The Causal Impact of Socio-Emotional Skills Training on Educational Success*

Giuseppe Sorrenti (University of Amsterdam) ⓡ Ulf Zölitz (University of Zurich)

Denis Ribeaud (University of Zurich) Manuel Eisner (University of Cambridge)

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Abstract

We study the long-term effects of a randomized intervention targeting children's socio-emotional skills. The classroom-based intervention for primary school children has positive impacts that persist for over a decade. Treated children become more likely to complete academic high school and enroll in university. Two mechanisms drive these results. Treated children show fewer ADHD symptoms: they are less impulsive and less disruptive. They also attain higher grades, but they do not score higher on standardized tests. The long-term effects on educational attainment thus appear to be driven by changes in socio-emotional skills rather than cognitive skills.

Keywords: Socio-emotional skills, randomized intervention, child development, school tracking
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Giuseppe Sorrenti: University of Amsterdam, Tinbergen Institute, CESifo, g.sorrenti@uva.nl. Ulf Zölitz: University of Zurich, Department of Economics and Jacobs Center for Productive Youth Development, IZA, CESifo, CEPR, ulf.zoelitz@econ.uzh.ch. Denis Ribeaud: University of Zurich, Jacobs Center for Productive Youth Development, denis.ribeaud@jacobscenter.uzh.ch. Manuel Eisner: University of Cambridge, Institute of Criminology and University of Zurich, Jacobs Center for Productive Youth Development, manuel.eisner@crim.cam.ac.uk. Manuel Eisner and Denis Ribeaud designed the z-proso RCT study, organized all data collection and provided constructive feedback at all stages of the research process. Giuseppe Sorrenti and Ulf Zölitz collected additional data, analyzed the data and prepared the manuscript. The author order of Sorrenti and Zölitz has been randomized following Ray ⓡ Robson (2018).

1. Introduction

Socio-emotional skills are predictive of major life outcomes like educational attainment, employment, earnings, health, and participation in crime (Heckman and Rubinstein 2001; Roberts et al. 2007; Almlund et al. 2011). While the predictive power of socio-emotional skills has been established, there is an ongoing debate about how malleable these skills are. If these skills are indeed malleable, interventions targeting children's socio-emotional skills may change the trajectory of a life and lead to lasting changes in educational attainment and labor market outcomes.

In this paper, we study how a randomized intervention among 8-year-old children in Switzerland affects tracking, high school completion, and university enrollment. The Promoting Alternative Thinking Strategies (PATHS) intervention is a classroom-based socio-emotional learning program for elementary school students that aims to reduce behavioral problems (Greenberg et al. 1995). The intervention consists of weekly lessons and homework assignments embedded in the school curriculum. PATHS lasts for up to two years and is designed to foster self-control, patience, social problem-solving skills, self-esteem, emotional intelligence, and academic engagement.

PATHS teaches children to think twice and to look ahead. For example, in one classroom exercise, children learn to make less impulsive choices in difficult situations with the three-part "stoplight approach." First, on the red light, children slow down, take a few deep breaths and explain the problem they face. Next, on the yellow light, children think about solution options and the consequences of their actions, and they plan a solution to the problem. Finally, on the green light, children execute their plan and evaluate whether it worked. Teachers support children in applying the stoplight approach in role-play and real-life situations occurring in class such as a conflict with peers. Children also practice this approach in homework assignments: they describe a school-related social or academic problem, explain solution strategies to parents or classmates, and collect feedback on their solution strategies. PATHS includes elements of cognitive behavioral therapy and targets problem-solving and regulatory skills that have been associated with improved externalizing behavior conducive to learning, achievement, and future school success (Izard et al. 2004; Fantuzzo et al. 2007; Roberts et al. 2007; Raver et al. 2011; Deming 2017).

The PATHS intervention was implemented in 2005 in Zurich, Switzerland. Its main goal was to reduce disruptive and aggressive behavior by improving children's socio-

emotional skills (Eisner, Malti, and Ribeaud 2012).[1] PATHS was introduced in 28 out of 56 randomly selected public primary schools. Randomization took place at the school level and was stratified within school districts. The intervention was supposed to last for one school year in second grade; however, the program was so popular that over 70 percent of schools accepted the offer to continue with the program for a second year. The experimental design also included the Triple P parenting training program, which was implemented in half of the schools in the PATHS treatment schools and in half of the control group schools. The Triple P intervention, in contrast to PATHS, was less intensive and parents received less than two hours of intervention time on average. Triple P did not affect educational outcomes. In this paper we focus on the PATHS intervention and, for completeness, discuss the additional intervention and evaluation results in Appendix Section D.

To evaluate the long-term effects of the PATHS intervention, we follow the treatment and control group over 17 years using the Zurich Project on Social Development from Childhood to Adulthood (z-proso) panel. This panel surveyed children, teachers, and primary caregivers annually or biannually from late 2004 until early 2022, with the last wave interviewing children at age 24. The data include baseline and follow-up measures of children's socio-emotional skills, parenting practices, and family and household characteristics, as well as administrative and self-reported educational outcomes. The combination of multi-respondent survey data matched to administrative education records allows us to provide detailed evidence on how treatment effects evolve over time and what skills the intervention affects.

PATHS has lasting effects on educational careers. At age 13, four years after the intervention, treated children become 4.4 percentage points more likely to get tracked into academic high school (*Gymnasium*).[2] The treatment effect persists, and treated children become 7.1 percentage points more likely to complete academic high school. This effect is economically significant. It represents a 23 percent increase relative to the mean of the control group. At age 24, fifteen years after the end of the intervention, the treatment

[1] See Eisner et al. (2012), and Malti, Ribeaud, and Eisner (2012), and Averdijk et al. (2016), for a more detailed description of the implementation.

[2] Ability tracking into secondary school represents a key educational transition in Switzerland. Over 62 percent of OECD countries use a similar school-based tracking system (OECD 2004). Academic high school (*Gymnasium*) is the highest secondary school track in Switzerland. Enrollment in university requires a degree from an academic high school. Tracking is not a choice outcome of parents or children and is not determined by subjective teacher recommendations. Tracking is determined by (1) grades in core subjects in the last grade of primary school, and (2) standardized externally evaluated admission test scores.

group is 6.5 percentage points more likely to attend or have completed university, which is a 26 percent increase relative to the control group.

How does PATHS's effectiveness compare to other childhood intervention programs? The size of the PATHS treatment effect is one-sixth of the treatment effect of the Abecedarian program for college attendance (Campbell et al. 2002) and one-third of the size of the Perry Preschool Program for high school completion (Schweinhart 1993, Heckman et al. 2010a). Our effect size on academic high school attendance is very similar to the treatment effect of the Baloo and You mentoring program (Falk, Kosse, and Pinger forthcoming).

To investigate how the PATHS intervention affected children's educational attainment, we study four potential mechanisms. We evaluate changes in: (1) grades and test scores, (2) socio-emotional skills, (3) children's classroom behavior, and (4) parenting practices. We find evidence for the first three mechanisms. First, we find suggestive evidence that the intervention increases students' teacher-assessed grades, but it has *no* impact on academic high school admission test scores. As grades are more influenced by socio-emotional skills and classroom behavior than achievement tests (Borghans et al. 2016), our results suggest that the treatment effect is more likely to operate through changes in socio-emotional skills rather than through improved cognitive skills. Second, treated children display less attention deficit/hyperactivity disorder (ADHD) symptoms: they are less impulsive and less disruptive. Treated children also display less opposition, defiance, and non-aggressive conduct disorders. Children's anxiety, physical aggression, and prosociality are not affected by the intervention. Third, treated children are less likely to disturb lessons and more likely to focus on the teaching content in class. We do not find that treated children become more likely to complete their homework assignments, which suggests that the treatment mostly affects engagement and attention in the classroom. Fourth, we find no treatment effects on parenting practices.

Taken together, our analysis of the underlying mechanisms paints a consistent picture. The PATHS program reduces children's impulsiveness and fosters their decision-making process. These behavioral changes improve classroom behavior, which is rewarded by higher grades. In the long run, these improvements in grades lead students to enter the academic high school track and ultimately, university.

Our paper makes a series of novel contributions. Existing work typically studies treatment effects on socio-emotional skills or academic outcomes in isolation. Although a number of existing studies hypothesize that the long-term impact of early childhood

interventions is driven by changes in socio-emotional skills, the direct empirical evidence for this link is limited. This paper fills that gap by studying both types of outcomes in a common framework and estimating to which degree changes in academic careers are mediated by changes in socio-emotional skills.

Existing childhood intervention studies either suffer from small sample sizes or are not able to follow individuals over an extended time period.[3] Our study addresses both shortcomings. In contrast to some iconic childhood intervention studies, we have a substantially larger sample size and low attrition rates.[4] Our ability to document how treatment effects evolve over a 17-year period distinguishes our work from the literature.

Our results add to recent evidence that challenge the view that effective interventions need to take place before age 6. We highlight that adding socio-emotional skills training to the primary school curriculum at ages 8–9 has meaningful long-run impacts on educational careers. Our paper thereby relates to a growing literature on other classroom-based primary school interventions targeting socio-emotional development. Alan, Boneva, and Ertac (2019) show that an intervention targeting grit increases students' perseverance and math test scores two years after the intervention. Alan and Ertac (2018) show that an intervention targeting patience improves self-control and the ability to imagine future selves. These effects lead students to make more-patient intertemporal choices and persist over a three-year period. Schunk et al. (2022) show that training in self-regulation improves both cognitive and non-cognitive skills and makes students' more likely to attend the academic high school track three years after the intervention. Berger et al. (2020) show that an intervention targeting students' working memory improves both cognitive and socio-emotional skills with effects measured up to four years after the intervention. Brown et al. (2022) show that training in cognitive endurance improves student performance by 0.09 standard deviations. Cipriano et al. (2023) conduct a meta-analysis of school-based socio-emotional learning (SEL) programs outside the economics literature and conclude that SEL programs are generally effective. While Cipriano et al. (2023) find that most interventions lead to improved school climates and student behavior, evidence on long-run effects remains extremely scarce. Hart et al. (2023) conduct a meta-analysis of education interventions targeting either cognitive or socio-emotional skills and

[3] Section 9.2 summarizes related intervention studies.
[4] With 1,675 individuals, we have more statistical power than the Abecedarian Program (n = 111), the Perry Preschool Program (n = 123), the Jamaican Study (n = 129) or the Montreal Longitudinal Study (n = 250), which are underpowered.

conclude that most intervention effects appear to fade out within a few years. In contrast to existing papers on primary school interventions and the work summarized by these two meta-analyses, we have a much longer follow-up period and are the first to look at university enrollment as an outcome.

Our paper is not the first evaluation of the PATHS program. Over the past two decades, PATHS has become increasingly popular and has been used in over 36 countries. Similar to the broader literature on socio-emotional learning programs, existing evaluations of PATHS focus on short- or medium-term behavioral changes in primary school (Averdijk et al. 2016, Crean and Johnson 2013; Humphrey et al. 2016; Malti, Ribeaud, and Eisner 2012).[5] Most of these evaluations were not designed to provide evidence of long-run effectiveness. In contrast to these studies, we follow students over a substantially longer time horizon and do not limit the analysis to survey-based behavioral measures. By looking at how the intervention affects university enrollment and graduation, we provide unique evidence on the long-term effectiveness of one increasingly popular SEL program used in a variety of countries. In contrast to previous evaluations, our study is the first to establish a causal link between the PATHS program, tracking, and participation in higher education.

2. The PATHS Training Program

PATHS is a teacher-led program for primary school children that was developed by Mark T. Greenberg and Carol A. Kusché at the University of Washington for the US context (Kusché and Greenberg 1994). The program teaches systematic coping and decision-making strategies with the aim of fostering children's self-control, emotional understanding, and social problem-solving skills (Greenberg et al. 1995).

PATHS focuses on regulatory skills; it aims to foster social skills and improve externalizing behavior (Greenberg et al. 1995, 1998). These behavior changes should improve educational participation, reduce disruptive and aggressive behavior in the classroom, and, ultimately, reduce violence, delinquency, and crime. Table C1 in Appendix C provides an overview of the PATHS curriculum, which targets the following competencies:[6]

(1) Self-control, patience

[5] Appendix Table A1 provides an overview of previous PATHS evaluations.
[6] Appendix Figures C1–C4 show teaching material examples related to core activities shown in Table C1.

(2) Decision-making strategies, social problem solving
(3) Self-esteem
(4) Emotional intelligence
(5) Fairness and rules

(1) Self-control, patience: PATHS targets self-control and patience through several exercises. Children learn to calm down in stressful situations using breathing techniques. They learn that it is their own responsibility to avoid exploding in anger and losing self-control through the analogy of a balloon that can burst. They role-play situations in which they practice ignoring, interpreting, and handling teasing of other children. They listen to a story of a girl who learned how to control herself by calming down and recognizing her emotions. The children complete some of these exercises at home. For example, children interview their parents about situations in which they had to calm down and write a summary of how their parents managed the situation.

(2) Decision-making strategies, social problem solving: PATHS targets decision-making strategies and social problem solving based on the stoplight approach described in the introduction. Figure C1 in the Appendix shows a poster used to explain the stoplight approach After introducing the method in class, the teacher discusses concrete situations in which children can use the approach. Children then apply the stoplight approach in repeated role-play exercises that simulate everyday situations. These exercises involve conflict situations with peers, parents, or teachers, or problems with school assignments. In homework assignments, children describe their problem-solving approach to a specific situation. They also practice the approach at home and explain the three steps to their parents, who receive a separate information leaflet about the benefits of the stoplight approach (Figure C5).

(3) Self-esteem: PATHS aims to increase children's self-esteem by making them aware of their strengths and skills. In one of the lessons, children learn to give and accept compliments from peers and teachers. The teacher explains the concepts of compliments and respect as well as how to express compliments. Children then practice how to give compliments to each other in the classroom. In one homework assignment, children exchange compliments with parents and other family members at home.

In another exercise, the "child of the week" receives special privileges and duties for one week. As part of this exercise, the child acts as the teacher's assistant. At the end of the week, the teacher and classmates prepare a special child-of-the-week certificate with a picture of the child and a series of compliments and anecdotes describing what attributes classmates value in the child. While this activity is supposed to foster self-esteem, it also teaches children that privilege comes with responsibilities. They are supposed to learn that being valued by others also requires contributing to the common good.

(4) Emotional intelligence: PATHS targets emotional intelligence by fostering the understanding and expression of feelings. In one lesson, the teacher reads stories and children guess what feelings the protagonist felt. In one homework assignment, children describe their feelings during a recent emotional situation and discuss with their parents how they dealt with their emotions. With this exercise, children learn about themselves and become more aware of how their behavior affects the feelings and perceptions of peers, parents, and teachers. To facilitate the recognition and expression of feelings, children receive "feelings cards." These cards show children expressing different emotions such as happiness, excitement, anger, surprise, sadness, and worry (see Figure C2 in the Appendix). Children first color these cards and then use them to express their current emotional state by placing the corresponding card on their table. In a final step, children reflect on how to demonstrate an emotion. For example, they have to find appropriate verbal responses to feelings like anger or sadness.

(5) Fairness and rules: Starting with the first PATHS lesson, children discuss the importance of having rules and manners. They discuss with their teachers in class and parents at home which rules should be established in the classroom, at home, and in everyday life. PATHS also tries to foster children's understanding of fairness by introducing children to principles of fair behavior. In one lesson, children have to identify fair and unfair behavior in different situations. In another lesson, the teacher reads a story and the children discuss whether the protagonists' behavior is fair or unfair.

3. Data and Institutional Background

This section provides the institutional background of this study. First, we introduce the Zurich Project on Social Development from Childhood to Adulthood (z-proso data

collection). Second, we illustrate the main characteristics of the education system in the Canton of Zurich.

3.1 The z-proso Study

The data we analyze in the paper come from the z-proso panel study (Malti, Ribeaud, and Eisner 2011; Eisner et al. 2012; Averdijk et al. 2016). Ribeaud et al. (2022) provide a detailed description of the Zurich Project on the Social Development from Childhood to Adulthood (z-proso). The study surveys students, teachers, and primary caregivers[7] to investigate the life course of 1,675 children starting primary school in 2004 in Zurich, which is the largest city in Switzerland. Table B1 in Appendix B provides an overview of the timing of the surveys, the respondents, and the response rate in nine different waves that took place between 2004 and 2022. By 2022, the study had followed children over a 17-year period until they were 24 years old. Throughout the nine interview waves, response rates remained high. At age 24, for example, about 70 percent of the original sample responded to the survey.

The z-proso data include pre-intervention (baseline) and follow-up measures of children's socio-emotional skills, parenting practices, family and household characteristics, and administrative and self-reported educational outcomes. Appendix Section B describes the data collection, informed consent, and ethics approval in greater detail.

Two early prevention programs were implemented as part of the z-proso study. The first intervention was PATHS—the school-based social and emotional learning-based program we focus on in this paper (see Section 2). The second intervention was the "Positive Parenting Program" (Triple P). Triple P encourages "positive parenting" by teaching techniques that support desired child behavior, routines that avoid parent-child conflicts, and techniques that help the child plan (Sanders 1999). In this paper, we focus on the PATHS intervention. For completeness, we provide more details on the Triple P intervention in Section 4 and show its treatment effects in Sections 6 and Appendix Section D.

3.2 Education and Tracking System

Figure 1 illustrates the school system and educational transitions in the canton of Zurich. Children start primary school at age 7. At age 12, after six years of primary school, children are tracked into different secondary schools.

[7] In most cases the primary caregiver is the child's biological parent. Throughout the paper, we use the terms primary caregiver and parents interchangeably.

The highest school track is academic high school (*Gymnasium*). Students attend this school for six years and typically graduate when they are 18 years old. It prepares students for university education and allows them to obtain the *Matura* degree required to enroll in university.[8] Tracking is determined by grades and an admission test. Parents cannot choose the secondary school track and have no direct influence on the tracking outcome.

Students can obtain the *Matura* degree from an academic high school either through attending long-term academic high school or short-term academic high school. Tracking into long-term academic high school takes place after Grade 6. Tracking into short-term academic high school takes place after Grade 8 or 9. Later transitions are possible if a student has sufficiently high grades and passes the standardized admission test. During the first two probation years, some students initially tracked into academic high school fail to meet performance standards and move to a lower track. Additionally, a substantial number of students from the lower track move into the academic high school at different points in time. As a result, the share of students in the highest track increases by 25 percent during the first three years of secondary school.

4. Experimental Design

4.1 Selection of Schools, Randomization, and Definition of Treatment Group

Selection of participating schools: Zurich has seven school districts and a total of 90 primary schools. In each school district, eight schools were randomly selected to participate in the experiment. All 56 selected schools complied with the request of the City of Zurich's School and Sports Department to participate in the study.

Stratification and randomization: The 56 participating schools were assigned to 14 strata cells. These cells were constructed by dividing each of the seven school districts into two groups consisting of four similar-sized schools. Within each strata, each school was randomly assigned to one of four treatment groups using a random number generated in Microsoft Excel. Schools with the largest random number in each strata were assigned to the PATHS program (PATHS only). Schools with the second-largest number were assigned to the Triple P program (Triple P only). Schools with the third-largest number

[8] Children in the lower track attend one of three secondary high schools called *Sekundarschule* level A, B, and C. These schools prepare students for vocational education and apprenticeship trainings. Level A leads to white-collar jobs, and levels B and C lead to blue-collar jobs. Students in all three lower tracks attend school for three years and are typically 15 or 16 years old upon completion.

were assigned both to the PATHS and Triple P programs (PATHS & Triple P). Finally, schools with the lowest number received neither the PATHS nor the Triple P intervention. These schools are the pure control group.

Definition of treatment and control groups: In this paper, we focus on the PATHS intervention and define the treatment group as the group of schools assigned to the one of the two PATHS treatment arms—either PATHS only or PATHS & Triple P combined. The control group consists of the pure control group and the Triple P-only group. Based on this definition, we have 28 treated and 28 control schools.

We include Triple P schools in the control group because this program had no impact on children's educational careers (Table D1 in the Appendix). Triple P also had no impact on children's problematic behavior or educational outcomes (Malti, Ribeaud, and Eisner 2011; Eisner et al. 2012). Triple P has been shown to be effective for younger children (Doyle 2020). In our setting, however, participation rates were low: only 27 percent of parents assigned to Triple P enrolled in the program and attended at least one session. Less than 19 percent of parents assigned to Triple P completed all four course units. Triple P parents received, on average, less than two hours of intervention time. Eisner et al. (2011) show that parents who decided to attend courses were more likely to come from families with a high socio-economic background and be of Swiss origin.

Given that there are four treatment arms of the original experimental design, we could also estimate effects for each of the three treatment groups separately. In Section 6.2 we show that this approach leads to similar results. Alternatively, we could drop all students that received the Triple P treatment and compare only the pure PATHS with the pure control group. We provide results based on this alternative sample definition in Section 6.3. Although we lose about half of our observations with this definition, results remain very similar.

4.2 Implementation of the Intervention

In the 2005/06 school year, PATHS was implemented in 28 primary schools in cooperation with the Department of School and Sports of the City of Zurich. Prior to the implementation, the original PATHS material was translated and adjusted to the Swiss context by Rahel Jünger in collaboration with the US developers (Eisner et al. 2007). Rahel Jünger also implemented the program and conducted the teacher training and supervision. This implementation was done independently from the evaluation.

In the selected schools, all Grade 2 classes were treated. Parents were not aware of the school's treatment status or the implementation of the program in Grade 2 when enrolling their children in primary schools. The level of compliance was remarkably high, with less than six percent of children changing schools between Grade 1, when baseline characteristics were collected, and Grade 2, when the PATHS program was implemented in the treated schools. We do not find that school changes were related to the treatment status.[9]

To prepare schools for delivering the PATHS intervention, all teachers in charge of running PATHS lessons participated in a three-day workshop with a PATHS coach. There was usually one teacher per treated class that received the PATHS training. Teachers not delivering PATHS were not trained. During this workshop the PATHS coach gave teachers an overview of the key concepts, classroom activities, posters, toys, and over 400 pages of materials. During the first year of the program, teachers regularly met their PATHS coach, who gave them feedback and support. PATHS coaches also monitored the implementation and observed six PATHS lessons for each participating class. After each of these observations, the coach provided suggestions for improvements and graded the quality of the implementation.

The 45-minute PATHS lessons typically took place twice per week. Treated children received PATHS lessons throughout the entire year of Grade 2. PATHS lessons replaced the class "Humans and Environment" (Mensch und Umwelt), which teaches children about the environment and organization of Swiss society. To reinforce the practice of PATHS methods, teachers also applied PATHS strategies in lessons not explicitly dedicated to the PATHS curriculum itself. Over the course of Grade 2, children received about 45 hours of PATHS lessons and about 20 hours of PATHS homework assignments (Eisner et al. 2007). Because the majority of teachers, parents, and children highly appreciated PATHS, over 70 percent of schools continued using the program for a second year in Grade 3. The program ended for all children at the end of Grade 3 when classes were reshuffled, and students received a new teacher.

[9] Appendix Table A2 shows that students' school changes between Grade 1 and 2 are unrelated to their treatment status.

4.3 Outcome Variables and Descriptive Statistics

Outcome variables: We evaluate the long-term effects of the PATHS intervention on educational outcomes. The key outcomes of interest are whether individuals attend and complete the academic high school track (*Gymnasium*), whether they obtain the *Matura* degree, which allows them to enroll in any university, and whether they are enrolled in or graduated from university at age 24.

We observe students' secondary school tracks at ages 13, 15, and 17 from administrative school data provided by the Department of Education of the Canton of Zurich. Some children leave the canton of Zurich and therefore disappear from the administrative data. We therefore complement the administrative records with self-reported tracking outcomes based on the z-proso survey.[10] We observe whether students complete academic high school and enroll in university or graduate from university in the wave 9 z-proso survey administered at age 24.

Table 1 shows that 16 percent of the participants attend academic high school at age 13, right after tracking has taken place. This number increases to 20 percent at age 15 and 26 percent at age 17.[11] Twenty-seven percent of children complete academic high school, and 17 percent are enrolled in university at age 20. At age 24, 22 percent have graduated from university or are still enrolled in university.

Baseline measures: Table 1 shows characteristics of children and parents measured at the baseline, that is, in the year before the start of the intervention. At this time, children are, on average, 7 years old. Forty-eight percent are girls. Our sample comes from a diverse population: only 60 percent are Swiss, 90 percent were born in Switzerland, and only 49 percent of mothers are Swiss. Seventeen percent of households are single-parent households. About 39 percent of mothers have completed at least academic high school (*Gymnasium*), and 16 percent hold a university degree. Fathers are slightly more educated than mothers, with 52 percent having completed *Gymnasium* or other types of higher education and 25 percent holding a university degree. The average family household income is USD 86,000 per year; 38 percent of families are entitled to state funded financial aid, and 18 percent report financial problems at the baseline. Our data also contain detailed

[10] The z-proso study aims to track individuals even after they moved out of the canton or leave the country, and it has a remarkably low attrition rate. At age 24, we observe self-reported education outcomes for almost 70 percent of the original sample (n = 1,675).

[11] The proportion of students in academic high school increases over time due to students' switching to *Gymnasium* from lower tracks during different stages of secondary school.

baseline measures of child behavior assessed through the Social Behavior Questionnaire (SBQ) (Tremblay et al. 1991; Murray et al. 2019) and the Alabama Parenting Questionnaire (APQ) (Shelton, Frick, and Wootton 1996).

5. Empirical Strategy

5.1. Empirical Model

We aim to estimate the treatment effect of the PATHS intervention on educational outcomes. Equation (1) shows our main empirical model:

$$Y_{is} = \beta_1 \, \text{PATHS}_s + X'_{is}\gamma + \theta_j + \varepsilon_{is}, \qquad (1)$$

where Y_{is} is the outcome of interest (initial tracking into academic high school at ages 13, academic high school completion, and university enrollment or graduation at age 24) of individual *i* in school *s*. $PATHS_s$ is an indicator showing whether the school *s* was randomly assigned to participate in the PATHS program. β_1 is the parameter of interest. It captures the treatment effect of participating in the PATHS program.

Vector X_{is} contains baseline control variables. These differ depending on the specification. In our most complete specification, we include pre-treatment measures of child characteristics, household characteristics, and child socio-emotional skills. Child characteristics include age, gender, and Swiss citizenship. Household characteristics include household income, mother's age at the baseline, mother's education, father's education, and indicator variables for whether the mother was born in Switzerland and whether she has Swiss citizenship, whether the household is single-headed, whether the household reports receiving financial aid, and whether the household reports financial problems. For a child's socio-emotional skills, we rely on SBQ measures reported by the child, the teacher, and the primary caregiver. These include ADHD symptoms (disruptiveness and impulsiveness), anxiety and depressivity, aggression, prosociality, non-aggressive externalizing problem behavior, non-aggressive conduct disorder, and opposition and defiance. The model always includes strata fixed effects θ_j, with $j = 1, \ldots, 14$, for the level at which randomization took place. ε_{is} represents the error term of the model.

We estimate Equation (1) using linear probability models and cluster standard errors at the school level. We additionally provide *p*-values based on randomization inference with 10,000 repetitions following Young (2018).

5.2. Balancing Tests

The identifying assumption of our empirical strategy relies on the random assignment of children to the treatment status. To verify this assumption, we test whether baseline characteristics predict treatment status. In particular, we regress treatment status on each of the pre-treatment characteristics separately. We use all available characteristics on child and family demographics and measures for socio-emotional skills, and we estimate a total of 56 regressions.

Table 2 summarizes the balancing tests. Column (1) shows the number of statistically significant coefficients we obtain when regressing the indicator for treatment status ($PATHS$) on baseline characteristics. Column (2) shows the number of coefficients we would expect to find statistically significant due to chance variation. Overall, Table 2 suggests that the randomization was successfully implemented: the number of significant coefficients is similar to the expected number of significant coefficients under random assignment.

Table 3 provides a closer look at unbalanced variables by reporting point estimates from all 56 balancing regressions. The analysis reveals a substantial and significant imbalance ($p < 0.01$) in fathers' education levels between the treatment and the control group. Given that parental education is a key determinant of children's educational outcomes, this imbalance deserves careful consideration. Children receiving the PATHS intervention come from families with, on average, *less* educated parents. Treated children are about 10 percentage points less likely to have a father that holds at least an academic high school degree. This imbalance in fathers' education levels will make it *harder* for us to identify effects of the intervention if the treatment affects children's educational outcomes positively. Without accounting for this imbalance, we would *underestimate* treatment effects of the PATHS program.

To provide a better understanding of the initial imbalance and its consequences for our results we conduct a series of exercises. In Section 6.2, we show how different sets of control variables affect our results. We highlight that we need to control for unbalanced parental education to obtain unbiased treatment effects. In Section 6.2, we further conduct a permutation exercise that highlights that creating a balanced estimation sample is an alternative way to obtain unbiased estimates that does not require the inclusion of control variables. Overall, our analyses highlight that it is essential to account for the initial imbalance in the sample to obtain unbiased results.

6. Results

In this section, we provide the main results of our analysis on the impact of the PATHS curriculum on educational careers. We also provide a series of sensitivity analyses and test whether results are driven by selective attrition and estimate treatment effects for different subgroups.

6.1 Main Results

Table 4 shows estimates of the PATHS treatment effect on education trajectories from Equation (1). The dependent variable in column (1) is an indicator for academic high school attendance at age 13, immediately after tracking has occurred. The dependent variable in column (2) is an indicator for academic high school completion at age 20. In column (3), the dependent variable is an indicator for university enrollment or graduation at age 24.

Table 4 shows positive and statistically significant treatment effects across all educational outcomes. The PATHS program leads to a 4.4 percentage point increase in the likelihood of children attending an academic high school at age 13, immediately after tracking. This effect is economically significant, as it corresponds to a 22 percent increase compared to the control group mean. The positive impact persists over time. By age 20, attending PATHS increases the likelihood of completing academic high school by 7.1 percentage points, representing a 23 percent increase over the completion rate of the control group. Furthermore, the treatment effect of PATHS remains visible for higher education. At age 24, PATHS increases the likelihood of attending university or having already graduated from university by 6.5 percentage points (26 percent).[12]

The results presented in Table 4 suggest that the PATHS treatment effect is fairly persistent over time. Many students, however, move between tracks during their career. Figure A1 shows a flowchart that illustrates how students switch between school tracks over time, which highlights substantial mobility. About 35 percent of students who

[12] Over 70 percent of schools assigned to the treatment group implemented PATHS for two years. In Appendix Section E, we test for dosage effects of the intervention. Although this analysis does not allow for a causal interpretation of the results, we find some suggestive evidence that children benefit more if they are exposed to the treatment for a longer time. In Appendix Section F, we investigate whether the treatment effect creates a potential mismatch between students and high schools. We find no evidence that marginal students who got pushed into academic high school by the treatment perform relatively worse in the more challenging school track. Also, grade retention seems unaffected by the intervention. We create an indicator variable for grade retention equal to one if the student's actual grade is lower than the age-based expected grade. According to the results in Table A3, there is no evidence that the PATHS intervention has any impact on grade retention.

graduate from academic high school were initially *not* admitted to this track at age 13. Similarly, 38 percent of students that are enrolled in or have graduated from university at age 24 did not attend the academic high school track at age 13. This evidence calls for a closer examination of how treatment effects evolve over time.

Figure 2 shows how the PATHS treatment effect evolves over time using data from all available waves. The figure displays the treatment effects on academic high school enrollment at ages 13, 15, and 17, as well as high school completion and university enrollment at age 20, and university enrollment or graduation at age 24. All the point estimates in Figure 2 are positive and statistically significant. The PATHS treatment effect slightly increases over time. Notably, the mean of the dependent variables also increases over time with the relative treatment effect being fairly constant over time.[13,14]

Overall, we observe large and economically significant effects. In the average class in our sample, five out of 28 children attend university at age 20. The size of the treatment effect implies that one additional child—six instead of five—will attend university due to the intervention. We discuss our effect sizes and how they compare to other childhood interventions in Section 9.

6.2 Sensitivity Analysis – Imbalanced Treatment and Control Groups

One potentially important concern for the interpretation of our results comes from the imbalance in fathers' education between the treatment and control group. To assess how much this initial imbalance affects our estimates, we estimate treatment effects with and without controls for the initial imbalance in Table 5. Panel A reports results without any control variables except the randomization strata. Panel B reports results with controls for parental education to account for the imbalance between the treatment and control group

[13] As we test multiple hypotheses by looking at different educational outcomes over time, we also estimate treatment effects using: (1) an aggregate index for the educational success of children through ages 13, 15, 17, 20, and 24 as a dependent variable, and (2) a pooled regression. For the construction of this education index, we follow Anderson (2008). Table A4 shows that our overall conclusions on PATHS effectiveness on children's educational outcomes are the same.

[14] Table A5 in the Appendix also investigates whether the treatment affects labor market outcomes at age 24—the latest available data wave. When examining the labor market outcomes at age 24, we do not observe any significant treatment effects on working full-time or part-time. However, we observe a negative effect on net wages, which is likely explained by the impact of the intervention on participation in higher education. At age 24, it seems to be too early to quantify the intervention impacts on earnings. Given the content of the PATHS intervention, we have also estimated treatment effects for crime-related outcomes. Appendix Tables G1 and G2 show that we find no evidence of effects of PATHS on administrative and self-reported crime outcomes.

at the baseline. Panel C reports results from the model that additionally includes the full set of baseline control variables.

Panel A of Table 5 shows that, despite having less-educated parents, children who attend the PATHS program seem to do slightly better than children in the control group. For example, treated children are 2.3 percentage points more likely to have completed academic high school at age 20. While the point estimates are positive for all outcomes, none of the estimates in Panel A are statistically significant at conventional levels. Panel B accounts for the imbalance in parental education at the baseline by including control variables for parental education. By only adding controls for parental education, we find positive and statistically significant treatment effects for all educational outcomes. Panel C of Table 5 replicates the analysis in Table 4 and confirms that the results are robust to including this large set of additional control variables. Despite the lower number of observations due to missing values in our control variables, point estimates in the model with controls for parental education (Panel B) and the full set of controls (Panel C) are not statistically different from each other.[15]

Taken together, Table 5 highlights that our results depend on whether we control for parental education. In an RCT with perfect randomization, we would not expect estimates to change when including controls. However, in our case, it is essential to account for the initial imbalance to obtain unbiased estimates. This imbalance—having fathers with less education in the treatment group—leads to downward bias and makes it harder for us to identify positive treatment effects.[16] We conduct a series of sensitivity analyses to support this intuition.

To understand the consequences of the imbalance, we conduct a permutation exercise that first creates a balanced estimation sample from the full sample and then estimates treatment effects using the model without controls (Table 5, Panel A). To obtain

[15] We test whether treated children are more likely to have non-missing control variables in Panel B of Table A6. We regress an indicator taking the value of one if no control variables are missing on the treatment status. The analysis shows that the treatment and control groups do not differ in their probability of having missing control variables.

[16] Table A7 shows that father's education, along with family income, represents the main determinant of children's likelihood of attending and completing academic high school, as well as their probability of enrolling in or graduating from university. The coefficient for father's completion of academic high school consistently shows a positive, sizeable, and statistically significant effect. Furthermore, the point estimate for father's education is notably larger than that for maternal education. The adjusted *R*-squared highlights the importance of father's education in shaping children's educational outcomes. When controlling for variables such as maternal education, demographics, and other family characteristics, such as family income, the adjusted *R*-squared increases only marginally compared to the *R*-squared in the bivariate regression that includes only father's completion of academic high school as an explanatory variable.

a balanced estimation sample we exclude classes with highly imbalanced shares of fathers who completed academic high school. Because the treatment group has a lower share of fathers who completed academic high school, we sequentially drop classes from the treatment (control) group with the lowest (highest) share of parents who completed academic high school. We start with the full sample and then symmetrically trim the sample by gradually dropping the same number of classes from both the treatment and control groups. We start by eliminating the class in the treatment group with the lowest share of parents who completed academic high school and the class in the control group with the highest share. By dropping imbalanced classes with unusually high or low levels of fathers' education, we can investigate how treatment effects evolve in an increasingly balanced sample.

Figure 3 shows the impact of the sample restriction procedure on the imbalance in fathers' education. The x-axis shows the number of classes we drop. The y-axis shows the "balancing coefficient"—the correlation between treatment status and having a father who completed academic high school. We begin with the entire sample and then gradually exclude classes. Figure 3 shows that the gradual exclusion of classes restores balance between the treatment and the control group. The exclusion of 14 out of 129 classes results in an imbalance that is no longer statistically significant at conventional levels, although the point estimates remain sizeable (–4.14 percentage points). When excluding 24 classes, the difference between the treatment and the control group is closest to zero. We will use the subsample that minimizes the imbalance as our benchmark model and mark corresponding estimates with a blue diamond. This subsample consists of 1,329 observations corresponding to 80 percent of the sample.

Figure 4 shows how treatment effects evolve depending on the number of classes dropped. Panel (a) shows treatment effects on academic high school completion, and Panel (b) shows treatment effects on university enrollment or graduation at age 24. Treatment effects are estimated using the model without controls (Table 5, Panel A). The figure highlights that removing imbalanced classes increases the treatment effects. Once the sample is sufficiently balanced, the effect becomes statistically significant. In our benchmark model that minimizes the imbalance, we observe a highly significant treatment effect of 7.8 percentage points (p-value = 0.012). This treatment effect is not distinguishable from the treatment effect we observe in the full sample model that includes

controls (Table 5, Panel C). Results in Panel (b) show that treatment effects evolve very similarly when we examine university enrollment or graduation at age 24 as an outcome.[17]

Table 6 shows treatment effects on education outcomes for the restricted sample (24 classes excluded) using the specification without controls (Panel A) and the specification with controls for parental education (Panel B). Table 6 provides the same conclusion as Figure 4 and highlights two important findings. First, the treatment effect of PATHS in the model without control variables is consistently positive and significant for all education outcomes. Second, the results in the restricted sample without controls are remarkably similar to the estimates in the full sample that account for the initial imbalance by controlling for fathers' education level. This similarity confirms that, as expected in an RCT, adding controls has no impact on the estimates once the sample is balanced. Additionally, it confirms that the model with no controls in the entire sample underestimates the treatment effect of PATHS and that controlling for parental education is a necessity that corrects for this bias.

6.3 Additional Robustness Tests

This section provides an additional set of robustness tests for our results. First, we test whether our conclusions remain the same if we compute *p*-values based on randomization inference. Second, we estimate specifications using an alternative treatment group definition. Third, we test whether selective attrition drives our results. Fourth, we discuss possible concerns of experimenter demand effects.

Randomization inference: In the main analysis, we cluster standard errors at the school level, resulting in 56 clusters. As a robustness test, we compute *p*-values based on randomization inference using 10,000 random permutations following Young (2018). With this procedure we account for possible bias in standard errors due to a small number of clusters. Table 4 shows that *p*-values based on randomization inference lead to the same overall conclusions.

[17] A potential additional concern regarding our main analysis, based on the full sample, is that there might be other unobserved variables related to fathers' education that could also be unbalanced. The results from our permutation exercise suggest that there is limited scope for bias arising from such unobservables. After creating a balanced sample with respect to fathers' education, we can expect the unobservable characteristics related to fathers' education to be balanced within this subsample.

Alternative treatment group definitions: Our baseline analysis compares individuals exposed to PATHS (treatment) to individuals who were not exposed to PATHS (control). However, some individuals in the treatment and control groups were also exposed to the Triple P program. In Table D1, Panel B in the Appendix we show estimates comparing individuals who were assigned to the Triple P program versus individuals who were not exposed to Triple P. This table shows that the Triple P intervention has no significant effect on educational outcomes. The lack of effects for Triple P is consistent with Eisner et al. (2012), who show that the intervention had no short-term effects on either parenting practices or child problem behavior.

An alternative evaluation strategy is to drop all students that received the Triple P treatment and compare only the pure PATHS with the pure control group. In Table A8 in the Appendix we show that, although we lose about half of our observations, results remain very similar.

Alternative treatment group definitions – full 2x2 design: Table D1 provides additional evidence on the robustness of our results by comparing all treatment arms of the original experiment. Panel A and Panel B confirm that PATHS, in contrast to Triple P, is effective. Panel C in Table D1 reports estimates for a model that includes an interaction effect between the two interventions, PATHS and Triple P. The PATHS treatment effect in Panel C is similar to Panel A and confirms that children exposed to PATHS are more likely to complete academic high school. As in Panel B, children exposed to the Triple P program are not significantly affected. The interaction effect between both interventions (PATHS * Triple P) never reaches statistical significance in any of the columns (1)–(3). These results suggest that there is no additional benefit from exposure to both programs.

Selective attrition: We observe initial tracking from administrative data for 95 percent of the initial sample. We observe university enrollment/graduation for 69 percent of the initial sample. To test for selective attrition, we estimate the effect of attending the PATHS program on the probability of observing an individual in our estimation sample at five different points in time: at ages 13, 15, 17, 20, and 24.[18] More specifically, we regress an

[18] Data are missing at ages 13, 15, and 17 when individuals move out of the canton of Zurich and refuse to participate in the survey. Outcomes for academic high school completion and university enrollment or

indicator showing whether we observe the individual in our sample at a given time on a PATHS treatment indicator. Table A6, Panel A, shows that the treatment does not affect the probability of being observed in the sample at different points in time. The PATHS coefficients are small and not statistically significant in all specifications. Selective attrition does not appear to drive our results.[19]

Demand effects: As in any social experiment, our results raise the question of whether knowledge of treatment or experimenter demand effects could drive treatment effects. Two reasons speak against this. First, tracking in Switzerland is determined by two objective student performance measures: (1) grades in core subjects in the last grade of primary school, and (2) standardized externally evaluated admission test scores. Therefore, tracking is not a choice variable, and it is not determined by subjective teacher recommendations. Second, those teachers involved in the program in Grade 2 have no direct or indirect influence on the tracking decision that takes place four years later. At the end of Grade 3, after the intervention is completed, children are reassigned to new teachers uninvolved in the intervention. It is therefore not plausible that these new teachers—who did not implement the program—manipulated treated students' grades four years after the end of the program to push them into academic high school. Third, the competitive tracking system and the fact that the treatment effect persists over time reject the interpretation that demand effects drive our results. If the intervention motivated teachers to inflate treated students' grades and pushed unqualified students into academic high school, they would not have survived in this competitive track. During the first two probation years, students initially tracked into academic high school who fail to meet performance standards are moved to the lower track. At the same time, a substantial number of students from the lower track move up into the academic high school at different times. If initial treatment effects had been driven by teacher-inflated grades, these students would not have survived the competitive environment of academic high schools. The fact that students move substantially between tracks in combination with the lasting

graduation are based on self-reported information and are only available for those individuals participating in survey waves 8 and 9.

[19] Although we do not find any evidence of selective attrition, we also replicate our main results following Wooldridge's (2007) inverse probability weighting in Appendix Table A9. We first model attrition for each outcome variable as a function of the initial assignment to a specific treatment condition and the full set of control variables used in the baseline analysis. Then, we predict individual attrition probabilities. In the estimation, we then weight each observation with the inverse of this probability to account for the probability of being observed in a specific administrative register or survey wave of the data collection. Appendix Table A9 shows that all main results remain similar when using inverse probability weighting.

treatment effect for academic high school completion rejects the idea that demand effects or knowledge of the treatment status could be driving our main results.

6.4 Heterogeneous Treatment Effects

Figure 5 investigates potential heterogeneous treatment effects for the impact of PATHS. Panel (a) displays the effects on initial tracking at age 13, panel (b) shows the effects for academic high school completion, and panel (c) illustrates the effect on university enrollment or graduation at age 24. We estimate heterogeneous effects by family income, parental education, socio-economic status (SES), and the child's gender and age. We also investigate heterogeneity in treatment effects by the main socio-emotional skills targeted by PATHS including ADHD symptoms, opposition and defiance, and non-aggressive conduct disorder. To estimate heterogeneous effects, we augment Equation (1) with interaction terms between the treatment variable and indicators for different subgroups. All subgroups are defined based on pre-treatment characteristics. Figure 5 shows the estimation results with the respective subgroup shown on the y-axis. Overall, the analysis remains suggestive and mainly shows that we lack the statistical power to detect systematic differences between subgroups.

7. Mechanisms

In this section, we study four possible mechanisms for the effect of the PATHS program on educational trajectories. First, we analyze whether PATHS affected the two elements that determine the tracking outcome: primary school grades and academic high school admission test scores. Second, we study whether PATHS affected children's socio-emotional development—the main target of the intervention. Third, as some of the PATHS activities involve parent-child interactions, we test whether the intervention affected parenting practices. Fourth, we investigate whether PATHS affected school-related behavior like classroom disruption and homework completion.[20]

[20] Appendix Figure A2 and Table A10 complement the analysis of possible mechanisms by providing a descriptive overview of the specific activities conducted as part of the PATHS program. We look at the coverage of activities related to six key modules: problems-solving, self-control, feelings, rules, self-esteem, and friendship. Figure A2 shows significant variation in the extent to which these different modules were covered. While the coverage of each module is likely endogenous, we nonetheless provide a descriptive analysis of how treatment effects may differ based on module coverage. Table A10 presents estimates of the interaction effect between the treatment and indicators that determine whether the coverage of different modules was above or below the median. The evidence remains suggestive but indicates somewhat larger treatment effects for classes that allocated more time to the modules focused on self-control and self-esteem.

7.1 Effects on Grades and Admission Test Scores

Primary school grades are given on a scale of 1–6 and are based on tests and the subjective assessments of the primary school teacher. The standardized high school admission test is graded on that same 1–6 scale and covers mathematics, reading comprehension, and writing. The test is evaluated by an external high school teacher who typically does not know the child. Students' tracking outcomes are determined by their average primary school grades and their admission test scores. Both performance measures have equal weight, and students with a minimum of 4.5 out of 6 are admitted to academic high school.[21]

We estimate the effect of PATHS on grades and admission test scores using the specification with the full set of controls. To simplify the interpretation of the results, we standardized both outcome variables to have means of zero and standard deviations of one. Figure 6 provides suggestive evidence that the PATHS program increases children's grades. Due to the lower sample size for this outcome, effects are less precisely estimated. Figure 6 suggests that PATHS increases grades by 20–25 percent of a standard deviation.[22] Figure 6 also shows the treatment effect on the admission test scores. Point estimates on test scores are close to zero. While this coefficient is imprecisely estimated and not statistically significant, we cannot fully rule out that the treatment had some positive impact on the standardized admission test.

Taken together, our results suggest that the intervention raises grades but has only a limited impact on admission test scores. On the one hand, test scores mainly capture dimensions of children's cognitive skills. On the other hand, grades are likely to also reflect differences in classroom behavior, aptitude, and engagement.[23] One plausible interpretation for the effects is that treated children display better classroom behavior that is rewarded with higher grades by the teacher. Our results suggest that long-term intervention effects are more likely to operate through changes in socio-emotional skills rather than cognitive skills.

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[21] Participation in the academic high school admission test is voluntary and there is some suggestive evidence that the treatment increases children's probability of taking the test (see Table A11 in the Appendix). To account for the fact that we only observe a subsample of children, we reweight our observations in Figure 6 using inverse probability weighting.

[22] Grades are likely determined on a curve within schools and might therefore not be comparable across schools. Given that all students within a school have the same treatment status, any within-school curving would lead to an underestimation of treatment effects on (uncurved) grades.

[23] Borghans et al. (2016) study the predictive power of socio-emotional skills for grades and achievement test scores and show that grades are more influenced by students' personality traits and socio-emotional skills than achievement tests.

7.2 Effects on Socio-Emotional Skills

We investigate changes in children's socio-emotional development as possible mechanisms. We measure this development with the Social Behavior Questionnaire (SBQ), which teachers and parents' answer. This questionnaire includes the following six domains: (1) ADHD symptoms (disruptiveness and impulsiveness), (2) opposition and defiance, (3) non-aggressive conduct disorder, (4) anxiety and depressivity, (5) aggression, and (6) prosociality. Each of these domains is measured with up to ten subitems that ask about the prevalence of a specific behavior.[24] For every survey wave, we combine all available responses from the primary caregiver and the teacher. We do this by computing the sum of answers to each subitem domain, then take the average and standardize for the primary caregiver and teacher, then compute the average of teacher and primary caregiver reports and standardize again to obtain measures with a mean of zero and a standard deviation of one.

Figure 7 shows the PATHS treatment effect on ADHD symptoms and opposition and defiance. Panel (a) of Figure 7 shows the evolution of the PATHS treatment effect on ADHD symptoms (disruptiveness and impulsiveness) over time. PATHS causes children to become *more* impulsive and disruptive during the intervention period and persistently *less* impulsive and disruptive after the intervention is completed.[25]

Seeing more behavioral problems during the intervention is, at first sight, surprising. This effect goes against the aim of the intervention. One explanation is that the intervention made teachers and parents more aware of what appropriate child behavior should look like. This possible increased awareness may have made them more critical in the short run. Consistent with this interpretation, the PATHS developers provide anecdotal evidence showing that teachers raise their expectations about children's appropriate behavior during the intervention.

After the intervention, starting from age ten, we see that PATHS reduces ADHD symptoms by making children less disruptive and impulsive. At age ten, children were also reassigned to new classes and new teachers who were not involved in the intervention. From this age, our measures therefore likely reflect child behavior and development more

[24] Appendix Table B2 provides an overview of the items used in the Social Behavior Questionnaire that constitute the six different SBQ domains. Answers are recorded on a 5-point Likert scale ranging from 1 "never" to 5 "very often."

[25] Appendix Figure A3 shows that splitting the analysis based on who—teachers or parents—reports on skills does not meaningfully alter our conclusion and that treatment effects do not seem to systematically differ based on who reports on socio-emotional skills. Although we observe parental responses only in two waves, they report similar changes in socio-emotional skills as teachers.

objectively. The treatment effect persists until primary school completion, when children are 12 years old, and remains visible at ages 13 and 15.[26]

Panel (b) of Figure 7 shows the PATHS treatment effect on opposition and defiance. Opposition and defiance capture behaviors like telling lies, cheating, or ignoring teachers' instructions. The overall picture is similar to the treatment effect for ADHD symptoms. PATHS increases opposition and defiance during the intervention and decreases those behaviors after the intervention is completed. The treatment effects fade out after children transition to secondary school.

Figure 8 shows the effects of PATHS on non-aggressive conduct behavior (panel a), anxiety and depressivity (panel b), aggression (panel c), and prosociality (panel d). PATHS reduces children's non-aggressive conduct disorders such as lying, stealing, or destroying other children's belongings after the intervention. This effect remains visible until age 11 and fades out afterward. Anxiety, aggression, and prosociality do not appear to be systematically affected by the intervention.

7.3 Effects on Parenting Practices

We investigate changes in parent-child interactions and parenting practices.[27] We analyze parenting practices using the Alabama Parenting Questionnaire (APQ), which captures the following five domains: (1) corporal punishment, (2) parental control and supervision, (3) inconsistent discipline, (4) parental involvement, and (5) positive parenting. Each domain is measured with up to ten questions answered by the primary caregiver on a 5-point Likert scale ranging from "never" to "always."[28] To facilitate comparisons, we standardize each subdomain to have a mean of zero and a standard deviation of one.

Figure 9 shows the evolution of the PATHS treatment effect on parenting practices over time. Taken together, our analysis suggests that the intervention had no systematic impact on parenting practices. Our analysis is, however, limited by the type of parenting practices we observe in the data. It remains possible that parents, who we directly and indirectly targeted by several activities of the PATHS program, changed their behavior in

[26] Figure A4 in the Appendix reports separate effects for disruptiveness (panel a) and impulsiveness (panel b). The figure shows that the overall picture is similar for both traits, but perhaps more pronounced for disruptiveness.

[27] Parenting styles and practices may shape child preferences and behavior with effects on children's education performance and choices (Doepke and Zilibotti 2017; Doepke, Sorrenti, and Zilibotti 2019).

[28] Appendix Table B4 provides an overview on the survey items used to measure parenting practices. Items remain the same across surveys conducted in different years.

domains that we do not observe in the data. However, we believe these changes are likely minor in our setting.

7.4 Effect on Behavior in Class

In this section, we look at possible intervention effects on school-related behavior. We have measures on school-related behavior for four different domains: (1) disturbing lessons, (2) being busy with other things during classes, (3) displaying impertinent school behavior, and (4) neglecting homework. We observe these outcomes starting from Grade 4, after children are reassigned to new classes and evaluated by a new teacher. Each domain is measured through a 5-point Likert scale ranging from "never" to "very often." To facilitate comparisons, we standardize each subdomain to have a mean of zero and a standard deviation of one.

Figure 10 shows results for school-related behavior. PATHS reduces children's likelihood of disturbing lessons by 12.4 percent at age 10. The effect persists throughout secondary education. We see a similar pattern for children's ability to focus. Treatment effects are largest immediately after the intervention at age 10 with an effect equivalent to a reduction of 20.4 percent of a standard deviation. The effect remains visible after children are tracked. We find no significant treatment effects for impertinent conduct at school or neglecting homework.

7.5 Multiple Hypothesis Testing

We estimate treatment effects for a substantial number of outcomes. This implies that some statistically significant effects might simply represent chance findings. We address this concern by: (1) testing which estimates remain significant after grouping outcomes, (2) correcting for multiple hypothesis testing, and (3) creating an overall index for children's socio-emotional and cognitive development measured post treatment.

Heckman et al. (2010a) points out that there is some arbitrariness in defining the blocks of hypotheses to be jointly tested in a multiple hypothesis testing procedure. We apply a simple and conservative criterion for our analysis: drawing on the fact that PATHS mainly targets children's socio-emotional, behavioral, and cognitive development, we include all child outcomes analyzed as mechanisms and our latest educational outcome.

Socio-emotional skills and classroom behavior are measured at multiple points in time. We can substantially reduce the number of hypotheses tested by creating a post-intervention index for a given skill. We can then test whether the intervention affected

average post-intervention measures of a skill domain. To aggregate a given domain, we first standardize each period-specific measure. We then calculate the mean over all post-treatment periods and standardize again. This results in ten distinct socio-emotional and two cognitive skills measures.

Table 7 shows treatment effects for these ten socio-emotional skill measures plus university enrollment or graduation at age 24, grades, and admission test scores. Results highlight that the post-treatment indexes for ADHD symptoms (column 4), opposition/defiance (column 5), non-aggressive conduct disorder (column 6), disturbing lessons (column 10), and being busy with other things (column 11) are significantly affected by the intervention. In other words, children exposed to the PATHS program significantly improve their post-treatment behavior in these realms.

Given that some of these significant effects may still represent chance findings, we next apply a Bonferroni correction. Table 7 reports the Bonferroni (Abdi 2007) and Bonferroni-Holm (Holm 1979; Jones, Molitor, and Reif 2019) corrected *p*-values for the thirteen socio-emotional and cognitive measures we investigate as candidate mechanisms. The positive treatment effect for university enrollment or graduation at age 24 remains significant as well as reductions in ADHD symptoms, opposition/defiance, and improvements in two measures of classroom behavior. The marginally significant treatment effect for non-aggressive conduct disorder does not survive the correction.

Finally, instead of considering thirteen different post-treatment outcomes, we construct one overall index for children's socio-emotional and cognitive development. This index is obtained by combining the thirteen post-intervention measures shown in Table 7 in the following way: first, we negate the sign on all "negative outcomes," that is, ADHD symptoms, opposition/defiance, non-aggressive conduct disorder, anxiety and depressivity, aggression, disturbs lessons, busy with other things in class, impertinent conduct at school, and neglects homework. to align their interpretation with the other positive socio-emotional outcomes. Second, we average across these thirteen standardized measures. Third, we standardize the resulting super-index to obtain a measure capturing productive child development.[29] Table 8 shows that the PATHS treatment significantly increases the post-intervention child development super-index (*p*-value = 0.008). Taken together, our results remain robust with respect to multiple hypothesis testing.

[29] Note that the underlying assumptions and the interpretation of this super-index are not trivial. The index rests on the strong assumption that standardized measures for ADHD symptoms and non-aggressive conduct behavior can be aggregated in a linear additive fashion.

8. Mediation Analysis

We perform a mediation analysis in the spirit of Heckman and Pinto (2015) and Gelbach (2016) to quantify the proportion of the treatment effect mediated by our proposed mechanisms and to separate the contribution of each single mechanism to the estimated treatment effect.

The results of the mediation analysis should be interpreted with caution. Imai, Keele, and Tingley (2010) show that to be able to interpret this type of analysis causally one needs to make strong assumptions about the source of variation of the mediators. As we lack exogenous variation in specific channels and have to rely on a single source of exogenous variation (one randomization), this analysis can only provide suggestive evidence on the importance of different mediators in explaining treatment effects.

We perform the mediation analysis for the following education outcomes: attendance of academic high school at ages 13, 15, and 17, academic high school completion, university enrollment at age 20, and university enrollment or graduation at age 24. As possible mediators, we focus on socio-emotional skills, parenting practices, and classroom behavior. The set of mediators includes all variables analyzed as potential mechanisms in Section 7 except grades and test scores because these variables are only available for a subsample of students that sit for the standardized academic high school admission test. We aggregate all candidate mechanisms into three domains: (1) socio-emotional skills, (2) parenting practices, (3) and classroom behavior. Given the longitudinal nature of our data, we only consider measures obtained after the intervention and before the educational outcome is measured. In cases in which we have multiple observations for the same mediator, we construct a summary index using the covariance weighting procedure discussed in Anderson (2008). We assume that the PATHS treatment has both direct and indirect effects on education outcomes. The indirect effects run through treatment effects of the intervention on socio-emotional skills, parenting practices, and classroom behavior. The results of the mediation analysis will give us an estimate of the importance of these indirect effects.

Panel (a) of Figure 11 shows the results of the mediation analysis. Each horizontal bar represents a specific outcome of interest.[30] Colored areas within the bars illustrate the contribution of each mediator to the overall treatment effect. The grey area stands for the unexplained share of the treatment effect. The mediation analysis highlights that our

[30] The note of Figure 11 explains the technical details underlying the mediation analysis.

candidate mechanisms explain about 20–39 percent of the treatment effect. Among the mechanisms we study, socio-emotional skills appear as the most important mediator of the PATHS treatment effect. For example, socio-emotional skills explain about 25 percent of the PATHS treatment effect on university attendance at age 20 and about 39 percent for university enrollment or graduation at age 24. The contribution of parenting practices and classroom behavior are smaller and less stable across different outcomes, suggesting that these are less important mechanisms.

Given their important mediating role, in Panel (b) of Figure 11 we investigate the contribution of each socio-emotional skill. The main mediator is reduction of ADHD symptoms. The relative importance of its mediating role is similar across outcomes and does not depend on the children's age. Non-aggressive conduct disorders and opposition/defiance are also relevant mediators, but quantitatively less important. Their mediating role is also less stable over time. The remaining socio-emotional skills seem to have a negligible role as mediators (prosociality) or have a negative load as mediators (anxiety and aggression).

Taken together, the mediation analysis described in this section suggests that the PATHS treatment effect on educational outcomes is driven by treatment-induced improvements in children's socio-emotional skills, in particular, by reductions in ADHD symptoms—impulsiveness and disruptiveness.

9. Comparison of Costs, Benefits, and Previous Evaluations

In this section, we contextualize the main results of this study. We start with the discussion of other randomized control trials (RCTs) that evaluated the PATHS program. We then compare the size of the treatment effects and the cost of PATHS to other (iconic) childhood intervention studies.

9.1 Previous Evaluations of PATHS

This is not the first evaluation of the PATHS program. Over the past two decades, PATHS has become increasingly popular and has been used in at least thirty-six countries. Table A1 provides an overview of all studies that provide causal evidence on PATHS effectiveness. Crean and Johnson (2013) examine the effect of PATHS on US elementary school students' aggressive behavior and find lower levels of aggressive behavior for treated students. The effect persists over two years after the intervention. Greenberg et al. (1995) show that PATHS increases vocabulary and emotional intelligence of second and

third grade children in the United States. Schonfeld et al. (2015) find similar results and show that PATHS improves reading and math proficiency in primary school. This effect, however, disappears two years after the intervention. Kam, Greenberg, and Kusché (2004) evaluate PATHS in a sample of children with special needs living in the United States. They find positive effects on externalizing and internalizing behavior and reduced self-reported depressivity three years after the intervention. Riggs et al. (2006) show that PATHS fosters inhibitory control and leads to less disruptive behavior. While many of the results of previous evaluations are consistent with our evidence on underlying mechanisms, we find no evidence that the intervention reduced physical aggression in our setting.

Table A1 highlights that previous evaluations of PATHS focus on short-term behavioral changes in primary school and were not designed to provide evidence of long-run effectiveness. In contrast to these studies, we follow students over a substantially longer time horizon and do not limit the analysis to survey-based behavioral measures. By looking at how the intervention affects school careers as well as university enrollment and graduation, we provide unique evidence on the long-term effectiveness of one increasingly popular SEL program. Our study is the first to establish a causal link between the PATHS program and participation in higher education.

9.2 Other Intervention Studies and Comparison of Effect Sizes and Costs

In this section, we benchmark our intervention to similar interventions affecting educational outcomes and targeting child development. Figure 12 summarizes related intervention studies and our contribution to this literature. Panel (a) shows childhood intervention programs with long-term evaluations: Campbell et al. (2002) evaluate the Abecedarian preschool program, one of the oldest early childhood interventions, and show that the intervention improved IQ, achievement, and college enrollment. Heckman et al. (2010a) and Schweinhart (1993) evaluate the Perry Preschool Program, which aimed to foster the development of disadvantaged children, and show that program participants obtained more schooling, had higher earnings, and committed fewer crimes.[31] Gertler et al. (2014) analyze long-term effects of the Jamaican Study that contained an intervention aimed at improving mother-child interactions through home visits. They find increases of 25 percent in earnings 20 years after the intervention. Algan et al. (2022) use data from the

[31] Heckman and Karapakula (2019a and 2019b) follow up on these results and highlight positive long-term effects on cognitive skills, employment, health, and reduced crime, as well as positive intergenerational spillovers.

Montreal Longitudinal Experimental Study, which aimed to improve socio-emotional skills in boys with after-school training sessions. This intervention increased self-control and trust during adolescence and increased educational achievements in early adulthood.

Panel (b) in Figure 12 summarizes interventions with relatively short follow-ups. These interventions explicitly targeted socio-emotional skills in children. Compared to these studies, we study treatment effects over a longer time horizon.

Alan, Boneva, and Ertac (2019) show that an intervention targeting grit increases students' perseverance and subsequent math test scores two years after the intervention. Alan and Ertac (2018) show that an intervention targeting patience improves self-control and the ability to imagine future selves. These effects lead to more patient intertemporal choices and persist over a three-year period. Cappelen et al. (2020) show that early childhood education affects children's social preferences for fairness and the importance children place on efficiency relative to fairness. Oreopoulos, Brown, and Lavecchia (2017) evaluate a mentoring and tutoring program and find that the program increases high school completion by 35 percent and postsecondary enrollment by more than 60 percent. Kosse et al. (2020) study a mentoring program for primary school children and show that the program persistently increases prosociality. Falk, Kosse, and Pinger (forthcoming) follow these children over time and show that the program also increases the probability of being assigned to the academic high school track. Heller et al. (2017) evaluate the "Becoming a Man" (BAM) intervention in Chicago and find that the program increases high school completion rates and reduces delinquent behavior.

Comparison of effect sizes: Figure 13 illustrates differences in effect sizes across studies. In our setting, PATHS increases children's probability of completing academic high school by 23 percent. This effect size is comparable to effects of other interventions. The Montreal Longitudinal Study social skills training program increases the probability of completing high school by 13 to 18 percent (Boisjoli et al. 2007; Algan et al. 2022). The BAM intervention forecasts treatment effects of 12 to 19 percent on high school completion (Heller et al. 2017). The Pathways mentoring and tutoring program increases high school completion by 35 percent (Oreopoulos et al. 2017). The Working Memory Training program increases the probability of getting tracked into academic high school by 16 percent (Berger et al. 2020). The Baloo and You mentoring program increases the probability of getting tracked into academic high school by 20 percent (Falk, Kosse, and Pinger, forthcoming). While Baloo and You and PATHS differ in their content, both

interventions are similarly long (as measured in contact hours), target similarly aged children, and have almost identical treatment effects.

The effect of PATHS is substantially smaller than effects of US preschool programs. The PATHS effect is about one-third of the effect size of the Perry preschool program on high school completion (Barnett 1995; Heckman et al. 2010a) and about one-sixth of the effect of the Abecedarian program on college attendance (Campbell et al. 2002). These studies might find larger effects because they are more time- and resource-intensive and target disadvantaged populations.

Comparison of costs: We complement our effect size comparison with a comparison of costs. This comparison is difficult because information on costs is sometimes missing and sometimes, like in the case of teacher salaries, very context dependent. Therefore, the following analysis should be interpreted with caution.

Figure 14 shows the costs of interventions for which this information is available. The total intervention cost per child refers to all costs over the intervention period, excluding evaluation costs. These costs are in nominal USD. The implementation of PATHS in Zurich cost USD 1,540 per class and USD 67 per child. The main cost of implementing PATHS stems from the teachers' training and the material for PATHS activities, for example, teaching folders, posters, books, and feeling cards. The Baloo and You intervention costs USD 1,266 per child (Péron and Baldauf 2015). The BAM intervention costs USD 1,475 per child (Heller at al. 2017). The socio-emotional skills and parenting training implemented as part of the Montreal Longitudinal Study costs USD 4,750 per child (Algan et al. 2022). The Pathways mentoring and tutoring program costs USD 10,100 per child (Oreopoulos, Brown, and Lavecchia 2017). In light of their substantial treatment effects, all these interventions seem cost-effective. However, PATHS stands out as remarkably low-cost.

PATHS is also substantially less expensive than early childhood education programs like the Perry Preschool Program or the Abecedarian project. The Perry Preschool Program costs USD 10,000 per child (Web-Appendix of Heckman et al. 2010b). The Abecedarian program costs USD 13,400 per child (Campbell et al. 2014). These striking cost differences reflect that the Perry Preschool Program and the Abecedarian program are high-intensity interventions targeted at particularly disadvantaged populations.

10. The Voltage Effect – Scalability of the PATHS Intervention

In this section, we discuss the scalability of the PATHS program, following List's (2023) five-step discussion guideline that addresses key concerns for scaling.

False positives: A general concern regarding scalability is that an effect may disappear once a program is rolled out because it was a false positive—a chance finding. This concern also applies to our study because we examine multiple outcomes, including education outcomes over time and mechanisms like changes in socio-emotional skills. However, the broad range of analyzed outcomes makes it difficult to attribute our findings solely to chance. Additionally, we pre-registered (AEARCTR-0003496) our intention to analyze academic high school attendance, grades, and socio-emotional skills when applying for data access. Nevertheless, to address this concern, we conducted multiple hypothesis testing in Section 7.5. Our results remain robust with respect to multiple hypothesis testing, indicating that false positives do not pose a threat to the scalability of the PATHS intervention.

Audience representativeness: Scalability is also challenged if the initial population that is exposed to the intervention differs from the population that receives the intervention when the program is scaled up. Our intervention sample consists of 56 Swiss primary schools in Zurich. These schools were randomly selected and mandated to participate in the field experiment and data collection. This sampling procedure suggests that our sample is representative of all schools and students in Zurich. As there was no selection into the evaluation sample at the student, teacher, or school level, we believe that concerns about audience representativeness are minimal.

At a broader level, it is reasonable to ask how representative the student population in Zurich is for Switzerland or Europe. Table 1 highlights that our sample is quite diverse. A significant percentage of mothers (57.7 percent) were not born in Switzerland, and 38.5 percent come from another European country. Treatment effects are visible for both native and foreign children. This evidence mitigates concerns regarding audience representativeness.

One additional potential concern is that the tracking-based education system in Switzerland is distinct, and we may not expect similar intervention effects in other countries. However, Figure 15, panel (a) illustrates that other European countries have similar school tracking systems. Several countries including Austria, Germany, and the

Netherlands use tracking systems akin to the Swiss one. Hence, we believe that our results are applicable to various settings outside Switzerland. Moreover, in addition to treatment effects for tracking, we find significant reductions in ADHD symptoms—even before tracking occurred. These results indicate that the intervention has positive effects independent of school tracking.

Unscalable ingredients: Some interventions include elements that cannot easily be replicated. The primary ingredient for the PATHS intervention is teacher training and the introduction of a new school subject. According to the coordinators of the Swiss program, PATHS has been successfully scaled up. In recent years, the PATHS program has been rolled out in Switzerland. To date, around 40,000 children in Switzerland have participated in the program since the initial experiment that we evaluate. Therefore, we believe that PATHS does not include unscalable components.

Have similar programs been scaled in other settings? According to the 2018 European Union Report on Socio-Emotional Learning (SEL) by Cefai et al. (2018) most education systems do not have a dedicated subject devoted to socio-emotional skill development. According to Cefai et al. (2018), Ireland and Malta are the only countries in Europe with a country-wide distinct SEL subject. In many other European countries, SEL is not a distinct subject but rather is included in other subjects such as citizenship, health and physical education, prevention of violence and bullying, moral/religious education, and art and crafts (OECD 2015; Torrente, Anjali, and Aber 2015). In Finland, for example "Growth as a Person" is a cross-curricular theme dedicated to social and emotional education and applied in all subjects.

In which settings has the PATHS program been implemented? Panel (b) in Figure 15 illustrates that the PATHS program has been implemented in primary schools in various countries. In sum, given that the PATHS intervention was adapted from the US context and is currently widely used worldwide, we do not believe that it contains unscalable components.

Cost traps: As discussed in Section 9.2, the PATHS program is relatively cost-effective. While scaling a program can sometimes result in unforeseen costs that diminish the attractiveness of the intervention, our framework suggests that this risk is minor. In fact, according to the developers, implementation costs for the PATHS intervention decreased after the initial experiment. Following the initial costs of adopting the material to the Swiss

context, costs have remained relatively stable over the past decade. Thus, we do not believe that cost traps represent a threat to the scalability of the PATHS program.

Negative spillovers: Negative spillovers introduced by the rollout of interventions can also hinder scalability. Our findings raise questions about whether we would observe similar tracking effects if every child in Switzerland participated in the program. These general equilibrium effects are ex-ante unclear and depend on whether academic high schools would admit more students if the program made all students more qualified. While academic high schools do not have explicit capacity constraints or quotas, there is a strong belief in Switzerland that these schools should remain selective.

To determine whether we would observe the same treatment effects on tracking if the entire population were treated, we can examine the year-to-year variation in the number of students admitted to academic high school.[32] Figure 16 shows the year-to-year percentage change in the number of admitted students at the school level, revealing substantial variation in student admissions. The average year-to-year deviation in the school-level number of admitted students is 20 percentage points. Considering that we find treatment effects of 20–25 percent on the control group mean of 20 percent, it is feasible that academic high schools could admit all the additional students "pushed" by the intervention. Therefore, it is unlikely that large parts of the treatment effects would be absorbed by the general equilibrium effects of a nationwide rollout.

While the ultimate general equilibrium effects for tracking remain somewhat ambiguous, the reduction in ADHD symptoms, improvements in classroom behavior, and enhancement of other socio-emotional skills represent important treatment effects. These changes benefit students, parents, and teachers, regardless of whether they lead students to a more prestigious secondary school track.[33]

[32] For this exercise, we use the administrative data from the Swiss Statistical office (LABB 2022).

[33] Regarding externalities, it is important to note that the PATHS intervention replaced the subject "Humans and Environment" ("Mensch and Umwelt"). This substitution could potentially have unintended consequences, such as treated children developing different political preferences due to a lack of knowledge of some aspects of the Swiss society. We test for this type of externality using survey data on political preferences reported on a left-right spectrum. Appendix Table A12 shows that there is no treatment effect of the intervention on political preferences. Replacing the subject "Humans and Environment" did not lead to unintended consequences for voting behavior.

11. Conclusion

This paper provides experimental evidence that fostering socio-emotional skills in primary school children has persistent positive effects on educational careers. We provide evidence on the PATHS program, a teacher-run intervention that lasts for up to two years in primary school. The intervention increases the probability of completing academic high school and enrolling or graduating from university 17 years after the intervention.

Our results on underlying mechanisms suggest that the PATHS treatment effect is mainly driven by changes in some of the socio-emotional skills targeted by the intervention. Treated children become less impulsive, less disruptive, and display less opposition to teachers and parents. In class, treated children become less likely to disturb lessons and more likely to focus on the teaching content. Although we find suggestive evidence that treated children have better grades, we find no evidence that standardized test scores are affected by the intervention. Long-term effects thus seem more likely to operate through changes in socio-emotional skills rather than cognitive skills.

Taken together, the results of this study raise an interesting and policy-relevant question. Would it be possible to teach children socio-emotional skills with a subject that is explicitly dedicated to it, similar to the way math and reading are taught? While it has been shown that teachers have lasting impacts on behavior (Chetty el al. 2011, Jackson 2018), there is no school subject explicitly designed to foster socio-emotional skills. The results of this study suggest that primary schools are a promising place to institutionalize socio-emotional skills training.

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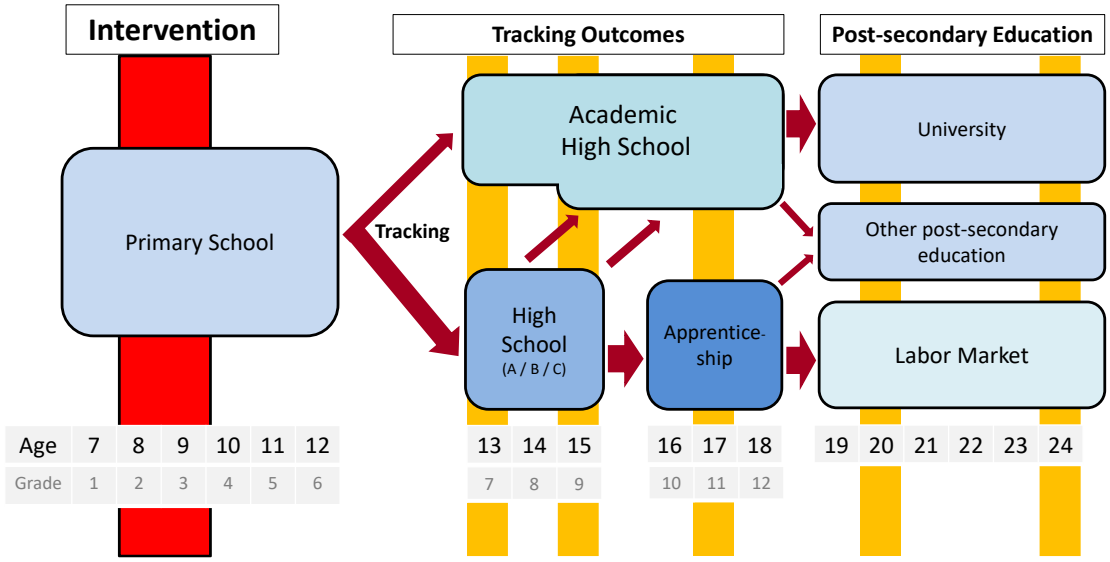
Tables and Figures

Figure 1: School Tracking and Measurement of Educational Outcomes



NOTE.—This figure illustrates the structure of the school system in the canton of Zurich. Children attend primary school for six years from ages 7 to 12 (Grade 1 to Grade 6). At the end of primary school, at age 12, children are tracked either into academic high school (*Gymnasium*) or into regular high school (*Sekundarschule*). The tracking outcome is determined exclusively by children's grades in the final year of primary school and academic high school admission test scores. Children can either attend an academic high school directly starting from Grade 7 (long-term *Gymnasium*) or from Grade 9 onward (short-term *Gymnasium*). The non-academic high school track comprises three lower tracks called *Sek* A, *Sek* B, and *Sek* C. Children attending regular high school can also transfer to academic high school after two or three years. The *Matura* degree, obtained upon completion of academic high school, is required to enroll in university. Students graduating from regular high school typically start an apprenticeship at age 16. Apprenticeships last two to four years. The red vertical bar indicates the intervention period. The yellow bars indicate the points in time when we observe educational outcomes.

Table 1: Descriptive Statistics

	(1) N	(2) Mean	(3) SD	(4) Min	(5) Max
Educational Outcomes:					
Attending Academic High School Age 13	1,589	0.157	0.364	0	1
Attending Academic High School Age 15	1,535	0.202	0.402	0	1
Attending Academic High School Age 17	1,305	0.261	0.439	0	1
Completed Academic High School Age 20	1,185	0.270	0.444	0	1
Enrolled in University Age 20	1,178	0.167	0.373	0	1
Enrolled in University Age 24	1,158	0.194	0.396	0	1
Enrolled or Graduated University Age 24	1,158	0.223	0.416	0	1
Baseline Child Characteristics:					
Age in 2005	1,238	7.033	0.396	5.699	8.494
Swiss Citizenship	1,238	0.599	0.490	0	1
Female	1,675	0.481	0.500	0	1
Baseline Child Socio-Emotional Skills (Teacher Report):					
ADHD Symptoms (Disruptiveness and Impulsiveness)	1,348	1.246	0.989	0	4
Opposition & Defiance	1,348	0.541	0.815	0	4
Non-Aggressive Conduct Disorder	1,348	0.217	0.405	0	2.500
Anxiety & Depressivity	1,348	0.871	0.762	0	4
Overall Aggression	1,348	0.588	0.684	0	4
Prosociality	1,348	2.171	0.824	0	4
Baseline Child Socio-Emotional Skills (Parent Report):					
ADHD Symptoms (Disruptiveness and Impulsiveness)	1,229	1.212	0.646	0	3.778
Opposition & Defiance	1,229	0.966	0.621	0	2.750
Non-Aggressive Conduct Disorder	1,229	0.296	0.326	0	2.800
Anxiety & Depressivity	1,229	0.704	0.464	0	2.556
Overall Aggression	1,229	0.601	0.423	0	2.750
Prosociality	1,229	2.577	0.528	0.600	4
Baseline Parenting Practices (Parent Report):					
Corporal Punishment	1,229	0.454	0.489	0	2.667
Inconsistent Discipline	1,229	1.188	0.598	0	3.200
Parental Control & Supervision	1,229	3.686	0.328	2	4
Parental Involvement	1,229	3.189	0.422	1.500	4
Positive Parenting	1,229	3.215	0.514	1.200	4
Baseline Household Characteristics:					
Mother Completed at least *Gymnasium* Degree	1,215	0.393	0.489	0	1
Father Completed at least *Gymnasium* Degree	1,015	0.518	0.500	0	1
Mother Holds University Degree	1,215	0.160	0.367	0	1
Father Holds University Degree	1,015	0.249	0.433	0	1
Single-Parent Household	1,230	0.172	0.378	0	1
Age Mother in 2005	1,218	37.02	5.375	23	53
Mother Swiss Citizenship	1,663	0.486	0.500	0	1
Mother Born in Switzerland	1,219	0.423	0.494	0	1
Family Receives Financial Aid	1,213	0.380	0.486	0	1
Family Reports Financial Problems	1,216	0.178	0.382	0	1
Household Income (in 1000 USDs)	1,132	86.31	48.71	12	270

NOTE.—This table shows descriptive statistics for the variables used in our analysis. SD stands for standard deviation.

Table 2: Summary Table for Balancing of Baseline Characteristics

	(1) Number of Balancing Tests	(2) Expectation under Random Assignment
Total Number of Balancing Tests	56	
Number of Tests Significant with p<0.01	1	0.560
Number of Tests Significant with p<0.05	2	2.800
Number of Tests Significant with p<0.1	5	5.600

NOTE.—This table summarizes the results of our balancing tests. To test random assignment, we regress treatment status on baseline characteristics. We run a separate linear probability model for each baseline characteristic. Table 3 shows a detailed list of all baseline characteristics and individual point estimates. All regressions include strata fixed effects for the level of randomization. Standard errors are clustered at the school level. Column (1) reports the total number of balancing tests and the number of statistically significant tests for different levels of significance. Column (2) reports the number of coefficients we would expect to be statistically significant due to chance under random assignment.

Table 3: Balancing Tests of Baseline Characteristics

Panel A: PATHS Treatment	(1)		(2)		(3)		(4)
Child and Household Characteristics	PATHS	SBQ (Parent Report)	PATHS	SBQ (Teacher Report)	PATHS	SBQ (Child Report)	PATHS
Age in 2005	-0.013	Prosociality	0.004	Prosociality	0.056**	Prosociality	-0.004
	(0.042)		(0.013)		(0.027)		(0.016)
Female	0.036*	Anxiety & Depressivity	0.009	Anxiety & Depressivity	0.035	Anxiety & Depressivity	0.009
	(0.020)		(0.014)		(0.021)		(0.013)
Swiss Citizenship	0.036	ADHD Symptoms (Disruptiveness and Impulsiveness)	-0.004	ADHD Symptoms (Disruptiveness and Impulsiveness)	0.035	ADHD Symptoms (Disruptiveness and Impulsiveness)	0.014
	(0.045)		(0.012)		(0.021)		(0.014)
Mother Holds University Degree	-0.049	Opposition & Defiance	-0.022*	Opposition & Defiance	0.029	Opposition & Defiance	0.013
	(0.045)		(0.013)		(0.024)		(0.013)
Father Holds University Degree	-0.073	Non-Aggressive Conduct Disorder	0.000	Non-Aggressive Conduct Disorder	0.008	Non-Aggressive Conduct Disorder	-0.009
	(0.044)		(0.012)		(0.019)		(0.011)
Mother Completed at least *Gymnasium* Degree	-0.049	Non-Aggressive Externalizing Problem Behavior	-0.016	Non-Aggressive Externalizing Problem Behavior	0.020	Non-Aggressive Externalizing Problem Behavior	0.005
	(0.035)		(0.013)		(0.022)		(0.012)
Father Completed at least *Gymnasium* Degree	-0.099***	Indirect Aggression	0.016	Indirect Aggression	0.029	Indirect Aggression	0.022
	(0.032)		(0.013)		(0.020)		(0.014)
Single-Parent Household	0.004	Reactive Aggression	0.000	Reactive Aggression	0.018	Reactive Aggression	0.002
	(0.029)		(0.012)		(0.026)		(0.013)
Age Mother in 2005	0.003	Physical Aggression	-0.005	Physical Aggression	0.001	Physical Aggression	0.009
	(0.003)		(0.015)		(0.021)		(0.014)
Mother Swiss Citizenship	0.029	Proactive Aggression & Dominance	-0.008	Proactive Aggression & Dominance	0.029	Proactive Aggression & Dominance	0.023*
	(0.039)		(0.013)		(0.021)		(0.012)
Mother Born in Switzerland	0.017	Overall Aggression	-0.005	Overall Aggression	0.017	Overall Aggression	0.013
	(0.036)		(0.014)		(0.023)		(0.014)
Family Receives Financial Aid	-0.031	Overall Externalizing Behavior	-0.009	Overall Externalizing Behavior	0.029	Overall Externalizing Behavior	0.013
	(0.028)		(0.013)		(0.024)		(0.014)
Family Reports Financial Problems	-0.009	Overall Behavior Score 1	-0.002	Overall Behavior Score 1	0.017	Overall Behavior Score 1	0.016
	(0.043)		(0.014)		(0.025)		(0.015)
Household Income (in 1000 USDs)	0.000	Overall Behavior Score 2	-0.010	Overall Behavior Score 2	-0.011	Overall Behavior Score 2	0.011
	(0.000)		(0.014)		(0.024)		(0.015)

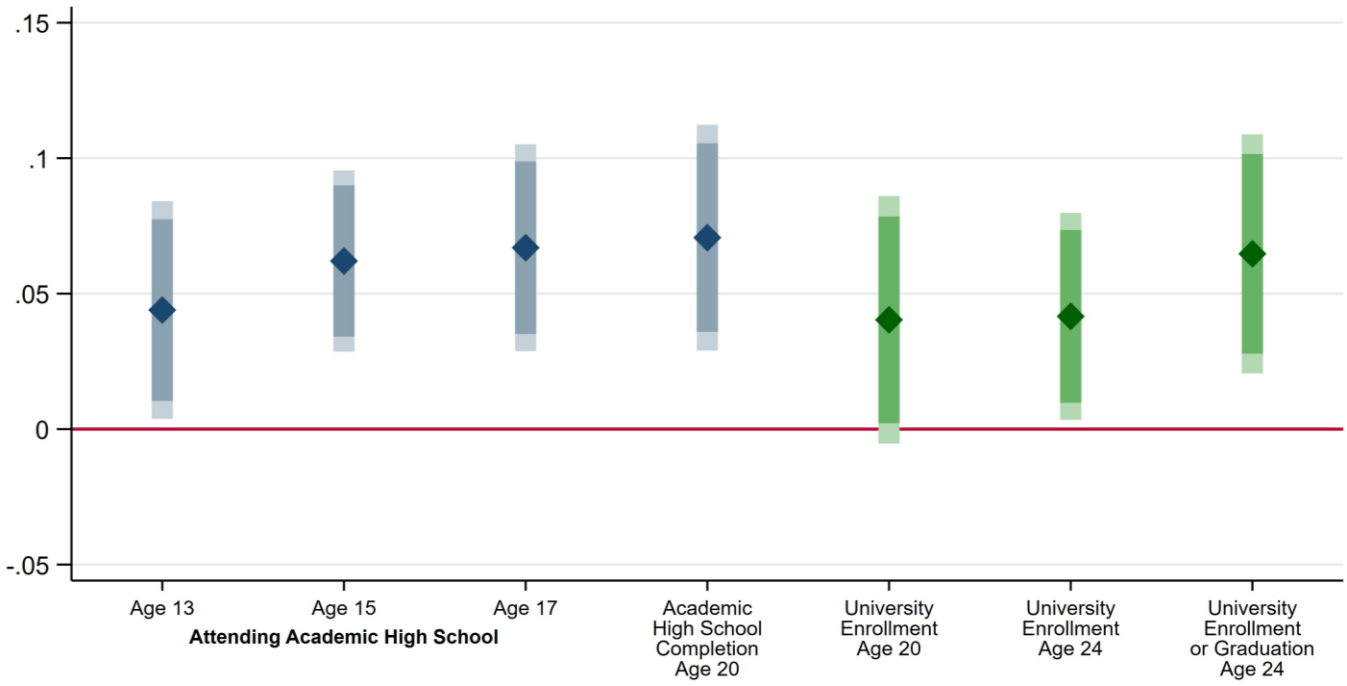
NOTE.—This table shows the coefficients from 56 separate OLS regressions testing whether a characteristic predicts treatment status. In Panel A, the treatment indicator PATHS is regressed on one baseline variable. Baseline variables include all available child, parental, and household characteristics and baseline child SBQ measures. All models include strata fixed effects for the level of randomization. Robust standard errors clustered at the school level are in parentheses. *** p<0.01, ** p<0.05, * p<0.1.

Table 4: Treatment Effects on Educational Outcomes

	(1) Initial Tracking into Academic High School	(2) Academic High School Completion	(3) University Enrollment or Completion
PATHS Treatment	0.044**	0.071***	0.065***
	(0.020)	(0.021)	(0.022)
Randomization Inference *p*-value	0.054	0.016	0.027
Observations	1,011	837	815
R-squared	0.303	0.364	0.249
Control Group Mean Dependent Variable	.199	.308	.252
Child Age	13	20	24
Panel Wave	5	8	9

NOTE.—This table shows the treatment effect of the PATHS intervention on initial tracking into academic high school at age 13, academic high school completion at age 20, and university enrollment or graduation at age 24. All outcomes are indicator variables and the specifications are estimated using linear probability models using controls for baseline child and household characteristics. Child controls include the age and gender of the child, having Swiss citizenship, measures for anxiety and depressivity, ADHD, non-aggressive externalizing problem behavior, non-aggressive conduct disorder, opposition and defiance, and prosociality, four measures of aggressive behavior, and four measures of overall behavior. Household controls include household income, mother's and father's education level (including an indicator for missing information), age of the mother, indicator variables for the mother's having Swiss citizenship and being born in Switzerland, and indicator variables for a single-parent household, a household that received financial aid, and a household that experienced financial problems. The outcome initial tracking into academic high school is based on administrative data. The outcomes academic high school completion and university enrollment or graduation are self-reported. The table also shows *p*-values based on randomization inference with 10,000 replications. All models include strata fixed effects for the level of randomization. Robust standard errors clustered at the school level are in parentheses. *** p<0.01, ** p<0.05, * p<0.1.

Figure 2: Main Results – Treatment Effects on Educational Outcomes



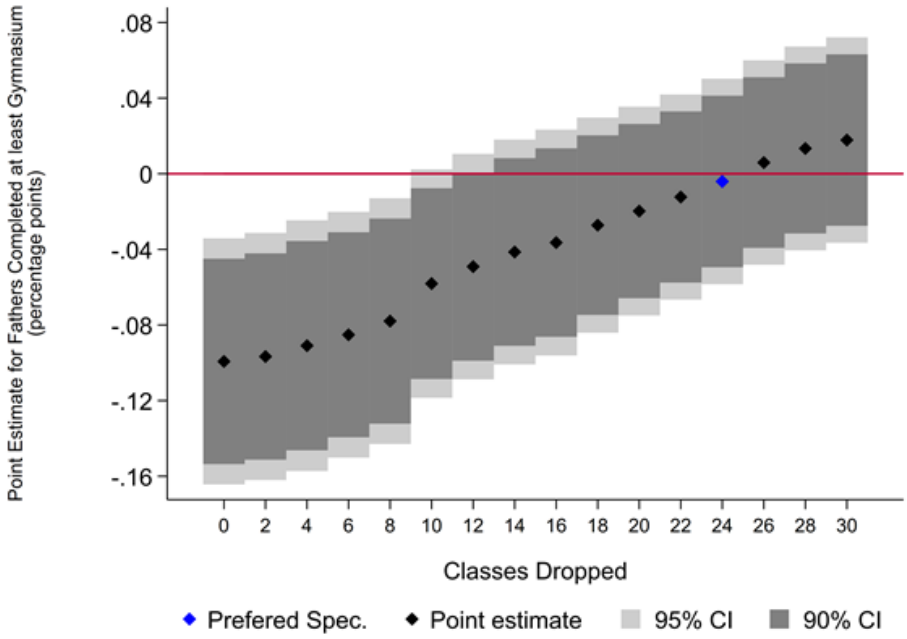
NOTE.—This figure shows the treatment effect of the PATHS intervention on attending academic high school at age 13, 15, 17 as well as academic high school completion at age 20, university enrollment at age 20 and 24, and university enrollment or graduation at age 24. All outcomes are indicator variables and the specifications are estimated using linear probability models using controls for baseline child and household characteristics. Child controls include the age and gender of the child, having Swiss citizenship, measures for anxiety and depressivity, ADHD, non-aggressive externalizing problem behavior, non-aggressive conduct disorder, opposition and defiance, and prosociality, four measures of aggressive behavior, and four measures of overall behavior. Household controls include household income, mother's and father's education level, age of the mother, indicator variables for the mother's having a Swiss citizenship and being born in Switzerland, and indicator variables for a single-parent household, a household that received financial aid, and a household that experienced financial problems. The outcomes attending academic high school at age 13, 15, and 17 are based on administrative data. The outcomes academic high school completion and university enrollment age 20, university enrollment age 24, and university enrollment or graduation are self-reported. All models include strata fixed effects for the level of randomization. Each point estimate is shown with the respective 90 and 95 percent confidence intervals calculated based on standard errors clustered at the school level.

Table 5: Treatment Effects of PATHS on Educational Outcomes in Different Specifications

Panel A: No Controls	(1) Initial Tracking into Academic High School	(2) Academic High School Completion	(3) University Enrollment or Graduation
PATHS Treatment	0.006	0.023	0.023
	(0.018)	(0.030)	(0.025)
Observations	1,589	1,185	1,158
R-squared	0.072	0.107	0.075
Control Group Mean Dependent Variable	.163	.269	.222
Child Age	13	20	24
Panel Wave	5	8	9
Panel B: Parental Education Controls	Initial Tracking into Academic High School	Academic High School Completion	University Enrollment or Graduation
PATHS Treatment	0.023*	0.051**	0.039**
	(0.013)	(0.021)	(0.020)
Observations	1,589	1,185	1,158
R-squared	0.224	0.265	0.188
Control Group Mean Dependent Variable	.163	.269	.222
Child Age	13	20	24
Panel Wave	5	8	9
Panel C: Full Controls	Initial Tracking into Academic High School	Academic High School Completion	University Enrollment or Graduation
PATHS Treatment	0.044**	0.071***	0.065***
	(0.020)	(0.021)	(0.022)
Observations	1,011	837	815
R-squared	0.303	0.364	0.249
Control Group Mean Dependent Variable	.199	.308	.252
Child Age	13	20	24
Panel Wave	5	8	9

NOTE.—This table shows the treatment effect of the PATHS intervention on initial tracking into academic high school at age 13, academic high school completion at age 20, and university enrollment or graduation at age 24. All outcomes are indicator variables and the specifications are estimated using linear probability models. In Panel A, we do not include any controls for baseline characteristics. In Panel B, we include controls for mother's and father's education level. In Panel C we include controls for baseline child and household characteristics. Child controls include the age and gender of the child, having Swiss citizenship, measures for anxiety and depressivity, ADHD, non-aggressive externalizing problem behavior, non-aggressive conduct disorder, opposition and defiance, and prosociality, four measures of aggressive behavior, and four measures of overall behavior. Household controls include household income, mother's and father's education level, age of the mother, indicator variables for the mother's having a Swiss citizenship and being born in Switzerland, and indicator variables for a single-parent household, a household that received financial aid, and a household that experienced financial problems. The outcome initial tracking into academic high school is based on administrative data. The outcomes academic high school completion and university enrollment or graduation are self-reported. All models include strata fixed effects for the level of randomization. Robust standard errors clustered at the school level are in parentheses. *** p<0.01, ** p<0.05, * p<0.1.

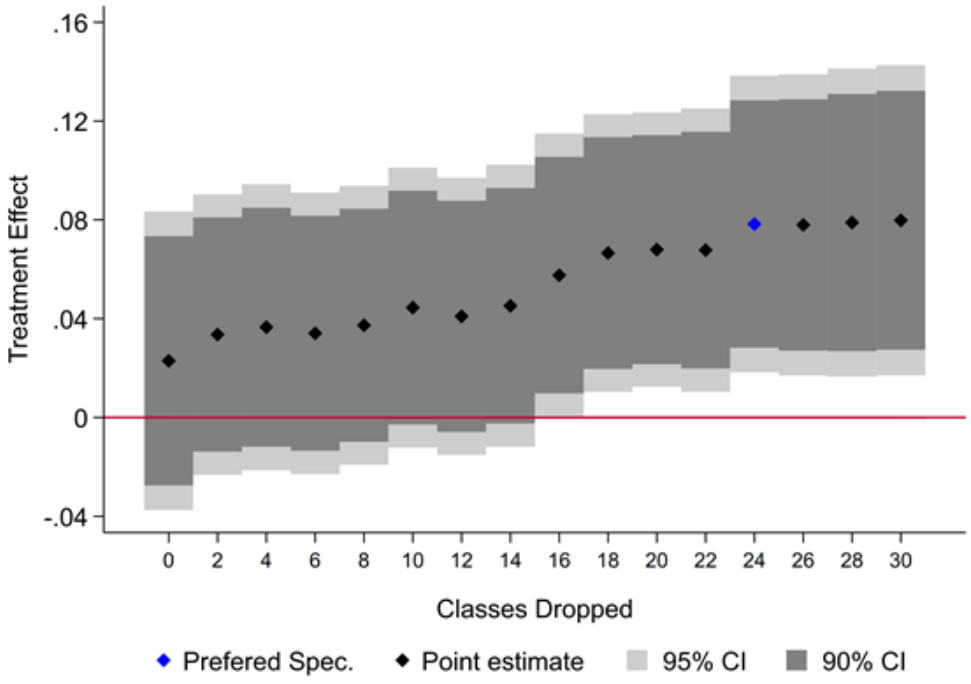
Figure 3: Balance between Control and Treatment Group after Dropping Imbalanced Classes



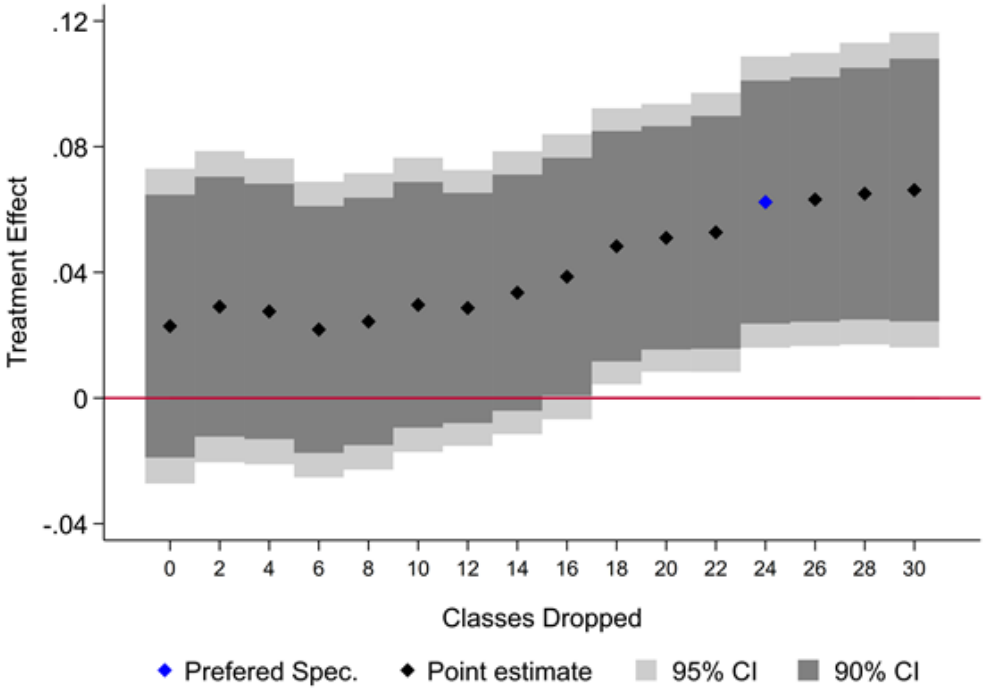
NOTE.—This figure shows the relation of shrinking the estimation sample by excluding classes with highly imbalanced shares of fathers with completed academic high school and the imbalance in fathers' education between the treatment and control groups. The x-axis shows the number of classes that are dropped. Because of the trimming mechanism, we always drop two classes simultaneously. These are the current classes with the lowest share of fathers who completed academic high school in the treatment group and the current class with the highest share of fathers who completed academic high school in the control group. We consider classes with at least six students. The y-axis shows the point estimate when regressing the treatment indicator PATHS on the baseline characteristic father completed at least a *Gymnasium* degree. The blue dot shows the specification in which the imbalance is closest to zero. All models include strata fixed effects for the level of randomization. Robust standard errors are clustered at the school level.

Figure 4: Treatment Effect without Controls – Different Sample Restrictions

Panel (a): Academic High School Completion



Panel (b): University Enrollment or Graduation



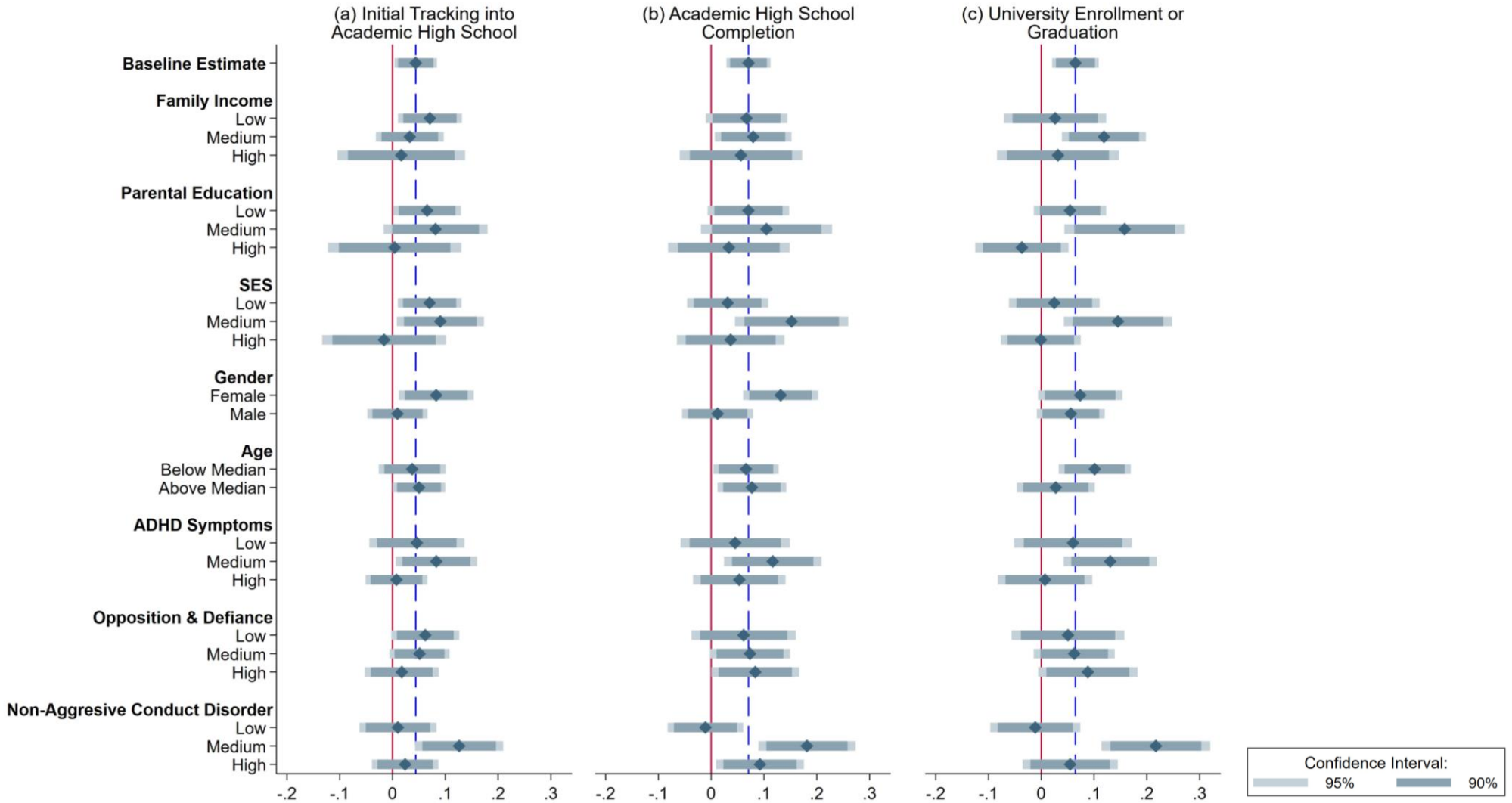
NOTE.—This figure shows a sensitivity analysis where we sequentially drop imbalanced classes and then estimate treatment effects. This figure shows the relation of shrinking the estimation sample by excluding classes with highly imbalanced shares of fathers who completed academic high school and estimated treatment effects on the outcomes academic high school completion at age 20 in Panel (a) and university enrollment or graduation at age 24 in Panel (b). The x-axis shows the number of classes that are dropped. Because of the trimming mechanism we always drop two classes simultaneously. These are the current classes with the lowest share of fathers who completed academic high school in the treatment group and the current class with the highest share of fathers who completed academic high school in the control group. We only consider classes with at least six students. The y-axis shows the point estimate when regressing the treatment indicator PATHS on the outcomes academic high school completion and university enrollment or graduation. The blue dot shows the specification in which the imbalance of fathers with at least a *Gymnasium* degree between the treatment and control group is closest to zero. All models include strata fixed effects for the level of randomization. Robust standard errors are clustered at the school level.

Table 6: PATHS Treatment Effect in the Restricted Estimation Sample

Panel A: No Controls	(1)	(2)	(3)	(4)	(5)	(6)
	Attending Academic High School			Academic High School Completion	University Enrollment	University Enrollment or Graduation
	Age 13	Age 15	Age 17			
PATHS Treatment	0.045**	0.063**	0.090***	0.078**	0.052**	0.062***
	(0.020)	(0.025)	(0.027)	(0.030)	(0.023)	(0.023)
Observations	1,264	1,224	1,028	936	928	904
Control Group Mean Dependent Variable	.112	.152	.184	.196	.114	.167
Number of Classes Excluded	24	24	24	24	24	24
Child Age	13	15	17	20	20	24
Panel Wave	Wave 5	Wave 6	Wave 7	Wave 8	Wave 8	Wave 9
Panel B: Parental Education Controls						
PATHS Treatment	0.039**	0.055***	0.085***	0.083***	0.055***	0.061***
	(0.016)	(0.018)	(0.018)	(0.021)	(0.020)	(0.017)
Observations	1,264	1,224	1,028	936	928	904
Control Group Mean Dependent Variable	.112	.152	.184	.196	.114	.167
Number of Classes excluded	24	24	24	24	24	24
Child Age	13	15	17	20	20	24
Panel Wave	Wave 5	Wave 6	Wave 7	Wave 8	Wave 8	Wave 9

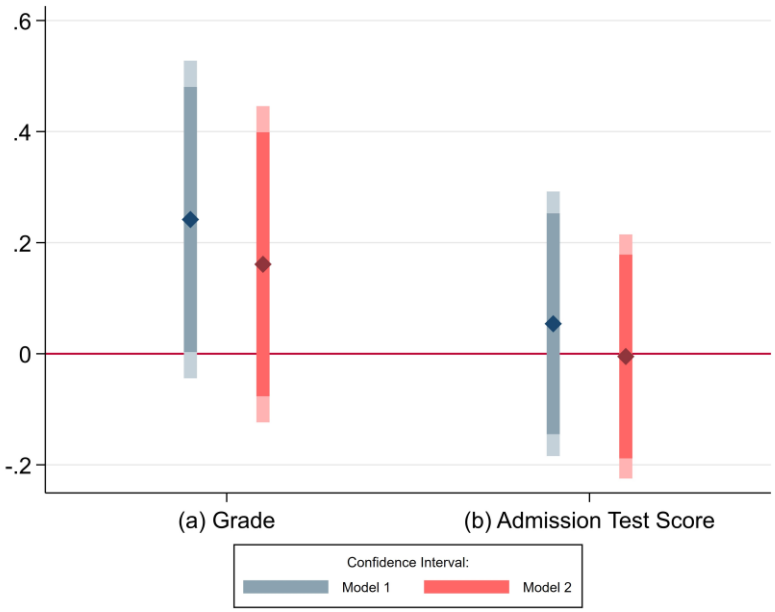
NOTE.—This table shows the treatment effect of the PATHS intervention on attending academic high school at age 13, 15, 17 as well as academic high school completion at age 20, university enrollment at age 20, and university enrollment or graduation at age 24. All outcomes are indicator variables and the specifications are estimated using linear probability models in the restricted sample in which we drop 24 classes to correct for the imbalance in fathers' education level between the treatment and control group. In Panel A, we do not include any controls for baseline characteristics. In Panel B, we include controls for mothers' and fathers' education level. The outcomes attending academic high school at age 13, 15, and 17 are based on administrative data. The outcomes academic high school completion and university enrollment and university enrollment or graduation are self-reported. All models include strata fixed effects for the level of randomization. Robust standard errors clustered at the school level are in parentheses. *** p<0.01, ** p<0.05, * p<0.1.

Figure 5: Heterogeneous Treatment Effects



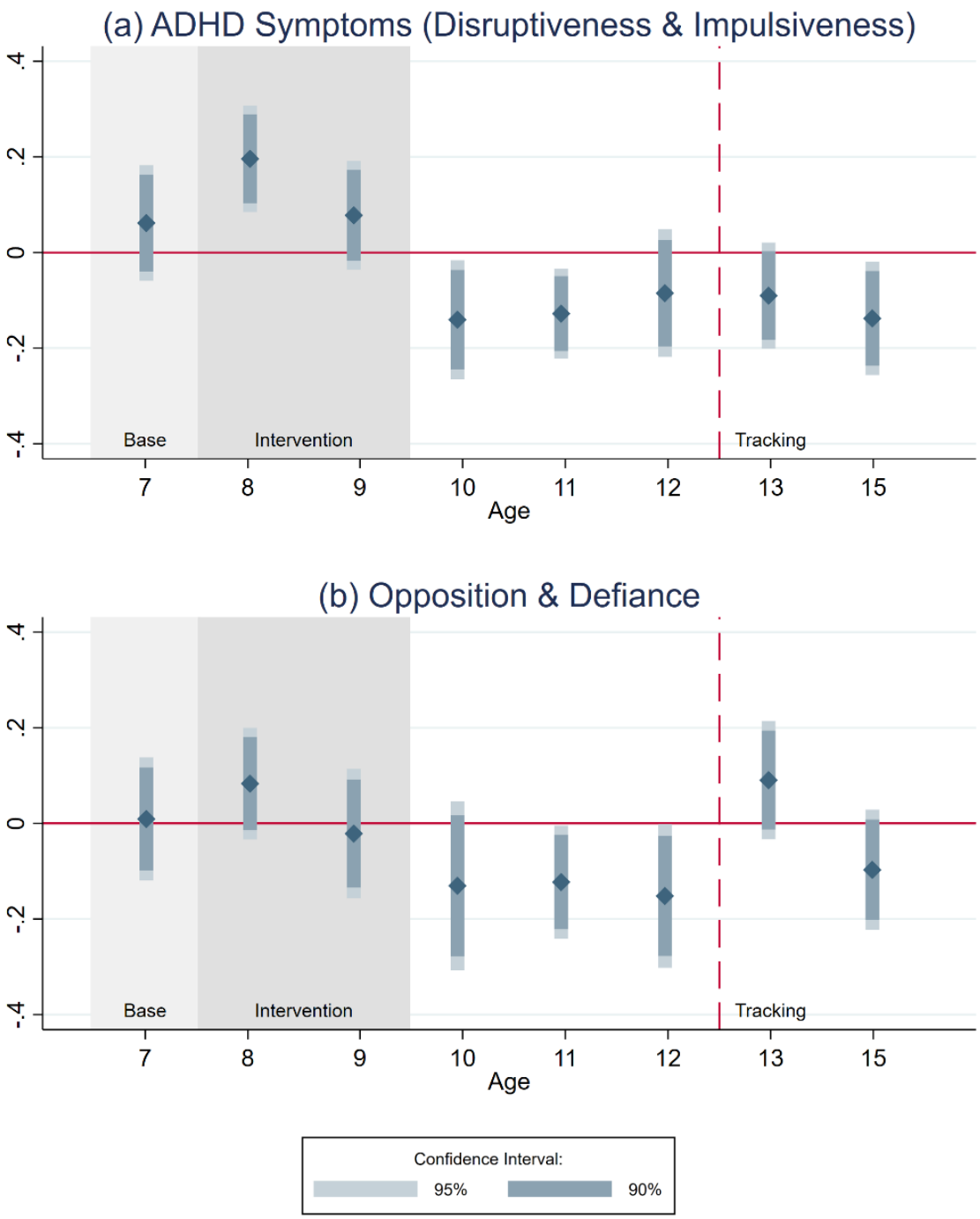
NOTE.—This figure shows heterogeneous treatment effects for: (a) initial tracking into academic high school at age 13, (b) academic high school completion at age 20, and (c) university enrollment or graduation at age 24. The dashed line indicates the baseline treatment effects. We estimate treatment effects by family income, parental education, socio-economic status (SES), gender, age, as well as on baseline child SBQ measures for ADHD symptoms (disruptiveness and impulsiveness), opposition and defiance, and non-aggressive conduct disorder. For family income, ADHD symptoms, opposition and defiance, and non-aggressive conduct disorder the groups low, middle, and high are defined by the respective tertiles of the sample distribution. For parental education, low is defined as both parents not having an academic high school degree, middle is defined as one parent having an academic high school degree, and high is defined as both parents having an academic high school degree. Low SES includes families with incomes in the bottom two quintiles of the sample distribution, with a non-working father, and with both parents not having an academic high school degree or families with income in the lowest quintile of the sample distribution. Middle SES includes families with incomes in the second to fourth quintile of the sample distribution, with a working parent, and with at least one parent that has an academic high school degree or families with incomes in the third quintile of the sample distribution, with a non-working parent, and with both parents not having an academic high school degree. High SES includes families with incomes in the second to fifth quintile of the sample distribution, with a working parent, and with both parents having an academic high school degree or families with incomes in the top quintile of the sample distribution. Estimates are based on models in Table 4 that include the full set of controls. All models include strata fixed effects for the level of randomization. Each point estimate is shown with the respective 90 and 95 percent confidence intervals calculated based on standard errors clustered at the school level.

Figure 6: Treatment Effects on Grades and Admission Test Scores



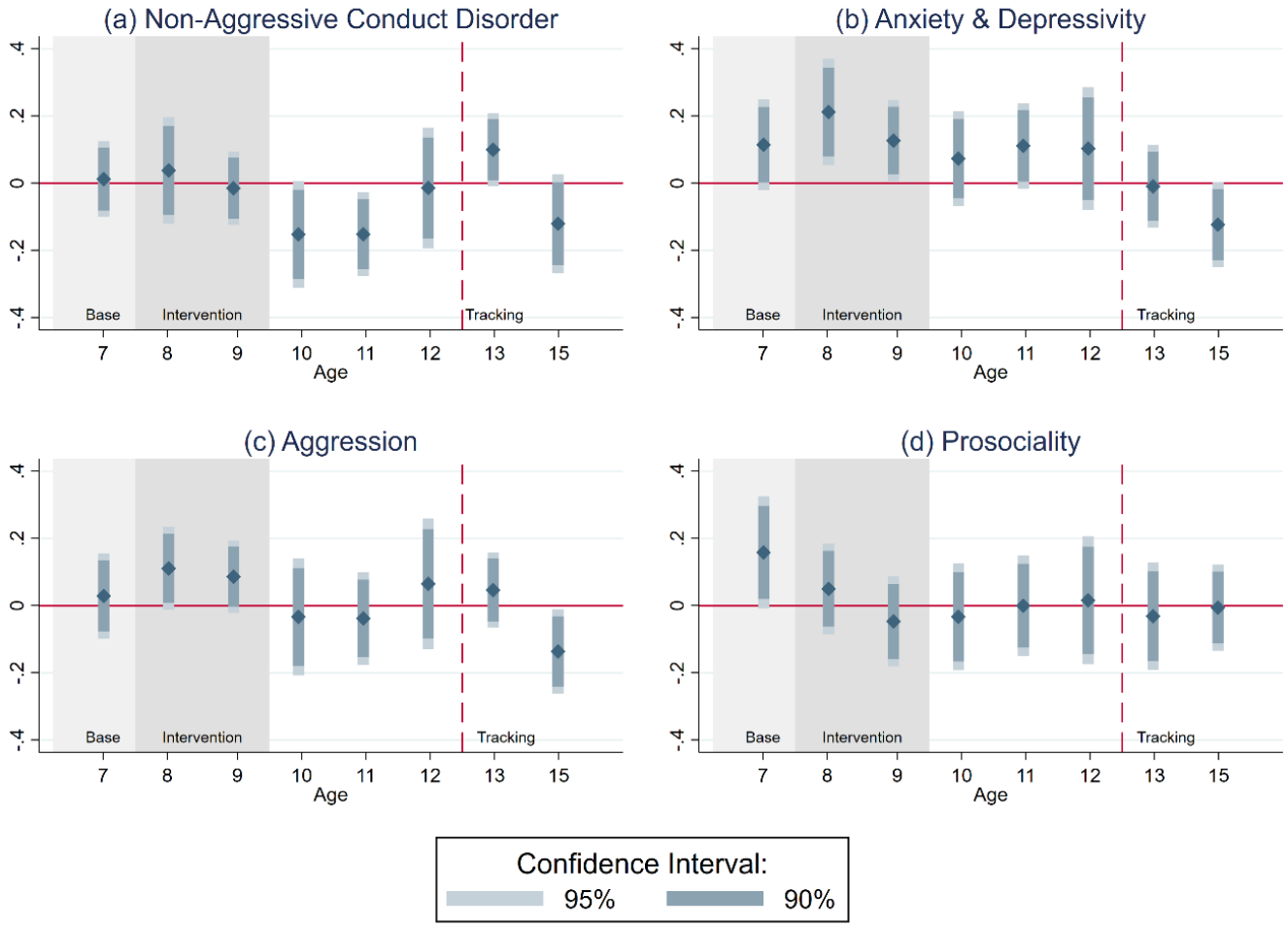
NOTE.—This figure shows the treatment effect of the PATHS intervention on children's standardized grades and children's test scores on the centralized admission test for academic high school. All outcomes are indicator variables and the specifications are estimated using linear probability models using controls for baseline child and household characteristics. Child controls include the age and gender of the child, having Swiss citizenship, measures for anxiety and depressivity, ADHD, non-aggressive externalizing problem behavior, non-aggressive conduct disorder, opposition and defiance, and prosociality, four measures of aggressive behavior, and four measures of overall behavior. Household controls include household income, mother's and father's education level, age of the mother, indicator variables for the mother's having Swiss citizenship and being born in Switzerland, and indicator variables for a single-parent household, a household that received financial aid, and a household that experienced financial problems. All models include strata fixed effects for the level of randomization. The regressions use inverse probability weighting, with weights constructed by regressing an indicator for whether we observe any grade or test score and then taking the square of the inverse prediction. In Model 1 we use the full set of controls except child SBQ when estimating the weights; in Model 2 we use the full set of controls when estimating the weights. Estimates for admission test scores are based on the score obtained from the first time taking the test. Grades in primary school correspond to the teacher-given grades obtained before taking the admission test. Each point estimate is shown with the respective 90 and 95 percent confidence intervals calculated based on standard errors clustered at the school level.

Figure 7: Dynamic Treatment Effects on Socio-Emotional Skills I



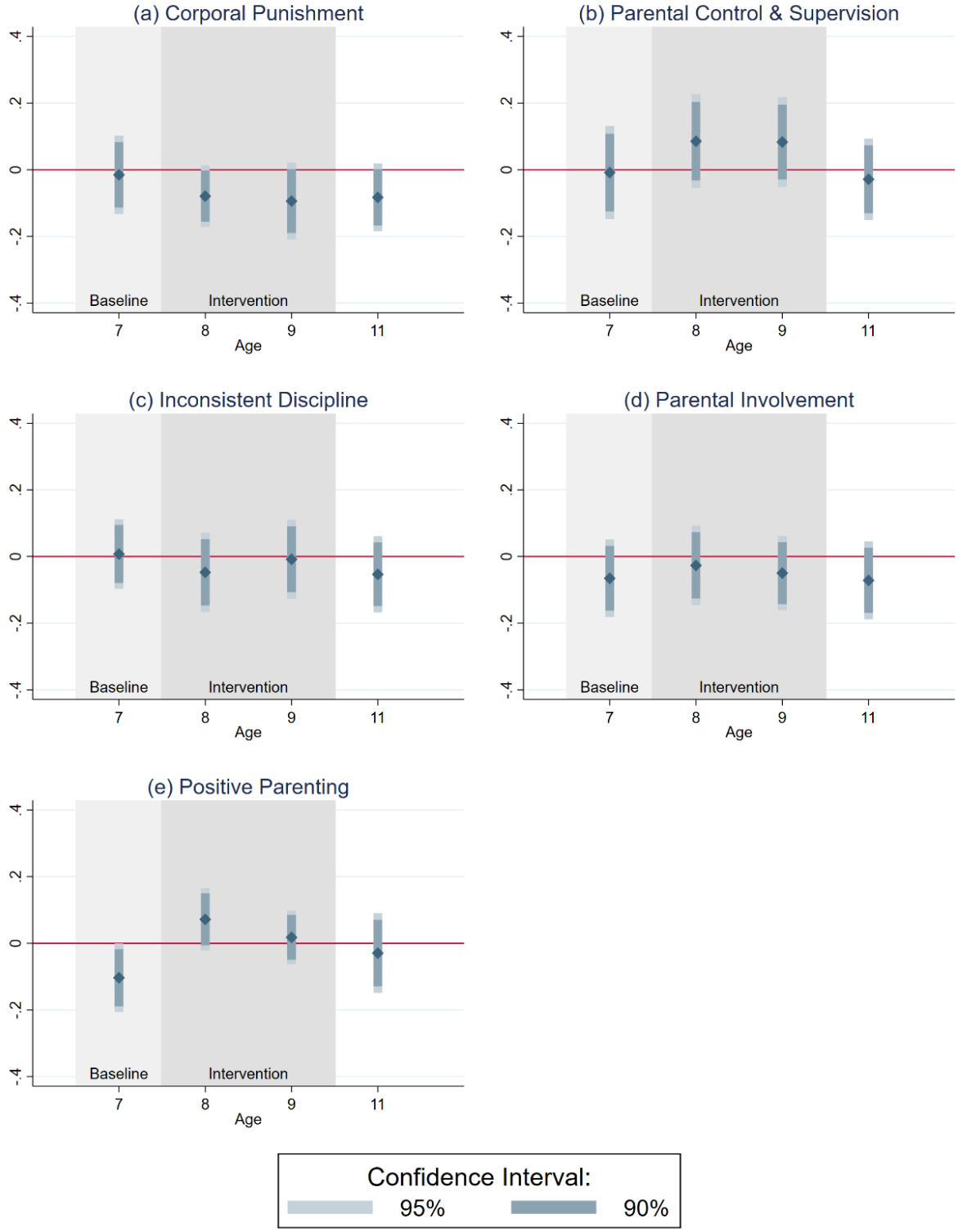
NOTE.—This figure shows the treatment effect of the PATHS intervention on children's socio-emotional skills from ages 7 through 15. The dependent variable in Panel (a) is ADHD symptoms (disruptiveness and impulsiveness). The dependent variable in Panel (b) is opposition and defiance. All dependent variables are indices standardized to mean zero and a standard deviation of one. All models include controls for baseline child and household characteristics. Child controls include the age and gender of the child, having Swiss citizenship, measures for anxiety and depressivity, ADHD, non-aggressive externalizing problem behavior, non-aggressive conduct disorder, opposition and defiance, and prosociality, four measures of aggressive behavior, and four measures of overall behavior. Household controls include household income, mother's and father's education level, age of the mother, indicator variables for the mother's having Swiss citizenship and being born in Switzerland, and indicator variables for a single-parent household, a household that received financial aid, and a household that experienced financial problems. To provide evidence on balance across the treatment and the control groups, we do not include individual controls in the estimation of the treatment effect at age 7. For each SBQ measure, we combine measures from teacher and parent reports by taking the average of the two standardized indices and standardizing the resulting index again. For measures at ages 8, 10, 12, 13, and 15, we rely solely on teacher reports, as there are no parent surveys at these times. Details on the SBQ items and construct validity are provided in Appendix Section B. Shaded areas indicate the baseline and the intervention periods. The dashed vertical line shows the time when tracking into secondary schools takes place. All models include strata fixed effects for the level of randomization. Each point estimate is shown with the respective 90 and 95 percent confidence intervals calculated based on standard errors clustered at the school level.

Figure 8: Dynamic Treatment Effects on Socio-Emotional Skills II



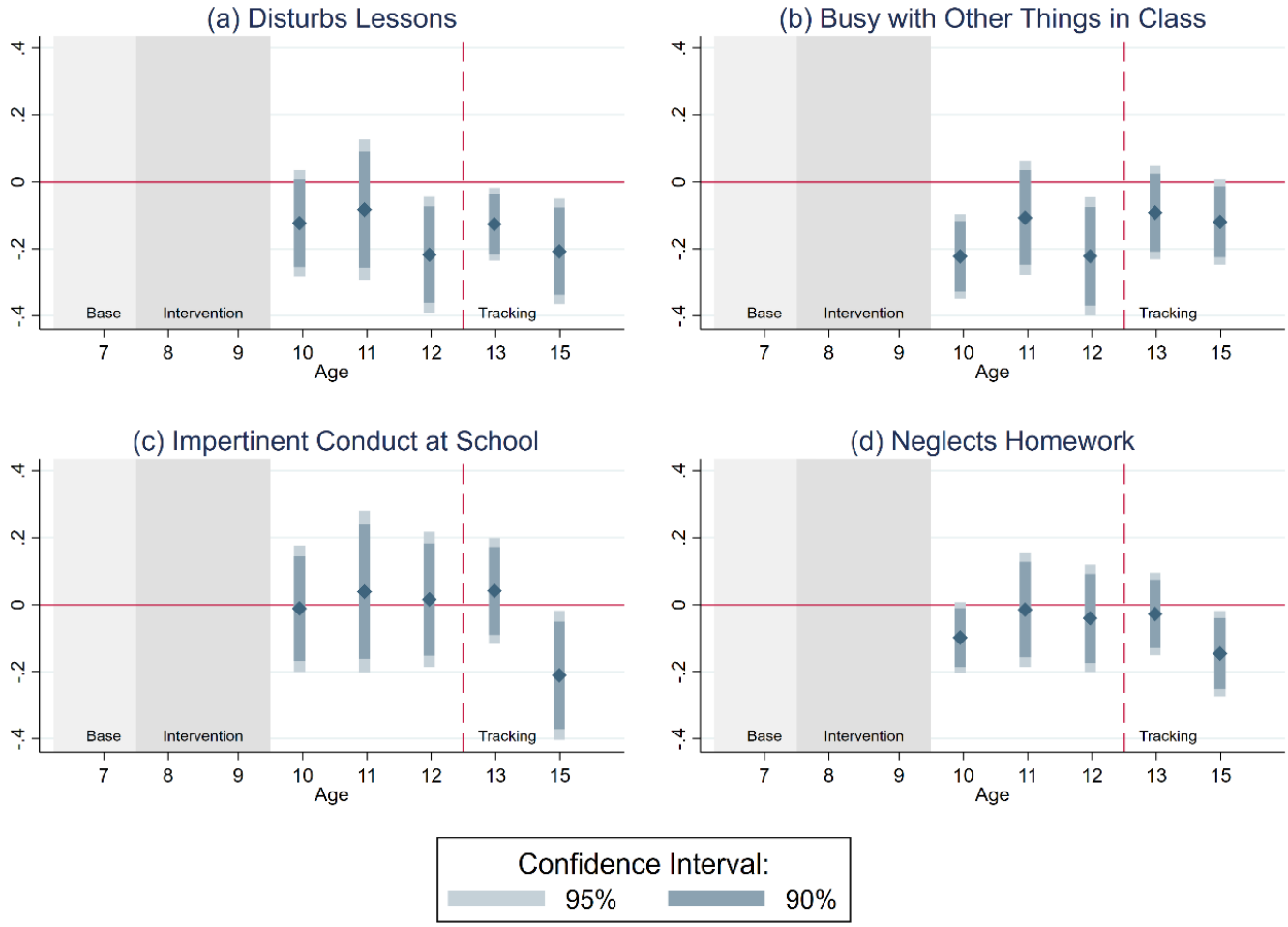
NOTE.—This figure shows the treatment effect of the PATHS intervention on children's socio-emotional skills from ages 7 through 15. The dependent variables are non-aggressive conduct disorder (Panel a), anxiety and depressivity (Panel b), aggression (Panel c), and prosociality (Panel d). All dependent variables are indices standardized to mean zero and a standard deviation of one. All models include controls for baseline child and household characteristics. Child controls include the age and gender of the child, having Swiss citizenship, measures for anxiety and depressivity, ADHD, non-aggressive externalizing problem behavior, non-aggressive conduct disorder, opposition and defiance, and prosociality, four measures of aggressive behavior, and four measures of overall behavior. Household controls include household income, mother's and father's education level, age of the mother, indicator variables for the mother's having Swiss citizenship and being born in Switzerland, and indicator variables for a single-parent household, a household that received financial aid, and a household that experienced financial problems. To provide evidence on balance across the treatment and the control groups, we do not include individual controls in the estimation of the treatment effect at age 7. For each SBQ measure, we combine measures from teacher and parent reports by taking the average of the two standardized indices and standardizing the resulting index again. For measures at ages 8 (anxiety and depressivity), 10, 12, 13, and 15, we rely solely on teacher reports, as there are no parent surveys at these times. Details on the SBQ items and construct validity are provided in Appendix Section B. Shaded areas indicate the baseline and the intervention periods. The dashed vertical line shows the time when tracking into secondary schools takes place. All models include strata fixed effects for the level of randomization. Each point estimate is shown with the respective 90 and 95 percent confidence intervals calculated based on standard errors clustered at the school level.

Figure 9: Dynamic Treatment Effects on Parenting Practices



NOTE.—This figure shows the treatment effect of the PATHS intervention on parenting practices from ages 7 through 11. The dependent variables are corporal punishment (Panel a), parental control and supervision (Panel b), inconsistent discipline (Panel c), parental involvement (Panel d), and positive parenting (Panel e). All dependent variables are indices standardized to mean zero and a standard deviation of one. All models include controls for baseline child and household characteristics. Child controls include the age and gender of the child, having Swiss citizenship, measures for anxiety and depressivity, ADHD, non-aggressive externalizing problem behavior, non-aggressive conduct disorder, opposition and defiance, and prosociality, four measures of aggressive behavior, and four measures of overall behavior. Household controls include household income, mother's and father's education level, age of the mother, indicator variables for the mother's having Swiss citizenship and being born in Switzerland, and indicator variables for a single-parent household, a household that received financial aid, and a household that experienced financial problems. To provide evidence on balance across the treatment and the control groups, we do not include individual controls in the estimation of the treatment effect at age 7. Shaded areas indicate the baseline and the intervention periods. The dashed vertical line shows the time when tracking into secondary schools takes place. All models include strata fixed effects for the level of randomization. Each point estimate is shown with the respective 90 and 95 percent confidence intervals calculated based on standard errors clustered at the school level.

Figure 10: Dynamic Treatment Effects on Behavior in Class



NOTE.—This figure shows the treatment effect of the PATHS intervention on children's behavior at school from ages 10 through 15. The dependent variables are disturbing the lesson (Panel a), being busy with other things in class (Panel b), displaying impertinent conduct at school (Panel c), and neglecting homework (Panel d). All dependent variables are indices standardized to mean zero and a standard deviation of one. All models include controls for baseline child and household characteristics. Child controls include the age and gender of the child, having Swiss citizenship, measures for anxiety and depressivity, ADHD, non-aggressive externalizing problem behavior, non-aggressive conduct disorder, opposition and defiance, and prosociality, four measures of aggressive behavior, and four measures of overall behavior. Household controls include household income, mother's and father's education level, age of the mother, indicator variables for the mother's having Swiss citizenship and being born in Switzerland, and indicator variables for a single-parent household, a household that received financial aid, and a household that experienced financial problems. Measures are taken from teacher reports. Shaded areas indicate the baseline and the intervention periods. The dashed vertical line shows the time when tracking into secondary schools takes place. All models include strata fixed effects for the level of randomization. Each point estimate is shown with the respective 90 and 95 percent confidence intervals calculated based on standard errors clustered at the school level.

Table 7: Multiple Hypothesis Testing I

	(1) University Enrollment or Graduation	(2) Standardized Grades in Primary School	(3) Standardized Admission Test Scores	(4) ADHD	(5) Opposition/ Defiance	(6) NACD	(7) Anxiety/ Depression	(8) Aggression	(9) Prosociality	(10) Disturbs Lessons	(11) Busy with Other Things in Class	(12) Impertinent Conduct at School	(13) Neglects Homework
PATHS Treatment	0.0647***	0.161	-0.00495	-0.154***	-0.148***	-0.136**	0.0541	-0.0390	-0.0168	-0.172***	-0.161***	-0.0954	-0.0205
Original *p*-value	0.005	0.262	0.964	0.001	0.005	0.034	0.333	0.556	0.778	0.002	0.003	0.118	0.658
Bonferroni-Holm corrected *p*-value	0.048	1.000	1.000	0.012	0.049	0.268	1.000	1.000	1.000	0.025	0.029	0.827	1.000
Bonferroni corrected *p*-value	0.062	1.000	1.000	0.012	0.071	0.436	1.000	1.000	1.000	0.027	0.035	1.000	1.000
Observations	815	364	375	1,035	1,035	1,035	1,035	1,035	1,035	1,034	1,034	1,034	1,034
R-squared	0.249	0.626	0.658	0.502	0.358	0.376	0.244	0.400	0.368	0.387	0.379	0.239	0.297
Control Group Mean Dependent Variable	.252	.01	.074	.03	.041	-.003	-.082	-.034	.016	.024	.06	-.005	-.022
IP-Weighting	No	Yes	Yes	No	No	No	No	No	No	No	No	No	No

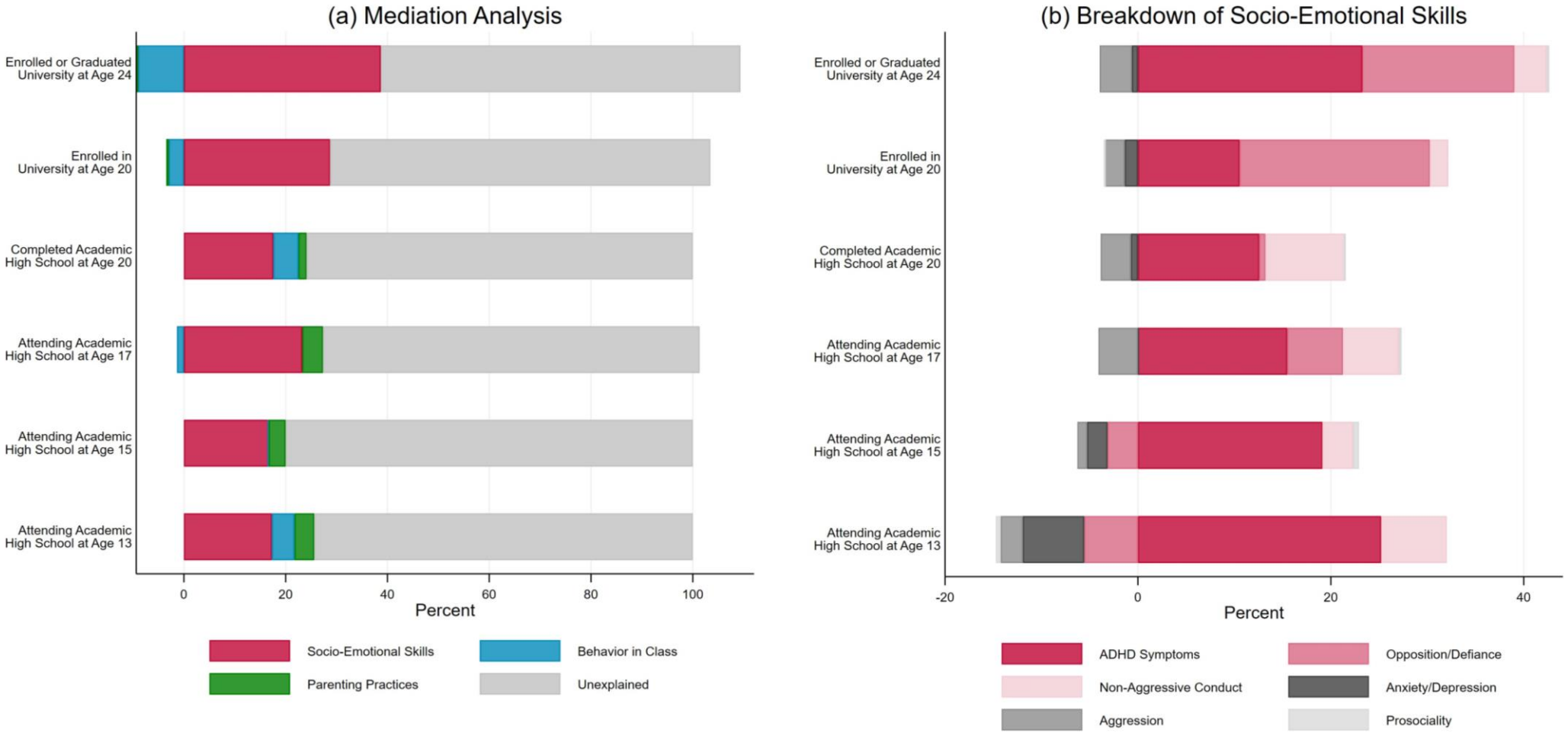
NOTE.—This table shows the treatment effect of the PATHS intervention on cognitive and socio-emotional outcomes. University enrollment or graduation refers to age 24 and is an indicator variable. Standardized grade corresponds to the teacher-given, primary school grades obtained before taking the academic high school admission test. Estimates for admission test scores are based on the score obtained from the first time taking the test. Admission to academic high school is possible after Grade 6, 8, and 9. The second and third regression are based on inverse probability weighting, with weights constructed by regressing an indicator for whether we observe any grade or test score on the full set of controls and then taking the square of the inverse predictions. Columns (4)–(9) show the treatment effect for socio-emotional outcomes and columns (10)–(13) for classroom behavior. The outcomes in columns (4)–(12) are averaged over survey waves and then standardized across the sample. We include Bonferroni and Bonferroni–Holm *p*-values to perform multiple hypotheses testing. All outcomes are estimated using controls for baseline child and household characteristics. Child controls include the age and gender of the child, having Swiss citizenship, measures for anxiety and depressivity, ADHD, non-aggressive externalizing problem behavior, non-aggressive conduct disorder, opposition and defiance, and prosociality, four measures of aggressive behavior, and four measures of overall behavior. Household controls include household income, mother's and father's education level, age of the mother, indicator variables for the mother's having Swiss citizenship and being born in Switzerland, and indicator variables for a single-parent household, a household that received financial aid, and a household that experienced financial problems. All models include strata fixed effects for the level of randomization. Robust standard errors clustered at the school level are in parentheses. *** p<0.01, ** p<0.05, * p<0.1.

Table 8: Multiple Hypothesis Testing II

	(1) Overall Socio-Emotional and Cognitive Outcomes
PATHS Treatment	0.134***
	(0.049)
p-value	0.008
Observations	1,043
R-squared	0.454
Control Group Mean Dependent Variable	0.004

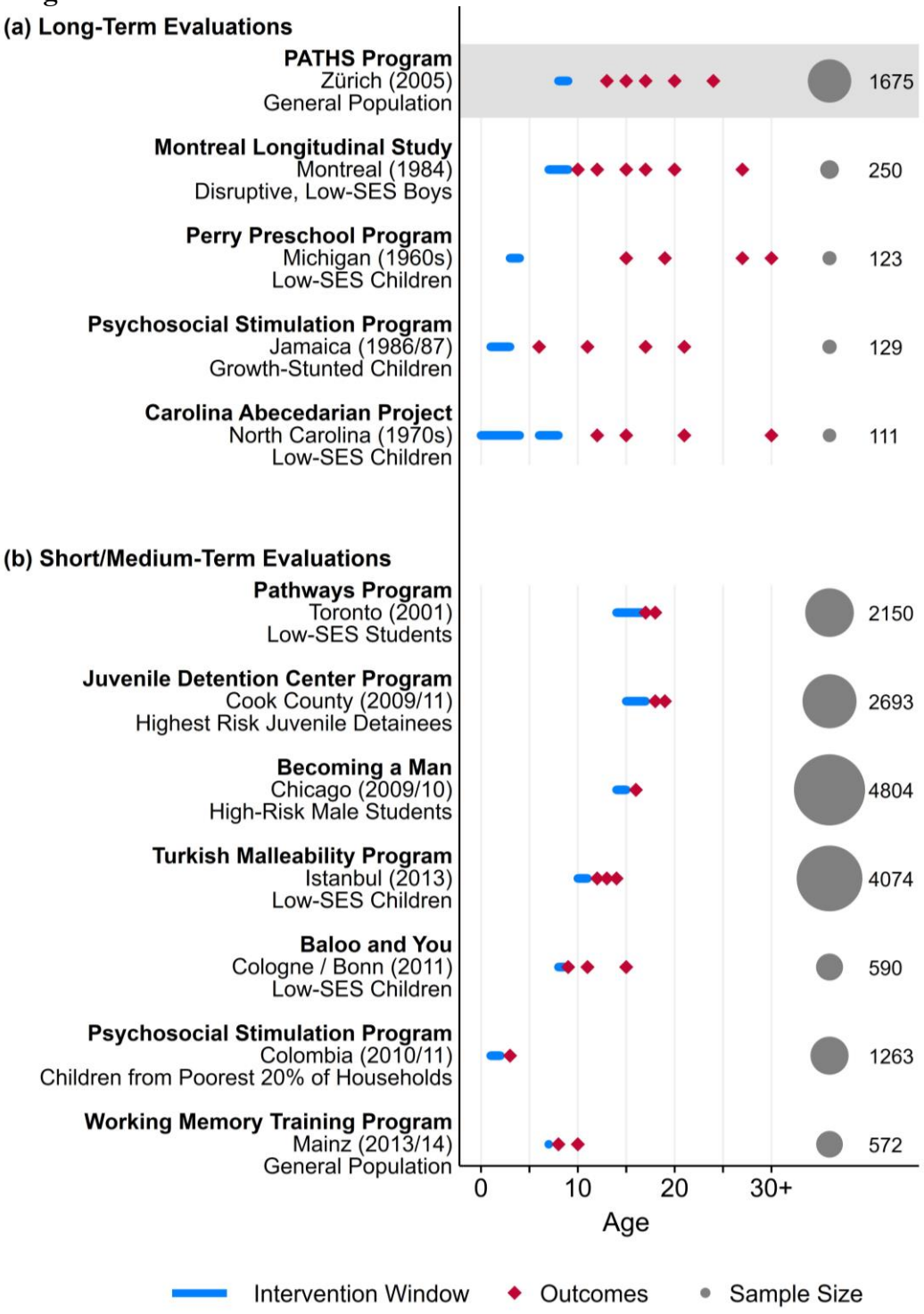
NOTE.—The outcome variable is an index created by standardizing the variable university enrollment or graduation, then taking the mean over all 13 outcomes in Table 7 and then standardizing across the sample. Before taking the mean, we first reverse the sign on all "negative outcomes," that is, ADHD, opposition and defiance, non-aggressive conduct disorder, anxiety and depressivity, aggression, disturbs lessons, busy with other things in class, impertinent conduct at school, and neglects homework. In doing so, we flip the interpretation from good to bad. We control for baseline child and household characteristics. Child controls include the age and gender of the child, having Swiss citizenship, measures for anxiety and depressivity, ADHD, non-aggressive externalizing problem behavior, non-aggressive conduct disorder, opposition and defiance, and prosociality, four measures of aggressive behavior, and four measures of overall behavior. Household controls include household income, mother's and father's education level, age of the mother, and indicator variables for the mother's having Swiss citizenship and being born in Switzerland, indicator variables for a single-parent household, a household that received financial aid, and a household that experienced financial problems. The outcome initial tracking into academic high school is based on administrative data. The model includes strata fixed effects for the level of randomization. Robust standard errors clustered at the school level are in parentheses. *** p<0.01, ** p<0.05, * p<0.1.

Figure 11: Mediation Analysis



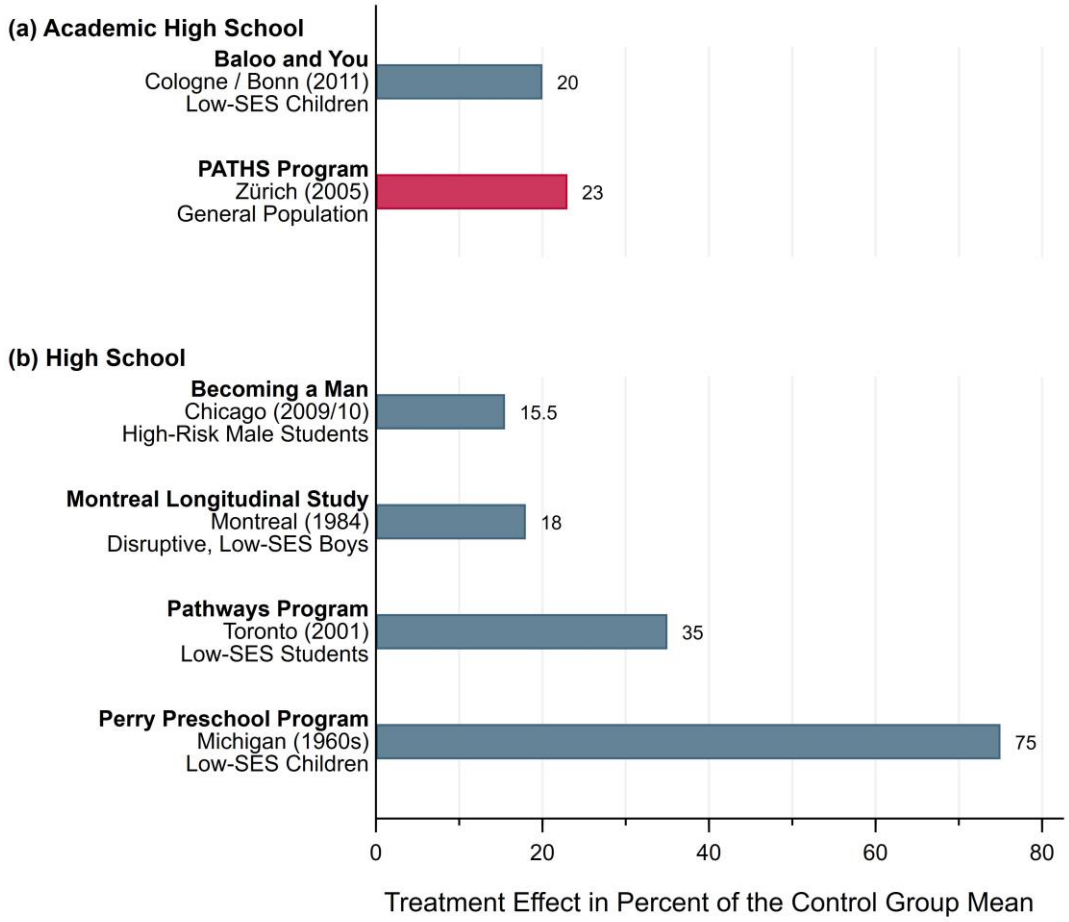
NOTE.—This figure shows the results of our mediation analysis. Panel (a) shows the decomposition of the overall treatment effect. In Panel (a) we include socio-emotional skills, parenting practices, and behavior in class as mediators. Panel (b) shows the decomposition of socio-emotional skills. We decompose the treatment effect obtained from the *unconditional* outcome equation $Y_{is} = \beta_1 \text{PATHS}_s + X'_{is}\gamma + \theta + \varepsilon_{is}$ shown in Equation (1) in the following way: $\frac{dY}{dPATHS} = \sum \frac{\partial Y}{\partial M}\frac{\partial M}{\partial PATHS} + R$, where Y is the outcome, $PATHS$ is the treatment indicator, M is a vector of k mediators (comprised of the variables included in socio-emotional skills, parenting practices, and behavior in class), and R is the unexplained part of the treatment effect. We estimate two additional specifications. First, we estimate the *conditional* outcome equation augmented with the vector M: $Y_{is} = \beta_2 \text{PATHS}_s + M_{is}\varphi + X'_{is}\gamma + \theta + \epsilon_{is}$. Second, we separately estimate the treatment effect of the intervention on each mediator $j \in k$: $M^j_{is} = \beta^j_3 \text{PATHS}_s + X'_{is}\gamma + \theta + v_{is}$. Given the longitudinal nature of our data, for all mediators we only consider measures obtained post-treatment and before the education outcome is measured. In case of multiple observations for the same mediator, we construct a summary index using the covariance weighting procedure discussed in Anderson (2008). The contribution of each mediator $j \in k$ is then computed as the ratio $\frac{\varphi^j \times \beta^j_3}{\beta_1}$, which is shown in the color-coded bars. The unexplained part, R, results from $R = 1 - \sum_{j=1}^{k} \frac{\varphi^j \times \beta^j_3}{\beta_1}$.

Figure 12: Related Intervention Studies and Contribution to the Literature



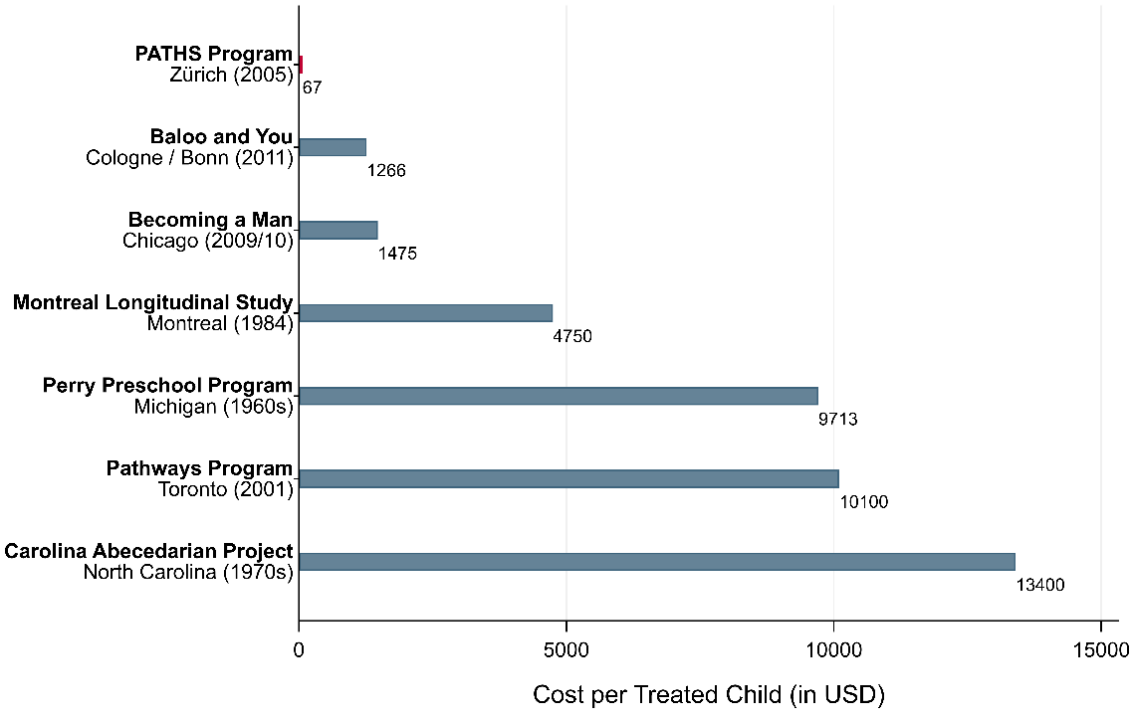
NOTE.—This figure provides an overview of intervention studies in the related literature. Panel (a) shows intervention programs with long-term evaluations. Panel (b) shows programs with short- and medium-term evaluations of interventions targeting socio-emotional skills. Horizontal bars indicate the intervention duration. Red diamonds indicate when post-treatment measures are observed. Sample size refers to the number of students effectively randomized into treatment or control status. "SES" stands for socio-economic status. Information on the Montreal Longitudinal Study is taken from Algan et al. (2022). Information on the Perry Preschool Program is reported in Heckman et al. (2010a,b). Information on the Jamaican Psychosocial Stimulation Program is taken from Gertler et al. (2014). Information on the Carolina Abecedarian Project is reported in Campbell et al. (2014), Information for the Juvenile Detention Center intervention and the Becoming a Man program is reported in Heller et al. (2017). Information for the Pathways program is reported in Oreopoulos, Brown, and Lavecchia (2017). The Turkish Malleability Program refers to the randomized control trials analyzed in Alan and Ertac (2018) and Alan et al. (2019). Sample size and invention periods for the Baloo and You program are taken from Kosse et al. (2020) and Falk, Kosse, and Pinger (forthcoming). Information for the Working Memory Training Program is reported in Berger et al. (2020).

Figure 13: Effect Size Comparison to Other Interventions



NOTE.—This figure shows treatment effect sizes for (academic) high school tracking or completion of different interventions in the related literature. The figure distinguishes between academic high school in Germany and Switzerland (Panel a) and high school completion in the United States and Canada (Panel b). The effect size for the Baloo and You program is reported in Falk, Kosse, and Pinger (forthcoming). The effect size of the Perry Preschool Program is reported in Heckman et al. (2010a). The intervention effect size of the Montreal Longitudinal Study is reported in Algan et al. (2022). The effect size for the Becoming a Man intervention represents the midpoint of the range of 12 to 19 percent as provided in Heller et al. (2017). The effect size of the Pathways program is reported in Oreopoulos, Brown, and Lavecchia (2017).

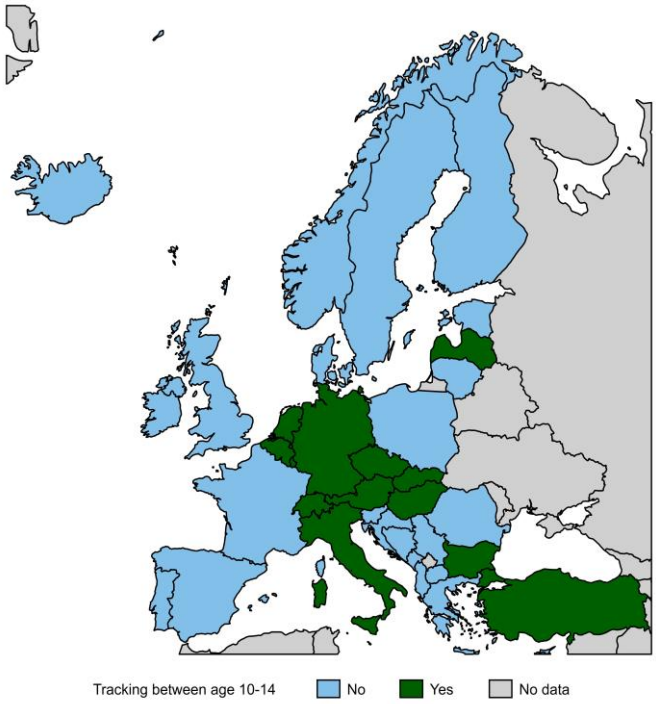
Figure 14: Cost Comparison with Other Interventions



NOTE.—This figure shows the cost per treated child of different interventions in the related literature. Cost estimates for the Becoming a Man, the Montreal Longitudinal Study, and the Carolina Abecedarian Projects intervention are taken from Heller at al. (2017), Algan et al. (2022), and Campell et al. (2014), respectively. Costs of the Perry Preschool Program are taken from the Web Appendix of Heckman et al. (2010b). Cost estimates of the Baloo and You intervention in Germany are based on Péron and Baldauf (2015). Costs of the Pathways program are reported in Oreopoulos, Brown, and Lavecchia (2017).

Figure 15: Tracking Systems in European Countries and PATHS Prevalence

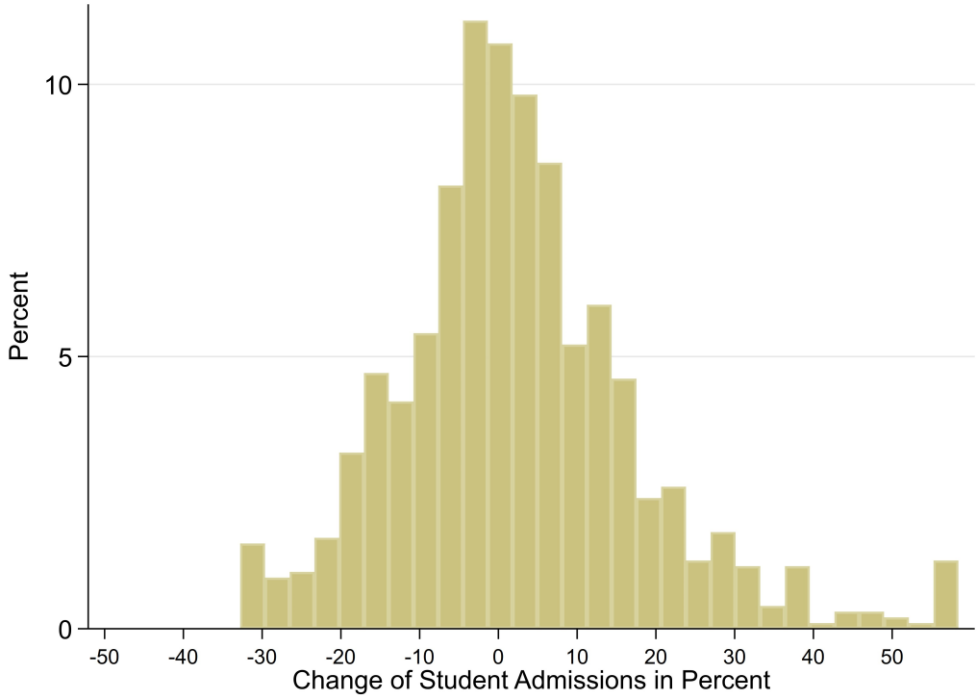
Panel (a): Early School-Based Tracking



Panel (b): PATHS Usage in European Primary Education

NOTE.—This figure provides a stylized overview of tracking systems in Europe and PATHS usage in European primary education. Panel (a) highlights differences in tracking age from primary to secondary education. Green indicates all countries in which students are tracked into different schools to follow distinct educational pathways or specific types of education between the ages of 10 and 14. Blue indicates countries for which this is not the case. Information about tracking systems stems from the European Commission (2019, 2022). Panel (b) highlights the European countries in which at least one primary school implemented the PATHS program. Coverage is based on the following studies: Humphrey et al. (2011), Malti, Ribeaud, and Eisner. (2011), Goossens et al. (2012), Morganti and Signorelli (2016), and Novak et al. (2017). Moreover, we used information given in a report by the Oregon Addiction and Mental Health Services and Washington Division of Behavioral Health and Recovery.

Figure 16: Year-to-Year Changes in Academic High School Admissions



NOTE.—This figure provides information showing the variation in yearly changes of school-level academic high school admissions for public schools in Switzerland between 2013 and 2020. The yearly change is calculated through the following formula: *(Number of Students in Year t – Number of Students in Year t–1) / (Number of Students in Year t–1 * 100)*. Values smaller than the 1st percentile and larger than the 99th percentile are trimmed to the 1st and 99th percentile. Data are provided by the Swiss Statistical office (LABB 2022).

Online Appendix

The Causal Impact of Socio-Emotional Skills Training on Education Success

Giuseppe Sorrenti
Ulf Zölitz
Denis Ribeaud
Manuel Eisner

Table of Content

Appendix A: Supplementary Tables and Figures

Table A1: Previous PATHS Evaluations

Paper	Country	Baseline Sample Size	Child Age at Intervention Start	Intervention Duration	Follow Up Duration	Outcomes	Key Results (reported in Abstract/Summary/Discussion)
Averdijk et al (2016)	Switzerland	1675	7–8 years old	2 years	5-6 years	adolescent delinquency, substance use, antisocial behavior	reduced prevalence of police contacts
Crean and Johnson (2013)	USA	779	Fall 3rd Grade	1 year	2 years	aggressive behaviour, social information processing abilities	reduced aggressive behaviors, improved social information processing abilities
Goossens et al (2012)	Netherlands	1294	5 to 11 years old	2 years	None	problem behavior, social skills, emotional skills, implementation quality and quantity	no significant effects, low levels of program implementation
Greenberg et al (1995)	USA	286	2nd and 3rd grade	1 year	None	feelings vocabulary, understanding of emotional experience, understanding feelings	improved emotional competence
Greenberg, Kusche and Cook (1991)	USA	308	1st and 2nd grade	1 year	None	feelings vocabulary, understanding of emotional experience, understanding feelings	improved emotional competence
Humphrey et al (2015)	UK	3336	3rd and 4th grade	2 years	None	academic outcomes (English/reading/math)	mostly no significant effects, higher levels of implementation quality and reach associated with improved academic outcomes
Humphrey et al (2016)	UK	5218	7–9 years old	2 years	None	social-emotional competence and mental health	improved social-emotional competence and prosocial behavior, reduced ratings of emotional symptoms
Humphrey et al (2018)	UK	5218	7–9 years old	2 years	2 years	social skills, pro-social behavior, mental health, well-being, peer and social support, exclusions, attendance and attainment	no significant effects
Little et al (2012)	UK	5397	4–6 years old	2 years	None	behavioral and emotional outcomes, social competence	no significant effects
Malti, Ribeaud and Eisner (2011)	Switzerland	1675	7 years old	2 years	2 years	externalizing and prosocial behavior, aggression, impulsivity/ADHD	reduced aggressive behavior and impulsivity/ADHD (children with high baseline levels)
Malti, Ribeaud and Eisner (2012)	Switzerland	1675	7 years old	2 years	2 years	externalizing and prosocial behavior, aggression, impulsivity/ADHD	reduced aggressive behavior and impulsivity/ADHD
Novak et al (2017)	Croatia	568	7 years old	1 year	None	prosocial, learning and oppositional behavior, emotion regulation, inattention, hyperactivity, physical aggression, peer problems, depression	no significant effect for overall sample and high-risk children, reduced inattention, hyperactivity, oppositional behavior, physical aggression and improved prosocial and learning behavior, emotion regulation for low-risk children
Panayiotou, Humphrey and Hennessey (2020)	England	5218	7–9 years old	2 years	None	well-being, peer social support, school connectedness	improved psychological well-being
Riggs et al (2006)	USA	318	7–9 years old	6 months	1 year	externalizing and internalizing behavior, inhibitory control, verbal fluency	improved inhibitory control and verbal fluency, reduced externalizing and internalizing behavior
Ruby and Doolittle (2010)	USA	786	3rd grade	3 years	None	social and emotional competence, altruistic, prosocial, problem and ADHD behavior, learning engagement, academic competence and motivation, perceptions of school climate	no significant effects
Schonfeld et al (2015)	USA	705	3rd Grade	4 years	None	reading, writing and math grades	improved proficiency in reading, writing, and math at some grade levels
Sheard, Ross and Cheung (2013)	Northern Ireland	1430	4–6 and 8–9 years old	3 years	None	social-emotional development	improved emotion recognition, emotion naming, and managing emotion
Turner et al (2020)	UK	5218	7–9 years old	2 years	None	quality-adjusted life years (QALY)	positive mean incremental QALYs

NOTE.—This table provides an overview of previous PATHS evaluations in primary school and shows the country of implementation, baseline sample size, child age at intervention start, intervention duration, follow-up duration, outcomes, and key results. Inclusion criteria are: (1) classroom-based intervention, (2) primary school intervention, (3) study sample representative of the general population, (4) randomized control and treatment groups, and (5) only PATHS or separate treatment arms if multiple programs are implemented.

Table A2: Treatment Effects on Changing School between Grades 1 and 2

	(1) School Changes between Grades 1 and 2
Initial PATHS Treatment Assignment	-0.017
	(0.013)
Observations	1,062
Control Group Mean Dependent Variable	.056

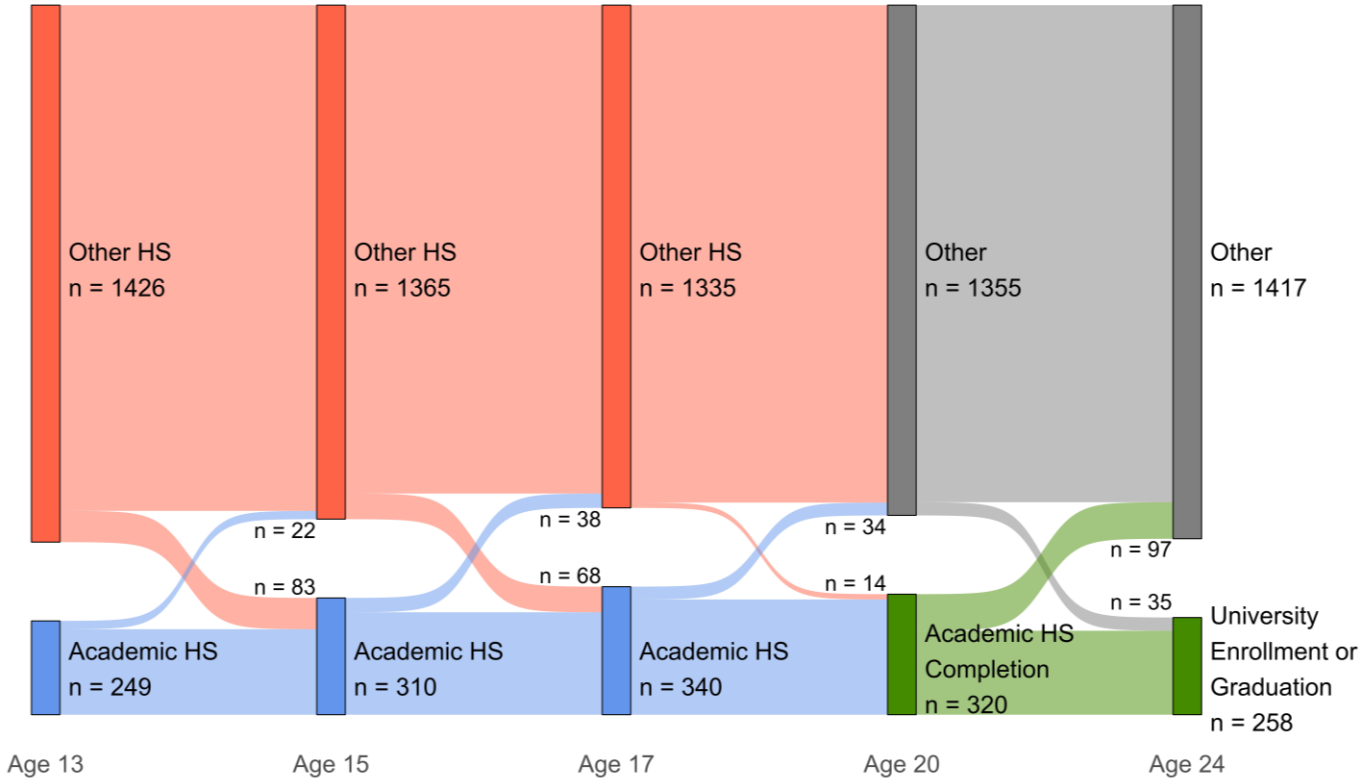
NOTE.—This table shows the treatment effects of the initial PATHS treatment assignment on school changers between grades 1 and 2. The outcome is an indicator variable. The specification is estimated using linear probability models using controls for baseline child and household characteristics. Child controls include the age and gender of the child, having Swiss citizenship, measures for anxiety and depressivity, ADHD, non-aggressive externalizing problem behavior, non-aggressive conduct disorder, opposition and defiance, and prosociality, four measures of aggressive behavior, and four measures of overall behavior. Household controls include household income, mother's and father's education level, age of the mother, indicator variables for the mother's having Swiss citizenship and being born in Switzerland, and indicator variables for a single-parent household, a household that received financial aid, and a household that experienced financial problems. All models include strata fixed effects for the level of randomization. Robust standard errors clustered at the school level are in parentheses. *** p<0.01, ** p<0.05, * p<0.1.

Table A3: Treatment Effects on Grade Retention

	(1) Grade Retention before Age 13
PATHS Treatment	0.014
	(0.022)
Observations	1,008
Control Group Mean Dependent Variable	.122

NOTE.—This table shows the treatment effects of the PATHS intervention on grade retention before the age of 13. The outcome is an indicator variable and is defined based on the expected grade level for each student in panel wave 5. If students are not yet in grade 7, a value of 1 is assigned. The specification is estimated using linear probability models using controls for baseline child and household characteristics. Child controls include the age and gender of the child, having Swiss citizenship, measures for anxiety and depressivity, ADHD, non-aggressive externalizing problem behavior, non-aggressive conduct disorder, opposition and defiance, and prosociality, four measures of aggressive behavior, and four measures of overall behavior. Household controls include household income, mother's and father's education level, age of the mother, indicator variables for the mother's having Swiss citizenship and being born in Switzerland, and indicator variables for a single-parent household, a household that received financial aid, and a household that experienced financial problems. All models include strata fixed effects for the level of randomization. Robust standard errors clustered at the school level are in parentheses. *** p<0.01, ** p<0.05, * p<0.1.

Figure A1: Movement in and out of the Academic High School Track



NOTE.—This figure shows the inflows and outflows of the academic track from initial tracking at age 13 until the outcome university enrollment or graduation at age 24. The blue bars represent the number of students in academic high school at ages 13, 15, and 17. The red bars represent the number of students that are not enrolled in academic high school. The green bars represent the number of participants that completed academic high school at age 20 and enrolled or graduated from university at age 24. The grey bars represent the number of participants for whom these outcomes are not true. To keep the sample size consistent, we labelled missing information for one of the outcomes as "Other." The size of the bars and flows is equal to the share of the total sample population.

Table A4: Main Results Using an Index Measure and Pooled Regression

Panel A: Index Measure	(1) Weighted Education Index	(2) Weighted Education Index	(3) Weighted Education Index
PATHS Treatment	0.039	0.077**	0.133***
	(0.045)	(0.030)	(0.038)
Observations	1,615	1,615	1,034
R-squared	0.110	0.265	0.343
Control Group Mean Dependent Variable	-.078	-.078	.001
Parental Education Controls	No	Yes	Yes
Additional Controls	No	No	Yes
Survey Wave Fixed Effects	No	No	No
Panel B: Pooled Regression	Pooled Regression	Pooled Regression	Pooled Regression
PATHS Treatment	0.020	0.041**	0.057***
	(0.018)	(0.016)	(0.020)
Observations	7,950	7,950	5,393
R-squared	0.096	0.241	0.309
Control Group Mean Dependent Variable	.211	.211	.25
Parental Education Controls	No	Yes	Yes
Additional Controls	No	No	Yes
Survey Wave Fixed Effects	Yes	Yes	Yes

NOTE.—This table shows the treatment effects of the PATHS intervention on aggregated outcomes measuring the educational success of children through ages 13, 15, 17, 20, and 24. In Panel A, the dependent variable is a weighted covariance index following Anderson (2008) based on indicator variables for the attendance of academic high school at ages 13, 15, and 17 as well as for academic high school completion and university enrollment at age 20 and university enrollment or graduation at age 24. In Panel B, the sample is reshaped to a panel format with the educational outcomes measured at ages 13, 15, 17, 20, and 24 as pooled dependent variables. Parental education controls include indicator variables for mother's and father's education level. Additional controls include the remaining child and household characteristics. These are age and gender of the child, having Swiss citizenship, measures for anxiety and depressivity, ADHD, non-aggressive externalizing problem behavior, non-aggressive conduct disorder, opposition and defiance, and prosociality, four measures of aggressive behavior, and four measures of overall behavior, household income, age of the mother, indicator variables for the mother's having Swiss citizenship and being born in Switzerland, and indicator variables for a single-parent household, a household that received financial aid, and a household that experienced financial problems. All models include strata fixed effects for the level of randomization. Robust standard errors clustered at the school level are in parentheses. *** p<0.01, ** p<0.05, * p<0.1.

Table A5: Treatment Effects of PATHS on Labor Market Outcomes

	(1) Working Full-Time	(2) Working Part-Time	(3) Wage Observed	(4) Log Wage
PATHS Treatment	0.010	-0.022	-0.024	-0.142**
	(0.035)	(0.020)	(0.025)	(0.064)
Observations	815	815	788	649
R-squared	0.194	0.121	0.142	0.251
Control Group Mean Dependent Variable	.235	.113	0.828	7.779
Participant Age	24	24	24	24

NOTE.—This table shows the treatment effects of the PATHS intervention on labor outcomes at age 24. The outcomes working full-time, working part-time, and wage observed are indicator variables and the specifications are estimated using linear probability models. The outcome log wage is the natural logarithm of the average net per month salary in the last 12 months. All outcomes are self-reported and the specifications are estimated using linear probability models using controls for baseline child and household characteristics. Child controls include the age and gender of the child, having Swiss citizenship, measures for anxiety and depressivity, ADHD, non-aggressive externalizing problem behavior, non-aggressive conduct disorder, opposition and defiance, and prosociality, four measures of aggressive behavior, and four measures of overall behavior. Household controls include household income, mother's and father's education level, age of the mother, indicator variables for the mother's having Swiss citizenship and being born in Switzerland, and indicator variables for a single-parent household, a household that received financial aid, and a household that experienced financial problems. All models include strata fixed effects for the level of randomization. Robust standard errors clustered at the school level are in parentheses. *** p<0.01, ** p<0.05, * p<0.1.

Table A6: Test for Selective Attrition

Panel A: Outcomes Observed?	(1) Tracking Observed at Age 13	(2) Tracking Observed at Age 15	(3) Tracking Observed at Age 17	(4) Completion of Academic High School Observed	(5) University Enrollment Observed	(6) University Enrollment or Graduation Observed
PATHS Treatment	0.017	0.011	0.001	0.012	0.012	0.009
	(0.011)	(0.015)	(0.021)	(0.019)	(0.019)	(0.019)
Observations	1,675	1,675	1,675	1,675	1,675	1,675
R-squared	0.012	0.029	0.063	0.090	0.089	0.088
Control Group Mean Dependent Variable	0.94	0.91	0.783	0.711	0.707	0.695
Child Age	13	15	17	20	20	24
Panel Wave	5	6	7	8	8	9
Panel B: Outcomes & Control Variables Observed?	Control Variables Observed at Age 13	Control Variables Observed at Age 15	Control Variables Observed at Age 17	Control Variables Observed at Age 20	Control Variables Observed at Age 20	Control Variables Observed at Age 24
PATHS Treatment	-0.035	-0.032	-0.035	-0.009	-0.011	-0.043
	(0.025)	(0.025)	(0.027)	(0.030)	(0.030)	(0.030)
Observations	1,589	1,535	1,305	1,185	1,178	1,158
R-squared	0.040	0.041	0.046	0.048	0.050	0.051
Control Group Mean Dependent Variable	0.659	0.671	0.711	0.717	0.719	0.731
Child Age	13	15	17	20	20	24
Panel Wave	5	6	7	8	8	9

NOTE.—This table shows the treatment effects of the PATHS intervention on observing a student's educational outcome at ages 13, 15, 17, 20, and 24. We estimate linear probability models. The dependent variables in Panel A are indicator variables for observing the respective educational outcome. The dependent variables in Panel B are indicator variables for observing the respective baseline covariates conditional on observing the educational outcome. All models include strata fixed effects for the level of randomization. Panel A includes controls for mother's and father's education level. The point estimates for the PATHS Treatment indicate whether the treatment has an effect on attrition. Robust standard errors clustered at the school level are in parentheses. *** p<0.01, ** p<0.05, * p<0.1.

Table A7: Father's Education and Child's Education

	(1) Initial Tracking into Academic High School	(2) Initial Tracking into Academic High School	(3) Academic High School Completion	(4) Academic High School Completion	(5) University Enrollment or Graduation	(6) University Enrollment or Graduation
Father Completed Academic High School Degree	0.305***	0.213**	0.314***	0.246***	0.259***	0.203***
	(0.072)	(0.081)	(0.066)	(0.058)	(0.052)	(0.051)
Mother Completed Academic High School Degree		0.090		0.066		0.169***
		(0.055)		(0.100)		(0.043)
Age in 2005		-0.060		-0.070		-0.016
		(0.067)		(0.070)		(0.077)
Female		-0.004		-0.094*		-0.066
		(0.048)		(0.054)		(0.066)
Age Mother in 2005		0.001		-0.004		-0.012*
		(0.003)		(0.006)		(0.006)
Mother Born in Switzerland		0.093		-0.033		-0.056
		(0.065)		(0.082)		(0.092)
Family Receives Financial Aid		0.046		0.121		0.084
		(0.056)		(0.084)		(0.071)
Family Reports Financial Problems		-0.044		0.033		0.044
		(0.054)		(0.061)		(0.081)
Household Income (in 1000 USDs)		0.002***		0.002***		0.001*
		(0.000)		(0.001)		(0.001)
Observations	266	244	216	199	214	198
Adjusted *R*-squared	0.196	0.260	0.258	0.284	0.201	0.241
Child Age	13	13	20	20	24	24
Sample	Pure Control Group	Pure Control Group	Pure Control Group	Pure Control Group	Pure Control Group	Pure Control Group

NOTE.—This table shows the relation between father's educational level on initial tracking into academic high school at age 13, academic high school completion at age 20, and university enrollment or graduation at age 24 using only students that neither participated in PATHS nor Triple P. The outcome initial tracking into academic high school is based on administrative data. The outcomes academic high school completion and university enrollment or graduation are self-reported. For each outcome, we estimate a simple linear regression model and a separate model with additional control variables. The controls include mother's education level, participant's age, participant's gender, mother's age and an indicator of being born in Switzerland, and indicator variables for a household that receives financial aid or reports financial problems and household income. All regressors are taken from the baseline. All models include strata fixed effects for the level of randomization. Robust standard errors clustered at the school level are in parentheses. *** p<0.01, ** p<0.05, * p<0.1.

Table A8: Main Results with Alternative Treatment Definition—Excluding All Children Receiving the Triple P Intervention

	(1) Initial Tracking into Academic High School	(2) Academic High School Completion	(3) University Enrollment or Graduation
PATHS Treatment	0.068**	0.074***	0.065**
	(0.027)	(0.021)	(0.026)
Observations	560	458	446
R-squared	0.358	0.404	0.293
Control Group Mean Dependent Variable	.231	.345	.268
Child Age	13	20	24
Panel Wave	5	8	9

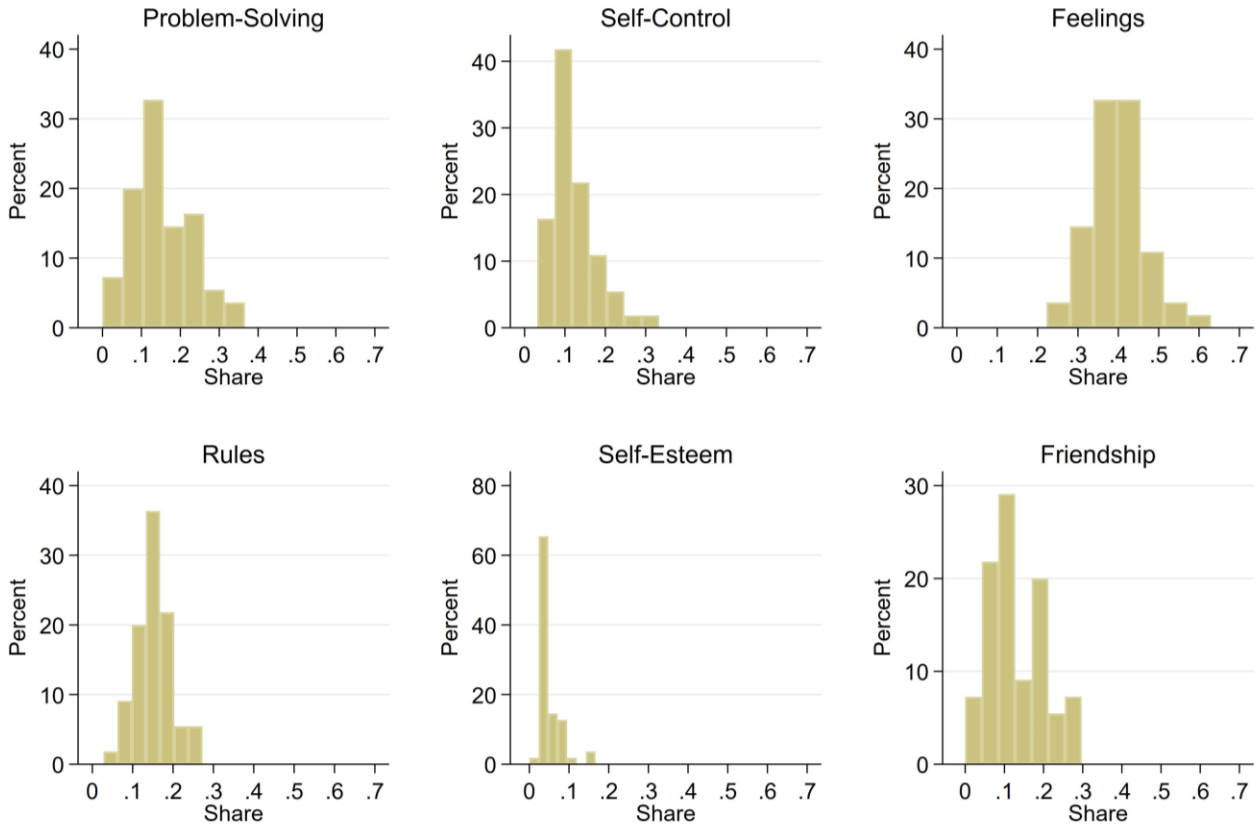
NOTE.—This table shows the treatment effects of the PATHS intervention on initial tracking into academic high school at age 13, academic high school completion at age 20, and university enrollment or graduation at age 24. All outcomes are indicator variables and the specifications are estimated using linear probability models using controls for baseline child and household characteristics. Child controls include the age and gender of the child, having Swiss citizenship, measures for anxiety and depressivity, ADHD, non-aggressive externalizing problem behavior, non-aggressive conduct disorder, opposition and defiance, and prosociality, four measures of aggressive behavior, and four measures of overall behavior. Household controls include household income, mother's and father's education level, age of the mother, indicator variables for the mother's having Swiss citizenship and being born in Switzerland, and indicator variables for a single-parent household, a household that received financial aid, and a household that experienced financial problems. The outcome initial tracking into academic high school is based on administrative data. The outcomes academic high school completion and university enrollment or graduation are self-reported. The estimation sample in this table includes only the control group and the treatment group that received the PATHS intervention. All children who received the Triple P intervention are excluded. All models include strata fixed effects for the level of randomization. Robust standard errors clustered at the school level are in parentheses. *** p<0.01, ** p<0.05, * p<0.1.

Table A9: Main Results with Inverse Probability Weighting

	(1) Initial Tracking into Academic High School	(2) Academic High School Completion	(3) University Enrollment or Graduation
PATHS Treatment	0.044**	0.066***	0.061***
	(0.020)	(0.020)	(0.022)
Observations	1,011	837	815
R-squared	0.306	0.366	0.251
Control Group Mean Dependent Variable	.199	.308	.252
Child Age	13	20	24
Panel Wave	5	8	9

NOTE.—This table shows the treatment effects of the PATHS intervention on initial tracking into academic high school at age 13, academic high school completion at age 20, and university enrollment or graduation at age 24. All outcomes are indicator variables and the specifications are estimated using linear probability models using controls for baseline child and household characteristics. Child controls include the age and gender of the child, having Swiss citizenship, measures for anxiety and depressivity, ADHD, non-aggressive externalizing problem behavior, non-aggressive conduct disorder, opposition and defiance, and prosociality, four measures of aggressive behavior, and four measures of overall behavior. Household controls include household income, mother's and father's education level, age of the mother, indicator variables for the mother's having Swiss citizenship and being born in Switzerland, and indicator variables for a single-parent household, a household that received financial aid, and a household that experienced financial problems. The outcome initial tracking into academic high school is based on administrative data. The outcomes academic high school completion and university enrollment or graduation are self-reported. All models use inverse probability weights to account for attrition. Inverse probabilities are based on predicted values from the model estimating attrition using the full set of controls. All models include strata fixed effects for the level of randomization. Robust standard errors clustered at the school level are in parentheses. *** p<0.01, ** p<0.05, * p<0.1.

Figure A2: Percent of Lessons Dedicated to Different PATHS Modules



NOTE.—This figure shows the class-level distribution of PATH lessons dedicated to the different PATHS modules within the first intervention year. The share explains how much of the taught PATHS content can be attributed to a specific module for a given class. The modules are problems-solving, self-control, feelings, rules, self-esteem, and friendship. The data stem from self-reported teacher surveys after the first year of the intervention.

Table A10: Treatment Effects and Module Coverage

	(1) University Enrollment or Graduation	(2) University Enrollment or Graduation	(3) University Enrollment or Graduation	(4) University Enrollment or Graduation	(5) University Enrollment or Graduation	(6) University Enrollment or Graduation
PATHS * Low N Lectures of Content Problem-Solving	0.054**					
	(0.025)					
PATHS * High N Lectures of Content Problem-Solving	0.077***					
	(0.028)					
PATHS * Low N Lectures of Content Self-Control		0.001				
		(0.036)				
PATHS * High N Lectures of Content Self-Control		0.082***				
		(0.022)				
PATHS * Low N Lectures of Content Feelings			0.052*			
			(0.028)			
PATHS * High N Lectures of Content Feelings			0.076***			
			(0.027)			
PATHS * Low N Lectures of Content Rules				0.092***		
				(0.030)		
PATHS * High N Lectures of Content Rules				0.048**		
				(0.022)		
PATHS * Low N Lectures of Content Self-Esteem					-0.039	
					(0.072)	
PATHS * High N Lectures of Content Self-Esteem					0.067***	
					(0.022)	
PATHS * Low N Lectures of Content Friendship						0.076**
						(0.031)
PATHS * High N Lectures of Content Friendship						0.058***
						(0.022)
Observations	815	815	815	815	815	815
R-squared	0.250	0.251	0.250	0.250	0.250	0.250
Control Group Mean Dependent Variable	.252	.252	.252	.252	.252	.252

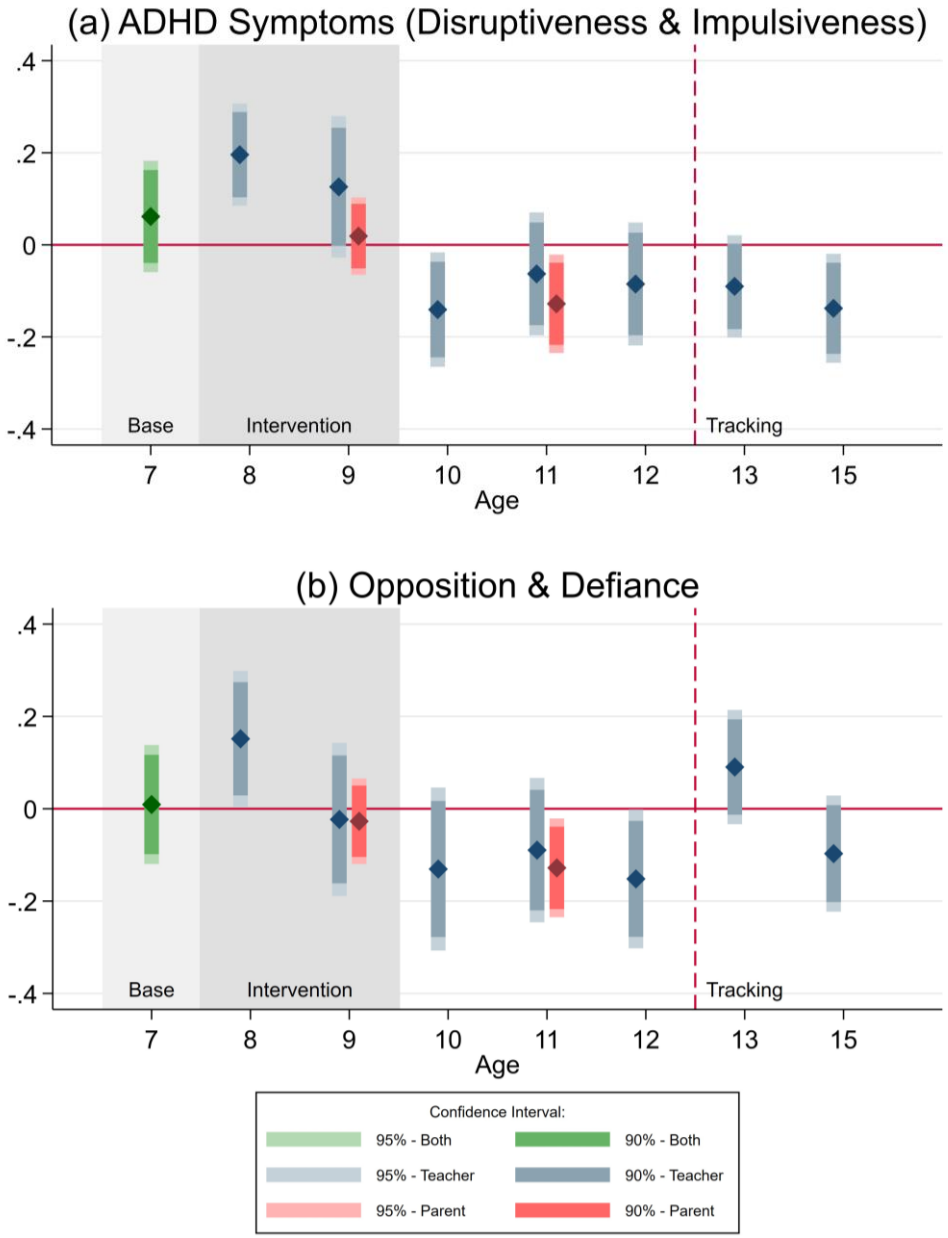
NOTE.—The table shows the interaction between the treatment effect of the PATHS interaction with indicators that determine whether the coverage of different modules was above or below the median class coverage on university enrollment or graduation. The modules are problems-solving, self-control, feelings, rules, self-esteem, and friendship. Coverage of the different modules is defined as *Low* when it is below the median and *High* when it is equal to or higher than the median number of lectures of the specific module. The outcome is an indicator variable, and the specifications are estimated using linear probability models using controls for baseline child and household characteristics. Child controls include the age and gender of the child, having Swiss citizenship, measures for anxiety and depressivity, ADHD, non-aggressive externalizing problem behavior, non-aggressive conduct disorder, opposition and defiance, and prosociality, four measures of aggressive behavior, and four measures of overall behavior. Household controls include household income, mother's and father's education level, age of the mother, indicator variables for the mother's having Swiss citizenship and being born in Switzerland, and indicator variables for a single-parent household, a household that received financial aid, and a household that experienced financial problems. The outcome initial tracking into academic high school is based on administrative data. The outcome is self-reported. All models include strata fixed effects for the level of randomization. Robust standard errors clustered at the school level are in parentheses. *** p<0.01, ** p<0.05, * p<0.1.

Table A11: Probability of Taking Academic High School Admission Test

	Taking Admission Test			
	Any	Age 12	Age 14	Age 15
PATHS Treatment	0.025	0.039	-0.011	0.015
	(0.026)	(0.024)	(0.017)	(0.016)
Observations	1,062	1,062	1,062	1,062
R-squared	0.311	0.306	0.082	0.072
Control Group Mean Dependent Variable	.367	.313	.102	.059

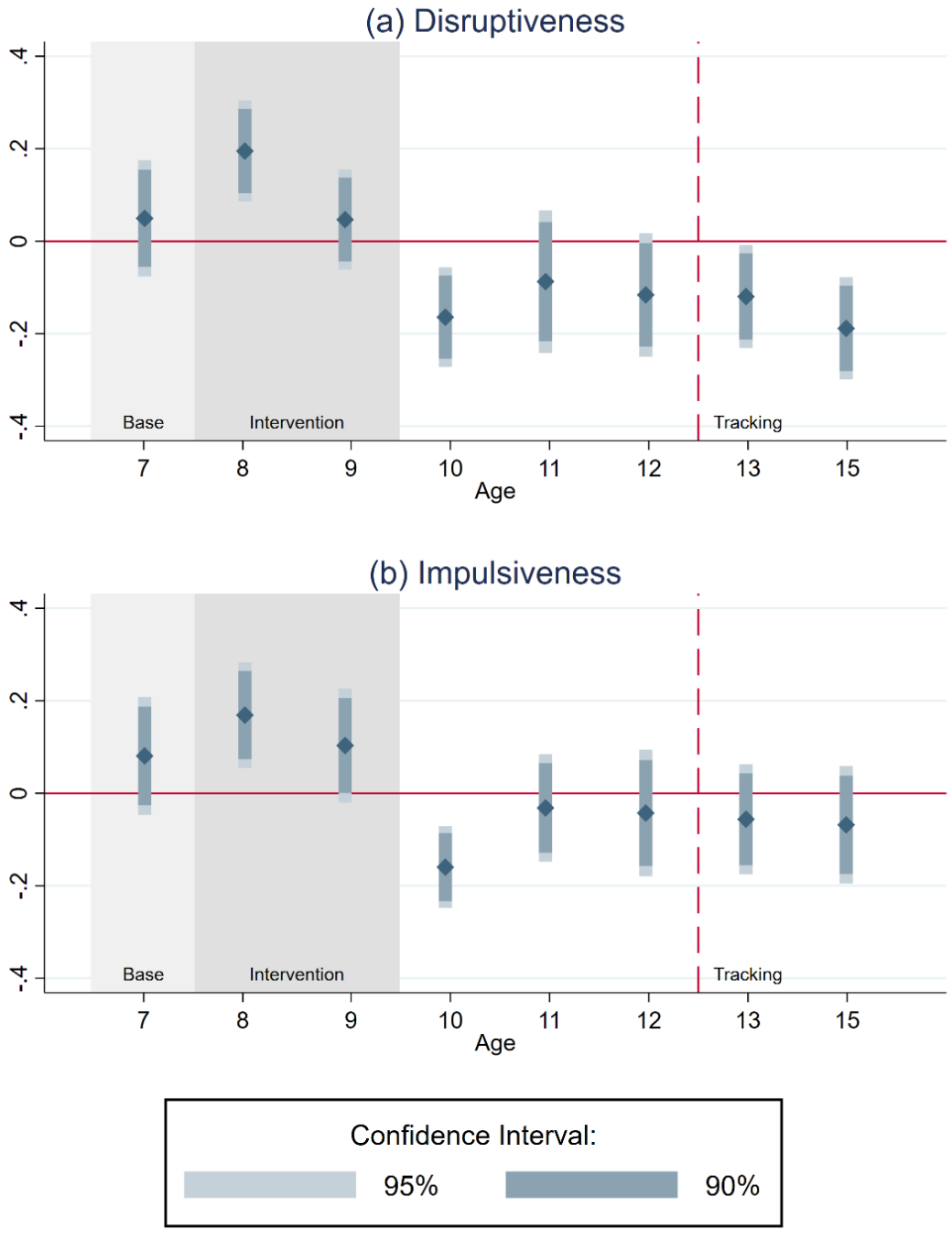
NOTE.—The table shows the treatment effects of the PATHS intervention on taking the academic high school admission test. We estimate linear probability models. Taking the admission test is possible at the three times. Column 1 shows the effect of ever taking the admission test. Columns (2)–(4) show the effect by grade. We include controls for baseline child and household characteristics. Child controls include the age and gender of the child, having Swiss citizenship, measures for anxiety and depressivity, ADHD, non-aggressive externalizing problem behavior, non-aggressive conduct disorder, opposition and defiance, and prosociality, four measures of aggressive behavior, and four measures of overall behavior. Household controls include household income, mother's and father's education level, age of the mother, indicator variables for the mother's having Swiss citizenship and being born in Switzerland, and indicator variables for a single-parent household, a household that received financial aid, and a household that experienced financial problems. All models include strata fixed effects. Robust standard errors clustered at the school level are in parentheses. *** p<0.01, ** p<0.05, * p<0.1.

Figure A3: Dynamic Treatment Effects on Socio-Emotional Skills (Teacher versus Parent Assessment)



NOTE.—This figure shows the treatment effect of the PATHS intervention on parent- and teacher-reported children's socio-emotional skills from ages 7 through 15. The dependent variable in Panel (a) is ADHD symptoms (disruptiveness and impulsiveness). The dependent variable in Panel (b) is opposition and defiance. All dependent variables are indices standardized to mean zero and a standard deviation of one. All models include strata fixed effects for the level of randomization. All models but the baseline model include controls for baseline child and household characteristics. Child controls include the age and gender of the child, having Swiss citizenship, measures for anxiety and depressivity, ADHD, non-aggressive externalizing problem behavior, non-aggressive conduct disorder, opposition and defiance, and prosociality, four measures of aggressive behavior, and four measures of overall behavior. Household controls include household income, mother's and father's education level, age of the mother, indicator variables for the mother's having Swiss citizenship and being born in Switzerland, and indicator variables for a single-parent household, a household that received financial aid, and a household that experienced financial problems. To provide evidence on balance across the treatment and the control groups, we do not include individual controls in the estimation of the treatment effect at age 7. For the combined measure at baseline, we combine measures from teacher and parent reports by taking the average of the two standardized indices and standardizing the resulting index again. At ages 8, 10, 12, 13, and 15 we do not observe parent reports. Details on the SBQ items and construct validity are provided in Appendix Section B. Shaded areas indicate the baseline and the intervention periods. The dashed vertical line shows the time when tracking into secondary schools takes place. All models include strata fixed effects for the level of randomization. Each point estimate is shown with the respective 90 and 95 percent confidence intervals calculated based on standard errors clustered at the school level.

Figure A4: Treatment Effects on Attention Deficit and Hyperactivity Symptoms



NOTE.—This figure shows the treatment effects of the PATHS intervention on children's socio-emotional skills from ages 7 through 15. The dependent variable in Panel (a) is disruptiveness. The dependent variable in Panel (b) is impulsiveness. All dependent variables are indices standardized to mean zero and a standard deviation of one. All models include controls for baseline child and household characteristics. Child controls include the age and gender of the child, having Swiss citizenship, measures for anxiety and depressivity, ADHD, non-aggressive externalizing problem behavior, non-aggressive conduct disorder, opposition and defiance, and prosociality, four measures of aggressive behavior, and four measures of overall behavior. Household controls include household income, mother's and father's education level, age of the mother, indicator variables for the mother's having Swiss citizenship and being born in Switzerland, and indicator variables for a single-parent household, a household that received financial aid, and a household that experienced financial problems. To provide evidence on balance across the treatment and the control groups, we do not include individual controls in the estimation of the treatment effect at age 7. For each SBQ measure, we combine measures from teacher and parent reports by taking the average of the two standardized indices and standardizing the resulting index again. For measures at ages 10, 12, 13, and 15, we rely solely on teacher reports, as there are no parent surveys at these times. Details on the SBQ items and construct validity are provided in Appendix Section B. Shaded areas indicate the baseline and the intervention periods. The dashed vertical line shows the time when tracking into secondary schools takes place. Each point estimate is shown with the respective 90 and 95 percent confidence intervals calculated based on standard errors clustered at the school level.

Table A12: Treatment Effect on Political Preferences

	(1)
	Std. Political Orientation
PATHS Treatment	-0.014
	(0.058)
Observations	808
R-squared	0.194
Control Group Mean Dependent Variable	-.105

NOTE.—This table shows the treatment effect of the PATHS interventions on standardized political orientation at age 24. Political orientation is a self-reported outcome that is measured on an 11-point Likert scale from 0 (extremely left) to 10 (extremely right). The model is estimated using controls for baseline child and household characteristics. Child controls include the age and gender of the child, having Swiss citizenship, measures for anxiety and depressivity, ADHD, non-aggressive externalizing problem behavior, non-aggressive conduct disorder, opposition and defiance, and prosociality, four measures of aggressive behavior, and four measures of overall behavior. Household controls include household income, mother's and father's education level, age of the mother, indicator variables for the mother's having Swiss citizenship and being born in Switzerland, and indicator variables for a single-parent household, a household that received financial aid, and a household that experienced financial problems. The model includes strata fixed effects for the level of randomization. Robust standard errors clustered at the school level are in parentheses. *** p<0.01, ** p<0.05, * p<0.1.

Table A13: Descriptive Statistics by Treatment Condition

Age (education level)	Criterion	Control	Paths	Chi-Sq.
13 (high)	Academic High School (Gymnasium)	16.30%	15.10%	0.445, p = .505
13 (low)	Primary School or Special Education (Primarschule or Sonderschule)	16.30%	18.40%	1.274, p = .259
15 (high)	Academic High School (Gymnasium)	20.40%	20.00%	0.028, p = .867
15 (low)	Primary School or Special Education (Primarschule or Sonderschule)	1.80%	1.80%	0.002, p = .964
17 (high)	Academic High School (Gymnasium)	25.60%	26.50%	0.123, p = .726
17 (low)	No apprenticeship, Special Education, Vocational Education (Keine Ausbildung, Sonderschule, Berufswahlschule)	11.60%	13.20%	0.921, p = .337
20 (high)	Academic High School Completion (Completed Gymnasium)	26.40%	26.70%	0.010, p = .920
20 (low)	Completed Primary School Only	9.00%	14.10%	7.597, p = .006
24 (high)	Completed University	13.60%	12.70%	0.227, p = .634
24 (low)	Completed Primary School Only	1.70%	4.00%	5.364, p = .021
24 (low)	Completed Primary School, 10 year or Anlehre	6.00%	9.50%	4.970, p = .026

Appendix B:

Data Collection, Survey Procedures and Additional Information for SBQ and APQ Measures

Ribeaud et al. (2022) provide a detailed description of the Zurich Project on the Social Development from Childhood to Adulthood (z-proso). In each of the 56 selected schools, all children entering Grade 1 in 2004 were invited to participate in the first survey wave via their parents, providing a target sample of 1,675 children. For the data collection of waves 1–3 at ages 7, 8, and 9, we obtained informed consent from the parents of participating children, which we renewed for the data collection in wave 4 at age 11. From wave 5 (age 13) onward, the participants themselves provided direct informed consent, though parents retained the right to opt their child out of the study. Informed consent by the youths was renewed at wave 7 (age 17), wave 8 (age 20) and wave 9 (age 24).

z-proso entails four main types of data collection, specifically, parent, teacher, child, and youth surveys. Parent interviews at child age 7, 8, 9, and 11 were usually carried out at the mothers' home using computer-aided personal interviews (CAPI). Given the highly multicultural population in Zurich, the standardized interviews were conducted by specially trained native speakers in nine different languages: German, Albanian, Bosnian/Croatian/Serbian, Portuguese, Spanish, Italian, Turkish, Tamil, and English. The interviews typically took about an hour and participating parents received vouchers worth USD 20–50 as participation incentives.

Teachers of all participating children were invited to complete postal surveys at ages 7, 8, 9, 10, 11, 12, 13, 15, and 17. The teacher survey consisted of a one-page form related to each participant in the teacher's class that took five to ten minutes to complete, plus a questionnaire at the level of the class and of the schoolhouse, which took five to ten minutes to complete. In the first three years, participation was mandatory for all teachers. After that, teachers who had to complete more than seven questionnaires were offered book vouchers worth about USD 50 as a participation incentive.

Specially trained interviewers conducted standardized computer-assisted child interviews (CAPI) at ages 7, 8, and 9 during regular school lessons (45 minutes). These surveys were specially designed for the age group and were mostly play-based. At ages 11, 13, 15, and 17 we changed the methodology to classroom-based paper-and-pencil questionnaires. Two or three research assistants conducted the survey sessions, which lasted 60 to 90 minutes. At age 11, the surveys were conducted during regular school lessons. For later waves, surveys took place during leisure time and were incentivized with the equivalent of USD 30–60 in cash. At age 20, the survey was based on essentially the same instrument as in previous waves, but was administered in a central university computer lab using computer-assisted self-interview (CASI) methodology. The participation incentive increased to USD 75. At age 24, the participation incentive increased to USD 100 for online participation and USD 150 for lab participation.

All data collections were in accordance with the Swiss data protection and human research acts. The most recent review by the Ethics Committee of the Faculty of Arts and Social Sciences of the University of Zurich took place in early 2018.

Table B1: Overview of the z-proso Study Survey Waves

Year	2004/5	2005/6	2006/7	2008/9	2009	2010	2011	2013	2015	2018	2022
Wave	1	2	3	4.1	4.2	4.3	5	6	7	8	9
Age	7	8	9	11	11+12	12	13	15	17	20	24
Grade	1	2	3	5	5+6	6	7	9	(11)	-	-
Respondents:											
Teacher	✓	✓	✓	✓	✓	✓	✓	✓	(✓)	×	×
Child	✓	✓	✓	×	✓	×	✓	✓	✓	✓	✓
Parent	✓	✓	✓	×	✓	×	×	×	×	×	×
Response Rate:											
Teacher	80.54%	80.54%	77.19%	75.70%	63.46%	58.27%	75.70%	77.13%	53.91%	×	×
Child	81.07%	79.58%	78.86%	×	68.48%	×	81.49%	86.32%	77.91%	70.45%	69.25%
Parent	99.94%	71.10%	70.45%	×	64.06%	×	×	×	×	×	×

NOTE.—The table shows the timing, respondents, and response rates of the different survey waves of the z-proso study. Age refers to the median child age in the respective survey wave. The table also shows which respondents took part in the respective survey wave. In wave 1, parents had already been surveyed in 2004. In our analysis, we do not use teacher assessments at age 17 because individuals outside academic high school do not have a regular school teacher who could provide a valid assessment at this age.

Table B2: Social Behavior Questionnaire Items (SBQ)

Domain	Survey Items Examples
ADHD symptoms (Disruptive and Impulsive)	Is impulsive, acts without thinking about it Has difficulty awaiting turn in games or groups Cannot sit still, is restless or hyperactive Is squirmy, fidgety Cannot settle to anything for more than a few moments Is distractible, has trouble sticking to any activity Can't concentrate, can't pay attention for long Is inattentive
Opposition and Defiance	Is disobedient Ignores teacher/parents
Non-Aggressive Conduct Disorder	Steals Destroys things/belongings Tells lies and cheats
Anxiety and Depressivity	Cries a lot Is nervous, high-strung, or tense Tends to be overly fearful and anxious Seems worried and concerned Seems sad, unhappy, or depressive Is not as happy as other children Has trouble enjoying him/herself Stares into space Appears miserable, depressed or unhappy
Aggression	When child has been teased or threatened, gets angry easily and strikes back Gets aggressive when contradicted Gets mad when not getting something Gets aggressive when something is taken from him/her Takes part in fights Attacks others physically Kicks, bites, or hits other kids Tortures or tyrannizes others or is mean to others Intimidates or bullies others in order to get his own way Tries to dominate others Threatens others Humiliates others Bosses others around Encourages other children to pick on a particular child
Prosocial Behavior	Volunteers to help clear up a mess someone else has made If there is a quarrel or dispute, will try to stop it Will try to help someone who has been hurt Will invite bystanders to join in a game Spontaneously helps to pick up objects that another child has dropped (e.g., pencils, books, etc.). Comforts a child who is crying or upset Listens to others' points of view Shows sympathy to someone who has made a mistake Is good at understanding other people s feelings Shares with others

NOTE.—This table shows the survey items for each domain measuring social behavior, taken from the Social Behavior Questionnaire. Answers were given on a 5-point Likert scale (1 = "never"; 5 = "always").

Table B3: Validity of SBQ Measures

	Survey Wave	P1	P2	P3	P4	T1.1	T1.2	T2.1	T2.2	T3.1	T4.1	T4.2	T4.3	T5.1	T6.1	T7.1	VT7.1
	Type of Assessment	Home CAPI	Home CAPI	Home CAPI	Home CAPI	Paper & Pencil	Paper & Pencil	Paper & Pencil	Paper & Pencil	Paper & Pencil	Paper & Pencil	Paper & Pencil	Paper & Pencil	Paper & Pencil	Paper & Pencil	Paper & Pencil	Paper & Pencil
	Age (Mean)	7.03	7.94	8.93	11.03	7.45	7.72	8.23	8.65	9.21	10.70	11.60	12.63	13.88	15.67	17.64	17.67
	Date (Median)	10/11/2004	9/15/2005	9/13/2006	9/30/2008	3/29/2005	6/3/2005	1/4/2006	6/3/2006	12/27/2006	6/13/2008	5/7/2009	5/24/2010	8/31/2011	5/24/2013	5/25/2015	5/26/2015
	N all	1230	1191	1181	1073	1349	1171	1343	1298	1294	1269	1064	977	1266	1288	896	615
Prosociality	Alpha	0.766	0.789	0.804	0.829	0.922	0.925	0.923	0.917	0.917	0.911	0.915	0.917	0.929	0.904	0.902	0.899
	N Items	10	10	10	10	7	7	7	7	7	7	7	7	7	7	6	6
	Mean	2.577	2.685	2.669	2.708	2.171	2.220	2.272	2.304	2.396	2.201	2.267	2.269	2.065	2.064	2.040	2.471
	Std.Dev.	0.528	0.527	0.532	0.560	0.824	0.851	0.821	0.810	0.832	0.791	0.834	0.826	0.830	0.786	0.819	0.820
Anxiety and Depressivity	Alpha	0.709	--	0.749	0.787	0.895	0.908	0.909	0.921	0.913	0.903	0.911	0.918	0.913	0.905	0.887	0.871
	N Items	9	--	9	9	7	7	7	7	7	7	7	7	7	7	7	7
	Mean	0.704	--	0.854	0.897	0.871	0.794	0.786	0.821	0.843	0.887	0.899	0.886	0.875	0.869	0.738	0.711
	Std.Dev.	0.464	--	0.494	0.531	0.761	0.726	0.732	0.765	0.739	0.736	0.763	0.773	0.758	0.751	0.671	0.624
ADHD Symptoms	Alpha	0.794	--	0.837	0.852	0.939	0.943	0.946	0.941	0.945	0.947	0.946	0.946	0.945	0.941	0.937	0.896
	N Items	9	--	9	9	8	8	8	8	8	8	8	8	8	8	8	8
	Mean	1.212	--	1.302	1.274	1.246	1.175	1.102	1.049	1.069	1.105	1.073	1.001	1.049	1.036	0.893	0.805
	Std.Dev.	0.646	--	0.674	0.690	0.989	0.990	0.979	0.947	0.953	0.987	0.985	0.944	0.942	0.922	0.850	0.683
Opposition and Defiance	Alpha	0.661	0.707	0.732	0.712	0.865	0.888	0.860	0.845	0.878	0.872	0.871	0.882	0.850	0.841	0.797	0.794
	N Items	4	4	4	4	2	2	2	2	2	2	2	2	2	2	2	2
	Mean	0.967	1.018	0.989	0.970	0.541	0.529	0.484	0.453	0.509	0.390	0.407	0.463	0.339	0.402	0.270	0.239
	Std.Dev.	0.621	0.618	0.631	0.615	0.815	0.823	0.756	0.719	0.790	0.704	0.718	0.796	0.660	0.702	0.548	0.526
Non-Aggressive Conduct Disorder	Alpha	0.511	0.549	0.602	0.634	0.688	0.773	0.758	0.777	0.781	0.742	0.714	0.741	0.733	0.778	0.491	0.569
	N Items	5	5	5	5	4	4	4	4	4	4	4	4	4	4	4	4
	Mean	0.296	0.323	0.268	0.276	0.217	0.246	0.221	0.225	0.246	0.213	0.198	0.234	0.180	0.216	0.072	0.108
	Std.Dev.	0.326	0.340	0.324	0.336	0.405	0.463	0.421	0.440	0.461	0.420	0.414	0.456	0.399	0.447	0.197	0.244
Aggression	Alpha	0.789	0.813	0.798	0.811	0.934	0.941	0.934	0.932	0.933	0.940	0.932	0.937	0.929	0.916	0.842	0.831
	N Items	12	12	12	12	11	11	11	11	11	11	11	11	11	11	11	11
	Mean	0.601	0.666	0.652	0.609	0.588	0.614	0.550	0.540	0.575	0.538	0.485	0.479	0.357	0.348	0.162	0.118
	Std.Dev.	0.423	0.442	0.432	0.431	0.684	0.703	0.638	0.628	0.644	0.687	0.630	0.637	0.543	0.508	0.288	0.248

NOTE.—This table provides information on the measurement of the SBQ inventory and Cronbach's Alpha of the respective subdomain.

Table B4: Parenting Practices Survey Items (APQ)

Domain	Survey Item
Corporal Punishment	You spank your child with your hand when he/she has done something wrong
	You slap your child when he/she has done something wrong
	You hit your child with a belt, switch, or other object when he/she has done something wrong
Parental Control and Supervision	Your child fails to leave a note or to let you know where he/she is going
	Your child stays out in the evening past the time he/she is supposed to be home
	Your child is out with friends you don't know
	Your child goes out without a set time to be home
	Your child is out after dark without an adult with him/her
	You get so busy that you forget where your child is and what he/she is doing
	You don't check that your child comes home at the time she/he was supposed to
	You don't tell your child where you are going
	Your child comes home from school more than an hour past the time you expect him/her
	You don't know where your child is out
Inconsistent Discipline	You threaten to punish your child and then do not actually punish him/her
	Your child talks you out of being punished after he/she has done something wrong
	You feel that getting your child to obey you is more trouble than it's worth
	You let your child out of a punishment early (like lift restrictions earlier than you originally said)
	Your child is not punished when he/she has done something wrong
	The punishment you give your child depends on your mood
Parental Involvement	You have a friendly talk with your child
	You volunteer to help with special activities that your child is involved in (such as sports, boy/girl scouts, church youth groups)
	You play games or do other fun things with your child
	You ask your child about his/her day in school
	You help your child with his/her homework
	You ask your child what his/her plans are for the coming day
	You drive your child to a special activity
	You talk to your child about his/her friends
	Your child helps plan family activities
	You attend PTA meetings, parent/teacher conferences, or other meetings at your child's school
Positive Parenting	You let your child know when he/she is doing a good job with something
	You reward or give something extra to your child for obeying you or behaving well
	You compliment your child when he/she does something well
	You hug or kiss your child when he/she does something well
	You tell your child that you like it when he/she helps out around the house

NOTE.—This table shows the survey items for each domain measuring parenting style, taken from the Alabama Parenting Questionnaire (Shelton, Frick, and Wootton 1996). Answers were given on a 5-point Likert scale (1 = "never"; 5 = "very often")

Appendix C: PATHS Activities

Table C1: PATHS Activities

Activity Category	Example Activities		
	Class Activity:	Homework:	Parental Involvement:
Self-Control; Patience	**Calming down:** Teacher discusses with class various methods to calm down. Teacher reads aloud story of a girl who learned how to control herself. **Teasing**: Children learn to ignore people who tease in a mean way. Children make role-plays to learn how to interpret and handle teasing.	**Calming down**: Children write what their parents do when they have a problem or want to calm down.	**Calming down**: Children ask their parents about situations in which they had to calm down and had to think about a possible solution.
Social Problem-Solving	**Control signals**: Children learn the three steps of problem solving: 1. Calm down and express own feelings. 2. Think about possible solutions and their consequences. 3. Try the plan and evaluate it. Children make role-plays to practice the problem solving steps. **Problem pot**: If children have problems, they can write them down and put them in the problem pot. The class will then try to solve these problems with the help of the control signals and role-playing. **Generosity**: Class plans a project to somehow help others (e.g., raise money or clean up neighborhood).	**Control signals**: Children have to make their own control signals. **Generosity**: Children should do something good for a person and draw/write about it.	**Control signals**: Parents receive an explanation about when and how they could use the control signals.
Self-Esteem	**Child of the week:** In each PATHS lecture a child is randomly picked to be the teacher's assistant during the lecture. Further, the other children make a list of compliments for the child-of-the-week. Before that, the children learn how to compliment another person.	**Compliments**: Children have to give compliments to other members of their families and reflect on how they felt giving compliments and how the other person reacted.	**Child of the week/ compliments:** Parents are informed that their child is the child of the week. They go through the list of compliments with their child and add compliments.
Emotional Intelligence	**Emotions**: Children get introduced to and discuss various emotions. Teacher tells a story about or shows picture of people, and children have to guess how the person in the story/in the picture felt in this situation. Child chooses an emotion and the other children try to mimic the emotion.	**Emotions**: Children draw a picture or write about a situation in which they felt a certain emotion.	**Emotions/appropriate behavior**: Children ask their parents or other adults to tell them about a situation in which they felt a certain emotion and how they behaved.

Table C1: PATHS Activities (continued)

Emotional Intelligence (Continued)	**Feelings cards**: Children receive cards with faces expressing different emotions. Children can place a card on their table to express their current emotional state. **Appropriate behavior:** Children are given drawings of children behaving out of an emotion (e.g., anger). They then have to color the drawings in which they think the behavior is appropriate.		
Fairness Rules	**Classroom rules**: Children discuss with teacher why rules are useful and establish a set of rules for their classroom. **Making friends:** Teacher reads aloud story to class about two children becoming friends. After, discussion and role-play about friendship and making friends. **Listening to others:** In groups, children learn to listen to each other to gather information about the members of their group. **Manners**: Classroom discussion about good/bad manners and why good manners are important. Children gather polite phrases and expressions. Teacher reads a story and children have to decide in each situation whether the teacher reads the polite or impolite version. Afterwards, children reenact the situation. **Fairness**: Teacher introduces poster with principles of fair behavior. Children hear stories/get worksheet with different situations and discuss in groups whether the displayed behavior is fair or not. Children establish ideas on how to make fair decisions (e.g., coin toss). **Reconciliation**: Children gather ideas and make a list of ways to reconcile.	**Rules at home**: Children have to establish a list with the rules that apply in their home.	**Rules**: Children have to interview their parents about the rules that applied in their home when they were children themselves. **Manners**: Parents should discuss with children good/bad manners and how they feel when the child shows bad manners at home.

NOTE.—This table provides an overview of the main themes of the PATHS curriculum. Besides classroom activities, children also received homework, which may have involved parents. All major themes of the PATHS curriculum were accompanied with an information leaflet for parents explaining the current theme and providing suggestions on how to support children with the current curricular activities.

Figure C1: Example Material from Intervention I

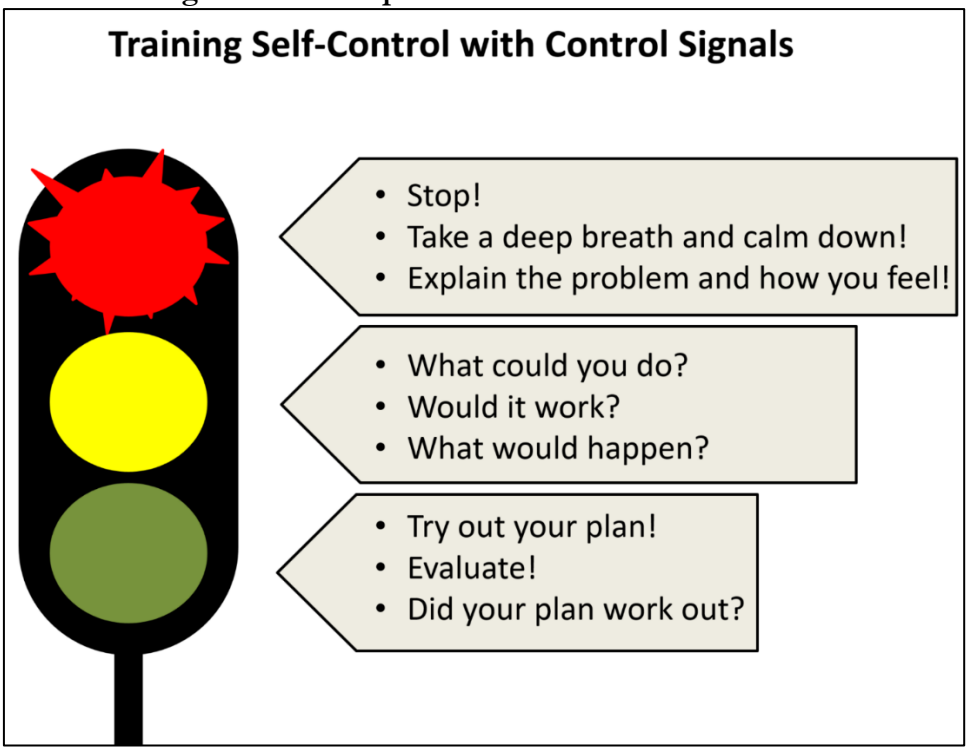
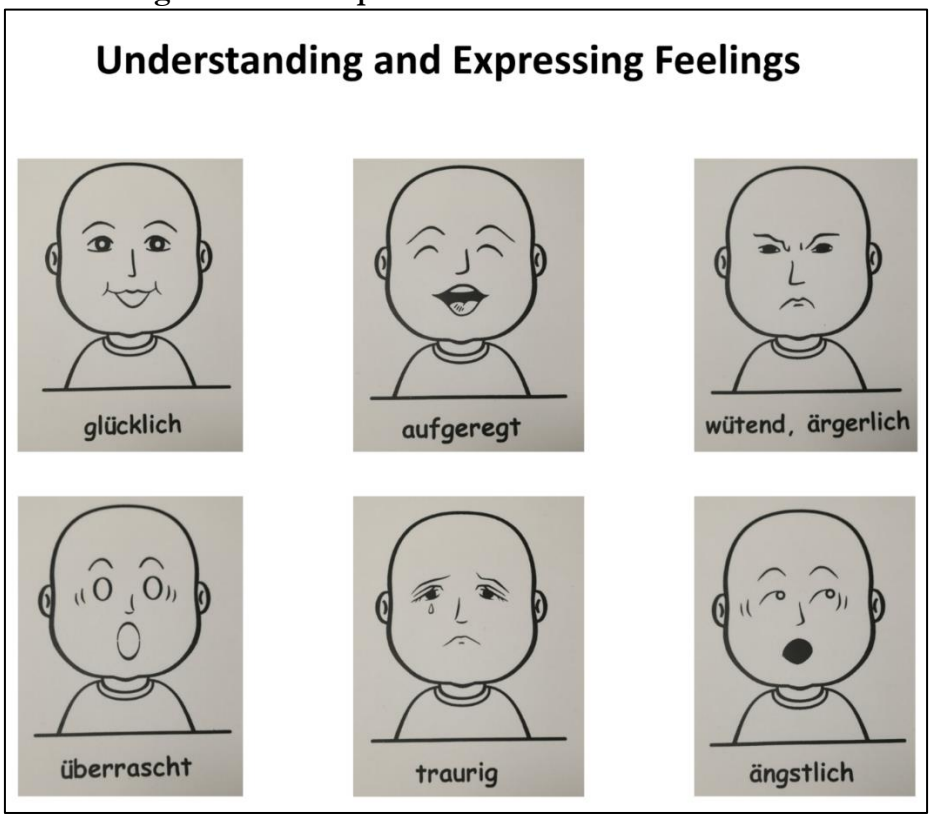


Figure C2: Example Material from Intervention II



NOTE.—Children use feeling cards to explain their own and other people's behavior, reactions, and feelings. Translation: happy, excited, angry, surprised, sad, worried.

Figure C3: Example Material from Intervention III
Fairness and Rules: Recognizing Aggression & Unacceptable Behavior

NOTE.—Instructions for children: Color all pictures showing a behavior that is okay.

Figure C4: Example Material from Intervention IV

Homework with parental involvement

Being proud of something

Ask your mother, father or another adult about a situation, back where they were around your age, when they were very proud of an achievement.

Draw a picture about this:

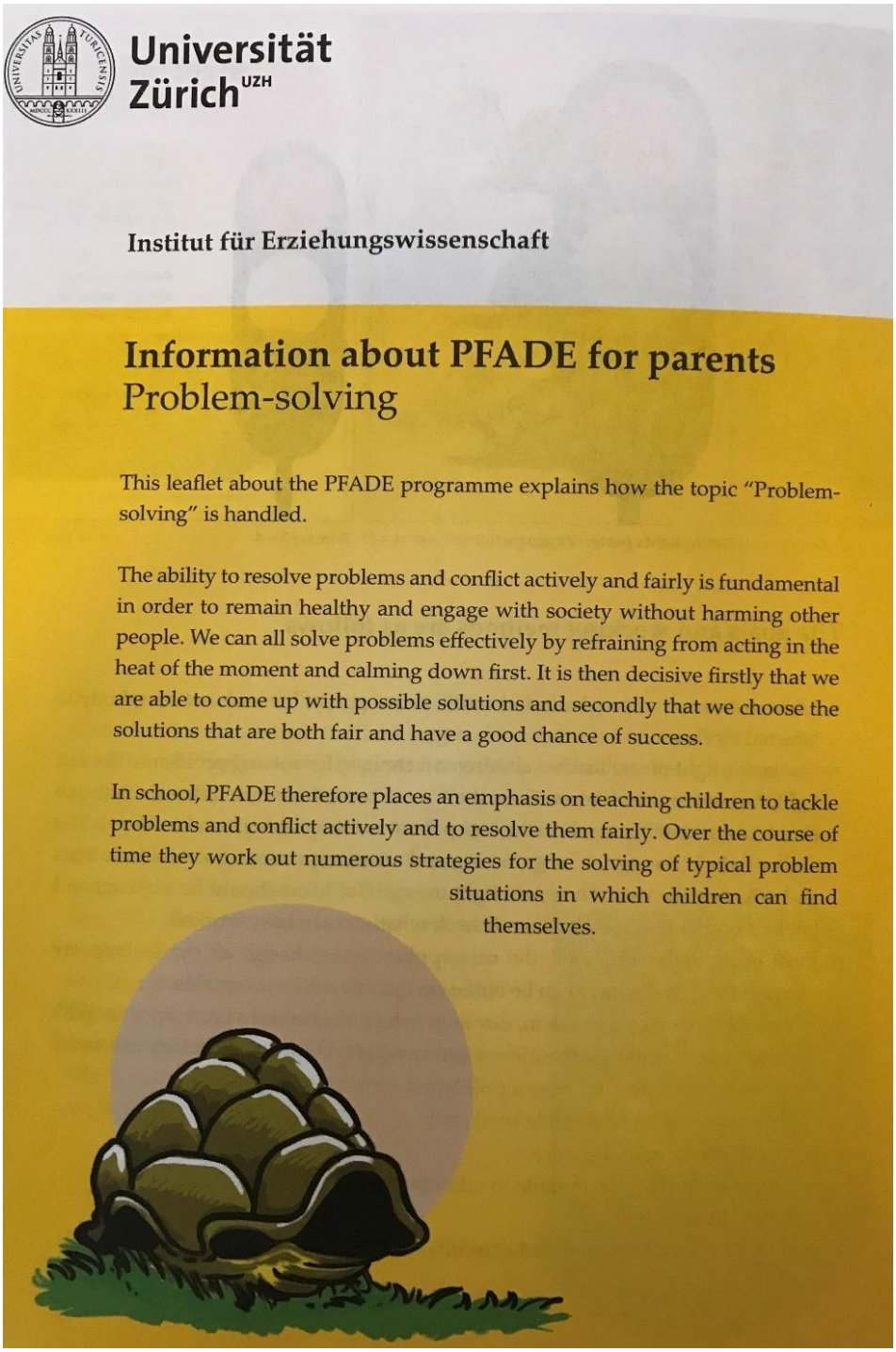
STOLZ sein

Frage deine Mutter, deinen Vater oder eine andere erwachsene Person nach einer Situation, in der sie sich richtig stolz fühlte über etwas, das sie getan oder erreicht hatte, als sie ungefähr in deinem Alter war.

Zeichne ein Bild dazu:

Figure C5: Example Material from Intervention V

Information Leaflet for Parents (a)



Universität Zürich[UZH]

Institut für Erziehungswissenschaft

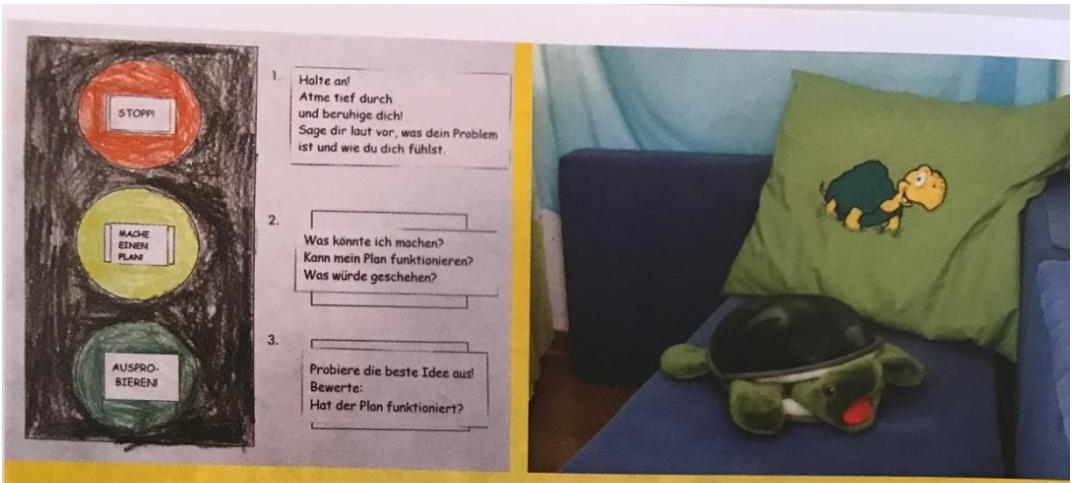
Information about PFADE for parents
Problem-solving

This leaflet about the PFADE programme explains how the topic "Problem-solving" is handled.

The ability to resolve problems and conflict actively and fairly is fundamental in order to remain healthy and engage with society without harming other people. We can all solve problems effectively by refraining from acting in the heat of the moment and calming down first. It is then decisive firstly that we are able to come up with possible solutions and secondly that we choose the solutions that are both fair and have a good chance of success.

In school, PFADE therefore places an emphasis on teaching children to tackle problems and conflict actively and to resolve them fairly. Over the course of time they work out numerous strategies for the solving of typical problem situations in which children can find themselves.

Information Leaflet for Parents (b)



What you can do at home to support your child:

- Ask your child whether there is a problem when he or she seems despondent, sad or annoyed.
- If the answer is yes, remind your child of the amber light. Say, for example: "Remember the amber light! Let's think about this. What could you do?" With your child, gather ideas for resolving the problem and if necessary, help him or her to do this. Think together about which idea is the best (feasible, conforming to the rules, fair, healthy).
- Ask later whether your child was successful in resolving the problem. If not, try to come up with further ideas together.
- If you yourself have a problem or conflict with your children, talk about the problem and your feelings. Using the traffic light model, proceed to the amber light and gather problem-solving ideas with your child. Think together about which is the best idea. Proceed to the green light and make a decision. After a while, check whether the problem has been resolved. If not, look for further ideas and try out another one.

Information Leaflet for Parents (c)

What you can do at home to support your child:

- Talk to your child about the TOP technique and ask what strategies he or she has learned through it.
- Organisation and planning also relate specifically to the time your child spends at home and in other places outside the classroom. Support your child in looking after the necessary materials and help him or her to have a tidy, quiet place for their school things and for studying.
- Help him or her to apportion their out-of-school time sensibly so that studying is completed in good time and where necessary in several sessions but also in order to ensure that relaxation has its place.
- Encourage your child to develop a strong motivation for school and schoolwork and to put in the appropriate amount of effort.

Appendix D:

Triple P Intervention and Analyses

Triple P is a multilevel parenting and family training program originally developed by Matthew R. Sanders and his colleagues at the University of Queensland in Brisbane, Australia (Sanders 1999). Triple P is founded on social learning principles and seeks to shape the home environment by bolstering family protective factors and mitigating risk factors associated with externalizing behavior (Sanders 1999; Malti, Ribeaud, and Eisner 2011).

Sanders (2012) provides a detailed description of the multilevel structure of the Triple P program. Triple P has five intervention levels—universal, selected, primary care, standard and enhanced—that vary in target population, method of intervention, program materials, and targeted behaviors (Sanders 1999). Triple P may also involve universal, targeted, or treatment approaches to intervention (Sanders et al. 2014). Triple P seeks to reduce behavioral and emotional problems in children and adolescents by teaching parents the following core principles of positive parenting:

(1) Safe and engaging environment
(2) Positive learning environment
(3) Assertive discipline
(4) Realistic expectations
(5) Parental self-care

(1) Safe and engaging environment: Triple P explains to parents the importance of creating an environment that allows children to safely play and develop imagination, creativity, and curiosity.

(2) Positive learning environment: Triple P teaches parents how to timely respond to children's requests for help, information, and guidance. Parents learn about techniques to assist children in their decision-making process.

(3) Assertive discipline: Triple P teaches parents non-coercive child management strategies. These strategies rely on constructive discussion techniques instead of ineffective discipline strategies such as shouting or corporal punishment.

(4) Realistic expectations: Triple P providers investigate parents' expectations about child development and behavior. This process allows the program to help parents in setting goals and objectives that are appropriate for them and for their children.

(5) *Parental self-care:* Triple P supports parents in developing parenting strategies that foster personal self-care, well-being, and self-esteem.

In the following table we investigate the impact of Triple P on educational outcomes. Table D1 analyzes the original 2x2 intervention design. Descriptions of results can be found in the main text and point to the same conclusion: Triple P did not affect educational outcomes.

Table D1: Triple P Treatment

Panel A: PATHS Treatment	(1) Initial Tracking into Academic High School	(2) Academic High School Completion	(3) University Enrollment or Graduation
PATHS Treatment	0.044**	0.071***	0.065***
	(0.020)	(0.021)	(0.022)
Observations	1,011	837	815
R-squared	0.303	0.364	0.249
Control Group Mean Dependent Variable	.199	.308	.252
Panel B: Triple P Treatment	Initial Tracking into Academic High School	Academic High School Completion	University Enrollment or Graduation
Triple P Treatment	-0.013	0.026	0.034
	(0.019)	(0.021)	(0.022)
Observations	1,011	837	815
R-squared	0.301	0.360	0.246
Control Group Mean Dependent Variable	.227	.325	.26
Panel C: PATHS and Triple P Treatment	Initial Tracking into Academic High School	Academic High School Completion	University Enrollment or Graduation
PATHS Treatment	0.047*	0.056**	0.042*
	(0.026)	(0.022)	(0.022)
PATHS * Triple P Treatment	-0.008	0.036	0.053
	(0.039)	(0.045)	(0.044)
Triple P Treatment	-0.008	0.011	0.010
	(0.025)	(0.031)	(0.032)
Observations	1,011	837	815
R-squared	0.303	0.365	0.251
Control Group Mean Dependent Variable	.207	.307	.252

NOTE.— This table shows the treatment effect of the PATHS and Triple P interventions on initial tracking into academic high school at age 13, academic high school completion at age 20, and university enrollment or graduation at age 24. "PATHS treatment" is an indicator taking the value of one if a child was only in the PATHS treatment or PATHS and Triple P treatment, while "Triple P Treatment" indicates that a child was only in the Triple P treatment or PATHS and Triple P treatment. "PATHS Treatment*Triple P Treatment" is the interaction between the two variables. Panel A only includes the PATHS treatment indicator, Panel B only includes the Triple P treatment indicator, while Panel C includes both as well as their interaction. All outcomes are indicator variables and the specifications are estimated using linear probability models using controls for baseline child and household characteristics. Child controls include the age and gender of the child, having Swiss citizenship, measures for anxiety and depressivity, ADHD, non-aggressive externalizing problem behavior, non-aggressive conduct disorder, opposition and defiance, and prosociality, four measures of aggressive behavior, and four measures of overall behavior. Household controls include household income, mother's and father's education level, age of the mother, indicator variables for the mother's having Swiss citizenship and being born in Switzerland, and indicator variables for a single-parent household, a household that received financial aid, and a household that experienced financial problems. The outcome initial tracking into academic high school is based on administrative data. The outcomes academic high school completion and university enrollment or graduation are self-reported. All models include strata fixed effects for the level of randomization. Robust standard errors clustered at the school level are in parentheses. *** p<0.01, ** p<0.05, * p<0.1.

Appendix E

Dosage Effect

We shed light on dosage effects of the intervention and test whether there are larger treatment effects for children who were exposed to the program for a longer period.

Over 70 percent of schools in the treatment group accepted the offer to continue with the program for a second year based on the perception of teachers and school principals that the program was effective. It appears likely that teachers who continued the program were either more successful in the implementation or had students who were more responsive to the program. Whether a student receives the PATHS intervention for one or two years is therefore endogenous and we *cannot* interpret any dosage estimates causally. Nevertheless, we can estimate if longer exposure to the PATHS program is correlated with better outcomes.

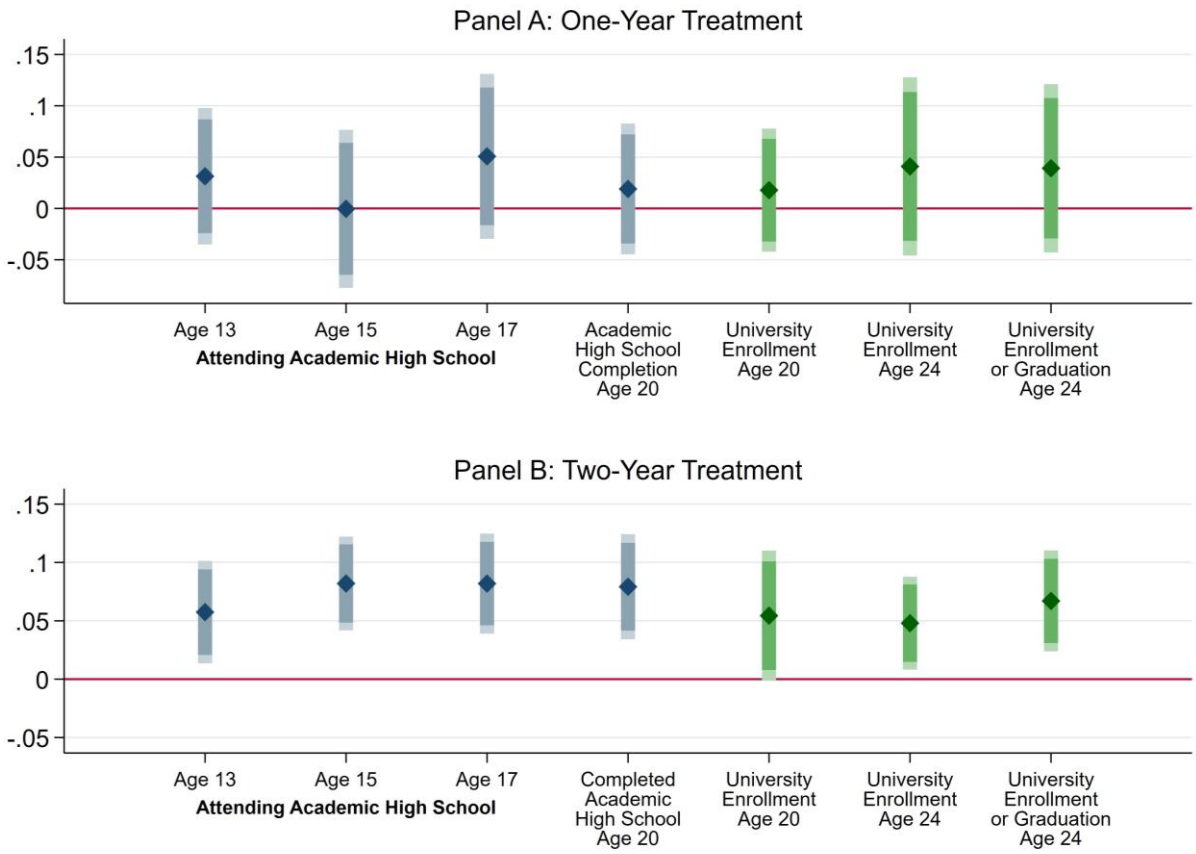
Table E1 shows the analysis of the dosage effect. Figure E2 visualizes the analysis and shows that the treatment effect for children exposed to PATHS for two years is approximately twice as large as the effect for children treated for one year. Although we cannot disentangle whether this effect is causal or reflects selection bias, it is encouraging to see that children exposed to the program for a longer time benefit more.

Table E1: Dosage Effects—Two Years vs. One Year of Treatment

	Initial Tracking into High School	Academic High School Completion	University Enrollment or Graduation
PATHS 2 Years	0.059**	0.087***	0.075***
	(0.023)	(0.024)	(0.022)
PATHS 1 Years	0.044	0.037	0.052
	(0.034)	(0.033)	(0.043)
Observations	933	777	764
R-squared	0.305	0.366	0.246
Child Age	13	20	24
Panel Wave	Wave 5	Wave 8	Wave 9

NOTE.—This table shows treatment dosage effects of the PATHS intervention on initial tracking into academic high school at age 13, academic high school completion at age 20, and university enrollment or graduation at age 24. The PATHS treatment effect is separately shown for children who received the treatment for one (*PATHS 1 Year*) or two (*PATHS 2 Years*) years. All outcomes are indicator variables and the specifications are estimated using linear probability models using controls for baseline child and household characteristics. Child controls include the age and gender of the child, having Swiss citizenship, measures for anxiety and depressivity, ADHD, non-aggressive externalizing problem behavior, non-aggressive conduct disorder, opposition and defiance, and prosociality, four measures of aggressive behavior, and four measures of overall behavior. Household controls include household income, mother's and father's education level, age of the mother, indicator variables for the mother's having Swiss citizenship and being born in Switzerland, and indicator variables for a single-parent household, a household that received financial aid, and a household that experienced financial problems. The outcome initial tracking into academic high school is based on administrative data. The outcomes academic high school completion and university enrollment or graduation are self-reported. All models include strata fixed effects for the level of randomization. Robust standard errors clustered at the school level are in parentheses. *** p<0.01, ** p<0.05, * p<0.1.

Figure E1: Dosage Effects—Two Years vs. One Year of Treatment



NOTE.—This figure is based on estimates shown in Table A14 and shows the treatment effect of the PATHS intervention for one versus two years on attending academic high school at ages 13, 15, and 17, on academic high school completion at age 20, on university enrollment at age 20 and 24, and on university enrollment or graduation at age 24. Panel A shows the treatment effect for children who received the treatment for one year. Panel B shows the treatment effect for children who received the treatment for two years. All models include controls for baseline child and household characteristics. Child controls include the age and gender of the child, having Swiss citizenship, measures for anxiety and depressivity, ADHD, non-aggressive externalizing problem behavior, non-aggressive conduct disorder, opposition and defiance, and prosociality, four measures of aggressive behavior, and four measures of overall behavior. Household controls include household income, mother's and father's education level, age of the mother, indicator variables for the mother's having Swiss citizenship and being born in Switzerland, and indicator variables for a single-parent household, a household that received financial aid, and a household that experienced financial problems. All models include strata fixed effects for the level of randomization. Each point estimate is shown with the respective 90 and 95 percent confidence intervals calculated based on standard errors clustered at the school level.

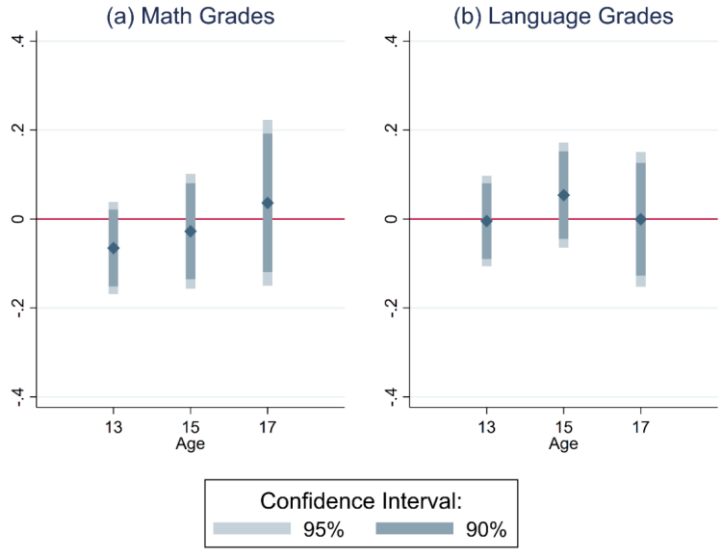
Appendix F

Performance Differences After Tracking

One question that arises from our results is whether the treatment effect creates a potential mismatch between students and secondary schools. Marginal students who got pushed into academic high school by the treatment may perform relatively worse in the more challenging school track. We analyze this question by looking at students' grades in secondary school after tracking has taken place. While grades are determined on a curve and might not be comparable across schools' tracks, this analysis can still provide important information about the relative performance positions of treatment and control children in their respective school. If the treatment causes a mismatch between students and schools, we would expect these children to receive worse grades.

Figure F1 (Panel (a) and Panel (b)) shows the treatment effect for standardized math and language grades at ages 13, 15, and 17. The figure shows that the treatment does not affect math or language grades in secondary school. Treated and untreated children perform similarly during secondary school. This similarity seems to confirm that the intervention did not lead to a mismatch between students and secondary schools. The intervention caused children to enter more-demanding school tracks without reducing their relative performance within these schools. Once tracked, they do not underperform in comparison to the control group. These results are consistent with the persistence of the treatment effect in secondary school documented in Figure 2.

Figure F1: Student-School Mismatch? Effects on Post-Tracking Performance



NOTE.—This figure shows the treatment effects of the PATHS intervention on standardized post-tracking school grades from ages 13–17. The dependent variable in Panel (a) is a student's grade in mathematics. The dependent variable in Panel (b) is a student's grade in language. All dependent variables are indices standardized with a mean of zero and a standard deviation of one. All models include controls for baseline child and household characteristics. Child controls include the age and gender of the child, having Swiss citizenship, measures for anxiety and depressivity, ADHD, non-aggressive externalizing problem behavior, non-aggressive conduct disorder, opposition and defiance, and prosociality, four measures of aggressive behavior, and four measures of overall behavior. Household controls include household income, mother's and father's education level, age of the mother, indicator variables for the mother's having Swiss citizenship and being born in Switzerland, and indicator variables for a single-parent household, a household that received financial aid, and a household that experienced financial problems. All models include strata fixed effects for the level of randomization. Each point estimate is shown with the respective 90 and 95 percent confidence intervals calculated based on standard errors clustered at the school level.

Appendix G

Delinquency and Crime

To test whether the intervention also affects crime-related outcomes we collected additional data from juvenile court cases on court appearances of children under the age of 18. Table G1 shows treatment effects on three crime-related outcomes. In column (1), we examine whether children in our sample were ever defendants in a juvenile crime case. This implies being formally charged with criminal offense in juvenile court and the initiation of legal proceedings against them. In column (2), we examine whether children were ever involved in a legal procedure, regardless of whether the outcome of the legal proceedings was favorable or not. Finally, in column (3), we examine whether children were ever convicted. Table G1 shows that we find no effect of the intervention on administrative crime outcomes.

Table G1: Treatment Effect of PATHS on Delinquency

	(1) Ever Defendant	(2) Ever Legal Procedure	(3) Ever Convicted
PATHS Treatment	0.019	-0.005	0.024
	(0.020)	(0.021)	(0.021)
Observations	878	878	878
R-squared	0.208	0.162	0.146
Control Group Mean Dependent Variable	.191	.147	.109
Child Age	up to age 18	up to age 18	up to age 18

NOTE.—This table shows the treatment effect of the PATHS intervention on administrative juvenile crime case outcomes at age 24 using the full control specification. Ever defendant defines any entry as a defendant in a juvenile criminal case by a Juvenile Prosecution Office. Ever legal procedure defines any regular procedure, regardless of the decision, that is, including both convictions and termination of proceedings. Ever convicted defines any regular procedure that ends with a conviction. All outcomes are indicator variables and the specifications are estimated using linear probability models using controls for baseline child and household characteristics. Child controls include the age and gender of the child, having Swiss citizenship, measures for anxiety and depressivity, ADHD, non-aggressive externalizing problem behavior, non-aggressive conduct disorder, opposition and defiance, and prosociality, four measures of aggressive behavior, and four measures of overall behavior. Household controls include household income, mother's and father's education level, age of the mother, indicator variables for the mother's having Swiss citizenship and being born in Switzerland, and indicator variables for a single-parent household, a household that received financial aid, and a household that experienced financial problems. All models include strata fixed effects for the level of randomization. Robust standard errors clustered at the school level are in parentheses. *** p<0.01, ** p<0.05, * p<0.1.

We complement the analysis of administrative crime records by examining self-reported crime data collected in different waves of the z-proso study. We estimate treatment effects for different types of criminal behavior and expand the age range up to 24 years. Table G2 shows estimates for instances of theft (column 1), threatening someone with violence (column 2), robbing someone using violence (column 3), physically attacks on others (column 4), and sexual assault (column 5). For each crime-related outcome, we construct a count measure variable to capture the number of times (if any) the specific crime was committed by an individual. These dependent variables can therefore be interpreted as the lifetime occurrences of a particular crime. Table G2 supports the conclusions we drew from the administrative data and indicates that there are no significant treatment effects on crime.

Table G2: Treatment Effect of PATHS on Delinquency and Crime

	(1) Theft	(2) Threaten Someone with Violence	(3) Robbed Someone using Violence	(4) Attacked another Person Physically	(5) Sexual Assault
PATHS Treatment	-1.000	0.001	-0.041	-0.067	0.008
	(2.161)	(0.090)	(0.061)	(0.254)	(0.011)
Observations	1,000	1,000	1,000	1,000	993
Control Group Mean Dependent Variable	9.984	.123	.142	1.127	.004

NOTE.—This table shows the treatment effect of the PATHS intervention on aggregated crime outcomes at age 24. Theft is defined as the sum of the self-reported the number of times the respondent stole in school, the number of times they stole at work, the number of times they stole at home, the number of times they shoplifted good worth less than 50 CHF, the number of times they shoplifted goods worth more than 50 CHF, and the number of times they stole a vehicle in panel waves five to nine. Threaten someone with violence is the sum of the number of times the respondent threatened someone with violence to obtain money or things in panel waves five to nine. Robbed someone using violence is the sum of the number of times the respondent took money or things from someone by force in panel waves five to nine. Attacked another person physically is the sum of the number of times the respondent intentionally hit, kicked, or cut someone resulting in injury in panel waves five to nine. Sexual assault is the sum of the number of times the respondent pushed a person against their will to engage in sexual acts that involved touching the respondent's own or the victim's private parts in panel waves six to nine. All outcomes are self-reported and the specifications are estimated using linear probability models that use controls for baseline child and household characteristics. Child controls include the age and gender of the child, having Swiss citizenship, measures for anxiety and depressivity, ADHD, non-aggressive externalizing problem behavior, non-aggressive conduct disorder, opposition and defiance, and prosociality, four measures of aggressive behavior, and four measures of overall behavior. Household controls include household income, mother's and father's education level, age of the mother, indicator variables for the mother's having Swiss citizenship and being born in Switzerland, and indicator variables for a single-parent household, a household that received financial aid, and a household that experienced financial problems. When aggregating, missing values are treated as zero, except when all values are missing. All models include strata fixed effects for the level of randomization. Robust standard errors clustered at the school level are in parentheses. *** $p<0.01$, ** $p<0.05$, * $p<0.1$.