Running Head: EFFECTIVENESS OF SCHOOL-BASED PREVENTION

Effectiveness of a Universal School-Based Social Competence Program:

The Role of Child Characteristics and Economic Factors

Abstract

This study evaluated the effectiveness of a school-based social competence curriculum PATHS (Promoting Alternative Thinking Strategies) on teacher-rated aggressive behavior, ADHD, and prosocial behavior in children. The 1-year prevention program was administered to children in 28 of 56 Swiss elementary schools ($N = 1,675$). Outcomes were assessed at pretest and posttest with a follow-up 2 years later. Moderator interactions involving baseline child characteristics and economic factors were tested. There were significant treatment effects for ADHD/impulsivity and aggression at the follow-up. Baseline development variables predicted increases in prosocial behavior as well as decreases in aggressive behavior and ADHD. Development variables moderated the impact of PATHS on ADHD and aggression at the follow-up. Economic risk factors predicted poor outcomes. The findings of this large-scale, independent field trial extend research on development and economic factors as moderators of the effects of school-based preventive interventions in children.

Effectiveness of a Universal School-Based Social Competence Program:

The Role of Child Characteristics and Economic Factors

Developmental scientists have emphasized the interaction between child characteristics and ecological conditions in the development of psychopathology and social competence (Bronfenbrenner & Evans, 2000). The need to prevent children's mental health problems has been broadly acknowledged as well, and a number of school-based curricula have been designed to prevent the development of problem behaviors such as aggression and ADHD. Meta-analyses of school-based aggression intervention programs indicate that programs that focus on the promotion of social skills reduce aggressive behavior and mental health problems (Hahn et al., 2007). Missing are dissemination trials by researchers who evaluate these programs independently of the program developers, use rigorous methodological designs, and implement the program "as marketed" (Eisner, Malti, & Ribeaud, 2011). Additionally, relatively few large-scale studies have investigated the role of initial development in children and economic factors in determining program outcomes, and most of the existing studies were conducted in the US. However, it is important to address these issues if we are to optimize the quality of evidence-based aggression-prevention research and generalize the findings to routine implementations. Our study aimed to fill some of this research gap. We evaluated the impacted of a universal school-based prevention program on a large longitudinal sample of children in Swiss schools. We examined how both child characteristics (baseline behavior, initial social-cognitive development, initial social-emotional development) and economic factors (socioeconomic status, financial problems, single-parent household) can moderate the impact of a universal intervention.

The Intervention

Our study employed PATHS (Promoting Alternative Thinking Strategies), a school-based, universal intervention program that is widely assumed to reduce mental health problems and improve social competence in primary-school children (Greenberg & Kusché, 2002). It was

chosen because it is highly evidence-based and yielded good results in a feasibility study conducted in collaboration with the school authorities of the city of Zurich, Switzerland (Eisner et al., 2011).

PATHS relies on an integrative model of children's risk-and-resiliency development. The underlying assumption is that the promotion of various aspects of social development helps to reduce a set of well-known risk factors for aggression as distal factors (Greenberg et al., 2003). These risk factors include poor social-cognitive skills (Crick & Dodge, 1996), poor emotional skills (Arsenio, Gold, & Adams, 2006), and poor inhibition control (Riggs, Greenberg, Kusché, & Pentz, 2006). To reduce these risks, the PATHS lessons promote social-cognitive development, positive social behavior, and understanding of emotions. PATHS is one of only 11 programs recommended as effective by Blueprints of Violence Prevention at the University of Colorado (Greenberg & Kusché, 2002). Several rigorous trials of PATHS have been undertaken (e.g., Conduct Problems Prevention Research Group, 2002; Riggs et al, 2006). All together, these trials show that PATHS has a strong evidential base. However, in contrast to the present study, most of these evaluations were supervised by the developer of the program and were conducted in the US.

Moderators of Program Impact

There is emerging evidence that children at high risk for mental health problems are the most likely to benefit from school-based interventions. For example, two large-scale prevention projects for aggressive elementary grade school children achieved long-term reduction in antisocial behavior with their interventions, which included social competence training (Conduct Problems Prevention Research Group, 2002). The MACS (2002) study, which included universal school-based prevention programs plus an intensive intervention for students with high levels of initial aggression, showed reduction of aggressive behavior in the latter group. Because of this evidence that intervention outcomes are moderated by initial behavioral risk, the present study

included a child's initial behavior as a moderator of intervention effects.

Contemporary research on the prevention of aggressive behavior also emphasizes the importance of social development in developing aggression. For example, studies have shown that social-cognitive problems and lack of emotional skills predict increased levels of aggression over time (Lansford et al., 2006; Peets, Hodges, & Salmivalli, 2008). This research, combined with the PATHS approach to promoting improvement in social development, makes exploration of the possible moderation of social competence interventions by initial social-cognitive and emotional development necessary. The present study therefore included two indicators of social-cognitive and emotional development: Social-cognitive skills and moral emotion attribution. These domains were chosen because research indicates that children's social-cognitive skills are important in reducing actual problem behavior. For example, it has been shown that children's social information processing is systematically related to aggressive behavior (e.g., Orobio de Castro, Veerman, Koops, Bosch, & Monshouwer, 2002).

Moral emotion attributions are defined as emotions that children and adolescents attribute to an actor as a consequence of a(n) (im)moral action. Moral emotion attributions have a strong cognitive component, because children need to consider the perspectives of both the self and others in the context of a(n) (im)moral action (Malti, Gasser, & Buchmann, 2009). These attributions were included as a moderator because they help children anticipate the outcomes of sociomoral events and adjust their moral behavior accordingly (Arsenio et al., 2006). Thus, moral emotion attributions are considered important to the development of (im)moral action tendencies (Hoffman, 2000; Malti & Latzko, in press; Malti & Krettenauer, in press). The PATHS curriculum aims at promoting emotional literacy and we therefore expected that children's initial emotional skills in the moral domain might be an important moderator of treatment effects.

To the best of our knowledge, no independent, large-scale randomized controlled trial of

PATHS has investigated this possible mediation of behavioral, social-cognitive, and emotional development in children.

In addition, it is necessary to examine economic factors as possible moderator variables. Research suggests that up to 25% of children living in economic hardship have negative mental health outcomes (Costello et al, 1996; Keenan, Shaw, Walsh, Delliquadri, & Giovannelli, 1997). It is thus important to understand whether the effectiveness of a given intervention varies as a function of the socio-economic background of the children.

The Present Study

Our study was designed to compare the effectiveness of the PATHS program to a control group using a factorial design with a posttest and 2-year postintervention follow-up. We predicted that children in the treatment (PATHS) condition would manifest greater reductions in aggressive behavior and ADHD/impulsivity, and greater increases in prosocial behavior, than children in the control condition. Based on the results of previous RCT trials of PATHS in the US, we assumed that the reduction in aggressive behavior and ADHD would be greatest among students showing the highest levels of aggressive behavior and ADHD at the beginning of the study. Because the promotion of social development as a proximal factor has been shown to reduce problem behavior as a distal outcome (Benson & Scales, 2009), we expected social development (i.e., initial problem behavior, social-cognitive skills, moral emotion attributions) to moderate program effects. It was hypothesized that economic factors would play a mediating role in the effectiveness of the PATHS intervention. Socioeconomic status, occurrence of financial difficulties, and single parent households were used to represent economic risk. Given that longitudinal and intervention research has consistently shown the importance of gender, nationality, and special-needs education as predictors of the outcomes of interest (Raver et al., 2009), we controlled for these variables. Since some studies have also documented a mediating role of gender on intervention effects (e.g. Raver et al., 2009), we additionally examined gender

as a moderator of program effects.

Method

Participants

The data were taken from the Zurich Project on the Social Development of Children, an ongoing prospective longitudinal study (for a detailed overview, see Eisner et al., 2011). For sampling, we used a cluster-randomized approach with schools as the unit of randomization (see Malti, Ribeaud, & Eisner, 2011). Two universal prevention programs, one-school based (PATHS) and the other family- based (Triple-P), were compared in a factorial design with schools randomly assigned to one of four treatment conditions (PATHS only, Triple P only, PATHS + Triple P, control). Schools were chosen as the randomization unit to minimize potential crossover effects and because PATHS works best when schools are the intervention units (Greenberg & Kusché, 2002). The sample at Time 1 (T1) consisted of 1,675 first graders (48% girls; 7.02 years, $SD = 0.42$; see Malti et al., 2011, for response rates across data waves).

Intervention

The version of PATHS used in the present study was the same as that used in the Fast Track Project during the second school year (Bierman et al., 2010). It is a 1-year program that includes 46 primary lessons. The content, methods, and materials were culturally adapted to the Swiss school system, and the materials were tested in a pilot study (see Eisner et al., 2011). PATHS lessons address problem-solving skills, social relationships, self-regulation, rule understanding, emotion understanding, and positive self-esteem. The classes were taught for 67 min per week, with an average of 2.4 sessions per week. The teachers who implemented PATHS received a 2-day training course prior to the start of the experimental sessions. The five coaches were trained and supervised by an experienced Dutch expert who also manages the PATHS teacher education institute in The Netherlands. To increase implementation quality, the coaches visited each class four to six times during the implementation period, after which they discussed

the lesson with the teacher and provided feedback. A refresher seminar was held midterm, and

regular PATHS newsletters helped to create a sense of cohesion among the teachers. The city of

Zurich had made the PATHS curriculum compulsory for teachers in the intervention group. The

procedures that were used to monitor implementation closely followed suggestions by Greenberg

and Kusché (2002) and included teacher and child questionnaires in addition to observations by

the coach. The overall implementation quality was evaluated as high (see Eisner et al., 2011).

Dependent Variables

As dependent variables, we assessed aggressive behavior, ADHD, and prosocial behavior.

All outcomes were rated by the teachers at T1–T4 using Tremblay et al.'s (1991) Social

Behavior Questionnaire (SBQ). The Zurich school system requires that children remain in the

same class with the same teacher from the first to the third grade, but they enter new classes in

the fourth grade; thus, all the teacher assessments at T4 were made by new teachers who were

blind as to treatment condition. The items in the teacher questionnaire were assessed on a 5-point

Likert scale.

For aggressive behavior, 11 items were assessed. A sample item was: "The child is cruel,

bullies or is mean to others." The reliabilities (Cronbach's α) across the four waves were .93. For

ADHD, 8 items of the SBQ were used. A sample item was: "The child is impulsive, acts without

thinking." The average αs for the ADHD scale were .91. For prosocial behavior, the SBQ

subscale contained 7 items. Across the four waves, α was .92.

Moderator Variables: Child Characteristics

The following moderator variables representing child characteristics were assessed: social-

cognitive skills, emotional skills in the moral domain, and baseline problem behavior

(aggression, ADHD, prosocial behavior).

Social-cognitive skills. The children's social-cognitive skills were measured before the

intervention by having them respond to four hypothetical vignettes: playing on a swing,

participating in a game, laughing at someone, and stealing a ball. These four scenarios were

adapted from previous research (Crick & Dodge, 1996). After the child was read the respective

story text, the child was asked the following question: "What could you say or do so that you

could play on the swing?" The responses were audiotaped and later coded in the following

categories: (a) aggressive strategies (e.g., "I'd just push him off the swing"), (b) socially

competent strategies (e.g., "I'll ask to take turns"), and (c) other strategies. Two independent

coders rated the total content of all the transcripts. The interrater agreement (Krippendorff's α)

across the categories was .80 (Krippendorff, 1978). Proportional mean scores for aggressive and

socially competent problem-solving strategies were then created.

Moral emotions. The children's emotional skills in the moral domain before the

intervention were measured by a revised version of the original happy-victimizer task, which has

been widely validated in the developmental literature (e.g., Malti, Gummerum, Keller, &

Buchmann, 2009). The children responded to four hypothetical rule violations and were asked to

attribute emotion to self as victimizer ("How would you feel afterwards if you had done this?

Why?"). Self-attributed emotions were coded on a 4-point Likert scale from 1 (*very good*) to 4

(*very bad*). The four scores were aggregated across stories (α = .67), and the scale was labeled

'moral emotions'. Because the final score was skewed, it was log transformed.

Moderator Variables: Economic Factors

As economic moderator variables, we assessed household SES, financial difficulties, and

single vs. dual parent household. SES was defined by coding the caregiver's current profession;

the codes were then transformed into an International Socio-Economic Index (ISEI)

occupational-status score (Ganzeboom, Degraaf, Treiman, & Deleeuw, 1992). The final SES

score was a derivative of the highest ISEI score of the two caregivers. Financial problems were

assessed in the parental interview at T1. The parents were asked if they had experienced periods

of financial difficulty resulting in arrears in payments of household bills during the last year.

Household composition was assessed in the parental interview at T1 as well (see Table 2).

Control Variables

We controlled for gender, special-class education, and nationality in all the multilevel

analyses. For nationality, a dummy variable was created that was coded 0 if at least one parent

was Swiss and 1 if both parents were non-Swiss. The latter represented more than 80 countries of

origin.

Procedure

The parents were asked to sign an informed consent form at the beginning of the first

interview; informed consent was renewed at wave 4. To optimize the participation rates for the

high proportion of parents having an immigrant background (57%), all parent interviews were

translated into the eight languages spoken by the most important immigrant minorities in Zurich.

The computer-assisted face-to-face interviews of the parents lasted an average of 1 hr. In the first

three waves, computer-assisted personal child assessments lasting 45 min were conducted at the

school. In the fourth wave, 90-min classroom-based paper-and-pencil surveys were utilized. The

interviews were conducted by 44 interviewers who had been intensively trained by the research

team. The child's teacher completed a questionnaire on the child's social behavior.

Analysis Approach

Hierarchical linear modeling (HLM Version 6.08) was used to assess the intervention

effects on child outcomes. The original design of the study combined PATHS and a family-based

intervention, i.e., Triple-P (for details, see Malti et al., 2011). We recoded treatment assignment

as two dummy variables to compare the PATHS and Triple-P conditions separately with the

control condition. Thus, a standard approach to coding a 2 x 2 design (2 levels of Factor A

crossed with 2 levels of Factor B) was used to analyze program effects. This 2 x 2 design

allowed us to specify the different timings of the interventions as well as the inclusion of

interactions involving the PATHS + Triple-P condition. The cross-product of the PATH +

Triple-P interaction answers the question of whether adding PATHS improves the effects of

Triple-P and whether adding Triple-P improves the effects of PATHS. The models incorporated

three levels: data-collection wave (level 1), child (level 2), and school (level 3). These levels

were employed in conjunction with a two-way interaction between time and intervention to

measure the treatment effects. Moderator effects were tested by three-way interactions between

intervention, the respective mediating variable, and time point.

<div align="center">**Results**</div>

Initial Equivalence and Attrition

Table 1 presents descriptive statistics for all the outcome variables, and Table 2 presents

descriptive statistics for all the moderator variables. We present data for the PATHS only ($n =$

360) versus the control condition ($n = 356$) in the Tables because of our analytic interest in the

PATHS program and because our previous analyses of the data indicated no statistically

significant effects of the Triple-P intervention or the combined treatment condition on any of the

outcome variables of interest here (Eisner & Meidert, 2011; Eisner et al., 2011; Malti et al.,

2011).

ANOVAs were conducted to determine the equivalence of the treatment and control

groups across outcomes. The models took account of the nesting of students within schools,

treating schools as a random effect. Although at baseline some of the outcome measures were

higher in the PATHS group than in the control group, our preliminary analyses revealed that

none of the baseline differences are significant. Table 3 displays the correlations between the

study variables across the four treatment conditions.

Attrition was low across the waves of data collection and was comparable in the four

treatment conditions. Specifically, children in the control condition completed an average of 3.68

waves, children in the PATHS condition an average of 3.76 waves, children in the Triple-P

condition an average of 3.64 waves, and children in the PATHS + Triple-P condition an average

of 3.72 waves.

Treatment Effects at Follow-up (T4)

 We report treatment effects at follow-up only because we have shown elsewhere that there

were no treatment effects at posttest (Malti et al., 2011). Preliminary, unconditional models were

run to ascertain the proportion of variance of each dependent variable that could be attributed to

school level. Intraclass correlations (ICCs) were estimated in the control group using

unconditional three-level hierarchical linear modeling. The ICC for school level was .25 across

all teacher-reported outcome variables.

 The multilevel models were then run to obtain intent-to-treat (ITT) estimates of the effects

of the interventions at the child and school levels on aggressive behavior, ADHD, and prosocial

behavior as measured by the SBQ. We used continuous moderator variables in all multilevel

analyses and computed interaction effects between the treatment variable and the respective

continuous moderator variable. For clarity's sake, we again only describe the findings for the

PATHS only condition versus the control condition. This was done because of our focus on

PATHS effects and because we have documented elsewhere that neither the Triple-P only

condition nor the combined PATHS + Triple P treatment condition revealed any significant

outcome effects, compared to the control condition (Eisner, Nagin, Ribeaud, & Malti, in press;

Malti et al., 2011).

 Table 4 presents the multilevel findings for the outcomes at follow-up. For each outcome

variable, Model 1 included all the Level 2 covariates, and Model 2 included the respective

interaction terms between treatment, the moderator variable, and time point. For the sake of

brevity and clarity, treatment interaction terms involving the moderators are in the following

reported only if at least one of them is significant across outcomes. We computed the effect sizes

of the significant effects by multiplying the estimated β for the interaction term by the number of

time points and dividing by $\sqrt{(\text{var}(y\_1) + \text{var}(y\_n) - 2*\text{cov}(y\_1, y\_n))}$, where var(y_n) is the estimated variance at the first and last time point and cov(y_1,y_n) is the estimated covariance between the two time points.

Preliminary analyses indicated that gender did not moderate any program effects. Therefore, gender was not included in the final moderator analyses.

Aggression. Children in the PATHS group were reported by their teachers as having a greater decrease in aggressive problem behaviors than children in the control group (effect size = 0.42; see Table 4). The treatment effect on teacher-rated aggression was moderated by level of moral emotions at baseline (effect size = 0.12). The superiority of PATHS over the control intervention in reducing aggression was significant only for children who scored high on moral emotions at baseline. In addition, baseline aggression predicted an increase in aggression. Furthermore, SES and female gender predicted a decrease in aggression, whereas financial problems, single-parent household, and non-Swiss nationality predicted an increase in aggression.

ADHD. Children in the PATHS group were reported by their teachers as having a significantly greater decrease in ADHD problems than children in the control group (effect size = 0.46; see Table 4). However, the treatment effect on teacher-rated ADHD was moderated by level of moral emotions at baseline (effect size = 0.10). The main effect was also moderated by initial level of competent problem-solving strategies (effect size = 0.40). The superiority of PATHS over the control intervention in reducing ADHD was significant only for children who scored high on moral emotions and problem-solving competence at baseline. Furthermore, aggressive problem-solving strategies and baseline ADHD predicted an increase in ADHD, whereas competent problem-solving strategies predicted a decrease in ADHD. Furthermore, SES and female gender predicted a decrease in ADHD; financial problems and single-parent household predicted an increase in ADHD.

Prosocial behavior. The results suggest that, overall, children in the PATHS condition did not differ from children in the control condition on prosocial behavior (Table 4). Competent problem-solving strategies, baseline prosocial, behavior and female gender predicted an increase in prosocial behavior, whereas non-Swiss nationality and special needs education predicted a decrease in prosocial behavior.

Discussion

A large-scale randomized controlled trial of a cohort of children attending public elementary schools in Zurich, Switzerland, was conducted. We investigated the effectiveness of the PATHS curriculum on teacher reports of children's aggressive problem behavior, ADHD, and prosocial behavior at follow-up (2 years later). The mediating roles of child characteristics and economic factors, as measured before the intervention (baseline), on the effects of the interventions were also investigated.

The analyses revealed a main effect of PATHS on ADHD and aggression as reported by teachers at follow-up. The findings for teacher reports are strengthened by the fact that these ratings were by new teachers, and it supports previous research in the US demonstrating the positive effects of social competence programs such as PATHS on ADHD/impulsivity problems (Riggs et al., 2006). Several of the intervention effects were moderated by child development variables. This finding is in line with other recent RCTs and emphasizes the need for a developmentally sensitive approach to understanding intervention effects (Bierman et al., 2010). The developmental systems framework on which our analyses were based stresses the need to investigate both child development and contextual factors in elucidating the relationship between intervention and outcomes. Because the PATHS curriculum reflects this framework through its promotion of social awareness, emotion understanding, and adaptive behavior, a proper evaluation of it requires the inclusion of preintervention social development variables as moderators in the research model. In our study, socioemotional skills in the moral domain at

baseline moderated the effect of PATHS on teacher ratings of aggressive behavior and ADHD. Thus, children in the PATHS condition who displayed high levels of moral (i.e., negative) emotions before the intervention were rated by their teachers as showing larger reductions in ADHD by the end of the fifth grade than children who started with low levels of moral emotions. Previous research has indicated that moral emotions predict both externalizing symptoms and prosocial behavior (Arsenio et al., 2006; Malti & Krettenauer, in press).

Additionally, socially competent problem solving skills moderated teacher-rated ADHD at follow-up. More specifically, children in the PATHS condition who displayed high levels of competent problem-solving strategies before the intervention were rated by their teachers as showing larger reductions in ADHD by the end of the fifth grade than children who started with low levels of competent problem-solving skills. These findings underscore the importance of social-cognitive research, and they show that preintervention social-cognitive skills are likely to enhance outcomes when the intervention focuses on the development of such skills, as is the case with PATHS. This finding is also consistent with longitudinal research showing that socially competent problem solving skills distinguish the trajectories of (mal)adaptive behavior (Lansford et al., 2006), as children who have strong social-cognitive skills before the intervention benefit most from the intervention in terms of a decrease in maladaptive behavior.

As expected, baseline measures of behavioral development predicted the corresponding behavioral outcomes. This finding is consistent with contemporary theory on externalizing problem behavior, which emphasizes the importance of initial behavioral development in the development and continuation of externalizing behavior (Arsenio et al., 2006).

Children who received special-needs education showed less increase in teacher-rated prosocial behavior at follow-up than children who did not receive it. In Switzerland, the children who need special education typically suffer from delayed development. Perhaps teachers who apply PATHS in special education classes put more emphasis on the components that emphasize

reducing problem behavior than on the components that promote prosocial behavior.

Our findings confirm several of the expected effects of economic variables such as family SES, financial problems, and single parent households on the outcome variables. Overall, our findings support research on the role of economic risk in exacerbating negative behavioral outcomes (Keenan et al., 1997). The effects of PATHS were not moderated by these factors, contrary to the results of other studies (Raver et al., 2009). This difference may be related to the fact that Switzerland does not face the great disparities in SES that one finds, for example, in the US, where most comparable RCTs have been conducted.

As expected, girls were more likely than boys to be rated as prosocial and less likely to be rated as aggressive and having ADHD. These results are consistent with other studies that have demonstrated gender differences in relevant outcomes (Malti et al, 2009; Raver et al., 2009).

In summary, our study is among the first dissemination trials to use a large sample, a multi-informant approach, high-quality program implementation, as well as high response and retention rates, with follow-up assessments within 2 years postintervention. It is important to note that our longitudinal intervention study yielded small to medium effect sizes, particularly on teacher-rated externalizing outcomes with child-development moderators. This might relate to the finding that large field trials conducted by independent investigators tend to yield less positive results than developer-led studies, because the latter tend to have tighter control over all aspects of the study (Petrosino & Soydan, 2005). Finally, it is unrealistic to assume that all children in the control group had absolutely no exposure to preventive treatments over a period of four years. Taken together, moderation by the child's initial emotional and social-cognitive development was found. This result reinforces the need to analyze the developmentally differential effects of a treatment on pathways of psychopathology and adaptation. School-based interventions such as PATHS, if combined with child-focused cognitive-behavioral counseling for more severe cases of problem behavior and the related developmental problems, have the

potential to reduce the long-term impact of developmental psychopathology and increase resilience (Malti, 2011; Malti & Noam, 2008).

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Table 1

Outcome Variables by Treatment Condition and Time Period

	Treatment Condition							
	Control group				PATHS only group			
Outcome Variables	*M* (*SD*)				*M* (*SD*)			
Teacher Reports	Pre 1	Pre 2[a]	Post	Follow-up	Pre 1	Pre 2[a]	Post	Follow-up
Aggressive behavior	0.51 (0.68)	0.41 (0.55)	0.45 (0.60)	0.53 (0.68)	0.56 (0.63)	0.56 (0.61)	0.62 (0.69)	0.48 (0.68)
ADHD	1.11 (0.97)	0.85 (0.94)	0.87 (0.94)	1.14 (1.04)	1.27 (1.02)	1.15 (1.00)	1.13 (1.01)	1.00 (0.89)
Prosocial behavior	2.16 (0.82)	2.14 (0.88)	2.42 (0.92)	2.26 (0.79)	2.34 (0.79)	2.43 (0.76)	2.54 (0.77)	2.24 (0.80)

[a]Pre 2 is a second baseline score, needed because of the time-lagged implementation of the PATHS and family interventions.

Table 2

Moderator Variables by PATHS Only Treatment Condition versus Control Condition at T1

	Treatment Condition	
	Control	PATHS only
Moderators	*M* (*SD*)/ %	*M* (*SD*)/ %
Child characteristics[1]		
Moral emotions	3.47 (0.59)	3.32 (0.68)
Aggressive problem-solving	0.15 (0.22)	0.16 (0.21)
Competent problem-solving	0.69 (0.30)	0.71 (0.27)
Economic characteristics		
SES (ISEI)	47.12 (18.10)	45.46 (17.08)
Financial difficulties: Yes	16	17
Single-parent household: Yes	13	15
Control variables		
Gender: Female	45	50
Nationality: Non-Swiss	39	28
Special education: Yes	8	6

Note. SES = socioeconomic status. ISEI = International Socio-Economic Index.

[1]For descriptive statistics of initial child behavior as moderator, see Time 1 variables in Table 1.

Table 3

Intercorrelations between Study Variables

	1.	2.	3.	4.	5	6.	7.	8.	9.	10.	11.	12.
1. AB[a]	-											
2. ADHD	.66***	-										
3. PB	-.39***	-.36***	-									
4. Moral emotions	.03	.05	-.02	-								
5. Aggressive PS	.07*	.10***	-.08**	.02	-							
6. Competent PS	-.07*	-.10***	.12***	-.02	-.67***	-						
7. SES	-.16***	-.19***	-.03	-.11***	.04	-.02	-					
8. Financial difficulties	.13***	.12***	-.01	.04	-.03	.02	-.13***	-				
9. Single-parent household	.06	.07*	.02	.02	.01	.01	-.02	.15***	-			
10. Gender	-.24***	-.27***	.38***	-.03	-.13***	.14***	-.02	.01	.05	-		
11. Nationality	.11***	.08**	-.07*	.05	-.02	-.01	-.40***	.01	-.12***	.02	-	
12. Special education	.12***	.14***	-.07*	.02	.11***	-.13***	-.22***	.10***	-.04	-.10***	.17***	-

Note. AB = Aggressive behavior. ADHD = Attention deficit/impulsivity. PB = Prosocial behavior.

PS = Problem solving. SES = socioeconomic status.

[a]Because all behavior scales were related across time points, aggregate scores across time are reported.

p < .05. **p* < .01. ***p* < .001.

Table 4

Parameter Estimates of Treatment Effects at Follow-Up

Parameter	Outcome		
	AB	ADHD	PB
Time x Treatment	-.08 (.04)*	-.11 (.06)**	-.08 (.08)
	Child development moderators		
Aggressive PS	-0.05 (0.08)	0.25 (0.15)*	0.03 (0.09)
Aggressive PS x treatment	0.10 (0.06)	-0.04 (0.07)	-0.06 (0.07)
Competent PS	-0.08 (0.06)	-0.19 (0.10)*	0.14 (0.07)*
Competent PS x treatment	-0.03 (0.03)	-0.08 (0.03)*	-0.04 (0.03)
Moral emotions	0.01 (0.02)	0.05 (0.04)	-0.01 (0.02)
Moral emotions x treatment	-0.03 (0.01)*	-0.02 (0.01)*	-0.05 (0.04)
Baseline behavior	1.09 (0.03)***	1.06 (0.02)***	1.10 (0.03)***
Baseline behavior x treatment	0.02 (0.03)	-0.03 (0.02)	-0.01 (0.01)
	Economic moderators		
SES	-0.01 (0.01)**	-0.01 (0.01)**	-0.01 (0.02)*
Financial problems	0.13 (0.05)*	0.22 (0.07)**	-0.01 (0.05)
Single-parent household	0.11 (0.04)*	0.17 (0.08)*	-0.05 (0.05)
	Control variables		
Girl	-0.18 (0.03)***	-0.38 (0.05)***	0.49 (0.04)***
Non-Swiss nationality	0.13 (0.03)***	0.03 (0.06)	-0.09 (0.04)*
Special-class education	0.02 (0.08)	0.16 (0.11)	-0.12 (0.06)*

Note. AB = Aggressive behavior. ADHD = Attention deficits/impulsivity. PB = Prosocial behavior.
PS = Problem solving skills. SES = socioeconomic status.
*p < .05. **p < .01. ***p < .001.