

Effectiveness of individually delivered indicated school-based interventions on externalizing behavior

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Abstract

In the present study the results of two meta-analyses on the effectiveness of *individually* delivered indicated school-based interventions for externalizing behavior problems at elementary schools are presented. A distinction was made between studies that evaluated effects of interventions with only an individual component ($k = 11$ studies, $n = 738$ children, $d = .30$), and studies on interventions that included both individual and additional components ($k = 13$ studies, $n = 1156$ children, $d = .30$). Both types of individually delivered school-based interventions reduced externalizing behavior in at-risk children. Moderator analyses showed individual interventions with additional components to be most beneficial for younger children. The variability in effectiveness of interventions indicates that schools need to carefully select evidence-based programs for their specific population.

Keywords

externalizing behavior, individual intervention, meta-analysis, moderation, school-based

Stable externalizing behavior in school-aged children may have serious negative consequences for children's mental health (i.e., development of diagnosable psychopathology) and for their environment (i.e., the school system) (Loeber, Burke, Lahey, Winters, & Zera, 2000). Schools are nowadays major providers of services for preventing externalizing behaviors; however, the effectiveness of the interventions currently being used in schools is often unclear (Gottfredson & Gottfredson, 2002). 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. The goal of this brief report, therefore, is to summarize results of studies that examined effectiveness of these interventions.

To date, most interventions for children with externalizing behavior are group interventions (73%; Wilson & Lipsey, 2007). To expand previous meta-analyses on effectiveness of school-based preventive interventions for externalizing behavior problems (e.g., Hahn et al., 2007; Mytton, DiGiuseppi, Gough, Taylor, & Logan, 2002; Wilson & Lipsey, 2007; Wilson, Lipsey, & Derzon, 2003), this study focused on *individually delivered indicated* school-based interventions. These interventions seem theoretically and empirically more promising than group interventions for children at risk because: (a) there is no risk of peer contagion of aggressive behavior as in group interventions and classroom settings (Dishion, McCord, & Poulin, 1999); (b) learned skills can easily be rewarded in sessions and generalized to school and home context by *individualized* cooperation with teachers and parents; and (c) a one-to-one setting allows children to develop an enduring warm and positive relationship with an adult, which might be helpful in enhancing the effectiveness of interventions. In this study we defined *individually* delivered programs as indicated preventive programs (children already exhibit symptoms of externalizing

disorders), delivered in a one-to-one setting with an adult at school. Some of these individually delivered indicated interventions consist of only one (individual child-focused) component, while other interventions included other components in addition to the child-focused component (e.g., modification of school environment, group intervention, classroom activities, parental involvement). To isolate effects of the individual component from other components of the intervention, we conducted two meta-analyses: one on purely individual interventions, and one on individual interventions with additional components.

An additional goal of the present study was to examine whether effects are moderated by child and intervention characteristics. A potential moderator of intervention effectiveness may be *child's age*. Based on developmental theory (Holmbeck, Greenley, & Franks, 2003) it can be expected that interventions that begin early in development will result in larger benefits, because behavior problems are less stable and ingrained (Ramey & Ramey, 1998). On the other hand, because of the development of cognitive skills in middle childhood, it can be expected that interventions would be more effective for middle childhood than for younger (preschool, first grades) children (Kendall & Braswell, 1982). As a second potential moderator we included *treatment modality*. Preventive indicated individual interventions differ in targeted domain (cognitively behavioral oriented programs or programs based on

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principles of counseling) which might be related to the programs' effectiveness. Although no moderating effects of treatment modality were found in a previous meta-analysis on school-based interventions in general (Wilson & Lipsey, 2007), we do not know whether differences in treatment modalities in individual delivered intervention exist. Finally, effectiveness of interventions may vary as a function of child's initial *risk level* of problem behavior. Findings from previous meta-analyses are inconclusive: Some studies found that children at higher risk show more improvements after interventions compared to children at lower risk (e.g., Nowak & Heinrichs, 2008; Wilson & Lipsey, 2007), whereas other studies found that high-risk children make the least improvement (Kazdin & Crowley, 1997). Because individually delivered interventions seem particularly promising for high-risk children, we expected children with high initial levels of externalizing behaviors to benefit most from these interventions.

Method

Procedure

Potentially relevant studies were identified by searching electronic databases (Educational Resource Information Centre [ERIC], PsycINFO, and Web of Knowledge) using keywords: "school," "school-based," with terms such as "intervention," "treatment," "program," "therapy," "prevention." Titles of articles were screened to select studies evaluating interventions for *externalizing* behavior. Bibliographies of previous meta-analyses, literature reviews, and retrieved studies were screened (Gansle, 2005; McCart, Priester, Davies, & Azen, 2006; Mytton et al., 2002; Reddy, Newman, De Thomas, & Chun, 2009; Wilson, Gottfredson, & Najaka, 2001; Wilson & Lipsey, 2006, 2007; Wilson et al., 2003). 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 databases). We contacted leading authors ($n = 16$) to request unpublished data (e.g., doctoral dissertations). No limit was set on publication year, and the final search was conducted in December 2011. Two researchers searched for relevant studies and determined whether studies met inclusion criteria as explained in what follows.

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 *grades kindergarten (K) to six*. Fifth, studies used a randomized controlled trial (RCT) design (participants, schools, or classes were *randomly* assigned to intervention or control group) or a quasi experimental design with matched control groups. Lastly, externalizing behavior was reported as intervention outcome.

Coding of study characteristics

For each selected study two coders rated moderators. Mean kappa agreement (.95–1.00) was calculated. Disagreements were resolved through discussion until consensus was reached.

Outcome measures. *Externalizing behavior* involved a range of negative interpersonal behaviors: verbal aggression (name calling, screaming, or yelling), physical aggression (fighting, attacking people), relational aggression (bullying, gossiping), delinquent behavior (stealing, swearing, lying, and truancy), disruptive, antisocial behaviors, or conduct problems.

Moderators. *Mean age* of participants was coded directly or estimated from reported school grades. Some studies only reported age ranges. Mean ages were then estimated by averaging the reported minimum and maximum age. In some instances only grades of participants were reported, and we then transformed grades to ages by adding 5 years to the reported grade. This is a common procedure to calculate mean age in meta-analyses (e.g., McCart et al., 2006; Polman, Orobio de Castro, Koops, van Bortel, & Merk, 2007). *Treatment modality* was coded as: (a) cognitive behavioral interventions, which focus on changing child's social cognitions and behavioral strategies, which use reinforcement and modeling to reduce inappropriate behavior and increase positive behavior; and (b) interventions that focus on individual counseling. *Risk level* was coded as high risk, indicated by multiple informants or lower risk, indicated by one informant. We decided to indicate children selected by one informant as lower risk, because it has been found that referrals by one informant (e.g., child's teacher) may overemphasize certain problems (e.g., Percy, Clopton, & Pope, 1993), while selection by multiple informants may indicate that the child is particularly in need of the intervention.

Data analyses

For studies that controlled for differences at pretest, 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: $ES = \frac{M_c - M_i}{SD_{pooled}}$. The positive effect size indicated a stronger decrease in externalizing behavior in the intervention group. For studies that found differences at pretest, and did not control for this, effect size was calculated as the mean gain standardized effect size, where posttest effect sizes are adjusted for pretest differences by subtracting the pretest value from the posttest value.

Before computing an overall effect size, all effect sizes were multiplied by the small sample correction factor (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).

Next, we tested for homogeneity of the effect size distributions with the Q-statistic (Hedges & Olkin, 1985). In addition to the Q-statistic, we use the I^2 test. When the number of studies in a meta-analysis is small, the Q-statistic may have low power to detect true heterogeneity (Paul & Donner, 1992). The I^2 test describes the percentage of total variation across studies that is due to

Table 1. Detailed description of selected studies

Study	Intervention	Design ¹	N _{intervention}	N _{control}	Grade	Type intervention	Outcome measure	Assessment outcome
Barrera et al. (2002)	SHIP	RCT	141	143	K-3	IA	TRF	TR
Camp et al. (1977)	TA	RCT	12	10	1-2	I	SBCL	TR
Coie et al. (1991)	SRTP	RCT	25	24	3	IA	TRA	TR
Corcoran (2006)	SFT	QE	58	27	—	I	CPRS	PR
Day and Hartley (1993)	ESP	QE	16	15	1-6	IA	TRF	TR
Elkin et al. (1988)	PSTI	QE	36	108	2-5	I	CARS	TR
Garrison and Stolberg (1983)	AIT	RCT	10	10	3-5	I	BC	TR
Kent and O'Leary (1976)	BM	RCT	16	16	2-4	IA	SBCL	TR
Lochman et al. (1993) ^a	SRTP	RCT	13	11	4	IA	TBC	TR
Lochman and Wells (2002)	CPP	RCT	59	63	5-6	IA	TOCA-R	TR
Meany-Walen (2010)	AdPT	RCT	27	31	K-3	I	TRF	TR
Nafpaktitis and Perlmutter (1998)	PIP	RCT	19	16	1-4	I	TRA	TR
Owens et al. (2008)	DRC	RCT	91	26	K-6	IA	DBD	TR
Rennie (2003)	IPT	QE	14	13	K	I	CBCL	PR
Reynolds and Cooper (1995)	CSA	RCT	77	35	2-5	IA	WPBIC	TR
Rickel and Smith (1979) ^b	PMHP	QE	36	36	PreS.	IA	AML	TR
Rickel et al. (1979) ^c	PMHP	RCT	13	10	PreS.	I	AML	TR
Sandler et al. (1975)	PMHP	QE	19	15	K-3	IA	AML	TR
Scheckner and Rollin (2003)	SMART	RCT	20	20	5	I	BASC	TR
Stoltz et al. (2012)	SCK	RCT	191	73	4	I	TRA	TR
Waschbush et al. (2005)	BEST	RCT	25	16	1-6	IA	TBR	TR
Weinrott (1979)	TC	RCT	10	10	1-3	I	BCS	TR
Weiss et al. (2003)	RECAP	RCT	62	31	4	IA	TRF	TR
Weiss et al. (1999)	TCT	RCT	76	84		IA	TRF	TR

Note. SHIP = Schools and Home in Partnership; TA = Think Aloud; SRTP = Social Relations Training Program; SFT = Solution Focused Therapy; ESP = Earls court School-Based Program; PSTI = Planned Short Term Intervention; AIT = Affective Imaginary Training; BM = behavior modification; CPP = Coping Power Program; AdPT = Adlerian Play Therapy; PIP = Primary Intervention Program; DRC = Daily Report Card; IPT = Individual Play Therapy; CSA = Community and School Approach; PMHP = Primary Mental Health Project; SMART = Students Managing Anger Resolution Together; SCK = Stay Cool Kids; BEST = Behavior Education Support and Treatment; TC = teacher consultation; RECAP = Reaching Educators, Children, and Parents; TCT = traditional child therapy; QE = quasiexperimental; RCT = randomized controlled trial; I = individual; IA = individual and additional component; TRF = Teacher Report Form; SBCL = School Behavior Checklist; TRA = Teacher Rating of Aggression; CPRS = Connors Parent Rating Scale; CARS = Classroom Adjustment Rating Scale; BC = Behavior Checklist; TBC = Teacher Behavior Checklist; TOCA-R = Teacher Observation of Classroom Adaption—Revised; CBCL = Child Behavior Checklist; WPBIC = The Walker Problem Behavior Identification Checklist; BASC = Behavior Assessment System for Children; TBR = Teacher Behavior Rating; BCS = Behavior Coding System; TR = teacher reports; PR = parent reports.

¹RCT: Randomization can be at school or individual level. ^aAggressive subsample of study; ^bhigh-risk subsample of study; ^caggressive subsample of study.

heterogeneity rather than chance and can be calculated as $I^2 = 100\% * (Q - df)/Q$, where Q is the heterogeneity statistic and df the degrees of freedom. A value of 0% indicates no observed heterogeneity, and larger values show increasing heterogeneity. To test whether variability could be explained by associations with the hypothesized moderator variables, moderator analyses were then performed using modified weighted regression analyses (Lipsey & Wilson, 2001).

Results

Our search strategy resulted in 24 studies on individually delivered indicated school-based interventions for elementary school-aged children with externalizing behavior.

Study and sample characteristics

Individual interventions. The 11 studies provided data on 738 children: 410 received the intervention, and 328 were in a control condition (Table 1). Studies were published between 1977 and 2011. Most of the studies were published in peer-reviewed journals (73%), there were two doctoral dissertations and one unpublished paper. Children in the studies were in Grades K to 6 ($M_{age} =$

7.85 [2.01]). Most of the studies (73%) consisted of mixed boy/girl samples; the rest of the studies included samples with exclusively or primarily boys. With respect to ethnic background, 45% of the studies included samples with African American or Mexican American as predominant ethnic background, 36% of the studies included mainly Caucasian participants, 18% included mixed samples. Almost all interventions were provided by trained professionals (82%) such as child mental health care workers, school psychologists, or trained master of psychology students. In 82% of the studies teachers reported on outcome measures. Most studies (73%) used RCT designs. Regarding treatment modality, most interventions were based on a cognitively oriented or behavioral strategy perspective (64%). Four studies (27%) included counseling/therapy interventions. In 27% of the studies, children were indicated by multiple informants as showing externalizing behavior and were therefore indicated as high risk. For other studies (73%), children were selected based on teacher referral and were therefore indicated as lower risk.

Individual and additional components. The 13 studies provided data on 1,165 children: 652 received the intervention, and 513 were in a control condition. Studies were published between 1975 and 2008 in peer-reviewed journals. There was one

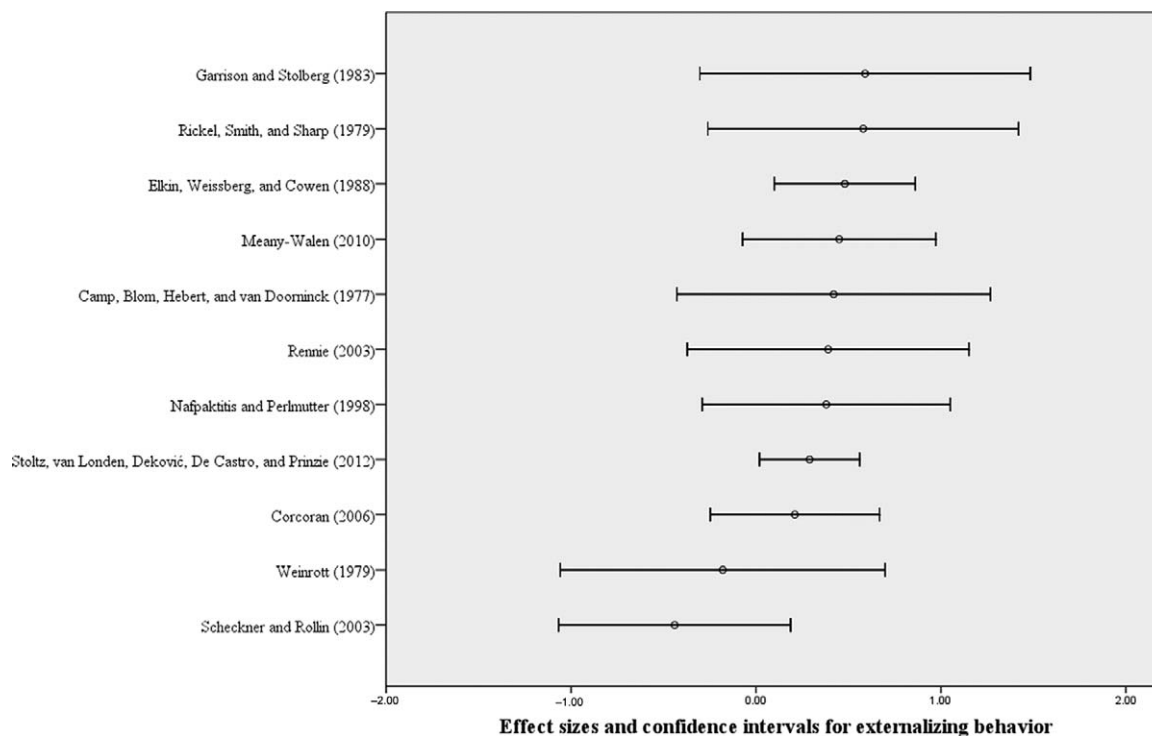


Figure 1. Effect sizes and confidence intervals for individual interventions.

unpublished paper. Children were from preschool to Grade 6 ($M_{\text{age}} = 8.03 [1.89]$). Most of the studies (77%) consisted of mixed boy/girl samples; other studies included samples with primarily boys. Regarding ethnicity, there was one study with mainly Mexican children, 38% of the studies included mainly African American participants, 23% mainly Caucasian participants, and 31% included mixed samples. Interventions were provided by trained professionals such as child mental health care workers, school psychologists, or trained master of psychology students. Teachers reported on outcome measures. Most studies (77%) used RCT designs. Regarding treatment modality, most interventions were based on a cognitively oriented or behavioral strategy perspective (77%). Only three studies (23%) included counseling/therapy interventions. Children were indicated as high risk by multiple informants in 54% of the studies. In other studies (46%) children were referred only by their teachers and therefore indicated as lower risk.

Overall effects

Individual interventions. The overall random effects mean was $d = .30$ ($p < .001$, 95% CI = .14–.46), indicating that the interventions on average significantly reduced externalizing behavior problems. See Figure 1 for effect sizes for each individual intervention.

Individual and additional components. The random effects mean was $d = .30$ ($p < .001$, 95% CI = .04–.56). This indicates that children in the intervention condition showed a larger decrease in externalizing behavior than children in the control condition. See Figure 2 for effect sizes for each individual intervention with additional components.

Analyses of moderator effects

There was significant variability in effect sizes across the studies. Tests of the homogeneity of the effect sizes using the Q-statistic (Hedges & Olkin, 1985) showed more variability across studies than expected from subject-level sampling error for the individual interventions with additional components ($Q_{13} = 47.89$, $p < .001$, $I^2 = 75\%$), but not for the purely individual interventions ($Q_{11} = 8.83$, $p = .55$, $I^2 = 13\%$). To test whether variability in effect sizes for the individual interventions with additional components could be explained by the hypothesized child and intervention characteristics, a series of moderator analyses were conducted. No moderating effects of treatment modality ($Q_{\text{between}} = .33$, $p > .05$; $k = 10$ studies cognitive behavioral interventions; $k = 3$ studies individual counseling interventions) or risk level ($Q_{\text{between}} = .07$, $p > .05$; $k = 7$ studies high risk; $k = 6$ studies lower risk) on intervention effectiveness were found. However, age appeared to be a significant moderator ($Q_{\text{between}} = 10.65$, $B = -.10$, $p = .001$): Younger children benefitted more from the interventions.

Discussion

The main objective of this study was to examine whether children at risk for developing stable externalizing problems would benefit from *individually* delivered school-based interventions. Most interventions aimed to reduce externalizing behavior are group interventions, 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). Despite the promising characteristics of individual interventions, especially for at-risk children, to the best of our knowledge, during the last 35 years only 11 empirical studies actually tested effectiveness of purely

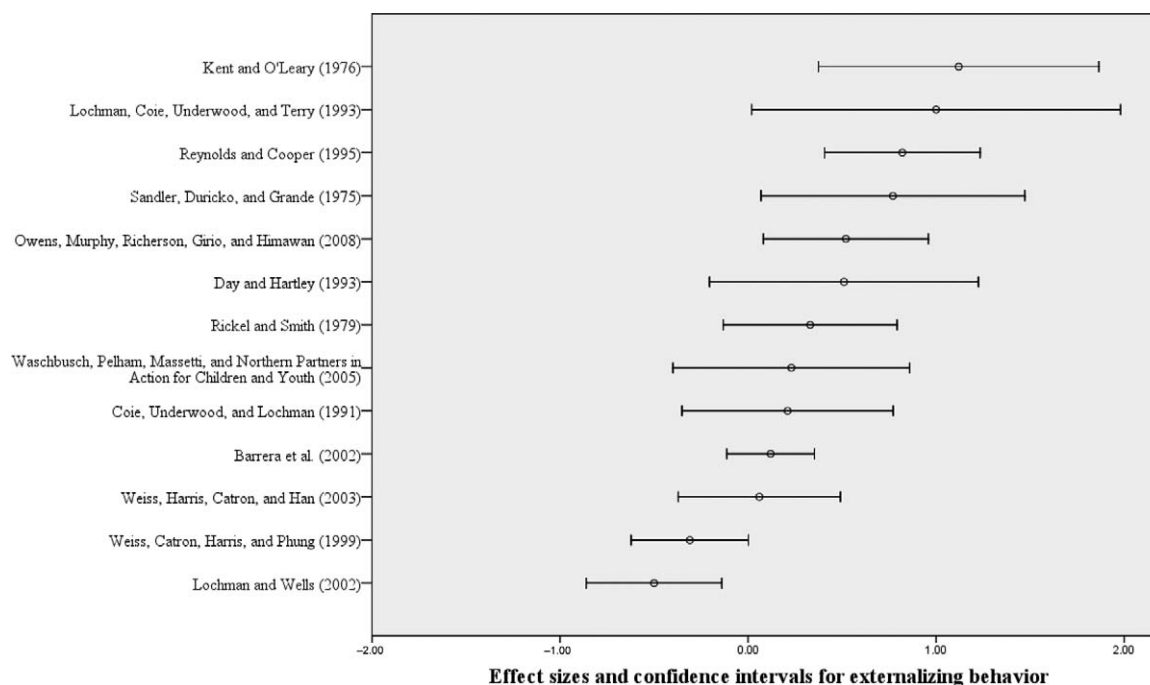


Figure 2. Effect sizes and confidence intervals for individual Intervention with additional components.

individual interventions and 13 studies examined effectiveness of individual interventions which also had added components (parent training, school-wide intervention, classroom intervention, group sessions, home sessions, and teacher consultation). Two separate meta-analyses were conducted to isolate effects of the individual child-focused component from other intervention components.

Due to the limited number of well-designed studies that evaluated effects of individual interventions, caution is recommended in interpretation of the findings. Moreover, the limitations of the included studies must be kept in mind: First, the sample in half of the studies is relatively small. Second, only 10 studies reported follow-up effects, which prevented the test of the long-term effects of school-based interventions. Finally, most studies used the Teacher Report Form (TRF; Achenbach, 1991) 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 sensitive, due to the 3-point Likert scale format.

Notwithstanding these limitations, this study provides evidence that *individually* delivered school-based interventions, which can be more adapted to children's specific needs, seem to be effective in reducing externalizing behavior in elementary school-aged children indicated with externalizing behavior problems. Effects sizes for the purely individual interventions and the individual with additional components interventions were comparable (both $d = .30$): Children who participated in interventions showed less externalizing behavior afterwards, compared to children in the control condition. We may therefore carefully suggest 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 which concluded that more is not necessarily better (Bakermans-Kranenburg, van IJzendoorn, & Juffer, 2003; Wyatt Kaminski, Valle, Filene, & Boyle, 2008). Mean effect sizes are comparable

to those found for school-based interventions for selected children (Wilson & Lipsey, 2007).

For individual interventions with additional components, there was large variability in intervention effects. This was partially explained by the children's ages. Findings suggest that intervening at a younger age is more effective in reducing externalizing behavior than at older ages, which is in line with studies which found some evidence that children with disruptive behavior become increasingly resistant to change with age (e.g., Bernazzani, Cothe, & Tremblay, 2001). When interpreting these results, it must be kept in mind that in several studies the intervention was delivered to a broad range of ages, so these findings need to be interpreted with caution. Risk level did not moderate effectiveness. Perhaps risk level can be better operationalized by the initial level of problem behavior at the start of the intervention; however, only few studies provided information on severity of problem behavior (e.g., clinical problem behavior vs. subclinical problem behavior) at the start of the intervention. Use of different modalities (cognitive behavioral intervention [CBI] vs. counseling) was not associated with differential effects.

It is important to note that there were also some programs that were not effective in reducing child problem behavior. This underscores the importance of careful selection of effective interventions on the basis of demonstrated effectiveness. 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 11 purely individual interventions were evaluated in recent 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., 1999). Children with externalizing problems represent a very heterogeneous group with respect to causes and maintaining factors for their behavior problems (Nock,

Kazdin, Hiripi, & Kessler, 2006). Moreover, externalizing behavior problems in children often present with comorbid internalizing problems (e.g., anxiety) or learning problems (Achenbach, 1991; Gilliom & Shaw, 2004). Therefore, children may need specific interventions adapted to the specific factors responsible for (the maintenance of) their behavior problems. When tailor-made interventions could be adapted to these individual needs, the effectiveness of individual interventions could possibly be enhanced.

Of many school programs in use to date, only a fraction have been studied. Given the potential effectiveness of individual interventions 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 conducted for research purposes. These programs often are more effective than routine practice programs because of treatment fidelity and implementation. Intervention studies should demonstrate efficacy under the conditions of implementation and evaluation in practice (Kratonchwill & Shernoff, 2004). Second, 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 children, families, and society. Most intervention studies do not include cost-effectiveness analyses, but there is a need to determine the economic impact of individually delivered interventions which may be more expensive.

The current study quantitatively integrated the available findings of effects of individually delivered school-based interventions on externalizing behavior. The analyses established positive mean effect sizes, and showed that some of the differences in effects sizes between studies could be partially explained by age of the child.

Funding

This research received no specific grant from any funding agency in the public, commercial, or not-for-profit sectors.

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