral therapeutic (CBT) elements is effective (Foolen, Ince, & de Baat, 2012; Garrido & Morales, 2007; Lipsey, 2009; Litschge, Vaughn, & McCrea, 2010; Özabaci, 2011). CBT utilizes various techniques to change the clients' cognitive processes and behavior (Beck, 2011). These techniques focus on recognizing cognitive distortions and (criminogenic) cognitive biases in combination with learning adequate cognitions (Landenberger et al., 2005), training problem-solving skills and alternative behaviors, for instance by means of role playing (Blake & Hamrin, 2007; Landenberger & Lipsey 2005; Sukhodolsky, Kassinove, & Gorman, 2004).

Adding 'relaxation' and/or 'mindfulness' elements to CBT appears to further contribute positively to the effectiveness of interventions for aggression problems (Deffenbacher, 2011; Kelly 2007; Novaco, 2001; Pellegrino 2012; Singh et al., 2007). Relaxation refers to the reduction of stress symptoms through the application of stress management. Mindfulness exercises are also aimed at reducing stress, but are directed at 'focusing attention', as well as enhancing one's consciousness of improving behavior. It has been shown that mindfulness exercises with delinquent aggressive youths lead to an improvement in self-regulation and reduction in stress (Himelstein, Hastings, Shapiro, & Heery, 2011).

Negative parent-child interactions increase the risk for developing and for the continuation of aggressive behavior (Compton, Snyder, Schrepferman, Bank, & Shortt, 2003; De Haan, Prinzie, & Dekovic 2010; Eichelsheim, 2011; Kawabata, Alink, Tseng, Van IJzendoorn, & Crick, 2011). Interventions that (also) offer family treatment have been shown to be effective for the treatment of (severe) aggression problems in adolescents (Foolen et al., 2012; Pellegrino, 2012; Weisz, Hawley, & Doss, 2004).

Finally, in determining the effectiveness of an intervention it is relevant to assess the degree of program integrity, as the effect of an intervention can only be assessed if it is conducted as intended. Interventions that maintain a sufficient degree of program integrity appear to achieve better results (DiGuiseppe & Tafrate 2003; Foolen et al., 2012). The quality of the study and the degree of independence of the researchers also seem to influence the outcome of research (Hoyle, Harris, & Judd, 2007). For instance, Petrosino and Soydan (2005) demonstrated that effect studies where researchers played a role in the development and/or implementation of the intervention showed substantially better results than those studies where this was not the case. These authors believe that this can be attributed to the fact that the implementation and program integrity are better maintained if

researchers also play a role in the execution of the intervention.

The present study is a multilevel meta-analysis examining whether interventions for adolescents and young adults with a severe aggression problem are effective if they contain individual elements and apply CBT techniques. It is also examined whether the use of mindfulness, family intervention and program-integrity influence the magnitude of the effect size. Furthermore, relevant background variables (such as age, gender, ethnic origin, mental health condition), the quality of the study, and publication characteristics were examined to explore which of these moderators can influence effectiveness. Three outcome measures were assessed, namely, externalizing behavior, physical aggression and verbal aggression.

Method

Selection of Studies

Studies were included in the meta-analysis if they met the following criteria: (1) studies (1980 till 2011) had to address the effectiveness of treatments for adolescents and young adults with aggressive problems, often accompanied with conduct disorder (CD), (2) studies should have examined interventions that were individually oriented or contained at least an individual component, possibly in combination with group and/or family therapy, (3) treatment had to include CBT-elements (an intervention was considered CBT if it involved anger management, skills training and cognitive restructuring), (4) studies had to provide at least post test scores and a control group (Treatment As Usual or regular care), (5) study samples had to include adolescents or young adults aged 12 to 24 years, (6) studies should have provided the necessary data for the calculation of effect sizes.

Search strategy

First, we systematically searched the following electronic databases: psychINFO, MEDLINE, ERIC, Picarta, International Bibliography of Social Sciences, Adlib, Scencedirect, Springerlink, Proquest Dissertation abstracts and Google Scholar. We used the following keywords in various combinations: aggression treatment, chronic aggression, externalizing problem behavior, cognitive-behavior therapy, anger-management training, adolescents, youth, juvenile, inpatient, incarcerated, individual, psychopathology. We inspected all the references and citations of the articles we found in this first step. Second, we inspected the reference sections of relevant systematic reviews and meta-analyses in order to find more studies that had not been included yet. Third, we approached several researchers to obtain unpublished studies. The retrieved studies were examined to eliminate any potential duplicates or overlapping data. This search yielded eight studies that met the inclusion criteria of our multilevel meta-analysis.

Coding the Studies

Each study included in this multilevel meta-analysis was coded for intervention characteristics, publication characteristics, sample characteristics, the country where the study was conducted, study design characteristics, study quality and type of setting. No studies could be coded for average length of stay in the residential setting, IQ, and integrity-report, because of a lack of information. Each study consisted of a quasi-experimental design with a control group (a study was considered matched if the experimental and comparison group were comparable in at least gender, age, cultural background and prevalence of conduct disorder). The control groups received (non-established) treatment as usual (i.e., standard care, psychotherapy, therapy with elements of cognitive behavior therapy or dialectic behavior therapy). All included studies were conducted in the USA.

None of the included studies reported that they were based on the principles of the RNR-model.

Categorical moderators were gender (male, female and unknown), independence of authors (yes or no), published in peer reviewed journal (yes or no), study quality (weak, moderate, or strong; see next paragraph for more information), residential setting (yes or no), delinquent (yes or no), mental disorders (oppositional defiant disorder/ODD, CD or attention deficit hyperactivity disorder/ADHD, PTSS, mix or none), parallel treatment (yes or no) and intervention characteristics: mindfulness (yes or no), stress-management (yes or no), family intervention (yes or no), group component (yes or no). Continuous moderators were average age, sample size, year of publication and impact factor, duration of treatment, proportion of ethnic minorities, proportion of treatment completers for both experimental and control group, and follow-up period.

The methodological quality of the studies was assessed using the Quality Assessment Tool for Quantitative Studies (Thomas, Ciliska, Dobbins, & Micucci, 2004), which classifies study design based on selection bias, study design, confounders, blinding, data collection method and dropouts as weak, moderate or strong.

Analysis

Cohen's d was calculated on the basis of mean scores and standard deviations or percentages to index differences between the experimental and control group. Cohens's d was adjusted for pre-test group differences in the outcome variables. After having calculated the effect sizes for each separate study on three outcomes (externalizing behavior, physical aggression, and verbal aggression), the overall combined effect size was calculated (Hox, 2002). Outlying effect sizes were identified on the basis of z values larger than 3.3 or smaller than -3.3 ($p < .005$; Tabachnick & Fidell, 2007). Outlying effect sizes were reduced to an

effect size that was equal to the largest or smallest effect size within the normal range. An effect size of $d = .20$ was considered small, an effect size of $d = .50$ was considered medium, and an effect size of $.80$ was considered large (Cohen, 1988).

The program MLwiN was used for conducting multilevel analysis, applying a multilevel random effects model for the calculation of combined effect sizes (Hox, 2002; Van den Noortgate & Onghena, 2003). The multilevel random effects model accounts for the hierarchical structure of the data, in which the effect sizes are nested within studies. We conducted a test for heterogeneity of effect sizes to detect variation in effect sizes across individual studies (Rosenthal, 1991). Studies were homogeneous when effect sizes were constant across the different studies. In case of heterogeneity, it is imperative to run a moderator-analysis to explain variances between studies.

Publication Bias

It is commonly known that studies with no positive results are less likely to be published than studies with the more appealing significant effects. This type of bias has been designated as the file drawer problem (Rosenthal, 1995). Part of this problem was resolved by the inclusion of non-published studies in the current meta-analytic study. Additionally, we applied one of the conventional methods to examine the possibility of publication bias, the fail-safe number (Rothstein, 2008). The fail-safe number estimates the number of unpublished studies, presumably reporting null results, needed to reverse the outcomes to non-significance (Lipsey & Wilson, 2001). There should be no file drawer bias if the fail-safe number is larger than $5*k+10$.

Results

Information about the Included Studies

Systematic literature searches yielded eight studies ($N = 218$) that met the inclusion criteria. The included studies examined the effect of three interventions, namely, Mode Deactivation Therapy (MDT; 6 studies), Stress-inoculation therapy (1 study), and the Cell-phone program (1 study).

Mode Deactivation Therapy (MDT; Apsche & Ward Bailey, 2004a) is designed to treat the complex interplay between trauma, personality factors and a child's belief system that often leads to conduct problems, such as aggression. Apsche and colleagues (2004) observed that the most aggressive youth are not responsive to the traditional procedures of cognitive restructuring, because of their defensive characteristics and complex problems. Moreover, Young, Klosko and Weishaar (2003) found that personality-disordered clients, especially borderline and narcissistic clients, continue to experience significant emotional distress following treatment. Therefore, a key component of Mode Deactivation Therapy (MDT) is the deactivation of negative cognitive/affective/motivation/behavioral responses aimed at reducing conduct disordered behaviors and emotional deregulation. MDT is a treatment that combines basic elements from Beck's 'theory of modes' (Beck & Clarke, 1996); traditional Cognitive Behavioral Therapy and Schema Therapy (Alford & Beck, 1997); Dialectical Behavior Therapy (Linehan et al., 1999); and Functional Analytic Behavior Therapy (Nezu, Nezu, Friedman, & Haynes, 1997). MDT includes centering, imagery and relaxation techniques (mindfulness) to facilitate cognition. This is followed by balance training, which teaches youngsters to balance their perception and interpretation of information. MDT focuses on individuals, but also offers an alternative form, namely family MDT. Family MDT uses the same model, with additional group components and meetings with the family.

Stress-inoculation therapy is an individual cognitive behavioral therapy to help adolescents control their stress and anger. In the first part of the treatment the adolescents are educated about anger and aggression, the causes and consequences, and about alternative methods of control. In the second part adolescents learn a variety of coping skills that are useful in managing stress and aggressive behavior. The treatment helps the adolescent to tackle the anger and stress in an early stage. Finally, adolescents receive practice in applying these coping skills during *exposure* to simulated provocations (Schlichter & Horan, 1981)

The Cell-phone program is a cognitive training supplemented with a cell-phone coach reducing recidivism of aggressive behavior. The cell-phone program is an intervention centered on the idea that behavior drives beliefs. Phone calls are used to monitor behavior and to remind individuals of their goals during the six-week cognitive training. The phone calls also serve as aftercare (1 year) when the training has been completed. Most adolescents receive two phone calls per day, each call consists of three short questions. First, the phone coach asks if the adolescent has followed the goal since the last phone call. Second, the coach asks how much effort the adolescent has put forth to achieve the goal. Finally, the phone coach asks what results the efforts have produced. A prerecorded positive message is played if there has been progress; a prerecorded encouragement message is played if the adolescent needs encouragement. These messages can be recorded by friends and family and can be regularly updated. Adolescents can always receive immediate care from a professional counselor (Burraston, Cherrington, & Bahr, 2010).

Sample

The sample of the included studies consisted of males (62.5%; rest is not reported) adolescents and young adults, between 12 and 24 years of age, who received treatment (in-

or outpatient). The average age was 15.8 years, 41% was of African-American origin, 24% American, and 5% Latino (in 30% of the studies no information on the cultural background was provided). Mental disorder was reported by 74.2% ($n = 153$) of the sample; 64% was diagnosed with conduct disorder (CD), 26% with oppositional defiant disorder (ODD), 47% with a Post Traumatic Stress Disorder (PTSD), and in 30% of the cases comorbid diagnoses were assessed. The majority of the control groups received (non-established) treatment as usual (7 studies; i.e. psychotherapy, therapy with elements of cognitive-behavioral therapy). In one study, the adolescents and young adults received established treatment, namely dialectical behavior therapy (Linehan et al., 1999).

Table 1 shows an overview of the relevant study characteristics of the included 8 studies ($N = 218$). The overall effect size for the effectiveness of individual interventions for adolescents with several aggressive problems was $d = 1.489$, $p < 0.01$, which is a large effect (Cohen, 1988). The individual study effect sizes ranged from $d = -.06$ to $d = 3.13$; (see Table 2). The test for heterogeneity of effect sizes to detect variation in effect sizes across individual studies showed that the effect size was homogeneous ($Z = 1.511$, $p < 0.05$), indicating that the effect sizes were constant across the different studies. Therefore, we did not conduct moderator analyses. The *fail-safe* number of the overall effectsizes ($k=15$) was 536, which is larger than 85 ($5*k+10$) and indicates that publication bias is unlikely.

Table 1.*Effect Sizes of the Included Studies*

Study*	Outcome	N	ES
1	Externalizing	40	1.87
2	Externalizing	20	1.51
3	Externalizing	40	1.63
5	Externalizing	40	1.18
8	Externalizing	13	2.70
3	Fysical aggression	59	1.18
3	Fysical aggression	40	0.30
2	Fysical aggression	20	0.66
4	Fysical Aggression	18	0.13
4	Fysical aggression	18	0.53
6	Fysical aggression	8	3.13
7	Fysical aggression	20	3.13
4	Verbal aggression	18	-0.06
4	Verbal aggression	18	1.00
6	Verbal aggression	8	1.46

*See Table 2 for study number.

Table 2.*Overview of the Included Studies*

Study	EG+	CG+	N EG	N CG	Age	Gender (Unknown and Male)	Migrants	CD	Duration	Follow-up	Residential	Family	Group	Mindfulness	Stress Management	Study quality	Independent research
1. Apsche et al. (2009)	MDT	CBT	20	20	16	U	62,5%	100%	52	No	Yes	Yes	Yes	Yes	No	Strong	No
2. Murphy & Siv (2007)	MDT	PT+	10	10	15.3	M	65%	80%	52	Yes	Yes	No	No	Yes	No	Weak	Yes
3. Apsche & Bass (2006)	MDT	TAU	21	19	16.3	M	80%	91,7%	48	No	Yes	No	No	Yes	No	Moderate	No
4. Schlichter & Horan (1981)	Stress inoculation	TAU	10	8	15.5	M	U	U	10	No	Yes	No	No	No	Yes	Weak	Yes
5. Burraston et al. (2010)	Cell-phone	TAU	28	31	15.7	U	U	U	52	Yes	Yes	No	Yes	No	No	Moderate	No
6. Apsche et al. (2007)	MDT Family	TAU	4	4	U	U	U	U	20	No	No	Yes	Yes	Yes	No	Weak	No
7. Apsche et al. (2006)	MDT	DBT+	10	10	16.1	M	65%	85%	U	No	Yes	No	No	Yes	No	Moderate	No
8. Apsche et al (2006c)	MDT Family	TAU	7	6	U	M	23%	77%	26	No	No	Yes	Yes	Yes	No	Weak	No

+: EG = Experimental Group, CG = control group; CBT= cognitive behavior therapy, PT = psychotherapy, TAU= treatment as usual, DBT = Dialectical Behavior Therapy.

Discussion

A multilevel meta-analysis was conducted to examine the effectiveness of individual cognitive behavioral interventions for adolescents and young adults with severe aggression problems. A large overall effect size was found supporting the hypothesis that adolescents and young adults with severe aggression problems benefit from an intervention with CBT elements and an individual component (Landenberger & Lipsey, 2005; Sukhodolsky et al., 2004). Furthermore, the current study demonstrated that no individually tailored behavioral interventions for adolescents describe the extent to which they have incorporated the *What Works* principles of effective judicial interventions. Most studies examining the effectiveness of judicial interventions in adolescents and young adults are primarily focused on group-based interventions (Garrido & Morales 2007; McGuire, 2008, Sukhodolsky et al., 2004). It also became apparent that few individually tailored interventions have been developed (particularly none that are explicitly based on the RNR model). These findings lead to the question whether the current intervention programs sufficiently serve youths with severe aggression problems. A proportion of this target group may be negatively affected by a deviant peer group (Dishion et al., 1999). Furthermore, group interventions may not adequately meet all RNR requirements because the specific responsivity principle requires an individual approach (Bonta & Andrews, 2007). Interventions that do not meet this principle may lead to demotivation, low treatment adherence and eventually high dropout rates.

This multilevel meta-analysis revealed that little is known about the effectiveness of individually tailored interventions with CBT elements for adolescents with a severe aggression problem. More studies involving individual interventions were found, but these interventions were aimed at other target groups (mild aggression problem, children or adults) or did not comprise CBT elements (e.g., psychotherapy or intensive care).

Researchers who have conducted meta-analyses on the effect of interventions for children and adolescents (or adolescents and adults) and discussed the effect of an individual component primarily based their conclusions for a large extent on studies conducted with children (e.g., Beck & Fernandez, 1998; Lipman et al., 2006) or adults (e.g., Deffenbacher, Oetting, & DiGiuseppe, 2002; DiGiuseppe & Tafrate, 2003).

The overall effect size found in this meta-analysis was homogeneous, meaning that the effect size was consistent across different studies. It was therefore not necessary and possible to test whether particular moderators had an influence on the effectiveness of the intervention. The homogeneity may be explained by the fact that only three (partly similar) interventions and a limited number of studies with a small sample size were included, resulting in both lack of variance and lack of statistical power. Therefore, these results do not mean that - on the basis of this meta-analysis – adding a family component (Eichelsheim, 2011; Kawabata, et al., 2011) or applying mindfulness (Pellegrino, 2012) will not have a positive effect on individually tailored interventions for youths with severe aggression problems. This needs to be studied further in a study with more power.

Noteworthy is that none of the included studies reported on the level of program integrity. This means there was no clarity about the quality of the programs offered and to what extent relevant components of the interventions were provided. However, six of a total of eight studies included in this meta-analysis were conducted by researchers who were – to a greater or lesser extent - involved in the development and/or implementation of the program, which in general is beneficial in terms of program integrity (Petrusino & Soydan, 2005).

Although the overall effect size established seemed promising for the specific target group, these findings should be interpreted with caution due to a number of limitations of this meta-analysis. First, it was impossible to test for publication bias in a robust way (by

means of a funnel plot) due to a relatively low number of studies. Thus, the large overall mean effect size could be an overestimation of the actual effect size. Nevertheless, an attempt was made to include as many studies as possible by including both experimental and quasi-experimental studies, and both published and non-published studies to prevent a possible file-drawer bias. Notably, the fail-safe number of the overall effect size was not indicative of a file drawer problem. A second limitation of the current study was that this multilevel analysis was performed using a small sample of studies, including few subjects. Furthermore, half of the studies used a weak research design. Thirdly, there was little diversity within the research group. Most of the studies evaluating effects of MDT aimed at a specific target group, that is, adolescents with severe aggression problems and, for a substantial part, PTSD. A final limitation was that the potential influence of dependent researchers on the results is not known. Petrosino and Soydan (2005) demonstrated that dependent researchers report more positive results compared to independent researchers. There are a number of explanations for this, such as differences in the quality of research (RCT, length of follow-up; Eisner, 2009), degree of program integrity or methodological bias through conflicts of interest (Gorman & Conde, 2007).

The majority of the current evidence-based judicial intervention programs are group-based. However, this meta-analysis demonstrated that group interventions that are supplemented with a number of (elements of) individually tailored evidence-based interventions, which meet requirements of the RNR model, and make use of essential CBT elements are effective. Additions such as these may lead to more positive treatment outcomes for aggressive adolescents who do not benefit (enough) from group treatment. Individually tailored evidence-based interventions are more easily tailored to their risk of recidivism, the presence of criminogenic needs and psychiatric problems (trauma related disorders) and responsivity. The results of this meta-analysis provide some support for the

(continued) development of and research into the effectiveness of such individually tailored interventions.

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