Is Early Intervention Forever?

The Educational Returns from Socio-Emotional Skills Training [*]

PRELIMINARY VERSION, PLEASE DO NOT CIRCULATE

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Abstract

We study the long-term effects of a randomized control trial targeting socio-emotional skills in 8-year-old primary school children. The intensive one-year, teacher-run training program which was integrated into the curriculum leads to a large and persistent boost of educational careers that remains visible a decade after the intervention. Treated children become 16 percent more likely to complete academic high school, the highest secondary school track in Switzerland. We present evidence that these results are mainly driven by (1) improvements in social and school related behavior and (2) an increase in math and language skills.

Keywords: Socio-emotional skills, intervention, ability tracking
JEL classification: C93, I21, I24, I26, J24

[*] We thank Denis Ribeaud, Manuel Eisner and seminar participants at the University of Zurich, the 2018 z-proso Workshop and the briq Workshop Skills, Preferences and Educational Inequality for helpful discussions and comments. Jeffrey Yusof provided outstanding research assistance. Giuseppe Sorrenti: University of Zurich, Department of Economics and Jacobs Center for Productive Youth Development, Schönberggasse 1, 8001 Zurich. Ulf Zölitz: University of Zurich, Department of Economics and Jacobs Center for Productive Youth Development, IZA, CESifo and CEPR, Schönberggasse 1, 8001 Zurich. ulf.zoelitz@econ.uzh.ch.

1. Introduction

The power of socio-emotional skills for the trajectory of a life has been widely recognized. Economists, psychologists and sociologists agree that socio-emotional skills are predictive for major life outcomes, including educational attainment, earnings, employment, health and participation in crime. While the predictive power has been acknowledged, there is a heated debate about how malleable these skills are and whether interventions targeting socio-emotional skills can lead to lasting changes in behavior, educational attainment and labor market success. Is it possible to change the trajectory of a life by boosting socio-emotional skills through early interventions?

In this paper, we study how a randomized intervention that promotes life skills among 8-year-old primary school children affects school success, school tracking, enrolment in higher education and earnings upon labor market entry. The one-year, teacher-run, "Promoting Alternative Thinking Strategies" (PATHS) intervention consists of weekly lessons designed to foster socio-emotional skills and regulatory skills. In these lessons, which are integrated in the regular school curriculum, students learn how to recognize and express emotions, how to react in risky situations and how to make less impulsive decisions. Treated students, for example, complete homework assignments on how to strategically solve problems that they face in everyday life and discuss them in class or with their parents. The intervention targeted in particular regulatory skills – a set of skills associated with school readiness, behaviors conducive to learning, achievement and future school success (Fantuzzo et al. 2007, Izard et al. 2004, Raver et al. 2011).

The data we analyze in this paper is part of the z-proso study, designed and maintained by Manuel Eisner and Denis Ribaud (Averdijk et al. 2016; Malti et al. 2012). The z-proso study is a longitudinal intervention panel that surveys students, parents and teacher on an annual or biannual basis since 2004. The data includes baseline and follow-up measures of children's socio-emotional skills, parenting style, family and household characteristics and a wide set of other characteristics.

The PATHS intervention which is part of the z-proso study included over 650 students in 28 schools in the municipality of Zurich, Switzerland. Randomization took place at the school level and was stratified within neighborhood blocks to avoid differences in the share treated across neighborhood districts. The original aim of the intervention was to reduce crime and delinquency of youth by targeting socio-emotional skills early on in primary school. While Averdijk et al. (2016) study the impacts on crime and delinquency, this paper is the first to study how the intervention affected educational and labor market outcomes.

Our results show that treated students become 4.9 percentage points more likely to get tracked into academic high school (Gymnasium), the highest school track in Switzerland, after the completion of primary school. This effect persists and translates into a 6.0 percentage point higher completion rate of academic high school. This treatment effect is economically significant as it represents a 16 percent increase from the baseline of the control group. The long-term benefits of the intervention are also visible for students not attending academic high schools: We find that the intervention increases earnings of students enrolled in the apprenticeship program, the most natural alternative to academic high school in Switzerland, by more than 5 percent at age 17.

In order to investigate why the intervention improved student outcomes we study three branches of potentially underlying mechanisms. We evaluate whether (1) students change their social and school related behavior, (2) parents change their parenting style, and (3) students' math and language skills improve as a result of the intervention.

Regarding the first mechanism, students' social and school related behavior, we find that children appear to become more aggressive and less prosocial immediately after the intervention. Given the aim of the intervention, these effects appear surprising, but are clearly visible in teachers, parents and children's own assessment of social behavior. One way to reconcile these effects is that the intervention made teachers and parents more aware for what appropriate child behavior

looks like. These negative effects on behavior, however, are short-lived. The treatment effect on reported aggression and prosocial behavior fades out quickly and is only visible immediately after the intervention. By the time tracking into secondary schools takes place, treatment and control children are no longer distinguishable in terms of aggression and prosocial behavior, but treated children display less ADHD related behavior, which we consider one possible driver of the main treatment effect we observe. We further find clear evidence that the intervention leads to lasting changes in students' school related behavior. Treated children become more likely to complete their homework and less likely to be truant. These effects are persistently visible throughout primary school and represent a likely mechanism for students' improved tracking outcomes.

Regarding the second mechanism, parenting style, we find that parents seem to respond to the intervention with less corporal punishment and improved child monitoring. While these treatment effects could be driven by improved interaction with the child due to the homework component of the intervention, we think it is more likely that these effects are triggered by demand effects of the intervention. As the PATHS program contained many elements about socially acceptable behavior, the intervention might have made parents more aware of socially acceptable behavior when answering questions about their parenting style. While the treatment seemingly induced some changes in parenting style, these are not persistent over time and thus represent an unlikely candidate for a key mechanism.

Regarding the third mechanism, school performance, we find that the intervention raises teacher assessed math and reading skills. These effects are visible for teachers uninvolved in the intervention study and persist over a three-year period until the end of primary school when tracking takes place. The increase in math and language skills are in line with the improved school related behavior and suggest that the intervention improved students' achievement through smarter school related decision-making.

Taken together, our analysis of underlying mechanisms suggests that the improvement of schools related behavior like school attendance and homework completion primarily drives the treatment effect induced by the intervention. This behavioral change in turn seems to raise educational performance and ultimately leads students to a higher secondary school track.

To this point, only a handful of studies has documented medium- and long-term effects of early childhood interventions. Closely related to our work Kosse et al. (forthcoming) study a mentoring program for children and show that it persistently increases prosociality. Following up on these results, and consistent with our findings, Falk et al. (2019) show that the mentoring program also increased the probability to attend Gymnasium, the academic high school track in Germany. Alan and Ertac (2018) conduct a classroom intervention targeting patience and show that their intervention improves self-control, the ability to imagine future selves that consequentially leads to more patient intertemporal choices. Algan et al. (2014) also study a school based intervention targeting socio-emotional skills and show that the intervention increased self-control and trust in adolescence as well as educational achievements in early adulthood. Attanasio et al. (2014) show that weekly home visits to improve maternal-child interactions led to improvements in cognition and language development immediately after treatment. Gertler et al. (2014) follows up on these results and documents an earnings increase of 25 percent, 20 years after the study.

We contribute to this literature by showing that a one year and low-cost intervention targeting social skills can successfully be embedded in the school curriculum and has the power to change the educational trajectory of a child. Our ability to follow children over a decade and our detailed evidence on the underlying mechanisms distinguish our work from the existing literature. Our results suggest that teaching regulatory skills, next to math and reading, as part of the

curriculum could substantially increase students' long-term outcomes while increasing equality of opportunity.

The remainder of the paper is structured as follows. Section 2 describes the experimental design and data. Section 3 discusses the empirical strategy and shows evidence that the assignment to treatment is random. Section 4 provides the main results and Section 5 shows evidence on underlying mechanisms. Section 6 concludes.

2. Experimental Design and Data

We study the effect of Promoting Alternative Thinking Strategies (PATHS), an early childhood intervention targeting socio-emotional development of children, on long-term outcomes such as educational choices and earnings. We exploit an experimental setting based on random assignment of the PATHS program to a subsample of children taken from the Zurich Project on the Social Development from Childhood to Adulthood (z-proso), a project aimed at the understanding of social development of children and youths.

In this section, we introduce the institutional background in which the experiment took place; we then describe the intervention, the experimental design, and the sample object of the empirical analysis.

2.1 Institutional Background

The intervention we study took place in the municipality of Zurich. Figure 1 shows the structure of the school system in the municipality of Zurich. Children attend primary school for six years (grade 1 to 6). Upon completion of primary school (grade 7), 13-year-old students are subject to a

tracking system based on two different tracks. The track choice results from the school performance at primary school as well as a teacher assessment of students' abilities and skills. The first track (Gymnasium) consists of academic high schools. The academic high school track lasts 6 years and prepares students for a university career. It is the only track that allows students to pursue an academic career and to enroll in university. The lower track is labor market oriented and consists of two steps. The first step is a 3-year cycle of high school. High schools are classified in three different levels/types (Sek A/Sek B/Sek C). Upon completion of the 3-year high school cycle (Grade 9), students from Sek A have the option to switch to the Gymnasium. Students in Sek B/C and students in Sek A who do not switch to the academic high school enter in an apprenticeship complemented by an additional 3-year cycle of vocational education. About 70 percent of secondary school graduates enter an apprenticeship in Switzerland. Apprenticeships differ in required skills and wage (earnings in apprenticeship).

The tracking decision, academic high school versus labor market oriented track, is crucial for an individual's life. Career patterns for students ending up in the two different tracks are considerably different, e.g., in terms of labor market opportunities or earnings patterns.

2.2 The Intervention

We study the "Promoting Alternative Thinking Strategies" (PATHS) program. PATHS represents a prevention program with the scope of reducing externalizing behavior problems and fostering social skills and competences of primary school children (Greenberg et al., 1995). The PATHS program was developed by Prof. Mark T. Greenberg (Prevention Research Center of Pennsylvania State University) and Dr. Carol A. Kusché, and is a widely used school based social skills program.

The PATHS curriculum is designed to enable children to make positive choices throughout life. The program fosters the creation process of social skills to reduce aggressive behavior and simultaneously enhances the educational process in the classroom. PATHS is aimed at reducing disruptive behavior and improving the child's prosocial development by means of learning skills and knowledge relevant to the development of self-control, empathy, the understanding, expression and regulation of emotions, and effective social problem solving. The program has a special focus on regulatory skills.

Primary school teachers are in charge of teaching the PATHS material two-three times per week for about 20-30 minutes per session. Teachers, upon attendance of a two- to three-day workshop and regular meetings with a consultant, are provided with systematic, developmentally appropriate lessons, materials, and instructions for teaching their students emotional literacy, self-control, social competence, positive peer relations, and interpersonal problem-solving skills.[1] According to Blueprints for Healthy Youth Development, in a framework with 500 students participating, the cost of implementing PATHS is about $119 per student.[2]

The PATHS program was implemented in a random sample of schools in the city of Zurich during the AY 2005/2006. The intervention targeted 8-year-old children in the second-grade of primary school. A total of 28 schools across the city were divided in 14 blocks made by two schools with similar size and located in the same school district.[3] In each block, a computer generated

[1] Figures A1-A4 in the Appendix show some example from the PATHS curriculum.
[2] Blueprints for Healthy Youth Development provides a registry of evidence-based youth development programs designed to promote the health and well-being of children and adolescents.
[3] The use of randomization-by-block allows to obtain schools (*within blocks*) with students comparable in terms of social background. In turn, the use of randomization-by-block implies the inclusion of block fixed effects in the empirical analysis.

randomization process assigned one school to the PATHS program and one school to a control group.[4]

Teachers employed in schools assigned to the PATHS treatment were trained by professional consultants and the standard school material in these schools was complemented by some additional material specific to the PATHS program (e.g. activity sheets, posters, books). Upon training of teachers, children assigned to the PATHS program were exposed to about 80 hours of socio-emotional training (1.5-2 hours per week). The training was held once-a-week in a two-hours session substituting the standard class in Humans and Society (Mensch und Umwelt). The PATHS program covered the entire second grade school year of primary school.

In Table 1, we provide a summary of (some of) the activities run as part of the PATHS curriculum.[5] These activities covered concepts such as self-esteem, self-control training with the visual help of control signals (traffic light exercise), the understanding and the expression of feelings, the identification of inappropriate behavior. Some activities also involved parents. For instance, one of the typical activities of the PATHS program is the so-called selection of the child of the day. In each PATHS lecture, one child is randomly selected to become the teacher's assistant for the lecture. The teacher instructs the child on how to compliment other people and then the child is exposed to compliments from the rest of the students in the classroom. The same activity also contemplates homework; the child repeats the activity, e.g. gives and receives compliments, at home with family members. Similarly, the PATHS program also targets emotional intelligence and the child-parent interaction. In a different activity, children are firstly required to identify and

[4] The complete setting of the intervention consisted of a stratified sample of 56 schools divided in 14 quadruplets made by four similar schools. Schools in each quadruplets were then randomly assigned to the PATHS program, the Triple-P program (a standardized program on positive parenting practices), both the PATHS and the Triple-P programs, a control group. Because of our specific interest on interventions directly targeting children and the low participation rate to the Triple-P program, we restrict the analysis to the PATHS intervention.

[5] The Appendix Figures A2-A4 provide an overview of the material used to cover some of the activities summarized in Table 1.

discuss in the class situations related with different emotions. Then, each child discusses these situations at home with parents to become more aware of parents' feelings and perceptions induced by different behaviors.

[Table 1]

2.3 Estimation Sample and Summary Statistics

Our estimation sample consists of 28 schools in the city of Zurich randomly assigned either to the PATHS program or to the control group. In Table 2, we introduce the descriptive statistics for the main individual characteristics of students attending these schools. We start with the set of outcome variables of the analysis and then we consider a subset of the baseline measures (or controls) we include in the model.

Outcomes variables: We are interested in the possible long-term effects of the PATHS intervention on educational outcomes. As a result, the key outcome of interest for the analysis is whether students attend or complete an academic high school (Gymnasium) after primary school. We focus on three different main outcomes. The first outcome of interest is a dummy variable for attendance of the academic high school during Grade 7, namely when the child is aged 13. The second outcome is a dummy variable for attendance of the academic high school during Grade 9, when the child is aged 15. The third outcome is a dummy for completion of the academic high school when the child is aged 19. The information about attendance of academic high school (Grades 7 and 9) comes from administrative school data of the Bildungsdirektion Zurich for all students who are currently attending one of the schools in the city. The information about

completed high school is self-reported by students. On average around 21 percent of students in the sample opt for academic high schools in Grade 7. The percentage raises to 25 percent in Grade 9. Finally, about 29 percent of students complete an academic high school.

To shed light on the mechanism underlying possible long-term effects of the PATHS intervention on educational career, we also focus the analysis on a subset of intermediate outcomes measured between Grade 3 (post-intervention) and Grade 6 (pre-tracking). In particular, we investigate intermediate outcomes related to general behavior, school related behavior, parenting style, and teacher assessed skills. With emphasis on skills, we focus on mathematics and language skills. The average performance in mathematics for students in our sample is 3.4 on a 5-point scale. The average performance in language is 3.3 on a 5-point scale. In terms of school behavior, we analyze indicators for truancy, neglecting homework, disturbing lessons and annoying teacher during classes. In our sample, on average, neglecting homework is a common practice that involves more than half of the students. More than one third of the students disturb lessons, while truancy involves about one fifth of the sample. Finally, around 10-16 percent of students incur in activities annoying teachers.

Control variables / baseline measures: In the bottom part of Table 2, we summarize the main pre-treatment characteristics for the sample used for the analysis. The sample is perfectly balanced in terms of gender composition with girls representing 50.3 percent of the whole sample. The average child's age is seven, and about 93 percent of children were born in Switzerland. In terms of household characteristics, the average household income is about CHF 89,000.[6] More than one third of the families receive financial aid, while about 19 percent experience financial problems.

[6] This amount corresponds to approximately $89,000.

About 13 percent of children are raised in a single-parent household. One out of three households is made by at least one parent with university degree.

[Table 2]

3. Empirical strategy

The assignment to the treatment condition (the PATHS training program) was based on a randomized procedure. Equation (1) shows the reference model for this work:

$$(1) \quad Y_{ib} = \beta_1 + \beta_2 \,\mathrm{PATHS_i} + \boldsymbol{X_i'\gamma} + \alpha_b + \varepsilon_i$$

where *i* is a subscript for each child in the sample, while *b* is the block (neighborhood) where the child attends primary school. Y_{ib} represents the outcome of interest for the analysis. In the main analysis, we focus on three outcomes. The first outcome is a dummy variable which takes value one if child *i* attends an academic high school in Grade 7 and zero otherwise. The second outcome is a dummy variable for a child's attendance of an academic high school in Grade 9. The third outcome is a dummy for academic high school completion.

The vector $\boldsymbol{X_i}$ consists of control variables for pre-treatment baseline characteristics. We focus on three groups of controls for child characteristics, household characteristics, and child's socio-emotional skills (Social Behavior Questionnaire, SBQ). Specifically, child controls include age, gender, and whether the child was born in Switzerland. Household controls include household income, whether the mother was born in Switzerland, and dummy variables for single parent household, both parents only having secondary school degree, household having a parent with

academic degree, household reporting receiving financial aid, and household reporting to have financial problems. For children's socio-emotional skills, we rely on SBQ measures capturing behavioral aspects such as anxiety/depression, ADHD, non-aggressive externalizing problem behavior, non-aggressive conduct disorder, and opposition/defiance. We also include in the set of controls aggregate measures for overall aggression, overall externalizing behavior, and two overall behavior scores. α_b captures block fixed effects. Finally, we cluster standard errors at the school level.

Our key identifying assumption is that the randomization protocol was successfully implemented. Prior to our analysis, we test whether this assumption holds and assignment to the treatment condition was indeed random. To verify random assignment, we test if a large set of pre-treatment children background variables predict treatment status. The 52 baseline characteristics we test include measures of children's socio-emotional skills (SBQ), parenting style measured by the Alabama Parenting Questionnaire (APQ) as well as child, parent, and household characteristics. Table 3 provides a summary of the balancing tests. We perform a dual analysis to assess random assignment. First, in column (1) of the table, a dummy variable taking value one for treatment units and zero for control units is regressed on each of the 52 baseline measures. In column (2), we repeat the same analysis by also including block fixed effects for the level of randomization. The number of significant coefficients from the described bivariate OLS regressions is always in line with the expected number of significant coefficients under random assignment. In the model without block fixed effects, none of the 52 tested characteristics is significant at the one percent level. Only one out of 52 characteristics is significant at the five percent level, and three characteristics are significant at the ten percent level. When block fixed effects are included, only one out of the 52 tested characteristics explains assignment to the treatment condition with significance level lower than one percent. Three characteristics display an effect on the probability of assignment to the

treatment condition statistically significant at the five percent level, while six baseline characteristics display significant effects at the ten percent level versus an expected value under random assignment of 5.2. Summing up, the randomization process was successfully implemented as baseline characteristics do not predict treatment status more often than what expected under random assignment. Appendix Table A1 provides the complete analysis for the models summarized in column (1) of Table 3.

[Table 3]

4. Results

Baseline results: Table 4 shows the treatment effect of the intervention on the probability of attending academic high school (Gymnasium). Column (1) shows the treatment effect for Grade 7, which is the first grade of secondary school where children are on average 13 years old. We find that treated children become 4.9 percentage points more likely to attend academic high school one year after completion of primary school and five years after the intervention took place. This effect is economically significant as it represent a 23 percent increase from the baseline of the control group, which is 22 percent.

As it is possible for students in Switzerland to change track during the first two years of secondary school, we next investigate if results persist to Grade 9 where students are on average 15 years old. Column (2) shows the treatment effect on the probability to attend academic high school in Grade 9. At this stage, treated children are 6.6 percentage points more likely to attend academic high school. This effect represents a 26 percent increase relative to the control group baseline of 25 percent.

Column (3) shows estimates of the treatment effect on the probability to complete the academic high school track. While we were relying on administrative school data provided by the school district in columns (1) and (2), the dependent variable in column (3) is based on individuals' self-reported information from the survey Wave 8 and therefore information is only available for individuals who answered the respective question. The analysis shows that the treatment effect persists. Treated individuals are 6 percentage points (+20 percent) more likely than the control group to complete academic high school.

We next turn to the question whether point estimates are sensitive to the inclusion of baseline control variables. In columns (4)-(6) we estimate the same models as in columns (1)-(3), but now we additionally control for a large set of background variables. The control variables we add are: child age, gender, Swiss-born, household income, migration status of the mother, dummies for single parent household, indicators for both parents only having secondary school degree, the household having a parent with academic degree, whether the household received financial aid, an indicator for whether the household reports financial problems as well as SBQ baseline measures for anxiety/depression, ADHD, non-aggressive externalizing problem behavior, non-aggressive conduct disorder, opposition/defiance overall aggression, overall externalizing behavior and two overall behavioral scores indexes.

Point estimates remain remarkably similar when control variables are included in the model. This fact provides additional evidence for the robustness of our results. The most conservative model in Column (6) shows that the treatment increased the probability to attend academic high school by 5.7 percent – a 16 percent increase from the mean of the control group. Finally, despite the stability of point estimates, it is important to notice that the R-squared of the regressions increases substantially when control variables are added.

[Table 4]

Figure 2 visualizes the estimation results and puts them into perspective to the control group mean of the respective schooling outcome. The figure compares the individual probability of treated versus control children to attend academic high school in Grade 7, Grade 9, and to complete academic high school. Similarly, Figure 3 displays the point estimates of the treatment effect of the PATHS intervention on the same set of outcomes for models without (left panel) and with control variables (right panel). This dual graphical analysis is suggestive of two important insights. First, graphical evidence helps rationalizing the effect of the PATHS intervention on educational outcomes by providing a simplified way to interpret the effect size of our baseline estimates.[7] Second, it is important to highlight that point estimates are remarkably similar when models without and with control variables are compared. This similarity reassures that the choice of the most appropriate set of control variables to be included in our empirical specifications does not undermine the main findings of the study.

[Figure 2]

[Figure 3]

Additional results: In this section, we analyze a set of additional outcomes potentially affected by the PATHS intervention. We start with earnings for those students enrolled in an apprenticeship program. As anticipated in Section 2.1, students who graduate from regular high school (lower

[7] We refer here to models in Table 4, columns (1)-(3).

high school track) normally enter in a 3-year apprenticeship program at age 16. Apprenticeships differ in required skills and wage. In Table 5, we investigate whether the PATHS intervention displays any treatment effect on monthly earnings for those students enrolled in an apprenticeship at age 17.[8] Estimates in Table 5 suggest a possible treatment effect on earnings induced by the PATHS intervention. On average, treated students enrolled in an apprenticeship tend to earn 5.6-7.5 percent more than the control group. As the average earning level in the control group is about CHF 730, the treatment effect accounts for about CHF 55 on a monthly basis.

[Table 5]

In Table 6, we investigate possible treatment effect of the PATHS intervention on education and labor market outcomes. The self-reported nature of the data used as outcome variables limits the sample size of the analysis. However, despite the reduced sample size, the analysis is potentially suggestive of possible effects induced by the intervention. In principle, the treatment effect shown on enrollment and completion of academic high school would suggest a positive effect of the intervention on university enrollment after high school and a negative effect on the students' probability to work. We test this hypothesis by focusing on two different outcomes measured at age 19. In column (1) we analyze individual probability to be in university and in column (2) the probability to report full time employment. All dependent variables are dummy variables. Results display interesting patterns. Academic high school prepares students for university. Therefore, the most natural outcome to validate the baseline estimates provided in Table 4 is enrollment in

[8] Admittedly, this analysis only considers students in the apprenticeship program. Therefore, the selection process into the apprenticeship program may raise concerns regarding the interpretation of the estimates. Despite this potential concern, we consider these estimates as suggestive of potential important effects induced by the intervention.

university. Are students who were exposed during primary school to the PATHS training program more likely than the control group to be enrolled in university at age 19? Results in column (1) seem to suggest a positive treatment effect of PATHS on enrollment in university. Treated children increase their probability to enroll in higher education (including university of applied sciences and teachers colleges) by 5.7 percentage point with respect to the baseline level of 40 percent observed in the control group. Interestingly, the point estimate for the treatment effect on university enrollment mimics the respective point estimates for the treatment effect on academic high school completion in Table 4, Column (6).

Finally, we test our initial hypothesis with the analysis of full time employment. As expected, treated students are on average 11 percentage points less likely to work full time at age 19. These results together seem to validate and confirm the main findings of the baseline analysis of this study. In general, the randomly assigned PATHS intervention was able to affect individuals' life trajectories by affecting tracking outcomes and future educational choices.

[Table 6]

5. Mechanisms

In order to investigate why the intervention improved students' outcomes we study three branches of potentially underlying mechanisms. We evaluate (1) whether students change their social and school related behavior, (2) whether parents change their parenting style in response to the intervention and (3) whether students' math and language skills improve in the post-intervention period.

Social behavior is measured with the Social Behavior Questionnaire (SBQ). We study six domains of the SBQ. Each domain is measured with 2-10 items. Answers are recorded on a 5-point Likert scale (from "never" to "very often"). The six covered domains of behavior are aggression, ADHD, anxiety/depression, opposition, non-aggressive conduct behavior and prosocial behavior. In Grade 3 and Grade 5 we have SBQ measure from all three perspectives of teachers, children and a parent (or primary caregiver).[9] These measures are collected using one-on-one interviews at child's home or at school for teachers. For our analysis we combine teacher, child and parents reports into one measure for each type of behavior. We standardize the sum of answers to each domain, then take the average over the teacher, child and parents reports and standardize again.

School related behavior is measured from teacher reports in Grade 4 and Grade 6. The four domains of study are truancy, neglecting homework, annoying the teacher, and disturbing the lesson. Teachers reported how frequently they observed the respective behavior during the last year. Based on these reports we generate indicator variables for observing type of behaviors on a weekly, monthly or yearly level. As children receive a new primary teacher in Grade 4, the responding teacher in Grades 4 and 6 is not the teacher involved in teaching the PATHS curriculum.

Parenting style is measured using the Alabama Parenting Questionnaire (APQ) that involves the following five domains: parental involvement, positive parenting, poor monitoring, inconsistent discipline, and corporal punishment. Each domain is measured with 2-10 items where the parents' or primary caregivers' answers are recorded on a 5-point Likert scale. To facilitate comparison, we standardize all subdomains to have a mean zero and standard deviation of one.

School performance is measured from teacher evaluations of math and language skills. These teacher assessments are in the form of grades ranging from 1 to 6, where 4 is the lowest

[9] For children reports in Grade 5 ADHD, opposition and NACD are missing. We therefore have to rely on teacher and parent reports in that year.

passing grade. Grades for math and language skills are available for Grades 3 to 7, Grade 9, and Grade 11. While the corresponding teacher in Grade 3 is possibly involved in the intervention, this is not the case from Grade 4 onwards. As of Grade 7, students are evaluated by different teachers from their respective school track.

5.1 Changes in Social and School-Related Behavior

The main aim of the PATHS intervention program is to foster regulatory behavior, smart decision-making, and emotional understanding. Given this primary aim of the intervention we start our analysis by looking at changes in students' social behavior and school related behavior.

[Figure 4]

Figure 4 shows the treatment effect of the intervention on general behavior on the left panel and school related behavior on the right panel. The top left graph in Figure 4 shows that children appear to become more aggressive and less prosocial based on reports shortly after the intervention in Grade 3. Treated children score 14.4 percent of a standard deviation higher on the aggressiveness index and 12.8 percent of a standard deviation lower on the prosociality index. Given the aim of the intervention, these effects appear surprising, but are also clearly visible when looking at teachers, parents, and children's disaggregated assessment of social behavior. Why does the treatment seem to have a negative impact on these measures of social behavior? One way to reconcile these short-run effects is to assume that the intervention made teachers, parents, and children more aware for what appropriate child behavior should look like. If these effects are indeed driven by demand or social desirability, we would not expect them to persist over the years.

The bottom left graph in Figure 4 shows that these negative effects on behavior are indeed only short-lived. The treatment effect on aggression and prosocial behavior appears to fade out quickly and is no longer visible in Grade 5. In Grade 5, three years after the intervention and one year before tracking into secondary schools takes place, treatment and control children are no longer distinguishable in terms of aggression and prosocial behavior. Instead, the bottom left graph in Figure 4 shows that treated children display less behavior associated with attention ADHD. The size of this effect is economically significant: treated children score 12.1 percent of a standard deviation lower on items used to diagnose ADHD. Given the strong association between ADHD, school success and tracking (Arnold et al. 2015, Barry et al. 2002, Frazier et al. 2007, Loe and Feldman 2007) we consider this effect as one possible driver of the main treatment effect.

The right panel of Figure 4 shows the treatment effect on different types of school related behavior. Teacher reports from Grades 4 and 6 suggest that the intervention lead to changes in students' school related behavior. While treated children already seem to be less truant ($p = 0.165$) in Grade 4, this effect becomes clearly visible in Grade 6 ($p \leq 0.01$). In Grade 4, treated children become 9.7 percent less likely to have skipped school during the last year, while in Grade 6 the likelihood decreases by 7.8 percent. In Grade 6, treated children also seem to become more likely to complete their homework ($p = 0.128$). While some of these effects are statistically insignificant at conventional levels, they are suggestive of improved school related behavior. Given that the intervention focused on fostering regulatory behavior and smart decision-making, it seems not surprising to find these effects on students' choices about class attendance and homework completion.

5.2 Adjustments in Parenting Style

The PATHS intervention also included a homework component which involved parents. Children are for example asked to discuss specific emotions or everyday problems with their parents. Consequently the intervention had potential effects on parent-child interactions, perhaps leading to an adjustment in parenting style.

[Figure 5]

Figure 5 shows the treatment effect on parenting style reported by the primary caregiver in Grade 3 and Grade 5. Point estimates for Grade 3 suggest that parents seem to respond to the intervention with less corporal punishment and improved child monitoring in Grade 5. Parents of treated children become 15.1 percent less likely to report hitting or smacking their child in Grade 3. Parents in the treatment group also report a reduction in poor monitoring equal to 11.7 percent of a standard deviation in Grade 5. While these treatment effects could in principle be driven by improved interaction with the child due to the homework component of the intervention, we think it is more likely that these effects are triggered by demand or social desirability effects of the intervention. As the PATHS program contained many elements about socially acceptable behavior, the intervention might have made parents also more aware of socially acceptable behavior when answering questions about their parenting style. While the treatment seemingly induced some changes in parenting style, these are not persistent over time. We thus believe that changes in parenting style represent an unlikely candidate for a key mechanism for the long-run impacts of the intervention.

5.3 School Performance

Given that we find some suggestive evidence on improved school related behavior, we next investigate if the intervention affected school performance. Figure 6 shows the treatment effect on teacher assessed math and reading skills in Grades 3 through Grade 11. In general, we find that, after the intervention, treated children over-perform the control group in terms of school performance. This comparative advantage fades away after the tracking process takes place.

[Figure 6]

While we find statistically insignificant effects in Grade 3, the intervention raises grades in math and reading skills from Grade 4 onwards. These effects persist over a three-year period until the end of Grade 6, where tracking into secondary school takes place. Based on teacher's assessment, in Grade 6 treated children display 17.7 percent of a standard deviation higher math grades and 11.3 percent of a standard deviation higher language skills. The increase in math and language skills is in line with the improved school related behavior and suggests that the intervention improved students' school related decision-making.

Taken together, our analysis of underlying mechanisms suggests that schools related behavior like attendance and homework completion primarily drive the treatment effects found in the baseline analysis. This behavioral change in turn seems to raise educational performance and ultimately leads student to a higher secondary school track.

6. Conclusion

This paper provides experimental evidence that fostering socio-emotional skills in primary school children has persistent positive effect on educational careers. We provide evidence from the city of Zurich in Switzerland and show that the one-year, teacher-run, and cost-effective "Promoting Alternative Thinking Strategies" (PATHS) program increases the probability to attend and complete academic high school (Gymnasium). The estimated effects are economically significant: treated children increase their probability to complete academic high school by about 16 percent compared to the control group. This impact on tracking and educational outcomes, which are major determinants of future life outcomes and opportunities, appears to be driven by improved school related behavior and an increase in math and language performance.

The results of this study raise an interesting question. Would it be possible to teach children socio-emotional skills in school – similar to the way we teach math and reading? While it has been shown that teachers have lasting impact on behavior (Chetty el al. 2014, Jackson 2018, Schellenberg, 2018) there exists no subject in school that is explicitly designed to foster socio-emotional skills. The results of this study suggest that primary schools are a promising place to institutionalize the training of socio-emotional skills.

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Tables and Figures

Tables

Table 1: PATHS Activities

Activity category	Example activities		
	Class activity:	Homework:	Parental involvement:
Self-esteem	**Child of the day:** In each PATHS lecture a child was randomly picked to be the teacher's assistant during the lecture. Further, the other children made a list of compliments for the child of the day. Before that, the children learned about 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 day/ compliments:** Parents are informed that their child was the child of the day. They go through the list of compliments with their child and add further 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 choses an emotion and the other children try to mimic the emotion. **Feelings faces**: 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 where they think the behavior is appropriate.	**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.
Self-control	**Calming down:** Teacher discusses various methods to calm down with class. Teacher reads out story of a girl that learned how to control herself. **Teasing**: Children learn to ignore people that tease in a mean way. Children make role-plays to learn how to interpret and handle teasing.	**Calming down**: Children write down what their parents do, when they have a problem or want to calm down.	**Calming down**: Children ask their parents about situations where they had to calm down and had to think about a possible solution.

Note: The table shows a selection of the PATHS activities. Besides classroom activities, children sometimes also received homework, which might also have involved the parents. Tasks and homework that involved the parents were always accompanied with a letter from the z-Proso team to the parents, explaining the idea and the goal of the task and suggestions on how parents could support their children and act as a role model.

Table 1: PATHS Activities (continued)

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 your 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 to a person and draw/write about it.	**Control signals**: Parents receive an explanation about when and how they could use the control signals.
Social interaction	**Classroom rules**: Children discuss with teacher why rules are useful and establish a set of rules for their classroom. **Making friends:** Teacher reads out story to class about two children becoming friends. Following 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 can be 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 at 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: The table shows a selection of the PATHS activities. Besides classroom activities, children sometimes also received homework, which might also have involved the parents. Tasks and homework that involved the parents were always accompanied with a letter from the z-proso team to the parents, explaining the idea and the goal of the task and suggestions on how parents could support their children and act as a role model.

Table 2: Descriptive Statistics

	(1) N	(2) Mean	(3) SD	(4) Min	(5) Max
School Tracking Outcomes:					
Attending Academic High School Grade 7	656	0.209	0.407	0	1
Attending Academic High School Grade 9	656	0.248	0.432	0	1
Completed Academic High School	563	0.291	0.455	0	1
Teacher Assessed Skills:					
Math Skills in Grade 3	551	3.341	1.102	1	5
Math Skills in Grade 4	548	3.422	1.261	1	5
Math Skills in Grade 5	472	3.424	1.260	1	5
Math Skills in Grade 6	443	3.400	1.305	1	5
Language Skills in Grade 3	551	3.232	1.077	1	5
Language Skills in Grade 4	548	3.303	1.235	1	5
Language Skills in Grade 5	472	3.386	1.265	1	5
Language Skills in Grade 6	443	3.465	1.275	1	5
School Related Behavior:					
Truancy in Grade 4	546	0.227	0.419	0	1
Truancy in Grade 5	471	0.163	0.370	0	1
Truancy in Grade 6	441	0.082	0.274	0	1
Neglecting Homework in Grade 4	546	0.705	0.456	0	1
Neglecting Homework in Grade 5	471	0.510	0.500	0	1
Neglecting Homework in Grade 6	441	0.574	0.495	0	1
Annoying Teacher in Grade 4	546	0.093	0.291	0	1
Annoying Teacher in Grade 5	460	0.065	0.247	0	1
Annoying Teacher in Grade 6	441	0.159	0.366	0	1
Disturbing Lesson in Grade 4	546	0.381	0.486	0	1
Disturbing Lesson in Grade 5	471	0.289	0.454	0	1
Disturbing Lesson in Grade 6	441	0.395	0.489	0	1
Child Baseline Characteristics:					
Female	656	0.503	0.500	0	1
Age	537	7.016	0.389	5.771	8.494
Born in Switzerland	538	0.926	0.263	0	1
Household Characteristics:					
Parent hold University Degree	538	0.307	0.462	0	1
Both Parents hold Secondary School Degree or lower	461	0.319	0.467	0	1
Single parent household	656	0.130	0.336	0	1
Mother migrated	528	0.523	0.500	0	1
Family receives financial aid	526	0.356	0.479	0	1
Family reports financial problems	529	0.193	0.395	0	1
Household Income (in 1000 Swiss Francs)	499	89.153	48.129	12	270

Note: This table shows descriptive statistics for the estimation sample of the baseline analysis. SD refers to the standard deviation of the respective variable.

Table 3: Summary of Randomization Check

	(1) Balancing tests I	(2) Balancing tests II	(3) Expectation under random assignment
Total number of balancing tests	52	52	
Number of tests significant at p<0.01	0	1	0.52
Number of tests significant at p<0.05	1	3	2.60
Number of tests significant at p<0.1	3	6	5.20
Block fixed effects	-	✓	

Note: This table shows the randomization check implemented to test random assignment of the treatment condition. To test random assignment, a dummy variable taking value one for treatment units and zero for control units is regressed on each of the 52 baseline measures of children's socio-emotional skills (SBQ), parenting style measured by the Alabama Parenting Questionnaire (APQ) as well as, child, parents and household characteristics. Column (1) in the table shows the number of significant coefficients from the described bivariate OLS regressions. Column (2) in the table shows the same analysis with the inclusion of block fixed effects for the level of randomization. Standard errors are clustered at the school level. Column (3) reports the expected number of significant coefficients under random assignment. Appendix Table A1 provides the full set of point estimates for each of the 52 regressions.

Table 4: Treatment Effect on Attending and Completing Academic High School

	(1) Attending Academic High School Grade 7	(2) Attending Academic High School Grade 9	(3) Completed Academic High School (self-reported)	(4) Attending Academic High School Grade 7	(5) Attending Academic High School Grade 9	(6) Completed Academic High School (self-reported)
PATHS Treatment	0.049**	0.066***	0.060*	0.058*	0.069***	0.057**
	(0.023)	(0.020)	(0.032)	(0.029)	(0.018)	(0.022)
Observations	656	656	563	478	478	423
R-squared	0.185	0.220	0.208	0.316	0.329	0.344
Control Group Mean Dependent Variable	.215	.252	.300	.258	.305	.343
Control variables	-	-	-	✓	✓	✓
Child Age	13	15	19	13	15	19
Panel Wave	Wave 5	Wave 6	Wave 8	Wave 5	Wave 6	Wave 8

Note: This table shows the treatment effect of the PATHS intervention on the probability of attending academic high school at different points in time. Columns (1) and (4) show point estimates for Grade 7. Columns (2) and (5) show point estimates for Grade 9. Columns (3) and (6) show point estimates for the probability to complete academic high school. All dependent variables are dummy variables. The number of observations in columns (3) and (6) is lower than in the other regressions since we here rely on self-reported survey data instead of administrative education data. Models in columns (4)-(6) include controls for baseline child and household characteristics and baseline child SBQ measures. Child controls include age and gender of the child and being born in Switzerland. Household controls include household income, migration status of mother, and dummy variables for single parent household, both parents only having secondary school degree, household having a parent with academic degree, household that received financial aid, and household that experienced financial problems. Controls for child SBQ include measures for anxiety/depression, ADHD, non-aggressive externalizing problem behavior, non-aggressive conduct disorder, opposition/defiance. We further include aggregate measures for overall aggression, overall externalizing behavior and two overall behavioral scores. SBQ measures are obtained from teacher, parent and child reports. All models include block fixed effects. Robust standard errors clustered at the school level are in parentheses. *** p<0.01, ** p<0.05, * p<0.1.

Table 5: Effect of Treatment on Earnings in Apprenticeship at Age 17

	(1)	(2)
	Log earnings	Log earnings
PATHS Treatment	0.075**	0.056*
	(0.031)	(0.031)
Observations	364	250
R-squared	0.033	0.296
Control Group Mean Dependent Variable	6.660	6.643
Control variables	-	✓
Child Age	17	17
Panel Wave	Wave 7	Wave 7

Note: This table shows the treatment effect of the PATHS intervention on earnings for individuals enrolled in an apprenticeship at age 17. Earnings are monthly earnings, self-reported, and expressed in logarithm. The model in column (2) includes controls for baseline child and household characteristics and baseline child SBQ measures. Child controls include age and gender of the child and being born in Switzerland. Household controls include household income, migration status of mother, and dummy variables for single parent household, both parents only having secondary school degree, household having a parent with academic degree, household that received financial aid, and household that experienced financial problems. Controls for child SBQ include measures for anxiety/depression, ADHD, non-aggressive externalizing problem behavior, non-aggressive conduct disorder, opposition/defiance. We further include aggregate measures for overall aggression, overall externalizing behavior and two overall behavioral scores. SBQ measures are obtained from teacher, parent and child reports. All models include block fixed effects for the level of randomization. Robust standard errors clustered at the school level are in parentheses. *** $p<0.01$, ** $p<0.05$, * $p<0.1$.

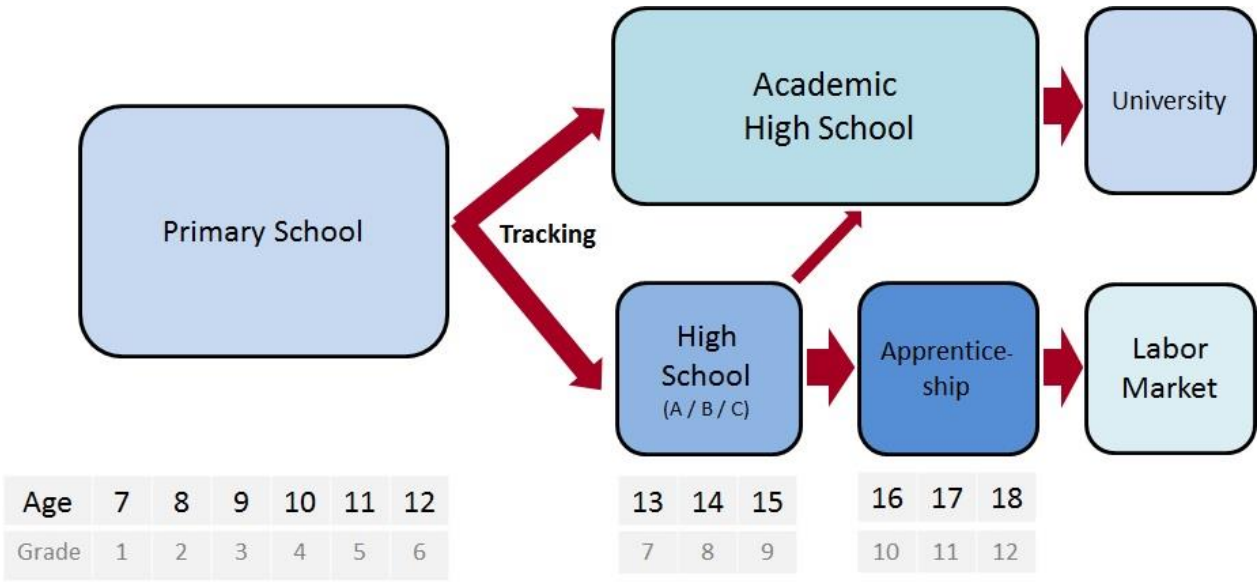
Table 6: Effect of Treatment on Education and Labor Market Participation

	(1) In Higher Education (including, University of Applied Sciences & Teachers College)	(2) Working full time
PATHS Treatment	0.057	-0.110***
	(0.034)	(0.037)
Observations	422	414
R-squared	0.302	0.185
Control Group Mean Dependent Variable	.405	.393
Control variables	✓	✓
Child Age	19	19
Panel Wave	Wave 8	Wave 8

Note: This table shows the treatment effect of the PATHS intervention on education and labor market participation. Columns (1) and (2) show point estimates for enrollment in education at age 19. Column (3) shows point estimates for labor market participation (working full time). All dependent variables are dummy variables. All models include controls for baseline child and household characteristics and baseline child SBQ measures. Child controls include age and gender of the child and being born in Switzerland. Household controls include household income, migration status of mother, and dummy variables for single parent household, both parents only having secondary school degree, household having a parent with academic degree, household that received financial aid, and household that experienced financial problems. Controls for child SBQ include measures for anxiety/depression, ADHD, non-aggressive externalizing problem behavior, non-aggressive conduct disorder, opposition/defiance. We further include aggregate measures for overall aggression, overall externalizing behavior and two overall behavioral scores. SBQ measures are obtained from teacher, parent and child reports. All models include block fixed effects. Robust standard errors clustered at the school level are in parentheses. *** p<0.01, ** p<0.05, * p<0.1.

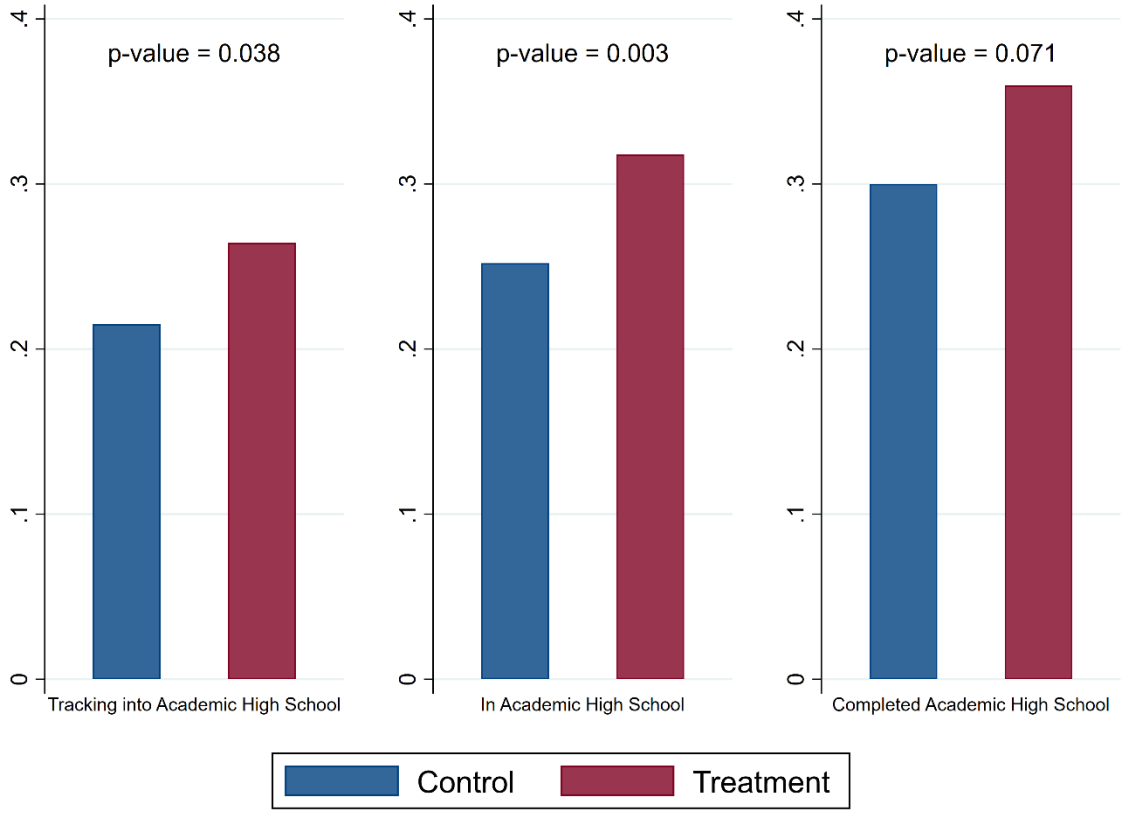
Figures

Figure 1: Overview of the School System in the Municipality of Zurich



Note: This figure shows the structure of the school system in the municipality of Zurich. For the sake of clarity, we provide here a simplified version of the typical educational career path of Swiss students. Primary school takes 6 years from Grade 1 to Grade 6 (age 7 to 12). After primary school, children are tracked either into academic high school (Gymnasium) or into regular high school (Secondary School). Admission to the academic high school depends on students' grades in Grade 6 and on the performance at an entry exam. Tracking into regular high school is based on teacher recommendation based on students' grades. Depending on the specific school the lower high school track can be composed of multiple lower tracks (Sek A, Sek B, and Sek C). The academic high school degree allows students to enter university. Students graduating from regular high school normally start an apprenticeship in Grade 10 (age 16). Usually the apprenticeship lasts 3 years until the child is about age 18. After three years of apprenticeship, 18-year-old individuals enter the labor market.

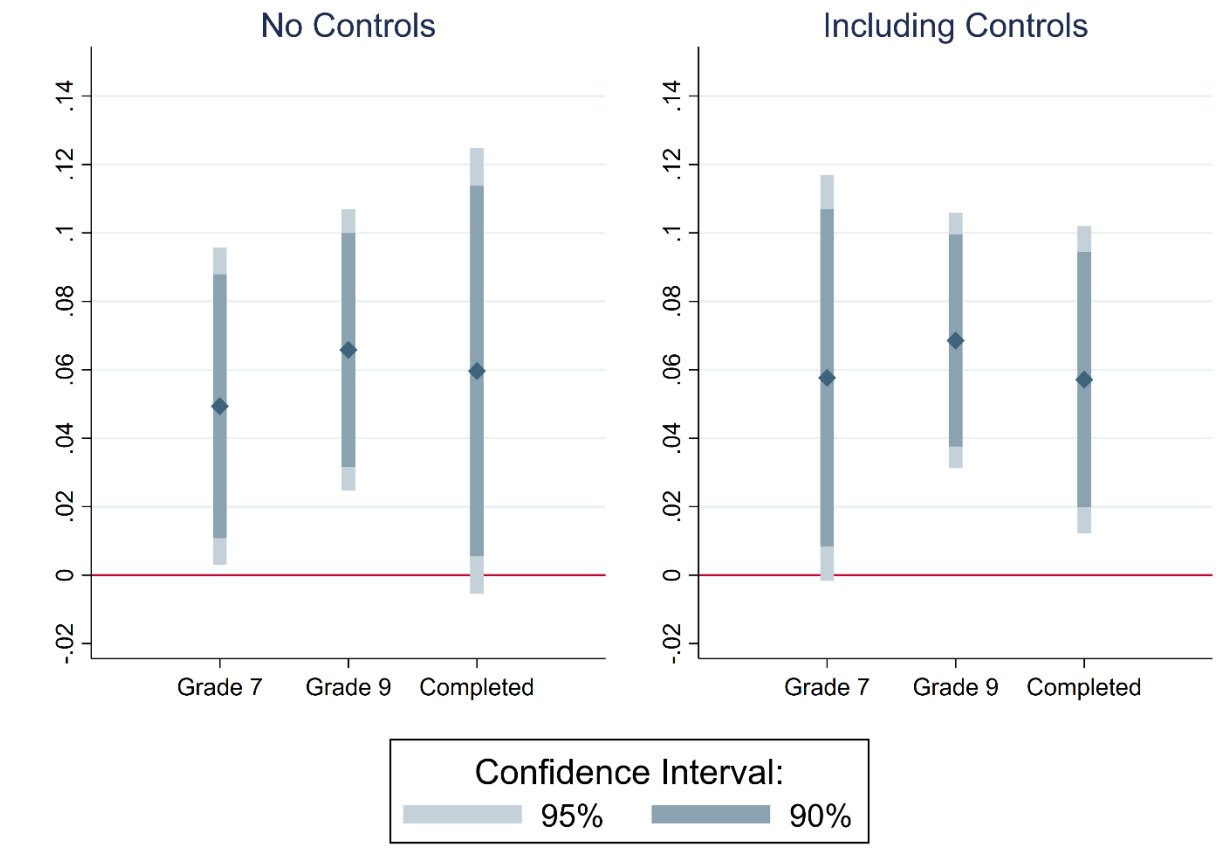
Figure 2: Main Results – Share of Children Attending and Completing Academic High School



Note: This figure shows the treatment effect of the PATHS intervention on the probability of attending academic high school in Grade 7 (left panel), Grade 9 (central panel), and on the probability to complete academic high school (right panel). Each bar represents the share of children attending (or completing) academic high school in the control group (blue bar) and in the treatment group. The share for the control group corresponds to the control group mean dependent variable in the estimation sample, while the difference between the control and the treatment groups correspond to the tretament effect (PATHS Treatment) estimated in Table 4, columns (1)-(3). P-values indicate the statistical significance of the difference between the control and the treatment groups.

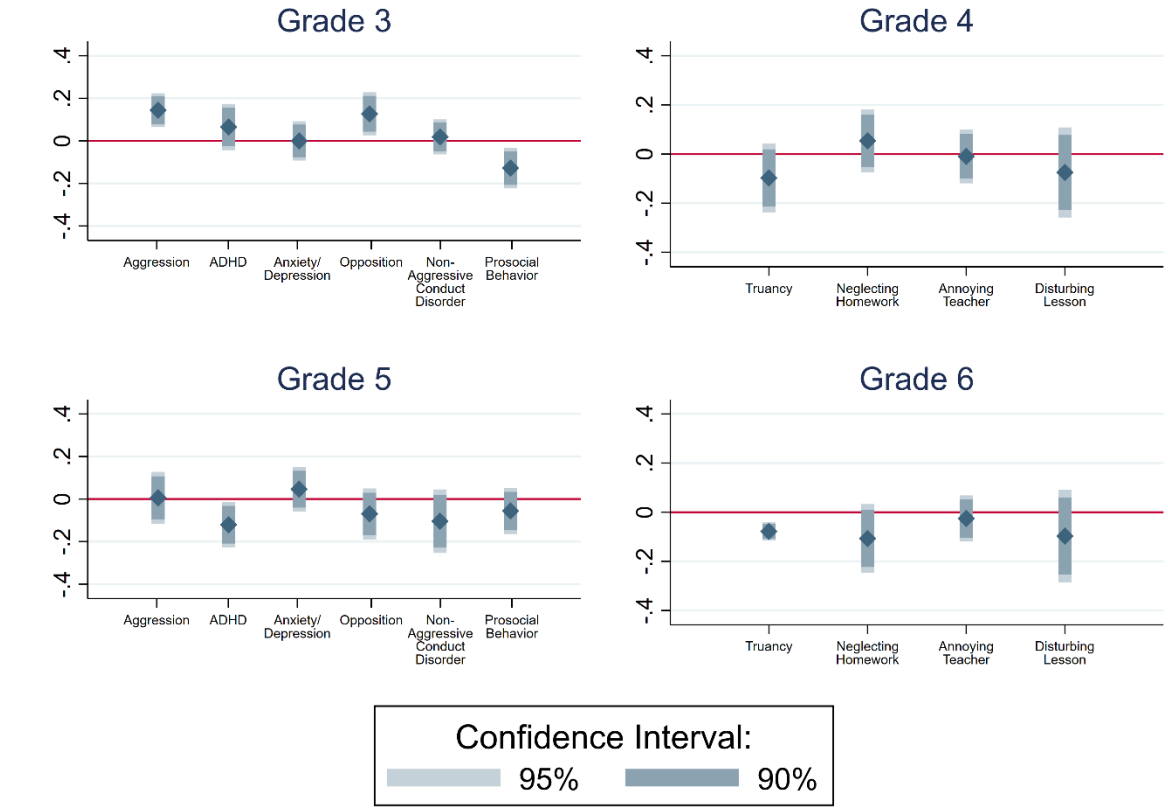
Figure 3: Main Results –

Effect of Treatment on Attending and Completing Academic High School



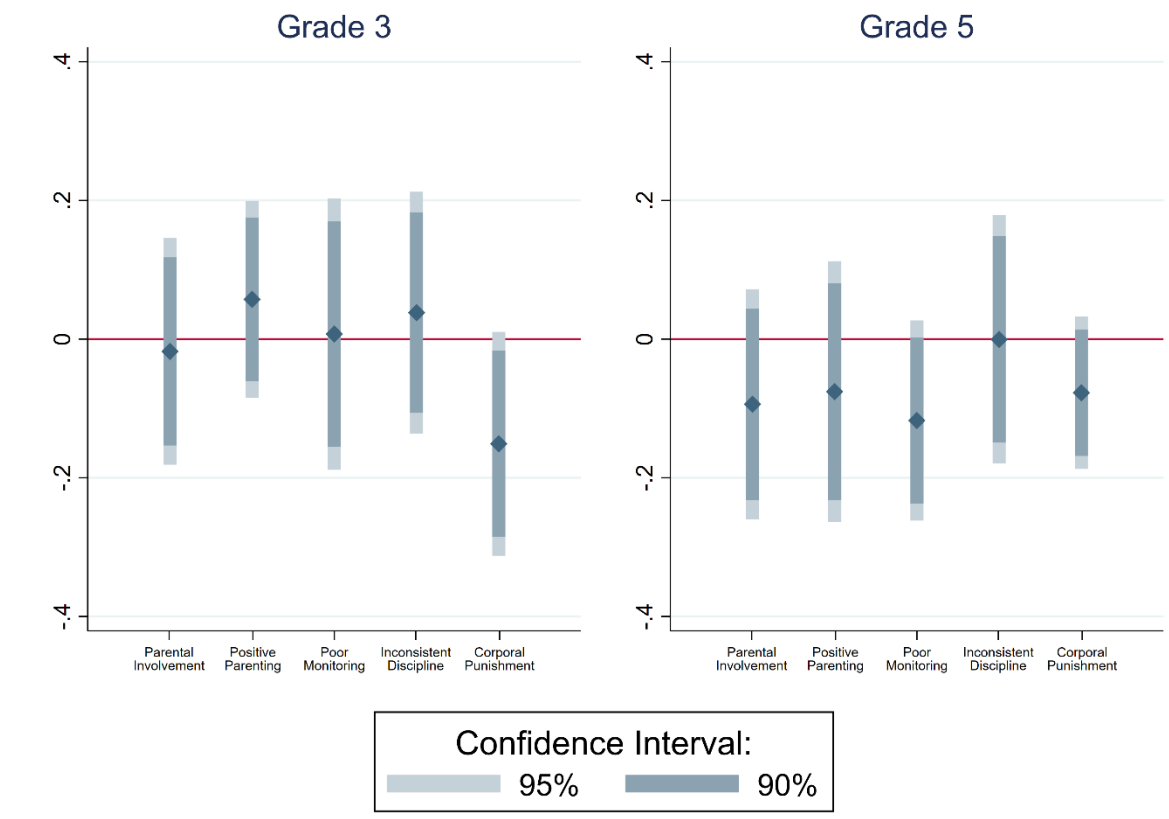
Note: This figure shows the treatment effect of the PATHS intervention on the probability of attending academic high school at different points in time. Point estimates for Grade 7, Grade 9, and probability to complete academic high school are displayed in the left panel. The left panel of the figure displays point estimates of models without control variables as in Table 4, columns (1)-(3). The right panel of the figure displays point estimates of models with control variables as in Table 4, columns (4)-(6). Control variables comprise baseline child and household characteristics and baseline child SBQ measures. Child controls include age and gender of the child and being born in Switzerland. Household controls include household income, migration status of mother, and dummy variables for single parent household, both parents only having secondary school degree, household having a parent with academic degree, household that received financial aid, and household that experienced financial problems. Controls for child SBQ include measures for anxiety/depression, ADHD, non-aggressive externalizing problem behavior, non-aggressive conduct disorder, opposition/defiance. We further include aggregate measures for overall aggression, overall externalizing behavior and two overall behavioral scores. SBQ measures are obtained from teacher, parent and child reports. All models include block fixed effects. Each point estimate is represented with the respective 90 percent and 95 percent confidence intervals.

Figure 4: Treatment Effect on Social and School Related Behavior



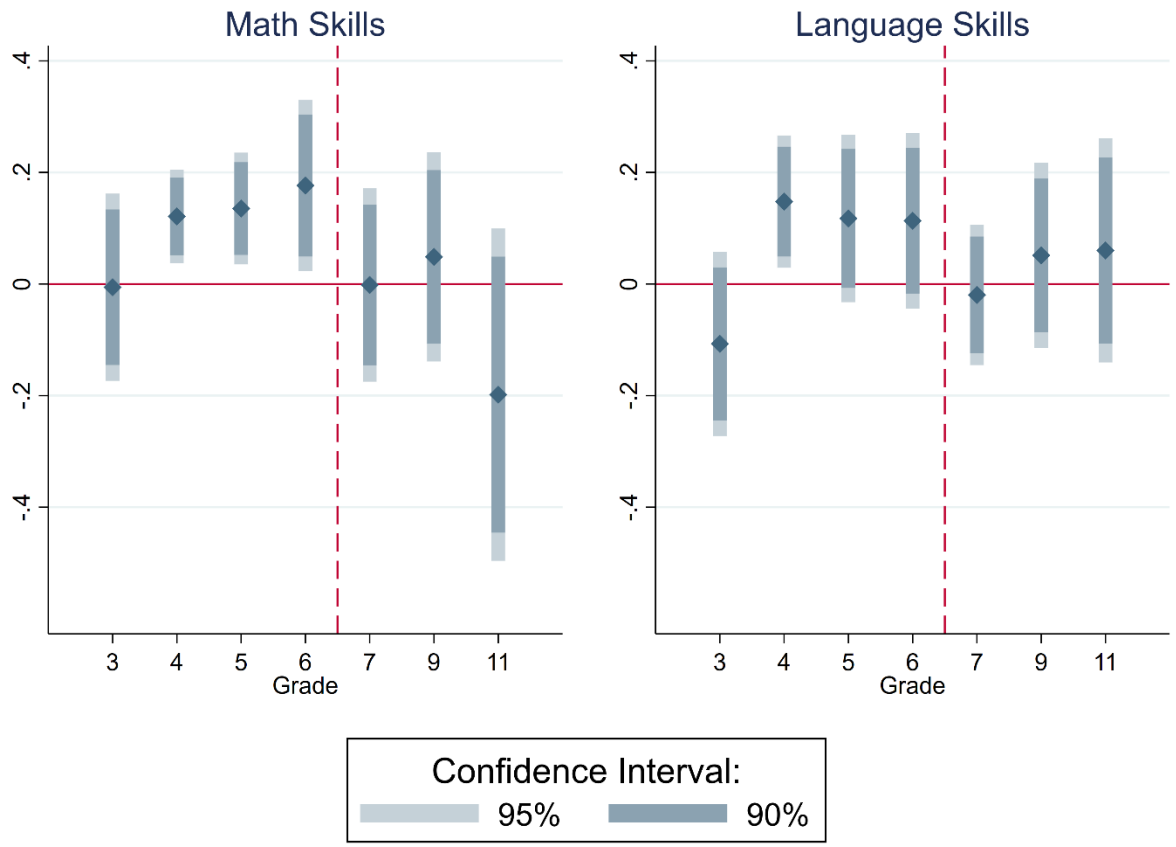
Note: This figure shows the treatment effect of the PATHS intervention on a child's social and school related behavior. Estimates are based on models in Table 4, columns (4)-(6). Social behavior is measured in Grade 3 (upper-left panel) and Grade 5 (bottom-left panel). School-related behavior is measured in Grade 4 (upper-right panel) and Grade 6 (bottom-right panel). The social behavior domain comprises measures for aggression, ADHD, anxiety depression, opposition, non-aggressive conduct disorder, and prosocial behavior. Each domain is measured using the SBQ with a 5-point Likert scale (from "never" to "very often") and standardized to obtain mean zero and standard deviation of one. School related behavior comprises measures for truancy, neglecting homework, annoying teachers, and disturbing lessons. All dependent variables are dummy variables. *Truancy* is and indicator taking value one if the teacher reported that the student missed classes during the past year. *Neglecting homework*, *annoying teacher*, and *disturbing lesson* are dummy variables taking value one if the teacher observed the respective problem behavior weekly or more often during the past year. Confidence intervals are based on standard errors clustered at the school level.

Figure 5: Treatment Effect on Parenting Style



Note: This figure shows the treatment effect of the PATHS intervention on parenting style. Estimates are based on models in Table 4, columns (4)-(6). Parenting style is measured in Grade 3 (left panel) and Grade 5 (right panel). The parenting style domain comprises parental involvement, positive parenting (rewarding positive behavior), poor monitoring, inconsistent discipline, and corporal punishment. Each domain is measured using the APQ with a 5-point Likert scale (from "never" to "always") and standardized to obtain mean zero and standard deviation of one. Confidence intervals are based on standard errors clustered at the school level.

Figure 6: Treatment Effect on School Performance



Note: This figure shows the treatment effect of the PATHS intervention school performance in mathematics and language. Estimates are based on models in Table 4, columns (4)-(6). Mathematics skills (left panel) are measured in Grades 3, 4, 5, 6, 7, 9, and 11. Language skills (right panel) are measured in Grades 3, 4, 5, 6, 7, 9, and 11. Mathematics and language skills are measured using the teacher based assessment. Teacher assessment for Grade 3 to Grade 6 is based on a 5-point Likert scale (from "worse" to "better than average"). From Grade 7 to Grade 11, teacher indicated school performance with grades from one to six (with four being the lowest passing grade). All grades are standardized to obtain mean zero and standard deviation of one. The assessing teacher in Grade 3 was the teacher involved in the intervention. After Grade 3, children were enrolled in new classes and therefore assigned to new teachers. The assessing teacher in Grade 4 to Grade 6 was unaware of the intervention. From Grade 7 to Grade 11, the respective secondary school teacher assessed school performance. The vertical line represents the time of tracking into secondary schools. Confidence intervals are based on standard errors clustered at the school level.

Appendix

Table A1: Full Randomization Check

Child and Household Characteristics	(1) 10 Separate Regressions	SBQ (Parent Report)	(2) 14 Separate Regressions	SBQ (Teacher Report)	(3) 14 Separate Regressions	SBQ (Child Report)	(4) 14 Separate Regressions
Female	0.0760*	Anxiety/Depression	-0.00958	Prosocial Behavior	0.0619	Prosocial Behavior	0.0162
	(0.0380)		(0.0241)		(0.0393)		(0.0226)
Age	-0.0359	ADHD	-0.0164	Anxiety/Depression	0.0590**	Anxiety/Depression	0.0200
	(0.0787)		(0.0219)		(0.0274)		(0.0161)
Born in Switzerland	0.0951	Non-Aggressive Externalizing Problem Behavior	-0.0223	ADHD	0.0200	ADHD	0.0120
	(0.0741)		(0.0259)		(0.0366)		(0.0244)
Parent with Academic Degree	-0.163*	Non-Aggressive Conduct Disorder	-0.00920	Opposition/Defiance	0.00825	Opposition/Defiance	-0.00254
	(0.0848)		(0.0244)		(0.0425)		(0.0222)
Both Parents Secondary School Degree	0.0338	Opposition/Defiance	-0.0241	Non-Aggressive Conduct Disorder	-0.00939	Non-Aggressive Conduct Disorder	-0.0129
	(0.0976)		(0.0244)		(0.0375)		(0.0249)
Single Parent Household	0.0551	Prosocial Behavior	0.00787	Non-Aggressive Externalizing Problem Behavior	0.00001	Non-Aggressive Externalizing Problem Behavior	-0.00836
	(0.0553)		(0.0261)		(0.0433)		(0.0223)
Migration Status Mother	-0.00863	Physical Aggression	0.000162	Indirect Aggression	0.0421	Indirect Aggression	0.0437
	(0.0637)		(0.0234)		(0.0433)		(0.0259)
Household Income	-0.000991	Indirect Aggression	0.0316	Reactive Aggression	0.0342	Reactive Aggression	0.0141
	(0.000819)		(0.0215)		(0.0407)		(0.0189)
Financial Aid	0.0587	Proactive Aggression/Dominance	0.0143	Physical Aggression	-0.0217	Physical Aggression	0.0208
	(0.062)		(0.0181)		(0.0372)		(0.0206)
Financial Problems	-0.000735	Reactive Aggression	0.00365	Proactive Aggression/Dominance	0.0476	Proactive Aggression/Dominance	0.0278
	(0.0785)		(0.0245)		(0.0406)		(0.0182)
		Overall Aggression	0.00631	Overall Aggression	0.0228	Overall Aggression	0.0260
			(0.0218)		(0.0427)		(0.0180)
		Overall Externalizing Behavior	-0.0110	Overall Externalizing Behavior	0.0216	Overall Externalizing Behavior	0.0133
			(0.0231)		(0.0444)		(0.0194)
		Overall Behavior Score 1	-0.00634	Overall Behavior Score 1	0.0171	Overall Behavior Score 1	0.0180
			(0.0256)		(0.0441)		(0.0162)
		Overall Behavior Score 2	-0.00704	Overall Behavior Score 2	-0.0184	Overall Behavior Score 2	0.00352
			(0.0265)		(0.0412)		(0.0201)

Note: Table shows coefficients for 52 separate OLS regressions. In each regression, the treatment dummy is regressed on one of the child or household characteristics, which are used as controls in the regression analyses of the treatment effect of the intervention. In other words, the table shows whether a characteristic can predict allocation to treatment. Robust standard errors clustered at the school level are in parentheses. *** p<0.01, ** p<0.05, * p<0.1

Figure A1: Example Material from the Intervention I

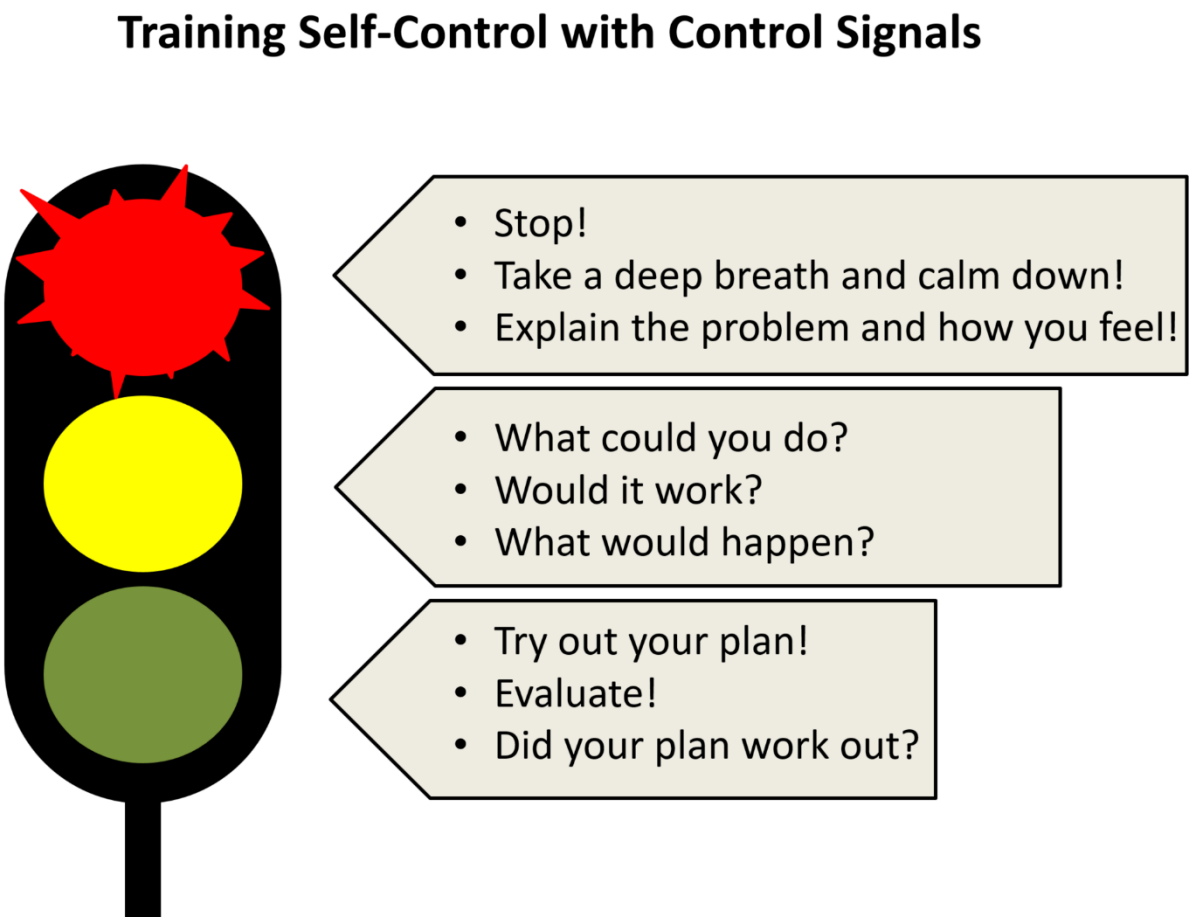
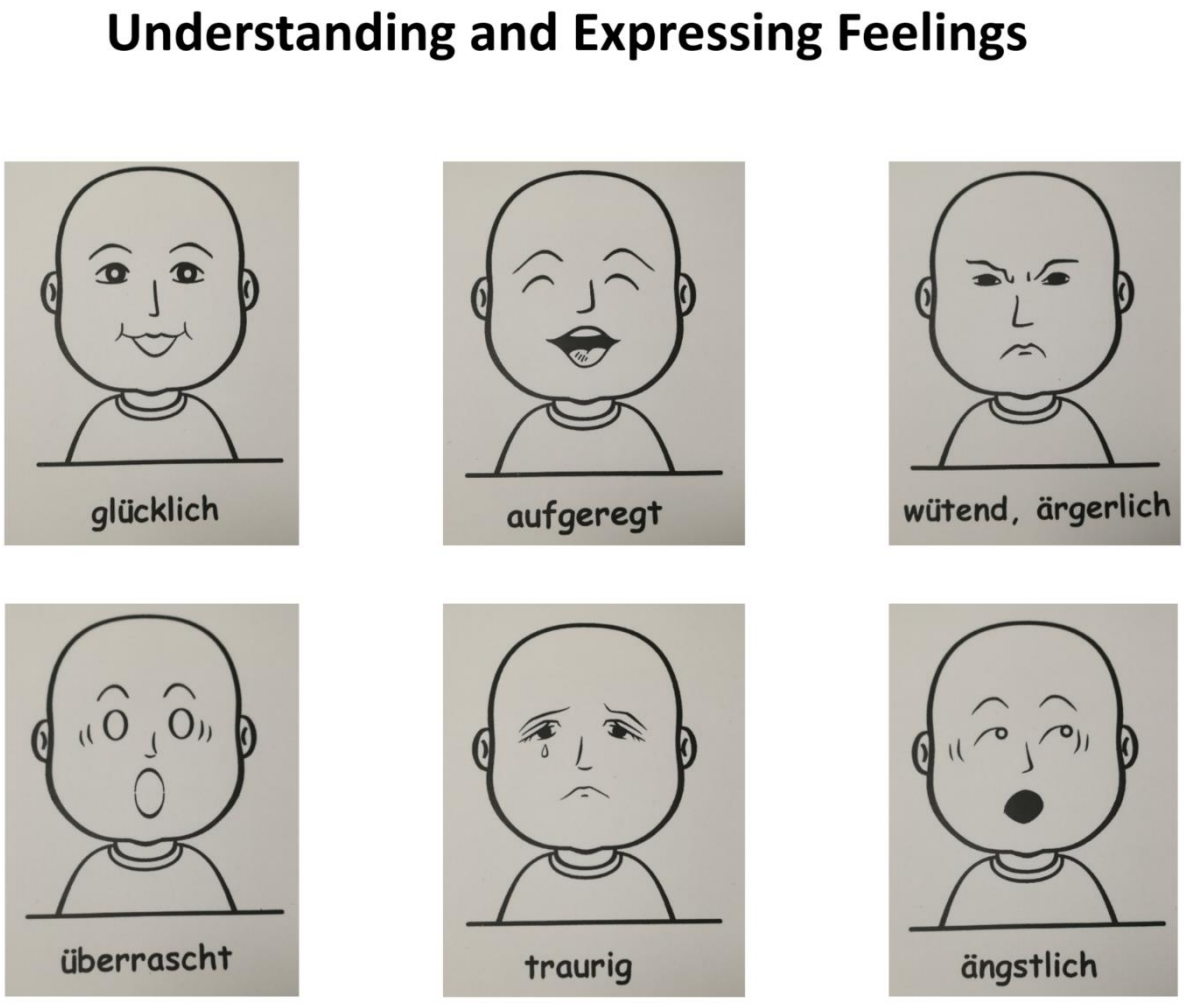


Figure A2: Example Material from the Intervention II



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

Figure A3: Example Material from the Intervention III

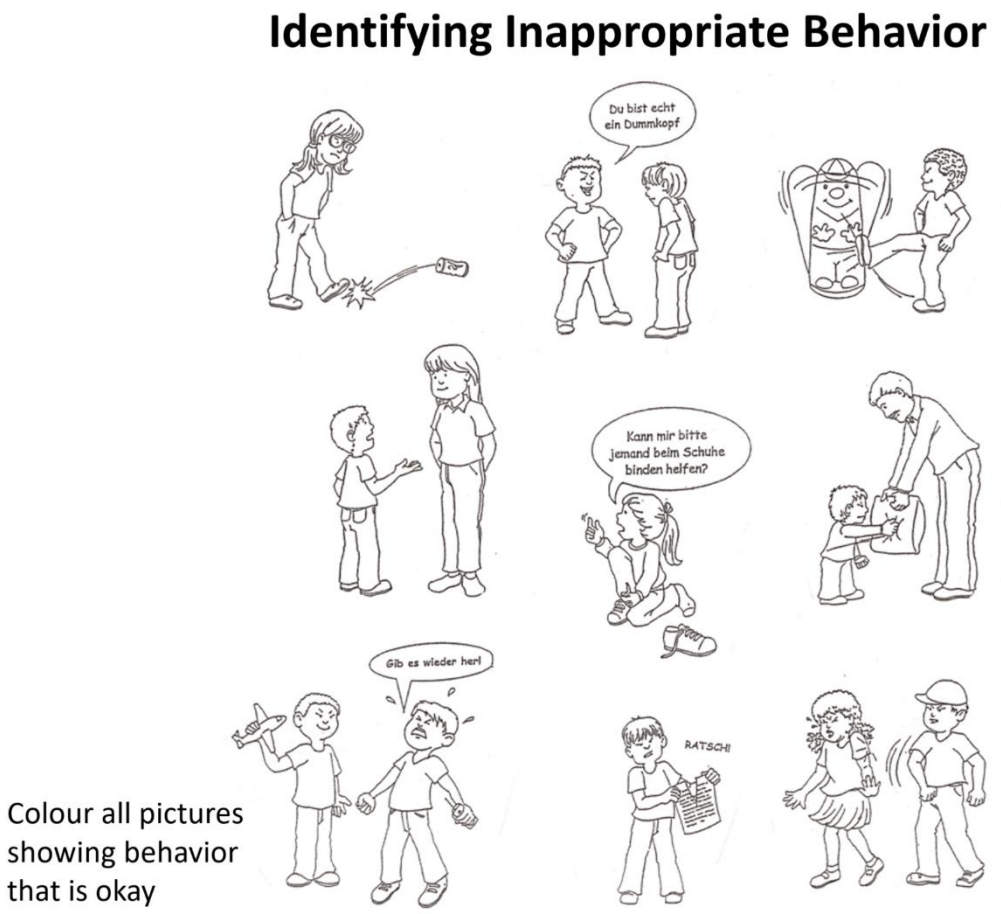


Figure A4: Example Material from the Intervention IV

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: