

# **Stay Cool Kids?!**

Effectiveness, Moderation and Mediation of a Preventive  
Intervention for Externalizing Behavior

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# **Stay Cool Kids?!**

Effectiveness, Moderation and Mediation of a Preventive Intervention for Externalizing Behavior

# **Alles Kidzzz?!**

Effectiviteit, Moderatie en Mediatie van een Preventieve Interventie voor Externaliserend Gedrag

(met een samenvatting in het Nederlands)

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*Dedicated to my daughter Liz and my mother Elma,  
There is something unique in the relationship  
between a mother and a daughter...*







# Contents

<b>Chapter 1</b>	General Introduction	11
<b>Chapter 2</b>	Parenting and Aggression in School Children At-risk: Social Cognitions as Mediators, Gender and Ethnicity as Moderators	23
<b>Chapter 3</b>	Individually Delivered Indicated School-Based Interventions on Externalizing Behavior: A Meta-analysis	37
<b>Chapter 4</b>	Effectiveness of an Individual School-based Intervention for Children with Aggressive Behavior	59
<b>Chapter 5</b>	Child Personality as Moderator of Outcome in a School-based Intervention for Preventing Externalizing Behavior	81
<b>Chapter 6</b>	What Works for Whom, How and under What Circumstances? Testing Moderated Mediation of Intervention Effects on Externalizing Behavior in Children	97
<b>Chapter 7</b>	General Discussion	117
	References	129
	Summary	149
	Samenvatting (Summary in Dutch)	153
	Dankwoord (Acknowledgements)	159
	Curriculum Vitae	165
	Publications	167



# 1

## General Introduction

Stable externalizing behavior in childhood places children at risk for the development of a chronic and persistent pattern of externalizing behavior problems. Preventive interventions aimed to interrupt this developmental trajectory are crucial to prevent children from negative consequences later in life, such as school failure, delinquency, or the development of diagnosable psychopathology (i.e., Oppositional Defiant Disorder and Conduct Disorder). The aim of the current dissertation was to study the effectiveness of a preventive intervention, Stay Cool Kids, and to examine for whom and how the intervention works.

## Externalizing Behavior: Definition and Prevalence

In the literature, many different terms are used to describe inappropriate child behaviors such as disobedience, aggression, and lying. The more general term externalizing behavior is used to cover a wide range of problems that are manifested in outward behavior and are disruptive for the child's environment. When externalizing behavior is further specified, a distinction is frequently made into *aggressive behavior*, such as fighting, bullying, and cruelty, and *rule-breaking behavior*, such as stealing, setting fires and truancy (Achenbach, 1991). Aggressive behavior can be further distinguished into *reactive aggression*, defined as impulsive aggressive responses to presumed threats or provocations, and *proactive aggression*, which is instrumental and used to obtain goals (object acquisition, domination or intimidation) (e.g., Dodge, 1991; Vitaro, Brendgen, & Barker., 2006). These separate types of aggression can occur together, but presumably have different causes and consequences, and therefore might require different interventions (Barker, Tremblay, Nagin, Vitaro, & Lacourse, 2006).

Externalizing behaviors are the most common form of maladjustment in school aged children (Schaeffer et al., 2006). Although some externalizing behavior can be part of the typical development of young children (terrible twos; Shaw, Lacourse, & Nagin, 2005; Tremblay et al., 2004) or adolescents (Moffit, 1993), a small group of children (5% to 11%) continues to show a stable pattern of frequent externalizing behavior (Prinzle, Onghena, & Hellinckx, 2005). This is especially true for children with much externalizing behavior at the start of elementary school (Broidy et al., 2003; Patterson, Reid, & Dishion, 1992). Children following this high stable trajectory have a continuing negative impact on the school system, since externalizing behaviors detract from learning opportunities, disrupt classroom routines, and have negative influences on classmates (McConaughy & Skiba, 1993; Wilson & Lipsey, 2006). Moreover, aggressive behavior can affect the community at large: costs for society are at least 10 times higher for children with severe aggressive behavior

compared to normally developing children (Scott, Knapp, Henderson, & Maughan, 2001).

Much research has been dedicated to understanding the etiology of aggression. One of the well grounded models explaining the development and persistence of aggressive behavior is the social information processing model, based on social cognitive theory (Dodge, 1986). According to this model aggressive children have problems in processing information, which lead to inappropriate responses in social settings. Numerous studies have indeed shown atypical social information processing in children with externalizing behavior problems (Crick & Dodge, 1994; De Castro, Veerman, Koops, Bosch, & Monshouwer, 2002; Dodge, 1986). Many interventions aim to prevent or treat externalizing behavior by targeting problems in social information processing.

### **First Aim: Does it Work? Effectiveness of Stay Cool Kids**

Because of the negative consequences for both children who exhibit aggressive behavior and their environment, externalizing problems are the most frequent ground for referral to psychological treatment (Kazdin, 2003). In the last decades numerous interventions have been developed to target externalizing behavior problems (Kazdin, 2003). Although many interventions exist, the effectiveness of most interventions has never been empirically tested. To be able to choose the optimal intervention for specific children in specific contexts, it is essential to know which interventions work best (Kraemer, Wilson, Fairburn, & Agras, 2002).

From several studies we know that delivering interventions at schools has clear advantages: It is the only place almost all children come to, which may result in higher attendance rates compared to outpatient settings (Lochman & Matthys, 2010). Moreover, it is the place where many interpersonal behavior problems occur, so locating the intervention at school increases the likelihood of generalization and maintenance of treatment effects to the natural environment (Evans, Langberg, & Williams, 2003). Although it has been suggested that preventive interventions should occur as early as possible because problem behaviors are less severe and stable at an early age (e.g., Dodge, Coie, & Lynam, 2006), intervening too early would be less beneficial because of lack of cognitive skills in young children (Kendall & Braswell, 1982). On the other hand, interventions should be delivered before the transition from elementary to high school, because this is a developmental risk point for increases in externalizing behavior (Lochman & Wells, 2004; Walker, Colvin, & Ramsey, 1995). Therefore, school-based interventions should preferably be conducted by fourth to sixth grades.

For high-risk children who already display externalizing behavior problems, indicated interventions, which are more intensive than universal class-room or selective group interventions, are needed (Saxena, Jané-Llopis, & Hosman, 2006; Weisz et al., 2005). Several scholars suggested that these indicated interventions should be delivered individually, to prevent the risk of peer contagion or reinforcement of negative behavior by deviant peers which can occur in group treatment (Dishion & Dodge, 2005; Lochman & Pardini, 2008). However, only a fraction of the interventions for children with externalizing behavior is individually delivered (27%, Wilson & Lipsey, 2007), probably because they are more costly and time consuming than universal or group interventions. It has been suggested that individual treatment does not allow children to practice social skills as they would in treatment groups. Yet, in a one-to-one setting appropriate behavior can be reinforced immediately and it allows children to develop an enduring warm and positive relationship with an adult, which might be helpful in developing more prosocial behavior. Moreover, individual interventions can be adapted more easily to a child's specific needs. This might be particularly necessary for children with externalizing problems who represent a very heterogeneous group with respect to causes and maintaining factors for their behavior problems (Nock, Kazdin, Hiripi, & Kessler, 2006).

In the Dutch school context, no evidence-based indicated preventive intervention exists for children with elevated levels of externalizing behavior (Hermanns, Schrijvers, & Öry, 2005<sup>1</sup>). At the same time, teachers experience an increase in aggressive behavior and violence (Van Overveld & Louwe, 2005) and are in need of such an intervention. Stay Cool Kids<sup>2</sup> is a preventive intervention designed to reduce externalizing behavior problems among elementary school children (age 9 – 12 years) indicated by teachers as showing elevated levels of externalizing behavior problems. It was developed by mental health prevention professionals and implemented in Dutch daily school routine practice several years ago (Kruuk & Hudepöhl, 2002). Stay Cool Kids includes a number of the characteristics that have been suggested to be promising. It is an indicated type school-based individually delivered and individualized training of social information processing patterns. However, its effectiveness has not been examined yet. In the present project, financed by a ZonMW grant (Londen et al., 2007), the effectiveness of Stay Cool Kids was examined in cooperation with two public mental health organizations delivering Stay Cool Kids in schools (ReinieR and Indigo).

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<sup>1</sup> Inventgroup; a committee advising the Dutch Minister of Health, Welfare, and Sport (Minister of VWS) on preventive interventions for psychosocial problems in children.

<sup>2</sup> Stay Cool Kids is a translation of 'Alles Kidzzz'


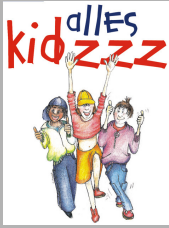
The first aim of this dissertation is to study whether Stay Cool Kids as delivered in routine-practice is effective in reducing externalizing behavior. There is increasing interest in evaluating intervention effects under real-world conditions, because school-based interventions proven to be effective in reducing externalizing behavior in efficacy studies (conducted under tightly controlled research conditions), have not been particularly successful in school practice (Berwick, 2003). Only a fraction of studies that evaluated effects of school-based intervention programs on aggressive behavior are routine practice programs (8% of 334 studies; Wilson, Lipsey, & Derzon, 2003).

### **The Stay Cool Kids Intervention**

The Stay Cool Kids intervention consists of 8 weekly individual sessions of 45 minutes. Before the start of the training, during a mid term evaluation after three weeks, and at the end of the training, the child trainer meets the child's parents and teacher. The training consists of 2 phases (see Figure 1.1). In the first phase (session 1 – 3), trainers investigate a child's specific needs and competences.

The first session starts with a general introduction, which is the same for all children. Next, trainers are able to choose two from six exercises (see Figure 1.1, step 2), which are best suited for the individual child, for the second and third session. After the third session, an individual analysis of child's competencies is made and discussed with the child's parents and teacher during a midterm evaluation, resulting in an individual intervention plan. For the intervention plan trainers choose five out of nine program components, which are most appropriate for the individual child's needs, as described in the trainer manual. Before phase 2 (session 4 -8) starts, a contract between the trainer and child is signed, in which the training program is described. Exercises focus on 1) self-perception (less negative, more realistic self-perception), 2) social cognitions (attribution of benign intent in ambiguous situations, accurate representation of other children's emotions), 3) anger management (emotion-regulations strategies, e.g., 'stop-think-act'), and 4) adequate behavior (generation of less aggressive responses to social provocations).

Parents and teachers receive information after each training session about the session's content and are stimulated to practice the newly learned skills together with the child. Parental involvement before, during and at termination of the intervention is supposed to enhance the effectiveness. Despite the individual character of the intervention, Stay Cool Kids is explicitly meant to be contextual by involving the child's school and home context.

	Phase	Child	Parents	Teacher
<b>Step 0</b>	Entry	Motivate Child for Stay Cools Kids	Entry Call	Entry Call
<b>Step 1</b>	Acquaintance	Fill in 'Passport' Meet Trainer	Meet Trainer	
<b>Step 2</b>	'Get to know each other' (3 meetings) 	Choose from exercises: 1. Week Card 2. Genealogy 3. Circle of Friends 4. Competence Game 5. Lifeline 6. Characteristics	Mail for Parents (after each meeting)	Mail for Teacher (after each meeting)
<b>Step 3</b>	Analysis of Competences			
<b>Step 4</b>	Mid-term Evaluation		Meeting with Trainer	Meeting with Trainer
<b>Step 5</b>	Contract	Make Contract with Trainer		
<b>Step 6</b>	'Start Training' (5 meetings) 	Choose from exercises: 1. Yellow Cap 2. What if... 3. Traffic Light 4. Anger Thermometer 5. Johny Boy 6. Supercircle 7. Up and Down 8. Monsters 9. Creditcard	Mail for Parents (after each meeting)	Mail for Teacher (after each meeting)
<b>Step 7</b>	Evaluation	Evaluation with Trainer	Evaluation with Trainer	Transfer to Teacher

**Figure 1.1** Overview Exercises for Trainers

## Second Aim: For Whom does it Work?

Our second aim was to go beyond answering the general question of 'Does it Work' by examining for whom the intervention works best (i.e., moderation of intervention effects). Including moderator effects can reveal important information about which children are responsive to the Stay Cool Kids intervention and for which children other interventions need to be developed. This knowledge can improve the selection of children for the intervention, which in turn can reduce high drop-out rates in child mental health care (Beauchaine, Webster-Stratton, & Reid, 2005).

We included gender, ethnic background and personality of the child as potential moderators of intervention effects in this dissertation. Because of gender differences



in prevalence and manifestations of aggression (e.g., Broidy et al., 2009; Crick & Grotpeter, 1995), differential responsiveness to interventions for boys and girls can be expected. *Ethnicity* is eligible as moderator, because immigrant Dutch children may respond differently to the intervention as a result of different parental socialization practices, cultural values and traditions, possible negative experiences with discrimination, and experienced challenges of the acculturative process (Kellam & Van Horn, 1997; Yasui & Dishion, 2007). Finally, given the prominence of child Big Five personality characteristics for the development of problem behaviors (Caspi & Shiner, 2006), there are reasons to speculate that *personality* traits may also influence the effectiveness of interventions.

### **Third Aim: How does it Work?**

Once the effectiveness of Stay Cool Kids is established, mechanisms through which the program affects behavior must be elucidated. Therefore, the third aim of this dissertation is to study why the intervention works. Although the importance of examining mediators of intervention effects is stressed by many scholars, only a few studies have actually tested theoretical models on which interventions are based (Hinshaw, 2002).

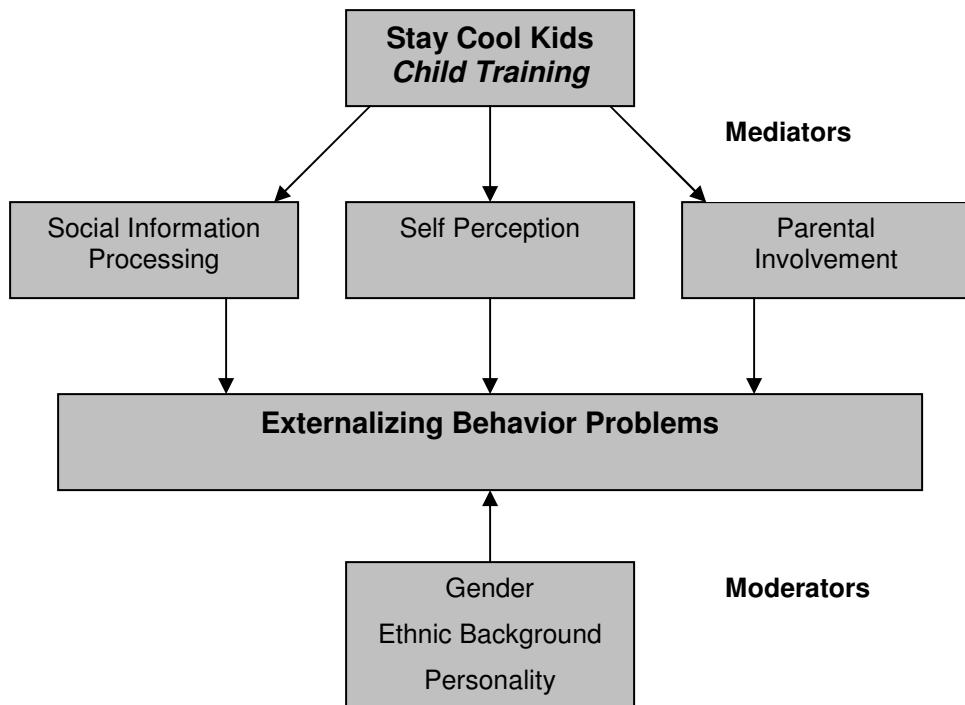
Stay Cool Kids is based on the social information processing model (Crick & Dodge, 1994; Dodge, 1986; Lemerise & Arsenio, 2000). In this model behavior is seen as a result of six mental steps: (1) encoding of cues, (2) interpretation of these cues, (3) clarification of goals, (4) response access or construction, (5) response decision and (6) enacting selected responses. A set of internal social schemas of others and self, derived from individual experiences, is the knowledge base for the social information processing steps (Arsenio & Lemerise, 2004). It has been suggested that children with aggressive behavior show problems in their social information processing patterns (Crick & Dodge, 1994; Dodge, 1986). For example, at the encoding stage, aggressive children attend to other cues from social situations (Horsley, Orobio de Castro, & van der Schoot, 2010). When making interpretations, they overattribute hostile intentions to peers and adults when provoked (De Castro, et al., 2002). They consequently hold more instrumental and less affiliative goals (Kempes, Orobio de Castro, & Sterck, 2008; Salmivalli, Kaukianinen, Kaistanieme, & Lagerspets, 1999). They generate less prosocial solutions and are more likely to opt for an aggressive solution (Matthys & Lochman, 2005). Children showing reactive aggression specifically make more hostile attributions, whereas proactive aggressive children evaluate aggressive responses

more positively (Crick & Dodge, 1996; De Castro, Merk, Koops, Veerman, & Bosch, 2005; Dodge et al., 1997).

In addition to these aspects of social information processing, aggressive children seem to differ from their peers in social cognitive schemas, notably in their self-perception. From a social learning theory perspective (Bandura, 1973), lasting experiences of coercive parenting, conflicts, and rejection by peers can make children uncertain of their worth and competence. This is reflected in highly variable self-esteem and self-perceived social competence in aggressive children (e.g., Kernis, 2003). Apparently, many aggressive children with such uncertain self-views feel they need to maintain a facade of high status to others (and perhaps even themselves). When their competence or worth is challenged these children try to defend their uncertain self-regard from external threats (e.g., Baumeister, Smart, & Boden, 1996). Thus, uncertainty about one's worth or competencies can lead to perceiving others as threatening, hostile and rejecting, which in turn can cause hostile, defensive and aggressive behavior (de Castro, Brendgen, van Boxtel, Vitaro, & Schaeppers, 2007). These behaviors supposedly lead to rejection by others, which confirm the child's uncertainty about himself (Donnellan, Trzesniewski, Robins, Moffit, & Caspi, 2005).

Interventions with the social information processing model as foundation, target these problems in social cognitive functioning by explicitly providing training on social information processing steps (e.g., Brainpower program; Hudley & Graham, 1993; Coping Power Program, Lochman & Wells, 2002a). Although these interventions are effective in reducing aggressive behavior in indicated school age children ( $k = 47$  studies, effect size = .26; Wilson & Lipsey, 2006) few studies have empirically tested whether targeting social cognitive deficits indeed is the working mechanism through which ameliorative effects are exerted (Hinshaw, 2002).

In this dissertation we first determined, using cross-sectional analyses, how proposed factors (problems in social information processing, self-perception, and parenting) are associated with reactive and proactive aggression in children indicated because of externalizing behavior problems. Second, through mediational analyses of longitudinal intervention data, we further tested whether targeting social cognitive functioning and self-perception (the aspects on which the training focuses) indeed is the working mechanism of the intervention (see Figure 1.2). In addition, because SCK attempts to increase involvement of parents, we examined whether parental involvement mediates effects. Results of these analyses can serve a dual aim of informing clinical practice (is the focus on specific program components legitimate?) and of theory-testing for scientific knowledge (Kazdin, 2007; Kellam & Rebok, 1992).



**Figure 1.2** Theoretical Model of Stay Cool Kids

## Design of the Study

The design of this study (Londen et al., 2007) is a cluster Randomized Controlled Trial with randomization at school level. Randomized Controlled Trials are considered to be the gold standard for testing intervention effectiveness (Consolidated Standards of Reporting Trials, 2010). It was decided to randomize at school-level in this study, because more children from the same classrooms participated in the intervention. Randomization at individual level could lead to 'spillover' effects that would compromise a fair test of effectiveness (Quint, 2011). Using blockwise randomization is, for these reasons, a common procedure in the education field (Xu & Nichols, 2010). However, with only a limited number of schools, randomization at school level could result in biases due to school factors and limited statistical power. To prevent this, a mixed within x between design was used, where each school participated in both conditions in consecutive years. Each school was randomly assigned to a sequence of intervention and control participation years (see Table 1.1 for randomization process).

**Table 1.1** Randomization Process

Randomization 48 Schools				
		Group 1: N = 16 schools	Group 2: N = 16 schools	Group 3: N = 16 schools
Year 1	2008	Child Training	Child Training + Later Parent Training	Control Group
Year 2	2009	Child Training + Later Parent Training	Control Group	Child Training
Year 3	2010	Control Group	Child Training	Child Training + Later Parent Training

The research design consisted of two intervention conditions and one control condition. The first intervention condition involved the child training Stay Cool Kids. In the second intervention condition, the child training was followed by a parent training. Evaluating the effects of the booster parent training (after child training) is beyond the scope of this dissertation. Future analyses will study whether an additional parent training can enhance or establish beneficial effects after the child training<sup>3</sup>.

In this multi-site research design, 48 elementary schools in the Netherlands were randomly assigned to one of three groups (see Table 1.1). Each school participated in the project for three years (2008-2011): For two years in one of the intervention conditions (child training or child and parent training) and for one year in the control condition. For example, schools in group one were in the child intervention condition in year one, which means that selected 4<sup>th</sup> grade children received the intervention. The next year, they were in the child and parent intervention condition: Children who were selected in 4<sup>th</sup> grade that year received the Stay Cool Kids training and their parents received the parent training after the child training. In the last year, selected 4<sup>th</sup> grade children were in the no-treatment control condition. In this way treatment condition was randomized and each school

<sup>3</sup> Because parental attendance in prevention programs is generally low, we decided to offer the parent training *after* the child training to increase motivation for parents to participate. It is found that parent training is effective (effect size  $d = .45$ ; McCart et al., 2006), especially for younger children, in reducing externalizing behavior (McCart et al., 2006), and because cognitive behavioral child interventions require participation of parents in child's natural environment to encourage use of skills (Frick, 2000), we expect the parent training to be effective in maintenance of treatment effects.

provided treatment and control children. Intervention effects are not the result of school factors, because the very same schools were represented evenly in all research conditions.

After parental consent was obtained, teachers nominated children from their classes who displayed the highest levels of externalizing behavior (the top 30%) and filled the Teacher Report Form (TRF, Achenbach, 1991) for these children. Researchers selected children when their externalizing behavior was at least sub clinical (TRF T-score > 60). This is a commonly used strategy in intervention research, to select a high-risk group (e.g., Lochman & CPPRG, 1995). If a child was selected, primary caretakers were contacted by phone and in meetings at school to gather their informed consent to participate in this study. Children in the intervention condition were seen during the school day from January until March. Children in the control condition received care as usual.

There were four assessment periods: prior to the beginning of the intervention, at intervention termination (after 11 weeks), at 6-months and at 12-months follow-up when children were in 5<sup>th</sup> grade. Dependent measures were individually administered to children in their school settings by trained research assistants. Teachers and parents received questionnaires and were asked to return the questionnaires within a week. The study was approved by the Dutch Central Committee on Research Involving Human Subjects.

## Outline

In the following chapters, five studies are presented. To provide insight in putative correlates of externalizing behavior in high-risk elementary school children, we conducted a cross sectional study in **Chapter 2**. The relations between child social information processing and self-perception, and the parent-child relationship, positive and negative parenting as risk factors were examined. In **Chapter 3**, we investigated the effectiveness of individual school-based child interventions aimed to reduce externalizing behavior in the scientific literature with a meta-analysis. We examined whether child, intervention and study characteristics can influence effect sizes, and described effects on social cognitions and self-perception in addition to externalizing behavior. In **Chapter 4**, the results of the evaluation of the individual school-based preventive intervention 'Stay Cool Kids, for children with externalizing behavior in the Netherlands, are reported. In **Chapter 5**, we examined moderation of intervention effects by child personality (for whom does it work?). Given the prominence of child Big Five personality characteristics for the development of problem behaviors (Caspi & Shiner, 2006), there are reasons to speculate that

personality traits may also influence the effectiveness of interventions. Knowledge about moderators of interventions effects can improve selection of children for intervention, which in turn can reduce high drop-out rates in child mental health care (Beauchaine, et al., 2005). In **Chapter 6**, the theoretically assumed working mechanisms of the training are tested as mediators of intervention effects (Why does it work?). Showing that changes in biased social cognitions are related to changes in child aggressive behavior, gives support for social cognitions as working mechanism of an intervention, but also for the social cognitive theory as developmental model (Weersing & Weisz, 2002). This can result in new input for fundamental research on the social information processing theory, but also for improvement of interventions (Deković, Stoltz, Schuiringa, Manders, & Asscher, 2011). Because of the contextual base of the intervention we also tested whether changes in parental involvement resulted in changes in externalizing behavior. In **Chapter 7**, findings from the previous studies are summarized, implications for clinical practice are discussed, and recommendations for future research are given.

# 2

## Parenting and Aggression in School Children At-risk: Social Cognitions as Mediators, Gender and Ethnicity as Moderators

Sabine Stoltz, Monique van Londen, Maja Deković, Bram O. De Castro, Peter  
Prinzle, & John E. Lochman

*Manuscript Submitted for Publication*

## Abstract

In this cross-sectional study of 206 4<sup>th</sup>-grade children at-risk for behavior problems we investigated whether children's self-perception and social information processing mediated the link between parenting and aggressive behavior, and whether gender and ethnicity moderated these associations. Parents reported on parenting, parent-child relationship, and reactive and proactive aggression and children reported on self-perception and social information processing. Results provided support for self-perception, but not for social information processing, as mediator of the relation between negative parenting and aggression, specifically for boys. For all children support for individual paths of the tested model was found: A positive parent-child relationship was associated with less aggression, negative parenting was related to less positive self-perception, and problems in social-cognitive functioning were related to aggression. Multigroup analyses showed ethnic similarities and gender differences in patterns of associations.

## Introduction

Aggressive behavior is part of the normal development of young children and most children show a decline in frequency and intensity of aggression during the preschool period (Campbell, Spieker, Burchinal, & Poe, 2006). However, a small group of children (5-11%) deviates from this normative development of aggression (Campbell et al., 2006). Their aggressive behavior remains stable and becomes problematic, which places them at risk for later-life delinquency, risky behaviors and for developing behavioral disorders (Broidy et al., 2003).

Compelling evidence exists for the relation between dysfunctional parenting and the development of aggressive behavior in children (Dishion & Patterson, 2006). Negative parenting, such as inconsistent discipline and overreactivity, is longitudinally related with more aggressive behavior in children (e.g., Snyder, Cramer, Afrank, & Patterson, 2005), whereas positive parenting (parental involvement, high quality of parent-child relationship) is concurrently associated with less aggression (Wissink, Deković, & Meijer, 2004). Less clear is which mechanisms mediate the association between parenting and child aggressive behavior. Specific social-cognitive orientations in children, predicting individual differences in different forms (reactive and proactive) of aggression (e.g., Crick & Dodge, 1994), may be unique candidates for such mediating mechanisms. Even though there is empirical evidence for the influence of harsh parenting on social cognitions in aggressive children (Simons, Paternite, & Shore, 2001; Weiss, Dodge, Bates, & Pettit, 1992), a



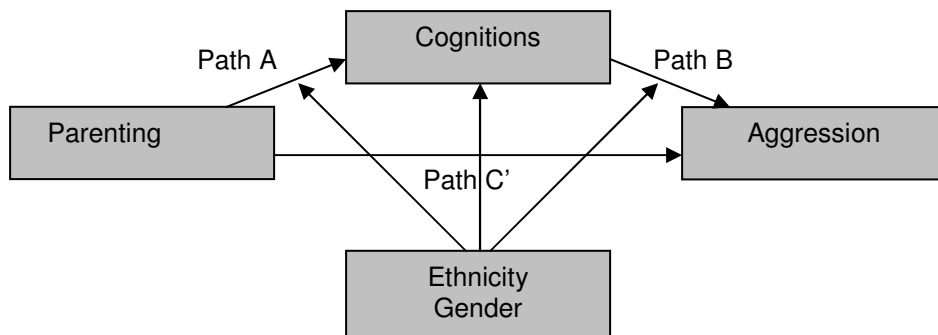
model in which social cognitions are tested as underlying *mechanism* for *more general parenting dimensions* influencing aggression has been rarely tested.

It has been found that physical punishment is positively related to children's hostile intent attributions of neutral peer behavior and to a limited repertoire of problem-solving strategies. Children's attributions and problem-solving, in turn, are predictive of aggressive behavior (Weiss et al., 1992). Highly aggressive children base their interpretations of social events on fewer cues, attribute more hostile intent to ambiguous behavior (De Castro, Veerman, Koops, Bosch, & Monshouwer, 2002), have limited response repertoires, and are more likely to opt for aggressive solutions in conflict situations (Matthys & Lochman, 2005). Problems in encoding, interpreting of social cues and aggressive response generation are related to *reactive aggression*, which can be seen as an angry, emotional reaction to a presumed threat or provocation. On the other hand, selecting and enacting aggressive responses to obtain desired goals, are related to *proactive aggression*, which is planned 'cold blooded' aggression to dominate or intimidate (De Castro, Merk, Koops, Veerman, & Bosch, 2005; Dodge, 1991). In addition, negative self-esteem can lead to perceiving others as threatening, hostile and rejecting, which in turn can cause hostile, defensive and aggressive behavior (Donnellan, Trzesniewski, Robins, Moffit, & Caspi, 2005), and on the other hand, overestimation of own competence may cause conflicts with peers about social dominance (Thomaes, Bushman, De Castro, Cohen, & Denissen, 2009). Especially distorted self-views has been suggested to be related to proactive aggression (Salmivalli, 2001).

Whereas much research focused on bivariate associations, the aims of the present study were to test (1) whether self-perception and social information processing (SIP) mediate the relation between parenting and aggression, and (2) whether ethnicity and gender moderate associations. The tested model (Figure 2.1) proposes that several parenting aspects (affective relationship, positive and negative parenting) predict self-perception and SIP in the child (Path A), which in turn predict child's aggressive behavior (Path B).

Whereas previous studies focused on a relatively limited range of parenting aspects, mainly physical punishment and harsh parenting, we broaden this scope and include other relevant aspects of parenting: Parent-child relationship, positive and negative parenting. Additionally, we distinguish reactive and proactive aggression, since social-cognitive functioning uniquely predicts these forms of aggression. Previous studies on paths of this model focused mainly on normative non-aggressive samples (e.g., Haskett & Willoughby, 2007) or on clinically referred samples (e.g., De Castro et al., 2005). However, we examine these associations in a specific group of highly aggressive, teacher-nominated, elementary school-children. Knowledge about risk factors for developing externalizing behavior in children

displaying symptoms of behavioral disorders can result in more adequate preventive indicated interventions.



**Figure 2.1** Hypothesized moderated mediation model

Moreover, the inclusion of a large ethnically diverse sample in the Netherlands enables us to study whether the strength of associations varies for specific subgroups. Though research on child aggression stresses the importance of studying cross-ethnic differences (e.g., Deater-Deckard, Dodge, Bates, & Pettit, 1996), studies on ethnicity as moderator of processes underlying the development of aggressive behavior are relatively scarce and inconsistent. We focus on Moroccan/Turkish versus Dutch children, because Moroccans and Turks are the largest immigrant groups in the Netherlands (Dutch Central Bureau of Statistics, 2010). Stevens and Vollebergh (2008) found ethnic differences in parenting, which also may influence child cognitions and behavior. Due to the limited research it is difficult to formulate specific hypotheses about the moderating role of ethnicity. It is possible that associations are identical in ethnic groups, as has been found in previous studies (Rowe, Vaszonyi, Flannery, 1994), but also ethnic differences in effects of risk factors were found (Deković, Wissink, & Meijer, 2004; Stevens & Vollebergh, 2008). However, based on the globally confirmed social information processing theory (Crick & Dodge, 1994), no moderation by ethnicity in the mediating role of SIP and self-perception is expected.

Moreover, by also including girls, our study has the potential to contribute to our knowledge of the understudied social-cognitive functioning - aggression association in girls (e.g., De Castro et al., 2005). We expect gender differences in associations between risk factors and aggressive behavior. For example, Meece and Mize (2010) found that only for girls hostile attributions were associated with teacher-rated aggression, whereas only for boys children's response generation was associated

with aggression. Besides providing information about generalizability of a theory, examining moderators of risk factors for developing aggressive behavior can have important clinical implications. When differences exist, interventions for highly aggressive children should be adapted to specific groups (boys/girls, ethnicity).

## Method

### Participants

Participants in this study were 206 children (72% boys,  $M_{age} = 10.2$  years,  $SD = .60$ ) and their parents (193 mothers, 128 fathers;  $M_{age} = 40.4$  years,  $SD = 5.1$ ). Most of the families (70%) were intact. Of the children 30% ( $n = 61$ ) had an immigrant background: One of the parents was born in another country (Dutch Central Bureau of Statistics, 2010). For most (85%) immigrant children, both parents were born in Morocco or Turkey.

### Procedure

The sample was drawn from 4<sup>th</sup>-grade classes of 48 elementary schools in two geographic regions in the Netherlands. Children were selected to participate in an individual school-based intervention to reduce externalizing behavior (Stoltz, van Londen, Deković, De Castro, Prinzie, & Lochman, 2011) using a two-stage screening. First, teachers nominated children with the highest levels of externalizing behavior (the top 30%) and filled in the externalizing scale of the Teacher Report Form (Achenbach, 1991). Next, researchers selected children based on T-scores > 60, indicating a (sub) clinical level of externalizing behavior ( $Mean\ T\ score = 67.49$  (5.58), *range from 60 to 89*). After parents' informed consent was obtained, the baseline pre-assessment was conducted. These data are analyzed in the current study. Trained assistants collected children's data in their school settings. In two-parent families, both parents filled in questionnaires. This study was approved by the Dutch Central Committee on Research Involving Human Subjects.

### Measures

**Aggressive behavior.** Reactive and proactive aggression were measured with an adapted parent version of the Teacher Rating of Aggression (Dodge & Coie, 1987). Reliability, factor structure and validity of the TRA are adequate (e.g., Hendrickx, Crombez, Roeyers, & De Castro, 2003). Items were rated on a 5-point scale (1 = *never* to 5 = *always*). The reactive (e.g., 'When my child has been teased or threatened, he/she gets angry easily and strikes back') and proactive (e.g. 'My child threatens or bullies others in order to get his/her own way') subscales both consisted

of 3 items (Reactive  $\alpha_{\text{fathers}} = .80$ ,  $\alpha_{\text{mothers}} = .81$ ; Proactive  $\alpha_{\text{fathers}} = .80$ ,  $\alpha_{\text{mothers}} = .81$ ). Given the high correlations between fathers and mother, ratings were averaged ( $n = 124$ ;  $r > .70$ ).

**Parenting.** The Alabama Parenting Questionnaire (Elgar, Waschbusch, Dadds, & Sigvaldason, 2007) was used to measure *parental involvement* (10 items, e.g., 'I have a friendly talk with my child',  $\alpha_{\text{fathers}} = .75$ ,  $\alpha_{\text{mothers}} = .70$ ), *positive parenting techniques*, (6 items, e.g., 'I praise my child if she/he behaves well',  $\alpha_{\text{fathers}} = .82$ ,  $\alpha_{\text{mothers}} = .77$ ), and *inconsistent discipline* (7 items, e.g., 'The punishment I give my child depends on my mood',  $\alpha_{\text{fathers}} = .65$ ,  $\alpha_{\text{mothers}} = .60$ ). Items were rated on a 5-point rating-scale (1 = *never* to 5 = *always*).

The Parenting Stress Index (Abidin, 1983) was used to measure *attachment* (5 items, e.g., 'My child and I have a bad relationship', reverse-coded,  $\alpha_{\text{fathers}} = .61$ ,  $\alpha_{\text{mothers}} = .62$ ) and *acceptance* (7 items, e.g., 'My child can be difficult; it is not easy to have a child like mine', reverse-coded,  $\alpha_{\text{fathers}} = .75$ ,  $\alpha_{\text{mothers}} = .75$ ). The items were answered on a scale of 1 (*I totally disagree*) to 4 (*I totally agree*).

Finally, the Parenting Scale (Arnold, O'Leary, Wolff, & Acker, 1993) was included to assess *overreactive parenting* using a 7-point likert-scale (7 items, e.g., 'When my child misbehaves: I raise my voice or yell',  $\alpha_{\text{fathers}} = .81$ ,  $\alpha_{\text{mothers}} = .80$ ).

A confirmatory factor analysis resulted in a three factor solution: (1) affective relationship (attachment, acceptance;  $\alpha_{\text{parents}} = .78$ ), (2) positive parenting (positive parenting techniques, parental involvement;  $\alpha_{\text{parents}} = .86$ ) and (3) negative parenting (inconsistent discipline, overreactivity;  $\alpha_{\text{parents}} = .75$ ). The three factors explained 77% of the variance, with factor loadings of at least .60. Composites of the means of standardized scores of the scales were computed.

**Social information processing (SIP).** Four hypothetical vignettes were presented to children (SIP test, De Castro et al., 2005). Because specific stories were only interesting and age relevant for boys, we adapted one vignette to the interest of girls after pilot testing. The stories all concerned being hindered by a peer whose intentions are ambiguous. Three aspects of SIP were assessed.

First, *hostile intent attribution* was measured by asking the child immediately after hearing a vignette why the peer in the story might have acted the way that he or she did. Responses were written down by the interviewer and scored as 0 (*benign intent*) or 1 (*hostile intent*). When children generated more than one response, they were asked what they thought was most likely in the specific situation. For intercoder agreement mean kappa was calculated (.95-1.00) and disagreements were resolved through discussions until consensus was reached. An open-answer hostile attribution variable was created by counting the number of stories with hostile

answers (0 = *never a hostile attribution* to 4 = *always a hostile attribution*). Furthermore, the child was asked to indicate the peer's intent on a ten-point rating-scale (1 = to be *nice* to 10 = to be *mean*). Scores were averaged over the stories. Because open-answer and rating-scale variables were strongly correlated ( $r = .74$ ), they were combined by standardizing each variable and computing their average ( $\alpha = .67$ ).

Second, *aggressive response generation* was measured by asking children what they would do when the events in the vignette would actually happen to them. Responses were written down by the interviewer and scored 0 (*not aggressive*), 1 (*verbally aggressive or coercive response*), or 2 (*physically aggressive response*) and scores were averaged over the vignettes. Inter-rater's agreement was found to be high: 95% ( $\alpha = .66$ ).

Finally, *approval of aggression* was measured by presenting a possible aggressive behavioral response to each vignette (e.g., 'if this happens to me, I will hit the child who pushed me'). The child had to indicate on a 10-point scale whether he/she approved of this response (0 = *not good response at all* to 10 = *a good response*). Ratings were averaged over the stories ( $\alpha = .77$ ).

**Child self-perception.** Children were asked to fill in the global self-evaluation subscale of the Perceived Competence Scale for Children (Harter, 1982) consisting of 6 items (e.g., 'Some children are happy with themselves' versus 'Other children would like to be someone else'). Children first had to decide which of the items in the pair better described them, then they had to choose between 'sort of true' or 'really true' ( $\alpha = .82$ , 6 items). Higher scores indicate a positive self-perception.

## Results

Because the child scales 'approval of aggression' and 'aggressive response generation' appeared to be skewed, log transformations were performed. Correlations and means for boys and girls are presented in Table 2.1. No significant differences in means of aggression, cognitions or parenting were found for ethnicity or gender.

Patterns for mother and father data were very similar, therefore we decided to present a combined 'parent model'. To examine gender and ethnicity differences we performed multigroup analyses. The overall goodness of fit of initial models was estimated using the fit-indices root mean square error of approximation (RMSEA < .05) and the Normed Fit Index (NFI > .95). Evaluation of the fit of the baseline model, in which all associations between variables were allowed to differ across

*gender* provided a good fit ( $\chi^2(6) = 3.3$ , RMSEA = .08, NFI = .96). Next, we compared this unconstrained baseline model to a fully constrained model, in which all proposed relations were constrained to be equal for boys and girls. Constraining the linkages did not worsen the fit ( $\chi^2(28) = 34.3$ , RMSEA = .03, NFI = .89). Although the fit was not significantly different ( $\Delta df = 22$ ,  $\Delta \chi^2 = 21$ ,  $p > .10$ ) the NFI dropped. Based on critical ratio indices we decided to add a series of sequential unconstrained paths ( $n = 4$ ), resulting in a partially constrained model ( $\chi^2(25) = 24.9$ , RMSEA = .00, NFI = .92), which had a significantly better fit than the fully constrained model ( $\Delta \chi^2 = 9.4$ ,  $\Delta df = 3$ ,  $p < .05$ ). For *ethnic* differences, the unconstrained model, in which parameters were allowed to differ across groups, provided a good fit ( $\chi^2(6) = 11.5$ , RMSEA = .07, NFI = .98). Constraining the linkages did not worsen the fit significantly ( $\Delta \chi^2 = 19.5$ ,  $\Delta df = 22$ ,  $p > .10$ ). Values of critical ratio indices gave no reason to release specific paths. The fit of the constrained model, with all paths fixed to be equal for immigrant and native Dutch children was adequate ( $\chi^2(28) = 31.1$ , RMSEA = .02, NFI = .90).

These multigroup analyses resulted in a final model, with all paths constrained to be equal for ethnic groups and specific paths released for boys and girls (Figure 2.2). For all children, higher levels of affective parent-child relationship were related to less reactive and proactive aggression ( $\beta = -.33$ ,  $p < .01$  and  $\beta = -.19$ ,  $p < .01$ , respectively). For girls, we found negative parenting to be related to more proactive aggression ( $\beta = .24$ ,  $p < .05$ ). For all children, negative parenting was related to less positive self-perception ( $\beta = -.15$ ,  $p < .05$ ). Aggressive response generation was related to more proactive aggression ( $\beta = .15$ ,  $p < .05$ ). In addition, the SIP variables were related to each other: higher levels of hostile intent are related to higher levels of approval of aggression ( $\beta = .30$ ,  $p < .01$ ) and to higher levels of aggressive response generation ( $\beta = .12$ ,  $p < .05$ ). Moreover, approval of aggression was positively related to aggressive response generation ( $\beta = .46$ ,  $p < .01$ ). For boys, we found more positive self-perception to be related to more proactive aggression ( $\beta = .17$ ,  $p < .05$ ), and more hostile intent to be related to more reactive aggression ( $\beta = .16$ ,  $p < .05$ ).

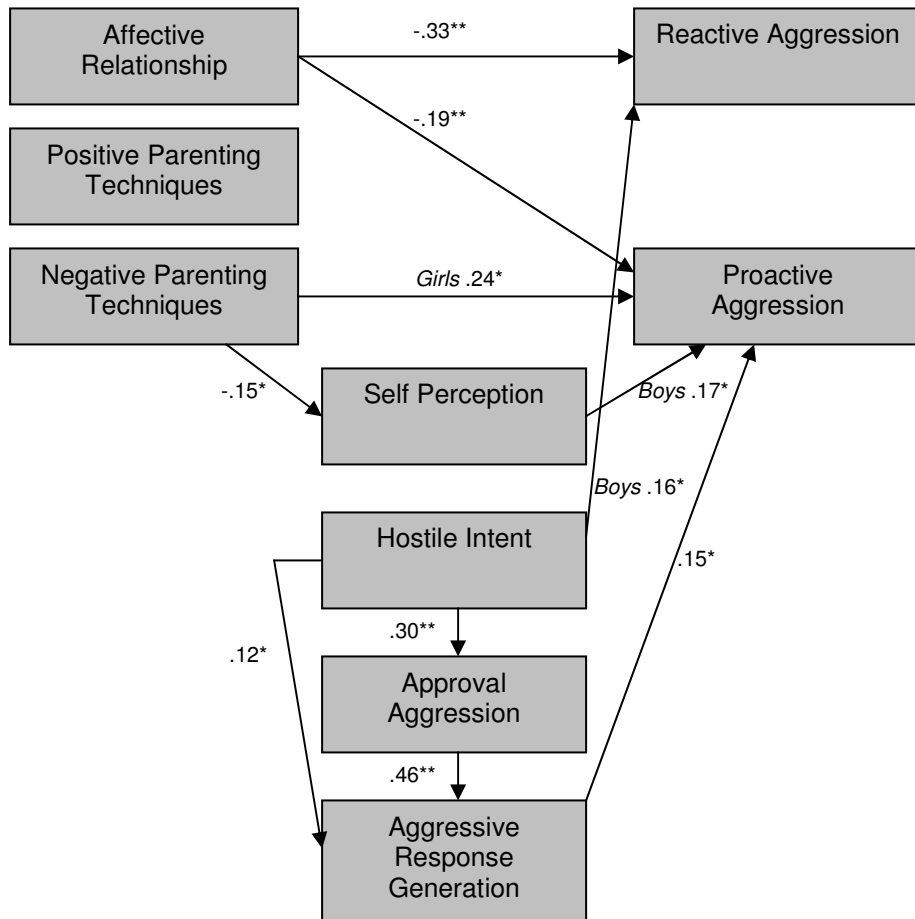
Next, we tested whether self-perception and SIP mediated the relation between parenting and aggression using multiple mediation analyses which obtain a bootstrap confidence interval (95%-CI, with 5000 resamples; Preacher & Hayes, 2008). Although for all children there was no direct effect of parenting on SIP and no significant mediating effects of SIP on the parenting-aggression associations, for boys we found significant direct effects of parenting on self-perception and of self-perception on aggression, indicating there was partial mediation (95%-CI:  $p > .10$ ), moderated by gender. Also, for boys we found a significant mediation effect in the SIP-aggression associations: Hostile intent was directly related to reactive

**Table 2.1** Intercorrelations Among Assessed Variables

	1	2	3	4	5	6	7	8	9	Mean	SD
1 Reactive Aggression	=	.67**	-.16	-.02	.04	.19	-.29*	-.09	.29*	2.78	.79
2 Proactive Aggression	.52**	=	.01	.06	.02	.15	-.17	-.22	.38**	1.52	.65
3 Self-perception	.06	.13	=	-.27*	.03	-.16	.08	.24 <sup>+</sup>	-.11	3.14	.62
4 Hostile Intent	.17 <sup>+</sup>	.14 <sup>+</sup>	.05	=	.25 <sup>+</sup>	.32*	.06	-.11	.01	.31	.31
5 Approval Aggression	.08	.15 <sup>+</sup>	-.12*	.29**	=	.51**	.15	-.30*	.18	2.11	1.89
6 Response Generation	.16*	.19*	-.21**	.30**	.54**	=	.07	.13	.06	.71	1.60
7 Affective Relationship	-.37**	-.28**	.08	.05	-.09	-.15	=	.41**	-.37**	3.59	.38
8 Positive Parenting	-.14 <sup>+</sup>	-.16 <sup>+</sup>	.13	-.02	-.06	-.06	.28**	=	-.38**	3.86	.47
9 Negative Parenting	.13	.06	-.21*	.00	.10	.12	-.26**	-.22**	=	.07	.78
Mean	2.99	1.57	3.22	.40 <sup>1</sup>	2.46 <sup>2</sup>	1.07 <sup>2</sup>	3.54	3.93	.01 <sup>1</sup>	=	=
SD	.88	.64	.60	.27	2.08	1.69	.39	.40	.76	=	=

Note. Values above diagonal represent girls, below diagonal represent boys. <sup>1</sup>Standardized means, <sup>2</sup>In analyses log-transformed score is used. \* $p < .05$ , \*\* $p < .01$ , <sup>+</sup> $p < .10$ .

aggression, but indirectly related to proactive aggression through aggressive response generation (95%-CI: [.00, .04],  $p < .05$ ). Therefore, also in the SIP-aggression association we found a mediation effect moderated by gender.



**Figure 2.2** Significant standardized path coefficients (AMOS). \*  $p < .05$ , \*\*  $p < .01$

To control for inverse effects (social cognitions predicting parenting) we tested an alternative model with inverse paths. This model, which proposed that children's social-cognitive functioning elicits parenting, was not adequate ( $\chi^2(2) = 6.2$ , RMSEA = .11, NFI = .98). In other words, the data were more consistent with the proposed parenting-cognitions-aggression model, than with the alternative model.



## Discussion

In a large group of Dutch elementary school children, at-risk for developing stable behavioral problem trajectories we investigated whether the link between parenting and aggression was mediated by SIP and self-perception, and whether gender and ethnicity moderated associations.

### Mediation model

No differences were found across ethnic groups in associations between parenting, social-cognitive functioning and aggression. However, for boys, results supported social cognitions as mediator between parenting and aggression, indicating moderating effects for gender but not for ethnicity. Consistent with many other studies (e.g., Dishion & Patterson, 2006), parenting was directly related to child aggression, with the strongest association for affective-parent child relationship with both reactive and proactive aggression. Negative parenting was related to less positive self-perception, which is consistent with social learning theories (Bandura, 1973). For boys, higher levels of positive self-perception, in turn, were related to more aggressive behavior. Therefore, the mediation model is partially supported for boys with different ethnic backgrounds.

### Parenting and Aggression

Results of the current study emphasize the importance of the parent-child relationship (Deković, Janssens, & van As, 2003) above and beyond parenting behavior. It seems that an affective parent-child relationship in general can 'buffer' the development of more serious aggressive behavior. Moreover, this study provides evidence for the role of parenting techniques in the development of proactive aggression. Dodge (1991) suggested that proactive aggression may be fostered through negative parenting (inconsistent parental discipline, lack of monitoring and control), which encourage children to see aggression as an acceptable strategy to achieve goals. The results of this study confirm this relation, but only for girls, which may be a result of girls being more sensitive to family processes than boys (Conger, et al., 1993).

### Parenting and SIP

In contrast to our expectations, none of the parenting aspects was related to SIP. From previous studies we can conclude that physical discipline is predictive of deviations in child's social-cognitive style (e.g., Weiss et al., 1992). The current study extends our knowledge about risk-factors for deviations in SIP: In a specific at-risk group, neither parenting nor parent-child relationship was related to SIP. More

normative parenting behaviors are obviously not as predictive as more deviant physical discipline. From a social learning perspective (Bandura, 1973), future studies should include the SIP-style of parents (e.g., Nelson & Coyne, 2009) as risk factor for deviations in child's SIP.

### **Social-cognitive Functioning and Aggression**

For boys, higher levels of positive self-perception were related to more proactive aggression, supporting previous findings about overestimation of own competence, which in turn may result in aggression (Thomaes et al., 2009). Proactive aggression can be seen as instrumental aggression to take possession of things or to dominate or intimidate (Dodge, 1991), and therefore is more likely to happen when children are more confident (Salmivalli, 2001).

Moreover, the hypothesis of the relation between the SIP-element aggressive response generation and proactive aggression was supported, for both *at-risk boys and girls*. In previous studies (e.g., Crick & Dodge, 1994) aggressive response generation was also related to proactive aggression, whereas encoding and attribution of intent were related to reactive aggression. The proposition of Crick and Dodge (1994) that certain SIP-elements contribute indirectly to aggression was supported by our finding that hostile intent attribution and approval of aggression indeed were indirectly, through aggressive response generation, related to proactive aggression.

In addition, the proposed relation between hostile intent attribution and reactive aggression (Dodge, 1991), was only found for boys. In a meta-analysis (De Castro et al., 2002) on hostile intent attribution and aggression it was found that girls were underrepresented in studies and therefore gender differences associations were not examined. The current study contributes to this gap in the literature: Gender differences exist in associations between hostile intent attribution and aggression. For boys, aggressive response generation in addition mediated the direct link between hostile intent and reactive aggression. As boys and girls did not differ in their mean level of hostile intent, girls attribute hostile intent as well to provoking social situations, but do not necessarily react with reactive or proactive aggression. Perhaps hostile intent in girls is related to relational aggression, which is more common in girls (Crick & Grotpeter, 1995). This should be examined in future studies.

Several *limitations* of the current study need to be recognized. The cross-sectional data limit the possibility of making causal inferences. Moreover, the assessment of parenting was by self-report, which might lead to underreporting negative and over-reporting positive parenting. Due to the restriction of range in aggression in this at-risk sample, we might miss relations existing in a normal

sample. However, finding specific associations despite these small margins may indicate their robustness. Notwithstanding these limitations, this study contributes to the existing literature on associations between parenting, cognitions and aggression by focusing on an ethnically diverse sample of boys and girls displaying elevated levels of aggressive behavior. Results give little support for SIP as mechanism of the association between parenting and aggression. However, self-perception partially mediates the association for boys. In addition, gender differences in associations were found, but there were no differences across ethnic groups.

For interventions aimed to reduce aggressive behavior in at-risk children, it is important to know which child and parenting risk-factors are associated with higher levels of aggression. The present findings, showing that both parenting and child characteristics are independently related to child aggressive behavior, support the notion that including a parent training, in addition to a child intervention can result in a larger change in children's behavior (e.g., Webster-Stratton & Hammond, 1997). Although findings should be considered tentative, until replicated with other samples, they raise the question how interventions might be adapted for boys and girls. Perhaps *personalized* tailor-made interventions adapted to child characteristics (i.e., gender) can produce stronger intervention effects (Chorpita, Daleiden, & Weisz, 2005).



# 3

## Individually Delivered Indicated School-Based Interventions on Externalizing Behavior: A Meta-analysis

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## Abstract

This meta-analysis synthesized the results of 22 studies (1,587 children), containing 9 purely individual interventions and 13 interventions including both individual and additional components, on the effectiveness of *individually* delivered school-based interventions for externalizing behavior problems. The overall weighted mean effect size on externalizing behavior was  $d = .28$ . Moderator analyses showed interventions to be most beneficial for younger children and children selected by multiple informants. No differences were found for individual ( $d = .26$ ) versus individual with additional component interventions ( $d = .29$ ). For subsets of studies significant effects were found on prosocial behavior ( $d = .43$ ,  $k = 7$ ) and social cognitions ( $d = .82$ ,  $k = 7$ ). Taken together, individually delivered school-based interventions reduce externalizing behavior in at-risk children, increase prosocial behavior and improve social cognitions.

## Introduction

Estimates of the prevalence of stable externalizing behavior among school-aged children range from 5 to 11 percent (Broidy et al., 2003). In elementary schools, teachers are challenged to deal with these problems, since these detract from learning opportunities, disrupt classroom routines, and have negative influences on classmates (Wilson & Lipsey, 2006). Moreover, externalizing problem behaviors are a developmental risk factor for future school failure and adult criminality (Loeber, Burke, Lahey, Winters, & Zera, 2000). Schools are ideal locations for reaching all children regardless of background, and probably therefore are nowadays major providers of services for preventing externalizing behaviors. Most schools are simultaneously conducting many different kinds of activities to reduce behavior problems (Gottfredson & Gottfredson, 2002), without really considering whether they are effective. To prevent children with elevated externalizing behavior from developing life-course persistent conduct problems, it is essential to know whether school-based indicated interventions are effective.

Yet, although several meta-analyses on effectiveness of school-based preventive interventions for externalizing behavior problems have been performed (e.g., Hahn, Fugua-Whitley, & Wethington, 2007; Mytton, DiGuseppi, Gough, Taylor, & Logan, 2002; Wilson, Lipsey & Derzon, 2003; Wilson & Lipsey, 2007), relatively little is known about more specific outcomes of *individually* delivered interventions. Wilson and Lipsey (2007) indicated that individual school-based interventions resulted in larger reductions in externalizing behavior compared to

group treatment; however, effect sizes for individual interventions were not calculated. Since individualized interventions seem theoretically and empirically promising for children at-risk for stable externalizing behavior problems, we felt urgent necessity for this meta-analysis to provide information on general effectiveness (does it work) and on moderators (for whom does it work).

In this study we define *individually* delivered programs as indicated (children already exhibit symptoms of externalizing disorders) preventive programs, delivered in a one-to-one setting with an adult in school. These programs seem to be promising because: 1) there is no risk of aggression-contagion by aggressive peers as in group interventions and classroom settings (Dishion, McCord, & Poulin, 1999), 2) learned skills can easily be rewarded in sessions and generalized in school and home context by *individualized* cooperation with teachers and parents, and 3) a one-to-one setting allows children to develop an enduring warm and positive relationship with an adult, which might be helpful in developing prosocial behavior. On the other hand, individual interventions may be more costly and there are no possibilities for practicing adequate behaviors with peers.

An additional goal of the present study was to provide more knowledge on concepts theoretically assumed to be *mediating* the reduction of externalizing problem behaviors. Although studying mediating mechanisms in meta-analysis is no option, we included – when available in studies - relevant mediating candidates as outcome measure: Prosocial behavior, social cognitions and self-perception. Social cognitions and self-perception are proposed as working mediating mechanisms of child interventions, whereas increasing prosocial behavior is often an additional goal, assuming elevated levels of prosocial behavior concurrently reducing the frequency of externalizing behaviors (as antagonistic mechanisms) (e.g., Elkin, Weissberg, & Cowen, 1988; Lochman & Wells, 2002a).

Theoretically relevant moderators of program effectiveness were grouped into the domains of child-, intervention-, and study characteristics. Regarding *child characteristics*, it appeared from other meta-analyses that gender, age, ethnic background, and initial risk level of problem behavior were related to program effectiveness. First, some studies found *gender* differences in types of aggression (e.g., Crick & Grotpeter, 1995) and therefore gender as moderator needs to be addressed. Second, based on developmental theory (Holmbeck, Greenley, & Franks, 2003), it can be expected that early interventions will result in larger benefits, due to less stable and ingrained behavior problems at younger *age*, but on the other hand it can be expected that interventions would be more effective for middle childhood than for younger (preschool, first grades) children because of maturation of cognitive skills (Kendall & Braswell, 1982). Next, research has shown that *ethnicity* is an important child characteristic to consider, because of different

cultural values and traditions, challenges of acculturation processes, negative experiences with discrimination, or different parental socialization practices (Yasui & Dishion, 2007). However, despite inclusion of ethnic minority children in intervention study samples, we don't know whether children from various ethnic backgrounds differ in their response to interventions (Yasui & Dishion, 2007).

Finally, it is not clear to what extent *initial risk level* of problem behavior is related to intervention outcomes. For example, several meta-analyses indicate that children with more severe behavior problems showed the best improvement after interventions compared to children at lower risk (e.g., Nowak & Heinrichs, 2008; Wilson & Lipsey, 2007). However, other studies found that children with more severe aggressive behavior at the start of the intervention make the least improvement (e.g., Kazdin & Crowley, 1997). In our study we expect at-risk children with high initial levels of externalizing behaviors to benefit from these *individualized* interventions.

*Intervention characteristics*, specifically program characteristics (treatment format, duration of treatment, providers of intervention) and treatment modalities (theoretical foundation of treatment program), may also moderate effect sizes. With respect to *treatment format*, we expect programs that include group and/or parent components in addition to the individual component to be more effective (Webster-Stratton & Hammond, 1990) than purely individual programs. Moreover, we expect longer *treatment duration* to be more effective, since there is more time to reinforce positive behavior and for children to learn and practice new skills (Lochman, 1985). Next, *programs delivered* by trained mental health care professionals are expected to produce higher effect sizes compared to programs delivered by teachers or volunteers, because higher quality of training and more training of delivery personnel predict higher quality implementation and larger effects (Gottfredson & Gottfredson, 2002) and trained professionals might be better able to deliver a program as it was intended (higher treatment fidelity). Finally, based on a previous meta-analysis on the effectiveness of school-based interventions in general (Wilson & Lipsey, 2007) we expect no differences between distinguished treatment modalities (cognitively oriented programs, programs focused on behavioral strategies or based on principles of counseling) in effectiveness of individual school-based interventions.

Finally, previous meta-analyses showed that effectiveness of interventions can also be moderated by specific *study characteristics*: The informant on child outcome behavior, study design, and selection of participants. In general, cross-informant correlations on reports of externalizing behavior are low (Achenbach, McConaughy, & Howell, 1987), but compared to parents, teachers may more accurately judge improvements in child's aggressive and prosocial behavior (at least in the school setting) and we expect them to have more knowledge on normative behavior



because of their experience with many children. Child self-reports might be associated with smaller effect sizes, since it is difficult for children to objectively evaluate their own behavior (Lochman & Dodge, 1998). Second, for *study design*, we expect that more rigorous designs (randomization at individual level) would produce larger effect sizes, since these designs are able to generate comparable groups on possible confounds at pretest. This reduces the chance that any of the confounds are correlated with research condition (intervention or control) and increases the ability to identify intervention effects (Stice, Shaw, Bohon, Marti, & Rohde, 2009). Finally, we expect that combining informants (teachers as well as parents) for the inclusion *selection procedure* will produce larger effect sizes, since these children selected by different informants might be particularly in need for the intervention.

In sum, the purposes of this meta-analysis were (1) to assess the effectiveness of individually delivered school-based programs in reducing externalizing behavior and promoting prosocial behavior, improving social cognitions and self-perception in children of preschool and school age (kindergarten to 6<sup>th</sup> grade) and (2) to examine child, program, and study characteristics that may moderate the effectiveness on externalizing behavior.

This study extends previous work in several ways. First, in contrast to other meta-analyses we focused our analyses specifically on *individually* delivered programs for children at-risk for stable aggression. As stated earlier, these programs are defined as *indicated* programs, delivered individually in a one-to-one setting with an adult and consequently universal or group based indicated programs are not the focus of this study. It is important to note that other individual-focused interventions, not delivered in a one-to-one setting, are not included (e.g., daily report cards or teacher consultations). Nevertheless, programs that include other components, *in addition to the specific individual component*, (e.g., modification of school environment, group intervention, classroom activities, parental involvement), were selected for this meta-analysis as well. Moreover, we included only RCT-studies or quasi-experimental studies with a control group, because single case designs and studies without a control group show inflated effect sizes (Busse, Kratochwill, & Elliot, 1995). Second, besides externalizing behavior, we examined other important outcomes for social functioning. Third, we provided a precise analysis of potential moderators to determine whether differences in outcomes could be explained by child, intervention and study characteristics.

## Method

### Procedure

To identify all potentially relevant studies we searched electronic databases Educational Resource Information Centre (ERIC), PsycINFO and Web of Knowledge. The following key words were used in varying combinations: 'school', 'school-based', with terms as 'intervention', 'treatment', 'program', 'therapy', 'prevention'. This resulted in more than 5,000 hits. Titles of articles were screened for keywords as 'aggression', 'externalizing behavio(u)r', 'disruptive behavior', 'antisocial behavior', 'conduct problems', 'problem behavior', 'ODD', to select studies evaluating interventions for externalizing behavior. No limit was set on publication year, and the final search was conducted in April 2010. A double search was done by two researchers in an attempt to be exhaustive. Also, bibliographies of previous meta-analyses and literature reviews were screened (Gansle, 2005; McCart et al., 2006; Mytton, et al., 2007; Reddy, Newman, De Thomas, & Chun, 2009; Wilson, et al., 2003; Wilson, Gottfredson, & Najaka, 2001; Wilson & Lipsey, 2006; 2007). Bibliographies of retrieved studies were examined for useful studies. Furthermore, a call for studies was made at the Society for Research of Child Development 2009 biennial meeting. Databases for prevention in the USA and the Netherlands were searched (CASEL, SAMSHA, NJI database). We contacted leading authors ( $n = 16$ ) to request unpublished data (e.g., doctoral dissertations).

Next, two authors screened titles, abstracts and keywords of identified records to search for school-based individual or multi component interventions. More than 250 effectiveness studies were found and were then screened for individually delivered intervention studies or for multi component intervention studies including an individual component. Full texts of remaining reports were screened and studies that did not meet the inclusion criteria below were excluded.

### Inclusion Criteria

The first selection criterion was that interventions were *school-based*, which means that the intervention took place in a school building. Second, children needed to be *individually selected* because of elevated levels of externalizing behavior, the intervention therefore was *indicated* (not universal) and children were at-risk for developing stable externalizing behavior problems. Third, (part of) the intervention was delivered *individually* in a one-to-one session with an adult. Fourth, children were *in grade K to six*. Fifth, participants, schools or classes were *randomly* assigned to intervention or control group or there was *a matched control group* (design was coded as a moderator, see below). Lastly, externalizing behavior was reported as intervention outcome.

### Coding of Study Characteristics

For each selected study two coders rated moderators, including participant (e.g., age, gender, ethnicity, and risk status), intervention (e.g., format, duration, components) and study characteristics (e.g., sample size, instruments, and randomization)<sup>1</sup>. For categorical items mean kappa agreement (.95–1.00) was calculated, for continuous items mean intercoder reliabilities (.95–1.00). Disagreements were resolved through discussion until consensus was reached.

**Outcome measures.** *Externalizing behavior* can be distinguished into aggressive and delinquent behavior (Achenbach, 1991) and involve a range of negative interpersonal behaviors. Examples of aggressive behavior are verbal aggression (name calling, screaming or yelling), physical aggression (fighting, attacking people) or relational aggression (bullying, gossiping). Examples of delinquent behavior are stealing, swearing, lying and truancy. These behaviors are also described as disruptive or antisocial behaviors or conduct problems. *Prosocial behavior* included social interpersonal behavior, mainly peer social behavior, but also prosocial classroom behavior and social competence. *Social cognitions* and *self-perception* can be described as internal schemas with cognitive representations about oneself and others. Self-perception is mostly conceptualized as self-esteem, self-efficacy, self-worth or self-concept. Social cognitions include for example hostile intent attribution, outcome expectations and feelings of anger.

### Moderators.

**Child characteristics.** *Risk level* of the child was coded as the initial level of problem behavior before intervention. We distinguished between: (1) clinical level (upper 10%, based on normed questionnaires) or comorbid problem behaviors (e.g., behavior and reading problems), (2) subclinical level (1 standard deviation above mean level), and (3) a non-normed selected group. To code for *ethnicity* in the study, we used the same procedures as McCart and colleagues (2006). A study was coded as using an African-American or Caucasian White sample when at least 66% came from either ethnic group. Other studies were coded as mixed. When studies did not provide information on ethnic background we coded ethnicity of children based on demographics of the school. This same procedure was used to determine whether a study used a *male*, *female* or mixed sample. Mean *age* of participants was coded directly or estimated from reported grades. When studies only reported age ranges, mean ages were estimated by averaging the reported minimum and

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<sup>1</sup> A copy of the coding scheme can be obtained from the first author.

maximum. We transformed reported grades to ages by adding five years to the reported grade.

**Intervention characteristics.** *Intervention format* was coded as purely individual, or individual with additional components (e.g., individual child intervention combined with either parent management training and/or group sessions for the child). *Intervention length* was the number of individual sessions (continuous variable). The person that interacted with the child in the intervention was coded as *delivery personnel*. We distinguished between either trained professionals (e.g., school psychologists, child aides, graduate students supervised by the researcher) or teachers. Based on the classification used by Wilson and Lipsey (2007) we distinguished three categories for coding *treatment modality* of the individually delivered component: (1) cognitively oriented programs, which focus on changing child's social cognitions, such as social information processing (e.g., hostile intent attribution, response generation), (2) behavioral strategies, which use reinforcement and modeling to reduce inappropriate behavior and increase positive behavior, and (3) counseling and therapy, where the focus is traditional individual counseling or therapy techniques.

**Study characteristics.** Different types of *informants* for outcome measures were coded: teacher, parents, peers and self. Regarding the *outcome measure* it was coded whether studies used questionnaires, observations or referrals to school deans. When questionnaires were used, *questionnaire type* was also registered (e.g., Teacher Report Form, School Behavior Checklist). Method of *assignment* (how children were assigned to treatment versus control groups) was established, and we distinguished between randomization at individual level, school level or non-random (matched) assignment. We also registered which person *selected the children*: Teachers, peers, professionals (e.g., school psychologists or researcher) or a combination of informants (e.g., teachers, peers and parents).

### Data-Analyses

For studies that used randomized controlled trials, and controlled for differences at pre test, an effect size on externalizing behavior was calculated as the standardized mean difference test (Lipsey & Wilson, 2001), where the posttest mean of the intervention group was subtracted from the posttest mean of the control group, divided by the pooled standard deviation:  $ES = M_c - M_i / SD_{pooled}$ . Computing the effect size in this manner allows for a positive effect size to be related to a decrease in externalizing behavior. For prosocial behavior, social cognitions, and self-perception the effect size was calculated with the posttest mean of the control group subtracted from the posttest mean of the intervention group:  $ES = M_i - M_c / SD_{pooled}$ . In this way, a positive effect size means an increase in prosocial behavior, self-perception or

social cognitions. For studies that found differences at pretest, and did not control for this, effect size was calculated as the Mean Gain standardized effect size. Before computing an overall effect size, first effect sizes were multiplied by the small sample correction factor  $(1 - (3/4n - 9))$ , where  $n$  is the total sample size for the study, because effect sizes based on small samples are known to be biased (Hedges & Olkin, 1985). In addition, each effect size was weighted by its inverse variance so that its contribution was in proportion to study sample size (Hedges & Olkin, 1985). We used results from random effects models assuming that observed studies are a random sample and with an error term composed of variation as result from within-study variability and between-study differences (Cooper & Hedges, 1994).

A common problem in conducting a meta-analysis is ‘publication bias’: Many studies may remain unpublished because findings were nonsignificant. To indicate sensitivity of the findings to publication bias, we calculated the fail-safe number, the minimum number of studies with null results that are needed to reduce significant results to nonsignificance. Meta-analytic findings are robust (Durlak & Lipsey, 1991) when the fail safe number exceeds the critical value of five times the number of studies plus 10 (Rosenthal & DiMatteo, 2001).

Next, we tested for homogeneity of the effect size distributions with the  $Q$ -statistic (Hedges & Olkin, 1985). If a set of studies is heterogeneous, variation in effect sizes is too large to represent a sample from one single population effect size. Therefore, a mixed effects model should be assumed which implies that a portion of the excess variability is systematic and can be statistically modeled and that the variability among effect sizes is greater than what would result from subject-level sampling.

Moderator analyses were performed using modified weighted regression analyses (Lipsey & Wilson, 2001) to test whether the excess variability could be explained by associations with the hypothesized moderator variables. We used ANOVA-procedures to analyze categorical variables. If  $Q_{between}$  statistic was not significant, we still conducted moderator analyses to test our moderation hypotheses, as recommended by Johnson & Turco (1992).

## Results

### General Study and Sample Characteristics

The 22 studies included in this meta-analysis provided data on 1,587 children, 848 of the children received an individual school-based intervention, and 739 children were in a control condition. Included studies are marked with an asterisk in the

references section. Table 3.1 provides a detailed description of the selected studies. Except for one study (Day & Hartley, 1993) all studies were conducted in the United States. Studies were published between 1975 and 2008. Most of the studies were published in peer-reviewed journals (80%). There was one doctoral dissertation, one book chapter, and one conference paper. Effect sizes did not depend on publication type.

Children in the studies were in grades K to six ( $M_{age} = 7.87 (1.87)$ ). Most studies included children with comorbid problem behavior (e.g., learning and behavioral problems), clinical problem behavior (68%), or subclinical externalizing behavior problems (27%). Other studies (14%) used a non-normed, but selected, sample. Most of the studies (77%) consisted of mixed boy/girl samples; the rest of the studies included samples with exclusively or primarily boys. With respect to ethnic background, 32% of the studies included samples with African American, or Mexican American, as predominant ethnic background, 32% of the studies included mainly Caucasian participants, 36% included mixed samples.

We distinguished between two intervention program formats: 41 % of the studies included purely individual interventions (delivered one-on-one in the school setting) and in 59% of the studies individual programs with additional components were evaluated (group sessions or parent/teacher consultation additional to individual sessions). For example specific skills were practiced in a one-on-one situation and were then discussed in group sessions (e.g., Social Relations Program; Lochman, Coie, Underwood, & Terry, 1993). Other studies used mainly group sessions and in addition periodic individual sessions to promote generalization of skills to the children's natural environment (e.g., Coping Power Program; Lochman & Wells, 2002b). Regarding treatment modality, most interventions were based on a cognitively oriented (26%) or behavioral strategy perspective (23%). Six studies (27%) included counseling / therapy interventions. For three studies (14%), a combination of intervention approaches was used.

In most studies (59%) children were selected by their teachers, in other studies based on information from peers (9%), by professionals (14%) or by a combination of informants (18%). Almost all interventions were provided by trained professionals (91%) such as child mental health care workers, school psychologists or trained master psychology students. As the intervention was provided by the classroom teacher only in two studies, we chose to exclude delivery personnel as moderator. The mean duration of the individual component in all the interventions was 31 sessions, with a minimum of 3 individual sessions and a maximum of 128 (twice a week during 16 months). For the central outcome measure externalizing behavior, the most frequently used instrument was the Teacher Report Form (27%). Other frequently used scales were the AML (Aggressive, Moody and Learning subscales).

**Table 3.1** Detailed Description of Selected Studies

Study	Name Intervention	Design <sup>1</sup>	$N_{intervention}$	$N_{control}$	Grade	Type Intervention	Outcome Measure	Assessment Outcome
Barrera et al. (2002)	SHIP	RCT	141	143	K-3	2	TRF	1
Camp et al. (1977)	Think Aloud	RCT	12	10	1-2	1	SBCL	1
Coie et al. (1991)	Social Relations Training Program	RCT	25	24	3	2	Teacher Rating Aggression	1
Corcoran (2006)	Solution Focused Therapy	Quasi-experimental	58	27	-	1	Connors Parent Rating Scale	2
Day & Hartley (1993)	Earl Scout	Matched groups	16	15	1-6	2	TRF	1
Elkin et al. (1988)	Planned Short Term Intervention	Quasi-experimental	36	108	2-5	1	CARS	1
Garrison & Stolberg (1983)	Affective Imaginary Training	RCT	10	10	3-5	1	Behavior Checklist	1
Kent & O'Leary (1976)	Behavior Modification	RCT	16	16	2-4	2	SBCL	1
Lochman et al. (1993) <i>Aggressive sample</i>	Social Relations Training Program	RCT	13	11	4	2	Teacher Behavior Checklist	1
Lochman & Wells (2002) <i>Indicated Intervention</i>	Coping Power Program	RCT	59	63	5-6	2	TOCA-R	1
Nafpaktitis & Perlmutter (1998)	Primary Intervention Program	RCT	19	16	1-4	1	Teacher Rating Aggression	1

Owens et al. (2008)	Daily Report Card	RCT	91	26	K-6	2	DBD	1
Rennie (2000)	Individual Play Therapy	Quasi-experimental	14	13	K	1	CBCL	2
Reynolds & Cooper (1995)	Community and School Approach	RCT	77	35	2-5	2	WPBIC	1
Rickel & Smith (1979) <i>High risk sample</i>	Primary Mental Health Project	Quasi-experimental	36	36	PreS.	2	AML	1
Rickel et al. (1979) <i>Aggressive sample</i>	Primary Mental Health Project	RCT	13	10	PreS.	1	AML	1
Sandler et al. (1975)	Primary Mental Health Project	Quasi-experimental	19	15	K-3	2	AML	1
Scheckner & Rollin (2003)	SMART talk	RCT	20	20	5	1	BASC	1
Waschbush et al., (2005)	Behavior Education Support and Treatment	RCT	25	16	1-6	2	Teacher Behavior Rating	1
Weinrott (1979)	Teacher consultation designed for target child	RCT	10	10	1-3	1	Behavior Coding System	1
Weiss et al. (2003)	RECAP	RCT	62	31	4	2	TRF	1
Weiss et al. (1999)	Traditional Child Therapy	RCT	76	84		2	TRF	1

Note. Values above diagonal represent girls, below diagonal represent boys. <sup>1</sup> Standardized means, <sup>2</sup> In analyses log-transformed score is used. \* $p < .05$ , \*\* $p < .01$ , \* $p < .10$ .



(18%), Teacher Rating of Aggression (9%), and the School Behavior Checklist (9%). Since in almost all studies ( $k = 20$ ) teachers reported on outcome measures, we could not include informant as moderator. Most studies (73%) used RCT-designs with randomization at individual (55%) or school level (18%). Six studies (27%) used a matched control group quasi-experimental design.

### Calculation of Effect Sizes

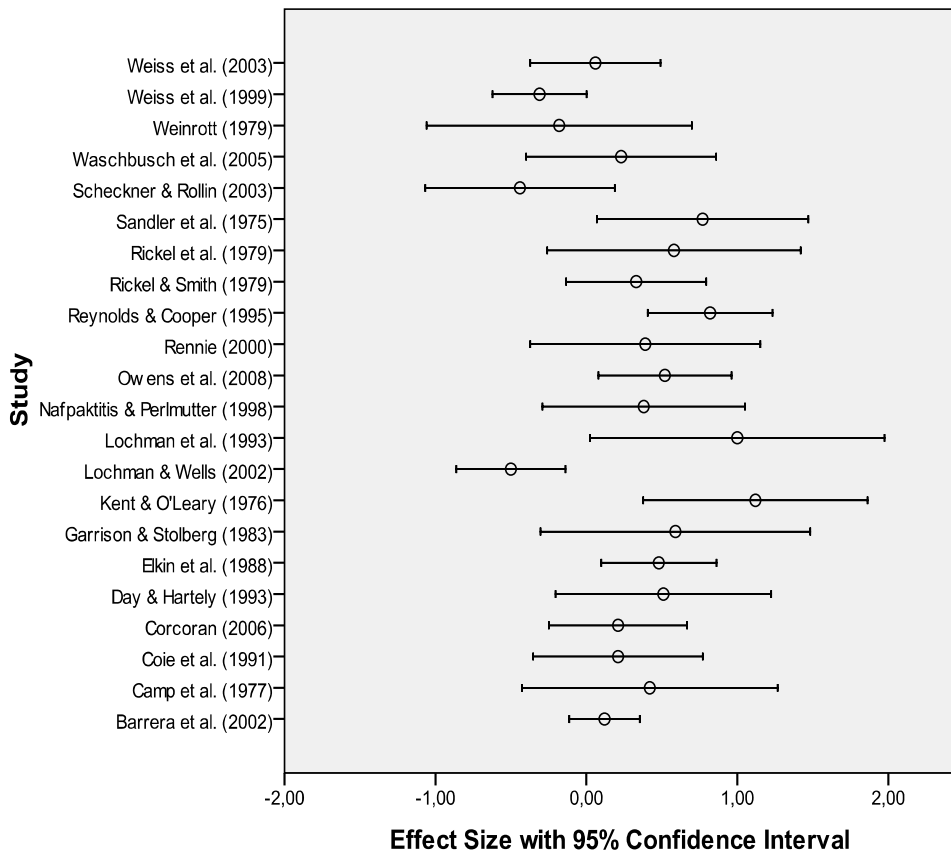
The 22 studies included in this meta-analysis generated a total of 72 standardized mean difference effect sizes: 36 on externalizing behavior, 9 on prosocial behavior, 19 on cognitions, and 8 on self-perception. Several studies ( $n = 10$ ) generated more than one effect size on one of the outcome measures, whereas for 12 studies only a single effect size was reported. Some studies reported on different aspects of externalizing behavior (e.g., physical aggressive behavior, acting-out behavior, truancy), prosocial behavior (e.g., classroom behavior or prosocial interpersonal behavior), cognitions (e.g., frustration tolerance, assertive social skills, intent attributions) or self-perception (e.g., perceived social competence, self-esteem, self efficacy) as outcome measure, and in some studies different informants reported on outcome behavior. To create a single effect size for each study for each outcome, we used the following procedures. When studies reported results on different types of externalizing behavior, we averaged effect sizes. For prosocial behavior, we selected the outcome that represented interpersonal prosocial behavior. For cognitions, we averaged effect sizes when multiple cognitions were reported within a study. For self-perception, we chose the outcome that most closely represented self-esteem.

From the studies with multiple effect sizes for the same outcome ( $n = 6$ ), reported by different informants, one effect size was selected from the informant that was most frequently represented in the data. In this case, teachers were the most common informants, followed by parent reports. We decided not to average across informants since agreement between informants, in general, is low (Achenbach et al., 1987). This procedure is also used in other meta-analyses (e.g., Wilson & Lipsey, 2006). These procedures resulted in 22 effect sizes for externalizing behavior (one for each study), 7 for prosocial behavior, 7 for social cognitions and 8 for self-perception.

### Overall Effects

For externalizing behavior ( $k = 22$  studies), the overall random effects mean was  $d = .28$  ( $p < .001$ , 95% CI = .09-.47), indicating that the interventions on average significantly reduced externalizing behavior problems. The fail-safe (FS) number

(Orwin, 1983) revealed that 86 studies with  $d = 0$  would be needed to reduce the overall effect size below the significance level of  $p < .05$ . Effect sizes ranged from  $-.50$  to  $1.12$ , indicating considerable variance in effectiveness (see Figure 3.1). For prosocial behavior ( $k = 7$  studies), the random effects mean was  $d = .43$  ( $p < .001$ ,  $95\% \text{ CI} = .17-.69$ ), indicating that children in the intervention condition showed more improvement in prosocial behavior than children in the control condition. Effect sizes ranged from  $-.36$  to  $1.20$ , with a FS-number of 20. The overall random effects mean for social cognitions was  $d = .82$  ( $p < .001$ ,  $95\% \text{ CI} = .46-1.17$ ) ( $k = 7$  studies), demonstrating that children reported a larger change in social cognitions after completion of the intervention, compared to children in the control condition. Effect sizes ranged from  $.24$  to  $1.92$ , with a FS-number of 46. Finally, for self-perception ( $k = 8$  studies) the overall random effects mean was non-significant,  $d = .16$  ( $p = .26$ ,  $95\% \text{ CI} = -.11-.42$ ), indicating that children in intervention conditions did not increase significantly more in positive self-perception than children in the control condition (ES ranged from  $-.57-.86$ ).



**Figure 3.1** Effect sizes externalizing behavior

**Analyses of Moderator Effects**

There was significant variability in effect sizes across the studies. Tests of the homogeneity of effect sizes using the Q-statistic (Hedges & Olkin, 1985) showed more variability across studies than expected from subject-level sampling error for externalizing behavior ( $Q_{21} = 57.38, p < .001$ ), prosocial behavior ( $Q_6 = 13.60, p = .03$ ), social cognitions ( $Q_6 = 13.74, p = .03$ ) and self-perception ( $Q_7 = 14.59, p = .02$ ).

**Table 3.2** Categorical moderator-analysis externalizing behavior

	$Q_{between}$	K	ES	CI
<b>Child Characteristics</b>				
<b>Risk level</b>	1.43			
- Clinical (upper 10%)/Comorbid problem behavior		13	.36*	.02 - .61
- Subclinical (upper 33%)		6	.10	-.27 - .46
- Non-normed		3	.29	-.25 - .83
<b>Ethnicity</b>	.56			
- African/Mexican American sample		7	.17	-.18 - .51
- Caucasian White sample		7	.39*	.04 - .74
- Mixed		8	.29 <sup>+</sup>	-.01 - .58
<b>Gender</b>	.05			
- Boys		5	.32	-.07 - .72
- Mixed		17	.27*	.05 - .49
<b>Intervention Characteristics</b>				
<b>Intervention format</b>	.17			
- Individual		9	.26 <sup>+</sup>	-.05 - .59
- Individual with additional components		13	.29*	.05 - .53
<b>Treatment modality</b>	.18			
- Cognitively Oriented		8	.23	-.11 - .58
- Behavioral Strategies		5	.35	-.06 - .75
- Counseling/Therapy		6	.29	-.10 - .68
- Combination		3	.31	-.25 - .88
<b>Study Characteristics</b>				
<b>Children selected by:</b>	6.32 <sup>+</sup>			
- Teachers		13	.23 <sup>+</sup>	-.00 - .45
- Peers		2	.46	-.17 - 1.11
- Professionals		3	-.04	-.43 - .35
- Combination		4	.63**	.45 - 1.01
<b>Assignment</b>	4.95 <sup>+</sup>			
- At-random – individual		12	.11	-.12 - .33
- At-random – school		4	.58**	.16 - 1.01
- Quasi-experimental – matched groups		6	.43**	.10 - .75

\*  $p < .05$ , \*\*  $p < .01$ , <sup>+</sup>  $p < .10$ .

However, moderator effects were only analyzed for externalizing behavior problems, because the number of effect sizes for the secondary outcomes prosocial behavior, social cognitions, and self-perception was too small for moderation analyses.

To test whether variability in effect sizes for externalizing behavior could be explained by the hypothesized child, intervention and study characteristics, a series of moderator analyses were conducted. Regression analyses yielded a moderating effect for age ( $\beta = -.42, p < .001$ ). This indicated that the older the child, the smaller the effect size for individual interventions on externalizing behavior. Number of individual sessions was not related to effect size ( $\beta = -.06, p = .66$ ). Although  $Q_{between}$  was not significant for any of the potential categorical moderators, inspecting effect sizes in different subgroups indicated for some moderating effects (see Table 3.2). We made contrasts between subgroups but post-hoc analyses only showed a significant difference in effect sizes between interventions where children were selected by a combination of informants ( $d = .63, p < .001$ ) and where children were selected by professionals ( $d = -.03, p = .68$ ).

## Discussion

The main objective of this meta-analytic review was to examine whether children at-risk for developing stable externalizing problems would benefit from *individually* delivered school-based interventions, and to test moderating effects of child, intervention and study characteristics. In addition, we addressed the question whether interventions resulted in increases in prosocial behavior and changes in child social cognitions and self-perception.

It can be concluded that these *indicated individually* delivered school-based interventions, which can be more tailor-made and adapted to child's specific needs, seem to be effective in reducing externalizing behavior problems and have positive effects on prosocial behavior and social cognitive functioning, particularly for those children at-risk for more serious behavioral disorders. Mean effect sizes are comparable to those found for school-based interventions for selected children (Wilson & Lipsey, 2007). However, important differences in effects on outcome behavior exist. For externalizing behavior, we found positive moderate overall effects ( $d = .28$ ). In general, children who participated in interventions showed less externalizing behavior afterwards, compared to children in the control condition. It is important to note that, although promising for high-risk children, only nine studies evaluated effects of purely individual interventions in the last 35 years. The other interventions in this meta-analysis included additional components, such as group sessions or parent training. For most of these interventions the additional

components were indicated interventions as well (e.g., group sessions for highly aggressive children, individualized parent sessions). In only two studies the individual intervention was added as an indicated intervention component attached to a universal school-wide intervention. As there were no differences in effect sizes for the purely individual interventions ( $d = .26$ ) and the individual interventions with additional components ( $d = .29$ ), it can be concluded that including other treatment components in addition to an individually delivered child intervention did not result in larger effects. This is in line with meta-analyses on parenting programs that concluded that more is not necessarily better (Bakermans-Kranenburg, Van IJzendoorn, & Juffer, 2003; Wyatt Kaminski, Valle, Filene, & Boyle, 2008).

However, since the mean effect size for externalizing behavior ranged from  $-.50$  to  $1.12$ , there was large variability in intervention effects, and part of this variability could be explained by child and study characteristics. Findings suggest that intervening at younger age is more beneficial in reducing externalizing behavior, which is in line with studies that found some evidence that children with disruptive behavior become increasingly resistant to change with age (e.g., Bernazzani, Cothe, & Tremblay, 2001). Another moderator of effectiveness was selection procedure. In most cases, because of the school-based nature of the interventions, teachers selected children for an intervention. However, when a combination of informants was used to select children for the intervention, this resulted in larger effect sizes. This finding suggests that agreement across informants indicates that the child is particularly in need for the intervention. More agreement between informants may also lead to more involvement of parents, teachers and children in the intervention, which can result in larger effects.

The included interventions mainly used behavior strategies and cognitive approaches. Other approaches used were counselling therapy and a combination of several approaches. Use of these different modalities was not associated with differential effects, and this suggests that schools can choose from a wide range of evidence-based interventions. Although the results show somewhat larger effects for programs that focused on high risk children (comorbid or clinical level of problem behavior), the differences in effectiveness for different risk level of children receiving the intervention were not significant.

We expected to find larger effect sizes for studies in which participants were randomly assigned to intervention and control groups, because this is the best way to generate equivalent groups on pretest. However, because analyses of effect sizes in this study adjusted for any existing initial differences at baseline on outcome behavior, the moderating effect of study design did not emerge.

It is important to note that there were also some programs that were not effective in reducing child problem behavior. For these nonsignificant effects several reasons

have been provided. First, in some studies children in the control condition received treatment as usual within their schools, which might have resulted in learning positive behavior as well (e.g., Scheckner & Rollin, 2003). Second, it has been suggested that children in the intervention condition learned new, less aggressive, behavior strategies, but that these may not yet have transferred to daily situations. Third, non significant intervention effects may be due to problems with adequate delivery of programs, such as lack of adherence to treatment by teachers or trainers, insufficient instruction or supervision, lack of experience of therapists with the intervention or contextual factors that prohibit adequate implementation. Fourth, non-specific treatment effects in the control groups (Weiss, Catron, Harris, & Phung, 1999) could also explain non significant effects.

In this meta-analysis we found that an additional parent component did not result in larger effect sizes. However, in a meta-analysis of McCart and colleagues (2006) it has been found that parent management training is more effective for younger children than child training only. Depending on several factors, such as child's age, quality of parents' contact with school, family dysfunctioning and social economic status, it should be decided whether a child or parent intervention (or a combination) is most beneficial (Nock & Kazdin, 2005; Webster-Stratton & Hammond, 1990).

In addition to effect sizes for problem behavior, we also examined effects on other relevant outcomes. For child prosocial behavior and social cognitions we found significant overall mean effect sizes of  $d = .43$  and  $d = .82$ , which indicates that children who received individually delivered school based interventions showed more prosocial behavior and improved social cognitive functioning. However, only seven studies reported on prosocial behavior and social cognitive functioning and therefore these results should be interpreted with caution, as indicated by the small fail safe numbers. Moreover, social cognitive functioning was broadly defined. It included, for example, intent attribution and outcome expectations, but also expression of feelings and generating solutions in conflict situations. Because of this large variability in operationalization, caution is warranted. Wider use of standardized, normed measures of child's social cognitions will enable comparisons of effectiveness on social cognitions between intervention studies. Child social cognitive functioning is often seen, but rarely tested, as working mechanism of interventions. In this meta-analysis we found a strong correlation ( $r_s = .67$ ,  $p = .10$ ) between effect sizes for externalizing behavior and social cognitions, indicating that a change in social cognitions is related to a change in child behavior.

Reports on child's self-perception were available in eight studies. The overall mean effect size was positive but not statistically significant, which indicates that individual interventions do not increase self-perception. In fact, inspecting the effect sizes for separate studies showed that self-perception even decreased in some

studies. Again, because of the small number of studies reporting on self-perception, results should be interpreted with caution. Lochman and colleagues (2003) suggest that lower perceived self-worth at post intervention is temporary and a result of 'internal distress', which might be caused by direct discussions about child's behavior and by termination of contact with the intervention coach. Another explanation might be that children who received the intervention became more open and less defensive and therefore reported lower levels of self-worth (Lochman et al., 2003). Since aggressive children tend to have artificially high, defensive, levels of self-perception (Coe, Underwood, & Lochman, 1991), this may be beneficial.

We find it important to note that increasing children's self-perception is not a goal of interventions by itself. Changing self-perception is meant as a mediating instrument to change children's behavior. Since children's behavior in the present studies *did* improve, increasing children's self-perception was evidently *not* the mechanism through which such changes in behavior are achieved. In fact, the very notion that self-perception of aggressive children is low and should be heightened has been strongly challenged (e.g., Bushman, et al., 2009; De Castro, Brendgen, van Boxtel, Vitaro, & Schaeppers, 2007). It appears that helping children develop *realistic* self-evaluation skills might be more beneficial than simply trying to enhance their level of positive self-perception.

Despite positive overall effects of individual programs, they are probably less cost-effective than group or universal programs and provide no opportunity to practice social skills with peers. This might be a reason why only nine purely individual interventions were evaluated in the last decades. Yet, individual interventions are particularly promising for highly aggressive children, since these interventions can be more easily tailor-made than group interventions and can prevent deviancy training by aggressive peers (Dishion et al., 1993). Conduct disorder symptoms in individual children may result from different causes and maintaining factors (Nock, Kazdin, Hiripi, & Kessler, 2006). Therefore, individual children may need specific interventions, adapted to the specific factors responsible for (the maintenance of) their behavior problems. When tailor-made interventions would adapt to these individual needs, the effectiveness of individual interventions could possibly be enhanced.

### **Limitations**

Several limitations of the present meta-analysis should be mentioned. First, this meta-analysis is based on a limited set of studies evaluating the effectiveness of individual interventions, especially for reports on prosocial behavior, social cognitions and self-perception. Second, study characteristics are not distributed independently, and therefore, relations between different moderator variables and

effect size are possibly confounded. As a result of small cell sizes, the effects of all moderators could not be tested in each set of studies. Third, in this study we did not distinguish between different forms of externalizing behavior (e.g., delinquency, reactive and proactive aggression, acting out behavior), which makes it more difficult to determine which specific types of behavior were modified through interventions. Research into the kinds of externalizing behavior on which interventions have effects is clearly needed. Fourth, a closely related issue is that many intervention studies used the Teacher Report Form, based on a 3-point likert scale, as outcome measure. Although the TRF appears to be a valid instrument for reporting on behavior problems, for detecting behavioral changes resulting from interventions it is less suitable (because of the small response range). Fifth, given the small number of studies that reported follow-up effects, we were not able to test the long-term effects of school-based interventions. Future intervention studies should test whether potential beneficial interventions will also produce long-lasting effects.

### **Research Directions**

Positive effects of individual school-based interventions on child externalizing behavior were found for the studies included in this analysis. However, of the many school programs in use to date, only a fraction has been studied. Only 22 studies evaluated effects of individually delivered programs in the last years. Given their potential effectiveness for children at-risk, we urgently need to learn more about factors that make present programs most effective and may further increase effectiveness. Three issues seem particularly important for future research.

First, most programs in this study were not routine practice programs, but were conducted for research purposes. Research programs often are more effective, because of treatment fidelity and implementation, and therefore they are less comparable to ongoing programs. Intervention studies should demonstrate efficacy under the conditions of implementation and evaluation in practice (Kratochwill & Shernoff, 2004). Although school-based interventions in efficacy studies seem to be quite effective in producing lower levels of externalizing behavior after the intervention, programs have not been particularly successful in school practice. Apparently, practitioners do not readily adopt evidence-based effective interventions (Berwick, 2003). For example, generalizing from RCTs to other contexts can be problematic when the use of manual-based interventions is in conflict with the beliefs and ideas of the trainer or practitioner. Therefore, what is required is evidence from routine practice. In this meta-analysis it was not possible to include this aspect as potential moderator, due to the small proportion of practice based studies.

Second, although most studies in this meta-analysis proved to be effective in reducing externalizing behavior at post test, very few studies focused on the long-



term effects of the interventions. Therefore, we do not know if these individually delivered childhood programs can prevent behavioral problems later in life. Moreover, evidence based effective interventions are believed to lead to a decrease in costs for the child, families and the society. Individually delivered interventions seem to be effective, but also more expensive. Most intervention studies do not include cost-effectiveness analyses, but there is a need to determine the economic impact of interventions. For health insurers, but also for schools, it is important to know which intervention gives best value for their money (Romeo, Byford, & Knapp, 2005).

Finally, individual interventions aimed at reducing child externalizing behavior were effective in modifying child social cognitions. In intervention studies, social cognitions are often seen as the working mechanism of the intervention, however, mediation is rarely tested. Given the moderate effects of *any* known intervention for behavior problems, it seems crucial to increase intervention effectiveness by learning more about mechanisms of change.

## **Conclusions**

The current meta-analysis quantitatively integrated the available findings of effects of individually delivered school-based interventions on externalizing and prosocial behavior, social cognitions and self-perception. The analyses established positive mean effect sizes, and showed that some of the differences in effects sizes between studies could be partially explained by systematic analysis of child and study characteristics. Because there are so many programs in schools, effects are generally unknown and they are probably also not effectively carried out (Forman, Fagley, Steiner, & Schneider, 2009). The present study shows that it is important for school personnel to realize what behavior or skills they would like to change, before choosing for a specific intervention. For individually delivered school-based interventions, other than selection procedure and age, differential intervention, study, and child characteristics were not associated with different effects. This might suggest that selection procedure, with agreement between involved informants, and intervening at younger age are the most important predictors of a successful program. The present study shows that school personnel can choose an evidence-based individual intervention and focus on selection of children for the specific intervention



# 4

## Effectiveness of an Individual School-based Intervention for Children with Aggressive Behavior

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## **Abstract**

The aim of this RCT-study was to evaluate a school-based individual tailor-made intervention (Stay Cool Kids), designed to reduce aggressive behavior in selected children by enhancing cognitive behavioral skills. The sample consisted of 48 schools, with 264 fourth-grade children selected by their teachers because of elevated levels of externalizing behavior (TRF T-score > 60), randomly assigned to the intervention or no-intervention control condition. The intervention was found to be effective in reducing reactive and proactive aggressive behavior as reported by children, mothers, fathers or teachers, with effect sizes ranging from .11 to .32. Clinically relevant changes in teacher-rated externalizing behavior were found: The intervention reduced behavior problems to subclinical levels for significantly more children than the control condition. Some aspects of problems in social cognitive functioning were reduced and children showed more positive self-perception. Ethnic background and gender moderated intervention effects on child and teacher reported aggression and child response generation. The results of this study demonstrate the effectiveness on outcome behavior and child cognitions of an individual tailor-made intervention across informants under real-world conditions.

## **Introduction**

Externalizing behaviors, such as disobedience, aggression, and lying, are the most common form of maladjustment in school aged children (Dishion & Patterson, 2006). Whereas the normative level of aggressive behavior declines when children are between 4 and 9 years old (Campbell, Spieker, Burchinal, & Poe, 2006), for a small group of children (5% to 11%) the aggressive behavior remains stable and becomes problematic (Prinz, Onghena, & Hellinckx, 2005). This is especially true for children with elevated aggression at the start of elementary school (Broidy et al., 2003). Several developmental trajectory studies indicate that stable aggressive behavior in elementary school places children at risk for future difficulties such as rejection by peers, school failure, and more serious externalizing problems (Moffitt, 1993; Patterson, Reid, & Dishion, 1992). Over time, these children also have increased risk to develop diagnosable psychopathology (Oppositional Defiant Disorder and Conduct Disorder), substance abuse, and delinquency in adolescence (Broidy et al., 2003). Moreover, in an 18 year longitudinal study of 10-year old children, it has been demonstrated that costs to society are 10 times higher for children with elevated levels of externalizing behavior, compared to children without

elevated levels of externalizing behavior (Scott, Knapp, Henderson, & Maughan, 2001). Given these findings, there is a strong need for effective preventive interventions designed to interrupt the developmental trajectory towards more serious behavior problems for elementary school-children with aggressive behavior problems (Buckley, 2009).

The aim of the present study was to test the effectiveness of an individual school-based preventive cognitive behavioral training (Stay Cool Kids) to reduce aggressive behavior among indicated elementary school children. The intervention was originally developed in real world practice and is routinely used in clinical practice. However, its effectiveness has not yet been examined. Therefore, we aimed to study the effectiveness of this program as actually delivered in daily practice.

Stay Cool Kids is based on a social cognitive perspective on the development of aggressive behavior. According to the social information processing model (Crick & Dodge, 1994; Lemerise & Arsenio, 2000) behavior can be seen as a product of six mental steps: 1) encoding of social cues, 2) interpretation of encoded cues, 3) clarifying goals, 4) generating responses to meet goals, 5) selecting responses, and 6) enacting the selected response. Systematic deviations in each of these steps have been found to lead to aggressive behavior (Yoon, Hughes, Gaur, & Thompson, 1999). For example, it has been found that aggressive children recall more threatening cues, interpret ambiguous peer provocations as hostile (De Castro, Veerman, Koops, Bosch, & Monshouwer, 2002; Dodge & Coie, 1987), generate more aggressive responses, and are more likely to opt for aggressive solutions in social conflict situations (Matthys & Lochman, 2005). It has been suggested that deviations in different steps of the social information processing model are related to different forms of aggression. The first two steps and response generation are related to *reactive aggression* (de Castro, Merk, Koops, Veerman, & Bosch, 2005), which can be seen as an angry, emotional reaction to a presumed threat or provocation (Dodge, 1991). The last two steps are related to *proactive aggression* (de Castro et al., 2005), which is planned 'cold blooded' aggression to dominate or intimidate (Dodge, 1991). Moreover, aggressive children seem to differ in preexisting expectations, called schemata, about the effects of their own behavior. They tend to overestimate their behavioral competence, while non-aggressive children more accurately evaluate their own behavior (e.g., De Castro, Brendgen, van Bortel, Vitaro, & Schapers, 2007; Patterson et al., 1992). This overestimation of own competence may cause conflicts with peers about social dominance (Thomaes, Bushman, De Castro, Cohen, & Denissen, 2009). Especially proactive aggression in children has been suggested to be related to distorted self-perceptions (Salmivalli, 2001).

The Stay Cool Kids program includes a number of the characteristics that have been suggested to be most promising. First, it is a school-based intervention, aimed at children displaying a (sub) clinical level of aggression according to their teachers, within regular education. Schools are excellent locations for prevention activities as children can be reached in a systematic and efficient way. Moreover, stable aggressive behaviors start to impair social and academic functioning at school age, and since school is the most common setting for social interaction, it is also the place where much interpersonal aggression among children can occur. Offering prevention activities in a school setting may make treatment more acceptable to parents (Catron & Weiss, 1994) and there is no dependence on parents remembering their child's appointments. Besides, locating the intervention at school increases the likelihood of generalization and maintenance of treatment effects to the natural environment (Evans, Langberg, & Williams, 2003).

Second, Stay Cool Kids is an indicated-type intervention that targets children at higher risk for developing more serious problem behaviors as a consequence of early onset aggressive behavior. Interventions can be distinguished into three categories: universal, selective, and indicated preventive interventions (Saxena, Jané-Llopis, & Hosman, 2006). Universal preventive interventions are offered to a whole population, not identified because of elevated levels of problem behavior. Selective prevention is for those individuals or subgroups at higher risk for developing psychosocial problems, because of biological, psychological or social risk factors. Finally, indicated prevention is for at-risk individuals, who are displaying symptoms of behavioral disorders, but who do not yet meet diagnostic criteria. School-based interventions exist at these three different levels (Reinke, Splett, Robeson, & Offut, 2009; Walker et al., 1996). School-based universal interventions are often 'curriculum' interventions, in which lessons that focus on reducing aggression or violence in schools can be given to a whole class or school population (e.g., Promoting Alternative Thinking Strategies; Greenberg, Kusche, Cook, & Quamma, 1995). Children at higher risk might not respond to universal interventions, so for these children selective preventive interventions can be offered (e.g., Primary Mental Health Project; Cowen, et al., 1996). For a small group of children, displaying more severe problems, indicated or targeted interventions, as Stay Cool Kids, might be more beneficial (Gottfredson & Wilson, 2003). An important advantage of targeted interventions, in contrast to universal and selective interventions, is that they can be adapted for individual children in need of more than a standard curriculum (Gottfredson & Wilson, 2003).

Third, Stay Cool Kids is an individual intervention and therefore may prevent children from exposure to deviancy training. Most of the targeted interventions for aggressive behavior take place in groups of selected children, although several

studies (e.g., Dishion, McCord, & Poulin, 1995) indicated that peer-group interventions may increase problem behavior, especially for high-risk youth. In addition, it is more difficult to focus on specific needs and difficulties of an individual child in group interventions. Stay Cool Kids is not just an individually delivered intervention, it is also an *individualized* (adaptive) intervention, which means that it can be adapted to particular individual differences, for example to cultural values or gender of the child. It has been recommended that an emphasis should be placed on tailoring interventions to specific youth (Frick, 2000; La Greca, Silverman, & Lochman, 2009).

Recently, it has been found that implementation of an intervention in schools is highly dependent on the skills of school staff, funding and the capacity to provide coaches for the program (Loman, Rodriguez, & Horner, 2010). A unique aspect of the Stay Cool Kids program is that it is provided to children in the school setting by professional mental health care workers, who work intensively together with school staff. It has been suggested that prevention programs offered by trained interventionists are more effective than programs delivered by classroom teachers (Baranowski, Cullen, Nicklas, Thompson, & Baranowski, 2002), because of more and higher quality training (Gottfredson & Gottfredson, 2002). Moreover, indicated individual interventions, as Stay Cool Kids, are time-consuming and teachers may not be able to devote as much time to providing one-to-one interventions. Additionally, teachers often have their own 'history' with a child displaying elevated levels of externalizing behavior, since these children disrupt classroom routines, detract from learning opportunities, and have negative influences on classmates (McConaughy & Skiba, 1993). Therefore, it might be beneficial to let an independent trainer conduct the intervention.

Finally, to make sure that a program is effective in changing child behavior, it is important to involve the context as well (e.g., Reid & Webster-Stratton, 2001). In the Stay Cool Kids training parents and teachers are involved with the goals of helping the child with generalization of new learned skills and behavior to the school and home setting.

The present study extends previous intervention studies in several ways. First, it focuses on an intervention that includes several specific promising characteristics: it is an indicated-type school-based intervention, delivered by trained professionals on an individual basis that still involves the context. Second, in contrast to studies concerning optimally implemented 'demonstration programs' for research purposes, the present study focuses on a routinely delivered program in daily practice, and therefore can give information about effectiveness under real-world conditions (Kratochwill & Shernoff, 2004). Third, in addition to general effectiveness, we also examined for whom the intervention works best by including gender and ethnic

background as moderators. Little is known about possible ethnic differences in response to the intervention, despite the inclusion of ethnic minority families in intervention study samples (Yasui & Dishion, 2007). As a result of different parental socialization practices, cultural values and traditions, possible negative experiences with discrimination, and experienced challenges of the acculturative process, it is important to include ethnicity as moderator (Kellam & Van Horn, 1997; Yasui & Dishion, 2007). Moreover, despite numerous studies showing differences in manifestations of aggression for boys and girls (e.g., Crick & Grotpeter, 1995), gender differences in intervention effects are less clear (Brestan & Eyberg, 1998). Fourth, multiple informants (children, mothers, fathers, and teachers) and multiple types of outcome behaviors (reactive and proactive aggression, social cognitions and self-perception) are included to provide a comprehensive view of changes in child behavior after the intervention (Achenbach, McConaughy, & Howell, 1987; Grietens et al., 2004). Primary outcome variables are reactive and proactive aggression. It has been suggested that these two types of aggression require different interventions (Vitaro, Brendgen, & Tremblay, 2002). We expect Stay Cool Kids to affect reactive aggression, since the training provides exercises on modifying encoding and interpretation of social cues and generating responses to social provocations. We also expect changes in proactive aggression, since the training focuses on modifying choosing responses to react and enacting behavior. Because of the social cognitive basis of this intervention, we examine in addition to aggressive behavior changes in child self-perception, hostile intent attribution, response generation and response evaluation and we expect that children will have more optimal levels of self-perception, will attribute less hostile intent, and will be more likely to select prosocial solutions.

Finally, clinically relevant changes are examined in addition to intervention effects on mean levels of outcome. Clinically relevant changes in every day life, in addition to the classical approach of evaluating intervention effects, are rarely tested in intervention studies (Kendall, 1999). Therefore, in the present study we investigated for how many children externalizing behavior actually changed from a (sub) clinical level to a normative level (i.e., recovery; Ogles, Lunnen, & Bonesteel, 2001).

## **Method**

### **Design**

Figure 4.1 shows the randomization process and participant flow. Forty-eight elementary schools (i.e., 4-th grade classrooms), in two urban regions in the



Netherlands, were randomly assigned to one of three groups. Each group of schools participated in the intervention as well as in the control condition, but in a different order. In group 1, schools were assigned to the intervention condition in the first and second year and to the control condition in the third year. In group 2, schools received the intervention in the first year, were in the control condition in the second year, and again in the intervention condition in the third year. In group 3, schools were assigned to the control condition in the first year, and were in the intervention condition in the second and third year. Thus, treatment condition was randomized, and each school provided both intervention and control condition children. In this way we ensured that intervention effects could not be due to school factors, because the same schools were in both conditions. Moreover, schools were more willing to participate in the control condition, when they were assured of receiving two years of training. In different years, different teachers selected children. However, in some schools, the same teachers selected children for the three years of the study. There were two assessment periods: prior to the beginning of the intervention (T1), and at intervention termination (after 11 weeks, T2). The study was approved by the Dutch Central Committee on Research Involving Human Subjects.

To control for the design effect (randomization at school level could lead to biased standard errors), we computed the design effect as recommended by Muthén (2000), which is expressed as  $d = 1 + \rho (c - 1)$ , where  $\rho$  is the average intraclass correlation (.18) and  $c$  is the common cluster size (i.e., the average number of children per school, 4.2). The design effect was 1.58, which is smaller than 2.0 and can therefore be ignored (Muthén, 2000).

### **Procedure**

First, parents of all children in fourth grade received a general information letter about the study and a consent form to give permission for teachers to fill out the Teacher Report Form (TRF; age 6-18; Achenbach, 1991, see Measures) about their child. Then teachers nominated children from their classes with the highest levels of externalizing behavior (the top 30%) and filled out the 32-item externalizing scale of the TRF. Next, researchers selected children based on their T-scores. The inclusion criterion was a T-score  $> 60$ , indicating a (sub) clinical level of externalizing behavior, which places children at risk for various negative outcomes. Other studies used similar criterion as high-risk indicators in prevention studies with elementary school-aged children (Lochman & CPPRG, 1995). If a child was selected, primary caretakers were contacted by phone and in meetings at school to gather their informed consent to participate in this study. After consent was obtained, the baseline pre-assessment was conducted. Children's measures were collected in their school settings and were administered to children by trained research

assistants. Parents received questionnaires in meetings at school or by mail. They were asked to return the questionnaires within a week and were reminded by teachers and research staff if needed. Children received a small gift for their participation. Parents and teachers received a small monetary reimbursement for their time.

### Participants

Teachers initially selected 437 children. Of these selected children, some children did not meet the inclusion criteria ( $n = 96$ ), some parents refused to participate ( $n = 52$ ), some children already participated in other forms of youth care ( $n = 15$ ) or were diagnosed with Autism Spectrum Disorder ( $n = 3$ ) (see Figure 4.1). Three children discontinued the intervention, four children discontinued in the control condition. Children in the control condition did not receive any intervention or received care as usual (e.g., remedial teaching, universal remediation programs).

There were no significant differences in child gender or TRF score between parents who consented to participate and those who did not. Children in the intervention and control group did not differ significantly on demographic characteristics at Time 1.

The final sample consisted of 264 children ( $n = 191$  boys,  $n = 73$  girls), 197 mothers, 130 fathers, and 155 teachers at Time 1. For 114 children both parents filled in the questionnaire at Time 1. For 83 children only mothers and for 14 children only fathers filled in the questionnaire at Time 1. As can be seen in Table 4.1, most children (76%) are from double-parent families. During the three year period most teachers ( $n = 79$ ) selected only one child, whereas some selected two ( $n = 54$ ), three ( $n = 19$ ), or four ( $n = 5$ ) children from their classes. As a result, for 185 children another classmate also participated in the same condition, but children always participated individually. Table 4.1 lists demographic characteristics for the intervention ( $n = 191$ ) and control ( $n = 73$ ) group.

Consistent with other studies on immigrant groups in the Netherlands (Eichelsheim et al., 2009), a child was considered “immigrant” if either the child or one of the parents was born in another country than the Netherlands. If both child and parents were born in the Netherlands, the child was considered “native Dutch”. In total, 27% of the participating children were immigrants.

At Time 2 99 percent of the children in the intervention actually had completed the intervention. All children who completed the intervention filled out the questionnaires at Time 2 ( $n = 264$ ). For 24 children (9%), teachers did not complete the questionnaire at Time 2, because of lack of time or personal circumstances. These missing values at Time 2 were completely random (Little’s MCAR test:  $\chi^2 / 2 = .05$ ,  $p = .95$ ).

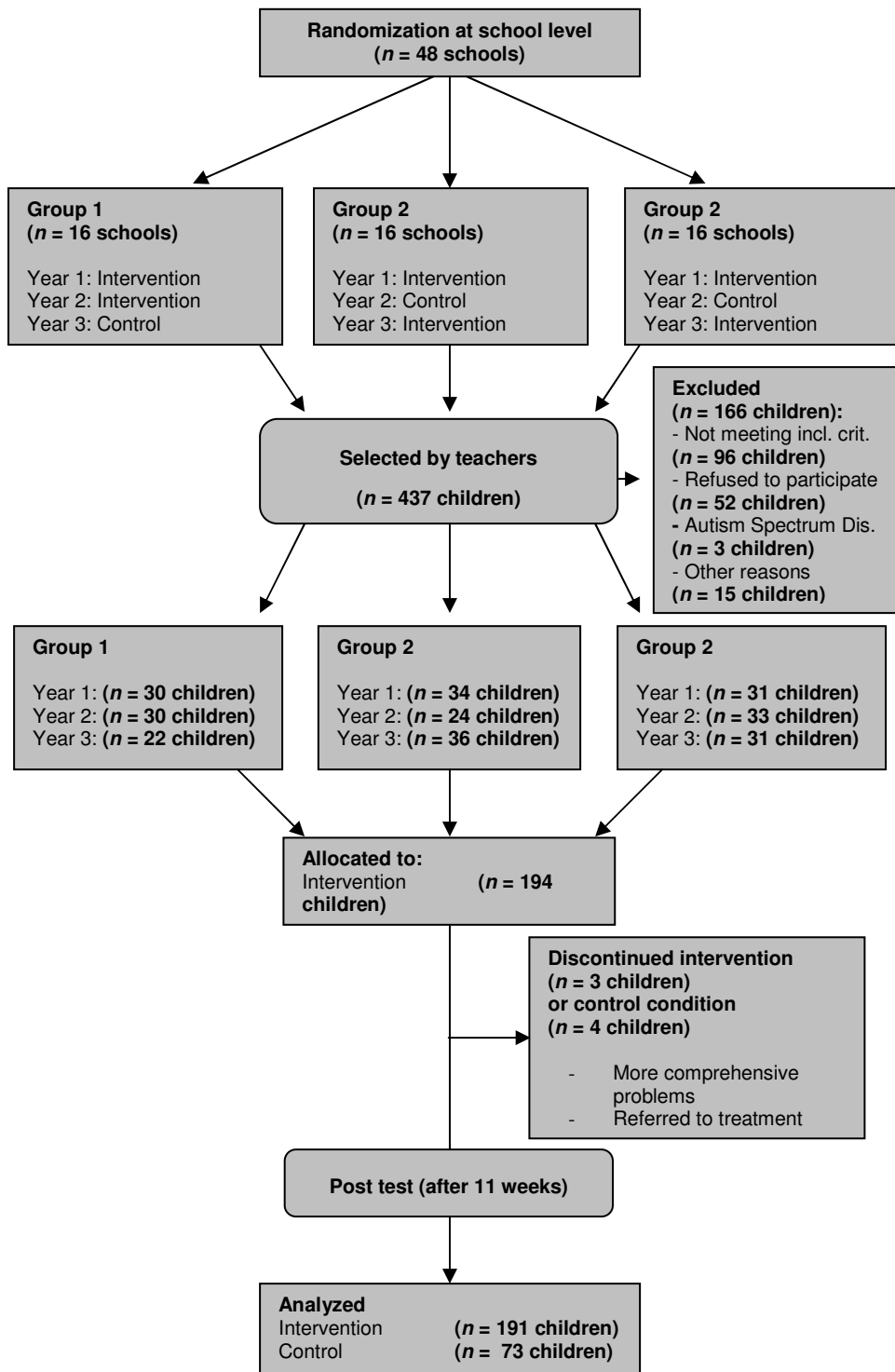


Figure 4.1 Flow Chart of Randomization Design

For both mothers (T1  $n = 67$ , T2  $n = 93$ ) and fathers (T1  $n = 134$ , T2  $n = 164$ ), missings were completely random as well (Mothers: Little's MCAR test:  $\chi^2 / 7 = .99$ ,  $p = .44$ ; Fathers: Little's MCAR test  $\chi^2 / 4 = .85$ ,  $p = .49$ ). We did not use listwise deletion as it may result in discarding a large proportion of the data, which can lead to biased results, because the power of the study decreases. Multiple imputation is currently recommended as modern missing data handling technique (Baraldi & Enders, 2010). We used Multiple Imputation techniques module of LISREL8.7 with the Expected Maximization (EM) algorithm. Imputed data were used in further analyses.

**Table 4.1** Sample Characteristics by Condition

Sample Characteristics	Intervention Group ( $n = 191$ ) <i>M (SD)</i>	Control Group ( $n = 73$ ) <i>M (SD)</i>
Child		
Gender (% boys)	72%	70%
Ethnicity (% immigrant)	32%	20%
TRF selection t-scores (externalizing)	66	67
Age (years)	10.1 (.54)	10.1 (.49)
Parent		
Age (years)		
- Mother	41.1 (4.24)	38.8 (4.51)
- Father	43.4 (4.94)	43.6 (6.23)
Civil Status (%)		
- Married	80%	71%
- Living together	6%	8%
- Divorced	14%	12%
Education (%)		
- Primary (or less)	10%	5%
- Secondary	30%	25%
- Intermediate Vocational	34%	40%
- Higher Vocational	16%	20%
- University	13%	11%
Number of children in family ( $n$ )	2.50 (1.00)	2.47 (1.10)

### Intervention

The Stay Cool Kids training is a social cognitive intervention that focuses on reciprocal relations between cognitions, emotions, and behavior of the child. The training is designed to reduce aggressive behavior in highly aggressive children at elementary schools. The long term goal is to prevent the development of disruptive

behavior disorders. Trainers worked individually, in 8 weekly sessions of 45 minutes, with the target child. Children were seen during the school day from January until March. The trainer met with parents and teachers before the start of the training, during a mid term evaluation, and at the end of the training.

The training consisted of 2 phases. In the first phase, trainers investigated child's specific needs and competences. The first session starts with a general introduction, which is the same for all children. Next, trainers were able to choose two from six exercises, which were best suited for the individual child, for the second and third session. After the third session, an individual analysis of child's competences was made and discussed with parents and teachers during a midterm evaluation, resulting in an individual intervention plan. For the intervention plan trainers chose five from nine program components, which were most appropriate for the individual child's needs, as described in the trainer manual. Before phase 2 (session 4 -8) started, a contract between the trainer and child was signed, in which the training program is described. Exercises focused on 1) self-perception (less negative, realistic self-perception), 2) social cognitions (attribution of benign intent in ambiguous situations, accurate representation of other children emotions), 3) anger management (emotion-regulations strategies, e.g., 'stop-think-act'), and 4) aggressive behavior (generation of less aggressive responses to social provocations). Parents and teachers received information after each training session about what was done during the training. Also, they were asked to practice together with the child its newly learned skills<sup>1</sup>.

### **Treatment Fidelity**

In this study, an existing frequently used implemented intervention is evaluated and participating Stay Cool Kids trainers from youth mental health care centers ( $n = 33$ ) are typical providers of the intervention within these schools. Trainers have a background in clinical child psychology, and have to be certified as a Stay Cool Kids trainer. To become certified, trainers have to run three pilot trainings, under supervision from accredited Stay Cool Kids trainers. These initial pilot trainings were prior to implementing the program, and these trained children were not included in the study. During the intervention period for this study trainers had two-weekly meetings to discuss trainings and get feedback from other trainers and supervisors. Trainers filled in logs after every intervention session. Logs completed by the trainers indicated that 99% of the trainings were completed as planned. The average training session lasted 45 minutes. Trainers changed the content of their training

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<sup>1</sup> More detailed description of the intervention can be obtained from the first author.

session in 6.5% of the cases, when the planned training session did not work for the specific child. Overall, it was found that Stay Cool Kids was conducted as intended.

### Parents and Teachers Satisfaction with Program

Parents and teachers in the intervention condition were asked to fill in a short questionnaire at Time 2 to assess the level of satisfaction with the program. Overall, parents and teachers were satisfied with the program at post test (*scale 0-6*;  $M_{teachers} = 4.4 (1.24)$ ,  $M_{mothers} = 4.6 (1.35)$ ,  $M_{fathers} = 4.6 (1.18)$ ).

### Measures

**Child aggressive behavior.** Reactive and proactive aggression according to teachers were measured with the Teacher Rating of Aggression (TRA; Dodge & Coie, 1987; Dutch version; Hendrickx, Crombez, Roeyers, & Orobio de Castro, 2003). Items for both reactive aggression (e.g., ‘When this child has been teased or threatened, he or she gets angry easily and strikes back’; 3 items) and proactive aggression (e.g., ‘This child uses force to dominate peers’; 3 items) were rated on a 5-point scale (1= *never* to 5 = *always*). Parents and children reported about child’s reactive and proactive aggression as well, with adapted parent and child versions of the TRA (Dodge & Coie, 1987; Hendrickx et al., 2003). Cronbach’s alphas were as follows. For teachers: reactive T1= .84, T2= .86; proactive T1= .79, T2= .88; children: reactive T1= .53, T2= .58; proactive T1= .70, T2= .75; mothers: reactive T1= .72, T2= .80; proactive T1= .77, T2= .76; and fathers: reactive T1=.74, T2= .77; proactive T1= .80, T2= .78.

As a screening measure the Externalizing subscale of the Teacher Report Form (age 6-18, Achenbach, 2001; Verhulst, van der Ende, & Koot, 1997) was used. To determine if the mean level of externalizing behavior for children in the intervention condition was still in the clinical range after the intervention, we included the broad band externalizing scale of the TRF as outcome measure as well (32 items; T1  $\alpha = .85$ , T2  $\alpha = .84$ ).

**Self Perception.** To assess self perception, children were asked to fill in the subscale ‘Behavior attitude’ of the Dutch version of the Self Perceived Competence Scale for Children (Harter, 1982; Veerman, Straathof, Treffers, van den Bergh, & ten Brink, 1997) (e.g., ‘Some kids usually get in trouble because of the things they do – Other kids don’t do things that get them into trouble’). Children first had to decide which of the items in the pair better described them, and then they had to choose between ‘sort of true’ or ‘really true’. With this format the effects of a pull for social desirability are reduced (T1  $\alpha = .68$ , T2  $\alpha = .73$ ).

**Hostile intent attribution.** Four hypothetical stories were presented to children (Social Information Processing test, De Castro et al., 2005). The stories all concerned being hindered by a peer whose intentions are ambiguous (e.g., “Imagine: You and a friend are taking turns at a game at the pin-ball machine. When one has lost the game, it is the other’s turn. Now it’s your turn, and you are doing great. You will soon earn an extra ball, so you are trying very hard! The boy you are playing with watches the game over your shoulder. He looks into the pin-ball machine to see where the ball is. Then he shouts “Watch out! The ball will drop from the right side!” But all of the sudden the ball appears from the left side and now you have lost the game!”). Immediately after hearing a story the child was asked to indicate why the peer in the story might have acted the way he or she did. Responses were written down by the interviewer and scored as 0 (*benign intent*) or 1 (*hostile intent*). Mean kappa was calculated to measure intercoder agreement which was .95 to 1.00. Disagreements were resolved through discussions until consensus was reached. An open-answer hostile attribution variable was created by counting the number of stories with hostile answers (0 = *never a hostile attribution* to 4 = *always a hostile attribution*). Furthermore, the child was asked to indicate the peer’s intent on a ten-point rating-scale ranging from 1 = to be *nice* to 10 = to be *mean*. Scores were averaged over the four stories. Because the open-answer and rating-scale variables were strongly correlated ( $r = .74$ ), they were combined by standardizing each variable and then computing their average (Cronbach’s alpha T1= .64, T2= .62).

**Response generation.** Next, children were asked what they would do when the events in the vignette would actually happen to them. Responses were written down by the interviewer and scored 0 (*not aggressive*), 1 (*verbally aggressive or coercive response*), 2 (*physically aggressive response*), and scores were averaged over the vignettes. In a previous study (De Castro, et al., 2005) findings showed that an accurate interval scale of response aggressiveness could be created by weighting physical aggression with two points, verbal aggression with 1 point, and non-aggression with zero points. Inter-rater’s agreement was found to be high: 95%. Cronbach’s alphas were .65 at T1 and .62 at T2.

**Response evaluation.** Next, a possible behavioral response to the problem was presented (e.g., ‘if this happens to me, I will hit the child who pushed me’), to measure *Approval of Aggression*. This was measured with a 10-point scale where the child had to indicate whether he or she thought this was a good response (0 = *not a good response* to 10 = *a good response*). Ratings were averaged over the stories (Cronbach’s alpha T1= .66, T2= .66). *Enactment of Aggression*. Children

similarly had to indicate on a 10-point scale to what extent they would enact a presented aggressive response themselves. Cronbach's alphas were .76 at T1, and .66 at T2.

### **Data-Analysis**

First, we tested for possible differences at baseline scores between the intervention and control group. Next, intervention effects were examined using a series of analyses of covariance (ANCOVA) on the post test scores on reactive aggression, proactive aggression, social cognitions, and self-perception, using the pre test scores as covariate and condition status (0 = *control group*; 1 = *intervention group*) as a fixed factor. Adjusting for pretest scores in ANCOVAs is recommended for testing intervention effects (Rausch, Maxwell, & Kelly, 2003). To test for moderating effects of gender and ethnicity, we conducted additional ANCOVAs in which gender (0 = *boys*; 1 = *girls*) or ethnicity (0 = *native Dutch*; 1 = *Immigrant*) were added as fixed factors, and interactions with condition status were tested.

Effect sizes were calculated as the standardized mean difference, with mean gain scores. The adjusted posttest mean (posttest mean minus baseline mean) of the control group was subtracted from the adjusted posttest mean of the intervention group, and the results were divided by the pooled standard deviation (Lipsey & Wilson, 2001). Effect sizes were coded such that positive values mean a positive outcome for the experimental group, compared to the control group. An effect size of .20 was considered small, .50 was considered medium, and an effect size of .80 was considered large (Cohen, 1988).

Next, we examined whether the level of externalizing behavior of children declined to a subclinical or normal range for more intervention than control children, using the norms of the Teacher Report Form (TRF). We calculated the percentage of children in the normal, subclinical, and clinical range at pre- and post test and compared this between intervention and control group with chi-square tests.

## **Results**

### **Preliminary Analyses**

Before running the analyses, the normality in the distribution of variables was assessed. Absolute values of skewness (*skew*) > 2, and absolute values of kurtosis (*kurt*) > 1 represent deviations from normal distributions (Muthén & Kaplan, 1992). Mother reported proactive aggression at post test (*skew* = 1.84, *kurt* = 5.10), and child reported proactive aggression (T1 *skew* = 1.95, *kurt* = 4.18; T2 *skew* = 2.07; *kurt* = 5.37), response generation (T1 *skew* = 2.06, *kurt* = 4.31; T2 *skew* = 2.25; *kurt*



= 5.19), approval of aggression (T1 skew = 1.86, kurt = 2.99; T2 skew = 1.98; kurt = 3.78), and enactment of aggression (T2 skew = 1.73, kurt = 2.57) appeared to be somewhat skewed. Log transformations were performed for these scales, and after transformation scales were normally distributed.

Although transformed scores were used in the analyses, Table 4.2 shows, for ease of interpretation, non transformed means and standard deviations for the intervention and control group on outcome measures at pre and post treatment, as well as effect sizes. Children in the intervention and control group differed only on teacher reported proactive aggression at pre test, with higher levels of proactive aggression for children in the intervention condition ( $t = 2.26, p = .03$ ). There were no differences on outcome behavior for boys and girls. Native Dutch and immigrant children differed only on teacher reported reactive aggression at pretest, with higher levels of reactive aggression for immigrant children ( $t = 3.35, p = .00$ ).

**Table 4.2** Means, Standard Deviations and Effect Sizes for Outcome Variables

Outcomes	Intervention		Control		<i>d</i>
	Pre <i>M (SD)</i>	Post <i>M (SD)</i>	Pre <i>M (SD)</i>	Post <i>M (SD)</i>	
Reactive Aggression					
Child	3.03 (.88)	2.80 (.81)	3.03 (.81)	3.00 (.87)	.21
Teacher	3.84 (.87)	3.40 (.89)	3.74 (.95)	3.57 (.94)	.28
Mother	3.04 (.82)	2.68 (.79)	2.93 (.79)	2.82 (.72)	.32
Father	2.73 (.76)	2.73 (.75)	2.60 (.68)	2.68 (.65)	.11
Proactive Aggression					
Child	1.48 (.70)	1.35 (.54)	1.61 (.80)	1.62 (.84)	.22
Teacher	2.46 (.89)	2.09 (.98)	2.17 (.89)	2.08 (.92)	.30
Mother	1.61 (.62)	1.41 (.47)	1.62 (.66)	1.52 (.48)	.18
Father	1.49 (.51)	1.40 (.48)	1.49 (.51)	1.55 (.49)	.30
Social Cognitions					
Self perception	2.54 (.55)	2.87 (.54)	2.53 (.56)	2.59 (.59)	.49
Hostile intent <sup>1</sup>	0.17 (.69)	0.15 (.48)	-.07 (.57)	0.14 (.49)	.15
Response generation	0.25 (.41)	0.21 (.41)	.31 (.53)	0.26 (.44)	.00
Approval aggression	2.36 (1.88)	1.95 (1.50)	2.56 (2.51)	2.47 (2.32)	.22
Enactment aggression	2.69 (2.06)	2.18 (1.75)	2.59 (2.15)	2.53 (2.21)	.17

Note. <sup>1</sup>Standardized scores

### Intervention Effects

**Reactive and proactive aggression.** For child reported reactive aggression, the ANCOVA revealed a significant condition effect ( $F(2,263) = 4.06, p = .02$ ), indicating that Stay Cool Kids decreased reactive aggression at post test. Moreover, the intervention had a significant effect on child reported proactive aggression ( $F(2,263) = 8.02, p = .02$ ). For teacher reported reactive aggression, effects were significant ( $F(2,263) = 3.81, p = .05$ ). No significant intervention effect was found for teacher reported proactive aggression. Significant intervention effects were found for mother reported reactive ( $F(2,263) = 10.71, p < .001$ ) and proactive aggression ( $F(2,263) = .3.81, p = .05$ ), indicating that children showed less reactive and proactive aggression after the intervention, compared to children in the control condition. For father reported reactive aggression, condition did not predict scores at post test. However, the intervention had a significant effect for father reported proactive aggression ( $F(2,263) = 6.02, p = .02$ ). Intervention children showed lower levels of proactive aggression at post test in intervention group compared to control group.

**Social cognitions and self-perception.** Children who received the Stay Cool Kids intervention reported higher levels of self-perception at posttest compared to children in the control condition ( $F(2,263) = 17.37; p < .001$ ). The intervention also had a significant effect on level of approval of aggression at post test, indicating that the intervention reduced approval of aggression ( $F(2,263) = 4.69, p = .04$ ). For hostile intent attribution, response generation and enactment of aggression, there were no significant intervention effects.

### Moderator Analyses

To test whether gender and ethnicity moderated intervention effects, we added gender and ethnicity (separately) in ANCOVA models, and tested the gender X condition and ethnicity X condition interactions. For child reported proactive aggression a significant gender X condition interaction effect was found ( $F(3,263) = 8.02, p = .02$ ). Post hoc analyses revealed that the intervention effects were stronger for boys ( $d = .55$ ) than for girls ( $d = .23$ ).

For teacher reported reactive aggression a significant ethnicity X condition interaction was found ( $F(3,263) = 7.89, p = .01$ ). Post hoc analyses showed stronger intervention effects for immigrant children ( $d = .87$ ) than for native Dutch children ( $d = .06$ ).

Also for child response generation, a marginally significant ethnicity X condition interaction was found ( $F(3,263) = 4.14; p = .05$ ). Post hoc analyses showed that intervention effects on aggressive response generation were stronger for children with an immigrant background ( $d = .58$ ) than for native Dutch children ( $d = .15$ ).

## Recovery

**(Sub) clinical externalizing behavior problems.** Children were selected by their teachers, based on their subclinical and clinical levels of externalizing behavior. At pretest, teachers reported child externalizing behavior of the children in the intervention group in the clinical range for 61% of the children and in the subclinical range for 39%. For the control group, 67% was rated as clinical, and 33% as subclinical. These small differences between groups were not significant ( $\chi^2 (1, n = 264) = .98, p = .61$ ). However, at post test, for the intervention group, teachers reported child externalizing behavior for 26% in the normal range, for 22% in the subclinical range, and for 52% in the clinical range. For the control group, teachers reported child externalizing behavior for 19% in the normal range, for 11% in the subclinical range, and for 70% in the clinical range. These differences in percentages between conditions were significant ( $\chi^2 (2, n = 264) = 5.89, p = .01$ ), indicating that the intervention significantly increased recovery according to teacher ratings.

## Discussion

In the present study, we examined whether the routine practice of the Stay Cool Kids intervention was effective in reducing reactive and proactive aggression and enhancing social cognitions and self-perception. In addition, through moderator analyses we examined ethnic and gender differences in response to the intervention. Overall, Stay Cool Kids significantly reduced aggressive behavior according to children, mothers, fathers and teachers, and clinical externalizing behavior problems according to teachers. Children showed more positive levels of self-perception and reported lower approval of aggression.

These results demonstrate that the intervention can reduce the level of aggression, across informants, in children at risk for developing more serious behavior problems, and therefore may help prevent children from various negative outcomes later in life. Effect sizes on aggressive behavior for teachers and children ranged from .21 to .30. For father and mother reported aggression, there was a larger variability in effect sizes ranging from .11 to .32. The effect sizes can be considered as small to modest effects. However, even small effect sizes can be of *practical significance*, because a small reduction in aggressive behavior may break a vicious cycle. Therefore, it is important to neither exaggerate nor minimize both the theoretical and practical significance of small to modest effect sizes (McCartney & Rosenthal, 2000). A notable finding was that fathers reported a significant decrease in proactive aggression, but not in reactive aggression. Reactive aggression might

be less early observable in the home setting, since there are less conflict situations with peers. In general, fathers spend less time with their children than mothers do (Jones, Forehand, & Beach, 2000) and therefore may have less opportunity to see their child in situations with peers. For teachers, we found the opposite. There was a significant intervention effect on reactive aggression, but not on proactive aggression. Reactive aggression may be more prominent in the school situation, as reaction on provocation by peers.

Effect sizes found in the current study are comparable to mean effect sizes found in meta-analyses on cognitive behavioral interventions for aggressive children (ES = .26; Wilson & Lipsey, 2006) and on selected school-based interventions (ES = .29; Wilson & Lipsey, 2007). It is noteworthy that most intervention studies are demonstration or research programs that usually result in larger effects sizes (Kratohwill & Shernoff, 2004). Findings of this study show comparable effect sizes, but these effects were found under *routine-practice conditions*.

Regarding child self-perception and social cognitions, we found that children were more positive about their own behavior after the intervention, and that they were less likely to evaluate an aggressive response as a good way to obtain desired outcomes. This indicates that the Stay Cool Kids intervention can have some impact on problems in social cognitive functioning. However, although we found significant effects on two social cognitive outcomes, several other aspects of the social cognitive processes did not change as a result of the intervention. It is possible that these aspects (e.g., hostile intent and enactment of aggression) are less sensitive to change and that more time is needed to internalize the newly learned cognitions. Changes in approval of aggression and perception of selves might well result in benign schemata that, in turn, can change social information processes (Lochman & Wells, 2002b). The present study was unable to test whether changes in self-perception and approval of aggression caused the reduction in child aggressive behavior. Longitudinal data with more time points are needed to test for mediational processes.

How do present results compare to results obtained with similar interventions? The Coping Power Program is a social-cognitive school-based group and parent intervention designed to reduce conduct problems. The intervention is effective in reducing aggression and disruptive classroom behavior and improving self-esteem in boys. However, teachers did not report effects (Lochman, Burch, Curry, & Lampron, 1984). Lochman and colleagues state that behavioral changes were modest and apparently situation-specific. Results of the current study show that the Stay Cool Kids intervention has the potential to reduce aggression (although effects are modest in size) across situations, which might be a result of the individual, tailor-made, format. Another comparable, although multisite, intervention focusing on a

high-risk sample is the Fast Track intervention (McMahon et al., 1999; Slough, McMahon, & CPPRG, 2008). Effects were found on emotional and social coping skills and on observed rates of problem behavior at school. Teachers and parents did not report significant improvements in child behavior. The authors state that major reductions in aggressive-disruptive behavior are needed in high-risk children, for losing their 'status' as disruptive by teachers (McMahon et al., 1999). As in the current study, parents did not select children for the Fast Track intervention, which might explain why parents did not report reductions in aggressive behavior in the Fast Track trial. In the current study, parents and teachers do report (modest) effects of the training, which strengthen our conclusion that the training may have some impact on child behavior in different situations.

To examine whether subgroups of children benefited more from the intervention, moderator analyses were performed. We found that gender and ethnicity moderated some of the intervention effects. Effects on teacher reported reactive aggression were stronger for children with an immigrant background than for native Dutch children. Initial levels of *reactive* aggression according to teachers were higher for immigrant children, which is in line with findings in other studies on mental health in immigrant (Moroccan) children in the Netherlands (Stevens & Vollebergh, 2008). Therefore, perhaps there was more room for improvement (Wilson & Lipsey, 2007). Immigrant children showed also a stronger decrease in aggressive response generation compared to native Dutch children. Because Stay Cool Kids is an individualized intervention, trainers perhaps focused more on this specific social cognitive aspect for immigrant children, and therefore, they learned to generate less aggressive responses in social situations. The increasing diversity of the Dutch population requires an intervention that is sensitive and effective for ethnically diverse children. Most evidence-based interventions are designed for majority children, and adapted afterward to specific needs of minority children (Yasui & Dishion, 2007). In the Stay Cool Kids intervention, the content of the training is based on an individual competence analysis, in which child's individual needs are investigated. Because of this, there is flexibility to address specific preferences and needs of specific ethnic groups. Gender emerged as moderator only for child reported proactive aggression with stronger effects for boys. It has been speculated that gender differences in response to intervention can occur as a consequence of differing therapy preferences of boys and girls (Garber, 2006). There were no other moderating effects of gender. Therefore, we can conclude that the Stay Cool Kids intervention can be effective in reducing aggressive behavior as well in at-risk boys as in girls. This enriches our knowledge about effectiveness of interventions for girls, since gender differences were less clear as a result of overrepresentation of boys in study samples (Brestan & Eyberg, 1998).

Another way of evaluate the effects of a program is to examine to what extent changes are clinically relevant (Kendall, 1999). Therefore, we examined in this study whether child's elevated level of externalizing behavior, which was the selection criterion of this study, changed significantly as a result of the intervention. We found clinically relevant changes, reported by teachers. Externalizing behavior of children who received the Stay Cool Kids intervention was rated more frequently in the normal or subclinical range, compared to children in the control condition. For children in the control condition, the externalizing behavior was most frequently rated in the clinical range. This indicates that the intervention can, at least for part of the participating children, reduce clinical levels of externalizing behavior to subclinical or normal levels.

Although many school-based interventions have shown significant initial effects on child's aggressive behavior, findings on long-term effects are mixed. For some studies positive short-term effects maintained or emerged at follow-up (e.g., Conduct Problems Prevention Research Group, 2002; Lochman & Wells, 2004), whereas for other studies effects faded with time (August, Lee, Bloomquist, Realmuto, & Hektner, 2004; Tolan & Gorman-Smith, 2002). In the current study we did find post test intervention effects, however, it is important to test whether the Stay Cool Kids training as well may set the stage for improvement of behavior in middle and high school years. Longitudinal data are needed to detect impact of the intervention on the long term, so called 'sleeper-effects', and the developmental processes over time.

There are several limitations to this study which may have affected effect sizes and should be addressed in future research. First, it should be noted that the unit of analyses (individual level) did not match the unit of randomization (school level) in this study, which might have increased the risk of false-positive finding (Stice, Shaw, Bohon, Marti, & Rohde, 2009). The present design permitted us to study actual effects of an intervention implemented in routine school practice. Allowing each school to participate both in control and intervention conditions and blockwise randomization made it practically feasible for schools to participate. This would not have been possible with a traditional individual randomization to either control or intervention condition, because ethical issues concerning assignment of individual children in the same classroom to different conditions and lack of motivation to participate in the control condition would have prevented schools, teachers, and parents from participating in the study. Moreover, the present design prevented biases due to school factors, by delivering intervention and control conditions in the very same schools.

Second, intervention effects are based on child, parent and teacher reported data, and informants were not blind to the condition. Although there are problems

inherent in ratings of parents and teachers, especially when they are involved in some way in the intervention, the fact that intervention effects were found across all informants and that the pattern of findings was similar across informants lends credibility to the findings. It is important to note that teachers and parents did not *conduct* the intervention themselves, as is frequently the case in other intervention studies. Therefore, they still may be critical to changes in child's behavior. However, for future studies we suggest a multi-method strategy. Including observational measures would increase reliability and generalizability of results (e.g., Shores, Jack, Gunter, Ellis, DeBriere, & Wehby, 1993). Observational data have been shown to be resistant to biases originating in observed persons (e.g., when child attempt to fake good behavior) or in trained coders (i.e., no self-fulfilling expectations of behavior). However, observational data have some limitations too. Observers tend to gather data during limited time intervals and have less access to the diversity of behavior settings found in schools (Ladd & Profilet, 1996). Therefore, data tend to be based on restricted samples of behavior. Furthermore, aggressive behavior often happens in the context with peers, not in the presence of adults (e.g., Dodge & Coie, 1987). Peer ratings, in addition to self-, teacher- and parent-reports, might provide useful information. Using a multi-method strategy in intervention studies, which includes observational measures and peer ratings in addition to questionnaires (e.g., Lochman & Wells, 2002b), would result in the most comprehensive picture of changes in child behavior. Many intervention studies, however, share this limitation of relying on questionnaires (e.g., Domitrovich, Cortes, & Greenberg, 2007). These studies still made great efforts to include empirical estimates that take into consideration recent recommendations (combine reports from different informants, use broad-assessment with information from adults having different relationships with the child) to use comprehensive, reliable and valid measurements (Grietens et al., 2004).

It is also worth noting that children were selected for this intervention by their teachers, because of elevated levels of externalizing behavior at schools. Selecting children for the intervention based on a combination of informants (teachers, parents and possibly peers) on child's externalizing behavior, might lead to larger effect sizes, as a result of more involvement in the intervention. Moreover, the control group in this study did not receive any treatment. It is possible that the beneficial effects of Stay Cool Kids are simply the consequence of receiving attention and that some other treatment would have the same effect.

Fourth, the intervention is conducted by trained professionals, rather than by school personnel. Although there are several advantages using trained professionals, it has been found that interventions provided by staff that is working full-time in school (for example teachers) are delivered with greater intensity, are

operated more frequently, used more regularly, and are offered to more students. But, to realize this, a large portion of the regular job of teachers should be dedicated to the intervention activity (Gottfredson & Gottfredson, 2002). Implementation may be more guaranteed when working with trained professionals (Silvia & Thorne, 1997).

Finally, with the research design used in the current study, twice as many intervention students as control students participated. The reason for this is that we plan to examine the effects of a booster intervention for a part of the intervention group. However, this is beyond the scope of the current study.

Despite these limitations, the results of this study are encouraging. The individualized preventive intervention, Stay Cool Kids, delivered to children at-risk for externalizing behavior problems can have some impact on reactive and proactive aggression, some aspects of social cognitive functioning, and self-perception. Based on the high treatment completion rate (99%), treatment integrity and high level of satisfaction with the training, it can be concluded that this program is an example of how prevention activities can be successful using the school as location. Moreover, this study showed that the program is particularly effective for children with an immigrant background and it proved to be effective for girls as well. The current study fills a gap in the literature because it evaluated the effects of an already existing real-world program, which is delivered in a one-to-one setting in schools and is tailor-made. We were able to show that Stay Cool Kids children showed clinically relevant changes in teacher reported aggressive behavior. The intervention can move externalizing problem behavior into a normative range, which strengthens implications for clinical practice.

These results provide information to clinicians working in schools with children showing elevated levels of externalizing behaviors and to policymakers concerning options for how to prevent the development of later, more serious externalizing behavior problems in at-risk youth at elementary schools. Effectiveness under real-world conditions, across informants, and on diverse outcomes, is demonstrated.



# 5

## Child Personality as Moderator of Outcome in a School-based Intervention for Preventing Externalizing Behavior

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## Abstract

Studying moderators of intervention effects is essential to elucidate what works for whom. The present study investigated whether child personality moderates short-term and follow-up effects of an individualized preventive school-based intervention for children with externalizing behavior. The sample consisted of 48 schools, with 264 fourth-grade children displaying externalizing behavior ( $M_{\text{age}} = 10.2$  years), randomly assigned to the intervention ( $n = 191$ ) or no-intervention control ( $n = 73$ ) condition. Teachers and children reported at pre-, post-, and follow-up-test about reactive and proactive aggression. Child personality was assessed by teachers at pretest. Child conscientiousness moderated short-term intervention effects, indicating that more organized and planful children benefited more from the intervention. Child extraversion moderated both short-term and follow-up intervention effects, with low extraverted children showing larger effects. These results affirm the importance of including personality as moderator of intervention effects in future studies, as interventions adapted to specific child traits might yield larger effects.

## Introduction

Pervasive and unremitting aggressive behavior at school age is a significant risk factor for future difficulties such as peer rejection, school failure, drug abuse and delinquency in adolescence (Broidy et al., 2003). Intervening at young age, when behavioral patterns are more easily modified, can prevent children from developing life-course persistent conduct problems (Tremblay, 2006). During the last decade evidence has been accumulating that school-based preventive child interventions are, in general, moderately effective in reducing aggression (Mean effect sizes range from .29 to .35; McCart, Priester, & Davies, & Azen, 2006; Wilson & Lipsey, 2007). Moreover, an increasing number of studies on the effectiveness of child interventions identified specific child characteristics (e.g., age, gender and ethnicity) that influence (i.e., moderate) intervention effects. For example, a meta-analysis on child interventions for antisocial youth reported that larger effects were achieved with older elementary school-children because of their more advanced cognitive development (McCart et al., 2006).

Studying moderator effects is important because interventions, for which no (or small) overall effects emerge, may still be effective for subgroups of children (Kraemer, Wilson, Fairburn, & Agras, 2002). Identifying children who are

differentially responsive to interventions can also enhance clinical practice. First, selection of children for specific interventions can be more adequate, which in turn can reduce poor treatment response, typically seen in one third of the cases, and high drop-out rates (40% - 60%) in child mental health care (Beauchaine, Webster-Stratton, & Reid, 2005; La Greca, Silverman, & Lochman, 2009). Additionally, programs can be modified and personalized for children for whom standardized interventions are less effective. Finally, identifying moderators can contribute to developmental theory by elucidating whether developmental processes can be changed under certain conditions (Kellam & Rebok, 1992).

Intervention studies usually identify moderators that are based on routinely obtained information (Kazdin, 2007), such as age or initial level of problems. However, moderators that are theoretically grounded may be most important to consider. A plausible moderator that has been relatively ignored is child personality. In recent years, the construct of personality has become more influential in theories about the development of behavior problems (Shiner & Caspi, 2003). Based on the vulnerability or predisposition model, it can be hypothesized that certain personality traits place children at risk for the onset and maintenance of behavior problems (Tackett, 2006). There is growing consensus that a comprehensive and systematic way to measure personality traits in children is with the Big Five model (McCrae & Costa, 1999). The Big Five are usually labelled as follows: Extraversion, benevolence (agreeableness in adults), conscientiousness, emotional stability, and imagination. The first factor, extraversion, describes sociability and agency, active engagement and assertiveness of children. Benevolence is characterized by friendliness, tender-heartedness and empathy. Conscientiousness can be described as the ability to inhibit impulses, to be playful, organized and motivated. The fourth factor, emotional stability, indicates child's self-reliance and emotional balance. The last factor, imagination or openness to experience, is characterized by intellectual curiosity, interest and willingness to try new activities, ideas, and beliefs (Caspi & Shiner, 2006; Mervielde & De Fruyt, 1999).

There is empirical evidence that the Big Five is a useful framework for ordering individual findings on child personality (Caspi & Shiner, 2006) and more specifically, several studies have found that low benevolence, conscientiousness, and emotional stability, and high extraversion in children (aged 6-13 years) were concurrently and longitudinally related to more externalizing behavior (De Haan, Prinzie, & Deković, 2010; John, Caspi, Robins, Moffitt, & Stouthamer-Loeber, 1994; Prinzie, van der Sluis, de Haan, & Deković, 2010; Van den Akker, Deković, & Prinzie, 2010). Children (non-clinical preschool and elementary school) with externalizing behaviors are *particularly* characterized by low benevolence (i.e., self-centered, hostile, manipulative), low conscientiousness (i.e., lack of ambition, difficult to control

impulses), and to a lesser extent high extraversion (Prinzle, et al., 2003). Besides, it has been found that differences in personality traits result in differential susceptibility to rearing practices (Belsky, 2005; Prinzle et al., 2003) and may evoke different parenting and peer behavior (Manders, Scholte, Janssens, & De Bruyn, 2006; Prinzle et al., 2010). For example, children who are dominant and bad-tempered may have difficulties in controlling their emotions and behaviors, which in turn can cause coercive interactions with parents (Prinzle et al., 2003) and peers (Shiner & Caspi, 2003). As a result, personality seems to be a predictor for different pathways to behavioral problems and this may provide important information for intervention studies to identify and target potential vulnerable subgroups (Caspi & Shiner, 2006; Frick, 2004).

Given this prominence of child Big Five personality characteristics for the development of problem behaviors, there are reasons to speculate that personality traits may also influence (i.e., moderate) the effectiveness of interventions. Although child personality traits have not been evaluated directly in clinical trials, a recent study on personality-targeted interventions for substance use in adolescents indicated that individual differences in personality reflect different susceptibility to substance misuse (Conrod, Castellanos, & Mackie, 2008). Interventions that focused on personality risk factors (impulsivity, sensation seeking, anxiety sensitivity, negative thinking) in adolescents and young adults, were found to be effective in reducing substance use and strongest effects were found for those personality types associated with higher risk for substance use (Conrod, Castellanos-Ryan, & Strang, 2010; Conrod, Stewart, Comeau, & Maclean, 2006; Watt, Stewart, Birch, & Bernier, 2006). For example, it was found that personality-targeted interventions were most effective for adolescents with sensation seeking personality, who appeared to be the most susceptible to alcohol misuse (Conrod et al., 2008). In another recent study (Hawes & Dadds, 2005) on treatment effects for 6 year old boys referred for conduct problems, it was found that callous-unemotional traits (i.e., limited empathy and guilt, constricted emotionality) in treated children were associated with poorer treatment outcomes. Although not really a personality *trait*, callous-unemotional traits can be considered as a personality-relevant concept. These results indicate that personality is important to consider as moderator of direct intervention effects.

Although considerable evidence exists for specific child personality traits that predict later externalizing behavior (e.g., Tackett, 2006), to our knowledge, the effects of personality on intervention outcomes in children with externalizing behavior problems have rarely been examined. Additionally, personality could even impact longer-term effects of interventions on child externalizing behavior. Although many school-based interventions have shown significant initial effects on child's

externalizing behavior, findings on follow-up are mixed. For some studies positive short-term effects maintained or emerged at follow-up (e.g., Lochman & Wells, 2004), whereas for other studies effects faded with time (Tolan & Gorman-Smith, 2002). Therefore, understanding factors that might be particularly influential in follow-up effects of promising interventions is needed; however, these factors are relatively understudied (Kellam & Rebok, 1992). For example, it is possible that for more conscientious children an intervention will lead to maintenance of initial effects on externalizing behavior since these children are better able to control their impulses and are more motivated to carry out tasks that they learned during the intervention.

Given the lack of intervention studies that include personality as moderator for children with externalizing behavior, we formed hypotheses based on prior findings and theory about relations between personality and externalizing behavior. Based on previous work (Miller & Lynam, 2001; Prinzie et al., 2010; Tackett, 2006), children who are low on benevolence and conscientiousness, and high on extraversion are expected to show less beneficial outcomes. These traits have the strongest link with externalizing behavior. Externalizing behavior of children with these traits therefore may be more difficult to change, perhaps because these children are less susceptible to environmental influences (e.g., Prinzie et al., 2003). For example, highly conscientious children, who are organized and practical, possibly benefit more from interventions, as they are better able to do things according to a plan. On the other hand, low benevolent children likely have stronger beliefs that aggressive responses will lead to positive outcomes (Miller & Lynam, 2006). These cognitions might be less sensitive to change, and therefore, their externalizing behavior might be more stable. Highly extravert children are less inhibited and have elevated activity levels (Tackett, 2006). When these children are provoked by peers, which is underlying of (reactive) aggression (Dodge & Coie, 1987), they may respond impulsively with aggression, without considering their newly learned skills.

In sum, the aim of the present study is to examine the moderating role of child personality on immediate and follow-up effects of a preventive intervention, Stay Cool Kids, for elementary school-children with externalizing behavior. Stay Cool Kids is an indicated-type school-based intervention, delivered by trained professionals on an individual basis that still involves the context. It is based on a social cognitive perspective on the development of aggressive behavior problems (Crick & Dodge, 1994; Lemerise & Arsenio, 2000). The main outcomes are reported by Stoltz, van Londen, Deković, de Castro, Prinzie, and Lochman (2011): Moderate intervention effects were found on multiple child, parent and teacher outcomes including reactive and proactive aggression, social cognitive functioning, self-perception and clinically relevant changes on externalizing behavior. It is noteworthy that the intervention was

originally developed in real world practice by mental health preventive professionals consulted by elementary schools and that effectiveness of the program as actually delivered in daily practice was examined. Even though the intervention is found to be effective, there is considerable variability in outcomes. Therefore, we conducted analyses following up from the main effectiveness study to explore personality as moderator of outcomes within an effectiveness trial. Moreover, by including information obtained from teachers regarding child personality, and from children regarding their reactive and proactive aggression, rater bias was avoided. Teachers have been found to be accurate raters of child personality because of their expertise on normative child development and their experience with a broad range of children (Goldberg, 2001; Prinzie & Deković, 2008).

The present study contributes to the existing literature on effectiveness of interventions by addressing two important issues: 1) examining theoretically grounded moderators of effects (e.g., Weersing & Weisz, 2002), and 2) studying effectiveness under real-world conditions (e.g., Gardner, Hutchings, Bywater, & Whitaker, 2010).

## Method

### Design

A randomized controlled trial design was used to evaluate intervention effects. Forty-eight elementary schools, in two urban regions in the Netherlands, were randomly assigned to the intervention or control condition. Each school (4<sup>th</sup>-grade classes) participated in the intervention condition, as well as in the control condition (see Figure 4.1). In this way, schools were more willing to participate in the control condition and treatment condition was randomized in such a way to ensure that intervention effects could not be due to school factors. However, randomization at school level could possibly lead to biased results. To examine whether the nesting of children within schools affected results, we computed the design effect (Muthén, 2000). This is expressed as  $d = 1 + \rho (c-1)$ , where  $\rho$  is the average intraclass correlation (.28) and  $c$  is the common cluster size (i.e., average number of children per school, 4.2). The design effect was 1.90, which is smaller than 2.0 and can therefore be ignored.

There were three assessment periods: prior to the beginning of the intervention, at intervention termination (after 11 weeks), and at 6-months follow-up when children were in 5<sup>th</sup>-grade. Dependent measures were individually administered to children in their school settings by trained research assistants. Teachers received questionnaires and were asked to return the questionnaires within a week. Both 4<sup>th</sup>-

grade (pre- and post-test) as 5<sup>th</sup>-grade (follow-up) teachers filled out questionnaires. The study was approved by the Dutch Central Committee on Research Involving Human Subjects.

### Participants

First, parents of all children in fourth grade received a general information letter about the study and a consent form to give permission for teachers to fill out the Teacher Report Form (TRF; age 6-18; Achenbach, 1991) about their child. Then teachers nominated children from their classes with the highest levels of externalizing behavior (the top 30%) and filled out the 32-item externalizing scale of the TRF ( $n = 437$ ). Next, researchers selected children based on their T-scores. The inclusion criterion was a T-score  $> 60$ , indicating a (sub) clinical level of externalizing behavior, which places children at risk for various negative outcomes. Some children did not meet the inclusion criterion of T-score  $> 60$  ( $n = 96$ ), participated in other forms of youth care ( $n = 15$ ), or were diagnosed with Autism Spectrum Disorder ( $n = 3$ ), and some parents refused to participate ( $n = 52$ ). If a child was selected, primary caretakers were contacted by phone and in meetings at school to gather their informed consent to participate in this study. After consent was obtained, the baseline pre-assessment was conducted. Three children discontinued the child intervention, four children discontinued in the control condition (see Figure 4.1).

The final sample consisted of 264 children (72% boys; 27% non-Western cultural background) and their teachers ( $n = 155$ ). At post-test, 99 % of the children in the intervention had completed the intervention and filled out the questionnaire ( $n = 264$ ). For 24 children (9%), teachers did not complete the questionnaire at post-test. These missing values were completely random (Little's MCAR test:  $\chi^2 / 2 = .05$ ,  $p = .95$ ). At follow-up, 95% of the children filled out the questionnaire, and 85% of the teachers. Reasons for non-completion were parents' refusal to continue with measurement ( $n = 3$ ), moving to other places ( $n = 5$ ) or other reasons ( $n = 5$ ). For these 13 children, teachers did not complete questionnaires either. Other reasons for teachers' missing data ( $n = 27$ ) were lack of time or personal circumstances. Missing data for children (Little's MCAR test:  $\chi^2 / 2 = .259$ ,  $p = .46$ ) and teachers (Little's MCAR test:  $\chi^2 / 2 = .554$ ,  $p = .69$ ) at follow-up were completely random as well. Children with complete and non-complete data did not differ significantly on predictors or demographic characteristics. Multiple imputation is recommended as an efficient missing data handling technique (Baraldi & Enders, 2010). We used the Multiple Imputation techniques (LISREL8.7) with the Expected Maximization (EM) algorithm. Imputed data were used in further analyses.

There were no significant differences in gender or TRF score for those children and parents who consented to participate and those who did not. Children in the

intervention and control group did not differ significantly on demographic characteristics (SES, ethnic background). Children in the control condition received care as usual (e.g., remedial teaching, universal remediation programs), if necessary, within their school.

### **Intervention ‘Stay Cool Kids’**

The Stay Cool Kids training is a social cognitive intervention that focuses on reciprocal relations between cognitions, emotions, and behavior of the child. The training is designed to reduce aggressive behavior in highly aggressive children at elementary schools. The long term goal is to prevent the development of disruptive behavior disorders. We recently reported short-term effects in reducing externalizing behavior problems and changing social cognitive functioning among 4<sup>th</sup>-grade school children (Stoltz, et al., 2011). Trainers from youth mental health care centers ( $n = 33$ ) worked individually, in 8 weekly sessions of 45 minutes, with the target child. Children were seen during the school day from January until March. The trainer met with parents and teachers before the start of the training, during a mid term evaluation, and at the end of the training.

The training consisted of 2 phases. In the first phase, trainers investigated child’s specific needs and competences. The first session starts with a general introduction. For the second and third session, trainers were able to choose exercises, which were best suited for the individual child. After the third session, an individual analysis of child’s competences was made and discussed with parents and teachers during a midterm evaluation, resulting in an individual intervention plan. For the intervention plan trainers chose five from nine program components, which were most appropriate for the individual child’s needs, as described in the trainer manual. Before phase 2 (session 4 -8) started, a contract between the trainer and child was signed, in which the training program is described. Exercises focused on 1) self-perception (less negative, realistic self-perception), 2) social cognitions (attribution of benign intent in ambiguous situations, accurate representation of other children emotions), 3) anger management (emotion-regulations strategies, e.g., ‘stop-think-act’), and 4) aggressive behavior (generation of less aggressive responses to social provocations). Parents and teachers received information after each training session about what was done during the training. Also, they were asked to practice together with the child its newly learned skills. Trainers filled in logs after every intervention session and these logs indicated that 99% of the trainings were completed as planned and consisted of 8 sessions.



## Measures

**Aggressive behavior.** Teachers reported on reactive and proactive aggression with the Teacher Rating of Aggression (TRA; Dodge & Coie, 1987; Hendrickx, Crombez, Roeyers, & Orobio de Castro, 2003). Items for reactive (e.g., ‘When this child has been teased or threatened, he or she gets angry easily and strikes back’; 3 items) and proactive aggression (e.g., ‘This child uses force to dominate peers’; 3 items) were rated on a 5-point Likert-scale (1 = *never* to 5 = *always*). An adapted child version of the TRA was used to measure child reported reactive and proactive aggression. Reliability, factor structure and validity of the TRA are adequate (e.g., Hendrickx et al., 2003; De Castro, Merk, Koops, Veerman, & Bosch, 2005). Cronbach’s alphas were averaged across pre-, post-, and follow up assessments and were as follows. For teachers: reactive = .85; proactive = .85; children: reactive = .58, proactive = .72.

Teachers filled in the Teacher Report Form (age 6-18, Achenbach, 1991) to measure aggressive (e.g., ‘argues a lot’, 20 items) and delinquent behavior (e.g., ‘doesn’t seem to feel guilty after misbehaving’, 20 items). Average Cronbach’s alphas were .85 for aggressive behavior, and .72 for delinquent behavior. The TRF is an extensively-validated instrument with adequate reliability and validity (Achenbach, 1991; Verhulst, van der Ende, & Koot, 1997).

**Personality.** Teachers rated about child personality characteristics using the Hierarchical Personality Inventory for Children (HiPIC, Mervielde & De Fruyt, 1999). The HiPIC is a comprehensive personality inventory that assesses individual differences of children in 144 items. It has been shown to have high convergent and discriminate validities, temporal stability and replicability (Mervielde & De Fruyt, 2002; Shiner & Caspi, 2003). The items are on a 5-point scale, ranging from 1 = *almost not characteristic* to 5 = *very characteristic* (e.g., “accepts authority”). Number of items and Cronbach’s alphas for each dimension were: Extraversion (32 items, .92 for Extraversion) Benevolence (46 items, .85), Conscientiousness (32 items, .93), Emotional stability (16 items, .87) and Imagination (24 items, .93).

## Plan of Analyses

To test whether personality is differentially associated with outcomes for the intervention group compared to the control group, interaction effects need to be examined (Gardner, et al., 2010; Hinshaw, 2002, Kraemer, et al., 2002). We performed a series of analyses of covariance (ANCOVA), using general linear models to test whether personality moderates the effects. We started with testing short-term and follow-up intervention effects with pretest scores as covariate and condition status (0 = *control group*; 1 = *intervention group*) as fixed factor. Effect

sizes were calculated as the standardized mean difference with mean gain scores (Lipsey & Wilson, 2001). Effect sizes of .20, .50 and .80 were considered as small, moderate, and large, respectively (Cohen, 1988).

Next, to test for moderation at post-test and follow-up, pre-test scores were entered as covariate and condition status and personality dimensions (separately) were entered as fixed factors and interactions with condition status were tested. Because we expected extremes on the dimensions, we created subgroups for each particular personality dimension based on mean  $\pm$  one SD (1 = *low*, 2 = *middle*, 3 = *high*). Significant moderator effects were further explored by testing intervention effects for separate subgroups of personality. Effect sizes were calculated.

## Results

### Preliminary Analyses

Table 5.1 shows correlations between personality dimensions and aggression at pre-test. Extraversion, benevolence, conscientiousness, emotional stability and imagination were related to teacher reported aggressive (reactive and proactive) and delinquent behavior. Higher scores on these personality dimensions were related to lower levels of aggressive or delinquent behavior at baseline. Higher levels of imagination were related to less child reported aggression.

**Table 5.1** Correlations Personality and Externalizing Behavior Pre-test

Outcome	Extraversion	Benevolence	Conscientiousness	Emotional Stability	Imagination
Reactive Aggression T	-.14*	-.31**	-.09	-.11	-.12
Proactive Aggression T	-.07	-.30**	-.13**	.06	-.17**
Aggressive Behavior T	.00	-.43**	-.16*	-.14*	-.05
Delinquent Behavior T	-.06	-.31**	-.29**	.08	-.23**
Reactive Aggression C	.06	-.06	-.11	.07	-.13*
Proactive Aggression C	-.00	-.06	-.03	.05	-.09

Note. \*  $p < .05$ , \*\*  $p < .01$ , T = Teacher report, C = Child report

### Short-term and Follow-up Intervention Effects

Table 5.2 shows means and standard deviations of outcomes at pre-, post-, and follow-up-test and effect sizes. First, intervention effects were tested at post-test. For child reported reactive ( $F(2, 263) = 4.06, p = .02$ ) and proactive aggression ( $F(2, 263) = 8.02, p < .001$ ) significant effects were found, indicating that the intervention reduced levels of aggression at post-test. For teacher reported reactive aggression, intervention effects were also significant ( $F(2, 263) = 3.81, p = .02$ ). In addition, the intervention significantly reduced teacher reported aggressive ( $F(2, 263) = 7.27, p < .001$ ), but not delinquent behavior. No significant intervention effects were found for teacher reported proactive aggression.

**Table 5.2** Means, Standard Deviations and Effect Sizes

Outcome	Intervention			Control Group			ES pre-post	ES pre-FU
	Pre	Post	FU	Pre	Post	FU		
Reactive Aggression T	3.84 (.87)	3.40 (.89)	3.02 (.97)	3.74 (.95)	3.57 (.94)	3.29 (.93)	.28	.40
Proactive Aggression T	2.46 (.89)	2.09 (.98)	1.93 (.87)	2.17 (.89)	2.08 (.92)	1.92 (.96)	.30	.31
Aggressive Behavior T	0.78 (.38)	0.68 (.41)	0.55 (.38)	0.76 (.34)	0.79 (.45)	0.66 (.40)	.33	.34
Delinquent Behavior T	0.38 (.25)	0.36 (.32)	0.28 (.23)	0.45 (.27)	0.43 (.29)	0.34 (.24)	.00	-.04
Reactive Aggression C	3.03 (.88)	2.80 (.81)	2.95 (.90)	3.03 (.81)	3.00 (.87)	2.95 (.82)	.21	.00
Proactive Aggression C	1.48 (.70)	1.35 (.54)	1.37 (.60)	1.61 (.80)	1.62 (.84)	1.47 (.65)	.22	-.04

Note. T = Teachers, C = Children

Next, to examine whether beneficial Stay Cool Kids effects were maintained at follow-up, we performed ANCOVAs, controlling for pre-test scores. Beneficial effects that were found at post-test remained for two outcomes: Teacher reported reactive aggression ( $F(2, 263) = 5.65, p = .00$ ) and teacher reported aggressive behavior ( $F(2, 263) = 5.40, p = .01$ ).

### Moderator of Intervention Effects

To investigate whether intervention effects at post-test were moderated by personality, ANCOVAs with interactions (personality factor X intervention status) were performed. We conducted a separate ANCOVA for each personality factor as potential moderator. Results indicated that the interaction between

conscientiousness and condition significantly predicted teacher reported proactive aggression ( $F(3, 263) = 3.48, p = .02$ ) and delinquent behavior ( $F(3, 263) = 2.95, p = .03$ ) at post-test. Moreover, conscientiousness X condition predicted child reported proactive aggression ( $F(3, 263) = 2.92, p = .05$ ). Post hoc analyses revealed that the strongest intervention effects on teacher reported proactive aggression ( $d = .43$ ) and delinquent behavior ( $d = .32$ ), and child reported proactive aggression ( $d = .46$ ) were found for children who had less extreme scores on conscientiousness. Child reported reactive aggression at post-test was predicted by extraversion X condition ( $F(3, 263) = 5.13, p = .00$ ). Post-hoc analyses revealed that less extraverted children showed the strongest intervention effects on reactive aggression ( $d = .88$ ). No other significant interactions between personality and condition status were found at post test.

At follow-up, effects on child reported reactive aggression ( $F(3, 263) = 3.28, p = .02$ ), teacher reported reactive aggression ( $F(3, 263) = 5.60, p < .001$ ) and proactive aggression ( $F(3, 263) = 3.04, p = .03$ ) were moderated by personality dimension extraversion. Marginally significant effects of condition X extraversion were found for teacher reported aggressive behavior ( $F(3, 263) = 2.38, p = .07$ ) at follow-up. Post-hoc analyses revealed that the strongest intervention effects on child ( $d = 1.02$ ) and teacher reported reactive aggression ( $d = .85$ ), teacher reported proactive aggression ( $d = .60$ ) and teacher reported aggressive behavior ( $d = .68$ ) were found for low extraverted children. These results suggested that maintenance of beneficial effects at long-term sustained, for less extraverted children. Conscientiousness did not moderate any of the outcomes at follow-up.

The three other personality factors, Benevolence, Emotional Stability and Imagination, did not moderate any of the outcomes at post test or follow-up.

## Discussion

The present study expanded previous intervention studies that examined moderators of intervention effects by focusing on moderation by child personality measured with the Big Five instrument. We examined which children benefitted from an indicated intervention for externalizing problem behavior, immediately after the intervention and at follow-up. The results of our study affirm the importance of including personality as moderator of intervention effects.

Short-term intervention effects were moderated by personality trait conscientiousness. This finding enriches findings from the effect study (Stoltz et al., 2011), because it gives indications which children might profit more from the Stay Cool Kids intervention (Hinshaw, 2007). Conscientious children are characterized as

being organized and planful. Also, they are motivated to fulfil tasks and are goal-directed (Mervielde & DeFruyt, 2002). The strongest intervention effects were found for those children who scored less extreme on conscientiousness. For highly conscientious children, aggressive behavior declined in both the intervention and the control group. However, for low conscientious children aggressive behavior remained stable after the intervention. These findings suggest that these children are hard to treat with a preventive intervention and that extra therapeutic effort may be needed. It is noteworthy that moderated effects were found on those teacher reported outcomes where no intervention effects were found for the total group (proactive aggression, delinquency). This emphasizes the importance of moderation analyses because through such analyses, significant intervention effects for subgroups of children in the absence of overall effects can be revealed (Kraemer et al., 2002). Proactive aggression and delinquency may be less sensitive to change, because these types of aggression are used as a mean to achieve certain rewards (Dodge, 1991). When children believe that their aggressive behavior is functional in obtaining desired outcomes it might be more difficult to convince them to change their strategies into more prosocial behavior. A specific subgroup of less extreme conscientious children responds better to the intervention, in terms of proactive aggression and delinquency.

Both short-term and follow-up intervention effects were moderated by child extraversion. This is an important finding because it indicates that among children indicated because of externalizing behavior problems; those who are highly extraverted are at-risk for poorer treatment outcomes. Teacher-reported effects on reactive aggression and aggressive behavior were sustained for all children in 5<sup>th</sup>-grade, but low extraverted children showed the strongest intervention effects. Moreover, only for low extraverted children maintenance of intervention effects were found on child reported reactive aggression and teacher reported proactive aggression. Low extraverted children are perhaps better able to adjust to situations and to control their impulses (Tackett, 2006). The risk for poorer treatment outcomes associated with extraverted traits, may be partly due to the relationship between extraverted traits, elevated activity levels and less inhibited behavior. For these children, it may be more difficult to implement newly learned behavior. Especially for these children, a booster may help further benefits from the intervention at follow-up (Tolan, Gorman-Smith, Henry, & Schoeny, 2009).

It is encouraging that effects of this implemented intervention on (reactive and proactive) aggression sustained at follow-up for at least a part of the children, although effect sizes are small to moderate. However, even small effect sizes can be of practical significance, because a small reduction in aggressive behavior may break a vicious cycle (McCartney & Rosenthal, 2000). With this intervention the

developmental trajectory towards more serious behavior problems can possibly be interrupted. However, for highly extraverted and low conscientious children it is important to develop a *more intensive individualized* intervention to prevent them from developing life-course persistent conduct problems.

Based on associations with externalizing behavior (e.g., Prinzie et al., 2010), we expected benevolence, besides conscientiousness and extraversion, to be related to intervention outcomes. However, intervention effects were not moderated by level of benevolence. Benevolent children are friendly, easy-going and compliant (John et al., 1994). This result suggests the program is as effective with less kind, empathic and friendly children, perhaps because of the individual targeted nature of the program.

### **Strengths, Limitations and Directions for Future Research**

The present study had several strengths. First, it offers the potential to contribute to the relatively understudied area of investigating theoretically grounded moderators in effectiveness studies (Weersing & Weisz, 2002). Moreover, to our knowledge this is the first study that included child personality as moderator in an effectiveness trial, using an RCT-design, well established measures and three waves of data collection. Finally, we were able to avoid the problem of method overlap by using multiple informants for reporting on child personality and problem behavior.

However, several methodological limitations warrant caution in interpretation of results. First, it is worth noting that the unit of analyses (individual level) did not match the unit of randomization (school level) in this study, which might have increased the risk of false-positive finding (Stice, Shaw, Bohon, Marti, & Rohde, 2009). The present design permitted us to study actual effects of an intervention implemented in routine school practice. Allowing each school to participate both in control and intervention conditions and blockwise randomization made it practically feasible for schools to participate. This would not have been possible with a traditional individual randomization to either control or intervention condition, because ethical issues concerning assignment of individual children in the same classroom to different conditions and lack of motivation to participate in the control condition would have prevented schools, teachers, and parents from participating in the study. Moreover, the present design prevented biases due to school factors, by delivering intervention and control conditions in the very same schools. In addition, results are based on child and teacher reported data, using questionnaires. Using a multi-method strategy, which includes observational measures in addition to questionnaires, would increase reliability and generalizability of results. Even though our study includes follow-up measurements at half-year after treatment termination, future research should focus on longer term follow-up.

Notwithstanding these limitations, the current study has some important implications for research and clinical practice. For outcome research it is important to focus not just on efficacy and effectiveness of interventions, but to include child personality as potential moderator in future studies. Since the current study indeed showed that personality influences intervention effects, it is important for other interventions to know which subgroups of children, with specific personality traits, respond to the interventions and for which subgroups other forms of help or adaptations of the program are needed. Assessing factors that predict and moderate follow-up effects can help identify those children who are at risk to continue with problem behavior. Adapted booster intervention can be developed for these children.

For clinical practice it is important, first, to know that a school-based individual preventive intervention can help children to develop less aggressive behavior both immediate after the intervention as after 6 months, when they move to the next grade. Schools are promising locations for interventions because children can be reached in a systematic and efficient way. Offering prevention activities in a school setting may make treatment more acceptable (Catron & Weiss, 1994) and increases the likelihood of generalization and maintenance of treatment effects to the natural environment (Evans, Langberg, & Williams, 2003). Although findings should be considered tentative, until replicated with other intervention study samples, they raise the question of how interventions might be adapted to target high extraverted and low conscientious children more effectively. Perhaps these children need a longer, more intensive individual targeted intervention. Knowledge of different child characteristics can lead to *personalized* mental health care, or modular protocols, by adapting programs to the child's specific needs, which in turn can produce stronger intervention effects (Chorpita, Daleiden, & Weisz, 2005; Frick & White, 2008).





# 6

## What Works for Whom, How and under What Circumstances? Testing Moderated Mediation of Intervention Effects on Externalizing Behavior in Children

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## Abstract

In this study we investigate whether changes in child social cognitive functioning and parenting are the mechanisms through which an individual real-world child intervention, Stay Cool Kids, aimed at preventing externalizing problem behavior in high risk elementary school children, induces changes in child behavior. Moreover, we tested whether mediation was moderated by child characteristics (gender and personality). The sample consisted of 264 fourth-grade children displaying externalizing behavior (TRF T-score > 60). Forty-eight schools were randomly assigned to the intervention or no-intervention control condition. Results of mediation analyses provided evidence for child positive self-perception and maternal involvement as working mechanisms of the intervention. Child personality factor extraversion moderated the mediating effect of involvement, whereas no moderated mediation was found for gender. The intervention works through the same mechanisms for boys and girls, but depending on personality characteristics mechanisms differ.

## Introduction

The vast majority of the studies that evaluated the effects of child interventions in reducing externalizing behavior are efficacy trials, in which effects of interventions are examined under ideal conditions (i.e., highly controlled settings, with groups of carefully selected individuals). Although highly important, these studies do not represent adequately the more complex reality of child mental health care services, with less structured care and heterogeneous groups of children. Recently, there has been more interest in effectiveness trials in real-world settings (e.g., schools), delivered by regular service staff (Weisz, Sandler, Durlak, & Anton, 2005).

Despite the fact that many trials measure potential mediators, mechanisms through which ameliorative effects are exerted have rarely been empirically tested (Hinshaw, 2002). Especially in effectiveness trials it is important to know what the critical ingredients of an intervention are. Therefore, the first goal of the current study is to examine mediators of intervention effects within a randomized controlled trial conducted under real-world conditions (in schools, delivered by regular service staff). In this study we investigate whether changes in child social cognitive functioning and parenting are the mechanisms through which an individual child intervention, Stay Cool Kids, aimed at preventing externalizing problem behavior in high risk elementary school children, induces changes in child aggressive behavior.

The intervention was found to be moderate effective across informants in reducing reactive and proactive aggression. Clinically relevant changes in externalizing behavior were reported for children who received the intervention. Moreover, several aspects of social information processing improved after the intervention and children had a more positive self-perception (Stoltz et al, 2012). In the current study, we conduct mediator analyses to elucidate the working mechanisms of the intervention.

There are several reasons to focus on child social cognitive functioning as a mechanism that can explain the effect of a child intervention on aggressive behavior. First, the intervention under investigation in the present study, Stay Cool Kids, is an indicated individual preventive intervention, based on a social cognitive perspective, which can be tailored to child's specific needs. Proposed effective program components and strategies are intent attribution retraining, perspective taking, awareness of emotions, anger regulation, a positive self-perception, goal setting, generating prosocial alternatives for aggressive behavior, and problem solving skills, which are all based on the assumption that aggressive children display distortions in their social cognitions (Kruuk & Hudepöhl, 2002).

Second, a body of research suggests that child social cognitions are central to child behavior. According to the social information processing model (Crick & Dodge, 1994; Lemerise & Arsenio, 2000) behavior can be seen as a product of six mental steps: 1) encoding of social cues, 2) interpretation of encoded cues, 3) clarifying goals, 4) generating responses to meet goals, 5) selecting responses, and 6) enacting the selected response. Systematic deviations in each of these steps have been found to lead to aggressive behavior. More particular, at the encoding stage, children with aggressive behavior tend to base interpretations of social events on fewer cues, recall more threatening cues and are more likely to rely on their memory instead of paying attention to new information (Dodge & Coie, 1987). With respect to the interpretation of encoded cues, aggressive children interpret ambiguous peer provocations as hostile (De Castro, Veerman, Koops, Bosch, & Monshouwer, 2002; Lochman & Dodge, 1994). Next, aggressive children often define their goals for obtaining desired (instrumental) outcomes without looking after consequences (Crick & Dodge, 1994). They generate more aggressive responses and are more likely to opt for aggressive solutions in social conflict situations, because they expect that it is more effective in obtaining desired outcomes (deviant outcome expectations) (Matthys & Lochman, 2005). Deficits in each of these steps have been found to be related to different forms of aggressive behavior. Children who have difficulties with encoding and interpreting cues in a non-hostile way and who consequently generate more aggressive response often show *reactive* aggression, which is an angry, emotional reaction to a presumed threat or provocation (De Castro, Merk, Koops, Veerman, & Bosch, 2005; Dodge, 1991).

Children who select aggressive responses and enact aggressive behavior to meet their goals are displaying mainly *proactive* aggression, which is planned aggression to dominate or intimidate (De Castro et al., 2005; Dodge, 1991). Moreover, aggressive children seem to differ in level of self-esteem, although deviations are not entirely clear. On the one hand it has been found that low levels of self-esteem are related to externalizing problems (Donnellan, Trzesniewski, Robins, Moffit, & Caspi, 2005), but on the other hand it is suggested that an unrealistic high self-esteem, rather than low self-esteem, contributes to externalizing (mainly proactive aggression) behavior (e.g., De Castro, Brendgen, van Boxtel, Vitaro, & Schapers, 2007; Thomaes, Bushman, De Castro, Cohen, & Denissen, 2009).

A final reason to focus on social information processing and positive self-perception is because several studies have shown that cognitive behavioral interventions for children indeed have positive effects on child social cognitive functioning (e.g., Coping Power Program; Lochman, Burch, Curry, & Lampron, 1984; Fast Track; McMahon et al., 1999). Moreover, so called social information processing interventions, that explicitly provide training on one or more of the social information processing steps, seem to be effective in reducing aggressive behavior in high-risk school-aged children (Wilson & Lipsey, 2006). However, in this meta-analysis it is not tested whether the social information components indeed are the working mechanism that may explain the effectiveness of these interventions. Therefore, because of limited evidence available, it is still possible that the effectiveness of these interventions has little to do with the theoretical model upon which the interventions are based. In their review on mechanisms of action in youth psychotherapy, Weersing and Weisz (2002), give an example of cognitive behavioral therapy for youth depression. Cognitive behavioral techniques, with the aim to remediate cognitive distortions, are often proposed as working mechanisms of these interventions. Although the interventions are successful in reducing depression, there was only one study that *tested* whether changes in cognitive distortions resulted in changes in behavior. This study did not find evidence for mediation (Kolko, Brent, Baugher, Bridge, & Birmaher, 2000).

In the current study, we also test whether changes in parenting behavior, more specifically changes in parental involvement and overreactivity, mediate intervention effects. The reason to include parenting behavior as potential mediator of intervention effects of a *child* training is that the Stay Cool Kids intervention can be seen as a contextual intervention. This means that, besides changing child's social cognitive functioning in the child training, parents are involved in the training as well. There are three meetings with the child's trainer, and parents are asked to practice exercises of the child training together with their child at home. Cross-contextual interventions are supposed to result in better generalization and maintenance of

changes in child behavior (Prinz, Blechman, & Dumas, 1994). Although changing parenting behavior is not a goal of the current intervention, parenting behavior may change, because of involvement of parents in the training, which in turn may lead to a change in child behavior. Many studies found that parenting has a significant impact on child aggressive behavior (e.g., Dishion & Patterson, 2006). Negative discipline, such as overreactive parenting, is associated with conduct problems in children (e.g., Snyder, Cramer, Afrank, & Patterson, 2005), whereas positive parenting, such as involvement, is associated with less aggression (Wissink, Deković, & Meijer, 2004). Some intervention studies indeed found that a child intervention to reduce aggression in children resulted in a (small) change in parenting behavior as well (e.g., Webster-Stratton & Hammond, 1997). However, whether changes in parenting behavior also mediate intervention effects of a child training has been examined less often.

A second goal of the present study is to examine whether mediational processes are influenced by moderators. More specifically, working mechanisms of an intervention can differ as a function of specific child characteristics, such as gender and personality. Very few intervention studies tested this 'moderated mediation'. In a study on the effects of a preventive intervention for children of divorce it was found that initial level of problem behavior moderated mediation effects (Tein, Sandler, MacKinnon, & Wolchik, 2004). Mediation effects of mother-child relationship quality on internalizing problems were primarily found for children who started the intervention with more problems in the mother-child relationship, discipline, and externalizing behavior. In previous studies on effectiveness of Stay Cool Kids, we found moderation of intervention effects by child personality and gender (Stoltz et al., 2012). Children with specific personality traits (low extravert and high conscientious) and boys benefitted more from the intervention on some of the outcome behaviors. Therefore, in the current study, we tested whether working mechanisms of the intervention are also dependent on these moderators.

In sum, the aims of the present study are to test 1) whether social information processing, positive self-perception and parenting are mediators of an intervention delivered under real-world circumstances, and 2) whether mediation is moderated by child characteristics. Based on the theoretical model and the contextual basis of the intervention, we expected that the effectiveness of Stay Cool Kids on reactive and proactive aggression would be explained by intervention induced changes in child social-information processing, self-perception, and changes in overreactive parenting and parental involvement. Because, to our knowledge, previous intervention studies did not include gender or personality as moderators of mediation effects of an intervention, the moderated mediation analyses are exploratory.

## Method

### Design

A randomized controlled trial design was used with 48 elementary schools in the Netherlands, randomly assigned to the intervention or control condition. Each school (4<sup>th</sup>-grade classes) participated in the intervention condition, as well as in the control condition. In this way, schools were more willing to participate in the control condition and treatment condition was randomized in such a way to ensure that intervention effects could not be due to school factors. However, randomization at school level could possibly lead to biased results. To examine whether the nesting of children within schools affected results, we computed the design effect (Muthén, 2000). This is expressed as  $d = 1 + \rho (c-1)$ , where  $\rho$  is the average intraclass correlation (.28) and  $c$  is the common cluster size (i.e., average number of children per school, 4.2). The design effect was 1.90, which is smaller than 2.0 and can therefore be ignored.

There were two assessment periods: prior to the beginning of the intervention and at intervention termination (after 11 weeks). Dependent measures were individually administered to children in their school settings by trained research assistants. Teachers and mothers received questionnaires and were asked to return these within a week. The study was approved by the Dutch Central Committee on Research Involving Human Subjects.

### Participants

After obtaining parental consent, 4<sup>th</sup>-grade teachers nominated children from their classes with the highest levels of externalizing behavior (the top 30%) and filled out the 32-item externalizing scale of the TRF ( $n = 437$ ; Achenbach, 1991). Next, researchers selected children based on their T-scores. The inclusion criterion was a T-score  $> 60$ , indicating a (sub) clinical level of externalizing behavior (*Mean T-score* = 67.49 (5.58), *range from 60 to 89*), which places children at risk for various negative outcomes. Some children did not meet the inclusion criterion of T-score  $> 60$  ( $n = 96$ ), participated in other forms of youth care ( $n = 15$ ), or were diagnosed with Autism Spectrum Disorder ( $n = 3$ ), and some parents refused to participate ( $n = 52$ ). If a child was selected, primary caretakers were contacted again to gather their informed consent to participate in this study. After consent was obtained, the baseline pre-assessment was conducted. Three children discontinued the child intervention, four children discontinued in the control condition.

The final sample consisted of 264 children (72% boys; majority of children was native Dutch, 73%), their teachers ( $n = 155$ ) and mothers ( $n = 197$ ) at Time 1. From these children, 191 children participated in the intervention condition, and 73

children in the control condition. Teachers filled out questionnaires about child personality for all children (some teachers filled out questionnaires for more than one child) only at Time 1. For mothers, missing data at Time 1 ( $n = 67$ ) and Time 2 ( $n = 93$ ) were completely random (Little's MCAR test:  $\chi^2 / 7 = .99, p = .44$ ). Therefore we decided to use Multiple Imputation techniques with the Expected Maximization (EM) algorithm. Imputed data were used in further analyses.

There were no significant differences in gender or TRF score for those children and parents who consented to participate and those who did not. Children in the intervention and control group did not differ significantly on demographic characteristics (SES, ethnic background). Children in the control condition received care as usual (e.g., remedial teaching, universal remediation programs), if necessary, within their school.

### **Intervention 'Stay Cool Kids'**

The Stay Cool Kids training is a social cognitive intervention that focuses on reciprocal relations between cognitions, emotions, and behavior of the child. The training is designed to reduce aggressive behavior in highly aggressive children at elementary schools. The long term goal is to prevent the development of externalizing behavior disorders. We recently reported short-term effects in reducing externalizing behavior problems and changing social cognitive functioning among 4<sup>th</sup>-grade school children (Stoltz et al., 2012). Trainers worked individually with the target child in 8 weekly sessions of 45 minutes. Children were seen during the school day from January until March. The trainer met with parents and teachers before the start of the training, during a mid term evaluation, and at the end of the training.

The training consisted of two phases. In the first phase, trainers investigated child's specific needs and competences. The first session starts with a general introduction, which is the same for all children. Next, trainers were able to choose two from six exercises, which were best suited for the individual child, for the second and third session. After the third session, an individual analysis of child's competences was made and discussed with parents and teachers during a midterm evaluation, resulting in an individual intervention plan. For the intervention plan trainers chose five from nine program components, which were most appropriate for the individual child's needs, as described in the trainer manual. Before phase 2 (session 4 -8) started, a contract between the trainer and child was signed, in which the training program is described. Exercises focused on 1) positive self-perception (less negative, realistic positive self-perception), 2) social cognitions (attribution of benign intent in ambiguous situations, accurate representation of other children emotions), 3) anger management (emotion-regulations strategies, e.g., 'stop-think-

act'), and 4) less aggressive behavior (generation of assertive instead of aggressive responses to social provocations). Parents and teachers received written information after each training session about what was done during the training. Also, they were asked to practice together with the child its newly learned skills.

## Measures

### Outcome variables.

**Aggressive behavior.** An adapted child version of the Teacher Rating of Aggression (TRA; Dodge & Coie, 1987; Hendrickx, Crombez, Roeyers, & Orobio de Castro, 2003) was used to measure child reported reactive and proactive aggression. Reliability, factor structure and validity of the TRA are adequate (e.g., Hendrickx et al., 2003; De Castro, et al., 2005). Items for reactive (e.g., 'When I am teased or threatened, I get angry easily and strike back'; 3 items) and proactive aggression (e.g., 'I use force to dominate peers'; 3 items) were rated on a 5-point Likert-scale (1 = *never* to 5 = *always*). Cronbach's alphas were averaged across pre- and post-assessment: Reactive aggression = .58, proactive aggression = .72.

### Mediator variables.

**Positive self-perception.** To assess positive self-perception, children were asked to fill out the subscale 'Behavior attitude' of the Dutch version of the Self Perceived Competence Scale for Children (Harter, 1982; Veerman, Straathof, Treffers, van den Bergh, & ten Brink, 1997) (e.g., 'Some kids usually get in trouble because of the things they do – Other kids don't do things that get them into trouble'). Children first had to decide which of the items in the pair better described them, and then they had to choose between 'sort of true' or 'really true'. With this format the effects of a pull for social desirability are reduced (T1  $\alpha = .68$ , T2  $\alpha = .73$ ). Higher scores indicate a more positive self-perception.

**Social Information Processing.** Four hypothetical stories were presented to children (Social Information Processing test, De Castro et al., 2005). The stories all concerned being hindered by a peer whose intentions are ambiguous (e.g., "Imagine: You and a friend are taking turns at a game at the pin-ball machine. When one has lost the game, it is the other's turn. Now it's your turn, and you are doing great. You will soon earn an extra ball, so you are trying very hard! The boy (or girl) you are playing with watches the game over your shoulder. He looks into the pin-ball machine to see where the ball is. Then he shouts "Watch out! The ball will drop from the right side!" But all of the sudden the ball appears from the left side and now you have lost the game!").



*Hostile intent.* Immediately after hearing a story the child was asked to indicate why the peer in the story might have acted the way he or she did. Responses were written down by the interviewer and scored as 0 (*benign intent*) or 1 (*hostile intent*). Mean kappa was calculated to measure intercoder agreement which was .95 to 1.00. Disagreements were resolved through discussions until consensus was reached. An open-answer hostile attribution variable was created by counting the number of stories with hostile answers (0 = *never a hostile attribution* to 4 = *always a hostile attribution*). Furthermore, the child was asked to indicate the peer's intent on a ten-point rating-scale ranging from 1 = to be *nice* to 10 = to be *mean*. Scores were averaged over the four stories. Because the open-answer and rating-scale variables were strongly correlated ( $r = .74$ ), they were combined by standardizing each variable and then computing their average (Cronbach's alpha T1= .64, T2= .62).

*Response generation.* Next, children were asked what they would do when the events in the vignette would actually happen to them. Responses were written down by the interviewer and scored 0 (*not aggressive*), 1 (*verbally aggressive or coercive response*), 2 (*physically aggressive response*), and scores were averaged over the vignettes. In a previous study (De Castro, et al., 2005) findings showed that an accurate interval scale of response aggressiveness could be created by weighting physical aggression with two points, verbal aggression with one point, and non-aggression with zero points. Inter-rater's agreement was found to be high: 95%. Cronbach's alphas were .65 at T1 and .62 at T2.

*Approval of Aggression.* Next, a possible behavioral response to the problem was presented (e.g., 'if this happens to me, I will hit the child who pushed me'). The child had to indicate on a 10-point scale whether he or she thought this was a good response (0 = *not a good response* to 10 = *a good response*). Ratings were averaged over the stories (Cronbach's alpha T1= .66, T2= .66).

*Enactment of Aggression.* Children similarly had to indicate on a 10-point scale to what extent they would enact a presented aggressive response themselves. Cronbach's alphas were .76 at T1, and .66 at T2.

### **Parenting.**

*Maternal Involvement.* The Alabama Parenting Questionnaire (Elgar, Waschbusch, Dadds, & Sigvaldason, 2007; Frick, 1991) was used to measure parental involvement (10 items, e.g., 'I have a friendly talk with my child', Cronbach's alpha T1 = .70, T2 = .71). On a 5-point rating-scale (1 = *never* to 5 = *always*) mothers were asked how much they agreed with statements.

*Overreactivity.* The Parenting Scale (Arnold, O'Leary, Wolff, & Acker, 1993; Prinzie, Onghena, & Hellinckx, 2007) was included to assess overreactive parenting using a 7-point likert-scale (7 items, e.g., 'When my child misbehaves: I raise my voice or yell', Cronbach's alpha T1 = .80, T2 = .79).

**Moderator variables.**

**Gender.** Gender (0 = *boys*; 1 = *girls*) was coded as a dichotomous variable.

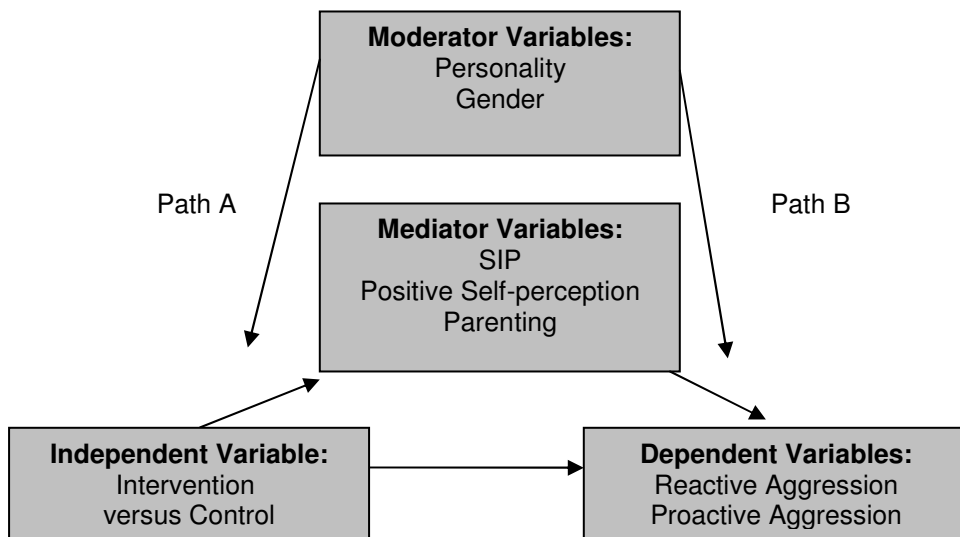
**Personality.** Teachers rated about child personality characteristics using the Hierarchical Personality Inventory for Children (HiPIC, Mervielde & De Fruyt, 1999). The HiPIC is a comprehensive personality inventory that assesses individual differences of children in 144 items. It has been shown to have high convergent and discriminate validities, temporal stability and replicability (Mervielde & De Fruyt, 2002; Shiner & Caspi, 2003). The items are on a 5-point scale, ranging from 1 = *almost not characteristic* to 5 = *very characteristic* (e.g., “accepts authority”). Number of items and Cronbach’s alphas for each dimension were: Extraversion (32 items, .92 for Extraversion) Benevolence (40 items, .85), Conscientiousness (32 items, .93), Emotional stability (16 items, .87) and Imagination (24 items, .93).

**Data Analyses**

**Mediator analyses.** We followed Baron and Kenny’s (1986) steps for testing potential mediators, child positive self-perception, child social information processing (SIP), and parenting, as has been done in other recent studies (e.g., Gardner, Hutchings, Bywater, & Whitaker, 2010). First, we examined whether there were significant associations between predictor (intervention versus control condition), mediator (positive self-perception, SIP or parenting) and dependent variable (child reactive and proactive aggression). Based on significant associations the variables were selected to be included in the mediation model. Second, we conducted hierarchical multiple regression analyses, with child reactive and proactive aggression at Time 2 as dependent variables. In step 1, baseline score (Time 1) and intervention status was entered, and in step 2, changes in child positive self-perception, SIP or parenting were introduced as a mediating variable. A significant reduction in the association between intervention and outcome, after introduction of the mediator, is seen as evidence for (partial) mediation. To formally assess significance of mediation, the Sobel test was calculated (Baron & Kenny, 1986). Because the Sobel test makes specific assumptions about the shape of the sampling distribution of indirect effects, we also generated 95% bias-corrected bootstrap confidence intervals for all indirect effects (Preacher & Hayes, 2008).

**Moderated mediation analyses.** Moderated mediation was tested using a macro developed by Preacher, Rucker and Hayes (2007), which allows us to determine the conditional indirect effect of the intervention on outcome variables (reactive and proactive aggression) through the proposed mediators (positive self-perception, SIP, or parenting). If mediating effects are moderated, this would be expressed by

significant interactions between independent variable and moderator (gender and personality) on Path A (see Figure 6.1), and between mediator and moderator on Path B, which then would affect the indirect effect process. Conditional indirect effects (i.e., mediator is moderated) can only be interpreted when there are significant interactions in the model (Preacher et al., 2007). Significant moderated mediation is tested with bootstrapped test of the indirect effects. For personality as moderator, we used the Johnson-Neyman technique (Preacher & Hayes, 2007) where values of the moderator where the conditional indirect effect transitions between significant and nonsignificant were estimated. The macro allows us to test single mediator, moderator and outcome variables at the same time (see Figure 6.1).



**Figure 6.1** Hypothesized Moderated Mediation

## Results

### Descriptives

We tested whether child changes in positive self-perception, SIP or parenting mediate intervention effects. First, intercorrelations between changes in all variables in the whole sample were calculated. Improvement in positive self-perception correlated with a larger reduction in reactive ( $r = .18, p < .001$ ) and proactive aggression ( $r = .13, p = .03$ ). A larger change in SIP aspect 'hostile intent' correlated with a larger change in reactive aggression ( $r = .21, p = .01$ ), but not with a change

in proactive aggression ( $r = .06, p = .31$ ). The same pattern was found for the aspect 'response generation' (reactive  $r = .19, p = .03$ , proactive  $r = .11, p = .11$ ). Changes in 'Approval of aggression' correlated with changes in reactive ( $r = .31, p = .00$ ) and proactive ( $r = .33, p = .00$ ) aggression. A larger reduction in 'Enactment of aggression' also correlated with a larger reduction in reactive ( $r = .24, p = .00$ ) and proactive ( $r = .36, p < .001$ ) aggression. Changes in parental involvement (reactive  $r = .23, p = .01$ , proactive  $r = .17, p = .03$ ) and overreactivity (reactive  $r = .17, p = .03$ , proactive  $r = .21, p = .01$ ) were correlated as well with changes in aggression.

As expected, based on a previous study (Stoltz et al., 2012), intervention status (0 = control, 1 = intervention) correlated with reactive ( $r = -.11, p = .07$ ) and proactive aggression ( $r = -.23, p < .001$ ) at Time 2. Intervention status also correlated with changes in positive self-perception ( $r = .23, p < .001$ ). Only some changes in SIP aspects were correlated with intervention status (hostile intent:  $r = .04, p > .10$ ; response generation:  $r = .10, p > .10$ ; approval of aggression:  $r = .19, p < .001$ , enactment of aggression:  $r = .10, p > .10$ ). This indicates that a change in 'approval of aggression' is the only SIP-aspect that is related to being in the intervention or control condition. Correlations between intervention status and changes in parental involvement were significant ( $r = .12, p = .05$ ). However, intervention status was unrelated to changes in overreactivity ( $r = -.05, p > .10$ ).

Based on the pattern of significant correlations, positive self-perception, approval of aggression and parental involvement were selected as potential mediating mechanisms of the intervention, and were included in tests of mediation in the next step.

## Mediation

Hierarchical multiple regression analyses were performed only for those mediators where associations with condition status and with outcome variables (reactive and proactive aggression) were significant<sup>1</sup>. Multiple regression was performed (Table 6.1), with reactive and proactive aggression at Time 2 as dependent variables. Independent variables were entered as follows. At step 1, Time 1 scores and intervention status were entered. At step 2, changes in hypothesized mediators were added. In the case of mediation, the effect of intervention status is attenuated where mediators are introduced in the regression equation. Sobel-tests and 95% confidence intervals are calculated (see Table 6.1).

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<sup>1</sup> Mediator analyses (Sobel-test and confidence intervals for indirect effects) were also performed for those mediators that were not significantly correlated with condition status and outcome variables. However, for these specific variables (hostile intent, response generation, enactment of aggression and overreactivity) no mediation was found. For ease of presentation we do not present these nonsignificant findings.

Changes in child positive self-perception mediated the intervention effects on reactive aggression (Sobel test = 2.12,  $p = .03$ ; 95% CI: .02 to .17) and on proactive aggression (Sobel test = 1.88,  $p = .07$ ; 95% CI: .00 to .11). Although adding the mediator 'approval of aggression' into the regression resulted in a decrease of the effect of intervention status (IV) on reactive and proactive (DV) aggression, both Sobel-test and bootstrapped confidence intervals indicate no significant mediation on reactive aggression (Sobel test = 1.43,  $p > .10$ ; 95% CI: -.02 to .16) and on proactive aggression (Sobel test = 1.45,  $p > .10$ ; 95% CI: -.01 to .16). Changes in parental involvement mediated intervention effects on reactive aggression (Sobel test = 3.04,  $p = .00$ ; 95% CI: .05 to .22), and on proactive aggression (Sobel test = 2.52,  $p = .00$ ; 95% CI: .01 to .15).

### **Moderated Mediation**

In the next step we examined whether these mediational effects were moderated by child gender and personality.

**Gender as Moderator of Mediation.** A significant interaction effect between gender and condition (control versus intervention) was found on proactive aggression ( $t = -2.52$ ,  $p = .03$ ). It can be concluded that the intervention resulted in a larger reduction of proactive aggression for boys ( $d = .55$ ) compared to girls ( $d = .23$ ). No significant interaction effects of gender as moderator with positive self-perception or parental involvement as mediators were found. This indicates that although boys benefitted more of the intervention on proactive aggression, mediation mechanisms in reducing reactive and proactive aggression are the same for boys and girls.

### **Personality as Moderator of Mediation.**

**Conscientiousness.** Testing the moderated mediation model with personality dimension 'conscientiousness' as moderator, no significant interaction effects were found. Although conscientious children seemed to benefit more from the intervention in a previous study (Stoltz et al., 2011), mediation effects are the same for all children.

**Extraversion.** No significant interaction effects of the moderator extraversion with mediators positive self-perception and involvement were found on *reactive* aggression.

**Table 6.1** Mediation Analyses: Regression Models Predicting Reactive and Proactive Aggression from Intervention Status and Change in Positive Self-perception, Approval of Aggression and Involvement.

Dependent Variable	Predictor Variable	R <sup>2</sup>	ΔR <sup>2</sup>	F	B	SE B	T	Z	95% CI
<b>Reactive Aggression</b>	<b>Step 1:</b>	.24	.24	39.66**					
	Pretest				.44	.47	8.66**		
	Intervention vs. Control				-.20	-.11	-2.08*		
	<b>Step 2:</b>	.25	.01	28.27**					
	Pretest				.45	.48	8.87**		
	Intervention vs. Control				-.15	-.09	-1.52		
<b>Proactive Aggression</b>	Change in Positive Self-perception				-.18	-.12	-2.11**	2.12*	.02 to .17
	<b>Step 1:</b>	.30	.30	57.42**					
	Pretest				.44	.51	9.76**		
	Intervention vs. Control				-.25	-.18	-3.47**		
	<b>Step 2:</b>	.31	.01	38.84**					
	Pretest				.45	.51	9.83**		
<b>Reactive Aggression</b>	Intervention vs. Control				-.23	-.17	-3.06**		
	Change in Positive Self-perception				-.07	-.06	-1.19	1.88 <sup>+</sup>	.00 to .11
	<b>Step 1:</b>	.24	.24	39.66**					
	Pretest				.44	.47	8.66**		
	Intervention vs. Control				-.20	-.11	-2.08*		
	<b>Step 2:</b>	.28	.04	32.77**					
<b>Reactive Aggression</b>	Pretest				.48	.51	9.48**		
	Intervention vs. Control				-.17	-.09	-1.75 <sup>+</sup>		
	Change in Approval Aggression				-.09	-.21	-3.84**	1.43	-.02 to .16

<b>Proactive Aggression</b>									
	<b>Step 1:</b>	.30	.30	57.42**					
	Pretest				.44	.51	9.76**		
	Intervention vs. Control				-.25	-.18	-3.47**		
	<b>Step 2:</b>	.34	.04	46.27**					
	Pretest				.48	.55	10.69**		
	Intervention vs. Control				-.21	-.16	-3.08**		
	Change in Approval Aggression				-.07	-.21	-4.11**	1.45	-.01 to .16
<b>Reactive Aggression</b>									
	<b>Step 1:</b>	.24	.24	39.66**					
	Pretest				.44	.47	8.66**		
	Intervention vs. Control				-.20	-.11	-2.08*		
	<b>Step 2:</b>	.29	.05	34.54**					
	Pretest				.46	.49	9.27**		
	Intervention vs. Control				-.11	-.06	-1.12		
	Change in Parental Involvement				-.57	-.24	-4.34**	3.04**	.05 to .22
<b>Proactive Aggression</b>									
	<b>Step 1:</b>	.30	.30	57.42**					
	Pretest				.44	.51	9.76**		
	Intervention vs. Control				-.25	-.18	-3.47**		
	<b>Step 2:</b>	.33	.03	43.77**					
	Pretest				.45	.52	16.09**		
	Intervention vs. Control				-.19	-.14	-2.69**		
	Change in Parental Involvement				-.33	-.18	-3.42**	2.52**	.01 to .15

Although less extraverted children seemed to benefit more from the intervention in a previous study (Stoltz et al., 2012), the effect of the intervention, through self-perception and involvement, on reactive aggression does not depend on level of extraversion in children. However, a significant interaction effect on proactive aggression was found for the extraversion x involvement interaction. This indicates that level of extraversion moderates the relation between involvement and proactive aggression. Bootstrapped confidence intervals indicate that the indirect effect of the intervention, through an increase in involvement, resulted in less proactive aggression, only for children with less extreme scores (range 2.66 to 3.44) on extraversion (95% CI range: -.40 to -.01). For children who scored either low or high on extraversion, indirect effects through an increase in involvement were nonsignificant.

## Discussion

The present study extends prior studies on effectiveness of child interventions for reducing aggressive behavior by testing mediators of intervention effects under real-world conditions, and by examining whether mediation is moderated by child characteristics. To our knowledge, this study is one of the first to test whether mediating mechanisms may vary by moderators (Gardner et al., 2010; Tein, et al., 2004), and therefore can answer the question ‘what works for whom, how, and in what circumstances?’ (Yirmiya, 2010). From a previous study we could already conclude that the individual school-based Stay Cool Kids intervention, for children indicated with externalizing behavior, was effective in reducing aggressive behavior (“*What works*” question). Results of mediation analyses in the current study provide evidence for child positive self-perception and maternal involvement as working mechanisms of the Stay Cool Kids intervention (*How does the intervention work?*). Child personality moderated the mediating effect of involvement, whereas no moderated mediation was found for gender. In other words: the intervention works through the same mechanisms for boys and girls, but through different mechanisms depending on personality characteristics (*For whom and under what circumstances does the intervention work?*).

Mediator analyses show that an increase in positive self-perception appears to be a key factor mediating change in reactive aggression, and partially in proactive aggression. One step of the SIP-model, approval of aggression, changed after participation in the intervention. Although changes in approval of aggression significantly predicted reactive and proactive aggression after the intervention, mediation was nonsignificant. In contrast, increasing maternal involvement seemed



to be an active ingredient of the intervention for reducing aggressive behavior. These findings extends other intervention studies that examined mediators of effects of social-cognitive interventions under research conditions (e.g., Lochman & Wells, 2002), by focusing on a routine-practice intervention. Moreover, results may contribute to developmental theories of children's aggressive behavior: Changes in child and parent processes can influence aggressive behavior in a specific high-risk group displaying symptoms of externalizing disorders. The mediating effect of child's positive self-perception in the current study shows that improving positive self-perception seems to be related to less aggression, which is in agreement with previous studies on the relation between self-esteem and externalizing behavior (Donnellan, et al., 2005).

Little evidence was found for the role of SIP as working mechanism in the current intervention. Whereas previous studies on associations between SIP and aggression found evidence for the other steps of the SIP-model (e.g., De Castro et al., 2002; Matthys & Lochman, 2005), only improvement in 'approval of aggression', which can be seen as accurate response evaluation (step 4 and 5 of the SIP-model), seems to be the key element of the SIP-model in the Stay Cool Kids intervention. Children showed decreases in approval of aggressive responses to ambiguous situations, and these changes were related to less aggression. Although changes in approval of aggression predicted changes in aggression, and the direct effect of intervention status dropped, mediation was nonsignificant and therefore there was only partial mediation of intervention effects. Finding evidence for only one step of the SIP-model in reducing aggressive behavior can be explained in several ways. First, perhaps response evaluation is the most important factor in maintaining aggressive and, therefore, reducing approval of aggressive response is related to improvement in behavior. Second, it is possible that trainers focused mainly on this specific SIP step. As Botvin (2004) suggested, interventions in 'natural settings' may not be as effective on all outcomes as expected because of poor fidelity. Third, the link between mediator and outcome may suffer from measurement problems. In this study, SIP is measured using self-reports in which children have to represent and verbally describe what they would do in hypothetical situations. It has recently been suggested that SIP should be measured directly, rather than inferred from self-report measures. For example, it has been found that through eye-tracking, using direct assessment in real-time, encoding cues and hostile intent attribution can be better assessed (Horsley, Orobio de Castro, & van der Schoot, 2010).

An interesting finding was that participating in a child training resulted in an increase in parental involvement. Increases in maternal involvement, in turn, resulted in decreases in reactive and proactive aggression. This finding is consistent with results of a meta-analysis on parenting interventions aimed to reduce antisocial

behavior problems in youth (McCart, Priester, Davies, & Azen, 2006), in which it was found that changing parenting behavior may be particularly effective for changing behavior in younger children, because of their dependency on their parents. The intervention did not result in significant changes in maternal overreactivity. Parental involvement can be seen as a more 'general' aspect of parenting. Overreactivity is more specific parenting behavior, which possibly could be changed in a parent training, but not with the Stay Cool Kids child intervention.

Although gender moderated intervention effects on proactive aggression, mediators were not moderated by gender. This indicates that boys benefitted more from the intervention, in terms of reductions in proactive aggression, which may raise the question whether the intervention should be adapted for girls (e.g., McMahon, Wells, & Kotler, 2006). However, working mechanisms through which reductions in aggression were achieved are the same for boys and girls. In contrast to gender, personality, more particular level of extraversion, moderated the mediating effect of parental involvement. For children with less extreme scores on extraversion, the intervention produced increases in maternal involvement, which in turn mediated the programs effects on aggressive behavior. In a previous study (Stoltz et al., 2012) we found that children with less extreme scores on extraversion (a mean level of extraversion) benefitted more from the intervention, perhaps because they are able to express their feelings (in contrast to very low extraverted children) and are better able to adjust to situations and to control their impulses (in contrast to very high extraverted children) (Tackett, 2006). The risk for poorer treatment outcomes associated with extraverted traits, may be partly due to the relationship between extraverted traits, elevated activity levels and less inhibited behavior. For these children, it may be more difficult to implement newly learned behavior. Interventions that focus on managing behavior (e.g., token reinforcement) may decrease the probability of problem behavior for highly extraverted children (DuPaul & Weyandt, 2006). Perhaps it is easier for mothers to get involved with children with less extreme extraverted behavior (i.e., children with a mean level of extraversion). Lower extraverted children may not enjoy social interactions, which can make it more difficult for parents to be involved and have positive experiences with their children. Whereas highly extraverted children, can be too dominant in social interactions with their parents (Tobin, Graziano, Vanman, & Tassinary, 2000), which may explain why involvement does not result in lower levels of aggression for these children.

### **Implications for Clinical Practice**

The identification of mediators of effectiveness in a real-world setting trial has important implications for clinical practice. First, for mental health care providers it is

important to know which ingredients are the core elements of an intervention, which result in a reduction in aggressive behavior. This can, in turn, lead to strengthen existing programs by focusing on effective components, and changing or omitting components with smaller effects (Kaminski, Vallew, Filene, & Boyle, 2008). For the Stay Cool Kids intervention, improving positive self-perception, increasing maternal involvement, and to a lesser extent reducing approval of aggression, are the core ingredients of the program. Second, trainers should be aware of different intervention effects for boys and girls and for children with different personality traits. For boys and girls, there are differences in intervention effectiveness, but working mechanisms are the same. However, it is important to know that different mechanisms might be operating for children with specific personality traits. Changing maternal involvement, through a preventive intervention for reducing aggression, result in larger effects for less extreme extraverted children. This knowledge can perhaps lead to personalized mental health care, in which programs are adapted to children's specific needs, so that effects of interventions can be enhanced (Chorpita, Daleiden, & Weisz, 2005; Frick & White, 2008).

### **Strengths and Limitations of the Study**

Several limitations of the study should be mentioned. Although we were able to assess some mediators and outcomes with multiple informants (mothers on parenting, children on aggressive behavior, teachers on personality), other mediators (SIP, positive self-perception) and outcomes were assessed within the same informant, which may have inflated correlations. This is a common problem in studies testing mediation (Weersing & Weisz, 2002). Second, as in many other intervention studies, mediators and outcomes were measured at two time points: Pre- and post intervention (e.g., Gardner et al., 2010). Using more time points would be better for testing mediation, because causal mechanisms can be demonstrated (Kazdin & Nock, 2003). Because of the relatively smaller sample size, we were not able to test more complex mediation models, which could give more information about how processes work together (Zhou, Sandler, Millsap, Wolchik, & Dawson-McClure, 2008). Also, several other child (e.g., prosocial behavior, peer relations) and parenting processes (e.g., parent-child relationship, monitoring) may contribute to changes in behavioral outcomes and should be examined in future studies. Finally, the moderated mediation analyses should be viewed as exploratory, and findings should be interpreted with caution. However, because of limited intervention studies testing mediation, and even fewer testing moderated mediation, exploratory studies are worthwhile.

Despite these limitations, the present study indicated that changing social-cognitive functioning in children and increasing parental involvement through a

preventive intervention for children at-risk for externalizing behavior problems improved outcomes. Again, it is important to realize that these mediating effects were found under real-world conditions. And as has been stated in other studies (e.g., Gardner et al, 2010; Weisz, 2004), this gives us information whether 'theoretically important ingredients of the intervention are operating to effect change in the real world in the same ways as in more tightly controlled efficacy studies' (Gardner et al., pp. 577).

# 7

## General Discussion

The first aim of this dissertation was to examine the effectiveness of Stay Cool Kids, an individual preventive school-based intervention aimed to reduce externalizing behavior in fourth grade children who show high levels of such behaviors according to their teachers. Moreover, we attempted to move beyond studying effectiveness by examining moderation and mediation of intervention effects. The goal of this dissertation was to answer three questions: 1) Does the intervention work for children with externalizing problem behavior?; 2) For *whom* does it work?; 3) *Why* does it work? In this concluding chapter we answer these research questions and discuss clinical implications following from the results of this study.

## Does it Work? Effectiveness of Stay Cool Kids

Until now, no *evidence-based* indicated intervention for children with elevated levels of externalizing behaviors existed in the Dutch school context (Overveld & Louwe, 2005; Hermanns, Öry, & Schrijvers, 2005). This is surprising, because the need for such an intervention is high, as externalizing problems have negative effects at the school system, peers, and the child itself. Effective preventive activities have the potential to reduce the incidence of diagnosed disorders in at risk children, and can thus prevent children from negative outcomes later in life (e.g., stable and persistent externalizing problem behavior, psychopathology) and can save society high costs of treatment (CPPRG, 2007; Matthys & Lochman, 2010). Stay Cool Kids seemed to be a promising existing preventive intervention to fill this gap. The Stay Cool Kids intervention was developed by preventive mental health trainers, and in the current study the effectiveness of Stay Cool Kids was examined.

In **Chapter 1**, we emphasized that effective interventions are needed to prevent children from developing behavioral disorders. Especially for children at high-risk, *individually delivered* and individualized indicated school-based interventions seem to be promising. Previous meta-analyses have shown that school-based interventions generally have positive effects and reduce externalizing behavior (Mytton, DiGuseppi, Gough, Taylor, & Logan, 2002; Wilson & Lipsey, 2007), with largest effects for targeted interventions for selected / indicated children ( $d = .29$ , Wilson & Lipsey, 2007). We argued in Chapter 1 that selected / indicated *individual* interventions, however, might be even more beneficial for children with elevated externalizing behavior, because of the risk of contagion in group interventions (Dishion & Dodge, 2005).

Therefore, in **Chapter 3**, we conducted a meta-analysis on individually delivered interventions for high-risk selected children. Only 9 studies evaluated effects of pure individual indicated school interventions. To date, most interventions aimed to

reduce externalizing behavior are group interventions (e.g., Wilson & Lipsey, 2007), probably because of practical advantages: they are less costly, more children can be served at the same time, and children can learn from each other (Ang & Hughes, 2002). We decided to include also interventions that added additional components to the individual interventions, resulting in 22 studies that evaluated effects of individual interventions (with or without additional components) in the last 35 years. Besides examining effects on externalizing behavior, we included other relevant outcomes: social cognitions, self-perception and prosocial behavior. We found that individually delivered interventions are effective in reducing externalizing behavior in indicated children ( $d = .28$ ), increasing prosocial behavior ( $d = .43$ ) and changing social cognitive functioning ( $d = .82$ ), but not in changing self-perception ( $d = .16$ , *ns*). There was large variability across studies, which was *not* explained by the additional components to the individual intervention (purely individual  $d = .26$ , individual interventions with additional components  $d = .29$ ). We may therefore carefully suggest that including other treatment components, in addition to an individually delivered child intervention does not result in larger effects. This is in line with meta-analyses on parenting programs that concluded that more is not necessarily better (Bakermans-Kranenburg, Van IJzendoorn, & Juffer, 2003; Wyatt Kaminski, Valle, Filene, & Boyle, 2008). The effects were moderated by age (younger children benefit more) and selection procedure (when children were selected by multiple informants this resulted in larger effects). Based on this meta-analysis, we can conclude that individually delivered school-based interventions are effective in reducing child externalizing behavior, but to produce larger intervention effects it is important to carefully select children for the intervention.

These results indicated that Stay Cool Kids, which is also an individually delivered indicated school-based intervention, has the potential to be effective. Therefore, in **Chapter 4**, we evaluated the effectiveness of Stay Cool Kids in the 'real-world' school setting. This study contributes to the limited literature on 'real-world' effectiveness studies. To date, government, policy makers, mental health care providers and also schools are more and more aware that interventions for children need to be evidence-based (Barlow, 1996). We found that Stay Cool Kids reduced reactive and proactive aggressive behavior, with small to medium effect sizes (mean effect sizes on aggressive behavior are .22, .29, .25 and .21 for children, teachers, mothers, and fathers, respectively). These effects are comparable to mean effects from international studies ( $d = .28$ ) included in our meta-analysis in Chapter 3. Findings differed across informants, with teachers reporting the largest effect sizes. This might be explained by the fact that the intervention is school-based and teachers selected the children for the intervention. Significant reductions in parent and child reported aggression were found as well, which strengthens the conclusion

that intervention effects can generalize from the school setting to the home setting. Moreover, the effect of the intervention was clinically significant, because participation in the intervention resulted in differences in the child's functioning from clinical to sub clinical or normal externalizing behavior. Although significant effects on child behaviors are comparable to effects of similar interventions, they are small in magnitude.<sup>1</sup> However, even small effect sizes can be of practical significance, because a small reduction in aggressive behavior may break a vicious cycle and can be of great value in social functioning (McCartney & Rosenthal, 2000).

To examine whether reductions in child's externalizing behavior after participation in the Stay Cool Kids intervention maintained over time, we conducted follow-up assessment six months after the intervention. These findings are reported in **Chapter 5**. In previous studies on long-term intervention effects, findings at follow-up are mixed. Some studies found maintenance of positive effects or even emergence of new positive effects at follow-up (e.g., Lochman & Wells, 2004), whereas in other studies effects faded with time (Tolan & Gorman-Smith, 2002). The present study showed that Stay Cool Kids resulted in sustained reduction in teacher reported aggression at six months follow-up, when children moved to fifth grade. It is important to note that these teachers who reported in fifth grade were not the same teachers who selected children and evaluated effects immediately after the intervention in fourth grade. Significant effects on child reported aggression after the intervention, however, faded at follow-up. Therefore, we might only carefully suggest that the intervention can, according to teachers, for part of the outcome behaviors interrupt the developmental trajectory towards more serious behavior problems.

## **For Whom does Stay Cool Kids work?**

It is unrealistic to expect an intervention to be effective for everyone: An intervention that works for one child may not work (as good) for another. After participation in Stay Cool Kids some children were still functioning in the (sub) clinical range. Therefore, we can conclude that Stay Cool Kids, although in general effective, did not work for all children equally well. Hence, we urgently need to learn more about moderator effects in intervention studies, because these can reveal important information about which children are responsive to a specific intervention and for which children other interventions need to be developed. Knowing for whom an intervention works can enhance selection procedures as well, and can in turn

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<sup>1</sup> Effect sizes of 0.80 are considered to be large, 0.50 are considered to be moderate, and effect sizes of 0.20 are considered to be small (Cohen, 1988).



prevent high drop-out rates (e.g., Kraemer et al., 2002). Usually, moderators in intervention studies are based on routinely obtained information (Kazdin, 2007), such as age or initial level of problems. However, moderators that are theoretically grounded may be even more important to consider.

To determine who benefitted from the Stay Cool Kids intervention and who did not, we investigated whether gender and ethnicity (Chapter 4) and personality (Chapter 5) moderated intervention effects. In **Chapter 4**, we found that for specific outcomes, the intervention worked *better* for boys (child reported proactive aggression) and for children with an immigrant background (teacher reported reactive aggression, aggressive response generation). This is important information, because the increasing diversity of the Dutch population requires an intervention that is effective for ethnically diverse children.

In **Chapter 5**, we examined child personality as moderator of immediate and follow-up effects of the Stay Cool Kids intervention and we found that children with moderate levels (not extremely high, but also not extremely low levels) of conscientiousness benefitted most of the intervention at short-term. Conscientious children are characterized as being organized and planful. Also, they are motivated to fulfil tasks and are goal-directed (Mervielde & DeFruyt, 2002). The strongest intervention effects were found for those children who scored less extreme on conscientiousness. For highly conscientious children, aggressive behavior declined in both the intervention and the control group. However, for low conscientious children aggressive behavior remained stable after the intervention. These findings suggest that these children are hard to treat with a preventive intervention and that extra therapeutic effort may be needed. We found these moderating effects on teacher reported outcomes where no effects for the total group were found (proactive aggression and delinquency), which emphasized the importance of these moderator analyses: In absence of overall effects, significant intervention effects for subgroups of children can be revealed (Kraemer et al., 2002). In addition, less extraverted children showed stronger intervention effects immediately after the intervention, and effects at follow-up were stronger for these children (teacher reported reactive aggression) or did only maintain for this subgroup of children (teacher reported proactive aggression; child reported reactive aggression). Low extraverted children are perhaps better able to adjust to situations and to control their impulses (Tackett, 2006).

In sum, we found that the intervention was effective in reducing externalizing behavior immediately after treatment termination. But, it appears that boys, immigrant Dutch children, children who are moderately conscientious and less extraverted *benefitted more* from the intervention on specific outcomes. Based on the results of half year follow-up, we can conclude that the intervention resulted in

lasting changes in teacher reported reactive aggressive behavior, but maintenance of effects on other outcomes were only found for less extraverted children. Although findings of moderator analyses should be considered tentative, they raise the question of how interventions might be adapted to target the less responsive subgroups of children. Perhaps these children need a longer, more intensive individual targeted intervention. It is also possible that content of the intervention was not appropriate for these subgroups of children, or delivery of the intervention resulted in smaller effects. These results underline the importance of personalized mental health care adapted to child's specific needs (Chorpita, Daleiden, & Weisz, 2005).

Because moderating effects were found in risk factors (Chapter 2) and in intervention effects (Chapter 4, 5), it can also be expected that for subpopulations different mechanisms play a role in the development of externalizing behavior and therefore, the working mechanisms of the intervention may differ across groups. This is so called 'moderated mediation' and this was tested in **Chapter 6**. First, however, we discuss the results of our mediation analyses.

## **Why does Stay Cool Kids work?**

Most intervention studies focus, as can be expected, on answering the question 'does it work?', which is directly relevant for clinical practice. An often neglected goal in intervention studies is to provide tests of theoretical models on which interventions are based (of *how* the intervention works). In the last decade there is a growing body of studies that tries to identify working mechanisms, i.e. mediators, through which an intervention exerts its effects (Howe, Reiss, & Yuh, 2002; Kazdin & Nock, 2003; Kraemer et al., 2002).

In **Chapter 2**, we tested whether child social cognitive functioning (social information processing and self-perception) mediates the association between parenting (parent-child relationship, positive and negative parenting) and aggression in high-risk elementary school children, selected by their teachers because of elevated levels (at least sub clinical) of externalizing behavior. Because individual child characteristics may affect the relations between risk factors, we included child gender and ethnic background as moderators of associations between parenting, child social cognitive functioning and aggressive behavior. We found support for associations in the proposed mediational model, with similarities across ethnic groups, but differences between boys and girls (see Figure 2.2). Significant associations were found between parenting and aggression, which is in agreement with many studies indicating that family factors play an important role in the

development and persistence of child's externalizing behaviors (Stormshak, Bierman, McMahon, Lengua, & CPPRG, 2000). Results of the study emphasized the importance of the parent-child relationship above and beyond parenting behavior, as was also found in other studies (e.g., Deković, Janssens, & van As, 2003). However, in contrast to our expectations, parenting was not related to children's social information processing style. From a social learning perspective (Bandura, 1973; Dodge, 1986), problems in social cognitive functioning are seen as a result of dysfunctional schemas that may be developed by observing a model (parents or peers) who demonstrates inappropriate cognitive problem solving and by limited cognitive capacities of children. Future studies should include the SIP-style of parents and peers (e.g., Nelson & Coyne, 2009) and a measure of child's cognitive abilities. We did find, however, child self-perception to be related to parenting behavior, which is consistent with social learning theories: experiences of negative control can result in negative self-perception (Bandura, 1973). Our results indicated that social cognitive functioning was related to aggressive behavior, although associations were mainly found for boys. Little support was found for the mediation model with social cognitive functioning underlying the parenting-aggression association.

In **Chapter 4**, we examined whether the intervention affected social cognitive functioning. We found that only some aspects of social cognitive measures we used changed (self-perception and approval of aggression) as a result of participation in the intervention. We suggested that other aspects of social cognitive processes were possibly less sensitive to change and that more time might be needed to internalize newly learned cognitions. In **Chapter 6**, we tested whether the changes in social cognitive functioning, in turn, predicted a decrease in aggressive behavior. In other words, is changing social cognitive functioning a mediator of the effectiveness of Stay Cool Kids? Is the theoretical model upon which the intervention is based indeed mechanism that explains reductions in externalizing behavior? Because Stay Cool Kids also involves the context (parents), we also tested whether changes in maternal involvement mediated intervention effects.

We found that changes in self-perception resulted in a decrease in child aggressive behavior. Interventions that aim to train children to have more positive levels of self-perception and to make them aware of their worth and self-perceived competences, can reduce hostile, defensive and aggressive behaviors. A possible reason is that it is not longer necessary to defend uncertain self-regard from external threats. Little evidence was found for the role of social information processing, with measures we used, as working mechanism in the current intervention: only response evaluation partially mediated intervention effects. No mediation effects were found for hostile intent, response generation and enactment of aggression. It is

possible that trainers mainly focused on this specific SIP step and not on the other SIP outcomes. Interventions in natural settings may not be effective on all outcomes as expected, because of poor fidelity (Botvin, 2004). Furthermore, the link between mediator and outcome may suffer from measurement problems (see paragraph Strengths and Limitations).

In addition, child participation in the intervention resulted in an increase in maternal involvement, which in turn resulted in decreases in reactive and proactive aggression. This confirms the findings of the meta-analysis of McCart and colleagues (2006); Changing parenting behavior may be particularly effective in changing outcome behavior in young children, because young children are most influenced by their parents.

What do these results mean for further development of Stay Cool Kids? Is the focus on social cognitive functioning, as suggested in tested etiological models, legitimate? Lochman and Matthys (2010) state that unrevealing the active ingredients of an intervention can lead to 'individualization of the actual implementation' of the intervention. For example, when an aggressive child shows a hostile attributional bias, but no problems in the other social information processing steps, the intervention should specifically focus on training the interpretation of others' motives (Matthys & Lochman, 2010). What is needed for clinical practice is a list of available active ingredients, so that trainers can focus on these components in their trainings (Matthys & Lochman, 2010). The present findings suggest that for the Stay Cool Kids intervention, the most effective component was changing self-perception. On the other hand, perhaps trainers should emphasize and focus more on social information processing in the intervention, because social information processing was related to aggressive behavior (see Chapter 2). In the effectiveness study (Chapter 4) it was found that the intervention only changed one SIP aspect (approval of aggression), so probably trainers need to focus more on those exercises that aim to change hostile intent and aggressive response generation.

In Chapter 6 we further tested whether mediational processes are influenced by child characteristics. Because personality and gender were moderators on some outcomes in Chapter 4 and gender moderated associations between risk factors and aggressive behavior in Chapter 2, it is plausible that changes in social cognitive functioning are moderated by these child characteristics as well. Concerning gender, we found in Chapter 6, using moderated mediation analyses, that mechanisms through which reductions in aggression were achieved were similar for boys and girls. With respect to personality, different mechanisms might be operating for children with specific personality traits. Extraversion moderated the mediation effect of parental involvement, with parents of children with mean levels of extraversion being more involved. Based on these results, we may carefully suggest that it might

be easier for mothers to get involved with children with less extreme extraverted behavior, which in turn can change the behavior of the child.

## **Strengths and Limitations**

Although this dissertation has several methodological strengths, such as a randomized controlled trial design, multiple informants on outcome measures, an ethnically diverse sample of boys and girls, the findings should be interpreted in the light of several limitations. Because in each chapter some specific limitations are mentioned, we will focus here on some general limitations of the randomized controlled trial studies (Chapter 4, 5, 6).

It should be noted that the unit of analyses (individual level) did not match the unit of randomization (school level), which might have increased the risk of false-positive findings (Stice, Shaw, Bohon, Marti, & Rohde, 2009). However, the present design permitted us to study actual effects of the Stay Cool Kids intervention implemented in routine school practice. Allowing each school to participate both in control and intervention conditions and a blockwise randomization made it practically feasible for schools to participate. Moreover, the present design prevented biases due to school factors, by delivering intervention and control conditions in the very same schools. The control group in this study did not receive any treatment. It is possible that the beneficial effects of Stay Cool Kids are simply the consequence of receiving attention and that some other treatment would have the same effect.

It is also worth noting that children were selected for this intervention by their teachers, because of elevated levels of externalizing behavior (indicated on a normed questionnaire, TRF) at schools. In Chapter 3, we found, using meta-analytic techniques, that selection procedure moderated effectiveness of intervention, with larger effects for studies that used multiple informants for selection. Selecting children for the intervention based on a combination of informants (teachers, parents and possibly peers) on child's externalizing behavior, might lead to larger effect sizes, because it may indicate that children might be particularly in need for the intervention.

Intervention effects were based on child, parent and teacher reported data. However, informants were not blind to conditions. It could therefore be the case that results have been biased because of involvement in the program. Although there were problems inherent in ratings of parents and teachers, especially when they are involved in some way in the intervention, the fact that intervention effects were found across all informants and that the pattern of findings was similar across informants

lends credibility to the findings. It is important to note that teachers and parents did not *conduct* the intervention themselves, as is frequently the case in other intervention studies. Therefore, they still may be critical to changes in child's behavior. However, for future studies we suggest a multi-method strategy. Including observational measures would increase the reliability and generalizability of our results (e.g., Shores, et al., 1993). Furthermore, aggressive behavior often happens in the context with peers, not in the presence of adults (e.g., Dodge & Coie, 1987). Peer ratings, in addition to self-, teacher- and parent-reports, might provide useful information.

In this study, social information processing is measured using self-reports in which children have to represent and verbally describe what they would do in hypothetical situations. It has recently been suggested that SIP should be measured directly, rather than inferred from self-report measures. For example, it has been found that through eye-tracking, using direct assessment in real-time, encoding cues and hostile intent attribution can be better assessed (Horsley, Orobio de Castro, & van der Schoot, 2010).

## **Future Directions**

The results of this dissertation give rise to a number of recommendations for future research. It has been suggested that children with externalizing behavior and their families can be best treated with a continuum of services rather than with separate components (Kazdin, 2000). In future studies we will test if offering a parent intervention *after* the Stay Cool Kids child intervention will result in larger effects or longer maintenance of effects. Second, measurement of longer term effects is needed to examine stability of program effects later in life. For example, it is possible that more time is needed to internalize newly learned social cognitive skills. This should be measured at half year follow-up, to determine whether this, in turn, predicts changes in behavior at a year follow-up. Third, for health insurers, but also for schools, it is important to know which intervention gives best value for their money (Raaijmakers, Posthumus, Van Hout, Van Engeland, & Matthys, 2011; Romeo, Byford, & Knapp, 2005). Most intervention studies do not include cost-effectiveness analyses, but there is a need to determine the economic impact of interventions. Fourth, in future studies it will be examined whether treatment fidelity and trainer characteristics (e.g., educational level or experience) moderate effects of Stay Cool Kids.

## General Conclusion

What are the implications of this dissertation for the Dutch school context? In 2005, it was concluded that no evidence-based indicated school-based intervention for children with an elevated level of externalizing behavior existed. The Stay Cool Kids intervention was already implemented in schools, however, it was not empirically tested whether the intervention was effective in reducing externalizing behavior. Studies in this dissertation showed that the Stay Cool Kids intervention can reduce externalizing behavior (reactive and proactive aggression, clinical externalizing behavior) across settings (school and home), in boys and girls and in children with different ethnic backgrounds. Teachers in fifth grade (not involved in the intervention) reported lower reactive aggression for children in the Stay Cool Kids group at a half year follow-up. However, although effect sizes were similar to findings in international meta-analyses, they can be considered as small to medium, and (maintenance of) intervention effects were not the same for all children. Can we conclude that the Stay Cool Kids intervention is 'evidence-based'? The definition of an evidence-based intervention is that the intervention should be evaluated and empirically supported by experimental studies. But when multiple outcome measures are used, how can we judge that an intervention is empirically supported when effects are found on one outcome, but not on another? What to do with interventions that produce effects at short term, but not at long term? Or when the intervention affects social cognitions, but when social cognitions are not the working mechanism of the intervention? In other words, are lists of evidence-based treatments of any value? Gresham and Lochman (2008) described a number of methodological considerations involved in determining the evidence base of an intervention (See for a debate on this Gresham & Lochman, 2008).

Perhaps it is more realistic to expect that certain components of an intervention will work for certain children and others will not. Maybe we should move from a list with evidence-based interventions towards a list with active ingredients of evidence-based interventions. In this way, we can perhaps create personalized mental health care, in which preventive mental health care providers can choose from an array of active components and choose specific components for specific child's needs. For example, when a child displaying externalizing behavior mainly suffers from low self-esteem, probably as a result of a negative parent-child relationship, intervention delivery could focus on enhancing the level of self-esteem in the child training (rather than focusing on social information processing) and emphasize the importance of a warm parent-child relationship in an additional parent training (rather than focusing on parenting practices). In this way, presence of specific risk factors, but absence of others, can lead to adaptations of delivery mode of the intervention

(Chorpita et al., 2005; Matthys & Lochman, 2010). Consequently, instead of focusing on one effective intervention, it is more realistic to find a combination of effective treatments, aimed at multiple domains, and changing both the individual and his or her environment.



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# Summary

Stable externalizing behavior in childhood places children at risk for the development of a chronic and persistent pattern of externalizing behavior problems. Therefore, preventive interventions aimed to interrupt this developmental trajectory are crucial. Although the need for such an intervention is high, as externalizing problems have negative effects at the school system, peers, and the child itself, until now, no *evidence-based* indicated intervention for children with elevated levels of externalizing behaviors existed in the Dutch school context. Stay Cool Kids, developed by preventive mental health trainers, seemed to be a promising existing preventive intervention to fill this gap. The aim of the current dissertation was to study the effectiveness of Stay Cool Kids and to examine for whom and how the intervention works.

This study is a cluster Randomized Controlled Trial with 48 elementary schools in the Netherlands. Fourth grade teachers selected children with elevated levels of externalizing behavior for participation in the study. Teachers, children, mothers and fathers filled out questionnaires prior to the beginning of the intervention, at intervention termination (after 11 weeks), at 6-months and at 12-months follow-up when children were in 5<sup>th</sup> grade.

### **Does it work?**

For children at high-risk, individually delivered and individualized indicated school-based interventions, such as Stay Cool Kids, seem to be promising. Results from our meta-analysis (Chapter 3) on international studies of these interventions showed that individually delivered interventions are effective for indicated children in reducing externalizing behavior ( $d = .28$ ), increasing prosocial behavior ( $d = .43$ ) and changing social cognitive functioning ( $d = .82$ ).

Findings of our meta-analysis indicated that Stay Cool Kids had the potential to be effective. Results of the RCT-study in a real-world school setting (Chapter 4), with 264 fourth-grade children randomly assigned to the intervention or no-intervention control condition, showed that Stay Cool Kids reduced reactive and proactive aggressive behaviour (mean effect sizes on aggressive behavior are .22, .29, .25 and .21 for children, teachers, mothers, and fathers, respectively). Findings differed across informants, with teachers reporting the largest effect sizes. Significant reductions in parent and child reported aggression were found as well, which strengthens the conclusion that intervention effects can generalize from the school setting to the home setting. Moreover, the effect of the intervention was clinically significant, because participation in the intervention resulted in differences in the child's functioning from clinical to sub clinical or normative levels of externalizing behavior (according to teachers). Although significant reductions in child externalizing problem behaviors were comparable to the effect sizes of

individually delivered interventions in the meta-analysis, the effect sizes were small to medium in magnitude. Some aspects of problems in social cognitive functioning were reduced (approval of aggression,  $d = .22$ ) and children showed more positive self-perception ( $d = .49$ ). The results of follow-up assessment showed that Stay Cool Kids resulted in sustained reduction in teacher reported aggression at six months follow-up, when children moved to fifth grade. Therefore, we may carefully suggest that the intervention can, according to teachers, for part of the outcome behaviors interrupt the developmental trajectory towards more serious behavior problems. Significant effects on child reported aggression after the intervention, however, faded at follow-up.

### **For whom does it work?**

After participation in Stay Cool Kids some children were still functioning in the (sub) clinical range. Therefore, we can conclude that Stay Cool Kids, although in general effective, did not work for all children equally well. Studying moderators of intervention effects is essential to elucidate what works for whom. Results from moderation analyses (Chapter 4 and 5) showed that boys, immigrant Dutch children, children who are moderately conscientious (organized and playful) and less extraverted (sociability and agency) *benefitted more* from the intervention on specific outcomes at short-term. In addition, less extraverted children showed stronger intervention effects immediately after the intervention, and effects at follow-up were stronger for these children or did only maintain for this subgroup of children. These results raise the question of how interventions might be adapted to target the less responsive subgroups of children and underline the importance of personalized mental health care adapted to child's specific needs.

### **Why does it work?**

Most intervention studies focus on answering the question 'does it work?' which is directly relevant for clinical practice. In addition to examining the effectiveness of Stay Cool Kids, this study tested the theoretical model upon which the intervention is based (*how* the intervention works). With cross-sectional analyses (Chapter 2), we provided insight in putative correlates of externalizing behavior in the selected high-risk children by testing whether child's social cognitive functioning mediated the association between parenting and aggression. We found support for associations between parenting and aggression, parenting and self-perception, and social cognitive functioning and aggression. Similarities across ethnic groups, but differences between boys and girls were found.

In the effectiveness study (Chapter 4), we found that only some aspects of social cognitive measures changed as a result of participation in the intervention. Tests of

the theoretical model (social cognitions) with mediation analyses (Chapter 6) revealed that an increase in positive self-perception resulted in a decrease in child aggressive behavior. Possibly, interventions that aim to train children to have more positive levels of self-perception and to make them aware of their worth and self-perceived competences, can reduce hostile, defensive and aggressive behaviors. Little evidence was found for the role of social information processing as working mechanism in the current intervention. Because Stay Cool Kids also involves the context (parents), we tested whether changes in maternal involvement mediated intervention effects and found that child participation in the intervention resulted in an increase in maternal involvement, which in turn resulted in decreases in aggression. This suggests that changing parenting behavior may be particularly effective in changing outcome behavior in young children, because young children are most influenced by their parents. Findings of Chapter 6 indicated that for the Stay Cool Kids intervention, the most effective component was changing self-perception. On the other hand, perhaps trainers should emphasize and focus more on social information processing in the intervention, because social information processing was related to aggressive behavior (see Chapter 2).

Because moderating effects were found in risk factors (Chapter 2) and in intervention effects (Chapter 4, 5), we tested whether working mechanisms of the intervention differed across subpopulations (moderated mediation). Mechanisms through which reductions in aggression were achieved seemed to be similar for boys and girls, but different for children with specific personality traits (Chapter 6). Moderated mediation analyses indicated that it might be easier for mothers to get involved with children with less extremely extraverted behavior, which in turn can change the behavior of the child.

### **General conclusion**

This dissertation ends with a general discussion of our findings in Chapter 7. In 2005, no evidence-based indicated school-based intervention for children with an elevated level of externalizing behavior existed. The Stay Cool Kids intervention was already implemented in schools, but the effectiveness had not been empirically tested. Altogether, the studies in this dissertation showed that Stay Cool Kids can reduce externalizing behavior (reactive and proactive aggression, clinical externalizing behavior) across settings (school and home), in boys and girls and in children with different ethnic backgrounds. Teachers in fifth grade reported lower aggression a half year after the intervention. Effect sizes of Stay Cool Kids were similar to findings in international meta-analyses and can be considered as small to medium. It is important to realize that (maintenance of) effects of the intervention were not the same for all children.



# **Samenvatting**

**(Summary in Dutch)**

Stabiel externaliserend probleemgedrag tijdens de basisschoolleeftijd geeft een verhoogd risico voor het ontwikkelen van een chronisch en persistent patroon van externaliserende gedragsproblemen. Om de ontwikkeling naar meer ernstige gedragsproblemen te kunnen doorbreken, zijn preventieve interventies nodig. Hoewel de behoefte aan een dergelijke interventie groot is, is er in de Nederlandse schoolcontext tot op heden geen *evidence-based* geïndiceerde interventie voor kinderen met een verhoogde mate van externaliserend gedrag. Externaliserend probleemgedrag heeft namelijk negatieve gevolgen voor de school, voor leeftijdsgenoten en voor het kind zelf. Alles Kidzzz, ontwikkeld door preventiemedewerkers vanuit de GGZ, leek een veelbelovende interventie om deze lacune op te vullen. Het doel van deze dissertatie was om de effectiviteit van Alles Kidzzz te onderzoeken en daarbij na te gaan voor wie en hoe de interventie werkt.

Deze studie is een cluster Randomized Controlled Trial (RCT) met 48 deelnemende basisscholen ( $n = 264$  kinderen) in Nederland. Leerkrachten in groep 6 selecteerden kinderen voor de studie vanwege een verhoogde mate van externaliserend gedrag. Leerkrachten, kinderen, moeders en vaders vulden vragenlijsten in voorafgaand aan de start van de interventie, direct na afloop van de interventie (na 11 weken) en 6 en 12 maanden na de interventie, wanneer de kinderen in groep 7 zaten.

### **Werkt het?**

Voor kinderen met een verhoogd risico op externaliserende gedragsproblemen zijn individuele en op maat gemaakte schoolinterventies, zoals Alles Kidzzz, veelbelovend. Resultaten van onze meta-analyse naar internationale studies van deze interventies (Hoofdstuk 3) tonen aan dat individuele interventies effectief zijn voor kinderen die geïndiceerd zijn voor externaliserend probleemgedrag. Deze interventies zorgen voor een vermindering van externaliserend gedrag ( $d = .28$ ), een toename van pro sociaal gedrag ( $d = .43$ ) en een verandering in sociaal cognitief functioneren ( $d = .82$ ).

Op basis van de bevindingen van de meta-analyse kan verwacht worden, dat Alles Kidzzz mogelijk effectief is in het verminderen van externaliserend gedrag. Resultaten van de RCT-studie (Hoofdstuk 4), uitgevoerd in de dagelijkse praktijk met 264 kinderen uit groep 6 die at-random werden toegewezen aan de interventie- of controlegroep, laten zien dat Alles Kidzzz reactieve en proactieve agressie kan verminderen (gemiddelde effect-sizes voor agressief gedrag waren .22, .29, .25 en .21 volgens respectievelijk de kinderen, leerkrachten, moeders en vaders.). Resultaten verschilden tussen informanten en leerkrachten rapporteerden de grootste effecten. Significante verminderingen in ouder- en kindgerapporteerde agressie werden gevonden. Deze resultaten geven aan dat interventie-effecten

kunnen generalizeren van de schoolsituatie naar de thuissituatie. Daarnaast leidde deelname aan de interventie tot een klinisch significante verandering in gedrag volgens leerkrachten: de mate van externaliserend gedrag viel na de interventie vaker in de subklinische of in de normale range. Hoewel effecten van Alles Kidzzz vergelijkbaar zijn met andere, soortgelijke, interventies, is het belangrijk te realiseren dat de effecten klein tot gemiddeld zijn. Na deelname aan Alles Kidzzz waren enkele aspecten van sociaal cognitief functioneren veranderd (waardering van een agressieve response,  $d = .22$ ) en lieten kinderen een positiever zelfbeeld zien ( $d = .49$ ). Follow-up metingen tonen aan dat kinderen na 6 maanden, wanneer zij in groep 7 zitten, een blijvende vermindering in agressief gedrag laten zien volgens hun leerkrachten. Daarom kunnen we voorzichtig concluderen dat Alles Kidzzz, volgens de leerkrachten, de ontwikkeling naar meer serieuze gedragsproblemen kan doorbreken. Significante effecten zoals gerapporteerd door het kind waren echter verdwenen een half jaar na de interventie.

### **Voor wie werkt het?**

Na deelname aan Alles Kidzzz waren er nog steeds kinderen die in de (sub) klinische range externaliserend gedrag vertoonden. Daarom kunnen we concluderen dat Alles Kidzzz, hoewel in het algemeen effectief, niet voor alle kinderen even goed werkt. Door moderatoren van interventie-effecten te onderzoeken, kunnen we bepalen wat werkt en voor wie. Resultaten van moderatie analyses (Hoofdstuk 4 en 5) laten zien dat jongens, allochtone kinderen en kinderen die gemiddeld consciëntieus en minder extravert zijn, meer baat hebben bij de interventie. Direct na de interventie laten zij op specifieke uitkomstmaten grotere verbeteringen zien. Daarnaast werden voor minder extraverte kinderen grotere effecten op de follow-up meting gevonden en sommige effecten op de follow-up meting werden alleen voor deze kinderen gevonden. Deze resultaten roepen de vraag op, op welke manier interventies zouden kunnen worden aangepast om ook de minder responsieve groep kinderen te bereiken. Het belang van op het individu afgestemde interventies wordt benadrukt door resultaten uit deze moderatie-analyses.

### **Waarom werkt het?**

De meeste interventiestudies focussen op het beantwoorden van de vraag 'werkt het?'. Dit antwoord is direct relevant voor de klinische praktijk. Daarnaast zouden interventiestudies de theoretische basis van interventies moeten toetsen (*hoe werkt de interventie*). Met cross-sectionele analyses (Hoofdstuk 2) hebben we inzicht verkregen in de associaties tussen opvoeding en agressie. We vonden hierbij dat in deze geselecteerde groep kinderen met externaliserend probleemgedrag, sociaal cognitief functioneren de relatie tussen opvoeding en agressie medieert. Daarnaast

vonden we associaties tussen opvoeding en agressie, opvoeding en zelfbeeld en sociaal cognitief functioneren en agressie. In deze associaties werden geen verschillen gevonden tussen autochtone en allochtone kinderen, maar wel tussen jongens en meisjes.

In de effectiviteitsstudie (Hoofdstuk 4) vonden we dat slechts enkele aspecten van sociaal cognitief functioneren veranderden na deelname aan de interventie. Met mediatie-analyses hebben we vervolgens het theoretische model getoetst voor de verklaring van de werkende mechanismen tijdens de interventie (Hoofdstuk 6) en hieruit bleek dat een toename van positief zelfbeeld leidde tot een afname in agressief gedrag van het kind. Mogelijk dragen interventies die zich richten op een positiever zelfbeeld, zelfwaardering en competenties, bij aan het verminderen van vijandige en agressieve gedragingen. Weinig bewijs is gevonden voor de rol van sociale informatieverwerking als werkzaam mechanisme van de Alles Kidzzz interventie. Omdat in de Alles Kidzzz interventie de context wordt betrokken (ouders), hebben we eveneens getest of veranderingen in ouderlijke betrokkenheid interventie effecten mediëren. We vonden hier, dat moeders meer betrokken raakten bij hun kind, wanneer het kind deelnam aan de Alles Kidzzz training, en dit zorgde vervolgens weer voor minder agressief gedrag bij het kind. Deze resultaten laten zien, dat via een contextuele interventie op school het veranderen van opvoedgedrag kan bijdragen aan het veranderen van gedrag bij kinderen, omdat zij in grote mate afhankelijk zijn van hun ouders. Resultaten in hoofdstuk 6 laten verder zien dat voor de Alles Kidzzz interventie het veranderen van het zelfbeeld de meest effectieve component van de interventie is. Aan de andere kant is het mogelijk dat trainers zich meer zouden moeten richten op het veranderen van sociale informatie verwerkingspatronen, omdat deze wel gerelateerd zijn aan het gedrag van het kind (Hoofdstuk 2).

Omdat modererende effecten (geslacht, etniciteit, persoonlijkheid) zijn gevonden in risicofactoren (Hoofdstuk 2) en in interventie effecten (Hoofdstuk 4 en 5) hebben we getest of werkzame mechanismen van de interventie ook verschillen tussen subpopulaties (gemodereerde mediatie). We vonden verschillen in werkzame mechanismen die leidden tot vermindering van agressie voor kinderen met verschillende persoonlijkheidskenmerken, maar overeenkomsten tussen jongens en meisjes (Hoofdstuk 6). Uit analyses bleek dat betrokkenheid bij het kind leidt tot vermindering van agressie voor kinderen met een gemiddeld niveau van extraversie.

### **Conclusie**

Dit proefschrift eindigt met een algemene discussie van resultaten in hoofdstuk 7. In 2005 werd geconstateerd dat er geen evidence-based geïndiceerde interventie bestond voor kinderen met verhoogd externaliserend gedrag in de Nederlandse

schoolcontext. Alles Kidzzz werd al uitgevoerd in scholen, maar de effectiviteit was nog niet aangetoond. Samenvattend kunnen we concluderen dat Alles Kidzzz kan bijdragen aan een vermindering van externaliserend gedrag (reactieve en proactieve agressie, klinische mate van externaliserend gedrag) in verschillende settings (school en thuis), bij jongens en meisjes en bij kinderen met verschillende etnische achtergronden. Leerkrachten in groep 7 rapporteren minder agressief gedrag, een half jaar na de interventie. Effecten van Alles Kidzzz zijn vergelijkbaar met effecten gevonden in internationale meta-analyses en kunnen worden beoordeeld als klein tot gemiddeld in grootte. Het is belangrijk te realiseren dat interventie-effecten niet voor alle kinderen hetzelfde zijn.



# Dankwoord

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*“Living isn’t just about doing for yourself, but what you do for others as well”*

*Nelson Mandela*

En waar was ik gekomen zonder de hulp van zoveel anderen? In de afgelopen vier jaar hebben veel mensen, op zeer verschillende wijzen, bijgedragen aan het tot stand komen van mijn proefschrift, waarvoor veel dank! Een aantal wil ik hierbij graag persoonlijk bedanken.

Dit proefschrift gaat over kinderen met externaliserend gedrag: kinderen die boos en opstandig zijn en regelmatig ruzie maken. Gelukkig bleken de 264 kinderen in dit onderzoek tijdens het afnemen van de vragenlijsten ook bereidwillig, enthousiast en spontaan te zijn! Hier wil ik hen hartelijk voor danken.

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# **Curriculum Vitae**

Sabine Stoltz was born on September 29<sup>th</sup> 1983 in Nijmegen, the Netherlands. After completing pre-university education (VWO) at the Nijmeegse Scholengemeenschap Groenewoud in 2001, she studied Pedagogical and Educational Sciences (master Pedagogy: Learning and Development) at the Radboud University of Nijmegen and graduated in 2005. From 2005 to 2007 she worked as junior researcher at the Institute for research in the field of lifestyle, addiction, and related social developments and at the Institute for Applied Sciences at Radboud University Nijmegen. Sabine started her PhD project in 2007 at the research group of Clinical Child and Family Studies at Utrecht University, where she worked on her dissertation about the effectiveness of Stay Cool Kids until 2012. During this period she went to The Center for the Prevention of Youth Behavior Problems (University of Alabama, Prof. Lochman) and worked as a child psychologist at the Child Psychology Centre (Ambulatorium) of Utrecht University. While being a PhD candidate, she gained experience in teaching: she supervised master theses, gave various guest lectures and was a lecturer in a course aimed at teaching students academic skills. After her PhD, Sabine will work as a researcher and lecturer at the research group of Clinical Child and Family Studies at Utrecht University and will continue research to the effectiveness of Stay Cool Kids.

# **Publications**

## This dissertation

- Stoltz, S., van Londen, M., Deković, M., Orobio de Castro, B., Prinzie, P. & Lochman, J.E. (2012). *Parenting and Aggression in School Children At-risk: Social Cognitions as Mediators, Gender and Ethnicity as Moderators*. Manuscript submitted for publication.
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## Other publications

- Deković, M., Stoltz, S., Schuiringa, H. & Manders, W. (2012). Testing Theories through Evaluation Research: Conceptual and Methodological Issues Embedded in Evaluations of Parenting Programs. *European Journal of Developmental Psychology, 9*, 61-74.
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