Economics Begins in Childhood

Essays in Applied Microeconomics

Inauguraldissertation

zur Erlangung des Doktorgrades
(doctor rerum politicarum)

eingereicht

an der Wirtschaftswissenschaftlichen Fakultät
der Heinrich-Heine-Universität Düsseldorf

von

Laura Breitkopf

aus Potsdam

August 2022

Erstgutachterin: Prof. Dr. Hannah Schildberg-Hörisch
Zweitgutachter: JProf. Dr. Andreas Lichter

Acknowledgements

Writing this thesis was the prevailing thing for me over the past few years, and was both challenging and rewarding. And while I only slowly start realizing what its submission means, I would like to turn to people who have supported me. The completion of this dissertation would not have been possible without you!

First and foremost, I am deeply grateful to my supervisor Hannah Schildberg-Hörisch for getting me on board. She encouraged me to go back to university when I was lost in discontent. I have benefited tremendously both from her guidance and from watching her work, which is an impressive lesson in seemingly effortless workflow organization and losing neither the big picture nor the small details forming it out of sight. Thank you for your trust.

I would also like to thank my second supervisor, Andreas Lichter. We only met during the last meters of my PhD, where I was stirred by the instant support he provided when I put myself on the job market on very short notice. He generously offered knowledge and expertise.

Moreover, special thanks go to my coauthors. I had just started when I was invited to accompany Shyamal Chowdhury on a research trip to Bangladesh. I was thrown in at the deep end of field work in a foreign culture, where he gave me assurance and guidance. Thank you to Daniel Kamhöfer, an uncompromising critic who has entertained, challenged, and promoted me throughout. I have learned a lot about the subtleties of empirical analysis from you. Shambhavi Priyam was a cheerful and unflinching companion when fighting our way through the data jungle, thank you. I am grateful to Matthias Sutter for his calm and precise feedback, advice whenever required, and trust. Being part of that thriving research group has set my standard for uncomplicated and effective co-working, against which any new collaboration must be measured. Thank you also to Henning Hermes, who joined team Düsseldorf only when I was about to finish, but who did not get tired of providing invaluable feedback and support.

I have written my thesis at DICE, which provided a great and reliable environment to learn, do research, or chat. In particular, I would like to thank Hedieh Aghelmaleki, Cecilia Guerrero, Sabrina Herzog, Jonathan Meinhof, Claudia Möllers, Max Osterhaus, Anja Rösner, and Nicole Wößner for making me enjoy going to work—despite tiring commuting ways. Thanks for long strolls through the university's botanical garden and surrounding fields.

Above all, however, I thank my parents and my boyfriend Frederik for their unconditional and unwavering faith and support. You raised me to have all the skills to tackle this endeavor, held the same motivating speeches again and again and again, as often as needed, and never cast any doubt on this being the right path for me. I dedicate my dissertation to you.

Contents

Acknowledgements **iii**

List of Figures **xi**

List of Tables **xv**

Introduction **1**

References 4

1 The Right Timing Matters: Sensitive Periods in the Formation of Socio-Emotional Skills **5**

1.1 Introduction 5

1.2 Study design and hypotheses 10

1.2.1 The intervention: The Lions Quest Skills for Growing program 10

1.2.2 Sensitive periods 13

1.2.3 Hypotheses 14

1.3 Data 15

1.3.1 Sampling procedure and data collection 16

1.3.2 Stratified randomization 18

1.3.3 Outcome variables 19

1.3.4 Baseline balance and attrition 23

1.4 Results 26

1.4.1 Treatment effects on socio-emotional skills 27

1.4.2 Sensitive periods in the formation of socio-emotional skills 30

1.4.3 Robustness checks 33

1.4.4 Discussion 34

1.5 Conclusion 36

References 37

Appendix 1.A Figures 43

1.A.1 LQ materials 43
1.A.2 Distributions 45
1.A.3 Sensitive periods 48
1.A.4 Teachers 49
Appendix 1.B Tables 50
1.B.1 Measures 50
1.B.2 Balancing and attrition 53
1.B.3 Robustness 55
1.B.4 Further results 58

2 Do Economic Preferences of Children Predict Behavior? 67
2.1 Introduction 67
2.2 Data 70
2.2.1 Sampling procedure and data collection 71
2.2.2 Experiments: time, risk, and social preferences 71
2.2.3 IQ 76
2.2.4 Child outcome variables 76
2.2.5 Sample characteristics 78
2.3 Hypotheses 79
2.4 Empirical strategy 81
2.5 Results 82
2.5.1 Baseline specifications 82
2.5.2 Replicating household environment 86
2.5.3 Robustness checks 88
2.6 Conclusion 89
References 90
Appendix 2.A Sampling 98
2.A.1 Covered households 98
2.A.2 2018 sampling procedure via elementary schools 98
Appendix 2.B Distributions 100
Appendix 2.C Preference measures for adults 102
Appendix 2.D Parenting style 103
Appendix 2.E Details on outcome measures 105
2.E.1 Risky behaviors 105
2.E.2 Prosociality scale 105
2.E.3 SDQ score 106
Appendix 2.F Additional summary statistics 107

Appendix 2.G Plotting main regressions 109
Appendix 2.H Adding household environment variables 114
Appendix 2.I Robustness checks 116
2.I.1 Including children who did not understand (all) experiments 116
2.I.2 Reducing the sample in baseline regressions to children for whom household environment variables are available 121
2.I.3 Using a different measure to capture risk preferences 125
2.I.4 Using the full SDQ score 125

3 Family First: Do Social Preferences Influence Behavior in Childhood? 129
3.1 Introduction 129
3.2 Empirical strategy 133
3.2.1 Measurement error 133
3.2.2 Model specifications to relate social preferences and field behavior 136
3.3 Data 139
3.3.1 Social preferences 139
3.3.2 Cognitive skills 141
3.3.3 Field behavior 142
3.3.4 Sample characteristics 143
3.4 Results 144
3.4.1 Baseline specifications 144
3.4.2 Adding family fixed effects 145
3.5 Robustness and discussion 147
3.5.1 Discussion of social preferences measures 147
3.5.2 Discussion of measures of field behavior 148
3.5.3 Addressing measurement error 148
3.6 Conclusion 149
References 150
Appendix 3.A Details on social preferences measures 156
Appendix 3.B Details on field behavior measures 158
3.B.1 SDQ prosociality scale 158
3.B.2 SDQ score 159
Appendix 3.C Additional summary statistics 160
Appendix 3.D Distributions 162
Appendix 3.E Further results 166

4 Positive Parenting Style and Skills of Children 175
4.1 Introduction 175

4.2 Data 177
4.2.1 Parenting style measures 178
4.2.2 Outcome measures: skills and behaviors 178
4.3 Empirical strategy 180
4.3.1 Positive parenting categorization 181
4.3.2 LDA model 182
4.4 Results 186
4.4.1 Cognitive skills 187
4.4.2 Non-cognitive skills 188
4.4.3 Behavioral outcomes 189
4.5 Discussion 189
References 191
Appendix 4.A Outcome measurement 195
4.A.1 Parenting style 196
Appendix 4.B Linear discriminant analysis (LDA) 198
Appendix 4.C Additional results 199
4.C.1 Complete regression tables 204

Experimental Instructions 209

Children experiments and individual survey 209
Time preferences 211
Risk preferences 217
Social preferences 223
Locus of control 227
Time preferences question 227
Risk preferences question 227
Trust 227
Self-control 228
Risky behaviors 228
Big Five 229
Self-esteem 230
Happiness 230
Mothers about children survey 231
Impulsivity/self-control 231
Big Five 231
Strengths and Difficulties Questionnaire 232
Parenting style 233
Adults experiments 234

Time preferences 234
Risk preferences 238
Social preferences 241

Declaration of Authorship **245**

List of Figures

1.1	Timeline of data collection and intervention	18
1.2	Treatment effects on socio-emotional skills by school grade	30
1.A.1	Lions Quest Skills for Growing PreK–8 Scope and Sequence Sheet	43
1.A.2	Example of learning materials	44
1.A.3	Distribution of outcome measures	45
1.A.4	Distribution of outcome components	45
1.A.5	Distribution of outcome measures by household income	46
1.A.6	Distribution of outcome measures by mothers' skills	47
1.A.7	Distribution of outcome measures by fathers' skills	47
1.A.8	Treatment effects on socio-emotional skills by school grade when controlling for pre-treatment outcomes	48
1.A.9	Number of teachers per school	49
1.A.10	Number of LQ grades per teacher	49
2.B.1	Distribution of time preferences	100
2.B.2	Distribution of risk preferences	101
2.B.3	Distribution of social preferences	101
2.G.1	Coefficient plot for outcome study atttitude	109
2.G.2	Coefficient plot for outcome risky behaviors	110
2.G.3	Coefficient plot for outcome prosociality	111
2.G.4	Coefficient plot for outcome SDQ internalizing subscale	112
2.G.5	Coefficient plot for outcome SDQ externalizing subscale	113
3.A.1	PCA scree plot	157
3.D.1	Distribution of prosociality scale	162
3.D.2	Distribution of SDQ score	162
3.D.3	Distributions of social preferences measures	163
4.B.1	LDA model accuracy	198
4.C.1	Distribution of parenting style dimensions	200

List of Tables

1.1	Sample overview	17
1.2	Time preferences experiments for children	20
1.3	Social preferences experiments for children	21
1.4	Balancing results for pre-treatment outcomes	24
1.5	Balancing overview for covariates and pre-treatment outcomes on grade level	26
1.6	Overall treatment effects	27
1.7	Treatment effects on socio-emotional skill components	29
1.8	Sensitive periods as captured by treatment effect heterogeneity along school grades	31
1.B.1	Items of the Impulsivity Scale for Children (ISC)	50
1.B.2	Items of the Strengths and Difficulties Questionnaire (SDQ) prosociality scale	50
1.B.3	Descriptive statistics of outcome variables, pooled and by school grade	51
1.B.4	Share of individuals reaching the ceiling of outcome scales	51
1.B.5	Using alternative definitions of experimental outcome measures for treatment effect estimations	52
1.B.6	Balancing results for covariates (measured in 2019 at the beginning of the treatment period)	53
1.B.7	Sample attrition	54
1.B.8	Treatment effects *p*-values	55
1.B.9	Treatment effects on socio-emotional skills when controlling for pre-treatment outcomes and family characteristics	56
1.B.10	Grade-specific treatment effects on socio-emotional skills when controlling for pre-treatment outcomes and family characteristics	57
1.B.11	Treatment effect heterogeneities along socio-demographic characteristics	58
1.B.12	Treatment effect heterogeneities along children's pre-treatment socio-emotional skills and parents' socio-emotional skills	59
1.B.13	School characteristics by treatment status	60
1.B.14	Teacher characteristics by treatment status	60
1.B.15	Relationship between teacher characteristics and student outcomes	61

1.B.16	Treatment effects when controlling for school and teacher characteristics	61
1.B.17	Pooled and grade-specific treatment effects on children's behaviors	62
1.B.18	Pooled and grade-specific treatment effects on parenting style	63
1.B.19	Teachers' assessment of LQ-specific aspects by grade	64
1.B.20	Treatment effects on teaching style and attitudes	65
2.1	Time preferences experiments for children	73
2.2	Risk preferences experiments for children	74
2.3	Social preferences experiments for children	75
2.4	Sample descriptives	79
2.5	Regressions of study attitude and risky behaviors on preferences: baseline vs. HH environment specifications	83
2.6	Regressions of prosociality and SDQ on preferences: baseline vs. HH environment specifications	84
2.A.1	Total study sample size 2018	99
2.C.1	Time preferences experiments for adults	102
2.F.1	Summary statistics	107
2.F.2	Summary statistics, continued	108
2.H.1	Adding household environment variables to regressions of child outcomes on preferences	115
2.I.1	Adding children who did not understand experiments not in focus of outcome	117
2.I.2	Adding children who did not understand some or any experiments (i.e., including all children participating in experiments)—I	118
2.I.3	Adding children who did not understand some or any experiments (i.e., including all children participating in experiments)—II	119
2.I.4	Comparison of children who understood all experiments with all children participating in experiments	120
2.I.5	Baseline regressions sample comparison—I	122
2.I.6	Baseline regressions sample comparison—II	123
2.I.7	Comparison of children in HH environment sample with children in baseline sample	124
2.I.8	Using a more differentiated risk measure in regressions of child outcomes on preferences—I	126
2.I.9	Using a more differentiated risk measure in regressions of child outcomes on preferences—II	127
2.I.10	Regressions of child outcomes on preferences and controls: SDQ full score vs. subscales	128
3.1	Social preferences games for children	140
3.2	Summary statistics for sample of siblings	144

3.3	Main results	146
3.A.1	Correlations of social preferences measures and games	156
3.A.2	Principal component analysis (PCA) of social preferences	157
3.C.1	Additional summary statistics for sample of siblings	160
3.C.2	Comparison of sample of siblings with full sample	161
3.D.1	Correlations of preferences, IQ, and field behavior between siblings	164
3.D.2	Variation in preferences, IQ, and field behavior between and within families	165
3.E.1	Full regression results for outcome prosociality	166
3.E.2	Full regression results for outcome SDQ	167
3.E.3	Results when using conventional IV strategies vs. using ORIV	168
3.E.4	Replication of main results for alternative combination of games	169
3.E.5	Replication of main results for alternative aggregation of stars	170
3.E.6	Main results for SDQ conduct and peer problems subscales	171
3.E.7	Results when applying alternative methods to address measurement error	172
3.E.8	ORIV regressions using bootstrapped standard errors	173
4.1	Group descriptive statistics	184
4.2	Pairwise correlations between parenting style dimensions	184
4.3	Skewness and kurtosis test for normality	185
4.4	Canonical discriminant function coefficients, structure matrix, and pairwise correlations of parenting style classes and underlying dimensions	185
4.5	Income categories and categorization based on LDA	186
4.6	Children's outcomes and positive parenting for children aged 6 to 16	187
4.A.1	Outcome measures	195
4.C.1	Summary statistics	199
4.C.2	Children's outcomes and positive parenting for children aged 6 to 9	201
4.C.3	Children's outcomes and positive parenting for children aged 10 to 16	202
4.C.4	Children's outcomes and income (median split) for children aged 6 to 16	203
4.C.5	Association between cognitive skills and positive parenting	204
4.C.6	Association between economic preferences and positive parenting	205
4.C.7	Association between Big Five personality traits and positive parenting	206
4.C.8	Association between personality traits as well as happiness and positive parenting	207
4.C.9	Association between behavioral outcomes and positive parenting	208

Introduction

Non-cognitive skills matter. By now, this statement is almost common knowledge, and economists have spent much time and energy integrating this insight into their models and, piece by piece, gathering and consolidating empirical evidence. Non-cognitive skills are key predictors of central life outcomes such as educational attainment, job performance, earnings, and health (see, for example, Almlund et al., 2011; Golsteyn, Grönqvist, and Lindahl, 2014; Falk et al., 2018; Cobb-Clark et al., 2022; Sunde et al., 2022). Non-cognitive skills, thereby, encompass economic preferences and personality traits from psychology, which are related concepts designed to characterize individuals (Becker et al., 2012). The predictive power of preferences and personality traits has been documented thoroughly for adults. However, less is known about both their relevance and their formation in childhood and adolescence. For adults, preferences and personality traits are assumed to have a high degree of stability over time. But when and how are they formed? Can they be molded and (how) can their development be promoted at an early stage? How do children's skills translate into behavior and well-being?

This thesis is organized around these broad questions and aims at contributing to an improved empirical understanding of the foundations of individual decision-making. The four essays reflect the deep belief that children play a relevant role and that understanding decision-making within a society requires researchers to perceive children and adolescents as economic actors.[1] As inequalities in skills across socio-economic groups open up at young ages, knowledge about skill formation can help to detect and alleviate (long-term) consequences (see, e.g., Heckman and Mosso, 2014, and the references therein). To gain more knowledge here, all thesis parts draw on incentivized lab-in-the-field experiments and validated survey scales from psychology to measure non-cognitive skills precisely and reliably. These profound measures are then taken to investigate childhood development of skills, relationships between skills and children's immediate life outcomes, and factors influencing both. Akin to and used interchangeably here for non-cognitive skills is the term socio-emotional skills.

1. As List, Petrie, and Samek (2021) respectfully term it, experiments with children are conducive to "inform economics," and they are more and more used to do so (see Sutter, Zoller, and Glätzle-Rützler, 2019, for an extensive review).

Core and basis of all chapters is a large-scale panel data collection in rural Bangladesh. These data cover nearly 6,000 children from elementary school age to the end of adolescence and their parents, and were collected from 2018 onwards. They combine measures of economic preferences (more precisely, time, risk, and social preferences) and personality traits (like locus of control, self-esteem, and the Big Five) with wide-ranging information on outcomes (such as study attitude, risky behaviors, prosociality, emotional health, and behavioral problems) and family environment. Time, risk, and social preferences were jointly elicited in incentivized experiments. Having such multi-dimensional data allows to comprehensively study decision-making and accounts for decisions typically involving more than one preference dimension. Additionally, the household dimension with data collection of whole families permits analyzing determinants of decision-making within the household, one of the most important yet difficult to study decision-making units. As all papers within this thesis share them, detailed experimental instructions and survey questions are attached as a joint appendix section at the end.

Each chapter can be read independently of the other chapters. Still, they all contribute to our understanding of the development of non-cognitive skills, the returns associated with and caused by them, and how targeted policy interventions can influence the formation of skills to promote personal and societal well-being. The different chapters apply a broad set of analyses of skill measures and associations, as well as explicit randomization to infer causality.

In Chapter 1, which is joint work with Shyamal Chowdhury, Daniel Kamhöfer, Hannah Schildberg-Hörisch, and Matthias Sutter, we study the malleability of skills in childhood. In a randomized controlled trial (RCT) with about 3,200 elementary school children, we examine the existence of sensitive periods in the formation of socio-emotional skills. In sensitive periods, as promoted in the seminal model on skill formation introduced by Cunha and Heckman (2007), returns to investments into skills are particularly high. To learn about sensitive periods, we implemented the same intervention in different school grades to assess its age-specific treatment effects on children's self-control, patience, and prosociality. Our results illustrate that investments can be more or less beneficial depending on the children's age: there seem to be sensitive periods in the formation of self-control and patience around the ages 7 and 8, while prosociality appears similarly malleable throughout ages 7 to 11. Knowledge about sensitive periods is valuable for effective and efficient timing of parental or public investments.

Chapters 2 (joint with Shyamal Chowdhury, Shambhavi Priyam, Hannah Schildberg-Hörisch, and Matthias Sutter) and 3 connect children's preferences and outcomes. How robust are previously observed associations, and what exactly do they reflect, especially given the still malleable and emerging nature of children's preferences (a finding emphasized in Chapter 1)? We provide evidence that relationships between child preferences and behavior to some extent encompass their joint correlation with family environment characteristics.

As our data comprise experimental measures of child preferences and manifold outcome measures, we can study the link between all key preference dimensions and various outcomes in childhood within a unified framework in Chapter 2. Our findings from cross-sectional regression models confirm that children's time preferences predict educational outcomes, and risk preferences predict risky behaviors. In addition, we provide first evidence on the predictive power of children's social preferences and observe that spiteful children score lower on prosociality, have a worse study attitude, and have more pronounced behavioral problems than egalitarian, altruistic, or selfish children. In a second step, we add detailed information on a family's socio-economic status, family structure, religion, parents' preferences and IQ, as well as parenting style as explicit control variables. When adding these extensive controls that replicate household environment, the predictive power of preferences for outcomes attenuates, frequently leading to insignificant correlations. As such, our findings already suggest that measures of children's and adolescents' preferences in part reflect family or household environment.

Following that path further, in Chapter 3, we focus on the prosociality dimension of child decision-making. Prosociality becomes relevant whenever humans interact, and social preferences are a key parameter in economic models. Empirical research largely supports these other-regarding preferences' predictive power for life outcomes, both on the individual and the societal level (see again, e.g., Becker et al., 2012, or Falk et al., 2018). However, do social preferences also directly translate into prosocial behaviors in childhood? We use measures of preferences and behaviors of almost 2,000 pairs of siblings to estimate family fixed effects models and control for characteristics of the family environment shared by siblings. Our data allow us to establish reliable estimates: we correct for measurement error in our preferences measures by applying the *obviously related instrumental variables* (ORIV) approach put forward by Gillen, Snowberg, and Yariv (2019). As in Chapter 2, we observe significant predictive power of social preferences for contemporaneous field behavior. Holding the household environment constant and comparing only siblings within families, however, substantially decreases effect sizes, again emphasizing the importance of the family environment a child is raised in for both the formation of preferences and child behavior.

In the final Chapter 4, we are turning to the influence of parental investments (also joint with Shyamal Chowdhury, Shambhavi Priyam, Hannah Schildberg-Hörisch, and Matthias Sutter). We examine the importance of parenting style for children's cognitive and non-cognitive development. We find that positive parenting (characterized by high degrees of emotional warmth and monitoring, and low degrees of strict control, psychological control, and negative communication) is positively related to children's IQ, their economic preferences (patience and altruism), their personality traits (including the Big Five, self-esteem, and self-control), behavioral outcomes, and life satisfaction. Thus, our results document the crucial role of parenting (styles) in children's lives, once more underlining the need to integrate the family environment in any analysis of childhood development. Or, as Francesconi and Heckman

(2016, p. F1) phrase it: “Childhood is the province of the family and the environments in which families are situated.”

References

Almlund, Mathilde, Angela L Duckworth, James J Heckman, and Tim Kautz. 2011. “Personality Psychology and Economics.” In *Handbook of the Economics of Education,* 4: 1–181. Elsevier. [1]

Becker, Anke, Thomas Deckers, Thomas Dohmen, Armin Falk, and Fabian Kosse. 2012. “The Relationship Between Economic Preferences and Psychological Personality Measures.” *Annual Review of Economics* 4 (1): 453–78. [1, 3]

Cobb-Clark, Deborah A, Sarah C Dahmann, Daniel A Kamhöfer, and Hannah Schildberg-Hörisch. 2022. “The Predictive Power of Self-Control for Life Outcomes.” *Journal of Behavior & Organization* 197: 725–44. [1]

Cunha, Flavio, and James J Heckman. 2007. “The Technology of Skill Formation.” *American Economic Review* 97 (2): 31–47. [2]

Falk, Armin, Anke Becker, Thomas Dohmen, Benjamin Enke, David Huffman, and Uwe Sunde. 2018. “Global Evidence on Economic Preferences.” *Quarterly Journal of Economics* 133 (4): 1645–92. [1, 3]

Francesconi, Marco, and James J Heckman. 2016. “Child Development and Parental Investment: Introduction.” *Economic Journal* 126 (596): F1–F27. [3]

Gillen, Ben, Erik Snowberg, and Leeat Yariv. 2019. “Experimenting with Measurement Error: Techniques with Applications to the Caltech Cohort Study.” *Journal of Political Economy* 127 (4): 1826–63. [3]

Golsteyn, Bart HH, Hans Grönqvist, and Lena Lindahl. 2014. “Adolescent Time Preferences Predict Lifetime Outcomes.” *Economic Journal* 124 (580): F739–F761. [1]

Heckman, James J, and Stefano Mosso. 2014. “The Economics of Human Development and Social Mobility.” *Annual Review of Economics* 6 (1): 689–733. [1]

List, John A, Ragan Petrie, and Anya Samek. 2021. “How Experiments with Children Inform Economics.” NBER Working Paper 28825. National Bureau of Economic Research (NBER). Forthcoming in *Journal of Economic Literature*. [1]

Sunde, Uwe, Thomas Dohmen, Benjamin Enke, Armin Falk, David Huffman, and Gerrit Meyerheim. 2022. “Patience and Comparative Development.” *Review of Economic Studies* 89 (5): 2806–40. [1]

Sutter, Matthias, Claudia Zoller, and Daniela Glätzle-Rützler. 2019. “Economic Behavior of Children and Adolescents – A First Survey of Experimental Economics Results.” *European Economic Review* 111: 98–121. [1]

Chapter 1

The Right Timing Matters: Sensitive Periods in the Formation of Socio-Emotional Skills*

Joint with Shyamal Chowdhury, Daniel Kamhöfer, Hannah Schildberg-Hörisch, and Matthias Sutter

1.1 Introduction

The model of skill formation by Cunha and Heckman (2007, 2008) is the seminal theoretical contribution to the development of children's cognitive and socio-emotional skills in economics. In this model, skills are the product of genetic and environmental conditions at conception, parental characteristics (e.g., IQ, education, income), and parental and public

* Financial support from the German Research Foundation (Deutsche Forschungsgemeinschaft, DFG) through grant no. SCHI 1377/1 and under Germany's Excellence Strategy (EXC 2126/1-390838866) as well as from the Lions Clubs International Foundation is gratefully acknowledged. IRB approval (Heinrich Heine University Düsseldorf) was granted under study number 6212. The intervention was preregistered at the AEA RCT Registry (RCT ID AEARCTR-0003129). For useful comments and discussions, we are grateful to Sarah Cattan, Katja Kaufmann, Fabian Kosse, Petter Lundborg, Gerhard Riener, Anya Samek, Joachim Winter, and Jonathan Zinman as well as seminar participants in Düsseldorf, at GIGA, Hamburg, at the University of Konstanz, at Royal Holloway, London, and at the University of Nottingham. In addition, the paper benefited from feedback of many conference participants at the IZA/ECONtribute Human Capital Workshop 2021, the M-BEES 2021, the IAREP/SABE 2021 Conference, the EALE Conference 2021, the VfS Annual Conference 2021, the FU Berlin Empirical Public Economics Workshop 2022, the Bank of Italy Human Capital Workshop 2022, the NHH-MPI Workshop 2022, and the CESifo Venice Summer Institute 2022. We thank the officials of the Bangladesh Ministry of Primary and Mass Education, especially the then Minister Adv. Mostafizur Rahman Fizar for his whole-hearted support in the implementation of the program in public elementary schools, all LQ trainers from India, and translators and editors from Bangladesh and India, especially Israt Zerin, for her tireless efforts. We also like to thank Arifur Rahman, Rabbi Rahim, Arun Jyoti, and Delowar Hossain for their assistance in the implementation of the LQ SfG program in the field.

investments in children. Skill formation is modeled as a dynamic, multistage process: children's skills change over time as the result of accumulating investments and exhibit both self-productivity and complementarity.[1]

A key assumption of the model is the existence of sensitive periods for the development of each skill. Sensitive periods are those maturational stages in which investments are especially productive.[2] While cognitive skills like IQ are most malleable in early childhood years, with sensitive periods likely below age 3 (Shonkoff and Phillips, 2000; Knudsen et al., 2006; Heckman and Mosso, 2014), research has not yet isolated sensitive periods in the formation of socio-emotional skills in general and economic preferences in particular (J-PAL, 2013; Kautz et al., 2014). This paper aims to address that gap.

The empirical identification of sensitive periods is challenging for several reasons. First, in observational data, investments are often endogenous such that returns to investments cannot be causally interpreted. Second, identifying sensitive periods requires comparing the returns to the *same investment into skills for children of different ages*. As an important prerequisite for clean inference, the investment needs to be implemented during the same time period for children of different ages to ensure that possibly interfering time trends do not overlay age-specific treatment effects. Moreover, investment intensity must be held constant across the different age groups. In contrast, studying an investment that is introduced at the same stage for all children and observing child outcomes in different grades in cross-sectional data compounds age heterogeneity in investment returns with differences in treatment length. This exacerbates the difficulties in learning about sensitive periods.[3]

In this paper, we propose and implement a novel design to empirically assess sensitive periods that can be applied more broadly in future work. To enable causal inference, we set up a randomized controlled trial (RCT) in which we assign a given investment, our treatment, to children of different ages, holding treatment period and intensity constant across all age groups. We then measure heterogeneity in the treatment effect along the age distribution

1. Skills produced at one stage do not only persist but also augment the skills attained at later stages. This so-called self-productivity embodies the idea that skills are reinforcing and cross-fertilizing, i.e., a higher stock of a given skill in one period raises the stock of the same or another skill in the next period. A second key feature of skill formation is complementarity: skills produced at one stage raise the productivity of investment in skills at subsequent stages. Together, complementarity and self-productivity produce multiplier effects such that skills together with investments are predicted to beget skills (Cunha and Heckman, 2007, 2008; Cunha, Heckman, and Schennach, 2010).

2. Moreover, also within the model there may exist critical periods in the formation of skills. If an individual does not receive a stimulus during a critical period, it may be difficult or even impossible to develop a skill later in life.

3. For example, providing free lunch at school from first grade onwards and comparing children in different grades or introducing such a program in different grades and observing outcomes at some point in time after school does not allow to disentangle age effects from the number of years children had access to the lunch (see, e.g., Hoynes, Schanzenbach, and Almond, 2016, and Lundborg, Rooth, and Alex-Petersen, 2021, as examples for quasi-experimental studies on the effects of food stamp or school lunch programs on economic, educational, and health outcomes).

(proxied by school grade). Grade-specific treatment effects that are substantially larger than those for the same skill in other grades indicate the existence of a sensitive period.

The investment under consideration is a well-established social and emotional learning (SEL) program, the Lions Quest Skills for Growing program, which provides the same investment to children of different ages. The program aims at supporting young people confronted with the challenges of growing up: they learn how to manage their emotions, achieve their goals, care about and have wholesome relationships with others, and act responsibly. It has a longstanding history and follows a curriculum implemented by the children's teachers in the classroom environment. The curriculum comprises lessons on personal development, social development, as well as responsible decision-making with respect to health and prevention of unhealthy, negative behaviors such as substance abuse, bullying, or violence. Based on its detailed documentation, such as its "Universal Program Guide" (LCIF, 2016) and the grade-specific "Facilitator's Resource Guides" for teachers, we hypothesize that program participation may increase three important socio-emotional skills: children's self-control, patience, and prosociality.

Self-control and patience are both integral to people's intertemporal decision-making as modeled by time preferences. Self-control captures an individual's present-bias that influences the extent to which individuals are able to resist temptations and suppress immediate impulses in order to achieve their long-term goals. Higher self-control is associated with higher educational attainment, better health, greater labor market success, more financial well-being, and greater overall life satisfaction (Tangney, Baumeister, and Boone, 2004; Moffitt et al., 2011; Cobb-Clark et al., 2022). Patience reflects the long-run discount factor in intertemporal utility and has been shown to predict education, labor market and health outcomes, and savings (DellaVigna and Paserman, 2005; Sutter et al., 2013; Golsteyn, Grönqvist, and Lindahl, 2014; Alan and Ertac, 2015), for example. Capturing altruistic behaviors, prosociality has been linked to both individual-level outcomes such as labor market success (Deming, 2017) and societal outcomes such as the provision of public goods and management of commons (Ostrom et al., 2002). Each of our skill measures combines children's revealed preferences measured in incentivized experiments and validated survey scales answered by children or their mothers. This synthesis of survey and lab-in-the-field assessment of skills results in measures that reflect the underlying skills' multi-dimensional nature and comprehensively characterize individuals (Falk et al., 2018; Kosse et al., 2020). Our approach also reduces measurement error and potential demand effects (Hertwig and Ortmann, 2001).

We compare self-control, patience, and prosociality of children in grades 2 to 5 (aged 7 to 11) in 69 treatment schools and of children in 66 control schools in rural Bangladesh. While all children in grades 2 to 5 in treatment schools received the treatment and participated in the Lions Quest Skills for Growing program for 28 weeks, we randomly chose five children per class and their families from both treatment and control schools to enter our RCT sample. By comparing grade-specific treatment effects of the same program, we can learn about possible

sensitive periods in the formation of self-control, patience, and prosociality between the ages of 7 to 11.

Our main findings can be summarized as follows. Overall, participation in the Skills for Growing program significantly enhances self-control and prosociality in elementary school children. Averaging treatment effects across grades yields increases of 10.7 and 8.8 percent of a standard deviation, respectively. While positive as well, the overall treatment effect on patience (4.4 percent of a standard deviation) is not significantly different from zero. Comparing treatment effects across grades reveals substantial heterogeneity that points to sensitive periods in the formation of the analyzed skills. In particular, for self-control and patience as key dimensions of time preferences, treatment effects are substantially larger for younger children in grade 2—and in the case of self-control also grade 3—than for older children. While grade-specific treatment effects are close to zero and insignificant for older children, they range between 15 and 21 percent of a standard deviation for second graders ($p < 0.05$) for both self-control and patience. Grade-specific treatment effects for prosociality are relatively large and significant throughout grades 2 to 5 (13 to 14 percent of a standard deviation, all $p < 0.05$ or < 0.1), with the exception of grade 3 (the insignificant treatment effect here is likely driven by an initial imbalance that occurred by chance). Prosociality seems equally malleable during the considered age range between 7 and 11 years.

The contribution of this study is threefold. First, as a conceptual contribution, we propose a novel design for empirically assessing sensitive periods in the formation of children's skills (Cunha and Heckman, 2007) and provide first evidence. While the results of this paper are only a first step towards addressing the lack of knowledge regarding the timing of sensitive periods in the formation of children's socio-emotional skills, our proposed design can also be applied in future research endeavors. Related research in developmental psychology and neuroscience defines sensitive periods as limited periods during which effects of experience on the brain are unusually strong (Knudsen, 2004; Zeanah et al., 2011; Hartley and Frankenhuis, 2020), which closely resembles the definition applied in this paper. Studies focus on the development of perceptual, cognitive, and emotional capacities such as vision, language proficiency, the formation of social relationships and stress management, as well as on underlying neural circuits (see Knudsen, 2004, and his references for cited examples). Identification of sensitive periods in these disciplines has also proven difficult and mainly follows environmental deprivation paradigms originating in animal research. Human developmental research, therefore, studies contexts where deprivation naturally occurs, such as for children raised in institutions who lack sensitive and responsive caregivers (Gabard-Durnam and McLaughlin, 2020). Enriching environments via childhood interventions is a new approach that bypasses the obvious ethical problems that would arise in controlled deprivation studies.

Second, our findings have important policy implications. For example, our results on sensitive periods in the formation of self-control and patience align with "the earlier, the better" findings regarding the development of cognitive skills (see, e.g., Knudsen et al., 2006;

Zeanah et al., 2011; Heckman and Mosso, 2014), extending evidence that earlier investments often have larger returns than later ones in the domain of time preferences. More generally, our findings underline that the same investment may be more effective at some ages than others. Knowledge about sensitive periods is thus crucial for effective and efficient timing of parental or public investments, including interventions that aim at enhancing socio-emotional skills. Finally, our results show that even if returns to investments in the cognitive skills of disadvantaged children beyond age 3 are low, returns to investments in socio-emotional skills can still be comparably high, as hypothesized by Cunha and Heckman (2007) and Borghans et al. (2008).

Third, we evaluate the Lions Quest Skills for Growing program that formed the basis of the RCT with respect to its impact on self-control, patience, and prosociality. Although the effect sizes we document are slightly smaller than those occasionally found for intensive model programs (Heckman et al., 2010) that are specially designed to foster specific skills and target disadvantaged children only, our results indicate that available, large-scale programs can provide an effective tool for improving children's socio-emotional skills. We thereby add to the literature on interventions for elementary school children, in which large-scale evaluations that are based on RCTs such as ours are rare (which is documented in, e.g., Rodríguez-Planas, 2012, and Kautz et al., 2014). For studies in the school context focusing on self-control and patience, see Alan and Ertac (2018) and Sorrenti et al. (2020), who also provide a comprehensive review of recent intervention studies on socio-emotional skills; for results on prosociality, see John and Thomsen (2015), Alan and Ertac (2017), Rao (2019), Cappelen et al. (2020), and Kosse et al. (2020). Castillo et al. (2020) present results of an intervention targeting cognitive skills and executive functioning, but also measure time, risk, and social preferences to comprehensively study effects. In light of the frequent implementation of the Lions Quest programs (cf. section 1.2.1), rigorous evaluations, especially of the Skills for Growing program targeting elementary school children, are surprisingly scarce and suffer from methodological limitations and small sample sizes. Only two studies have evaluated the Lions Quest Skills for Growing program, and our results on the program's positive impact are in line with suggestive evidence they provide.[4] Meta-analyses on the impact of different universal social and emotional learning programs attest participants in general im-

4. Kidron et al. (2015) report on a two-year implementation in grades 3 to 5 in eight US elementary schools and find positive effects on students' self-reported interpersonal skills and perception of their school environment as safe and supportive, as well as on disruptive behavior at school. However, the authors document low implementation quality and in the end the program was even delivered by Lions Quest guidance counselors instead of teachers. Gol-Guven (2017) collected data in four schools in Turkey (two program and two control schools, data were only elicited for subsamples of classrooms and students) and finds positive effects on school climate (such as order in routines, positive behaviors and interactions, and student participation in decision-making), students' behaviors (among others helpfulness, cooperation, problem solving, selfishness, unresponsiveness, or rudeness), and conflict resolution skills, but not on students' perceptions of school (for example, whether students indicate to like their school, trust their teachers, or to see themselves as successful students). More studies deal with the subsequent Lions Quest programs for adolescents but exhibit similar shortcomings in their evaluation-setups or

proved attitudes, behavior, academic performance, and indicators of well-being (Durlak et al., 2011; Taylor et al., 2017).[5]

The remainder of this paper is organized as follows. In the next section, we discuss the design of our study, the intervention, its implementation, and hypotheses. Section 1.3 first provides details on sampling, data collection, and the randomization procedure. We then describe experimental and survey measures of self-control, patience, and prosociality and how we construct the respective outcome indices. Section 1.4 presents our results and robustness checks before we conclude in section 1.5.

1.2 Study design and hypotheses

Our study design builds on the Lions Quest Skills for Growing program for two main reasons: First, as discussed in detail in section 1.2.3, we hypothesize that it may affect the formation of three important socio-emotional skills—self-control, patience, and prosociality—that are powerful predictors of individual decision-making and many life outcomes (Almlund et al., 2011; Moffitt et al., 2011; Falk et al., 2018; Cobb-Clark et al., 2022). Second, the program provides well-established means to target the same skills with the same investments at different ages during childhood. It thus enables a design that allows investigating existence and timing of sensitive periods in the formation of these skills, see section 1.2.2. In section 1.2.1, we start by providing basic information on the intervention and elementary schooling in Bangladesh.

1.2.1 The intervention: The Lions Quest Skills for Growing program

Developed by the Lions Clubs International Foundation, a global non-profit organization, Lions Quest (LQ) programs have a longstanding history. Together with its sister programs, the LQ Skills for Adolescence for middle schoolers and the LQ Skills for Action for high schoolers, the LQ Skills for Growing (SfG) program for elementary school children has been realized in schools in more than 100 countries worldwide (Maalouf et al., 2019). LQ programs are classroom-based social and emotional learning (SEL)[6] programs that aim at helping young

investigate, for instance, the effects on teachers instead of student outcomes (see, e.g., Matischek-Jauk, Krammer, and Reicher, 2018, and Maalouf et al., 2019, and the references therein).

5. However, by far not all reviewed studies used randomized designs and even though all programs underlying the reviewed studies targeted the development of social and emotional skills, most of them did not assess skills as an outcome (Durlak et al., 2011). Also, neither of these meta-studies discusses sensitive periods.

6. Social and emotional learning is a form of positive youth development (PYD, see https://youth.gov/). The term "social and emotional learning" was introduced by the Collaborative for Academic, Social and Emotional Learning (CASEL), a Chicago-based consortium of educators and educational scholars, see https://casel.org/what-is-sel/. Other major SEL programs include Promoting Alternative Thinking Strategies (PATHS), Life Skills Training (LST), and the Seattle Social Development Project (SSDP); see https://pg.casel.org/review-programs/ for available SEL programs (all webpages were last accessed on August 11, 2021).

people to find their way by learning how to manage their emotions, achieve their goals, have supportive relationships with others, and act in a responsible and caring manner.[7] Despite their widespread implementation, LQ programs have not been realized in schools in Bangladesh before the start of our intervention.

Throughout the program's implementation, we collaborated with the Lions Clubs International Foundation to stick to standard procedures as closely as possible. Moreover, the Ministry of Primary and Mass Education of Bangladesh supported the program's rollout, directing treatment schools to teach the LQ SfG program. The program was implemented by the children's elementary school teachers following a pre-existing curriculum. In cooperation with the Lions Clubs International Foundation, learning materials got translated and adapted to the local context (for instance, pictures of children in the materials were changed to depict Bangladeshi rather than US American or Indian children).[8] In the course of our program adoption, school teachers got trained as LQ teachers in intensive three-day workshops by international, qualified LQ trainers and received textbooks with detailed instructions. Children got student journals to summarize the topics and do homework. Parents were invited to a single mid-program meeting with the LQ teachers, implementation staff, and local education authorities in their children's schools. The program ran for one school year following a 28-week schedule between February and October 2019.[9] Lessons took place weekly and were held during classes that teachers could use flexibly (these classes are often used for "creative" and art classes, or for physical education). Thus, our treatment effect has to be interpreted vis-à-vis this counterfactual. The total instruction time was constant across treatment and control schools.

Elementary school in Bangladesh is compulsory and covers grades 1 to 5, starting at age 6.[10] Public elementary education is free of charge. Our implementation of the LQ SfG

7. For web content on the LQ SfG program, see https://lions-quest.org (last accessed on August 11, 2021).

8. Independent of the official program implementation and the data collection for children and their families, we hired four research assistants who served as contact persons for the schools and regularly visited the treatment schools to monitor program realization. Given that the schools in our sample experience a relatively low level of supervision, presence of the research assistants ensured that treatment schools implemented the treatment as desired, rather than changing the treatment's nature compared to other settings. The research assistants also administered paper-and-pencil school questionnaires to the head teachers and teacher questionnaires to, in general, two teachers per school. In treatment schools, these were the LQ teachers while in control schools two teachers were randomly chosen (in practice, the research assistants often picked control school teachers that were available when they visited the school).

9. In order to fit the SfG program into one school year with one lesson per week, the leadership and service unit was not implemented, as the Lions Club recommends for a shorter 28-week schedule. Given the unit's content, we do not expect that including it would do much in terms of fostering self-control, patience, and prosociality. In case it does, the estimated effects of the 28-week schedule are lower bounds of the effects of the full program.

10. Nearly 60 percent of elementary schools are managed and financed by the Ministry of Primary and Mass Education. The remaining elementary schools are under the responsibility of other ministries and non-governmental organizations, also comprising (private and state-sponsored) religious schools (The World Bank, 2018).

program focused on grades 2 to 5 to give children in grade 1 time to accustom themselves to the new school environment before being exposed to the intervention (pre-elementary education is only slowly advancing in rural Bangladesh, see UN, 2015).

Elementary schools have regular teachers and one head teacher who, among other things, decides about class allocation. Following the standard implementation of the program, teachers in the treatment schools were not randomly assigned to become LQ teachers but the decision of who taught the program was left with the schools. Not unexpected given this decentralized assignment, the evaluation of teacher characteristics indicates that LQ teachers differ from average teachers in control schools. LQ teachers are significantly more likely to be male, older, more experienced, and be the head teacher, see Table 1.B.14. However, since the non-random assignment of teachers to the program is not related to the likelihood of a school becoming a treatment school, this does not pose a threat to our identification. Moreover, empirical evidence suggests that the decentralized teacher assignment did not influence the quality of the program implementation. First, teacher characteristics are not significantly correlated with students' skill outcomes (Table 1.B.15). Second, the LQ teacher assignment did not influence the overall assignment of teachers to classes.[11]

The SfG program comprises six units that each consist of several lessons: 1) building a positive learning community, 2) personal development, 3) social development, 4) health and prevention, 5) leadership and service, and 6) a reflection section on what has been learned. According to the program's "Scope and Sequence Sheet" (see appendix Figure 1.A.1), the program aims at promoting the "SEL competencies" self-awareness and self-management, social awareness and relationship skills, as well as responsible decision-making. The documentation of the program translates these SEL competencies, in turn, into the academic concepts of self-discipline, impulse control, goal-setting, working cooperatively, empathy, and self-confidence as underlying skills to be fostered by the program units (again, see Figure 1.A.1).

Each lesson lasts for about 30 minutes and is divided into four parts. First, the teacher presents an everyday situation, like a short story or pictures of someone getting bullied, and identifies together with the students why this situation is problematic ("discovery phase"). Second, students are encouraged to share similar experiences, and the class discusses reasons and solutions for the problem ("connecting phase"). When learning how to make good decisions, for example, children are taught to act according to the "Think, Predict, Choose

11. In an extreme case, a concern might be that the best teachers in treatment schools taught LQ classes throughout and the remaining teachers (with lower teaching skills) taught the non-LQ classes. Then, the treatment would be confounded by teacher quality. However, our research assistants did not report any changes in the teacher assignment in response to the LQ training. Usually, students in each grade are taught by multiple teachers, and any single teacher is not responsible for teaching all subjects in a particular grade. Descriptive statistics at the school level also speak against such a concern. Schools are relatively small, and all students in the same grade are taught in the same class (sometimes, there are even students of multiple grades in the same class). With an average of five teachers per school (see Figure 1.A.9) and two LQ teachers per treated school (Figure 1.A.10), it is unlikely that the two LQ teachers taught all four treated classes (grades 2 to 5), while the three non-LQ teachers taught grade 1.

Model." Being confronted with a decision such as choosing which friend to invite to a festival, they are trained to follow a traffic light approach and step back, calm down, reflect on their options and the consequences, and carefully work out what to do. They also discuss how to keep up their motivation for tedious tasks by not following immediate impulses but reminding themselves of why this goal is important to them or where they have been successful in the past. Third, students reenact the presented situations in role plays or solve tasks in pairs or small groups and employ the solutions and strategies they have talked about ("practicing phase"). Finally, teachers assign homework related to the week's topic ("applying phase"). Students are, for instance, asked to discover and solve similar situations in their daily life and document their progress in the student journal. Appendix Figure 1.A.2 shows examples for English versions of the instruction materials, teachers' resource guides, and student journals. According to anecdotal evidence from our local research assistants, students were attentive during the LQ classes and barely wanted to miss them.

1.2.2 Sensitive periods

The key objective of our study design is to provide new insights into the timing of sensitive periods in the formation of socio-emotional skills. Following Cunha and Heckman (2007) and their seminal work on the development of skills, childhood has more than one stage during which skills develop. Stages differ in how easily various skills are acquired and how productive investments in given skills are, for example, due to changing brain plasticity as children grow. Stages that are more effective in producing a certain skill and in which returns to investments into skills are particularly high are called sensitive periods for the acquisition of this skill. While this theoretical framework is well-established, empirical evidence on sensitive periods in the formation of socio-emotional skills is lacking (Cunha et al., 2006; J-PAL, 2013; Heckman and Mosso, 2014; Kautz et al., 2014).[12]

The SfG program provides a particularly well-suited tool for investigating sensitive periods in the formation of socio-emotional skills, as it is designed to deliver the same investment (same content and objectives) in all grades. Appendix Figure 1.A.1 displays the program's official Scope and Sequence Sheet that summarizes the SfG curriculum and the targeted SEL components from pre-kindergarten to grade 8. It underlines that program lessons in each unit have the same goals and target the same skills from pre-kindergarten up to grade 8. Only

12. A literature in neuroscience relates self-control and executive functioning in general to the prefrontal cortex and its development (Gogtay et al., 2004; Hare, Camerer, and Rangel, 2009; Figner et al., 2010). The region of the prefrontal cortex responsible for executive functioning (i.e., cognitive control over behavior) matures later in adolescence than the region responsible for basic functioning (such as motion and speech). While this would suggest sensitive periods in the development of executive functioning after children leave elementary school, the socio-emotional skills considered here likely also require emotional control. As emotional responses are governed by the limbic system—which matures earlier in life than executive functioning in the prefrontal cortex (Committee on the Science of Adolescence, 2011, chapter 3)—it is not possible to derive clear-cut hypotheses about the timing of sensitive periods for socio-emotional skills from the development of the brain.

the specific SfG materials (e.g., example stories used) are partly adjusted to better reflect students' cognitive development and everyday environment in the respective school grades. This feature allows us to introduce the same investment in different grades and hence to learn about possible sensitive periods in the formation of children's skills. We measure sensitive periods as heterogeneity in the treatment effect of the intervention along the school grade. Skill- and grade-specific treatment effects that substantially exceed those for the same skill in other grades point towards the existence of a sensitive period.

In order to allow for clean inference, our design has two further important features. First, the SfG intervention was implemented during the same time period for children of different ages, excluding possibly different period effects. Second, treatment intensity was the same for all children in the treatment group, i.e., all treated children were equally long exposed to the intervention.

1.2.3 Hypotheses

Based on program structure, content, and aims, we derive the following hypotheses:

HYPOTHESIS 1A. Participation in SfG increases self-control.

HYPOTHESIS 2A. Participation in SfG increases patience.

Self-control and patience are both integral to people's intertemporal decision-making. In psychological research, self-control is often conceptualized as impulse control, while a common way to formalize it in economic theory is time-inconsistency. For example, $\beta\delta$-preferences or quasi-hyperbolic discounting (Laibson, 1997; O'Donoghue and Rabin, 1999), one of the most commonly used models of intertemporal choice in behavioral economics (Ericson and Laibson, 2019), assume the following utility function: $U^t(u_t, u_{t+1}, ..., u_T) = u_t + \beta \sum_{\tau=t+1}^{T} \delta^\tau u_\tau$, where $0 < \beta \leq 1$ and $0 < \delta \leq 1$. Total utility is given by U^t, u_t is flow utility in period t, and parameter δ represents long-run, time-consistent discounting ("patience"). β is a present-bias parameter that indicates whether and how much an individual favors the current period over later periods. The smaller is β, the stronger is the degree of present-bias, which can be thought of as larger self-control problems. If $\beta < 1$, $\beta\delta$-preferences represent time-inconsistent preferences; that is, individuals place more relative weight on the current period once it has arrived than in any previous period and are thus more likely to give in to temptations and impulses in the here and now. If $\beta = 1$, $\beta\delta$-preferences coincide with time-consistent, exponential discounting. Time-consistent individuals ($\beta = 1$) are often referred to as individuals who do not have any self-control problems and time-inconsistent individuals ($\beta < 1$) as having self-control problems.

The SfG unit on personal development as well as lessons on how to best restrain yourself and keep calm when working in groups, on managing stress and strong emotions, on

recognizing the connection between thoughts, emotions, and actions, or on how to set long-term goals, motivate yourself, and build healthy habits are expected to foster impulse control, making responsible and forward-thinking decisions, and self-management. This is likely to be reflected in a higher level of self-control. Although not directly mentioned in the SfG's Scope and Sequence Sheet, the lessons that relate to intertemporal decision-making may also affect patience, and be it indirectly. Children learn, for instance, to think things through and consider all choices before making a decision.[13]

HYPOTHESIS 3A. Participation in SfG increases prosociality.

Prosociality comprises altruistic or prosocial behavior in interpersonal situations which comes down to behaviors that benefit others. In economics, models of social preferences (e.g. Fehr and Schmidt, 1999; Bolton and Ockenfels, 2000) are consistent with such behaviors. The SfG units on building a positive learning environment and on social development, as well as lessons on how to show empathy and appreciation for others, on working together, and on social engagement are expected to foster social awareness and relationship skills. This is likely to be reflected in a higher level of prosociality.

While there is very little empirical evidence on sensitive periods in the formation of socio-emotional skills, research on cognitive skills suggests that earlier investments are more effective in enhancing skills than the same investments at a later stage. Based on these empirical findings on the formation of cognitive skills (Knudsen et al., 2006; Heckman and Mosso, 2014) and the theoretical framework of skill formation (Cunha and Heckman, 2007, 2008; Cunha, Heckman, and Schennach, 2010), we formulate the following hypotheses:

HYPOTHESES 1B TO 3B. Participation in the SfG program in earlier grades is more beneficial than in later grades for the formation of

1B. self-control,
2B. patience,
3B. prosociality.

1.3 Data

In this section, we first provide details on sampling, data collection, and the randomization procedure. We then describe experimental and survey measures of self-control, patience, and prosociality, and how we construct the outcome indices.

13. We also expect the intervention to increase self-esteem. However, self-esteem is usually assessed by children and adolescents themselves (as opposed to their parents or teachers, for instance) through survey scales. As confirmed by pre-tests, most of the children in our intervention are too young to answer self-esteem survey items meaningfully. For example, the commonly used Rosenberg scale is generally applied from age 10 onwards. This prevents us from considering self-esteem as an outcome variable.

1.3.1 Sampling procedure and data collection

Data were collected in the four rural districts Netrokona, Sunamganj, Chandpur and Gopalganj of Bangladesh.[14] These districts represent four of the eight administrative divisions of the country. In the course of a previous survey that was conducted in 2014 and 2016 (see Chowdhury, Sutter, and Zimmermann, 2022), 11 subdistricts were chosen based on the availability of NGOs willing to collaborate. 150 villages were randomly drawn from the 11 subdistricts. In 2018, the 150 villages were visited and a public elementary school suitable for sampling school children was chosen. Most villages have only one elementary school. If a village had more than one school, the school with the majority of students from the village and situated at the village center was selected. As a one-to-one village–school matching was not always possible due to some schools serving multiple villages, the process resulted in a selection of 135 elementary schools.

The Lions Quest Skills for Growing program was taught at school level in 68 of the 135 selected public elementary schools (69 schools got selected for treatment, yet, one school's teachers accidentally did not receive training; see below for details on the randomization procedure). To measure its effects, we sampled children and their families from these 135 elementary schools. In general, from each school and each grade 2 to 5, five students were sampled randomly from class lists. If a school was serving two or three of the original 150 sample villages, two or three times as many students were chosen, respectively. Sampling started in grade 2 instead of grade 1 to match the program implementation. Children in grades 2 to 5 are in general between the ages of 7 and 11. Some children are slightly older if they had to repeat classes. Interviews with the sampled student, both parents (if available), and one randomly selected sibling (again, if available) were conducted by a specialized survey firm (ECONS) at the families' homes. If siblings were still in elementary school, they usually visited the same school and therefore have the same treatment status as their sampled siblings (when in grade 2 to 5). Due to delays in the beginning of program implementation, the intervention did not start in 2018 as planned, but only in 2019 and the originally sampled students were one grade higher than initially expected. That is, students sampled in grade 2 were in grade 3 at the time of the intervention and students sampled in grade 5 had left elementary school. To maintain the originally intended sample composition, the wave of data collection comprised a refreshment sample of new second graders for whom we do not have (pre-treatment) baseline information on skills. Our final sample consists of 3,222 children from 2,809 families, see Table 1.1.

14. Even though, with around 163 million inhabitants, Bangladesh is the world's eighth most populous country, about two thirds of the population are living in rural areas. Bangladesh's living conditions are evolving rapidly. Bangladesh's GDP at purchasing power parity per capita increased from US-$ 851 in 1990 to US-$ 5,083 in 2021, which places Bangladesh at rank 148 out of 199 countries (The World Bank, 2021).

TABLE 1.1. Sample overview

	(1) All	(2) Treatment group	(3) Control group
Number of schools	135	69	66
Number of students	3,222	1,637	1,585
– sampled students	2,809	1,434	1,375
– siblings	413	203	210
By grade			
– grade 2	890	455	435
– grade 3	789	386	403
– grade 4	763	393	370
– grade 5	780	403	377

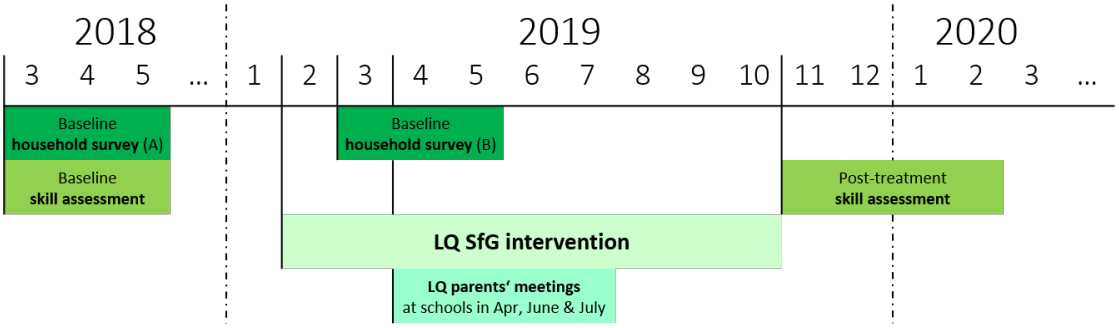
NOTES: Own representation.

As a result of this recruitment process, we have a large sample of families in which we comprehensively measure both children's and parents' skills.[15] The first part of the interviews (the "household survey") assessed survey information on socio-demographics, income, expenditures, employment, land ownership, credits and savings, assets, and health. It was answered by either the household head or his/her spouse (whoever was the most knowledgeable person for the respective part) using computer-assisted personal interviews (CAPI). The second part of the interviews (the "skill assessment") elicited economic preferences (time, risk, and social preferences), personality traits, and cognitive skills via paper-and-pencil interviewing (PAPI) for both the sampled children, up to one sibling, and their parents. We complement this comprehensive information on skills for the whole family with a questionnaire that mothers answered about their children. In the mother questionnaire, mothers assessed among other things their children's strengths and difficulties (including prosociality) as well as their self-control (for children up to age 13). Importantly, the family interviews did not include any reference to the Skills for Growing program and the interviewers were not aware of the intervention to avoid social desirability bias or interviewer demand effects.

Up to now, we have collected two waves of data, see Figure 1.1: a baseline wave of interviews before the treatment in 2018 and early 2019 and a post-treatment wave of skill assessment interviews after the end of the program in 2019 and early 2020.

15. Since this is a multipurpose-built dataset (German Research Foundation (DFG) project no. SCHI 1377/1: "Towards a better understanding of the development of non-cognitive skills in children: Malleability, sensitive periods, typical trajectories, and transmission within the family"), it also includes information on skills we do not expect to be affected by the intervention. Following the pre-registration, we do not analyze treatment effects on these skills.

FIGURE 1.1. Timeline of data collection and intervention



NOTES: Own representation.

In our sample, children's mean age is 9.4 years and 51.4 percent of children are girls. On average, yearly household income is around 230,000 Taka (approximately 2,700 US-$). More than 90 percent of households have an electricity connection. Fathers' mean age is 43, mothers' mean age is 35. 58 percent of fathers and 72 percent of mothers can read and write. Almost all fathers and 88 percent of mothers are working. The latter, however, are usually looking after the family's live stocks or poultry instead of being formally employed. Table 1.B.6 in the appendix provides a more detailed sample description.

As introduced in the previous section 1.2.1, we also collected school and teacher data with the help of local research assistants after the program has ended from both treatment and control schools. These data comprise information on school and LQ statistics, such as numbers of (LQ) teachers, on school facilities, on teachers' socio-demographics, on teaching statistics, such as missed school days, on teachers' attitudes and their teaching practices, and for LQ teachers on subjective identification with the program and potential problems with the implementation. For data collection, our research assistants conducted paper-and-pencil interviews with a school's head teacher, in treatment schools with LQ teachers, and in control schools with two randomly chosen teachers (in practice, the research assistants mostly picked control school teachers that were available when they visited the school). Figure 1.A.9 shows the distribution of teachers per school and Figure 1.A.10 the number of grades in which trained LQ teachers gave LQ lessons. In general, schools are small with about a third of schools having only five teachers. Nearly all treatment schools had two teachers actively teaching LQ lessons and LQ teachers mostly held LQ lessons in two different grades.

1.3.2 Stratified randomization

The treatment was randomized on school level following a stratified randomization procedure. The 135 participating schools were assigned to 35 strata, based on the 11 subdistricts,

the villages' literacy rates, and their distance to the subdistrict capitals.[16] Distance to subdistrict capital is expected to possibly reflect lower school quality with more rural schools being less attractive for teachers and less effectively supervised by education officials. The village literacy rate is a proxy for the village population's educational level. Within each stratum, each school was randomly assigned to either treatment or control group using a random number generated in Stata.

69 schools were randomly drawn for the treatment group, the remaining 66 schools serve as our control group.[17] As the treatment was part of the curriculum in grades 2 to 5 of the treatment schools, children could not single-handedly drop out of the treatment. However, the teachers of one treatment school with 22 sampled students did not receive the LQ teacher training due to miscommunication and the school did therefore not implement the treatment. Given that 1,637 students were supposed to receive the treatment and only 22 of them did not, the compliance rate is 98.7 percent ($=1-{}^{22}/_{1{,}637}$). Since we will present intention-to-treat estimates throughout the paper, the students in this school still belong to the treatment group in all analyses.

1.3.3 Outcome variables

Our data include multiple measures to capture self-control, patience, and prosociality. In particular, our skill measurements include both children's revealed preferences from incentivized experiments and well-established survey scales answered by mothers about their children (or, in the case of patience, by children themselves). This combination of lab-in-the-field and survey assessment results in measures that reflect the multi-dimensional nature of the underlying skills and combines the advantages of incentive-compatible experiments and validated psychological survey questionnaires (Falk et al., 2018; Kosse et al., 2020). The remainder of this subsection describes the experiments and survey scales as well as their aggregation into final outcomes.

1.3.3.1 Experiments: time and social preferences

Children participated in a sequence of experiments designed to measure two core dimensions of economic preferences: time and social preferences. To elicit preferences, we relied on well-established measurement tools that, in the case of time preferences, have been used in developing countries before. We still carefully pre-tested all items in our context and adapted

16. The strata were constructed by first splitting schools according to the 11 subdistricts they belonged to, then by a binary indicator whether the village is below or above the median distance to the subdistrict capital and lastly by a binary indicator whether the village is below or above the median literacy rate as measured by a preceding village survey in 2016. In some districts, all villages were either above or below the median literacy rate. Therefore, the number of strata is not 44 (which would equal $11\times2\times2$), but 35.

17. Since not all strata contained an even number of schools, randomization within strata led to an unequal number of treatment and control group schools.

payments to children's ages. We used standardized control questions to verify that participating children understood the instructions.[18]

The order of the experiments was randomly determined by rolling a die. Children were able to earn stars which were transformed into money after the experiments using age-specific exchange rates (proportional to pocket money: one star's value ranged between 10 and 30 Taka, depending on children's age, which equals approximately half of a child's weekly pocket money). Each child received one star as a show-up fee. All experiments took place in one-on-one settings in the families' homes and the interviewers ensured that members from the same household could not influence each other's decisions.

Time preferences: time-consistency and patience. In order to measure time preferences, we followed a simple choice list approach, used by, e.g., Bauer, Chytilová, and Morduch (2012) in a similar form for adults in rural India. Each child had to make six choices which consisted of trade-offs between smaller, sooner and larger, later rewards (see Table 1.2). The six choices were grouped in three choice sets, each consisting of two choices with the same time delay. The early payment took place either on the next day (choice sets 1 and 2) or in a month (choice set 3), the later payment in three weeks (choice set 1), three months (choice set 2), or four months (choice set 3), respectively. The choice sets were ordered randomly.

TABLE 1.2. Time preferences experiments for children

Choice set 1	2 stars tomorrow	vs.	3 stars in 3 weeks
	2 stars tomorrow	vs.	4 stars in 3 weeks
Choice set 2	2 stars tomorrow	vs.	3 stars in 3 months
	2 stars tomorrow	vs.	4 stars in 3 months
Choice set 3	2 stars in 1 month	vs.	3 stars in 4 months
	2 stars in 1 month	vs.	4 stars in 4 months

NOTES: Own representation.

As an experimental measure of self-control, we observe children's *time-consistency* in choice sets which have the same three-months time delay but different starting points: starting either on the next day or in one month. Children are classified as time-consistent if they make identical choices in choice sets 2 and 3, implying that their current and future discount

18. Understanding is controlled by interviewers asking children in between to repeat their explanations (four times for the time preferences game and once for the social preferences game). Each time, the interviewer notes down whether the child understood the game after the first, second or third explanation or whether the child did not understand the game at this point. A child is indicated as having understood a game if answering each of the control questions correctly after at most three explanations of the interviewer.

rates are equal. Additionally, to disentangle time-consistency from extreme impatience, we only classify children as time-consistent if they exhibit some degree of patience by choosing (hence, waiting for) the larger, but later reward in at least one of the choice sets 2 and 3.

As an experimental measure of *patience* we simply count the number of patient choices in all six decisions, i.e., we count the number of larger, but later reward choices among all six decisions. This measure hence ranges from 0 to 6.

Social preferences: altruism. We followed an experimental protocol inspired by Fehr, Bernhard, and Rockenbach (2008) which got extended by Bauer, Chytilová, and Pertold (2014) to assess social preferences using dictator games. Children made four allocation choices dividing stars between themselves (x) and another child (y) of the same gender and roughly the same age, but unknown and unrelated to them (see Table 1.3). In each of the four choices (x,y), one option was the allocation (1,1), while the alternative allocation benefited one of the children ($y > x$ in two cases and $y < x$ in two cases).

TABLE 1.3. Social preferences experiments for children

Costly prosocial game	1 star for me 1 star for the other child (1,1)	**vs.**	2 stars for me 0 stars for the other child (2,0)
Costless prosocial game	1 star for me 1 star for the other child (1,1)	**vs.**	1 star for me 0 stars for the other child (1,0)
Costless envy game	1 star for me 1 star for the other child (1,1)	**vs.**	1 star for me 2 stars for the other child (1,2)
Costly envy game	1 star for me 1 star for the other child (1,1)	**vs.**	2 stars for me 3 stars for the other child (2,3)

NOTES: Own representation.

As our experimental measure of *altruism*, we count the number of stars a child allocated to herself and to the other child and calculate the overall share of stars a child has given to the other child across all four games. This share varies between 0.29 and 0.58.

In our preferred specifications, we set an experimental outcome to missing if a child answers the respective control question(s) incorrectly. In the time preference experiment, we also set answers to missing if children prefer the later, larger reward over the sooner, smaller one only for the lower interest rate (decisions 1, 3, and 5), but not the higher one (corresponding decisions 2, 4, and 6, respectively), as this likely reveals that children have not

understood the experiment.[19] In robustness checks we also consider the answers of children excluded in our preferred specification.

1.3.3.2 Survey measures

Self-control: reversed Impulsivity Scale for Children. We measure self-control using the reversely coded Impulsivity Scale for Children (ISC) that was introduced and validated by Tsukayama, Duckworth, and Kim (2013). The authors conceptualize effortful and volitional control that is exerted in order to achieve long-term goals. Their scale is designed to capture both impulsive behavior in the social context and with respect to schoolwork. The ISC consists of eight items which record how often specific behaviors occur that are rated on a five-point Likert scale by the mother regarding her children aged 6 to 13. Appendix Table 1.B.1 lists the eight items. For example, mothers had to state whether their child interrupts other people "at least once per day," "about once per week," "about 2 to 3 times per month," "about once per month," or "almost never." Answers are combined with equal weighting into one scale.

Patience. Children were asked to rate how well the statement "I am good at giving up something nice today (e.g., a reward) in order to get something even nicer in the future (e.g., a larger reward)." applies to them on a five-point Likert scale from 1 ("not at all right") to 5 ("absolutely right").

Prosocial behavior. We make use of the prosociality scale of the well-established and widely used Strengths and Difficulties Questionnaire (Goodman, 1997; Goodman et al., 2000) to measure the extent to which children behave prosocially, i.e., interact with others in a positive and cooperative way in their daily routine. Mothers rated five items related to their children's prosocial behavior on a three-point scale such as "Considerate of other people's feelings" or "Shares readily with other children (treats, toys, pencils, etc.)," see appendix Table 1.B.2 for all five items. Answers are combined with equal weighting into one scale.

1.3.3.3 Aggregation of measures

To obtain a comprehensive assessment of the socio-emotional skills under study, we combine information from experiments and surveys into aggregate measures that reflect the multidimensional nature of the underlying skills. We refer to the aggregate measures as self-control (index), patience (index), and prosociality (index).

The combined outcomes are calculated as follows: We first standardize each experiment and survey component to have a mean of 0 and a standard deviation of 1 across control group observations. We then calculate an individual's mean over the standardized components that

19. This affects 116 children, out of 3,222 children in total and 3,140 children with otherwise complete information.

enter the final outcome index. This index is again standardized to have a mean of 0 and a standard deviation of 1 in control group terms (z-score). If one of the measures is missing, we use only the remaining component for the child.[20]

Self-control. The self-control index combines experimentally elicited time-consistency with the reversed Impulsivity Scale for Children (ISC).

Patience. The patience index combines experimentally elicited patience with a survey question on patience.

Prosociality. The prosociality index combines experimentally elicited altruism with survey-assessed prosocial behavior, measured by the respective SDQ scale.

Figure 1.A.3 in the appendix displays the post-treatment distribution of our standardized outcome indices, while Figure 1.A.4 shows the distribution of each outcome component (including number of observations).[21] Figures 1.A.5, 1.A.6, and 1.A.7 show distributions of outcome measures along household income and parents' socio-emotional skill levels. Patterns follow our expectations with children's socio-emotional skills increasing with income and both mothers' and fathers' skills and strenghtens trust in our measures. Appendix Table 1.B.5 provides additional results for the treatment effects presented in section 1.4 using alternative definitions of the experimental outcome components: changing the unit of measurement of time-consistency, using a binary patience measure instead of a continuous one, changing the way we aggregate the decisions in the social preferences experiment, or the sample composition by including children who likely did not fully understand parts of the experiments does not alter our interpretation of results.

1.3.4 Baseline balance and attrition

Baseline imbalance and selective attrition are potential threats to identification in randomized controlled trials. Since we have collected the outcomes of interest (self-control, patience, and prosociality) not only after but also before treatment assignment, we can use these data to provide evidence on successful randomization and the absence of selective attrition.

20. In our preferrec specification, experimental time-consistency is missing for 178 children, the ISC for 145 children, experimental patience for 178 children, the patience survey item for 56 children, experimental altruism for 60 children, and SDQ prosociality for 113 children. z-scores are calculated over all control group observations that enter a regression. Using age-specific z-scores does not change the magnitude of our findings.

21. Skill components seem to be complements rather than substitutes. For self-control, components are only weakly correlated (Pearson correlation coefficient of -0.037 with p-value < 0.05). For patience, components are significantly correlated (correlation coefficient of 0.353 with p-value < 0.01). Experimentally elicited altruism and survey-assessed prosocial behavior are not significantly correlated.

1.3.4.1 Baseline balance

Given our randomization procedure, there should be no systematic difference in the pre-treatment outcomes of treatment and control group. As a first balancing test, we regress the pre-treatment outcome measures (assessed in 2018, half a year before the intervention started) on the treatment indicator. As expected, Table 1.4 shows that pre-treatment differences in means and distributions between treatment and control group are small and statistically not significant.

TABLE 1.4. Balancing results for pre-treatment outcomes

	(1)	(2)	(3)	(4)
	Observations	Treatment/ control group difference	*p*-value *t*-test of equal means	*p*-value K.-Smirnov test
Self-control index, pre-treatment	2,170	−0.034	0.613	0.308
Patience index, pre-treatment	2,162	0.010	0.858	1.000
Prosociality index, pre-treatment	2,186	−0.031	0.697	0.542

NOTES: All variables are standardized such that the mean of the control group in 2018 is 0 and the standard deviation is 1. Point estimates and *p*-values of *t*-tests are obtained from regressions of pre-treatment outcomes on the treatment indicator. School-clustered standard errors.

As a second randomization check for covariates, we regress 24 pre-treatment, socio-demographic child and family characteristics on the treatment indicator. The upper panel of Table 1.5 summarizes the results. Appendix Table 1.B.6 gives a detailed account of these variables, their definitions, and the balancing results. Under successful randomization, the actual number of significant differences between treatment and control group (displayed in the second row of columns (2) to (5) of Table 1.5) should be similar to the number of significant differences we expect to find by chance for a given significance level (see the first row of Table 1.5). The actual number of significant treatment coefficients is in line with the expected one. Column (6) approaches the multiple-testing problem when comparing the treatment effects across a large number of outcomes from another angle and shows the *p*-value of a 'stacked *F*-test' as suggested by Lee and Lemieux (2010). Here, the joint significance of differences in the 24 covariates between treatment and control group is assessed.[22] The

22. For the stacked regression, the data are structured in a way that the values of the 24 child and family characteristics are stored in one variable, with 24 observations for each child, each representing one of the 24 child and family characteristics. This variable is regressed on indicators for the 24 child and family characteristics the outcome value is belonging to (capturing level differences across the child and family characteristics) and interactions between the 24 child and family characteristics and the treatment indicator (and strata fixed effects). Ignoring missing values in the child and family characteristics, the coefficients of the 24 interaction terms will be the same as the coefficients of the separate regressions of covariates on the treatment indicator, see Oberfichtner

coefficients of the treatment effects on the covariates are not jointly significantly different from zero.

The bottom panel of Table 1.5 repeats the procedure when using the grade-specific treatment effects on the pre-treatment outcomes instead of the covariates. In one of the twelve cases, a pre-treatment outcome differs significantly between the treatment and the control group: children in grade 3 of treatment schools have, on average, a significantly lower prosociality than their counterparts in control schools. Although this difference is not desirable with respect to our analysis, it is not entirely surprising given that we test a total of twelve hypotheses regarding the grade-specific pre-treatment outcome differences. With $p = 0.09$, the stacked *F*-test also suggests some imbalance when comparing the pre-treatment outcomes by grade. This needs to be taken into account when analyzing sensitive periods.

Drawing on the interviews with the head teachers, we are also able to consider the balancing between treatment and control schools' characteristics. Only one of the eight characteristics that got elicited differs significantly (at the 10 percent level). In treatment schools, students in distinct grades are less likely to be taught in the same classroom, see Table 1.B.13 in the appendix.

Using rich information and pre-treatment outcomes and covariates, the treatment and control group appear to be balanced, overall. While there are some significant differences, we do not find evidence that this is more often the case than we would expect by chance.

1.3.4.2 Absence of selective attrition

As we interview families twice within 18 months, some families may have opted out of the second interview. With 4.4 percent, the overall rate of attrition is low (4.6 percent in the control and 4.3 percent in the treatment group). Attrition is unlikely to be systematically related to treatment, as the treatment was on school level and there was no visible connection between the treatment in school and the interviews at home. To investigate this further, we regress an attrition indicator (1 if families are interviewed in 2018 but not in 2019, 0 else) on the treatment indicator and children's pre-treatment self-control, patience, and prosociality as well as their interaction. Appendix Table 1.B.7 shows the results. All coefficients are economically small, none is significant at the 5 percent level, and only one coefficient, the interaction between pre-treatment self-control and the treatment indicator, is significant at the 10 percent level. An *F*-test for joint significance of treatment, pre-treatment outcomes, and their interactions yields $p = 0.28$. All in all, our results do not suggest that selective attrition is affecting our results.

---

and Tauchmann (2021). The *F*-test and its *p*-value refer to the test of joint significance of the 24 interactions terms in the stacked regression.

TABLE 1.5. Balancing overview for covariates and pre-treatment outcomes on grade level

	(1)	(2)	(3)	(4)	(5)	(6)
		Significance level				*F*-test
Set of variables	Number of variables	1%	5%	10%	15%	*p*-value
Covariates						
Expected number of significant effects	24	0.24	1.2	2.4	3.6	
Actual number of significant effects		0	0	2	4	0.522
Pre-treatment outcomes on grade level						
Expected number of significant effects	12	0.12	0.6	1.2	1.8	
Actual number of significant effects		1	1	1	1	0.092

NOTES: This table summarizes the results of the balancing checks. **In the upper panel**, we regress a total of 24 child and family characteristics on the treatment indicator and strata fixed effects. Columns (2) to (5) of the table present results for different significance levels. The first row gives the number of outcome variables (i.e., the 24 child and family characteristics) for which we expect the treatment indicator to be significant given the respective significance level in the column header. The second row gives the actual number of outcome variables for which the treatment indicator is significant. The number of variables is accumulative from the left to the right, i.e., an indicator that is significant at the 1% level is also counted as significant at the other three levels. See appendix Table 1.B.6 for definitions of the 24 child and family characteristics and the coefficients of the treatment indicator associated with them. Column (6) of the table gives the *p*-value of a 'stacked *F*-test' as suggested by Lee and Lemieux (2010). It tests for joint significance of differences in the covariates between treatment and control group by testing for joint significance of interaction terms of covariates and the treatment indicator in a stacked regression. The characteristics in the upper panel are taken from the baseline household survey (B) in 2019, at the beginning of the treatment period. When we use these characteristics from the baseline household survey (A) in 2018 instead, the results do not differ substantially, but we have fewer observations. **The bottom panel** summarizes the balancing checks for the pre-treatment outcomes by grade (comparable to the pooled analysis in Table 1.4). We regress the three outcomes (the self-control index, the patience index, and the prosociality index) on the treatment indicator interacted with the grade indicators (similar to our specification for the sensitive periods analysis) and strata fixed effects (standard errors are clustered on school level, again). This results in a total of 12 treatment indicator coefficients. The interpretation of the columns is the same as for the upper panel of the table.

1.4 Results

In this section, we first provide causal evidence on the overall treatment effects of the Lions Quest Skills for Growing program on self-control, patience, and prosociality. Section 1.4.2 then exploits the specific features of our design that enable estimating sensitive periods in the formation of these skills and presents the corresponding results. Section 1.4.3 contains robustness checks. This includes a confirmation of our main results using *p*-values adjusted for multiple hypotheses testing or randomization inference as well as estimations of treatment effects when controlling for pre-treatment outcomes and additional family characteristics. Also, we can reject the concern that children are reaching the ceiling of our measures with no further room for improvement, both overall and on grade level. We conclude in section 1.4.4 with a discussion of our findings.

1.4.1 Treatment effects on socio-emotional skills

Table 1.6 displays the treatment effects of the Lions Quest Skills for Growing program on the indices of socio-emotional skills.[23] The indices are standardized, with a control group mean of 0 and a standard deviation of 1. In our preferred specification, we regress the skill indices Y on a treatment indicator (=1 if treated, 0 otherwise) and a full set of strata fixed effects $\boldsymbol{\phi}$:

$$Y = \alpha + \beta \text{treatment} + \boldsymbol{\phi} + \varepsilon. \tag{1.1}$$

Standard errors are clustered at the school level. We find that program participation increases children's self-control by 10.7 ($p < 0.01$) and prosociality by 8.8 ($p < 0.05$) percent of a standard deviation. These findings provide evidence in line with hypotheses 1A and 3A. Regarding hypothesis 2A on patience, we find a positive, but smaller effect size of 4.4 percent of a standard deviation that is not statistically different from zero. As we show later, however, this aggregate result hides heterogeneity across grades. Also, given that the documentation of the SfG program does not explicitly name patience as a targeted skill, it is not surprising that the treatment effect on patience is smaller.

TABLE 1.6. Overall treatment effects

	(1)	(2)
Dependent variable	Number of observations	Treatment effect
Self-control index	3,208	0.107***
		(0.039)
Patience index	3,166	0.044
		(0.042)
Prosociality index	3,219	0.088**
		(0.036)

NOTES: All dependent variables are standardized such that the mean of the control group is 0 and the standard deviation is 1. Regressions include a full set of strata fixed effects. School-clustered standard errors in parentheses. Significance at $^{+}p < 0.15$, $^{*}p < 0.1$, $^{**}p < 0.05$, $^{***}p < 0.01$.

The treatment effects are measured against the counterfactual situation of lessons teachers could use flexibly. According to our research assistants, who monitored the SfG implementation in the field, these lessons were often used for physical education. Thus, as far as physical education increases the skills under review, our estimates present the value-added

23. Strictly speaking, we estimate intention-to-treat (ITT) effects, as only 98.7 percent of children who were intended to participate in the treatment actually did so (see section 1.3.2). Given that non-compliance is very limited, we do not qualify estimated parameters as ITT every time, but just refer to them as treatment effects.

effects of the program on skill formation. However, it is not particularly likely that physical education has a large effect on socio-emotional skills. If anything, it might have a small positive effect on prosociality in the case of team sports. Our treatment effect on prosociality would then be a lower bound.

Putting effect sizes of the significant treatment effects into perspective underlines their economic significance. One way to do so is to look at the control group and compare skill index values of subgroups such as girls and boys, children from households with different income levels, or children in different school grades. For example, regarding self-control, the size of the treatment effect resembles a reduction of the gender gap in self-control (girls in the control group have, on average, 20 percent of a standard deviation higher self-control than control group boys) by half. Moreover, the gap along median income is 14 percent of a standard deviation. So, our treatment effect size is about two-thirds of the gap between children from below-median income households and those above. The treatment-induced increase in prosociality exceeds the average increase in prosociality we observe when students advance one year in age (of about 7 percent of a standard deviation per grade). The treatment effect also accounts for 80 percent of the gender gap in prosociality (11 percent of a standard deviation, again with higher values for control group girls than boys). Please note that these comparisons do not imply that the treatment, for example, closes or reduces the gender gap. For respective statements one would need to look at heterogeneous treatment effects for girls and boys.[24]

For completeness, Table 1.7 displays the effects of the treatment on each of the six components of the socio-emotional skill indices.[25] It conveys several insights. First, all coefficients are positive, underlining that the treatment tends to uniformly increase the various facets of self-control, patience, and prosociality. Second, the treatment effect on self-control is largely driven by a decrease in children's impulsive behavior. The treatment effect on the reversed

24. Tables 1.B.11 and 1.B.12 in the appendix document that for all three skill measures, we do not find statistically significantly different treatment effects for boys and girls (there is only a tendency for girls' self-control to be affected more strongly than boys' self-control). Also, there is no heterogeneity in treatment effects with respect to parents' literacy or family income (with the exception of a marginally significant treatment effect on patience for children whose mother can read and write contrary to those with an illiterate mother). Turning to heterogeneities along skill levels, we observe a tendency for children with below-median skill levels of self-control and prosociality before the treatment (second-graders are largely missing in this analysis due to a lack of pre-treatment data) to benefit more from the treatment. Again, however, differences are not statistically significant. Also not statistically significant are differences along parents' skills with a weak pattern of children whose parents have higher skill levels to benefit more from the treatment.

25. The way we calculate the index measures (as the average of the non-missing components) does not require that the treatment effect on the index equals the unweighted average of the treatment effects on the components. We could achieve this by imputing missing values in the components with the mean value of the components over the treatment and control group before taking the average over the components, as suggested by Kling, Liebman, and Katz (2007). Our interpretation of the treatment effects does not change when we apply this strategy. However, we prefer the index aggregation used here, as it does not rely on the additional assumption that missing values in the components are treatment neutral.

Impulsivity Scale amounts to 11 percent of a standard deviation ($p < 0.01$). Given that impulse control and self-discipline are among the SEL components that are explicitly targeted by the SfG program (see, e.g., the SfG PreK–8 Scope and Sequence Sheet in Figure 1.A.1), this confirms our expectations. Third, the increase in prosociality is largely driven by more altruistic behavior as measured in the social preference experiment, with a treatment effect of 9.2 percent of a standard deviation ($p < 0.05$). Although the treatment effect on the prosocial behavior scale is positive, it is neither large nor statistically different from zero. A significant effect on the experimental preference component, but not the survey scale suggests the absence of demand effects[26] since the observed increase in altruistic behavior in the dictator game induces monetary costs to children.

TABLE 1.7. Treatment effects on socio-emotional skill components

	(1)	(2)
Dependent variable	Number of observations	Treatment effect
Self-control		
Exp: Time-consistency when patient	3,044	0.054
		(0.043)
Svy: Impulsivity Scale for Children (rev.)	3,077	0.110***
		(0.042)
Patience		
Exp: Patience	3,044	0.016
		(0.044)
Svy: Patience survey item	3,166	0.050
		(0.041)
Prosociality		
Exp: Altruism in dictator games	3,162	0.092**
		(0.039)
Svy: Prosocial behavior scale	3,109	0.018
		(0.042)

NOTES: All dependent variables are standardized such that the mean of the control group is 0 and the standard deviation is 1. Regressions include a full set of strata fixed effects. School-clustered standard errors in parentheses. Significance at $^{+}p < 0.15$, $^{*}p < 0.1$, $^{**}p < 0.05$, $^{***}p < 0.01$.

26. We take great care to exclude demand effects by design. For example, the treatment takes place in school, the interviews at home and the intervention is not mentioned during the interviews and experiments.

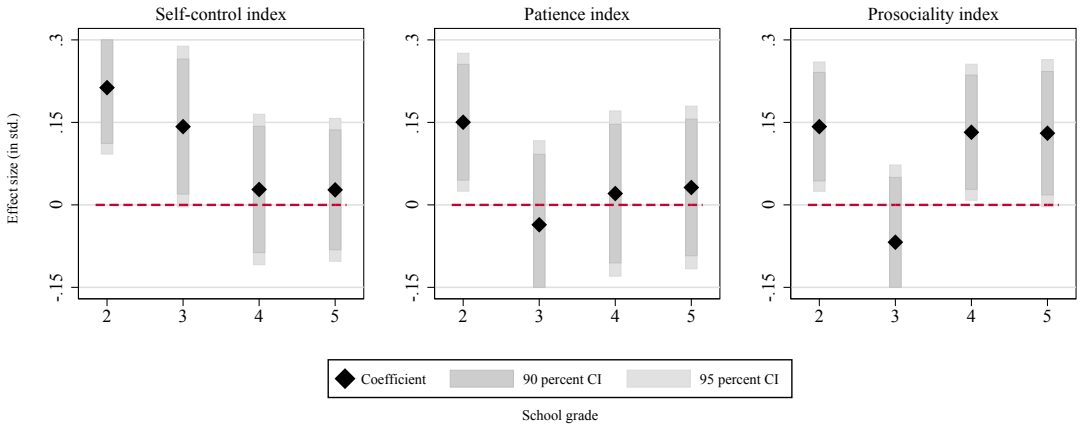
1.4.2 Sensitive periods in the formation of socio-emotional skills

We continue by exploiting the specific design elements of our randomized controlled trial that enable us to investigate potential sensitive periods in the development of socio-emotional skills—namely that we implemented the same investment (the Lions Quest SfG program) in different school grades (i.e., at different ages), while holding intensity and start and end date of the investment constant. Given these features, comparing the treatment effects across grades informs about possible sensitive periods in the formation of the analyzed skills in the age range we consider (ages 7 to 11). In order to estimate grade-specific treatment effects, we regress the skill indices Y on a full set of grade indicators ($1(\text{grade}{=}g){=}1$ if grade$=g$ with $g \in \{2,3,4,5\}$, 0 otherwise), the grade indicators interacted with the treatment indicator, and a full set of strata fixed effects $\boldsymbol{\phi}$ (the linear treatment indicator is multicollinear):

$$Y = \sum_{g=2}^{5}\Big(\gamma_g 1(\text{grade} = g) \times \text{treatment} + \omega_g 1(\text{grade} = g)\Big) + \boldsymbol{\phi} + \varepsilon \qquad (1.2)$$

Table 1.8 reports the coefficients of the grade indicators (ω_g) and the grade–treatment interactions (γ_g); Figure 1.2 illustrates the latter, that is, the grade-specific treatment effects. Grade-specific treatment effects qualify as sensitive periods if they are significant and substantially larger than grade-specific treatment effects in other periods, implying a higher return to investment.

FIGURE 1.2. Treatment effects on socio-emotional skills by school grade



NOTES: Figure plots coefficients of interactions displayed in Table 1.8. Observations: about 880 for grade 2, 780 for grade 3, 760 for grade 4, and 760 for grade 5. For **self-control**, the grade 2 treatment effect is significantly different (based on t-tests for the equality of coefficients) from treatment effects in grades 4 and 5 ($p \leq 0.05$). For **patience**, treatment effects in grades 2 and 3 are significantly different ($p = 0.05$). For **prosociality**, the grade 3 treatment effect is significantly different from the treatment effects in all other grades ($p \leq 0.10$). For all other grade combinations, grade-specific treatment effects are not statistically significantly different.

TABLE 1.8. Sensitive periods as captured by treatment effect heterogeneity along school grades

	(1)	(2)	(3)	(4)
	School grade			
Dependent variable	Grade 2	Grade 3	Grade 4	Grade 5
Self-control				
Grade		−0.046	−0.077	0.038
		(0.052)	(0.068)	(0.063)
Treatment × grade	0.213***	0.142*	0.028	0.027
	(0.062)	(0.075)	(0.070)	(0.066)
Patience				
Grade		−0.017	−0.170***	−0.084
		(0.060)	(0.063)	(0.068)
Treatment × grade	0.150**	−0.036	0.021	0.032
	(0.064)	(0.078)	(0.077)	(0.075)
Prosociality				
Grade		0.155**	0.113*	0.262***
		(0.067)	(0.062)	(0.068)
Treatment × grade	0.142**	−0.068	0.132**	0.130*
	(0.060)	(0.072)	(0.063)	(0.068)

NOTES: All dependent variables are standardized such that the mean of the control group is 0 and the standard deviation is 1. Regressions include a full set of strata fixed effects. School-clustered standard errors in parentheses. Significance at $^{*}p < 0.15$, $^{*}p < 0.1$, $^{**}p < 0.05$, $^{***}p < 0.01$.

Looking at the two dimensions of time preferences, we find that the extent of self-control and patience of the 7- to 11-year-olds in our sample remains rather stable over time. Self-control has been shown to develop at relatively young ages with a first qualitative shift between the ages 3 and 7 (Montroy et al., 2016). Previous evidence from cross-sectional and panel studies on patience is mixed. Most studies document an increase in patience as children grow up for younger children up to age 10 (Bettinger and Slonim, 2007; Angerer et al., 2015; Sutter, Yilmaz, and Oberauer, 2015; Falk et al., 2021), but not for older children (Sutter et al., 2013).

The grade-specific treatment effects on self-control make a strong case for the existence of a sensitive period during early elementary school age. The treatment effects in grades 2 and 3 (21.3 and 14.2 percent of a standard deviation, respectively) are much higher than the treatment effects in grades 4 and 5 (both smaller than 3 percent of a standard deviation and statistically indifferent from zero). Unsurprisingly, given the visual evidence in Figure 1.2, the point estimates in grade 2 are also statistically different from those in grades 4 and 5 (both $p \leq 0.05$). Moreover, the slight decrease in the treatment effect from grade 2 to grade 3 for

self-control suggests that the time period we study (grades 2 to 5) possibly captures the fading out of an even longer sensitive period in the formation of self-control.

For patience, we find a sizeable (15 percent of a standard deviation) treatment effect in grade 2 only ($p < 0.05$). In contrast, treatment effects in grades 3 to 5 are small, ranging from −3.6 to 3.2 percent of a standard deviation, and not significant. The treatment effect in grade 2 is also statistically different from the treatment effect in grade 3 ($p = 0.05$). Together, these findings suggest grade 2 (ages 7 to 8) as a (perhaps fading away) sensitive period in the formation of patience. Our result that sensitive periods for patience are rather in early than later elementary school age has a similar spirit as the cross-sectional evidence that, on average, children's patience increases at younger ages, but no longer once they have turned 10 or older (Sutter et al., 2013). Similar to the results on self-control, the higher treatment effect in an early period compared to later ones is in line with "the earlier, the better" findings for sensitive periods in the formation of cognitive skills (Shonkoff and Phillips, 2000; J-PAL, 2013; Heckman and Mosso, 2014).

Turning to social preferences, we observe that prosociality increases significantly during elementary school age (ages 7 to 11), as indicated by previous evidence from cross-sectional (see Sutter, Zoller, and Glätzle-Rützler, 2019, for an overview of this literature) and panel data (Kosse et al., 2020). This suggests that prosociality is, in principle, malleable in this age range. Note, however, that cross-sectional patterns in the development of children's economic preferences are not sufficient to identify sensitive periods, i.e., when returns to investments are particularly high. In line with the observed trajectory during elementary school age, grade-specific treatment effects are relatively large and significant throughout grades 2 to 5, with the exception of grade 3. The treatment effects for grades 2, 4, and 5 are similar in size—ranging between 13 and 14.2 percent of a standard deviation—, while the grade 3 treatment effect is −6.8 percent of a standard deviation and not statistically significant. Likely, the latter is driven by an imbalance we observe at baseline: children in grade 3 of treatment schools have, on average, a significantly lower prosociality than their counterparts in control schools. This difference amounts to 20 percent of a standard deviation. Not observing a significant difference between treatment and control group in grade 3 after the treatment suggests that treated children caught up with an effect size similar to the ones we see in the other grades. Hence, prosociality seems to be equally malleable during the whole age range between 7 and 11 years.

Overall, our findings provide a first proof of concept that designs such as ours can be a valuable tool for learning about sensitive periods. Moreover, they suggest that sensitive periods differ across socio-emotional skills. Earlier investments in self-control and patience, the two dimensions of time preferences, seem to be more effective than the same investments in these skills at later stages (grades 4 and 5). In contrast, prosociality can presumably be molded equally by the same investment at beginning and end of the age range covered by elementary school. In terms of the SfG program, our results indicate that an implementation

in earlier grades is likely to be more effective than in later grades, especially as the higher returns on self-control and patience do not seem to come at the costs of lower prosociality returns.

1.4.3 Robustness checks

We have run several checks to test the robustness of our findings and confirm our main results. For this, in the following we use *p*-values that are based on randomization inference or are adjusted for multiple hypothesis testing, and we estimate treatment effects when controlling for pre-treatment outcomes and additionally for family characteristics. We also look for potential ceiling effects.

Alternative *p*-values. Significance levels reported so far are based on conventional critical values of *t*-tests. Appendix Table 1.B.8 reports *p*-values based on randomization inference as well as from multiple hypothesis testing adjustment.

With randomization inference, the *p*-values for self-control and prosociality of our overall estimates in Table 1.6 (referred to as the "pooled specification" in Table 1.B.8) are still well below the 5 percent significance level, see column (3) of Table 1.B.8. Next, we account for an increasing probability of false positives in the number of tested hypotheses (i.e., outcomes). Column (4) uses the adjustment of critical *t*-values proposed by Romano and Wolf (2005a, 2005b), column (5) shows the *p*-values suggested by Westfall and Young (1993), and column (6) reports Anderson (2008)'s *q*-values, see McKenzie (2020) for a discussion of their different properties. Importantly, *p*-values for self-control and prosociality do not exceed 0.05 for any method of multiple hypothesis testing adjustment.

Table 1.B.8 also gives alternative *p*-values for our grade-specific treatment effects used to assess sensitive periods. The results in Table 1.8 in section 1.4.2 that are repeated in column (1) are based on a more efficient joint estimation of grade-specific treatment effects through the interaction of grade indicators and the treatment indicator. The alternative *p*-values in column (2) of Table 1.B.8 rely on separate estimations (i.e., by restricting the sample to include only second graders, for example). As expected, some of the point estimates are less precise (the *p*-values for the grade 3 effect on self-control and the grade 4 effect on prosociality become insignificant in the separate estimations approach). However, this does not alter the overall results and our interpretation of sensitive periods remains unchanged. All grade-specific treatment effects that are significant under separate estimation remain significant under randomization inference and when applying the various forms of multiple hypothesis testing adjustment. All in all, results in Table 1.B.8 show that the overall interpretation of our results remains unchanged when using several alternative ways to assess inference.

Controlling for pre-treatment variables. Appendix Tables 1.B.9 and 1.B.10 (coefficients from the latter are also plotted in Figure 1.A.8) give the overall and grade-specific treatment ef-

fects when controlling for (i) pre-treatment outcomes and (ii) pre-treatment outcomes and the socio-demographic family characteristics elicited at the beginning of treatment that are used in the balancing test in Table 1.B.6 in the appendix. Neither of these specifications qualitatively changes our treatment effects.

Potential ceiling effects. We do not observe ceiling effects in higher grades that could explain results on sensitive periods. That is, we do not observe that older children are simply reaching the top of our scales and measures and hence have no more room for improvement contrary to younger children. Appendix Table 1.B.4 shows that the fraction of children who score the highest possible value on the respective scales are low in general and, importantly, does not differ much between grades.

1.4.4 Discussion

Cunha and Heckman (2007) define a sensitive period in the formation of skills as a stage t^* in the life cycle, where the return to an investment I exceeds the one of an investment at another stage $s \neq t^*$. At each stage t, let θ_t denote the outcome vector of skill stocks. Formally, for an outcome θ_{t+1}, stage t^* is a sensitive period if $\frac{\partial \theta_{t+1}}{\partial I_{t^*}} > \frac{\partial \theta_{t+1}}{\partial I_s}$. This notion implicitly holds all other inputs in the production function of θ_{t+1} constant. That is, the return to investment I is a ceteris paribus effect that disregards responses to the investment in terms of other production function inputs. In contrast, the results in section 1.4.2 (just as in section 1.4.1) are what Todd and Wolpin (2003) refer to as policy effects. Consequently, the estimated grade-specific treatment effects may in part be driven by responses in other inputs of children, parents, or teachers to the treatment.

To learn about sensitive periods in the ceteris paribus sense, we consider a number of potential explanations of the heterogeneity in the grade-specific treatment effects that are not due to children's development: grade-specific behavioral child responses, parental responses, and teacher responses.

Child responses. Children in higher grades may experience more time constraints and have less time to engage with the content of the SfG program. Our data allow exploring two dimensions of children's time use: how much time they spend studying for school at home and how much they help their parents at home. The child's mother answered the studying variable on a three-point scale (less than 2 hours a day, 2–3 hours, or more than 3 hours).[27] Investigating the treatment effects on studying by grade tells us about a possible "crowding

27. The question does not differentiate between subjects the child is learning for (e.g., LQ lessons vs. math or Bangla). However, as column (2) of Table 1.B.17 shows, the treatment has no overall effect on studying behavior. As children in the control group will not have to study for the counterfactual lessons, the study variable does not seem to capture studying for LQ lessons; otherwise, treated children would mechanically study more. Therefore, it is plausible to interpret the variable as studying for subjects other than LQ lessons.

out" effect: older children might engage less in the LQ program because other subjects require more attention in higher grades. Columns (3) to (6) in Table 1.B.17 give the grade-specific treatment effects on studying. Neither is any treatment coefficient significantly different from zero, nor is their joint effect (assessed through an F-test in column (7)). Further, we consider whether older children have to help more at home (e.g., with rearing younger siblings or helping on the family's farm). As expected, there is no overall treatment effect on binary indicators for helping at home, helping in the family business, or missing days of school due to work (column (2) of Table 1.B.17). And, more relevant for the explanation of sensitive periods, grade-specific heterogeneity in the three variables for helping at home does not seem to explain grade-specific treatment effects on socio-emotional skills.

Lastly, apart from missing days of school for work, older children may be more resilient and less prone to missing school due to illness. However, Table 1.B.17 shows that there are no grade-specific treatment effects on absence from school for health reasons.

Parental responses. The SfG intervention may change parents' behavior towards their children, either because of the parents' meeting as part of the program or because they respond to their children's behavior (e.g., parents of less impulsive children may need to be less strict). To test this, we use a battery of six parenting style dimensions, each comprising three survey items.[28] For most dimensions, there is no significant difference between treatment and control group parents of children in all grades; see column (2) of Table 1.B.18. Mothers in the treatment group show slightly less emotional warmth and less monitoring activity than control group mothers. Importantly, style differences do not vary much by grade (columns (3) to (6)). The F-statistic (in column (7)) is below 0.10 for the grade-specific treatment effects on strict control, but the pattern of the grade-specific effects does not resemble the ones of self-control and patience in section 1.4.2 (the grade 2 and 5 effects are significantly below zero).

Teacher responses. As the SfG program is a classroom-based intervention, teachers' implementation of the program and their attitudes are essential. As a consequence, the sensitive periods patterns we observe in section 1.4.2 may not be driven by children's age- or grade-specific development but reflect teachers implementing the program differently across grades. To investigate this pathway, the teacher questionnaires for LQ teachers included questions about the program implementation and teachers' attitudes. Specifically, we asked about the average duration of the LQ lessons, the teaching style (combination of textbook-based teaching with real-world examples and visual aids), problems with the program implementation, and teachers' days of absence. The attitude questions refer to the teachers' identification with

28. The assessed dimensions of parenting are emotional warmth, inconsistent parenting, monitoring, negative communication, psychological control, and strict control. These styles have been taken from the Panel Analysis of Intimate Relationships and Family Dynamics project's parenting questionnaire (Thönnissen et al., 2019) and are, for example, also used in the German Socio-Economic Panel Study (Richter et al., 2013).

the program, whether they enjoy being a teacher, and an indicator whether they consider the teaching of values more important than the teaching of knowledge.[29]

Table 1.B.19 compares the answer means across grades. To facilitate a more direct comparison across grades, each variable is regressed on grade indicators (grade 2 is the reference category) with the coefficients reported in columns (2) to (4). Column (5) gives the *F*-statistic for the joint significance of the indicators. Neither the duration of the lessons significantly differs across grades nor does the share of teachers who report that they encountered problems when implementing the program. Teachers' attitudes react differently across grades, in particular if we compare grade 5 to grade 2. However, we do not observe patterns which might account for stronger treatment effects in earlier grades. In contrast, the higher program identification in grade 5 and the higher job satisfaction would rather suggest that grade 5 effects are more pronounced.

Overall, the factors investigated here do not offer an alternative explanation for the bigger treatment effects in earlier grades for self-control and patience. Thus, the sensitive periods hypothesis that the children's age- or grade-specific development drives grade heterogeneity cannot be rejected.

1.5 Conclusion

This study presents a novel design to learn about sensitive periods in the formation of children's skills and provides first evidence. We propose to investigate sensitive periods by documenting heterogeneity in age-(or grade-)specific treatment effects in a randomized controlled trial that assigns a given investment to treatment children of different ages and holds treatment period and intensity constant across all age groups. In such a setup, age-specific treatment effects that are substantially larger than those for the same skill at different ages point towards the existence of a sensitive period. Our design and identification strategy can also be applied in future research that aims at broadening our knowledge about sensitive periods in skill formation.

The results of this study offer important insights into sensitive periods in the formation of children's time and social preferences. They thereby contribute to filling the knowledge gap regarding the timing of sensitive periods in the formation of children's socio-emotional skills. For self-control and patience, we find that returns to the same investment—participation in

29. Some questions are not specific to the LQ program and were asked to all teachers. Table 1.B.20 shows the treatment effects on these variables. Two effects are significant: LQ teachers are more likely to combine textbook-based teaching with real-world examples, and LQ teachers miss, on average, more days of school. The former effect is mechanical as the LQ materials use real-world examples, such that finding this effect is reassuring. The latter effect might be driven by LQ teachers being older compared to the teachers answering the questionnaire in control group schools. This effect also indicates that the treatment does not raise socio-emotional skills through increased supervision. Otherwise, LQ teachers would be less absent than control group teachers.

the Lions Quest Skills for Growing program—are substantially larger for 7- to 8-year-old than for older children. While the corresponding treatment effects are small and insignificant for older children, they range between 15 and 21 percent of a standard deviation for second graders. In contrast, grade-specific treatment effects for prosociality tend to be relatively large and significant throughout elementary school ages 7 to 11 (13 to 14 percent of a standard deviation).

Our findings hold broad significance. First, we contribute to the scarce, causal evidence on drivers of the formation of time preferences and prosociality in childhood (see Alan and Ertac, 2018, and Sorrenti et al., 2020, for time preferences and John and Thomsen, 2015, Alan and Ertac, 2017, Rao, 2019, Cappelen et al., 2020, and Kosse et al., 2020, for prosociality). We complement this literature by adding evidence from Bangladesh, a culturally and economically distinct context from those studied in previous work. Our results show that even if returns to investments in children's cognitive skills are low after age 3, returns to investments in socio-emotional skills can still be higher, as proposed by Cunha and Heckman (2007) and Borghans et al. (2008).

Second, our findings imply that the Lions Quest Skills for Growing program provides a valuable input in the process of children's skill formation. This is highly relevant as this program is widely implemented at a large scale in dozens of countries worldwide, but lacks rigorous evaluations.

Finally, our findings have important policy implications. Our results on sensitive periods in the formation of time preferences are in line with the "the earlier, the better" hypothesis (see, e.g., Zhou et al., 2021), providing new evidence that earlier investments do indeed have larger returns than later ones in the domain of time preferences. We also document that the timing of sensitive periods differs across socio-emotional skills. During elementary school age, earlier investments seem to be more effective in fostering self-control and patience than the same investments at later stages. In contrast, the malleability of prosociality through the investment under study remains high throughout elementary school age. Our results thus imply that an implementation of the SfG program is likely to be more effective in earlier rather than later grades since the higher returns on patience and self-control do not come at the cost of lower returns on prosociality. As a more general takeaway, our findings emphasize that the same intervention may be more effective at some ages than others. Learning about sensitive periods is thus a crucial prerequisite for effective and efficient timing of parental or public investments aimed at fostering children's skills.

References

Alan, Sule, and Seda Ertac. 2015. "Patience, Self-Control and the Demand for Commitment: Evidence from a Large-Scale Field Experiment." *Journal of Economic Behavior & Organization* 115: 111–22. [7]

Alan, Sule, and Seda Ertac. 2017. "Belief in Hard Work and Altruism: Evidence from a Randomized Field Experiment." Working Paper. [9, 37]

Alan, Sule, and Seda Ertac. 2018. "Fostering Patience in the Classroom: Results from Randomized Educational Intervention." *Journal of Political Economy* 126 (5): 1865–911. [9, 37]

Almlund, Mathilde, Angela L Duckworth, James J Heckman, and Tim D Kautz. 2011. "Personality Psychology and Economics." In *Handbook of the Economics of Education,* edited by Eric A. Hanushek, Stephan Machin, and Ludger Woessmann, 4: 1–181. Elsevier. [10]

Anderson, Michael L. 2008. "Multiple Inference and Gender Differences in the Effects of Early Intervention: A Reevaluation of the Abecedarian, Perry Preschool, and Early Training Projects." *Journal of the American Statistical Association* 103 (484): 1481–95. [33, 55]

Angerer, Silvia, Philipp Lergetporer, Daniela Glätzle-Rützler, and Matthias Sutter. 2015. "How to Measure Time Preferences in Children: A Comparison of Two Methods." *Journal of the Economic Science Association* 1 (2): 158–69. [31]

Bauer, Michal, Julie Chytilová, and Jonathan Morduch. 2012. "Behavioral Foundations of Microcredit: Experimental and Survey Evidence from Rural India." *American Economic Review* 102 (2): 1118–39. [20]

Bauer, Michal, Julie Chytilová, and Barbara Pertold. 2014. "Parental Background and Other-Regarding Preferences in Children." *Experimental Economics* 17: 24–46. [21]

Bettinger, Eric, and Robert Slonim. 2007. "Patience Among Children." *Journal of Public Economics* 91 (1-2): 343–63. [31]

Bolton, Gary E, and Axel Ockenfels. 2000. "A Theory of Equity, Reciprocity, and Competition." *American Economic Review* 90 (1): 166–93. [15]

Borghans, Lex, Angela Lee Duckworth, James J Heckman, and Bas ter Weel. 2008. "The Economics and Psychology of Personality Traits." *Journal of Human Resources* 43: 972–1059. [9, 37]

Cappelen, Alexander, John List, Anya Samek, and Bertil Tungodden. 2020. "The Effect of Early-Childhood Education on Social Preferences." *Journal of Political Economy* 128 (7): 2739–58. [9, 37]

Castillo, Marco, John A List, Ragan Petrie, and Anya Samek. 2020. "Detecting Drivers of Behavior at an Early Age: Evidence from a Longitudinal Field Experiment." NBER Working Paper 28288. National Bureau of Economic Research (NBER). [9]

Chowdhury, Shyamal, Matthias Sutter, and Klaus F Zimmermann. 2022. "Economic Preferences across Generations and Family Clusters: A Large-Scale Experiment in a Developing Country." *Journal of Political Economy* 130 (9): 2361–410. [16]

Clarke, Damian, Joseph P Romano, and Michael Worlf. 2020. "The Romano-Wolf Multiple-Hypothesis Correction in Stata." *Stata Journal* 20 (4): 812–43. [55]

Cobb-Clark, Deborah A, Sarah C Dahmann, Daniel A Kamhöfer, and Hannah Schildberg-Hörisch. 2022. "The Predictive Power of Self-Control for Life Outcomes." *Journal of Behavior & Organization* 197: 725–44. [7, 10]

Committee on the Science of Adolescence. 2011. *The Science of Adolescent Risk-Taking: Workshop Report.* National Academies Press, Washington, DC. Report. [13]

Cunha, Flavio, and James J Heckman. 2007. "The Technology of Skill Formation." *American Economic Review* 97 (2): 31–47. [5, 6, 8, 9, 13, 15, 34, 37]

Cunha, Flavio, and James J Heckman. 2008. "Formulating, Identifying and Estimating the Technology of Cognitive and Noncognitive Skill Formation." *Journal of Human Resources* 43: 738–82. [5, 6, 15]

Cunha, Flavio, James J Heckman, Lance Lochner, and Dimitriy V Masterov. 2006. "Interpreting the Evidence on Life Cycle Formation." In *Handbook of the Economics of Education,* edited by E Hanushek and F Welch, 1: 697–812. Elsevier. [13]

Cunha, Flavio, James J Heckman, and Susanne M Schennach. 2010. "Estimating the Technology of Cognitive and Noncognitive Skill Formation." *Econometrica* 78 (3): 883–931. [6, 15]

DellaVigna, Stefano, and M Daniele Paserman. 2005. "Job Search and Impatience." *Journal of Labor Economics* 23 (3): 527–88. [7]

Deming, David J. 2017. "The Growing Importance of Social Skills in the Labor Market." *Quarterly Journal of Economics* 132 (4): 1593–640. [7]

Durlak, Joseph A, Roger P Weissberg, Allison B Dymnicki, Rebecca D Taylor, and Kriston B Schellinger. 2011. "The Impact of Enhancing Students' Social and Emotional Learning: A Meta-Analysis of School-Based Universal Interventions." *Child Development* 82 (1): 405–32. [10]

Ericson, Keith Marzilli, and David Laibson. 2019. "Chapter 1—Intertemporal Choice." In *Handbook of Behavioral Economics—Foundations and Applications 2,* edited by B. Douglas Bernheim, Stefano DellaVigna, and David Laibson, 2: 1–67. Handbook of Behavioral Economics: Applications and Foundations 1. North-Holland. [14]

Falk, Armin, Anke Becker, Thomas Dohmen, Benjamin Enke, David Huffman, and Uwe Sunde. 2018. "Global Evidence on Economic Preferences." *Quarterly Journal of Economics* 133 (4): 1645–92. [7, 10, 19]

Falk, Armin, Fabian Kosse, Pia Pinger, Hannah Schildberg-Hörisch, and Thomas Deckers. 2021. "Socio-Economic Status and Inequalities in Children's IQ and Economic Preferences." *Journal of Political Economy* 129 (9): 2504–45. [31]

Fehr, Ernst, Helen Bernhard, and Bettina Rockenbach. 2008. "Egalitarianism in Young Children." *Nature* 454: 1079–83. [21]

Fehr, Ernst, and Klaus M Schmidt. 1999. "A Theory of Fairness, Competition, and Cooperation." *Quarterly Journal of Economics* 114 (3): 817–68. [15]

Figner, Bernd, Daria Knoch, Eric J Johnson, Amy R Krosch, Sarah H Lisanby, Ernst Fehr, and Elke U Weber. 2010. "Lateral Prefrontal Cortex and Self-Control in Intertemporal Choice." *Nature Neuroscience* 13 (5): 538–39. [13]

Gabard-Durnam, Laurel, and Katie A McLaughlin. 2020. "Sensitive Periods in Human Development: Charting a Course for the Future." *Current Opinion in Behavioral Sciences* 36: 120–28. [8]

Gogtay, Nitin, Jay N Giedd, Leslie Lusk, Kiralee M Hayashi, Deanna Greenstein, A Catherine Vaituzis, Tom F Nugent III, et al. 2004. "Dynamic Mapping of Human Cortical Development During Childhood Through Early Adulthood." *Proceedings of the National Academy of Sciences (PNAS)* 101 (21): 8174–79. [13]

Gol-Guven, Mine. 2017. "The Effectiveness of The Lions Quest Program: Skills for Growing on School Climate, Students' Behaviors, Perceptions of School, and Conflict Resolution Skills." *European Early Childhood Education Research Journal* 625 (4): 575–94. [9]

Golsteyn, Bart HH, Hans Grönqvist, and Lena Lindahl. 2014. "Adolescent Time Preferences Predict Lifetime Outcomes." *Economic Journal* 124 (580): F739–F761. [7]

Goodman, Robert. 1997. "The Strengths and Difficulties Questionnaire: A Research Note." *Journal of Child Psychology and Psychiatry, and Allied Disciplines* 38 (5): 581–86. [22, 50]

Goodman, Robert, Tamsin Ford, H Simmons, RA Gatward, and H Meltzer. 2000. "Using the Strengths and Difficulties Questionnaire (SDQ) to Screen for Child Psychiatric Disorders in a Community Sample." *International Review of Psychiatry (Abingdon, England)* 15: 166–72. [22]

Hare, Todd A, Colin F Camerer, and Antonio Rangel. 2009. "Self-Control in Decision-Making Involves Modulation of the vmPFC Valuation System." *Science* 324 (5927): 646–48. [13]

Hartley, Catherine, and Willem E Frankenhuis. 2020. "Editorial Overview: Sensitive and Critical Periods." *Current Opinion in Behavioral Sciences* 36: iii–v. [8]

Heckman, James J, Seong Hyeok Moon, Rodrigo Pinto, Peter A Savelyev, and Adam Yavitz. 2010. "The Rate of Return to the HighScope Perry Preschool Program." *Journal of Public Economics* 94 (1): 114–28. [9]

Heckman, James J, and Stefano Mosso. 2014. "The Economics of Human Development and Social Mobility." *Annual Review of Economics* 6 (1): 689–733. [6, 9, 13, 15, 32]

Hertwig, Ralph, and Andreas Ortmann. 2001. "Experimental Practices in Economics: A Methodological Challenge for Psychologists?" *Behavioral and Brain Sciences* 24 (3): 383–403. [7]

Hess, Simon. 2017. "Randomization Inference with Stata: A Guide and Software." *Stata Journal* 17 (3): 630–51. [55]

Hoynes, Hilary, Diane Whitmore Schanzenbach, and Douglas Almond. 2016. "Long-Run Impacts of Childhood Access to the Safety Net." *American Economic Review* 106 (4): 903–34. [6]

J-PAL. 2013. "J-PAL Youth Initiative Review Paper." Report. Cambridge, MA: Abdul Latif Jameel Poverty Action Lab. [6, 13, 32]

John, Kathrin, and Stephan L Thomsen. 2015. "School-Track Environment or Endowment: What Determines Different Other-Regarding Behavior Across Peer Groups?" *Games and Economic Behavior* 94: 122–41. [9, 37]

Jones, Damon, David Molitor, and Julian Reif. 2019. "What Do Workplace Wellness Programs Do? Evidence from the Illinois Workplace Wellness Study." *Quarterly Journal of Economics* 134 (4): 1747–91. [55]

Kautz, Tim, James J Heckman, Ron Diris, Bas ter Weel, and Lex Borghans. 2014. "Fostering and Measuring Skills: Improving Cognitive and Non-Cognitive Skills to Promote Lifetime Success." OECD Education Working Paper No. 110. OECD. [6, 9, 13]

Kidron, Yael, Mark Garibaldi, Emily Anderson, and David Osher. 2015. "Lions Quest Skills for Growing: Implementation and Outcome Study in Wood County, West Virginia." Report. American Institutes for Research (AIR). [9]

Kling, Jeffrey R, Jeffrey B Liebman, and Lawrence F Katz. 2007. "Experimental Analysis of Neighborhood Effects." *Econometrica* 75 (1): 83–119. [28]

Knudsen, Eric I. 2004. "Sensitive Periods in the Development of Brain and Behavior." *Journal of Cognitive Neuroscience* 16 (8): 1412–25. [8]

Knudsen, Eric I, James J Heckman, Judy L Cameron, and Jack P Shonkoff. 2006. "Economic, Neurobiological, and Behavioral Perspectives on Building America's Future Workforce." *Proceedings of the National Academy of Sciences (PNAS)* 103 (27): 10155–62. [6, 8, 15]

Kosse, Fabian, Thomas Deckers, Pia Pinger, Hannah Schildberg-Hörisch, and Armin Falk. 2020. "The Formation of Prosociality: Causal Evidence on the Role of Social Environment." *Journal of Political Economy* 128 (2): 434–67. [7, 9, 19, 32, 37]

Laibson, David. 1997. "Golden Eggs and Hyperbolic Discounting." *Quarterly Journal of Economics* 112 (2): 443–78. [14]

LCIF. 2016. "Lions Quest Universal Program Guide." Guide. Lions Clubs International Foundation, Oak Brook, IL. [7]

Lee, David S, and Thomas Lemieux. 2010. "Regression Discontinuity Designs in Economics." *Journal of Economic Literature* 48 (2): 281–355. [24, 26]

Lundborg, Petter, Dan-Olof Rooth, and Jesper Alex-Petersen. 2021. "Long-Term Effects of Childhood Nutrition: Evidence from a School Lunch Reform." *Review of Economic Studies.* [6]

Maalouf, Wadih, Milos Stojanovic, Matthew Kiefer, Giovanna Campello, Hanna Heikkila, and Ziad El-Khatib. 2019. "Lions Quest Skills for Adolescence Program as a School Intervention to Prevent Substance Use—A Pilot Study Across Three South East European Countries." *Prevention Science* 20 (4): 555–65. [10]

Matischek-Jauk, Marlies, Georg Krammer, and Hannelore Reicher. 2018. "The Life-Skills Program Lions Quest in Austrian Schools: Implementation and Outcomes." *Health Promotion International* 33: 1022–32. [10]

McKenzie, David. 2020. "If It Needs a Power Calculation, Does It Matter for Poverty Reduction?" *World Development* 127: 104815. [33, 55]

Moffitt, Terrie E, Louise Arseneault, Daniel Belsky, Nigel Dickson, Robert J Hancox, HonaLee Harrington, Renate Houts, et al. 2011. "A Gradient of Childhood Self-Control Predicts Health, Wealth, and Public Safety." *Proceedings of the National Academy of Sciences (PNAS)* 108 (7): 2693–98. [7, 10]

Montroy, Janelle J, Ryan P Bowles, Lori E Skibbe, Megan M McClelland, and Frederick J Morrison. 2016. "The Development of Self-Regulation Across Early Childhood." *Developmental Psychology* 52 (11): 1744–62. [31]

O'Donoghue, Ted, and Matthew Rabin. 1999. "Doing It Now or Later." *American Economic Review* 89 (1): 103–24. [14]

Oberfichtner, Michael, and Harald Tauchmann. 2021. "Stacked Linear Regression Analysis to Facilitate Testing of Hypotheses Across OLS Regressions." *Stata Journal* 21 (2): 411–29. [24]

Ostrom, Elinor, Thomas Dietz, Nives Dolsak, Paul C Stern, Susan Stonich, and Elke U Weber. 2002. *The Drama of the Commons.* Washington, DC: National Academy of Sciences. [7]

Rao, Gautam. 2019. "Familiarity Does Not Breed Contempt: Generosity, Discrimination, and Diversity in Delhi Schools." *American Economic Review* 109 (3): 774–809. [9, 37]

Richter, David, Maria Metzing, Michael Weinhardt, and Jürgen Schupp. 2013. "SOEP Scales Manual." SOEP Survey Papers 138, Technical Report. German Institute for Economic Research (DIW Berlin), Socio-Economic Panel Study. [35]

Rodríguez-Planas, Núria. 2012. "Mentoring, Educational Services, and Incentives to Learn: What Do We Know About Them?" *Evaluation and Program Planning* 35 (4): 481–90. [9]

Romano, Joseph P, and Michael Wolf. 2005a. "Exact and Approximate Stepdown Methods for Multiple Hypothesis Testing." *Journal of the American Statistical Association* 100 (469): 94–108. [33, 55]

Romano, Joseph P, and Michael Wolf. 2005b. "Stepwise Multiple Testing as Formalized Data Snooping." *Econometrica* 73 (4): 1237–82. [33, 55]

Shonkoff, Jack P, and Deborah A Phillips. 2000. *From Neurons to Neighborhoods: The Science of Early Child Development.* Washington, DC: National Academy Press. [6, 32]

Sorrenti, Guiseppe, Ulf Zölitz, Denis Ribeaud, and Manuel Eisner. 2020. "The Causal Impact of Socio-Emotional Skills Training on Educational Success." IZA DP No. 13087. IZA Institute of Labor Economics. [9, 37]

Sutter, Matthias, Martin G Kocher, Daniela Glätzle-Rützler, and Stefan T Trautmann. 2013. "Impatience and Uncertainty: Experimental Decisions Predict Adolescents' Field Behavior." *American Economic Review* 103 (1): 510–31. [7, 31, 32]

Sutter, Matthias, Levent Yilmaz, and Manuela Oberauer. 2015. "Delay of Gratification and the Role of Defaults—An Experiment with Kindergarten Children." *Economics Letters* 137: 21–24. [31]

Sutter, Matthias, Claudia Zoller, and Daniela Glätzle-Rützler. 2019. "Economic Behavior of Children and Adolescents—A First Survey of Experimental Economics Results." *European Economic Review* 111: 98–121. [32]

Tangney, June P, Roy F Baumeister, and Angie L Boone. 2004. "High Self-Control Predicts Good Adjustment, Less Pathology, Better Grades, and Interpersonal Success." *Journal of Personality* 72 (2): 271–324. [7]

Taylor, Rebecca D, Eva Oberle, Joseph A Durlak, and Roger P Weissberg. 2017. "Promoting Positive Youth Development Through School-Based Social and Emotional Learning Interventions: A Meta-Analysis of Follow-Up Effects." *Child Development* 88 (4): 1156–71. [10]

The World Bank. 2018. "Program Appraisal Document on a Proposed Credit for the Quality Learning for All Program for Fourth Primary Education Development Porgram." Report No. 122705-BD. The World Bank. [11]

The World Bank. 2021. "World Development Indicators Database: GDP per Capita, PPP (current international $)—Bangladesh (last accessed August 13, 2021)." Online Database. The World Bank. [16]

Thönnissen, Carolin, Barbara Wilhelm, Philipp Alt, Henriette Greischel, and Sabine Walper. 2019. "Scales and Instruments Manual, Waves 1 to 10; Release 10.0." Technical Report. Panel Analysis of Intimate Relationships and Family Dynamics. [35]

Todd, Petra E, and Kenneth I Wolpin. 2003. "On the Specification and Estimation of the Production Function for Cognitive Achievement." *Economic Journal* 113 (485): F3–F33. [34]

Tsukayama, Eli, Angela Duckworth, and Betty Kim. 2013. "Domain-Specific Impulsivity in School-Age Children." *Developmental Science* 16: 879–93. [22, 50]

UN. 2015. "Bangladesh: Pre-primary Education and the School Learning Improvement Plan." Report. United Nations and UNESCO. [12]

Westfall, Peter H, and S Stanley Young. 1993. *Resampling-Based Multiple Testing: Examples and Methods for p-value Adjustment.* Vol. 279. John Wiley & Sons. [33, 55]

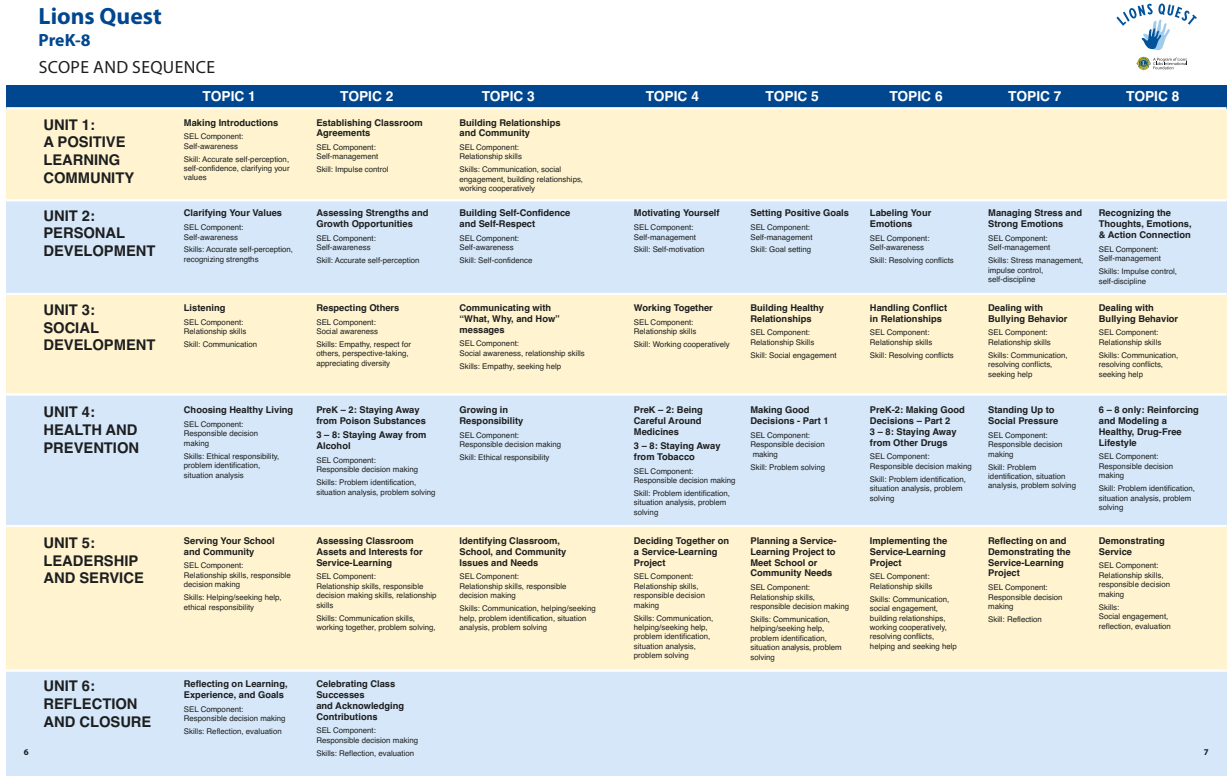
Zeanah, Charles H, Megan R Gunnar, Robert B McCall, Jana M Kreppner, and Nathan A Fox. 2011. "VI. Sensitive Periods." *Monographs of the Society for Research in Child Development* 76 (4): 147–62. [8]

Zhou, Jin, Alison Baulos, James J Heckman, and Bei Liu. 2021. "The Economics of Investing in Early Childhood: Importance of Understanding the Science of Scaling." In *The Scale-Up Effect in Early Childhood and Public Policy: Why Interventions Lose Impact at Scale and What We Can Do About It,* edited by John A List, Dana Suskind, and Lauren H Supplee. New York: Routledge, Taylor & Francis. [37]

Appendix 1.A Figures

1.A.1 LQ materials

FIGURE 1.A.1. Lions Quest Skills for Growing PreK–8 Scope and Sequence Sheet



Lions Quest
PreK-8
SCOPE AND SEQUENCE

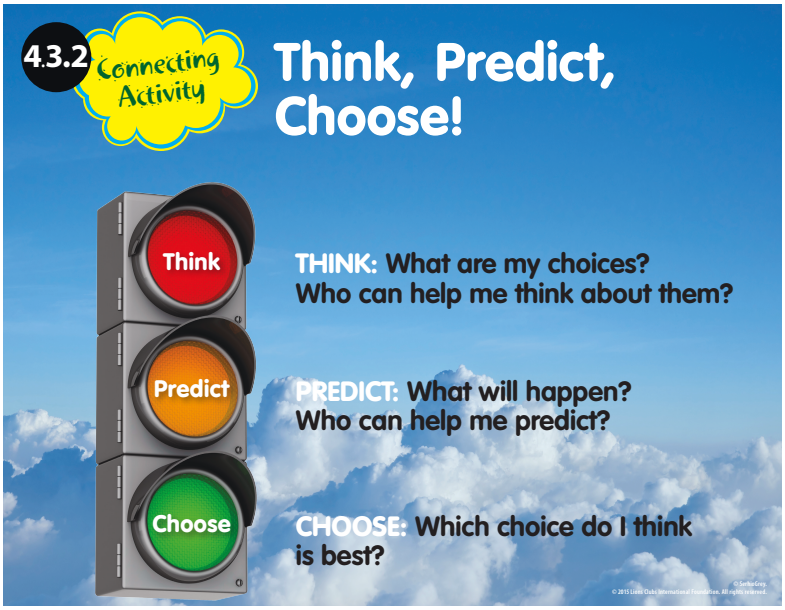
	TOPIC 1	TOPIC 2	TOPIC 3	TOPIC 4	TOPIC 5	TOPIC 6	TOPIC 7	TOPIC 8
UNIT 1: A POSITIVE LEARNING COMMUNITY	**Making Introductions** SEL Component: Self-awareness Skill: Accurate self-perception, self-confidence, clarifying your values	**Establishing Classroom Agreements** SEL Component: Self-management Skil: Impulse control	**Building Relationships and Community** SEL Component: Relationship skills Skills: Communication, social engagement, building relationships, working cooperatively					
UNIT 2: PERSONAL DEVELOPMENT	**Clarifying Your Values** SEL Component: Self-awareness Skills: Accurate self-perception, recognizing strengths	**Assessing Strengths and Growth Opportunities** SEL Component: Self-awareness Skil: Accurate self-perception	**Building Self-Confidence and Self-Respect** SEL Component: Self-awareness Skil: Self-confidence	**Motivating Yourself** SEL Component: Self-management Skil: Self-motivation	**Setting Positive Goals** SEL Component: Self-management Skil: Goal setting	**Labeling Your Emotions** SEL Component: Self-awareness Skil: Resolving conflicts	**Managing Stress and Strong Emotions** SEL Component: Self-management Skills: Stress management, impulse control, self-discipline	**Recognizing the Thoughts, Emotions, & Action Connection** SEL Component: Self-management Skills: Impulse control, self-discipline
UNIT 3: SOCIAL DEVELOPMENT	**Listening** SEL Component: Relationship skills Skil: Communication	**Respecting Others** SEL Component: Social awareness Skills: Empathy, respect for others, perspective-taking, appreciating diversity	**Communicating with "What, Why, and How" messages** SEL Component: Social awareness, relationship skills Skills: Empathy, seeking help	**Working Together** SEL Component: Relationship skills Skil: Working cooperatively	**Building Healthy Relationships** SEL Component: Relationship Skills Skil: Social engagement	**Handling Conflict in Relationships** SEL Component: Relationship skills Skil: Resolving conflicts	**Dealing with Bullying Behavior** SEL Component: Relationship skills Skills: Communication, resolving conflicts, seeking help	**Dealing with Bullying Behavior** SEL Component: Relationship skills Skills: Communication, resolving conflicts, seeking help
UNIT 4: HEALTH AND PREVENTION	**Choosing Healthy Living** SEL Component: Responsible decision making Skills: Ethical responsibility, problem identification, situation analysis	**PreK – 2: Staying Away from Poison Substances** **3 – 8: Staying Away from Alcohol** SEL Component: Responsible decision making Skills: Problem identification, situation analysis, problem solving	**Growing in Responsibility** SEL Component: Responsible decision making Skil: Ethical responsibility	**PreK – 2: Being Careful Around Medicines** **3 – 8: Staying Away from Tobacco** SEL Component: Responsible decision making Skil: Problem identification, situation analysis, problem solving	**Making Good Decisions - Part 1** SEL Component: Responsible decision making Skil: Problem solving	**PreK-2: Making Good Decisions – Part 2** **3 – 8: Staying Away from Other Drugs** SEL Component: Responsible decision making Skil: Problem identification, situation analysis, problem solving	**Standing Up to Social Pressure** SEL Component: Responsible decision making Skil: Problem identification, situation analysis, problem solving	**6 – 8 only: Reinforcing and Modeling a Healthy, Drug-Free Lifestyle** SEL Component: Responsible decision making Skil: Problem identification, situation analysis, problem solving
UNIT 5: LEADERSHIP AND SERVICE	**Serving Your School and Community** SEL Component: Relationship skills, responsible decision making Skills: Helping/seeking help, ethical responsibility	**Assessing Classroom Assets and Interests for Service-Learning** SEL Component: Relationship skills, responsible decision making skills, relationship skills Skills: Communication skills, working together, problem solving,	**Identifying Classroom, School, and Community Issues and Needs** SEL Component: Relationship skills, responsible decision making Skills: Communication, helping/seeking help, problem identification, situation analysis, problem solving	**Deciding Together on a Service-Learning Project** SEL Component: Relationship skills, responsible decision making Skills: Communication, helping/seeking help, problem identification, situation analysis, problem solving	**Planning a Service-Learning Project to Meet School or Community Needs** SEL Component: Relationship skills, responsible decision making Skills: Communication, helping/seeking help, problem identification, situation analysis, problem solving	**Implementing the Service-Learning Project** SEL Component: Relationship skills Skills: Communication, social engagement, building relationships, working cooperatively, resolving conflicts, helping and seeking help	**Reflecting on and Demonstrating the Service-Learning Project** SEL Component: Responsible decision making Skil: Reflection	**Demonstrating Service** SEL Component: Relationship skills, responsible decision making Skills: Social engagement, reflection, evaluation
UNIT 6: REFLECTION AND CLOSURE	**Reflecting on Learning, Experience, and Goals** SEL Component: Responsible decision making Skills: Reflection, evaluation	**Celebrating Class Successes and Acknowledging Contributions** SEL Component: Responsible decision making Skills: Reflection, evaluation						

6 7

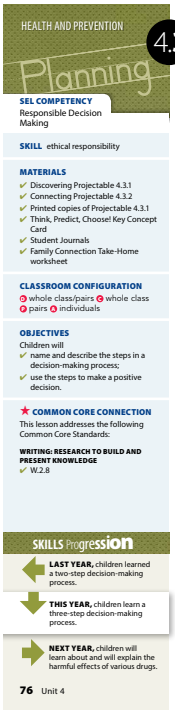
NOTES: Lions Quest Skills for Growing resources.

FIGURE 1.A.2. Example of learning materials

(A) Instruction materials



(B) Teachers' resource guide


HEALTH AND PREVENTION

4.3 Planning

Step into Decision Making

Children make decisions every day. Some decisions are easier than others, but all decisions have consequences. Learning decision-making techniques will benefit children when they are required to make difficult decisions.

SEL COMPETENCY
Responsible Decision Making

SKILL ethical responsibility

MATERIALS
- Discovering Projectable 4.3.1
- Connecting Projectable 4.3.2
- Printed copies of Projectable 4.3.1
- Think, Predict, Choose! Key Concept Card
- Student Journals
- Family Connection Take-Home worksheet

CLASSROOM CONFIGURATION
whole class/pairs whole class
pairs individuals

OBJECTIVES
Children will
- name and describe the steps in a decision-making process;
- use the steps to make a positive decision.

COMMON CORE CONNECTION
This lesson addresses the following Common Core Standards:

WRITING: RESEARCH TO BUILD AND PRESENT KNOWLEDGE
- W.2.8

SKILLS Progression

LAST YEAR, children learned a two-step decision-making process.

THIS YEAR, children learn a three-step decision-making process.

NEXT YEAR, children will learn about and will explain the harmful effects of various drugs.

76 Unit 4

DISCOVERING 10 MINUTES — Lesson Link — ACTIVITY 1

State that today children will be putting what they learned about helpful and harmful decisions to good use and will learn about the steps they can take to make positive choices. State that they will be learning the skill of ethical responsibility. Ask children to sit in pairs with a shoulder partner. Ask volunteers to remind the class of the listening skills. Display page one of the Trouble with Tickets projectable (**Discovering Projectable 4.3.1**) and read the first paragraph aloud to the children.

ASK: *What do you think are Jason's choices?*

Allow a few pairs to volunteer their thoughts and then continue reading the story on the projectable.

Stop at the end of page one and ask the children what they think Jason should do. After gathering responses, display page two of the Trouble with Tickets projectable and read the remainder of the story out loud.

Ask children to raise their hand if they think Jason made a wise decision. Tell the children that they will learn how to use a three-step decision-making process to help them make positive decisions.

CONNECTING 10 MINUTES — INSTRUCTION

Explain that, like Jason, sometimes children will have to make tough decisions.

ASK: *How did Jason make his decision? What steps did he take?*

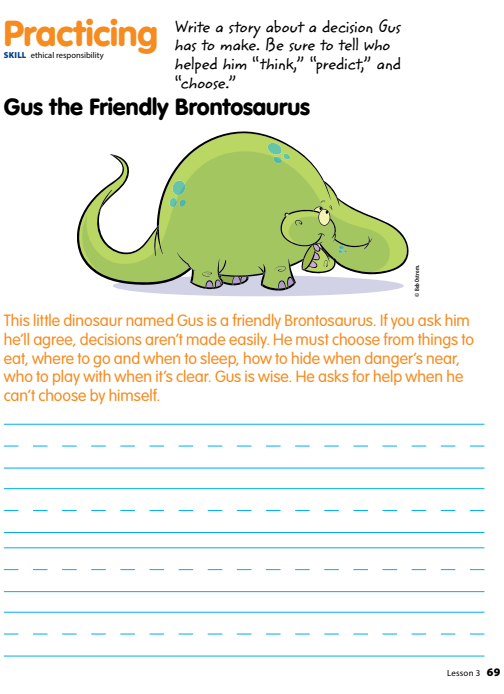
Allow a few children to share their thoughts aloud.

Introduce Think, Predict, Choose!

Explain that Jason used the Think, Predict, Choose Model to make his decision. Display the Think, Predict, Choose! projectable (**Connecting Projectable 4.3.2**). Show them where they can locate a copy in their Student Journal.

Think, Predict, Choose!
- Step One: THINK
  - What are my choices? Who can help me think about them?
- Step Two: PREDICT
  - What will happen? Who can help me predict?

(C) Student journal


Practicing
SKILL ethical responsibility

Write a story about a decision Gus has to make. Be sure to tell who helped him "think," "predict," and "choose."

Gus the Friendly Brontosaurus

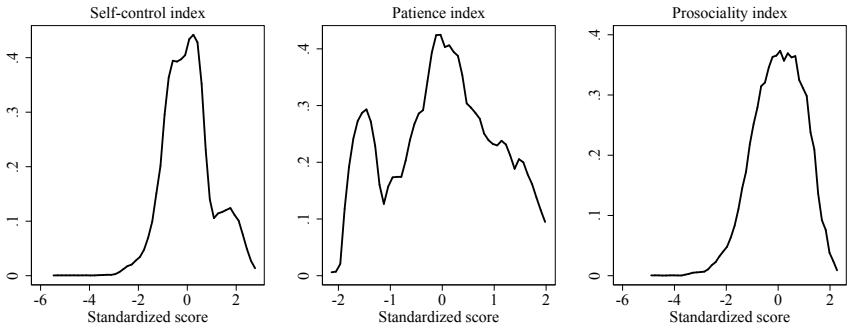
This little dinosaur named Gus is a friendly Brontosaurus. If you ask him he'll agree, decisions aren't made easily. He must choose from things to eat, where to go and when to sleep, how to hide when danger's near, who to play with when it's clear. Gus is wise. He asks for help when he can't choose by himself.

Lesson 3 69

NOTES: Lions Quest Skills for Growing resources, grade 2, unit 4. English translation.

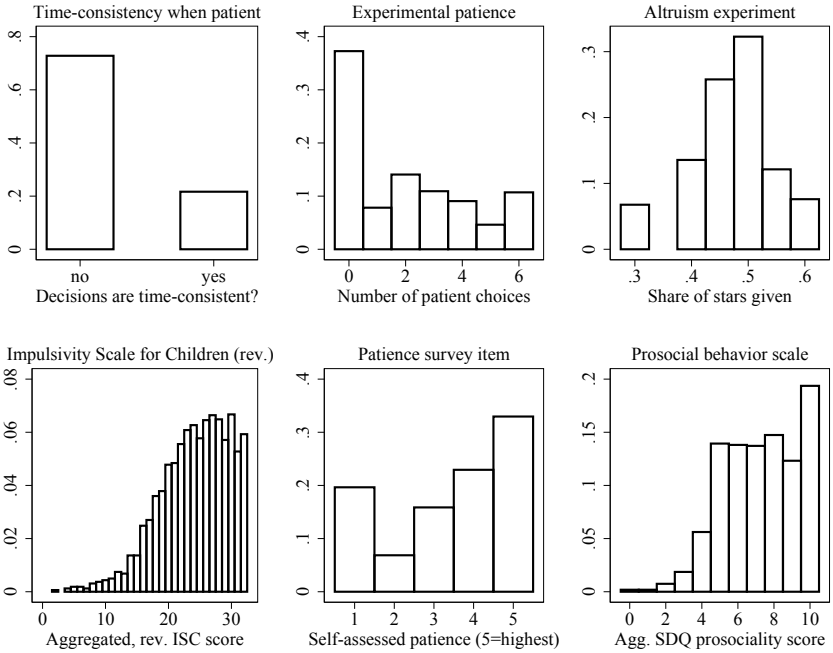
1.A.2 Distributions

FIGURE 1.A.3. Distribution of outcome measures



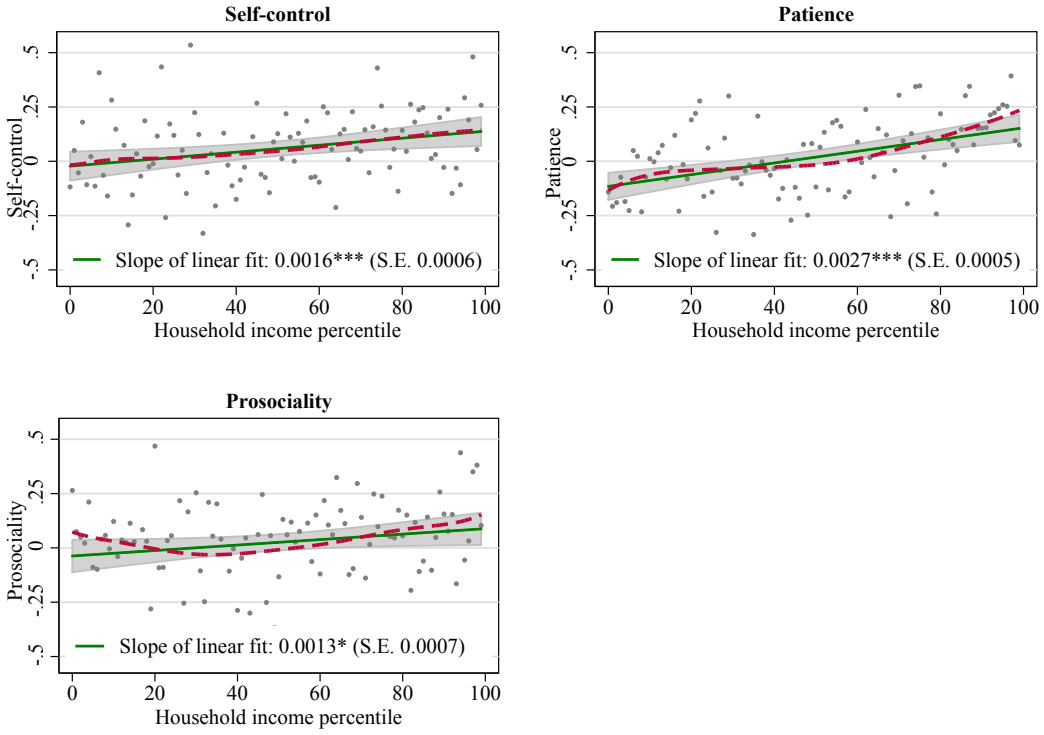
NOTES: Observations for self-control index: 3,215; patience index: 3,166; prosociality index: 3,219. All measures are standardized to have control group mean 0 and standard deviation 1. Exact aggregation procedures are described in section 1.3.3.3. Higher values indicate higher degrees of self-control, patience, or prosociality, respectively.

FIGURE 1.A.4. Distribution of outcome components



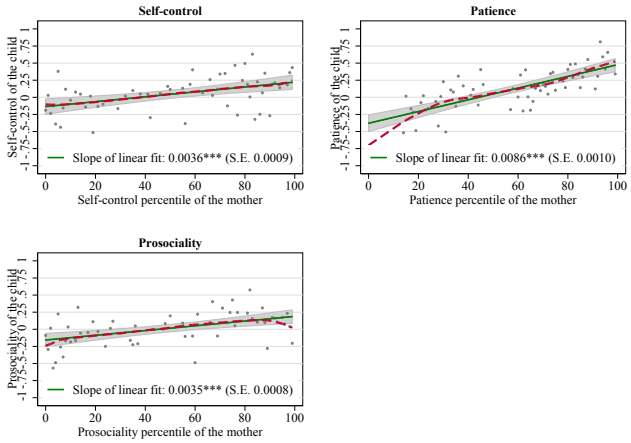
NOTES: Observations for experimental time-consistency: 3,160; ISC: 3,077; experimental patience: 3,160; patience survey item: 3,166; experimental altruism: 3,162; prosocial behavior scale: 3,109.

FIGURE 1.A.5. Distribution of outcome measures by household income



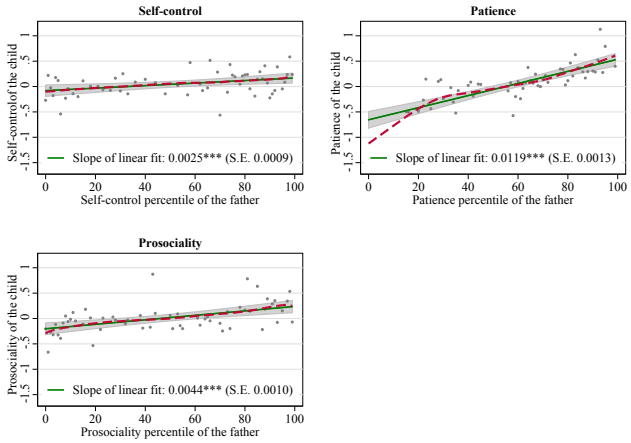
NOTES: Graphs show distributions of outcome measures along household income percentiles. Observations for self-control index: 3,185; patience index: 3,140; prosociality index: 3,193. All measures are standardized to have control group mean 0 and standard deviation 1. Higher values indicate higher degrees of self-control, patience, or prosociality, respectively. Added are lines of best fit: linear in green (95% confidence intervals in grey) and non-linear in red.

FIGURE 1.A.6. Distribution of outcome measures by mothers' skills



NOTES: Graphs show distributions of outcome measures along mothers' skill levels. Observations for self-control index: 3,036; patience index: 2,995; prosociality index: 3,044. All measures are standardized to have control group mean 0 and standard deviation 1. Higher values indicate higher degrees of self-control, patience, or prosociality, respectively. Added are lines of best fit: linear in green (95% confidence intervals in grey) and non-linear in red.

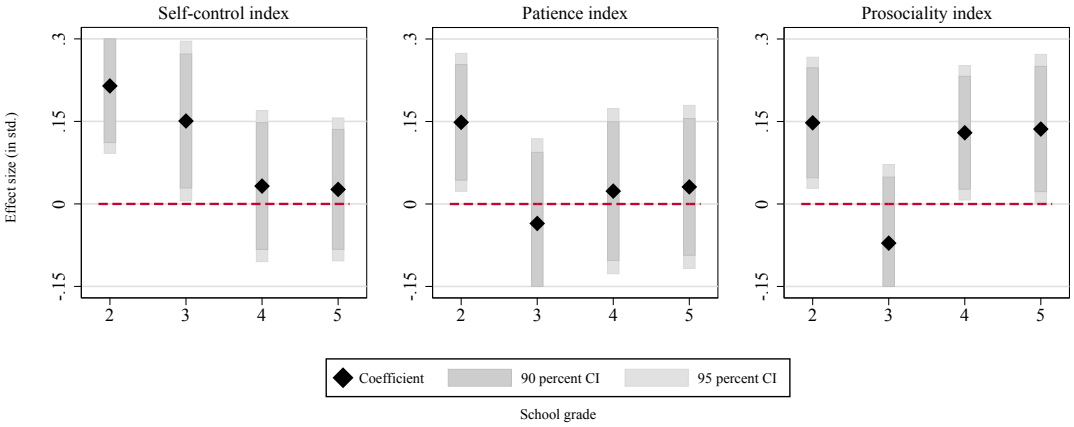
FIGURE 1.A.7. Distribution of outcome measures by fathers' skills



NOTES: Graphs show distributions of outcome measures along fathers' skill levels. Observations for self-control index: 2,431; patience index: 2,401; prosociality index: 2,437. All measures are standardized to have control group mean 0 and standard deviation 1. Higher values indicate higher degrees of self-control, patience, or prosociality, respectively. Added are lines of best fit: linear in green (95% confidence intervals in grey) and non-linear in red.

1.A.3 Sensitive periods

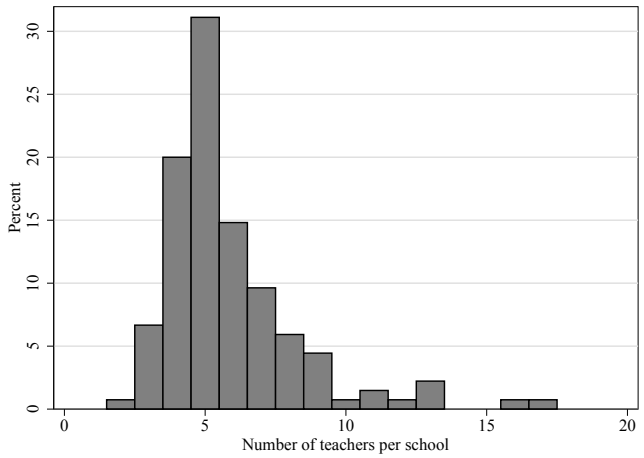
FIGURE 1.A.8. Treatment effects on socio-emotional skills by school grade when controlling for pre-treatment outcomes



NOTES: Figure plots coefficients displayed in column (1) of Table 1.B.10. Observations: about 880 for grade 2; 780 for grade 3; 760 for grade 4; and 760 for grade 5.

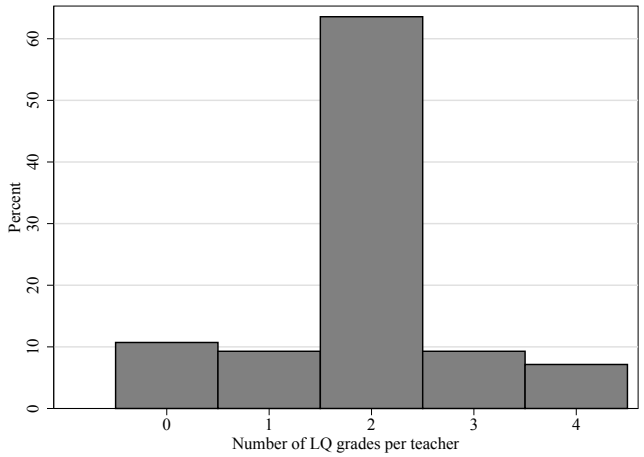
1.A.4 Teachers

FIGURE 1.A.9. Number of teachers per school



NOTES: Figure shows the distribution of the number of teachers per school, both for treatment and control schools (135 observations).

FIGURE 1.A.10. Number of LQ grades per teacher



NOTES: Figure shows the distribution of the number of grades for which LQ teachers (i.e., teachers who received the LQ training and actively taught LQ lessons in treatment schools) were the main responsible teachers for teaching LQ. Some LQ teachers indicated to have only assisted (e.g., as replacement in case of illness; overall or in specific grades), such that there is a small number of teachers stating 0 here. 131 observations from 68 schools that have implemented the program.

Appendix 1.B Tables

1.B.1 Measures

TABLE 1.B.1. Items of the Impulsivity Scale for Children (ISC)

Item
Mothers assess how often the following behaviors occur on the scale 1 "almost never," 2 "about once a month," 3 "about 2 to 3 times per month," 4 "about once per week," and 5 "at least once per day":
1 My child interrupts other people.
2 My child says something rude.
3 My child loses temper.
4 My child talks back when upset.
5 My child forgets something needed for school.
6 My child cannot find something because of mess.
7 My child does not remember what someone said to do.
8 My child's mind wanders.

NOTES: Impulsivity Scale for Children (ISC) taken from Tsukayama, Duckworth, and Kim (2013).

TABLE 1.B.2. Items of the Strengths and Difficulties Questionnaire (SDQ) prosociality scale

Item
Mothers assess the following statements on the scale 1 "not true," 2 "somewhat true," and 3 "certainly true":
1 My child is considerate of other people's feelings.
2 My child shares readily with other children (treats, toys, pencils, etc.).
3 My child is helpful if someone is hurt, upset or feeling ill.
4 My child is kind to younger children.
5 My child often volunteers to help others (parents, teachers, children).

NOTES: Strengths and Difficulties Questionnaire (SDQ) taken from Goodman (1997). The SDQ covers 25 items in total. The displayed items are items 1, 4, 9, 17, and 20.

TABLE 1.B.3. Descriptive statistics of outcome variables, pooled and by school grade

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
	Pooled		Grade 2		Grade 3		Grade 4		Grade 5	
	Mean	S.d.	Mean	S.d.	Mean	S.d.	Mean	S.d.	Mean	S.d.
Self-control index	0.057	1.001	0.130	1.006	0.046	1.014	-0.052	0.986	0.093	0.988
Patience index	0.019	1.011	0.134	1.008	0.012	1.039	-0.119	0.989	0.029	0.992
Prosociality index	0.028	0.963	-0.081	0.947	-0.014	0.963	0.042	0.961	0.181	0.966

NOTES: The odd columns of this table give the mean of the variable stated on the left, the even columns give the standard deviation. All variables are standardized such that the overall (pooled) mean of the control group is 0 and the standard deviation is 1.

TABLE 1.B.4. Share of individuals reaching the ceiling of outcome scales

	(1)	(2)	(3)	(4)	(5)
	Pooled	Grade 2	Grade 3	Grade 4	Grade 5
Self-control					
Exp: Time-consistency when patient (dummy)	0.229	0.280	0.230	0.190	0.210
Svy: ISC (rev.)	0.062	0.064	0.061	0.059	0.065
Patience					
Exp: Patience	0.113	0.146	0.114	0.089	0.099
Svy: Patience survey item	0.335	0.339	0.306	0.309	0.387
Prosociality					
Exp: Altruism in dictator games	0.077	0.076	0.067	0.074	0.094
Svy: Prosocial behavior scale	0.201	0.160	0.207	0.208	0.235

NOTES: This table shows the share of individuals whose score reaches the ceiling (i.e., the highest possible value) of the respective scale. For time-consistency, this reduces to being time-consistent contrary to being time-inconsistent.

TABLE 1.B.5. Using alternative definitions of experimental outcome measures for treatment effect estimations

	(1)	(2)
	Treatment effect on the	
Dependent variable	experimental measure	corresponding index
Panel A: time-consistency and self-control		
Time-consistency (std., main specification)	0.054	0.107***
	(0.043)	(0.039)
Time-consistency, binary	0.022	
	(0.018)	
Time-consistency, not conditional on patience (std.)	0.024	0.087**
	(0.030)	(0.036)
Time-consistency, full sample (std.)	0.032	0.099**
	(0.042)	(0.039)
Panel B: patience		
Experimental patience (std., main specification)	0.016	0.044
	(0.044)	(0.042)
Indicator for at least one patient decision (std.)	−0.002	0.035
	(0.042)	(0.041)
Experimental patience, full sample (std.)	0.011	0.035
	(0.044)	(0.041)
Panel C: altruism measures and prosociality		
Altruism experiment (std., main specification)	0.092**	0.088**
	(0.039)	(0.036)
Altruism experiment: average share (std.)	0.076*	0.075**
	(0.040)	(0.037)
Altruism experiment: number of altruistic choices (std.)	0.082**	0.080**
	(0.038)	(0.036)

NOTES: Column (1) gives the treatment effects on alternative definitions of the experimental outcome components. Column (2) reports the treatment effects on the aggregated socio-emotional skill indices when using the experimental components as stated on the left of the table. The first row of each panel displays our preferred specification also presented in Tables 1.6 and 1.7. **Panel A.** Second row: binary time-consistency indicator that conditions on some degree of patience; third row: same as preferred specification but not conditioning on a minimum of patience; fourth row: same as preferred specification but using the full sample of children, including those who fail to answer the control question of the time preferences experiment correctly and those who prefer the later outcome over the sooner one when the interest is low, but not when the interest is high (we exclude these children in the preferred specification as this likely reflects that they have misunderstood the experiment). **Panel B.** Second row: binary indicator that is 1 if the child makes any patient choice (and 0 otherwise); third row: number of patient decisions (as in preferred specification), but using the full sample of children, as in fourth row of Panel A. **Panel C.** Second row: avg. of the share of stars given to the other child over the four games; third row: counting the number of games with altruistic decisions. If measures are standardized (indicated in table), then such that the mean of the control group is 0 and the standard deviation is 1. Regressions include a full set of strata fixed effects. School-clustered standard errors in parentheses. Significance at $^{+}p < 0.15$, $^{*}p < 0.1$, $^{**}p < 0.05$, $^{***}p < 0.01$.

1.B.2 Balancing and attrition

TABLE 1.B.6. Balancing results for covariates (measured in 2019 at the beginning of the treatment period)

Variable	Definition	(1) Uncond. mean	(2) Treatment difference
C: female	= 1 if C is female, 0 else	0.514	−0.011
C: age	C's age in years	9.430	0.008
Number of siblings	Number of siblings (whether they live in the HH or not)	2.342	0.027
C: grade 2	= 1 if C is in grade 2 during intervention, 0 else	0.276	0.005
C: grade 3	= 1 if C is in grade 3 during intervention, 0 else	0.245	−0.021*
C: grade 4	= 1 if C is in grade 4 during intervention, 0 else	0.237	0.004
C: grade 5	= 1 if C is in grade 5 during intervention, 0 else	0.242	0.012
Dwelling: brick	= 1 if the family's dwelling has brick floors and walls, 0 else (usually mud floors and tin walls)	0.094	0.028*
Dwelling: area	Area family's dwelling (unit: decimal/dismil; 1 dismil ≈ 40 square meters)	9.726	−0.148
Dwelling: electricity	= 1 if family's dwelling is connected to the national power grid, 0 else	0.901	−0.016
M: age	M's age in years	34.969	0.075
M: literate	= 1 if M can read and write, 0 else	0.718	0.033+
M: days of absence	M's days of absence from work due to ill health in the last 12 months	10.110	0.757
F: age	F's age in years	42.591	0.199
F: literate	= 1 if F can read and write, 0 else	0.577	−0.021
F: days of absence	F's days of absence from work due to ill health in the last 12 months	13.948	−0.894
F: no interview	= 1 if F did not answer questionnaire, 0 else	0.243	0.018
Family Muslim	= 1 if the family is Muslim, 0 else (usually Hindu)	0.803	0.060+
HH income	Total HH income in 10,000 Taka (10,000 Taka ≈ $118), including wages, salaries, in-kind benefits, net value of agricultural products (can be negative), and cash transfers	22.976	−3.698
M: working	= 1 if M is working (usually looking after live stocks or poultry, but no formal employment), 0 else	0.876	−0.002
F: agricultural work	= 1 if F is working in an agricultural occupation, 0 else	0.424	0.038
F: high-status job	= 1 if F is a wholesale trader, labor contractor, (service-sector) employee, doctor, advocate, tutor, Imam, or receives rent; 0 else	0.089	−0.004
F: not working	= 1 if F is not working (unemployed, disabled, retired), 0 else	0.007	−0.003
F: other occupation	= 1 if F's occupation indicators above are all 0, 0 else	0.481	−0.030

NOTES: C = child, M = mother, F = father, HH = household. The second to the right column (1) gives the unconditional mean. The rightmost column (2) states the treatment effect when the variable on the left is regressed on a treatment indicator. School-clustered standard errors. Significance level of the treatment effects: $^{+}p < 0.15$, $^{*}p < 0.1$, $^{**}p < 0.05$, $^{***}p < 0.01$.

TABLE 1.B.7. Sample attrition

	Dependent variable
	Attrition indicator
Panel A: attrition w.r.t. treatment	
Treatment indicator	−0.003
	(0.008)
Constant	0.046***
	(0.006)
Panel B: attrition w.r.t. treatment and outcomes	
Treatment indicator	−0.001
	(0.009)
Self-control index, pre-treatment	0.008
	(0.006)
– interaction with treatment	−0.015*
	(0.009)
Patience index, pre-treatment	0.002
	(0.008)
– interaction with treatment	−0.011
	(0.010)
Prosociality index, pre-treatment	0.004
	(0.007)
– interaction with treatment	0.005
	(0.009)
Constant	0.042***
	(0.007)

NOTES: Point estimates from regressions of an attrition indicator (1 if families are interviewed in 2018 but not in 2019, 0 else) on the treatment indicator (**Panel A**) and additionally on children's pre-treatment self-control, patience, and prosociality, as well as their interaction (**Panel B**). Standard errors in parentheses, clustered at school level for Panel B specification. Significance at $^{+}p < 0.15$, $^{*}p < 0.1$, $^{**}p < 0.05$, $^{***}p < 0.01$. Number of observations for attrition w.r.t. treatment only: 2,716; for attrition w.r.t. treatment and outcomes: 2,665. p-value of an F-test of joint significance of treatment, pre-treatment outcomes, and interactions: 0.28.

1.B.3 Robustness

Table 1.B.8. Treatment effects *p*-values

	(1)	(2)	(3)	(4)	(5)	(6)
	Conventional *p*-value		Randomization inference	Multiple hypothesis testing adjusted		
	joint estimation	separate estimation		Romano–Wolf	Westfall–Young	Anderson's *q*-value
Self-control						
Pooled	0.006		0.014	0.036	0.001	0.019
Grade 2	0.001	0.000	0.003	0.004	0.000	0.001
Grade 3	0.058	0.178	0.197	0.445	0.199	0.414
Grade 4	0.689	0.891	0.881	0.978	0.969	1.000
Grade 5	0.680	0.613	0.641	0.706	0.445	0.692
Patience						
Pooled	0.295		0.358	0.306	0.129	0.110
Grade 2	0.020	0.016	0.040	0.030	0.001	0.011
Grade 3	0.644	0.653	0.690	0.649	0.509	0.414
Grade 4	0.788	0.857	0.856	0.978	0.969	1.000
Grade 5	0.676	0.471	0.540	0.706	0.445	0.692
Prosociality						
Pooled	0.015		0.036	0.046	0.004	0.019
Grade 2	0.019	0.007	0.012	0.030	0.001	0.008
Grade 3	0.345	0.195	0.275	0.445	0.199	0.414
Grade 4	0.038	0.209	0.261	0.480	0.420	1.000
Grade 5	0.058	0.017	0.039	0.074	0.002	0.054

Notes: **The first two columns** give the *p*-values of the treatment effects (on the outcome stated in the panel) using the conventional critical values of the *t*-test. In each panel, the first row gives the *p*-value that corresponds to the overall results in Table 1.6. The other four rows ("Grade 2" to "Grade 5") state the *p*-values for the estimation of sensitive periods, i.e., the grade-specific effects in Figure 1.2. For each grade-specific effect we report two *p*-values: The first *p*-value (in column (1)) results from a joint estimation, that is, the treatment indicator is interacted with grade indicators (cf. Table 1.8 or Figure 1.2). Alternatively, the grade-specific effects can be obtained through separate estimations (i.e., by restricting the sample to include only second graders, for example). The alternative *p*-values discussed in the following (columns (3) to (6)) use the separate estimations approach. **The third column** states the *p*-values based on randomization inference, when we randomly assign the treatment indicator to schools within the strata 1,000 times. Randomization inference rests on the Stata `ritest` ado-file introduced by Hess (2017). **Columns (4) and (5)** report the *p*-values when adjusting the critical *t*-value of the treatment indicator for multiple hypothesis testing using the techniques suggested by Romano and Wolf (2005a, 2005b) and Westfall and Young (1993), respectively. The number of hypotheses is three, cf. section 1.2.3. Romano–Wolf *p*-values are calculated using the `rwolf` ado-file provided by Clarke, Romano, and Worlf (2020). Westfall–Young *p*-values are obtained using the `wyoung` ado-file by Jones, Molitor, and Reif (2019). In both cases bootstrapping was repeated 10,000 times as suggested by Westfall and Young (1993), see McKenzie (2020). **Column (6)** gives the *q*-value suggested by Anderson (2008) using the accompanying syntax. All errors are our responsibility. Romano–Wolf and Westfall–Young adjustments both account for the probability of making any type-I error. This family-wise error rate (FWER) allows for a correlation of the *p*-values between the tested outcomes. As we do not necessarily assume that the treatment effects correlate across outcomes, we also calculate the false discovery rate (FDR) *q*-values. The FDR gives the expected proportion of false rejections (type-I errors) based on the number of hypotheses and their conventional *p*-values.

TABLE 1.B.9. Treatment effects on socio-emotional skills when controlling for pre-treatment outcomes and family characteristics

	(1)	(2)	(3)	(4)
	Controlling for pre-treatment outcomes		... additionally controlling for pre-treatment characteristics	
Dependent variable	Treatment effect	Pre-treatment outcome	Treatment effect	Pre-treatment outcome
Self-control index	0.109***	0.085***	0.103***	0.078***
	(0.039)	(0.024)	(0.038)	(0.025)
Patience index	0.044	−0.014	0.045	−0.011
	(0.042)	(0.019)	(0.042)	(0.019)
Prosociality index	0.090**	0.047***	0.092**	0.038**
	(0.036)	(0.018)	(0.036)	(0.018)

NOTES: All dependent variables are standardized such that the mean of the control group is 0 and the standard deviation is 1. Regressions include a full set of strata fixed effects. School-clustered standard errors in parentheses. Significance at $^{+}p < 0.15$, $^{*}p < 0.1$, $^{**}p < 0.05$, $^{***}p < 0.01$. Observations: 3,208 for self-control; 3,166 for patience; and 3,219 for prosociality. Missing values in pre-treatment outcomes are imputed with the mean and we control for the imputation.

TABLE 1.B.10. Grade-specific treatment effects on socio-emotional skills when controlling for pre-treatment outcomes and family characteristics

	(1)	(2)	(3)	(4)
	Controlling for pre-treatment outcomes		... additionally controlling for pre-treatment characteristics	
Dependent variable	Treatment effect	Pre-treatment outcome	Treatment effect	Pre-treatment outcome
Self-control				
Grade 2	0.214***	0.096*	0.197***	0.085+
	(0.062)	(0.057)	(0.062)	(0.057)
Grade 3	0.151**	0.068+	0.151**	0.053
	(0.074)	(0.041)	(0.072)	(0.042)
Grade 4	0.031	0.103**	0.034	0.097**
	(0.070)	(0.047)	(0.070)	(0.048)
Grade 5	0.027	0.083**	0.017	0.084***
	(0.066)	(0.032)	(0.065)	(0.032)
Patience				
Grade 2	0.150**	0.072	0.147**	0.070
	(0.064)	(0.058)	(0.065)	(0.058)
Grade 3	−0.035	−0.047+	−0.031	−0.047+
	(0.078)	(0.031)	(0.078)	(0.031)
Grade 4	0.021	−0.011	0.028	−0.011
	(0.077)	(0.035)	(0.076)	(0.035)
Grade 5	0.030	−0.005	0.022	−0.003
	(0.076)	(0.037)	(0.075)	(0.036)
Prosociality				
Grade 2	0.141**	0.079+	0.147**	0.079+
	(0.060)	(0.053)	(0.060)	(0.053)
Grade 3	−0.067	0.004	−0.066	0.000
	(0.073)	(0.032)	(0.074)	(0.033)
Grade 4	0.128**	0.058**	0.128**	0.057**
	(0.063)	(0.028)	(0.063)	(0.029)
Grade 5	0.135**	0.041	0.146**	0.034
	(0.069)	(0.033)	(0.068)	(0.033)

NOTES: All dependent variables are standardized such that the mean of the control group is 0 and the standard deviation is 1. Regressions include a full set of strata fixed effects. School-clustered standard errors in parentheses. Significance at $^{+}p < 0.15$, $^{*}p < 0.1$, $^{**}p < 0.05$, $^{***}p < 0.01$. Observations: about 880 for grade 2; 780 for grade 3; 760 for grade 4; and 760 for grade 5. Missing values in pre-treatment outcomes are imputed with the mean and we control for the imputation.

1.B.4 Further results

TABLE 1.B.11. Treatment effect heterogeneities along socio-demographic characteristics

	(1)	(2)	(3)
	Treatment effect on		
	Self-control index	Patience index	Prosociality index
Panel A: effect by child's gender			
Female	0.140**	0.040	0.078+
	(0.055)	(0.054)	(0.051)
Male	0.081+	0.049	0.099**
	(0.051)	(0.053)	(0.042)
Equality (p-value)	0.415	0.884	0.724
Panel B: effect by mother's literacy			
Literate	0.090	0.140*	0.073
	(0.076)	(0.074)	(0.064)
Illiterate	0.103**	0.007	0.094**
	(0.042)	(0.045)	(0.042)
Equality (p-value)	0.868	0.079	0.779
Panel C: effect by father's literacy			
Literate	0.149**	0.072	0.113**
	(0.062)	(0.071)	(0.054)
Illiterate	0.077	0.049	0.089*
	(0.060)	(0.049)	(0.049)
Equality (p-value)	0.418	0.779	0.731
Panel D: effect by family income			
Below median	0.111**	0.042	0.054
	(0.048)	(0.048)	(0.043)
Above median	0.102**	0.048	0.115***
	(0.047)	(0.049)	(0.042)
Equality (p-value)	0.870	0.903	0.193

NOTES: Each panel shows the treatment effect when the outcome in the column header is regressed on the treatment indicator interacted with the manifestation of the characteristics stated the panel, the characteristics, and strata fixed effects. The bottom row of each panel reports the p-value of an equality test of the coefficients. Standard errors are clustered at school level. Significance at $^{+}p < 0.15$, $^{*}p < 0.1$, $^{**}p < 0.05$, $^{***}p < 0.01$.

TABLE 1.B.12. Treatment effect heterogeneities along children's pre-treatment socio-emotional skills and parents' socio-emotional skills

	(1)	(2)	(3)
	Treatment effect on		
	Self-control index	Patience index	Prosociality index
Panel A: children's pre-treatment skills			
Below median	0.136***	0.020	0.127***
	(0.047)	(0.066)	(0.045)
Above median	0.060	0.057	0.038
	(0.058)	(0.048)	(0.048)
Equality (p-value)	0.263	0.613	0.134
Panel B: mothers' skills			
Below median	0.081	0.072	0.067+
	(0.058)	(0.065)	(0.046)
Above median	0.119**	0.019	0.102*
	(0.055)	(0.048)	(0.052)
Equality (p-value)	0.638	0.479	0.610
Panel C: fathers' skills			
Below median	0.051	0.005	0.078+
	(0.058)	(0.059)	(0.052)
Above median	0.158**	0.125**	0.120**
	(0.065)	(0.058)	(0.055)
Equality (p-value)	0.235	0.133	0.578

NOTES: Each panel shows the treatment effect differentiated by the median-split of the same skill of (i) the child in the pre-treatment period (**Panel A**), (ii) the mother (**Panel B**), or (iii) the father (**Panel C**). All regressions include strata fixed effects. The coefficient in the first row of the first column gives, for example, the treatment effect on self-control for a child with a pre-treatment self-control score below the median. The second column of the first row gives, on the other hand, the treatment effect on patience for a child with a pre-treatment patience score (not self-control score) below the median. That is, the table does not include cross-skill treatment effect heterogeneities. The bottom row of each panel report the p-value of equality test of the coefficients. Standard errors are clustered at school level. Significance at $^{+}p < 0.15$, $^{*}p < 0.1$, $^{**}p < 0.05$, $^{***}p < 0.01$.

Table 1.B.13. School characteristics by treatment status

School characteristic	(1) Treatment group mean	(2) Control group mean	(3) *p*-value treatment effect
Total number of teachers	5.942	5.788	0.877
Number of female teachers	3.870	3.955	0.644
Number of classrooms	4.594	4.182	0.238
School supplies food to students (1=yes)	0.188	0.182	0.294
Every grade taught in a separate classroom (1=yes)	0.638	0.576	0.068
Sanitary facilities good (1=good, 0=medium/poor)	0.420	0.424	0.738
School provides desks, chairs, and tables (1=yes)	0.884	0.818	0.217
Overhead projector of school works (1=yes)	0.507	0.515	0.946
Observations	69	66	

Notes: Column (3) reports the *p*-value of the treatment effect when the school characteristic on the left is regressed on the treatment indicator and strata fixed effects, with standard errors clustered at school level.

Table 1.B.14. Teacher characteristics by treatment status

Teacher characteristic	(1) Treatment group mean	(2) Control group mean	(3) *p*-value treatment effect
Female (1=yes)	0.564	0.701	0.003
Age (in years)	40.593	38.381	0.003
Completed teacher training (1=yes)	0.893	0.866	0.200
Working experience (in years)	14.964	13.381	0.062
Reason to become a teacher: love the job (1=yes)	0.807	0.694	0.175
Head teacher (1=yes)	0.114	0.022	0.000
Lives in village of school (1=yes)	0.286	0.306	0.617
Observations	140	134	

Notes: Column (3) reports the *p*-value of the treatment effect when the teacher characteristic on the left is regressed on the treatment indicator and strata fixed effects, with standard errors clustered at school level.

TABLE 1.B.15. Relationship between teacher characteristics and student outcomes

	(1)	(2)	(3)
	Dependent variable		
Teacher characteristic	Self-control index	Patience index	Prosociality index
Female (1=yes)	−0.019	0.113^{+}	0.023
Age (in years)	0.010	0.007	−0.009
Lives in village of school (1=yes)	−0.044	−0.071	−0.045
Completed teacher training	0.044	−0.028	0.022
Working experience (in years)	−0.002	−0.003	0.006
Head teacher (1=yes)	0.086	0.297*	0.136
Reason to become a teacher: love the job (1=yes)	0.110	−0.011	0.173**

NOTES: Each column reports the output of one regression, where the variable stated in the header (self-control, patience, and prosociality, respectively) is regressed on the teacher characteristics and strata fixed effects. Standard errors are clustered at school level. Significance at $^{+}p < 0.15$, $^{*}p < 0.1$, $^{**}p < 0.05$, $^{***}p < 0.01$.

TABLE 1.B.16. Treatment effects when controlling for school and teacher characteristics

Dependent variable	Treatment effect
Self-control index	0.095**
	(0.040)
Exp: Time-consistency when patient	0.047
	(0.046)
Svy: Impulsivity Scale for Children (reversed)	0.100**
	(0.047)
Patience index	0.021
	(0.047)
Exp: Patience	0.002
	(0.048)
Svy: Patience survey item	0.030
	(0.047)
Prosociality index	0.082**
	(0.038)
Exp: Altruism in dictator games	0.112***
	(0.039)
Svy: Prosocial behavior scale	−0.010
	(0.053)

NOTES: Dependent variables are standardized such that the mean of the control group is 0 and the standard deviation is 1. Regressions include a full set of strata fixed effects. Additionally, we control for the school and teacher characteristics included in Tables 1.B.13 and 1.B.14. School-clustered standard errors in parentheses. Significance at $^{+}p < 0.15$, $^{*}p < 0.1$, $^{**}p < 0.05$, $^{***}p < 0.01$.

TABLE 1.B.17. Pooled and grade-specific treatment effects on children's behaviors

	(1)	(2)	(3)	(4)	(5)	(6)	(7)
			Grade-specific treatment effects				*F*-test
Dependent variable	Mean	Overall TE	Grade 2	Grade 3	Grade 4	Grade 5	*p*-value
Studying: <2 hrs a day	0.503	−0.019	−0.039	−0.011	−0.008	−0.004	0.887
		(0.018)	(0.032)	(0.040)	(0.038)	(0.036)	
Studying: 2–3 hrs a day	0.381	−0.010	0.011	−0.005	−0.018	−0.034	0.820
		(0.018)	(0.032)	(0.040)	(0.038)	(0.036)	
Studying: >3 hrs a day	0.116	0.029**	0.028	0.016	0.025	0.038	0.937
		(0.012)	(0.019)	(0.021)	(0.023)	(0.028)	
Working	0.365	−0.029	−0.036	−0.023	−0.066	0.000	0.630
		(0.022)	(0.036)	(0.035)	(0.040)	(0.039)	
Helping in the household	0.793	0.005	0.002	0.020	−0.016	0.011	0.788
		(0.017)	(0.034)	(0.030)	(0.026)	(0.026)	
Missed school: due to work (days)	1.354	−0.186	−0.074	−0.323	−0.436	0.062	0.723
		(0.206)	(0.263)	(0.357)	(0.440)	(0.373)	
Missed school: due to illness (days)	1.159	−0.176*	−0.117	−0.259	−0.050	−0.268	0.680
		(0.099)	(0.168)	(0.168)	(0.161)	(0.200)	

NOTES: The table displays overall (column (2)) and grade-specific (columns (3) to (6)) treatment effects on children's behavior. Column (1) gives the mean across all children. The first five dependent variables are dummy variables. To estimate the grade-specific treatment effects on children's behaviors, we use the specification employed for sensitive periods, except that the outcome variables are not the skill indices but the variables stated on the left of this table. Column (7) gives the *p*-value of an *F*-test on equality of the grade-specific treatment effects. All regressions include strata fixed effects. Standard errors (in parentheses) are clustered at school level. Significance at $^{*}p < 0.1$, $^{**}p < 0.05$, $^{***}p < 0.01$.

TABLE 1.B.18. Pooled and grade-specific treatment effects on parenting style

	(1)	(2)	(3)	(4)	(5)	(6)	(7)
			Grade-specific treatment effects				*F*-test
Dependent variable	Mean	Overall TE	Grade 2	Grade 3	Grade 4	Grade 5	*p*-value
Emotional warmth	3.402	−0.056*	−0.081	−0.041	−0.023	−0.072	0.778
		(0.031)	(0.050)	(0.049)	(0.051)	(0.048)	
Inconsistent parenting	2.596	−0.050	−0.035	−0.081*	−0.031	−0.056	0.873
		(0.031)	(0.052)	(0.046)	(0.050)	(0.048)	
Monitoring	2.989	−0.045	−0.085*	−0.036	0.005	−0.057	0.400
		(0.031)	(0.044)	(0.049)	(0.045)	(0.047)	
Negative communication	2.586	−0.021	−0.049	0.020	−0.038	−0.013	0.723
		(0.035)	(0.055)	(0.054)	(0.048)	(0.049)	
Psychological control	1.904	0.007	−0.003	−0.004	0.007	0.025	0.957
		(0.026)	(0.041)	(0.042)	(0.044)	(0.045)	
Strict control	2.652	−0.064*	−0.119**	−0.041	0.033	−0.116**	0.073
		(0.033)	(0.053)	(0.056)	(0.054)	(0.055)	

NOTES: The table displays overall (column (2)) and grade-specific (columns (3) to (6)) treatment effects on parenting style. Column (1) gives the mean across all children (3,158 observations on child level). Parenting style dimensions are indicating how much parenting style is characterized by emotional warmth, inconsistent parenting, monitoring, negative communication, psychological control, and strict control; each scale ranges from 1 to 5. To estimate the grade-specific treatment effects on parenting style, we use the specification employed for sensitive periods, except that the outcome variables are not the skill indices but the variables stated on the left of this table. Column (7) gives the *p*-value of an *F*-test on equality of the grade-specific treatment effects. All regressions include strata fixed effects. Standard errors (in parentheses) are clustered at school level. Significance at $^{*}p < 0.1$, $^{**}p < 0.05$, $^{***}p < 0.01$.

TABLE 1.B.19. Teachers' assessment of LQ-specific aspects by grade

	(1)	(2)	(3)	(4)	(5)
Dependent variable	Mean	Grade 3	Grade 4	Grade 5	*F*-test *p*-value
Teachers' program implementation					
Average duration of an LQ lesson (in minutes)	30.476	−1.540	−0.343	−0.539	0.318
		(0.983)	(0.546)	(0.524)	
Teaching practice: multiple concepts (1=yes)	0.401	0.154*	0.103	0.152	0.844
		(0.091)	(0.071)	(0.096)	
Use of visual aids in teaching (1=yes)	0.857	0.044	0.021	0.065	0.433
		(0.048)	(0.024)	(0.053)	
Implementation: materials confusing (1=yes)	0.661	−0.111	−0.029	−0.078	0.684
		(0.091)	(0.067)	(0.085)	
Implementation: felt unprepared (1=yes)	0.725	−0.063	−0.102	−0.099	0.864
		(0.094)	(0.108)	(0.061)	
Implementation: other problems (1=yes)	0.459	0.014	−0.023	−0.021	0.643
		(0.044)	(0.018)	(0.018)	
Absence from school previous year (in days)	15.379	−0.817	−0.011	−3.761	0.430
		(0.937)	(2.957)	(4.739)	
Teachers' attitudes					
Identification with program (7-point scale)	5.308	−0.026	0.131	0.326**	0.006
		(0.106)	(0.131)	(0.152)	
Enjoy being a teacher (1=a lot)	0.527	0.087	0.008	0.196***	0.057
		(0.083)	(0.061)	(0.073)	
Values more important than knowledge (1=yes)	0.604	−0.021	−0.031	−0.152**	0.106
		(0.065)	(0.055)	(0.076)	

NOTES: This table compares teachers' assessment of LQ-specific aspects by grade. These aspects only apply to teachers who taught the program and are therefore not measured for the control group. Observation (on teacher–grade level): 168 for average duration, 182 for assessment whether students liked LQ lessons and teachers' identification with the LQ program, and 109 for the remaining variables. Column (1) gives the overall mean. To compare aspects by grade, we regress the aspect stated on the left on grade indicators (grade 2 is the reference category) and strata fixed effects. Column (5) gives the *p*-value of an *F*-test of equality of the grade indicator coefficients reported in columns (2) to (4). Standard errors (in parentheses) are clustered at school level. Significance at $^{*}p < 0.1$, $^{**}p < 0.05$, $^{***}p < 0.01$.

TABLE 1.B.20. Treatment effects on teaching style and attitudes

Dependent variable	Treatment effect
Teaching practice: multiple concepts (1=yes)	0.112**
	(0.053)
Use of visual aids in teaching (1=yes)	0.009
	(0.029)
Absence from school previous year (in days)	3.328*
	(1.928)
Enjoy being a teacher (1=a lot)	0.074
	(0.054)
Values more important than knowledge (1=yes)	−0.016
	(0.050)

NOTES: This table shows the treatment effects on teaching style and teachers' attitudes. 274 observations on teacher level. The variable stated on the left is regressed on the treatment indicator and strata fixed effects. The coefficient is given in the right column. Standard errors (in parentheses) are clustered at school level. Significance at $^{*}p < 0.1$, $^{**}p < 0.05$, $^{***}p < 0.01$.

Chapter 2

Do Economic Preferences of Children Predict Behavior?*

Joint with Shyamal Chowdhury, Shambhavi Priyam, Hannah Schildberg-Hörisch, and Matthias Sutter

2.1 Introduction

Preferences are a key concept in economic theory and empirical research largely supports their predictive power for major life outcomes and behaviors. While the corresponding evidence is comprehensive for adults,[1] much less is known about their relevance for the behavior of children and adolescents. In childhood and adolescence, preferences emerge before they become more stable in adulthood (Heckman, 2007; Schildberg-Hörisch, 2018). Recently, our

* We thank Lukas Kiessling, Daniel Kamhöfer, Fabian Kosse, Sule Ertac, and Ulf Zölitz as well as participants of the M-BEPS 2019 conference for helpful comments and discussion. Financial support by the German Research Foundation (Deutsche Forschungsgemeinschaft, DFG) through grant SCHI-1377/1-1, project number 392529304, is gratefully acknowledged. We declare no competing financial interests. IRB approval (Heinrich Heine University Düsseldorf) was granted under study number 6212.

1. Time preferences are linked to criminal behavior, educational attainment, occupational success, income, wealth, and health outcomes (see, e.g., Fuchs, 1982; Bickel, Odum, and Madden, 1999; Kirby, Petry, and Bickel, 1999; Ventura, 2003; Kirby and Petry, 2004; DellaVigna and Paserman, 2005; Eckel, Johnson, and Montmarquette, 2005; Chabris et al., 2008; Golsteyn, Grönqvist, and Lindahl, 2014; Cadena and Keys, 2015; Åkerlund et al., 2016; Sunde et al., 2022). Risk preferences are associated with labor market success, health outcomes, investment decisions, addictive behaviors, and migration (Barsky et al., 1997; Hong, Kubik, and Stein, 2004; Bonin et al., 2007; Anderson, 2008; Kimball, Sahm, and Shapiro, 2008; Jaeger et al., 2010; Dohmen and Falk, 2011; Dohmen et al., 2011; Von Gaudecker, van Soest, and Wengström, 2011; Becker et al., 2012; Dawson and Henley, 2015; Hsieh, Parker, and van Praag, 2017). Social preferences are related to cooperative behaviors, e.g., at the work place, donations, repayment of loans, and management of common pool resources (Karlan, 2005; Dohmen et al., 2009; Rustagi, Engel, and Kosfeld, 2010; Carpenter and Seki, 2011; Becker et al., 2012; Burks et al., 2016; Deming, 2017).

understanding of the formation of preferences in childhood and their measurement in incentivized experiments have made significant progress (see, e.g., Heckman, 2007; Sutter et al., 2013; Doepke and Zilibotti, 2017; Alan and Ertac, 2018; Cappelen et al., 2020; Kosse et al., 2020; Falk et al., 2021). We are thus now ready to move forward and explore the link between children's preferences and outcomes.

First evidence points to an existing relation between economic preferences of children and adolescents and how they act. Impatience is associated with drinking and smoking behavior, health outcomes like a higher body mass index, a lower propensity to save, and worse school performance (Castillo et al., 2011; Sutter et al., 2013; Castillo, Jordan, and Petrie, 2019). Risk averse teenagers are less likely to be overweight (Sutter et al., 2013), behave better at school, and are more likely to complete high school (Castillo, Jordan, and Petrie, 2018). Importantly, such associations tend to persist as measures of economic preferences in childhood or adolescence have also been shown to predict adult outcomes (Borghans, ter Weel, and Weinberg, 2008; Golsteyn, Grönqvist, and Lindahl, 2014).[2] However, it is not yet clear how robust these associations are and what exactly they reflect, especially given the still malleable and emerging nature of children's preferences.

This paper contributes to a better understanding of the link between children's and adolescents' preferences and their field behaviors and goes beyond previous evidence in several respects. To begin with, we jointly elicit time preferences, risk preferences, and social preferences in incentivized experiments. This is relevant as decisions typically involve more than one preference dimension. For example, addictive behaviors such as smoking, drinking, or gambling involve risk considerations, but also a trade-off between immediate and delayed gratification (Ida and Goto, 2009; Sutter et al., 2013). Moreover, our data cover nearly 6,000 children and their parents and combine comprehensive measures of preferences with wide-ranging information on child outcomes (study attitude, risky behaviors, prosociality, emotional health, and behavioral problems) and household environment. Children and adolescents in our sample are between the ages 6 and 16, so we cover early elementary school age up to the end of adolescence. This allows us to study within a unified framework whether preferences at a young age translate into observable behavior for many outcome dimensions at once.

An exceptional feature of our data is that we elicit preferences and behaviors of whole families. What sets our paper apart from previous studies is our estimation of specifications that control for many characteristics of household environment such as parental preferences and parenting style. We hence take a step forward towards a more causal interpretation of the

2. A related literature on childhood temperament in psychology documents that childhood temperament does not only predict functioning in childhood, but that early childhood differences in temperament are also systematically related to a broad range of adult outcomes, possibly due to the existence of some continuity in temperament development from early childhood to early adulthood (Caspi, 2000; Caspi et al., 2003; Moffitt et al., 2011).

link between child preferences and outcomes. Many facets of household environment may be important for both preference formation and field behavior, among them socio-economic status (Dohmen et al., 2012; Kosse and Pfeiffer, 2012; Bauer, Chytilová, and Pertold-Gebicka, 2014; Almås et al., 2016; Brenøe and Epper, 2019; Falk et al., 2021), family structure (Detlefsen et al., 2018), parents' economic preferences (Bisin and Verdier, 2000; Dohmen et al., 2012; Kosse and Pfeiffer, 2012; Bauer, Chytilová, and Pertold-Gebicka, 2014; Almås et al., 2016; Alan et al., 2017; Campos-Vazquez, 2018; Brenøe and Epper, 2019; Falk et al., 2021; Chowdhury, Sutter, and Zimmermann, 2022), parenting style, parental time, monetary and further investments in their children (Cunha and Heckman, 2007; Guryan, Hurst, and Kearney, 2008; Heckman, 2008; Heckman and Mosso, 2014; Falk and Kosse, 2016; Doyle et al., 2017; Cobb-Clark, Salamanca, and Zhu, 2019; Falk et al., 2021), parental values and religiosity (see, e.g., Brañas-Garza, Espín, and Neuman, 2014), genetic contributions (e.g., Cesarini et al., 2009; Zyphur et al., 2009), and exposure to stress at the household level (e.g., Starcke and Brand, 2012; Buchanan and Preston, 2014; Haushofer and Fehr, 2014; Ceccato et al., 2018). For example, if higher socio-economic status of a family on the one hand translates into children being more patient and on the other hand has an independent effect on their success in school, as parents provide more support with homework, explanations, or extra tutoring, it is not clear how to interpret an observed correlation between children's patience and educational attainment.

In a first step of our analysis, we use cross-sectional regression models comparable to those applied in previous work. Our results confirm and add to our knowledge on the predictive power of child preferences for outcomes. For example, we find that time-consistent children study harder. Risk-averse children engage in fewer risky behaviors but have lower emotional health. We provide first evidence on the predictive power of children's social preferences and observe that spiteful children have a worse study attitude, more pronounced behavioral problems, and score lower on prosociality than egalitarian, altruistic, or selfish children. In the outcome dimension, our results extend the predictive power of child preferences to domains such as emotional health and behavioral problems that have not been studied before. In a second step, we further exploit our rich data to add information on a family's socio-economic status, family structure, religion, parental preferences and IQ, and parenting style as explicit control variables in the baseline specifications. When adding these extensive control variables to replicate household environment, the predictive power of preferences for outcomes in general attenuates.

Our findings have considerable implications. First, they inform the debate on how (much) children's preferences are related to their field behaviors (Castillo et al., 2011; Sutter et al., 2013; Castillo, Jordan, and Petrie, 2018, 2019). This debate is only in its infancy and we contribute with data on nearly 6,000 children that are exceptionally broad both with respect to preference and outcome measures. Moreover, our results emphasize the importance of family and household environment for the formation of preferences (see, e.g., Doepke and

Zilibotti, 2017; Kosse et al., 2020; Falk et al., 2021). They thus relate to the literature on skill formation (see, e.g., Cunha and Heckman, 2007) that highlights childhood as a sensitive period for the formation of personality traits and preferences.

Taking a broader perspective, our findings raise the fundamental question what experimental measures of childhood preferences ultimately capture. They suggest that measures of children's and adolescents' preferences in part reflect household environment. In our view, this does not imply that concept and measurement of these preferences are redundant. Quite in contrast, our results underline that children's and adolescents' preferences are a valuable tool for the prediction of child outcomes. If children's preferences can predict outcomes precisely because they reflect manifold household characteristics that are hard to quantify comprehensively, we can consider them to be highly useful. Obviously, our findings also emphasize the importance of abstaining from causal claims in such endeavors.

The remainder of the paper is structured as follows. Section 2.2 discusses sampling and data. Hypotheses are outlined in section 2.3. Section 2.4 illustrates our empirical strategy and section 2.5 presents results. We discuss implications of our findings and conclude in section 2.6.

2.2 Data

Data collection took place in rural areas in Bangladesh. With around 163 million inhabitants, Bangladesh is the world's eighth most populous country. 63 percent of the population are living in rural areas.[3] In the last two decades, Bangladesh has made notable progress in reducing poverty and cut down the percentage of people living below the income poverty line of USD 1.90 a day to 14.3 percent in 2016 in international prices. Sustained economic growth has enabled Bangladesh to reach lower middle-income status in 2015 (World Bank classification; second lowest out of four categories: GNI per capita between USD 1,026 and USD 3,995).[4] With a Human Development Index (HDI) of 0.632 in 2020, however, it still ranks only 133rd out of 189 countries in terms of human development, placing it in the medium human development category (index and classification developed by the United Nations; also second lowest out of four categories).[5]

3. Data from 2019. See United Nations Human Development Reports country profile: http://hdr.undp.org/en/countries/profiles/BGD. Last accessed on February 2, 2022.

4. See World Bank country profile (data) and overview: https://data.worldbank.org/country/bangladesh & https://www.worldbank.org/en/country/bangladesh/overview. Last accessed on February 2, 2022.

5. The HDI is a summary measure for assessing long-term progress in enabling people to live a long and healthy life, have access to knowledge and a decent standard of living (UN Development Programme, 2020).

2.2.1 Sampling procedure and data collection

Data were collected in the four rural districts Netrokona, Sunamganj, Chandpur and Gopalganj from March to May 2018 with the help of a local, specialized survey firm. These districts represent four of the eight administrative divisions of the country. In the course of a previous survey that was conducted in 2014 and 2016, 11 subdistricts were chosen based on the availability of NGOs willing to collaborate and 150 villages were randomly drawn from these 11 subdistricts. In 2018, the 150 villages were visited and a public elementary school suitable for sampling school children was chosen. From each selected school, 20 students were drawn across grades 2 to 5 via class lists using a simple random sampling procedure.[6] We surveyed the 3,000 new households of these students from 2018 onwards, along with 1,001 households already sampled and interviewed in 2014/16 (see Chowdhury, Guiteras, and Zimmermann, 2014; Chowdhury, Sutter, and Zimmermann, 2022). Section 2.A in the appendix contains further details on the sampling.

The aim of our data collection was to establish a large sample of families in which we measure both children's and parents' skills as comprehensively as possible. We therefore elicited economic preferences (time, risk, and social preferences), personality traits, and cognitive skills via paper-and-pencil interviewing for up to four household members (one or two children aged 6 to 16 and their parents). In particular, we were able to elicit preferences for 5,989 children from 3,771 households. We complement this rich data on skills of whole families with a questionnaire that mothers answered about their children and a general household survey, that were collected via paper-and-pencil interviews. The comprehensive household questionnaire covered socio-demographics, income, expenditures, employment, land ownership, credits and savings, assets, health, and shocks. It was answered by either the household head or his/her spouse (whoever was the most knowledgeable person for the respective part). The mother questionnaire covered information on parenting style.[7] Moreover, mothers assessed their children's strengths and difficulties as well as further personality traits (for children up to age 13).

2.2.2 Experiments: time, risk, and social preferences

Children participated in a sequence of experiments designed to measure the three core dimensions of economic preferences: time, risk, and social preferences. Experimentally elicited preference measures have important advantages. On top of being incentivized, they are constructed from revealed preferences in well-defined and controlled contexts. This gives them a readily-interpretable metric and allows for a straightforward comparison across individuals.

6. Typically, there was one school per village, and five students per grade were sampled randomly from class lists. For more details see section 2.A.2 in the appendix.

7. For details on the parenting style measure and a complete list of items, see section 2.D in the appendix.

To elicit preferences, we relied on well-established measurement tools that, in the case of time and risk preferences, have been used in developing countries before. We still carefully pre-tested all items in our context and adapted them to the children's ages. We used standardized control questions to verify that children understood the instructions.[8] The order of the experiments was randomly determined by rolling a die. Children were able to earn money or stars which were transformed into money after the experiments using age-specific exchange rates (one star's value equals approximately half of a child's weekly pocket money). Each child (and adult) received one star as a participation fee. All experiments took place in one-on-one settings in the families' homes and the interviewers ensured that members from the same household could not influence each other's decisions. Detailed instructions are attached in the joint appendix section at the end of this thesis.

Time preferences for children. In order to measure time preferences we followed a simple choice list approach, used by, e.g., Bauer, Chytilová, and Morduch (2012) in a similar form for adults in rural India. Each child had to make six choices which consisted of trade-offs between smaller, sooner and larger, later rewards (see Table 2.1). The six choices were grouped into three choice sets, each consisting of two choices with the same time delay. The early payment took place either on the next day (choice sets 1 and 2) or in a month (choice set 3), the later payment in three weeks (choice set 1), three months (choice set 2), or four months (choice set 3), respectively. The choice sets were ordered randomly.

For our analysis, we use the total number of patient choices as patience measure as well as an indicator for time-consistency. The variable *patience* is a simple count of the larger, but later reward choices among all six choices and hence ranges from 0 to 6. Children are classified as *time-consistent* if they make identical choices for choice sets 2 and 3 with the same three-month delay, implying that their current and future discount rates are equal, and time-inconsistent otherwise. Additionally, to disentangle time-consistency from extreme impatience, we refine our analysis by including an indicator (*never patient*) for whether a child has never made a patient choice in any of the choice sets (i.e., patience equals 0) as control. That way, we also account for the jump from being very impatient to showing some degree of patience being potentially different from the assumed linear impact when moving from making at least one patient choice to making up to six patient choices and allow for more flexibility in our patience measure.

8. Understanding of games was controlled by interviewers asking children in between (four times for the time preferences game, once for the risk preferences game, and once for the social preferences game) to repeat explanations. Each time, the interviewer noted down whether the child understood the game after the first, second or third explanation or whether it did not understand the game at this point. A child is indicated as having understood a game if it answered each of the control questions correctly after at most three explanations given by the interviewer. Out of the 5,989 children, 662 (439) [223] did not fully understand the rules of the games that we used to measure time (risk) [social] preferences after possibly repeated explanations. We are excluding these children from our analyses. 5,079 children understood all games.

TABLE 2.1. Time preferences experiments for children

Choice set 1	2 stars tomorrow	vs.	3 stars in 3 weeks
	2 stars tomorrow	vs.	4 stars in 3 weeks
Choice set 2	2 stars tomorrow	vs.	3 stars in 3 months
	2 stars tomorrow	vs.	4 stars in 3 months
Choice set 3	2 stars in 1 month	vs.	3 stars in 4 months
	2 stars in 1 month	vs.	4 stars in 4 months

NOTES: Own representation.

The preference distributions for our estimation sample can be found in the appendix (section 2.B). Figure 2.B.1 displays the distribution of the number of patient choices. About a third of children never made a patient choice. 64 percent of children are classified as time-consistent. Our findings on time-consistency are in line with comparable previous findings among children. Alan and Ertac (2018) observe about half of the children in their sample to make time-consistent choices in a convex time budget task.[9] Regarding patience, results for our sample are hard to compare to previous studies due to different interest rates. As in Sutter et al. (2013), who elicit time preferences for 10- to 18-year-old Austrian children using choice lists, our children are, on average, impatient. Falk et al. (2021), in contrast, observe more patient choices among their samples of German elementary school children. They measure patience by letting children decide how much of their initial endowment they want to put in a piggy bank paying out the double amount one week after the experiment. About a third of children save all their coins in the piggy bank. In another study by Alan and Ertac (2018), children aged 9 to 10 years in Turkey also display substantially more patience (measured by multiple choice lists as well as a convex time budget task).[10]

Risk preferences for children. For the elicitation of risk preferences we applied a setup originally designed by Binswanger (1980) and widely used in developing countries, e.g., by Bauer, Chytilová, and Morduch (2012) in India. Each child had to choose one out of six gambles that yielded either a high or a low payoff with equal probability (see Table 2.2). The low payoff was decreasing and the high payoff was increasing for each successive gamble. In gambles 1 to 5, the expected value increased jointly with the variance, and in gamble 6 the variance

9. As with our definition, time-inconsistency includes both present- and future-biased preferences.

10. For a recent overview of economic behavior and experimental economics results of children and adolescents, especially with respect to the influence of age and gender, see Sutter, Zoller, and Glätzle-Rützler (2019).

increased in comparison to gamble 5, meaning that choices of higher gamble numbers were associated with a higher willingness to take risks.

For our analysis, we use an indicator for being *risk-averse* (choosing one of the first four gambles) in contrast to being comparably risk-neutral or risk-seeking in case of choosing gamble number 5 or 6, respectively.[11]

TABLE 2.2. Risk preferences experiments for children

Age 10 to 11	Low amount (50% chance)	High amount (50% chance)	
Gamble 1	25	25	*risk-averse*
Gamble 2	22	48	
Gamble 3	20	60	
Gamble 4	15	75	
Gamble 5	5	95	*risk-neutral*
Gamble 6	0	100	*risk-seeking*

NOTES: Own representation. Example for age 10 to 11.

Figure 2.B.2 in the appendix shows that 41 percent of children in our estimation sample are risk-averse. The other 59 percent are evenly distributed across being risk-neutral and risk-seeking. This distribution closely resembles what Castillo (2020) finds when eliciting risk preferences in a similar manner among 8-year-old Peruvian children and what Falk et al. (2021) find among 7- to 9-year-old German children (using a different risk preferences game, however). In line with age trends in risk attitudes (Sutter, Zoller, and Glätzle-Rützler, 2019), our sample children are much less risk-averse than samples of high school students and young adults from the US (see Ball, Eckel, and Heracleous, 2010, and Eckel et al., 2012, who use experimental setups similar to ours).

Social preferences for children. We followed an experimental protocol inspired by Fehr, Bernhard, and Rockenbach (2008) which got extended by Bauer, Chytilová, and Pertold-Gebicka (2014) to assess social preferences. Children had to make four allocation choices dividing stars between themselves (x) and another child (y) of the same gender and roughly the same age, but unknown and unrelated (see Table 2.3). In each of the four choices (x,y), one option was always the allocation (1,1), while the alternative allocation was designed to classify different social preference types. From the four choices, one can create four mutually exclusive social preference types: Children are classified as egalitarian if they always minimize the difference in payoffs for themselves and the recipient. They are categorized as altruistic if they

11. As a robustness check, we provide estimation results including indicators for being risk-neutral or risk-seeking instead of the risk-aversion dummy variable in the appendix (section 2.I.3). Results remain similar.

maximize the recipient's payoff in all four choices and as spiteful if they always minimize the recipient's payoff. Children are classified as selfish if they maximize their own payoff in the first and the fourth choice (the payoff of the decision maker is the same in both options in the other two choices). Children who do not follow any of these patterns are subsumed in a residual category.

For our analysis, we use the four indicator variables *egalitarian, altruistic, selfish*, and *mixed*, with "mixed" being the residual category and "spiteful" being the (extreme) base category.

TABLE 2.3. Social preferences experiments for children

(A) Games

Costly prosocial game	1 star for me 1 star for the other child (1,1)	**vs.**	2 stars for me 0 stars for the other child (2,0)
Costless prosocial game	1 star for me 1 star for the other child (1,1)	**vs.**	1 star for me 0 stars for the other child (1,0)
Costless envy game	1 star for me 1 star for the other child (1,1)	**vs.**	1 star for me 2 stars for the other child (1,2)
Costly envy game	1 star for me 1 star for the other child (1,1)	**vs.**	2 stars for me 3 stars for the other child (2,3)

(B) Classification of children based on games

	Costly prosocial game (1,1) vs. (2,0)	**Costless prosocial game** (1,1) vs. (1,0)	**Costless envy game** (1,1) vs. (1,2)	**Costly envy game** (1,1) vs. (2,3)
Egalitarian	(1,1)	(1,1)	(1,1)	(1,1)
Altruistic	(1,1)	(1,1)	(1,2)	(2,3)
Spiteful	(2,0)	(1,0)	(1,1)	(1,1)
Selfish	(2,0)	(1,1) or (1,0)	(1,1) or (1,2)	(2,3)

NOTES: Own representation.

Figure 2.B.3 in the appendix displays the distribution of social preferences for our estimation sample. A large fraction (38 percent) of children is categorized as being selfish. Still nearly a fifth are egalitarian whereas only 7 to 8 percent are either spiteful or altruistic. Nearly

30 percent of children fall into the residual category "mixed".[12] The observed pattern is similar to what Bauer, Chytilová, and Pertold-Gebicka (2014) find among 4- to 12-year-old Czech children (only the fractions of altruistic and egalitarian children are reversed). Comparisons across different types of social preferences games, however, are difficult.

Preference measures for adults. While children's preferences are at the core of our analysis, we additionally measured parents' preferences to grasp children's everyday household environment as comprehensively as possible. Elicitation of preferences for adults followed similar or identical protocols as for children. Details can be found in appendix section 2.C.

2.2.3 IQ

For children and adults, we elicited measures of crystallized and fluid IQ, which together form overall IQ (Cattell, 1971). We measured fluid IQ using the standard progressive matrices, digit span and symbol search tests of the well-established Wechsler Intelligence Scale for Children (WISC-IV) or the Wechsler Adult Intelligence Scale (WAIS-IV), respectively (Wechsler, 2003). For crystallized IQ, we used the word similarities test for children and the corresponding word meaning test for adults that are both subtests of the respective Wechsler Intelligence Scales. All tests got adapted to the specific context of Bangladesh.[13] IQ is standardized to a mean of zero and standard deviation of one across our children sample or these children's fathers and mothers, respectively.

2.2.4 Child outcome variables

For adults, preferences have been shown to predict key life outcomes such as educational attainment, labor market success, cooperative behaviors, health status, and health-related behaviors as well as life satisfaction (see footnote 1). Due to their young age, it is, however, not feasible to use the exactly same outcomes for children and adolescents as it is typically done for adults. We therefore decided to collect related and equally multifaceted information on child outcomes and behaviors, spanning attitudes and conduct related to education, risk-taking, prosocial behavior, as well as emotional and behavioral syndromes that have been shown to be highly predictive of later adult outcomes (Clark and Lepinteur, 2019; Layard et al., 2019). To further diversify our measurement approach, some of the child outcomes are reported by children themselves, others by their mothers.

12. Yet, note that the four social preference types account for more than 70 percent of subjects although those four types are based on only 6 out of 16 (38 percent) choice patterns.

13. We worked with local academics with expertise in the adaptation and use of WISC version IV. In particular, Salim Hossain of the Department of Psychology, Dhaka University, and his team have adapted both WISC and WAIS.

Study attitude. To measure study attitude for which it is fair to assume that it positively relates to educational success in the long run, children rated the following statement on a five-point Likert scale: "By working very hard, one can succeed at each area in life, for example at school or at work."[14] The variable is standardized to a mean of zero and standard deviation of one across our children sample.

Risky behaviors. Children answered 16 questions related to behaviors considered to be risky in Bangladesh, e.g., "Do you jump from tree/bridge to river or canal?" or "Do you often get into physical fights?" Section 2.E.1 in the appendix contains the list of all items regarding risky behaviors. The set of questions was developed in focus group discussions with respondents similar to our sample survey respondents. The questions were also pre-tested in villages similar to our study villages. Using standard questions from Western countries is often not appropriate or meaningful. We included, for example, the question "Do you smoke?" as a frequently used measure of risk-taking behavior, but nearly 100 percent of children and adolescents answered "no." Drinking alcohol, another popular indicator for risk-seeking behavior, is forbidden due to religious reasons. For our analysis, we use the fraction of questions related to engaging in risky behaviors answered with "yes," conditional on being answered. Risky behaviors are closely related to health status. For example, Eaton et al. (2012) monitor six categories of health-risk behaviors among youth and young adults including behaviors that contribute to unintentional injuries and violence or substance abuse. Sutter et al. (2013) document a link between risk attitudes and obesity. The variable is standardized to a mean of zero and standard deviation of one across our children sample. Contrary to our other outcome measures, risky behaviors were only elicited from age 10 onwards as included questions are often not suitable for younger children.

Prosociality. We make use of the prosociality scale of the well-established and widely used Strengths and Difficulties Questionnaire (SDQ) to measure the extent to which children behave prosocially, i.e., interact with others in a positive and cooperative way in their daily routine. Mothers rated five items related to their children's prosocial behavior on a three-point scale such as "Considerate of other people's feelings" or "Shares readily with other children (treats, toys, pencils, etc.)." For a complete list of the prosociality items see section 2.E.2 in the appendix. Answers are combined with equal weighting into one scale. The variable is standardized to a mean of zero and standard deviation of one across our children sample.

Emotional and behavioral difficulties. Moreover, we use a two-scale division of the total difficulties score based on the Strengths and Difficulties Questionnaire (SDQ). The SDQ score captures emotional and behavioral difficulties and was originally developed by psychologists

14. This is an item from Rotter's locus of control questionnaire (Rotter, 1966).

as a brief screening tool for mental health problems.[15] In recent times, economists have frequently used the SDQ (Gupta and Simonsen, 2010; Flèche, 2017; Cornelissen and Dustmann, 2019; Attanasio et al., 2020; Briole, Le Forner, and Lepinteur, 2020; Kühnle and Oberfichtner, 2020). Its predictive power for child psychiatric disorders (known to be interfering with social and educational development)[16] as well as adult outcomes such as educational attainment, unemployment, mental health, and life satisfaction (Clark and Lepinteur, 2019; Layard et al., 2019) makes it a valuable outcome dimension.

The full SDQ score comprises the four subscores "emotional symptoms," "peer problems," "hyperactivity," and "conduct problems" and was elicited asking mothers about their children. For each subscore, mothers rated five items on a three-point scale. Questions are referring to whether children are easily worried, often nervous or unhappy, how well they are socially embedded, how well children can concentrate, and whether they tend to have temper tantrums, lie, cheat, or steal (see section 2.E.3 in the appendix for a complete list of items). Answers are combined with equal weighting into the four subscores. According to Goodman, Lamping, and Ploubidis (2010), for low-risk samples it can be advisable to split the full SDQ score into two broader dimensions, grouping the emotional and peer items into an "internalizing" subscale to measure emotional or mental health, and the hyperactivity and conduct items into an "externalizing" subscale which is referring to conspicuous behaviors. As Briole, Le Forner, and Lepinteur (2020), we are following this approach to allow for a more differentiated mapping of preferences into emotional health and behavioral problems.[17] Like prosociality, the variables are standardized to a mean of zero and standard deviation of one across our children sample. Note that higher values indicate more emotional or behavioral problems and hence a more negative outcome.

2.2.5 Sample characteristics

Table 2.4 displays basic descriptives and household characteristics for the children sample that participated in the experiments to elicit time, risk, and social preferences. The number of observations differs across variables depending on the survey part and availability of

15. Its reliability and validity has been examined and confirmed in a number of studies across Europe, Asia, Australia, and South America (see, e.g., Hoosen et al., 2018, for an extensive overview). Bangladesh received special attention as data collected in its capital city Dhaka have played a particularly important role in documenting that the SDQ can be purposefully applied and interpreted in different cultural settings. Its inventor conducted multiple tests to explore the suitability of the questionnaire as a cheap and effective method for detecting child psychiatric problems in the developing world (Goodman, Renfrew, and Mullick, 2000; Mullick and Goodman, 2001).

16. Academic achievement is among the most thoroughly studied repercussions of mental health problems (McLeod, Uemura, and Rohrman, 2012). Rothon et al. (2009), e.g., conduct a longitudinal study in Great Britain, suggesting that psychological distress as measured by the SDQ is associated with educational achievement. Minkkinen et al. (2017) examine a similar setup in Finland.

17. Estimation results for the full SDQ score are displayed in the appendix (Table 2.I.10 in section 2.I.4).

household members to be interviewed. Since a large number of households was sampled via elementary schools, mean age of child participants is 10 years and more than 95 percent are able to read and write. The sample is well-balanced in terms of gender with only slightly more girls than boys. For further summary statistics please see Tables 2.F.1 and 2.F.2 in section 2.F in the appendix.

TABLE 2.4. Sample descriptives

	Mean	Std. dev.	Min.	Max.	Obs.
age	10.30	2.64	6	16	5,989
age of father	43.08	8.18	20	85	5,621
age of mother	35.97	6.27	15	67	5,697
number of siblings	2.51	1.46	0	10	5,989
homestead area (sqm)	392.50	404.82	4	4,400	5,969
income (in 100 Tk)	1,973	3,214	-16,806	102,789	5,964
literacy	95.5% are able to read and write				5,933
gender	52.1% are girls and 47.9% are boys				5,989
religion	82.2% are Muslim households				5,975
grandparents	In 20.0% of households at least one grandparent is living with the family				5,989
electricity	91.8% of households have an electricity connection				5,969

NOTES: Table displays summary statistics for 5,989 children from 3,771 households. Age is measured in years. Tk = Taka: Bangladeshi currency; 100 Taka $\approx$ 1 USD (January 2022). Note that total income values can be negative, if, for example, costs in agricultural businesses such as labor or feedings costs have been higher than income.

2.3 Hypotheses

Reflecting the three core dimensions of economic preferences, we formulate hypotheses that link time, risk, and social preferences and outcomes in childhood and adolescence. Accordingly, we analyze whether our experimental preference measures for children and adolescents are significant predictors of contemporaneous outcomes, i.e., of field behavior already at an early stage in life. In the following, we state our main hypotheses, each of them followed by a brief discussion of the existing body of evidence that backs up the hypothesis.

HYPOTHESIS 1. More patient and time-consistent children are more diligent and have a better study attitude.

In a wide range of studies from many disciplines, researchers have established an association between non-cognitive skills and academic outcomes for adults (Bowles and Gintis, 2002; Farkas, 2003; Heckman, Stixrud, and Urzua, 2006; Lleras, 2008). Patience and self-control have attracted particular attention regarding educational outcomes. Golsteyn, Grönqvist, and Lindahl (2014), for example, link adolescent time preferences to school performance. Castillo, Jordan, and Petrie (2019) show that higher discount rates go hand in hand

with a lower probability of graduating from high school. Further indirect links have been established with children's time preferences being related to future disciplinary referrals (Castillo et al., 2011; Alan and Ertac, 2018) which in turn predict high school graduation (Rumberger, 1995; Alexander, Entwisle, and Horsey, 1997).

HYPOTHESIS 2. More risk-averse children engage in fewer risky behaviors.

It is straightforward to assume that more risk-averse children are more likely to refrain from risky behaviors. There is not much empirical evidence, however, linking children's risk preferences and their actual field behavior. Sutter et al. (2013) show that for Austrian adolescents risk-aversion is connected to health behavior (body mass index) but do not find a significant association of risk attitude and smoking, alcohol consumption, saving behavior or conduct at school. Using data on 8th graders from the US, Castillo, Jordan, and Petrie (2018) find that more risk-averse children are less likely to have future disciplinary referrals and more likely to complete high school.

HYPOTHESIS 3. Compared to spiteful children, egalitarian, altruistic, and selfish children behave more prosocially.

It is also intuitive to hypothesize that children who exhibit less antisocial preferences than spiteful ones behave more prosocially in their everyday life. We are not aware, however, of any empirical evidence linking experimentally elicited other-regarding preferences of children and adolescents and their field behavior. For adults, social preferences have been shown to be predictive of prosocial behaviors and outcomes such as donating, volunteering time, assisting strangers, helping friends and relatives, or family ties (Falk et al., 2018).

HYPOTHESIS 4. All economic preferences have predictive power for emotional and behavioral difficulties. More patient and time-consistent children exhibit less behavioral difficulties measured by the SDQ externalizing subscale. More risk-averse children have fewer conduct problems picked up by the externalizing subscale but more emotional problems captured by the internalizing subscale. Compared to spiteful individuals, egalitarian, altruistic, and selfish children exhibit less difficulties both with respect to the internalizing and externalizing dimension of the SDQ.

Regarding emotional and behavioral difficulties, different preferences are likely to affect distinct dimensions of the SDQ as represented by the two subscales, internalizing and externalizing behavior, possibly differently. Since more patient and time-consistent individuals are known to possess higher self-control, we expect them to have fewer difficulties (Moffitt et al., 2011). This could presumably be driven by the externalizing subscale, with children exhibiting less hyperactivity, suffering less from hot tempers and making less myopic decisions such as cheating or stealing. Studies linking impatience to criminal behavior or poor

school conduct (e.g., Castillo et al., 2011; Åkerlund et al., 2016) support this notion. For risk preferences, expectations are ambiguous. Following the idea that risk-averse individuals are less likely to get into conflict with rules and other children (as the study by Castillo, Jordan, and Petrie, 2018, suggests), they should also score lower on the externalizing subscale of the SDQ, i.e., display less behavioral problems. However, risk-aversion might as well go hand in hand with emotional symptoms (being worried, nervous, easily losing confidence, easily being scared), leading to higher values on the internalizing subscale. Finally, we expect more prosocial individuals to exhibit less difficulties, both with respect to the internalizing and externalizing dimension of the SDQ. Peer problems (being solitary, not being liked, being picked on or bullied) and conduct problems (being disobedient, fighting with or bullying other children, lying, cheating or stealing) are both less likely for more egalitarian, altruistic or selfish children than for spiteful ones.

2.4 Empirical strategy

Analyses are conducted by estimating the following OLS regression model:

$$y_{ij} = \alpha + \beta_P P_{ij} + \beta_C C_{ij} + \beta_X X_{ij} + \beta_H H_j + \varepsilon_{ij} \tag{2.1}$$

where y_{ij} is the outcome of individual i in family j (study attitude, risky behaviors, prosociality, or emotional and behavioral difficulties), P_{ij} is the vector of time, risk, and social preferences, C_{ij} captures cognitive skills, i.e., IQ, X_{ij} is a vector of exogenous control variables (gender and age fixed effects (age FE)) and ε_{ij} is the error term. H_j is a vector of household environment variables that we include in a set of broader specifications but omit in the baseline regressions. It comprises household socio-demographics (number of siblings, income, parents' age and literacy, whether the household has an electricity connection, whether a senior (grandparent) is living in the household, whether it is a Muslim household), parents' preferences (time, risk, and social preferences, analogous to children's preferences), parents' IQ and parenting style (six dimensions: emotional warmth, inconsistent parenting, monitoring, negative communication, psychological control, strict control).[18] For all specifications, standard errors are clustered at village level.

In a first step, we follow previous work and run regressions of child outcomes on preferences as well as IQ, gender, and age FE (that is, including dummy variables for the different ages from 6 to 16 with age 6 or 10, depending on the outcome variable's defined age range, being the omitted base category) to establish the predictive power of children's preferences for their field behavior.

18. Details on exact coding of all variables can be found in section 2.H in the appendix.

We then go beyond existing work by including household environment variables in our specifications, exploiting that our exceptionally rich data encompass measures of preferences and cognitive skills *both* for children and their parents as well as extensive information on a family's socio-economic status, family structure, religion, and parenting style.

2.5 Results

This section presents the results of our analysis regarding the link between child preferences and the five outcome variables study attitude, risky behaviors, prosociality, and SDQ (split into an internalizing and externalizing subscale for emotional and behavioral problems). Using OLS regressions, we first examine the predictive power of child preferences in sparse baseline regressions. We then proceed by controlling for an extensive set of measurable facets of household environment. The inclusion of these controls leads to attenuation tendencies.

2.5.1 Baseline specifications

Results of the baseline specifications are displayed in Columns (1) and (3) of Table 2.5 and (1), (3), and (5) of Table 2.6. They contain OLS regressions of the five outcomes on our key explanatory variables: time, risk, and social preferences.[19] Additionally, we are controlling for cognitive skills (IQ) as well as basic exogenous variables that are unrelated to household environment (gender and age fixed effects[20]).

In the baseline specifications, preferences have significant predictive power. In particular, time preferences map into study attitude, risky behaviors, as well as emotional and behavioral difficulties; risk preferences map into risky behaviors, prosociality, as well as emotional health; and social preferences map into prosociality, study attitude, risky behaviors, as well as emotional and behavioral difficulties.[21] Tests of joint significance for groups of preference coefficients generally confirm this. Also, all preferences jointly have substantial predictive power.

In line with our hypothesis, being time-consistent is associated with a 9 percent of a standard deviation increase in study attitude, i.e., higher valuation of working diligently as a prerequisite to being successful at school. Otherwise weak results for study attitude and time preferences may be on the grounds that our data do not contain a direct measure of educational attainment which is usually found to be connected with patience.[22] Time-consistent

19. Coefficients of main explanatory variables of interest for each outcome (cf. section 2.3 on hypotheses) are printed in bold. Regression results are visualized with coefficient plots in section 2.G in the appendix.

20. Including age and age^2 instead does not change our results.

21. Running (ordered) logit and probit regressions for suitable outcome representations such as using raw scores for study attitude, prosociality, and SDQ as well as SDQ categories leads to similar results.

22. Adolescents' time preferences have been linked to school performance with more patient teenagers having higher educational attainment (Golsteyn, Grönqvist, and Lindahl, 2014) and being more likely to graduate

TABLE 2.5. Regressions of study attitude and risky behaviors on preferences: baseline vs. HH environment specifications

	STUDY ATTITUDE†,‡		RISKY BEHAVIORS†,‡	
	(1) Baseline	(2) HH env	(3) Baseline	(4) HH env
Preferences†				
patience	**-0.014**	**-0.013**	0.031**	0.028*
	(0.011)	(0.012)	(0.014)	(0.015)
time-consistent	**0.087****	**0.048**	-0.015	-0.016
	(0.041)	(0.044)	(0.044)	(0.045)
never patient	**-0.026**	**-0.029**	-0.041	0.027
	(0.056)	(0.063)	(0.075)	(0.081)
risk-averse	0.006	-0.006	**-0.062***	**-0.054**
	(0.027)	(0.030)	(0.035)	(0.038)
egalitarian	0.316***	0.211***	-0.182*	-0.116
	(0.065)	(0.068)	(0.098)	(0.092)
altruistic	0.279***	0.166**	-0.250**	-0.100
	(0.086)	(0.080)	(0.112)	(0.111)
selfish	0.321***	0.168**	-0.147	-0.061
	(0.071)	(0.065)	(0.095)	(0.091)
p-value joint significance				
time preferences	0.026	0.395	0.001	0.104
social preferences	0.000	0.047	0.185	0.678
all preferences	0.000	0.143	0.001	0.115
Cognitive skills†,‡				
IQ	0.114***	0.072***	-0.137***	-0.089***
	(0.018)	(0.020)	(0.024)	(0.024)
Control variables: gender & age (FE)††				
female	0.031	0.033	-0.829***	-0.847***
age 6	*base*	*base*		
age 7	0.104	0.070		
age 8	0.104	0.050		
age 9	0.243***	0.204***		
age 10	0.352***	0.292***	*base*	*base*
age 11	0.334***	0.282***	-0.068	-0.025
age 12	0.422***	0.364***	-0.129**	-0.133**
age 13	0.397***	0.294***	-0.190***	-0.115**
age 14	0.513***	0.463***	-0.348***	-0.285***
age 15	0.617***	0.536***	-0.441***	-0.379***
age 16	0.548***	0.436***	-0.533***	-0.413***
Household environment (HH env)‡‡				
socio-demographics	✗	✓	✗	✓
p-value joint significance		0.054		0.131
parents' preferences	✗	✓	✗	✓
p-value joint significance		0.000		0.081
parents' IQ	✗	✓	✗	✓
p-value joint significance		0.078		0.001
parenting style	✗	✓	✗	✓
p-value joint significance		0.000		0.000
Observations	5,076	4,096	2,968	2,339
R^2	0.038	0.087	0.220	0.307
Adj. R^2	0.034	0.074	0.216	0.292
F	9.381	7.441	54.597	23.857

NOTES: Standard errors (in parentheses) are clustered at the village level for all specifications. †Study attitude, risky behaviors, preferences, and cognitive skills measures are defined as described in sections 2.2.2-2.2.4. ‡Study attitude, risky behaviors, and IQ are standardized to a mean of zero and standard deviation of one across all available observations in our children sample. ††Female is an indicator for being a girl, age is measured in years and included as fixed effects (FE), i.e., in the form of dummy variables for each age except the base category. ‡‡Household (HH) socio-demographics comprise the number of siblings in HH, HH income, parents' age and literacy, whether the HH has an electricity connection, whether a senior is living in the HH, and religion; parents' preferences and IQ comprise variables analogous to children's measures (see sections 2.2.2 and 2.2.3 as well as section 2.C in the appendix); parenting style comprises the six dimensions emotional warmth, inconsistent parenting, monitoring (intensity), negative communication, psychological control, and strict control as described in appendix section 2.D. All columns display OLS regressions. Coefficients of main explanatory variables of interest for each outcome (cf. section 2.3 on hypotheses) are printed in bold. Significance at $^{*}p < 0.10$, $^{**}p < 0.05$, $^{***}p < 0.01$.

TABLE 2.6. Regressions of prosociality and SDQ on preferences: baseline vs. HH environment specifications

	PROSOCIALITY†,‡		SDQ INTERN. SCALE†,‡		SDQ EXTERN. SCALE†,‡	
	(1) Baseline	(2) HH env	(3) Baseline	(4) HH env	(5) Baseline	(6) HH env
Preferences†						
patience	0.019	0.027**	-0.000	-0.013	**0.022***	**0.005**
	(0.012)	(0.012)	(0.013)	(0.012)	(0.013)	(0.012)
time-consistent	0.014	-0.006	-0.091**	-0.056	**-0.068***	**-0.046**
	(0.041)	(0.041)	(0.046)	(0.049)	(0.040)	(0.039)
never patient	0.010	-0.004	-0.062	-0.071	**0.046**	**0.039**
	(0.067)	(0.070)	(0.066)	(0.072)	(0.064)	(0.066)
risk-averse	0.119***	0.085***	**0.060***	**0.056***	**0.006**	**0.014**
	(0.031)	(0.028)	(0.032)	(0.030)	(0.027)	(0.029)
egalitarian	**0.269*****	**0.279*****	**-0.352*****	**-0.218*****	**-0.413*****	**-0.306*****
	(0.068)	(0.069)	(0.075)	(0.068)	(0.071)	(0.066)
altruistic	**0.203****	**0.152***	**-0.242****	**-0.084**	**-0.234****	**-0.098**
	(0.083)	(0.084)	(0.097)	(0.083)	(0.094)	(0.073)
selfish	**0.197*****	**0.162****	**-0.400*****	**-0.192*****	**-0.352*****	**-0.163*****
	(0.064)	(0.066)	(0.081)	(0.064)	(0.076)	(0.061)
p-value joint significance						
time preferences	0.227	0.011	0.004	0.046	0.111	0.688
social preferences	0.001	0.000	0.000	0.005	0.000	0.000
all preferences	0.000	0.000	0.000	0.001	0.000	0.001
Cognitive skills†,‡						
IQ	0.142***	0.030	-0.155***	-0.073***	-0.133***	-0.042**
	(0.021)	(0.020)	(0.023)	(0.023)	(0.021)	(0.020)
Control variables: gender & age (FE)††						
female	0.107***	0.119***	0.018	0.013	-0.229***	-0.227***
age 6	*base*	*base*	*base*	*base*	*base*	*base*
age 7	0.234***	0.067	-0.112	-0.007	-0.306***	-0.171**
age 8	0.303***	0.150**	-0.050	-0.004	-0.235***	-0.148*
age 9	0.287***	0.115	-0.125*	-0.024	-0.270***	-0.151**
age 10	0.385***	0.239***	-0.139	-0.045	-0.352***	-0.250***
age 11	0.448***	0.279***	-0.270***	-0.126	-0.457***	-0.305***
age 12	0.519***	0.292***	-0.315***	-0.165*	-0.526***	-0.369***
age 13	0.550***	0.324***	-0.324***	-0.163*	-0.529***	-0.352***
age 14	0.657***	0.440***	-0.480***	-0.290***	-0.782***	-0.598***
age 15	0.673***	0.463***	-0.406***	-0.252***	-0.759***	-0.603***
age 16	0.657***	0.446***	-0.408***	-0.154	-0.766***	-0.597***
Household environment (HH env)‡‡						
socio-demographics	✗	✓	✗	✓	✗	✓
p-value joint signific.		0.307		0.211		0.000
parents' preferences	✗	✓	✗	✓	✗	✓
p-value joint signific.		0.000		0.000		0.000
parents' IQ	✗	✓	✗	✓	✗	✓
p-value joint signific.		0.000		0.058		0.223
parenting style	✗	✓	✗	✓	✗	✓
p-value joint signific.		0.000		0.000		0.000
Observations	4,913	4,032	4,913	4,032	4,913	4,032
R^2	0.041	0.199	0.043	0.260	0.063	0.244
Adj. R^2	0.037	0.188	0.039	0.250	0.059	0.233
F	9.310	14.577	9.123	15.246	19.155	15.720

NOTES: Standard errors (in parentheses) are clustered at the village level for all specifications. †Prosociality, SDQ subscales, preferences, and cognitive skills measures are defined as described in sections 2.2.2-2.2.4. ‡Prosociality, SDQ subscales, and IQ are standardized to a mean of zero and standard deviation of one across all available observations in our children sample. ††Female is an indicator for being a girl, age is measured in years and included as fixed effects (FE), i.e., in the form of dummy variables for each age except the base category. ‡‡Household (HH) socio-demographics comprise the number of siblings in HH, HH income, parents' age and literacy, whether the HH has an electricity connection, whether a senior is living in the HH, and religion; parents' preferences and IQ comprise variables analogous to children's measures (see sections 2.2.2 and 2.2.3 as well as section 2.C in the appendix); parenting style comprises the six dimensions emotional warmth, inconsistent parenting, monitoring (intensity), negative communication, psychological control, and strict control as described in appendix section 2.D. All columns display OLS regressions. Coefficients of main explanatory variables of interest for each outcome (cf. section 2.3 on hypotheses) are printed in bold. Significance at $^{*}p < 0.10$, $^{**}p < 0.05$, $^{***}p < 0.01$.

children also have less emotional and, as assumed, behavioral problems. Patience is positively associated with risky behaviors and behavioral problems. This at first sight counterintuitive result becomes more plausible if our patience measure to some degree also captured risk preferences. Given the institutional setting of a developing country and families in our sample being poor, waiting for money might be perceived as being inherently risky, that notion thereby overriding actual time preferences. That patience is predictive of risk-taking behavior provides some suggestive evidence for this reasoning.

Being risk-averse instead of risk-neutral or risk-seeking comes along with a 6 percent of a standard deviation reduction in the fraction of risky behaviors children engage in ($p < 0.1$). Thus, pursuant to our hypothesis, risk-aversion as measured by our experimental procedures is accompanied by lower risk-taking behavior in everyday life. This adds to the rather scarce and mixed empirical evidence linking children's risk preferences and field behavior described before. Also, risk-averse children behave in a significantly more prosocial manner and score higher on the internalizing SDQ scale (a 6 percent of a standard deviation increase, $p < 0.1$) than risk-neutral or risk-seeking children, and thus, just as expected, tend to show more emotional struggles.

Besides providing novel results on the relation between preferences and emotional and behavioral problems, we are the first to connect social preferences and field behavior of children and adolescents. Being egalitarian as opposed to spiteful is associated with a 27 percent of a standard deviation higher prosociality score. Being altruistic or selfish instead of spiteful still increases prosociality by 20 percent of a standard deviation. These results match our initial assumptions. In a similar vein, egalitarian children exhibit 35 and 41 percent of a standard deviation lower SDQ scores in the internalizing and externalizing dimension, i.e., fewer emotional and behavioral problems, than spiteful children. Compared to spiteful children, altruistic children show 24 and 23 percent of a standard deviation lower scores on the internalizing and externalizing subscale. Selfish instead of spiteful children have 40 and 35 percent of a standard deviation lower internalizing and externalizing SDQ scores. Hence, as expected, more prosocial preferences are, in general, positively associated with prosocial behaviors and negatively associated with emotional and behavioral problems. Besides, spiteful children exhibit a less diligent study attitude than egalitarian, altruistic, or selfish children. Egalitarian or altruistic children also engage less in risky behaviors.

Condensed, most results are in line with our hypotheses. Risk and social preferences map into their respective outcome counterparts, risky behaviors and prosociality. Time preferences are at least in part reflected in study attitude. Social preferences also seem predic-

---

from high school (Castillo, Jordan, and Petrie, 2019). Falk et al. (2021) show that IQ, patience, risk aversion, and altruism map positively into success in school (measured by grades). Study attitude captures a belief that motivates behavior rather than the behavior itself. In that sense, results regarding time preferences and study attitude are weaker by construct and should be interpreted with more caution than estimations linking preferences and behavior.

tive of emotional and behavioral difficulties. Moreover, being risk-averse is associated with increased emotional problems in terms of being fearful or easily worried (captured by the SDQ internalizing score), but not with better conduct (SDQ externalizing score). Interestingly, time-consistency is related to better emotional health and less behavioral problems as measured by the SDQ subscales whereas a higher degree of patience is associated with more behavioral problems. This might be driven by interdependence between our measured patience and some kind of risk preferences as discussed above. More risk-loving children could be more likely to get into conflict with rules and other children as hypothesized but not mirrored in the relation between measured risk preferences and the SDQ externalizing scale.

Besides, IQ is predictive of all outcome measures and higher IQ scores are associated with more favorable outcomes throughout. Based on a highly standardized test, the Wechsler Intelligence Scale for Children is known to capture cognitive skills in different cultural contexts—always being a strong indicator for a variety of outcomes such as school performance (Reynolds, Temple, and Ou, 2010; Almlund et al., 2011) or later adult life outcomes (Strenze, 2007; Borghans, ter Weel, and Weinberg, 2008; Golsteyn, Grönqvist, and Lindahl, 2014).

In sum, in the standard specifications, child preferences have predictive power for a broad range of outcomes. Our results thus extend the scarce existing results on the link between children's preferences and outcomes to a much broader set of outcomes than those studied previously, using a large sample of children that covers elementary school age to late adolescence. Incorporating multiple preferences domains in joint regressions allows to control for confounding effects of time, risk, and social preferences in the predictive power of single preferences for their field behavior counterparts. Also, since we comprehensively measure all three main domains of economic preferences, we are the first to add evidence regarding the predictive power of children's social preferences. They turn out to be associated with manifold outcome dimensions that range from study attitude and behavioral problems to measures of emotional health and prosociality.

2.5.2 Replicating household environment

Limiting many cross-sectional studies is the difficulty to establish causal relationships. Omitted variables might be driving both independent and dependent variables of models, thereby biasing analyses. In our context, even though this does not reduce the observed predictive power of measures, it becomes difficult to argue whether preferences influence field behavior or whether it is more plausible that both measured preferences and field behavior are affected by further environmental factors. We proceed by presenting suggestive evidence that this source of bias cannot be removed but reduced by controlling for measurable household environment facets. To grasp children's environment, we control for family structure by including the number of siblings and whether a senior is living in the household, for their

parents' age and literacy, for household income and whether the household has an electricity connection reflecting socio-economic status and living conditions, for religion, for their parents' preferences and IQ, and the parenting style that is employed. We observe attenuation among many coefficients indicating that some predictive power of our variables reflects that they are picking up household environment.

Tables 2.5 and 2.6, again, display comparisons of baseline and enriched household environment regression specifications for all five outcome measures. Columns (1) and (3) in Table 2.5 and columns (1), (3), and (5) in Table 2.6 contain the sparse regressions of child outcomes on preferences and IQ as well as gender and age. Specifications in columns (2) and (4) (and (6)) extend these regressions adding the discussed household environment variables.[23] Reduced numbers of observations in columns (2) and (4) (and (6)) compared to baseline specifications are due to missing values in single control variables added to describe household environment. For study attitude, including household environment variables nearly halves the coefficient of time-consistency. Looking at risky behaviors, adding the full set of control variables renders the coefficient of risk-aversion 13 percent smaller. Both coefficients are no longer significant. In contrast, coefficients of social preferences in the prosociality specification remain similar compared to the baseline specification. Strong repercussions can be observed for emotional and behavioral problems (SDQ). We record decreased coefficients for all significant preference measures, often by around 50 percent. Several remain significant, among them many of social preferences. Comparisons of specifications, coefficient sizes, and significance are straightforward in our data as changing effects when adding further controls are not explained by increased or decreased precision.[24]

It is also worth noting that, when controlling for household environment variables, coefficients on IQ get much smaller (up to being reduced to a fifth of their original size). Besides affecting preferences, controlling for children's family environment thus influences highly standardized, established, and repeatedly tested skill measures and their predictive power for field behavior. Table 2.H.1 in the appendix (section 2.H) displays all coefficients of estimations. Note that across all outcome measures, parenting style is highly predictive, often

23. Within our children sample (5,989 observations), we do not have complete parental preferences for all children. For 72 percent of children (4,304 observations) both father and mother participated in the experiments. For 2 percent (142 observations) only the father participated, for 22 percent (1,314 observations) only the mother participated. The latter cases reflect the fact that often the father is away for work while the mother as the main caretaker is at home. In order to not lose those observations, we applied the missing-indicator method: Adding an indicator for the missing father or mother values and setting the respective missing values to zero. We are aware that this might introduce (additional) bias into our estimations (see, e.g., Groenwold et al., 2012). However, replicating household environment is merely suggestive evidence and facing the trade-off between a loss of data and hence precision and some more uncertainty regarding the interpretation of results, we decided to increase statistical power.

24. Standard errors of estimated preferences and skills effects hardly change between specifications even though there is a considerable jump in explained variance when adding household environment variables as controls.

much more than socio-demographics or parental IQ and preferences. Depending on the outcome measure, a change in a single parenting style dimension by one standard deviation can have an impact several times as high as a one standard deviation change in child IQ.[25] Assuming that household environment shapes a child's personality and behavior, it is plausible that parenting style, i.e., the atmosphere and direct reactions to attitudes and actions, is of great importance for children's and adolescents' behavior. A child's socio-economic status (his or her parents' income and education) is mostly insignificant. The father's IQ significantly relates to his child's study attitude, risky behaviors, prosociality, and emotional problems. Mothers' preferences are more predictive of children's preferences than the mothers' IQ and the fathers' preferences, in particular the mothers' social preferences. We refrain from (further) in-depth interpretations here as household environment variables essentially serve as controls for the relations of interest between preferences and field behavior.

2.5.3 Robustness checks

To verify robustness of our findings, we run a range of adjusted regressions. In a first step, we vary our regression samples. In a second step, we vary our measures for preferences and outcomes.

Adjusted regression samples. As understanding of experiments is crucial to reliably infer underlying preferences, in our main regressions we restrict our sample to children who have understood all games according to the control questions the interviewers have asked when giving the instructions (this is further explained in section 2.2.2 that introduces the data). As robustness check, we rerun baseline and household environment regression specifications including children who have not understood either single games or all games. In general, adding different groups of children (depending on how many and which games they have understood) does not qualitatively change our results. Also, samples do not differ systematically in observed characteristics. For a more thorough discussion and a direct comparison of samples, please see section 2.I.1.

Besides, including a broader set of household environment variables into our regressions leads to a reduction in the number of observations due to missing values in single variables. To ensure that it is not the different sample composition that drives our results, we are repeating our baseline regressions with the sample of children for whom we have complete information on household environment. Further, we are comparing regression samples from baseline and household environment specifications in whether they differ in their mean preferences, IQ, gender composition, age, or field behavior outcomes. Overall, regression results

25. For example, a one standard deviation increase in emotional warmth increases a child's emotional health by 20 percent of a standard deviation (SDQ internalizing subscale). Increasing psychological control by one standard deviation reduces emotional health by 36 percent of a standard deviation. A one standard deviation higher IQ, as a comparison, increases emotional health by 7 percent of a standard deviation.

remain similar with the exception of how time-consistency relates to different outcomes: its predictive power for study attitude, emotional health, and behavioral problems vanishes. However, samples are not significantly different in basic characteristics, including preferences and outcomes. For more details, please see section 2.I.2 and the tables therein.

Modified preferences and outcome measures. We are using a more differentiated measure to capture risk preferences in order to ensure we are not losing valuable information when reducing the risk decision to one binary indicator for being risk-averse or not. Also, we are running regressions using the full SDQ score instead of its two subscales for internalizing and externalizing behavior as it is classically done. Detailed results can be found in sections 2.I.3 and 2.I.4. Yet, conclusions are robust and not more enlightening than for our main specifications.

2.6 Conclusion

This study provides several insights for a better understanding of the relation between preferences and outcomes of children and adolescents. Using standard cross-sectional specifications, we first confirm and extend previous findings that establish the predictive power of children's preferences for their field behavior. We thereby rely on novel data of nearly 6,000 children, covering the whole age range from elementary school age to the end of adolescence. Our data encompass incentivized experimental measures of time, risk, and social preferences as well as manifold outcome measures. In contrast to earlier studies, this allows for a comprehensive investigation of the link between all key preference dimensions and various child outcomes within a unified framework. Our findings confirm that children's time preferences predict educational outcomes and risk preferences risky behaviors. In addition, we provide first evidence on the predictive power of children's social preferences. In particular, we find that non-spiteful children behave in a more prosocial manner, have a better study attitude, engage in fewer risky behaviors, and display fewer behavioral problems, both with regard to internalizing and externalizing behaviors.

We proceed by exploiting the extensive set of variables measuring household environment facets that are designed to capture social facets and interactions beyond economic setups. Explicitly controlling for household characteristics such as fundamental socio-demographics (family composition, income, parents' age and literacy, living conditions, and religion), parents' preferences and IQ, as well as their parenting style leads to attenuation tendencies for the estimated link between childhood preferences and outcomes.

Our findings hold broad significance. Previous research has shown that household environment matters for both preference formation (Delaney and Doyle, 2012; Bauer, Chytilová, and Pertold-Gebicka, 2014; Angerer et al., 2015; Alan et al., 2017; Doepke and Zilibotti, 2017; Cobb-Clark, Salamanca, and Zhu, 2019; Kosse et al., 2020; Falk et al., 2021) and child outcomes (Currie, 2001; Bradley and Corwyn, 2002; Case, Lubotsky, and Paxson, 2002; Cur-

rie and Moretti, 2003; Ruhm and Waldfogel, 2012; Aizer and Currie, 2014; Heckman and Mosso, 2014). In that sense, our result that the predictive power of childhood preferences decreases when controlling for household environment is no surprise. However, it firmly demonstrates the importance of finding ways to mirror close family environment when studying the development of children's preferences and behavior. This is inherently difficult to capture especially in quantitative surveys.[26] Knowing that family environment is connected to both children's preferences and behaviors underlines findings such as the importance of socioeconomic status (Falk et al., 2021) regarding children's skills and valuably contributes to the debate on how (much) children's preferences are related to their field behaviors (Castillo et al., 2011; Sutter et al., 2013; Castillo, Jordan, and Petrie, 2018, 2019).

Our findings also raise the fundamental question what experimental measures of childhood preferences ultimately capture. They suggest that measures of children's and adolescents' preferences in part reflect household environment. Does this make childhood preferences a dispensable concept and recent advances in their measurement (Sutter et al., 2013; Sutter, Zoller, and Glätzle-Rützler, 2019) redundant? If children's preferences have predictive power precisely because they reflect manifold household characteristics such as all the input and values from parents and family surrounding that is conveyed between the lines and hence difficult to quantify, as our results suggest, they can be considered helpful in predicting outcomes. Prediction is conducive, e.g., when exploring new contexts or identifying children at risk.

In contrast to the malleable and still emerging preferences of children and adolescents, adult preferences are assumed to be largely stable (Schildberg-Hörisch, 2018) and less responsive to family and social environment. It would thus be interesting to investigate in future research to which extent the predictive power of adult preferences for life outcomes decreases when controlling for household and social environment in a similarly comprehensive manner.

References

Aizer, Anna, and Janet Currie. 2014. "The Intergenerational Transmission of Inequality: Maternal Disadvantage and Health at Birth." *Science* 344 (6186): 856–61. [90]

Åkerlund, David, Bart HH Golsteyn, Hans Grönqvist, and Lena Lindahl. 2016. "Time Discounting and Criminal Behavior." *Proceedings of the National Academy of Sciences* 113 (22): 6160–65. [67, 81]

26. There exists increasingly more empirical evidence that the social environment beyond the family also plays a significant role in shaping children's preferences. For recent contributions, see Alan and Ertac (2018) for a school-based intervention that boosted patience, Kosse et al. (2020) for the effect of an out-of-school mentoring program and Cappelen et al. (2020) for the effect of early education on social preferences. Rodrìguez-Planas (2012) and Kautz et al. (2014) provide overviews on mentoring programs and childhood interventions and their causal impact on children's non-cognitive skills. Yet, it is much more difficult to introduce exogenous variation to the family environment to make comparable claims here.

Alan, Sule, Nazli Baydar, Teodora Boneva, Thomas F Crossley, and Seda Ertac. 2017. "Transmission of Risk Preferences from Mothers to Daughters." *Journal of Economic Behavior & Organization* 134: 60–77. [69, 89]

Alan, Sule, and Seda Ertac. 2018. "Fostering Patience in the Classroom: Results from Randomized Educational Intervention." *Journal of Political Economy* 126 (5): 1865–911. [68, 73, 80, 90]

Alexander, Karl L, Doris R Entwisle, and Carrie S Horsey. 1997. "From First Grade Forward: Early Foundations of High School Dropout." *Sociology of Education* 70 (2): 87–107. [80]

Almås, Ingvild, Alexander W Cappelen, Kjell G Salvanes, Erik Ø Sørensen, and Bertil Tungodden. 2016. "Willingness to Compete: Family Matters." *Management Science* 62 (8): 2149–62. [69]

Almlund, Mathilde, Angela L Duckworth, James J Heckman, and Tim D Kautz. 2011. "Personality Psychology and Economics." In *Handbook of the Economics of Education,* edited by Eric A Hanushek, Stephen Machin, and Ludger Woessmann, 4: 1–181. Elsevier. [86]

Anderson, Michael L. 2008. "Multiple Inference and Gender Differences in the Effects of Early Intervention: A Reevaluation of the Abecedarian, Perry Preschool, and Early Training Projects." *Journal of the American Statistical Association* 103 (484): 1481–95. [67]

Angerer, Silvia, Daniela Glätzle-Rützler, Philipp Lergetporer, and Matthias Sutter. 2015. "Donations, Risk Attitudes and Time Preferences: A Study on Altruism in Primary School Children." *Journal of Economic Behavior & Organization* 115: 67–74. [89]

Attanasio, Orazio, Richard Blundell, Gabriella Conti, and Giacomo Mason. 2020. "Inequality in Socio-Emotional Skills: A Cross-Cohort Comparison." *Journal of Public Economics* 191: 104171. [78]

Ball, Sheryl, Catherine C Eckel, and Maria Heracleous. 2010. "Risk Aversion and Physical Prowess: Prediction, Choice and Bias." *Journal of Risk and Uncertainty* 41 (3): 167–93. [74]

Barsky, Robert B, F Thomas Juster, Miles S Kimball, and Matthew D Shapiro. 1997. "Preference Parameters and Behavioral Heterogeneity: An Experimental Approach in the Health and Retirement Study." *Quarterly Journal of Economics* 112 (2): 537–79. [67]

Bauer, Michal, Julie Chytilová, and Jonathan Morduch. 2012. "Behavioral Foundations of Microcredit: Experimental and Survey Evidence from Rural India." *American Economic Review* 102 (2): 1118–39. [72, 73]

Bauer, Michal, Julie Chytilová, and Barbara Pertold-Gebicka. 2014. "Parental Background and Other-Regarding Preferences in Children." *Experimental Economics* 17 (1): 24–46. [69, 74, 76, 89]

Becker, Anke, Thomas Deckers, Thomas Dohmen, Armin Falk, and Fabian Kosse. 2012. "The Relationship Between Economic Preferences and Psychological Personality Measures." *Annual Review of Economics* 4: 453–78. [67]

Bickel, Warren K, Amy L Odum, and Gregory J Madden. 1999. "Impulsivity and Cigarette Smoking: Delay Discounting in Current, Never, and Ex-Smokers." *Psychopharmacology* 146 (4): 447–54. [67]

Binswanger, Hans P. 1980. "Attitudes Toward Risk: Experimental Measurement in Rural India." *American Journal of Agricultural Economics* 62 (3): 395–407. [73]

Bisin, Alberto, and Thierry Verdier. 2000. ""Beyond the Melting Pot": Cultural Transmission, Marriage, and the Evolution of Ethnic and Religious Traits." *Quarterly Journal of Economics* 115 (3): 955–88. [69]

Bonin, Holger, Thomas Dohmen, Armin Falk, David Huffman, and Uwe Sunde. 2007. "Cross-Sectional Earnings Risk and Occupational Sorting: The Role of Risk Attitudes." *Labour Economics* 14 (6): 926–37. [67]

Borghans, Lex, Bas ter Weel, and Bruce A Weinberg. 2008. "Interpersonal Styles and Labor Market Outcomes." *Journal of Human Resources* 43 (4): 815–58. [68, 86]

Bowles, Samuel, and Herbert Gintis. 2002. "Schooling in Capitalist America Revisited." *Sociology of Education* 75 (1): 1–18. [79]

Bradley, Robert H, and Robert F Corwyn. 2002. "Socioeconomic Status and Child Development." *Annual Review of Psychology* 53: 371–99. [89]

Brañas-Garza, Pablo, Antonio M Espín, and Shoshana Neuman. 2014. "Religious Pro-Sociality? Experimental Evidence from a Sample of 766 Spaniards." *PLoS ONE* 9 (8): e104685. [69]

Brenøe, Anne A, and Thomas Epper. 2019. "Parenting Values Moderate the Intergenerational Transmission of Time Preferences." IZA Discussion Paper No. 12710. [69]

Briole, Simon, Hélène Le Forner, and Anthony Lepinteur. 2020. "Child's Socio-Emotional Skills: Is There a Quantity-Quality Trade-off?" *Labour Economics* 64: 101811. [78]

Buchanan, Tony W, and Stephanie D Preston. 2014. "Stress Leads to Prosocial Action in Immediate Need Situations." *Frontiers in Behavioral Neuroscience* 8 (5): 1–6. [69]

Burks, Stephen V, Daniele Nosenzo, Jon E Anderson, Matthew Bombyk, Derek Ganzhorn, Lorenz Götte, and Aldo Rustichini. 2016. "Lab Measures of Other-Regarding Preferences Can Predict Some Related On-the-Job Behavior: Evidence from a Large Scale Field Experiment." IZA Discussion Paper No. 9767. [67]

Cadena, Brian C, and Benjamin J Keys. 2015. "Human Capital and the Lifetime Costs of Impatience." *American Economic Journal: Economic Policy* 7 (3): 126–53. [67]

Campos-Vazquez, Raymundo M. 2018. "Intergenerational Persistence of Skills and Socioeconomic Status." *Journal of Family and Economic Issues* 39 (3): 509–23. [69]

Cappelen, Alexander, John List, Anya Samek, and Bertil Tungodden. 2020. "The Effect of Early-Childhood Education on Social Preferences." *Journal of Political Economy* 128 (7): 2739–58. [68, 90]

Carpenter, Jeffrey, and Erika Seki. 2011. "Do Social Preferences Increase Productivity? Field Experimental Evidence from Fishermen in Toyama Bay." *Economic Inquiry* 49 (2): 612–30. [67]

Case, Anne, Darren Lubotsky, and Christina Paxson. 2002. "Economic Status and Health in Childhood: The Origins of the Gradient." *American Economic Review* 92 (5): 1308–34. [89]

Caspi, Avshalom. 2000. "The Child is Father of the Man: Personality Continuities from Childhood to Adulthood." *Journal of Personality and Social Psychology* 78 (1): 158–72. [68]

Caspi, Avshalom, HonaLee Harrington, Barry Milne, James W Amell, Reremoana F Theodore, and Terrie E Moffitt. 2003. "Children's Behavioral Styles at Age 3 Are Linked to their Adult Personality Traits at Age 26." *Journal of Personality* 71 (4): 495–514. [68]

Castillo, Marco. 2020. "Negative Childhood Experiences and Risk Aversion: Evidence from Children Exposed to Domestic Violence." IZA Discussion Paper No. 13320. [74]

Castillo, Marco, Paul J Ferraro, Jeffrey L Jordan, and Ragan Petrie. 2011. "The Today and Tomorrow of Kids: Time Preferences and Educational Outcomes of Children." *Journal of Public Economics* 95 (11–12): 1377–85. [68, 69, 80, 81, 90]

Castillo, Marco, Jeffrey L Jordan, and Ragan Petrie. 2018. "Children's Rationality, Risk Attitudes and Field Behavior." *European Economic Review* 102: 62–81. [68, 69, 80, 81, 90]

Castillo, Marco, Jeffrey L Jordan, and Ragan Petrie. 2019. "Discount Rates of Children and High School Graduation." *Economic Journal* 129 (619): 1153–81. [68, 69, 79, 85, 90]

Cattell, Raymond B. 1971. *Abilities: Their Structure, Growth, and Action.* Boston: Houghton Mifflin. [76]

Ceccato, Smarandita, Sara E Kettner, Brigitte M Kudielka, Christiane Schwieren, and Andreas Voss. 2018. "Social Preferences under Chronic Stress." *PLoS ONE* 13 (7): e0199528. [69]

Cesarini, David, Christopher T Dawes, Magnus Johannesson, Paul Lichtenstein, and Björn Wallace. 2009. "Genetic Variation in Preferences for Giving and Risk Taking." *Quarterly Journal of Economics* 124 (2): 809–42. [69]

Chabris, Christopher F, David Laibson, Carrie L Morris, Jonathon P Schuldt, and Dmitry Taubinsky. 2008. "Individual Laboratory-Measured Discount Rates Predict Field Behavior." *Journal of Risk and Uncertainty* 37 (2/3): 237–69. [67]

Chowdhury, Shyamal, Raymond P Guiteras, and Klaus F Zimmermann. 2014. "Labor Supply and Productivity in Times of Environmental Shocks: The Case of Arsenic Contamination in Bangladesh." Mimeo. [71]

Chowdhury, Shyamal, Matthias Sutter, and Klaus F Zimmermann. 2022. "Economic Preferences across Generations and Family Clusters: A Large-Scale Experiment in a Developing Country." *Journal of Political Economy* 130 (9): 2361–410. [69, 71]

Clark, Andrew E, and Anthony Lepinteur. 2019. "The Causes and Consequences of Early-Adult Unemployment: Evidence from Cohort Data." *Journal of Economic Behavior & Organization* 166: 107–24. [76, 78]

Cobb-Clark, Deborah A, Nicolás Salamanca, and Anna Zhu. 2019. "Parenting Style as an Investment in Human Development." *Journal of Population Economics* 32 (4): 1315–52. [69, 89]

Cornelissen, Thomas, and Christian Dustmann. 2019. "Early School Exposure, Test Scores, and Noncognitive Outcomes." *American Economic Journal: Economic Policy* 11 (2): 35–63. [78]

Cunha, Flavio, and James J Heckman. 2007. "The Technology of Skill Formation." *American Economic Review* 97 (2): 31–47. [69, 70]

Currie, Janet. 2001. "Early Childhood Education Programs." *Journal of Economic Perspectives* 15 (2): 213–38. [89]

Currie, Janet, and Enrico Moretti. 2003. "Mother's Education and the Intergenerational Transmission of Human Capital: Evidence from College Openings." *Quarterly Journal of Economics* 118 (4): 1495–532. [89]

Dawson, Chris, and Andrew Henley. 2015. "Gender, Risk, and Venture Creation Intentions." *Journal of Small Business Management* 53 (2): 501–15. [67]

Delaney, Liam, and Orla Doyle. 2012. "Socioeconomic Differences in Early Childhood Time Preferences." *Journal of Economic Psychology* 33 (1): 237–47. [89]

DellaVigna, Stefano, and M Daniele Paserman. 2005. "Job Search and Impatience." *Journal of Labor Economics* 23 (3): 527–88. [67]

Deming, David J. 2017. "The Growing Importance of Social Skills in the Labor Market." *Quarterly Journal of Economics* 132 (4): 1593–640. [67]

Detlefsen, Lena, Andreas Friedl, Katharina Lima de Miranda, Ulrich Schmidt, and Matthias Sutter. 2018. "Are Economic Preferences Shaped by the Family Context? The Impact of Birth Order and Siblings' Sex Composition on Economic Preferences." IZA Discussion Paper No. 11949. [69]

Doepke, Matthias, and Fabrizio Zilibotti. 2017. "Parenting With Style: Altruism and Paternalism in Intergenerational Preference Transmission." *Econometrica* 85 (5): 1331–71. [68, 69, 89]

Dohmen, Thomas, and Armin Falk. 2011. "Performance Pay and Multi-Dimensional Sorting: Productivity, Preferences and Gender." *American Economic Review* 101 (2): 556–90. [67]

Dohmen, Thomas, Armin Falk, David Huffman, and Uwe Sunde. 2009. "Homo Reciprocans: Survey Evidence on Behavioural Outcomes." *Economic Journal* 119 (536): 592–612. [67]

Dohmen, Thomas, Armin Falk, David Huffman, and Uwe Sunde. 2012. "The Intergenerational Transmission of Risk and Trust Attitudes." *Review of Economic Studies* 79: 645–77. [69]

Dohmen, Thomas, Armin Falk, David Huffman, Uwe Sunde, Jürgen Schupp, and Gert G Wagner. 2011. "Individual Risk Attitudes: Measurement, Determinants, and Behavioral Consequences." *Journal of the European Economic Association* 9 (3): 522–50. [67]

Doyle, Orla, Colm Harmon, James J Heckman, Caitriona Logue, and Seong H Moon. 2017. "Early Skill Formation and the Efficiency of Parental Investment: A Randomized Controlled Trial of Home Visiting." *Labour Economics* 45: 40–58. [69]

Eaton, Danice K, Laura Kann, Steve Kinchen, Shari Shanklin, Katherine H Flint, Joseph Hawkins, William A Harris, et al. 2012. "Youth Risk Behavior Surveillance—United States, 2011." *Morbidity and Mortality Weekly Report: Surveillance Summaries* 61 (4): 1–162. [77]

Eckel, Catherine, Cathleen Johnson, and Claude Montmarquette. 2005. "Saving Decisions of the Working Poor: Short- and Long-Term Horizons." In *Field Experiments in Economics (Research in Experimental Economics),* edited by Glenn W Harrison, Jeffrey Carpenter, and John A List, 10: 219–60. Emerald Group Publishing Limited. [67]

Eckel, Catherine C, Philip J Grossman, Cathleen A Johnson, Angela CM de Oliveira, Christian Rojas, and Rick K Wilson. 2012. "School Environment and Risk Preferences: Experimental Evidence." *Journal of Risk and Uncertainty* 45 (3): 265–92. [74]

Falk, Armin, Anke Becker, Thomas Dohmen, Benjamin Enke, David Huffman, and Uwe Sunde. 2018. "Global Evidence on Economic Preferences." *Quarterly Journal of Economics* 133 (4): 1645–92. [80]

Falk, Armin, and Fabian Kosse. 2016. "Early Childhood Environment, Breastfeeding and the Formation of Preferences." HCEO Working Paper No. 2016-036. [69]

Falk, Armin, Fabian Kosse, Pia Pinger, Hannah Schildberg-Hörisch, and Thomas Deckers. 2021. "Socio-Economic Status and Inequalities in Children's IQ and Economic Preferences." *Journal of Political Economy* 129 (9): 2504–45. [68–70, 73, 74, 85, 89, 90]

Farkas, George. 2003. "Cognitive Skills and Noncognitive Traits and Behaviors in Stratification Processes." *Annual Review of Sociology* 29: 541–62. [79]

Fehr, Ernst, Helen Bernhard, and Bettina Rockenbach. 2008. "Egalitarianism in Young Children." *Nature* 454 (7208): 1079–83. [74]

Flèche, Sarah. 2017. "Teacher Quality, Test Scores and Non-Cognitive Skills: Evidence from Primary School Teachers in the UK." CEP Discussion Paper No 1472. [78]

Fuchs, Victor R. 1982. "Time Preference and Health: An Exploratory Study." In *Economic Aspects of Health,* edited by Victor R Fuchs, 93–120. University of Chicago Press, Chicago. [67]

Golsteyn, Bart HH, Hans Grönqvist, and Lena Lindahl. 2014. "Adolescent Time Preferences Predict Lifetime Outcomes." *Economic Journal* 124 (580): F739–F761. [67, 68, 79, 82, 86]

Goodman, Anna, Donna L Lamping, and George B Ploubidis. 2010. "When to Use Broader Internalising and Externalising Subscales Instead of the Hypothesised Five Subscales on the Strengths and Difficulties Questionnaire (SDQ): Data from British Parents, Teachers and Children." *Journal of Abnormal Child Psychology* 38 (8): 1179–91. [78]

Goodman, Robert, D Renfrew, and Mohammad SI Mullick. 2000. "Predicting Type of Psychiatric Disorder from Strengths and Difficulties Questionnaire (SDQ) Scores in Child Mental Health Clinics in London and Dhaka." *European Child & Adolescent Psychiatry* 9 (2): 129–34. [78]

Groenwold, Rolf HH, Ian R White, A Rogier T Donders, James R Carpenter, Douglas G Altman, and Karel GM Moons. 2012. "Missing Covariate Data in Clinical Research: When and When Not to Use the Missing-Indicator Method for Analysis." *Canadian Medical Association Journal* 184 (11): 1265–69. [87]

Gupta, Nabanita D, and Marianne Simonsen. 2010. "Non-Cognitive Child Outcomes and Universal High Quality Child Care." *Journal of Public Economics* 94 (1-2): 30–43. [78]

Guryan, Jonathan, Erik Hurst, and Melissa Kearney. 2008. "Parental Education and Parental Time with Children." *Journal of Economic Perspectives* 22 (3): 23–46. [69]

Haushofer, Johannes, and Ernst Fehr. 2014. "On the Psychology of Poverty." *Science* 344 (6186): 862–67. [69]

Heckman, James J. 2007. "The Economics, Technology, and Neuroscience of Human Capability Formation." *Proceedings of the National Academy of Sciences* 104 (33): 13250–55. [67, 68]

Heckman, James J. 2008. "Schools, Skills, and Synapses." *Economic Inquiry* 46 (3): 289–324. [69]

Heckman, James J, and Stefano Mosso. 2014. "The Economics of Human Development and Social Mobility." *Annual Review of Economics* 6: 689–733. [69, 90]

Heckman, James J, Jora Stixrud, and Sergio Urzua. 2006. "The Effects of Cognitive and Noncognitive Abilities on Labor Market Outcomes and Social Behavior." *Journal of Labor Economics* 24 (3): 411–82. [79]

Hong, Harrison, Jeffrey D Kubik, and Jeremy C Stein. 2004. "Social Interaction and Stock-Market Participation." *Journal of Finance* 59 (1): 137–63. [67]

Hoosen, Nikhat, Eugene Lee Davids, Petrus J de Vries, and Maylene Shung-King. 2018. "The Strengths and Difficulties Questionnaire (SDQ) in Africa: A Scoping Review of its Application and Validation." *Child and Adolescent Psychiatry and Mental Health* 12 (6). [78]

Hsieh, Chihmao, Simon C Parker, and C Mirjam van Praag. 2017. "Risk, Balanced Skills and Entrepreneurship." *Small Business Economics* 48 (2): 287–302. [67]

Ida, Takanori, and Rei Goto. 2009. "Simultaneous Measurement of Time and Risk Preferences: Stated Preference Discrete Choice Modeling Analysis Depending on Smoking Behavior." *International Economic Review* 50 (4): 1169–82. [68]

Jaeger, David A, Thomas Dohmen, Armin Falk, David Huffman, Uwe Sunde, and Holger Bonin. 2010. "Direct Evidence on Risk Attitudes and Migration." *Review of Economics and Statistics* 92 (3): 684–89. [67]

Karlan, Dean S. 2005. "Using Experimental Economics to Measure Social Capital and Predict Financial Decisions." *American Economic Review* 95 (5): 1688–99. [67]

Kautz, Tim D, James J Heckman, Ron Diris, Bas ter Weel, and Lex Borghans. 2014. "Fostering and Measuring Skills: Improving Cognitive and Non-Cognitive Skills to Promote Lifetime Success." OECD Education Working Paper No. 110. [90]

Kimball, Miles S, Claudia R Sahm, and Matthew D Shapiro. 2008. "Imputing Risk Tolerance from Survey Responses." *Journal of the American Statistical Association* 103 (483): 1028–38. [67]

Kirby, Kris N, and Nancy M Petry. 2004. "Heroin and Cocaine Abusers Have Higher Discount Rates for Delayed Rewards Than Alcoholics or Non-Drug-Using Controls." *Addiction* 99 (4): 461–71. [67]

Kirby, Kris N, Nancy M Petry, and Warren K Bickel. 1999. "Heroin Addicts Have Higher Discount Rates for Delayed Rewards Than Non-Drug-Using Controls." *Journal of Experimental Psychology: General* 128 (1): 78–87. [67]

Kosse, Fabian, Thomas Deckers, Pia R Pinger, Hannah Schildberg-Hörisch, and Armin Falk. 2020. "The Formation of Prosociality: Causal Evidence on the Role of Social Environment." *Journal of Political Economy* 128 (2): 434–67. [68, 70, 89, 90]

Kosse, Fabian, and Friedhelm Pfeiffer. 2012. "Impatience Among Preschool Children and Their Mothers." *Economics Letters* 115 (3): 493–95. [69]

Kühnle, Daniel, and Michael Oberfichtner. 2020. "Does Starting Universal Childcare Earlier Influence Children's Skill Development?" *Demography* 57: 61–98. [78]

Layard, Richard, Andrew E Clark, Francesca Cornaglia, Nattavudh Powdthavee, and James Vernoit. 2019. "What Predicts a Successful Life? A Life-Course Model of Well-Being." *Economic Journal* 124 (580): F720–F738. [76, 78]

Lleras, Christy. 2008. "Do Skills and Behaviors in High School Matter? The Contribution of Noncognitive Factors in Explaining Differences in Educational Attainment and Earnings." *Social Science Research* 37 (3): 888–902. [79]

McLeod, Jane D, Ryotaro Uemura, and Shawna Rohrman. 2012. "Adolescent Mental Health, Behavior Problems, and Academic Achievement." *Journal of Health and Social Behavior* 53 (4): 482–97. [78]

Minkkinen, Jaana LK, Pirjo Lindfors, Jaana Kinnunen, Eerika Finell, Mari-Paulina Vainikainen, Sakari Karvonen, and Arja H Rimpelä. 2017. "Health as a Predictor of Students' Academic Achievement: A 3-Level Longitudinal Study of Finnish Adolescents." *Journal of School Health* 87 (12): 902–10. [78]

Moffitt, Terrie E, Louise Arseneault, Daniel Belsky, Nigel Dickson, Robert J Hancox, Hona Lee Harrington, Renate Houts, et al. 2011. "A Gradient of Childhood Self-Control Predicts Health, Wealth, and Public Safety." *Proceedings of the National Academy of Sciences* 108 (7): 2693–98. [68, 80]

Mullick, Mohammad SI, and Robert Goodman. 2001. "Questionnaire Screening for Mental Health Problems in Bangladeshi Children: A Preliminary Study." *Social Psychiatry and Psychiatric Epidemiology* 36 (2): 94–99. [78]

Reynolds, Arthur J, Judy A Temple, and Suh-Ruu Ou. 2010. "Preschool Education, Educational Attainment, and Crime Prevention: Contributions of Cognitive and Non-Cognitive Skills." *Children and Youth Services Review* 32 (8): 1054–63. [86]

Rodrìguez-Planas, Nùria. 2012. "Mentoring, Educational Services, and Incentives to Learn: What Do We Know about Them?" *Evaluation and Program Planning* 35 (4): 481–90. [90]

Rothon, Catherine, Jenny Head, Charlotte Clark, Emily Klineberg, Vicky Cattell, and Stephen Stansfeld. 2009. "The Impact of Psychological Distress on the Educational Achievement of Adolescents at the End of Compulsory Education." *Social Psychiatry and Psychiatric Epidemiology* 44 (5): 421–27. [78]

Rotter, Julian B. 1966. "Generalized Expectancies for Internal Versus External Control of Reinforcement." *Psychological Monographs: General and Applied* 80 (1): 1–28. [77]

Ruhm, Christopher J, and Jane Waldfogel. 2012. "Long-Term Effects of Early Childhood Care and Education." *Nordic Economic Policy Review* 1: 23–51. [90]

Rumberger, Russell W. 1995. "Dropping Out of Middle School: A Multilevel Analysis of Students and Schools." *American Educational Research Journal* 32 (3): 583–625. [80]

Rustagi, Devesh, Stefanie Engel, and Michael Kosfeld. 2010. "Conditional Cooperation and Costly Monitoring Explain Success in Forest Commons Management." *Science* 330 (6006): 961–65. [67]

Schildberg-Hörisch, Hannah. 2018. "Are Risk Preferences Stable?" *Journal of Economic Perspectives* 32 (2): 135–54. [67, 90]

Starcke, Katrin, and Matthias Brand. 2012. "Decision Making Under Stress: A Selective Review." *Neuroscience & Biobehavioral Reviews* 36 (4): 1228–48. [69]

Strenze, Tarmo. 2007. "Intelligence and Socioeconomic Success: A Meta-Analytic Review of Longitudinal Research." *Intelligence* 35 (5): 401–26. [86]

Sunde, Uwe, Thomas Dohmen, Benjamin Enke, Armin Falk, David Huffman, and Gerrit Meyerheim. 2022. "Patience and Comparative Development." *Review of Economic Studies* 89 (5): 2806–40. [67]

Sutter, Matthias, Martin G Kocher, Daniela Glätzle-Rützler, and Stefan T Trautmann. 2013. "Impatience and Uncertainty: Experimental Decisions Predict Adolescents' Field Behavior." *American Economic Review* 103 (1): 510–31. [68, 69, 73, 77, 80, 90]

Sutter, Matthias, Claudia Zoller, and Daniela Glätzle-Rützler. 2019. "Economic Behavior of Children and Adolescents—A First Survey of Experimental Economics Results." *European Economic Review* 111: 98–121. [73, 74, 90]

Thönnissen, Carolin, Barbara Wilhelm, Philipp Alt, Henriette Greischel, and Sabine Walper. 2019. "Manual of the German Family Panel: Scales and Instruments Manual (Waves 1 to 10), Release 10.0." Report. Panel Analysis of Intimate Relationships and Family Dynamics. [103]

UN Development Programme. 2020. "Human Development Report 2020: The Next Frontier—Human Development and the Anthropocene." Report. United Nations Development Programme. [70]

Ventura, Luigi. 2003. "Direct Measures of Time Preferences." *Economic and Social Review* 34 (3): 293–310. [67]

Von Gaudecker, Hans-Martin, Arthur van Soest, and Erik Wengström. 2011. "Heterogeneity in Risky Choice Behavior in a Broad Population." *American Economic Review* 101 (2): 664–94. [67]

Wechsler, David. 2003. *The Wechsler Intelligence Scale for Children: Fourth Edition.* London: Pearson. [76]

Zyphur, Michael J, Jayanth Narayanan, Richard D Arvey, and Gordon J Alexander. 2009. "The Genetics of Economic Risk Preferences." *Journal of Behavioral Decision Making* 22 (4): 367–77. [69]

Appendix 2.A Sampling

2.A.1 Covered households

2014/16. In 2014, 4,500 randomly drawn households from the 150 selected villages were surveyed (general household survey). Among those 4,500 households, 1,500 were randomly selected for further data collection regarding cognitive and non-cognitive skills (i.e., experimental measures of time, risk, and social preferences, survey measures of personality traits as well as IQ tests) in 2014 and 2016. Out of these 1,500 households, 1,001 had children aged 6 to 16 years. These households were chosen to be re-interviewed from 2018 onwards. In the original survey, four members were selected for the elicitation of cognitive and non-cognitive skills from each of the 1,001 survey households: the household heads and their spouses as well as children aged 6 to 16. The lower age bound was set to ensure that children are able to understand the survey questions and all experiments. If there were two or less children aged 6 to 16 in a household, all children were interviewed. Otherwise, only the youngest and the oldest child in the respective age range were interviewed.

2018. Due to the sampling procedure via local schools, each household added in 2018 had at least one child at elementary school age. If there was more than one child aged 6 to 16 years, a second child was randomly selected for the experimental survey. Additionally, two adults, typically mother and father of the selected children, from each of the newly sampled households took part in the data collection. Other constellations comprise grandparents or other relatives taking part in the experiments in case parents were not available. Typically, if only the mother participated, fathers were living and working abroad or outside the study area to earn the family's living (cf. footnote 23). In 2018, as before, we elicited preferences using experiments, personality traits applying validated scales, and IQ relying on well-established tests. Additionally, we collected anthropometric data besides the general household survey.

Total. 93 percent (928 out of 1,001) households from 2014/16 were successfully re-interviewed in 2018. Some of the remaining households had migrated, some refused to cooperate and some were unavailable. In total, we interviewed 928+3,000+7=3,935 households in 2018 (see Table 2.A.1).

2.A.2 2018 sampling procedure via elementary schools

Selection of elementary schools. In 2018, the given 150 villages were visited and an elementary school suitable for the selection of school-going children was chosen. However, a 1:1 village-school matching was not always possible, leading to a lower number of sample schools than villages. Some villages do not have their own elementary school such that children attend a school in a neighboring village. Hence, some schools serve multiple villages. In these cases, the school the children from the original sample village attend got selected.

TABLE 2.A.1. Total study sample size 2018

District	Subdistrict	Number of Villages	Targeted Sample		Sample Covered		Additional (Split HH)
			2014/16	2018	2014/16	2018	
Netrokona	Kalmakanda	17	116	340	98	340	0
	Durgapur	11	75	220	70	220	0
	Atpara	14	141	280	131	280	0
	Mohanganj	19	88	380	80	380	0
Chandpur	Kachua	16	103	320	99	320	3
	Hajiganj	18	117	360	110	360	2
Sunamganj	Sunamganj Sadar	11	97	220	87	220	0
	Dakkhin Sunamganj	3	34	60	33	60	0
Gopalganj	Gopalganj Sadar	16	79	320	76	320	0
	Muksudpur	13	60	260	56	260	0
	Kotwalipara	12	91	240	88	240	2
Total		**150**	**1,001**	**3,000**	**928**	**3,000**	**7**

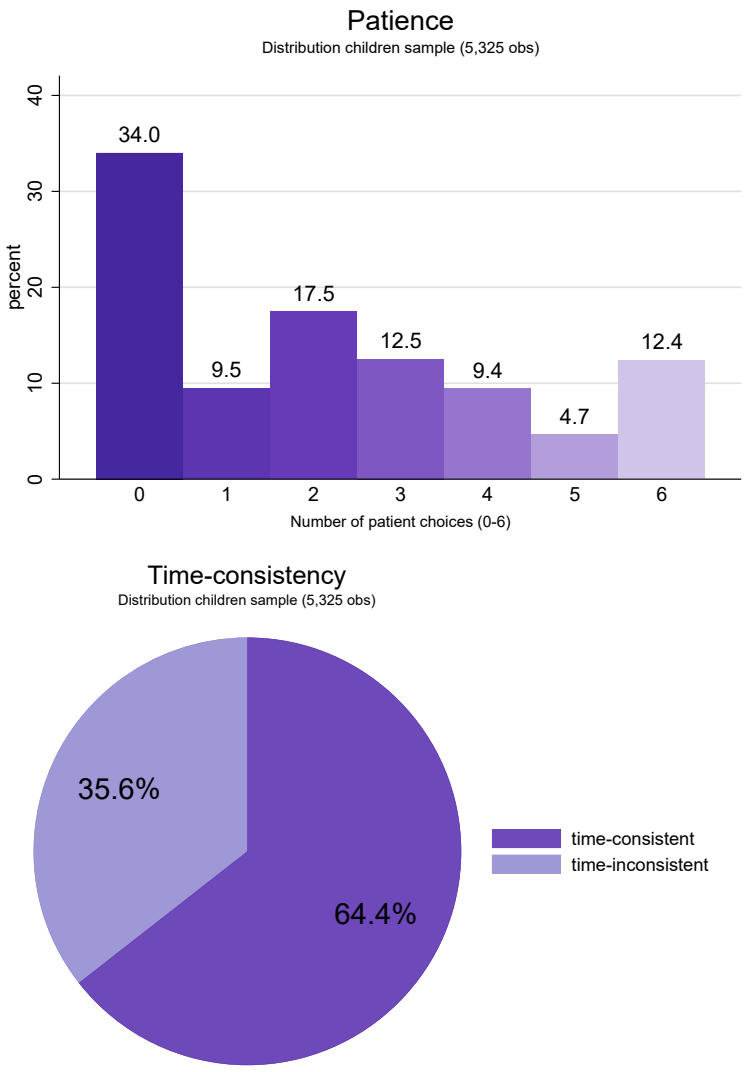
NOTES: Split households are cases in which a member of a sample household founded or joined a new household.

In other cases, villages have multiple schools. Here, the school with the majority of students from the village and situated at the village center was selected. This resulted in a selection of 135 elementary schools forming the basis for the following sampling procedure.

Sampling procedure. Taking the 135 selected schools as a starting point, in general five students from each of the grades 2 to 5 (i.e., 20 students in total) were selected. If from any grade there couldn't be found five students from the connected sample villages, they got replaced by students from neighboring villages (leading to a higher number of villages than originally selected, with 53 additional villages but always only few children from those villages). If still there couldn't be found enough students from a particular grade, the remaining children got selected from other grades.

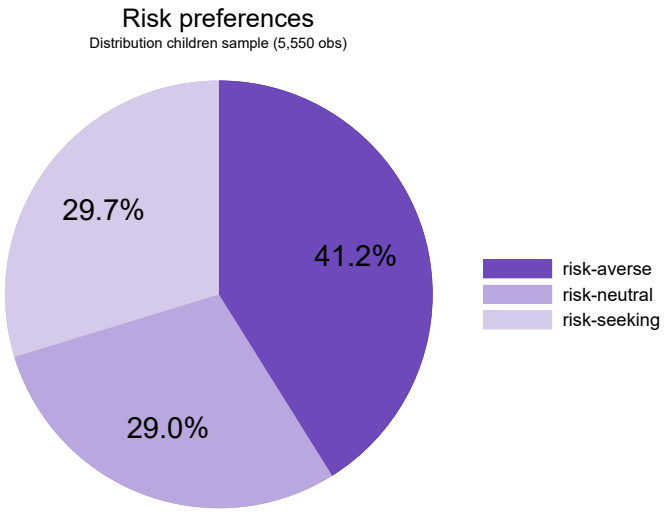
Appendix 2.B Distributions

FIGURE 2.B.1. Distribution of time preferences



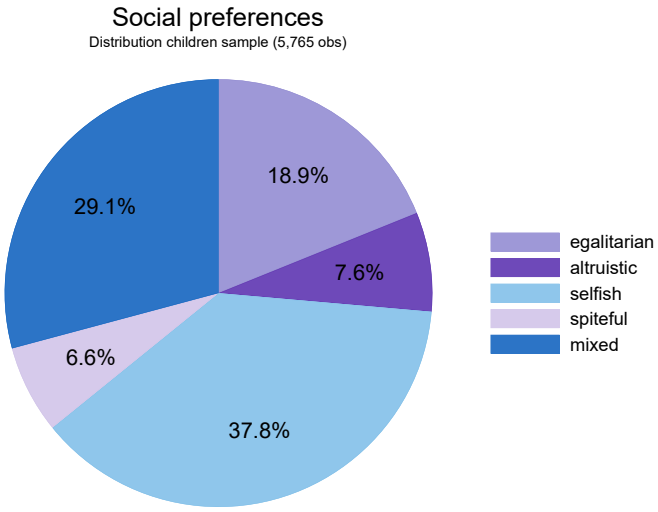
NOTES: In our sample (5,989 children) we have 5,325 observations for time preferences, i.e., 5,325 children who understood the time preferences games and for whom decisions got entered correctly.

FIGURE 2.B.2. Distribution of risk preferences



NOTES: In our sample (5,989 children) we have 5,550 observations for risk preferences, i.e., 5,550 children who understood the risk preferences games and for whom decisions got entered correctly.

FIGURE 2.B.3. Distribution of social preferences



NOTES: In our sample (5,989 children) we have 5,765 observations for social preferences, i.e., 5,765 children who understood the social preferences games and for whom decisions got entered correctly.

Appendix 2.C Preference measures for adults

For the elicitation of time preferences, adults had to make 18 choices (three choice sets with six choices each) between smaller, sooner and larger, later rewards. All choice sets had three-month time horizons with different starting points: "Tomorrow," "After 1 month," "After 1 year." Within each choice set, participants had to choose between two options, A and B, with increasing annual interest rates (see Table 2.C.1). For our analysis, we also use the total number of patient choices which is a simple count of the larger, but later reward in all 18 choices (variable *patience* ranging from 0 to 18) as well as an indicator for whether adults are *time-consistent*. In order to match the child data, we are also controlling for adults not making any patient choice including a respective indicator variable (dummy variable *never patient*).

TABLE 2.C.1. Time preferences experiments for adults

Payoff Alternative		**Payment Option A** (pays amount below)	**Payment Option B** (pays amount below)	**Annual Interest Rate**	**Choice:** A or B?
	Set 1:	**Tomorrow**	**After 3 Months**	in %	
	OR Set 2:	**After 1 Month**	**After 4 Months**		
	OR Set 3:	**After 1 Year**	**After 1 Year 3 Months**		
1		100	105	20	
2		100	110	40	
3		100	120	80	
4		100	125	100	
5		100	150	200	
6		100	200	400	

NOTES: Own representation.

Regarding risk preferences we applied the same setup as for children and only adjusted the absolute amounts of money to be paid out (higher amounts than the age-specific payments for children). In our analysis, we again use an indicator for being *risk-averse* (i.e., choosing one of the first four gambles).

Social preferences were also elicited in the same way for children and adults, except for the conversion rate of stars into Taka (Bangladeshi currency). In our regression specifications, we use the four dummy variables introduced above, *egalitarian, altruistic, selfish*, and *mixed*, with "mixed" being the residual category and "spiteful" as base category.

Surveyor instructions for all three preferences games can be found in the final appendix of this thesis.

Appendix 2.D Parenting style

Mothers were rating 18 items on a five-point scale, stating the frequency of different actions when raising their children ("never" to "very frequently"). The questionnaire was answered once for each household, so values are identical for siblings. These items are combined into six scales (in general three items per scale), indicating for each mother how much parenting style is characterized by emotional warmth, inconsistent parenting, monitoring, negative communication, psychological control, and strict control.

Emotional warmth encompassed the degree of affirmative attention and care in parenting. *Inconsistent parenting* points to inconsistencies in parents' behavior when bringing up their children. *Monitoring* refers to how well parents are informed about activities and social contacts of their children. *Negative communication* indicates the degree of negative behavior of parents towards their children. *Psychological control* assesses parents' negative intrusive thoughts, feelings, and behavior towards their children with parents potentially building up psychological pressure. *Strict control* encompasses how rigorously and harshly parents interact with their children. For an overview and a detailed description of the parenting style measures, see Thönnissen et al. (2019) and the references therein.

The variables are standardized to a mean of zero and standard deviation of one across our children sample.

Emotional warmth

(1) I use words and gestures to show my child that I love her/him.
(2) I comfort my child when s/he feels sad.
(3) I praise my child.

Inconsistent parenting

(1) I threaten my child with punishment, but don't actually follow through with it.
(2) I reduce punishments or lift them ahead of time.
(3) It is hard for me to be consistent in my childrearing.[27]

Monitoring

(1) I talk to my child about things s/he has done, seen, or experienced when s/he was out.
(2) When my child is outside the home, I know exactly where s/he is.
(3) I try to actively influence my child's circle of friends.

27. Due to a translation issue, the dimension "inconsistent parenting" is reduced to item number 3: "It is hard for me to be consistent in my childrearing." Translation of the other two items into Bengali did not properly convey the true meaning.

Negative communication

(1) I criticize my child.
(2) I shout at my child when s/he did something wrong.
(3) I scold my child when I am angry at her/him.

Psychological control

(1) I feel that my child is ungrateful because s/he disobeys.
(2) I stop talking to my child for a while when s/he did something wrong.
(3) I am disappointed and sad when my child misbehaves.

Strict control

(1) I punish my child when s/he was disobedient.
(2) I tend to be strict with my child.
(3) I make it clear to my child that s/he should not oppose orders and decisions.

Appendix 2.E Details on outcome measures

2.E.1 Risky behaviors

16 yes/no-questions referring to behaviors considered as risky in Bangladesh and asked from age 10 onwards. The items were developed in cooperation with locals from villages similar to our sample villages.

(1) Do you smoke?
(2) Do you eat pan/jorda/supari?[28]
(3) Do you gamble/bet/play lottery?
(4) Do you play on the road with car tires?
(5) Do you jump from a tree/bridge/saqo/troller to a river or canal?
(6) Do you run behind a motorbike/car/trolley?
(7) Do you play danguli?[29]
(8) Do you get up in the tree or on your house roof?
(9) Do you dive in a pond/river?
(10) Do you bring flowers or fruits without permission from someone else's garden?
(11) Do you play somersault?
(12) Do you blow fire-works?
(13) Do you play ha-du-du?[30]
(14) Do you use marijuana/ganja/hashish?
(15) Do you drive a car/motorbike?
(16) Do you often get into physical fights?

2.E.2 Prosociality scale

The prosociality scale is a standalone subscale of the Strengths and Difficulties Questionnaire (SDQ) and is elicited asking mothers about their children. Mothers rated five items related to prosocial behavior of their children on a three-point scale ("not true," "somewhat true," "certainly true"):

My child...

(1) Is considerate of other people's feelings
(2) Shares readily with other children (treats, toys, pencils, etc.)
(3) Is helpful if someone is hurt, upset or feeling ill
(4) Is kind to younger children
(5) Often volunteers to help others (parents, teachers, children)

28. Quid to be chewed after eating that contains stimulating substances (betel nut) similar to tobacco and can cause health problems including oral cancers
29. Rough game played with sticks (a similar European game is called "tipcat")
30. National contact team sport in Bangladesh, also known as "Kabaddi"

2.E.3 SDQ score

The full SDQ (Strengths and Difficulties Questionnaire) score comprises the four subscores "emotional symptoms," "peer problems," "hyperactivity," and "conduct problems" and is elicited asking mothers about their children. For each subscale, mothers were rating five items of selected children between the ages of 6 and 16 on a three-point scale ("not true," "somewhat true," "certainly true"). Items for emotional symptoms and peer problems can be grouped into an internalizing subscale, items for hyperactivity and behavioral/conduct problems into an externalizing subscale.

Internalizing subscale

Emotional symptoms My child...

(1) Often complains of headaches, stomach-ache or sickness
(2) Has many worries, often seems worried
(3) Is often unhappy, down-hearted or tearful
(4) Is nervous or clingy in new situations, easily loses confidence
(5) Has many fears, is easily scared

Peer problems My child...

(1) Is rather solitary, tends to play alone
(2) Has at least one good friend (*reversed*)
(3) Is generally liked by other children (*reversed*)
(4) Is picked on or bullied by other children
(5) Gets on better with adults than with other children

Externalizing subscale

Hyperactivity My child...

(1) Is restless, overactive, cannot stay still for long
(2) Is constantly fidgeting or squirming
(3) Is easily distracted, concentration wanders
(4) Thinks things out before acting (*reversed*)
(5) Sees tasks through to the end, good attention span (*reversed*)

Conduct problems My child...

(1) Often has temper tantrums or hot tempers
(2) Is generally obedient, usually does what adults request (*reversed*)
(3) Often fights with other children or bullies them
(4) Often lies or cheats
(5) Steals from home, school or elsewhere

Appendix 2.F Additional summary statistics

TABLE 2.F.1. Summary statistics

	Mean	Std. dev.	Min	Max	Obs.
Preferences					
patience	2.175	2.081	0	6	5,325
time-consistent	0.644		0	1	5,325
never patient	0.340		0	1	5,325
risk-averse	0.412		0	1	5,550
egalitarian	0.189		0	1	5,765
altruistic	0.076		0	1	5,765
selfish	0.378		0	1	5,765
spiteful	0.066		0	1	5,765
mixed	0.291		0	1	5,765
Cognitive skills					
IQ					
score	20.966	6.902	4	57	5,989
standardized†	0	1	-2.458	5.221	5,989
Gender & age					
female	0.521		0	1	5,989
age	10.301	2.640	6	16	5,989
Outcomes					
study attitude					
score	4.434	0.793	1	5	5,989
standardized†	0	1	-4.331	0.714	5,989
risky behaviors					
fraction (0–1)	0.189	0.163	0	0.813	3,424
standardized†	0	1	-1.162	3.837	3,424
prosociality					
score	6.481	2.266	0	10	5,793
standardized†	0	1	-2.860	1.553	5,793
SDQ internalizing subscale					
score	5.574	2.799	0	17	5,793
standardized†	0	1	-1.992	4.083	5,793
SDQ externalizing subscale					
score	5.945	3.259	0	19	5,793
standardized†	0	1	-1.824	4.006	5,793
SDQ full score					
score	11.519	5.242	1	32	5,793
standardized†	0	1	-2.007	3.907	5,793
Socio-economic status					
income (in 100 Tk)††	1,973.585	3,214.040	-16,806.4	102,789	5,964
father: literacy	0.551		0	1	5,621
mother: literacy	0.647		0	1	5,697

NOTES: See section 2.2 for details on preferences and outcome measures and appendix section 2.H for details on household environment variables. †Reference group for standardization to a mean of zero and standard deviation of one is the sample of children participating in the experiments. ††Tk = Taka: Bangladeshi currency; 100 Taka $\approx$ 1 USD (January 2022). Note that total income values can be negative, if, for example, costs in agricultural businesses such as labor or feedings costs have been higher than income.

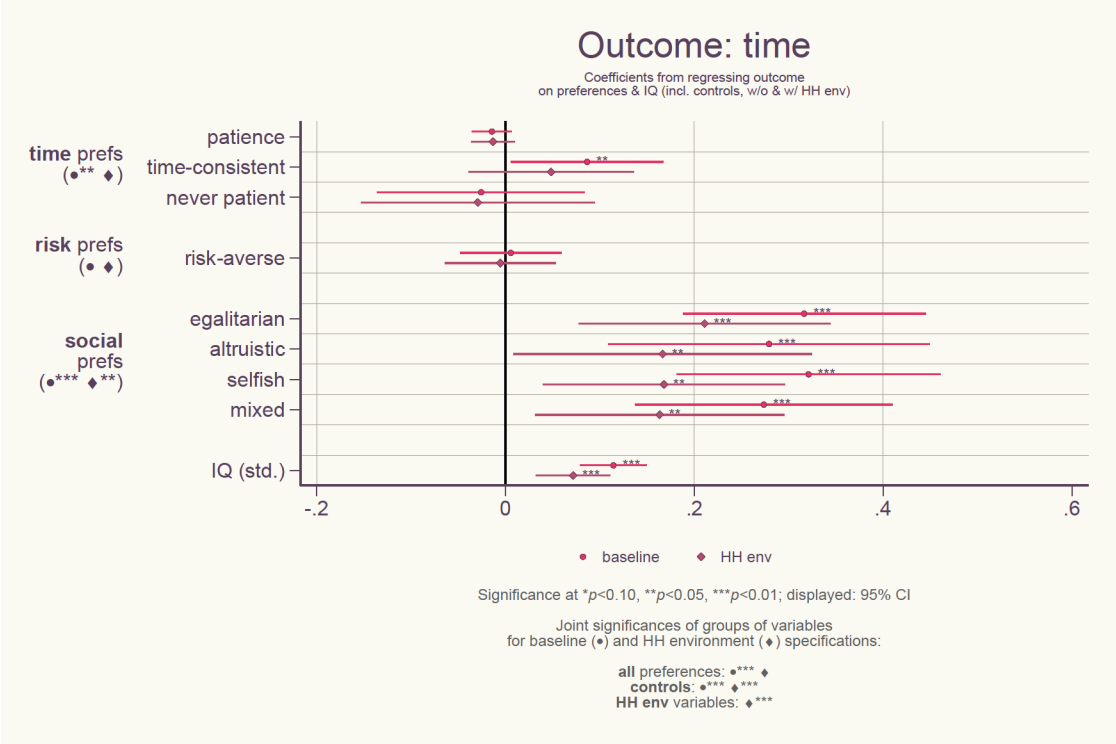
TABLE 2.F.2. Summary statistics, continued

	Mean	Std. dev.	Min	Max	Obs.
Parents' preferences					
father: patience	5.469	6.010	0	18	4,179
father: time-consistent	0.666		0	1	4,179
father: never patient	0.405		0	1	4,179
father: risk-averse	0.405		0	1	4,141
father: egalitarian	0.188		0	1	4,294
father: altruistic	0.070		0	1	4,294
father: selfish	0.397		0	1	4,294
father: spiteful	0.044		0	1	4,294
father: mixed	0.301		0	1	4,294
mother: patience	5.454	5.800	0	18	5,107
mother: time-consistent	0.624		0	1	5,107
mother: never patient	0.379		0	1	5,107
mother: risk-averse	0.434		0	1	5,102
mother: egalitarian	0.198		0	1	5,316
mother: altruistic	0.074		0	1	5,316
mother: selfish	0.375		0	1	5,316
mother: spiteful	0.052		0	1	5,316
mother: mixed	0.302		0	1	5,316
Parents' IQ					
father: IQ					
score	17.347	4.381	6	41	4,447
standardized†	0	1	-2.590	5.398	4,447
mother: IQ					
score	16.019	4.176	4	46	5,578
standardized†	0	1	-2.878	7.180	5,578
Parenting style					
style emotional warmth					
score	3.270	0.736	1	5	5,913
standardized†	0	1	-3.086	2.351	5,913
style incons. parenting					
score	2.918	1.094	1	5	5,913
standardized†	0	1	-1.754	1.903	5,913
style monitoring					
score	2.871	0.664	1	5	5,913
standardized†	0	1	-2.819	3.206	5,913
style neg. communication					
score	2.491	0.625	1	5	5,913
standardized†	0	1	-2.386	4.013	5,913
style psych. control					
score	2.141	0.676	1	5	5,913
standardized†	0	1	-1.689	4.232	5,913
style strict control					
score	2.519	0.692	1	5	5,913
standardized†	0	1	-2.193	3.584	5,913

NOTES: See appendix section 2.H for details on measures and variables. Parents' preferences and IQ are analogous to children's measures. Parenting style comprises the six dimensions (scales) emotional warmth, inconsistent parenting, monitoring (intensity), negative communication, psychological control, and strict control. †Reference groups for standardization to a mean of zero and standard deviation of one are the sample of children participating in the experiments and the sample of these children's parents, respectively.

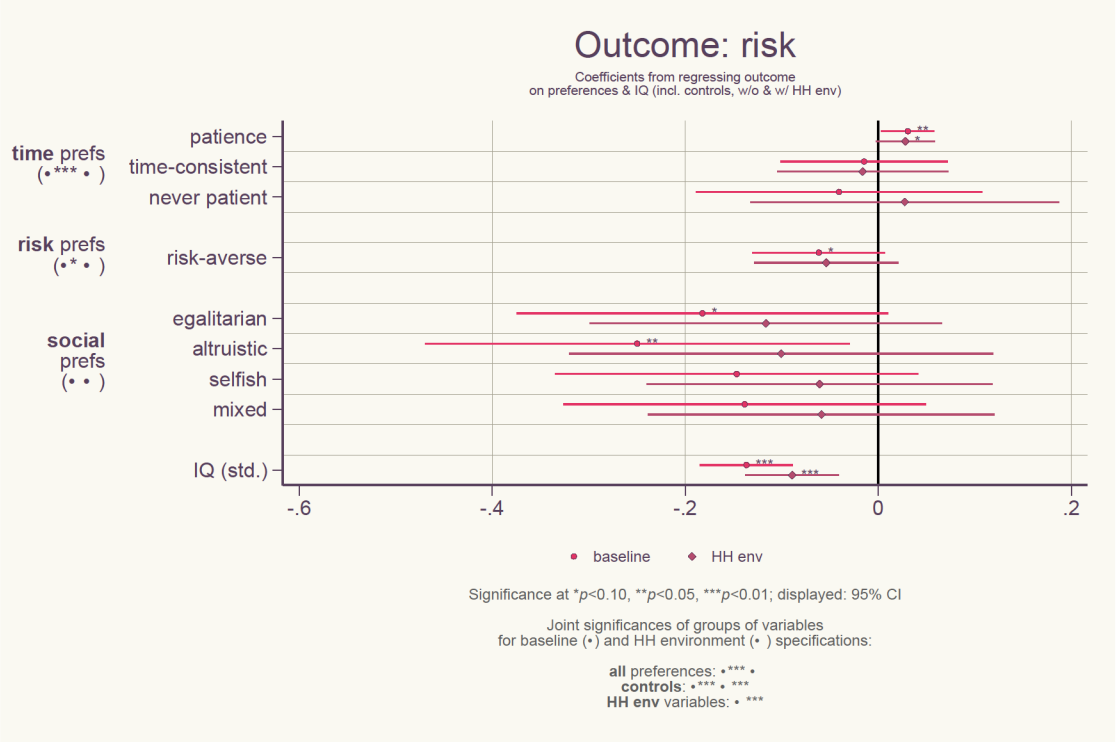
Appendix 2.G Plotting main regressions

FIGURE 2.G.1. Coefficient plot for outcome study atttitude



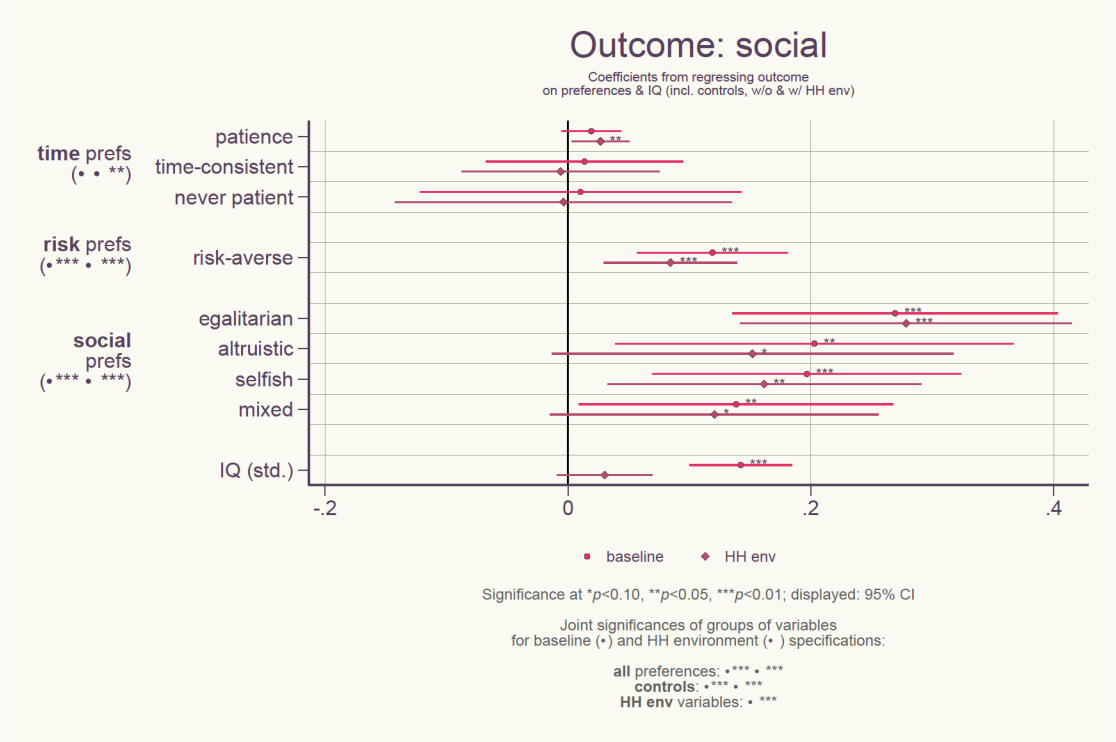
NOTES: Plot displays coefficients for main independent variables of interest (preferences & IQ) when regressing STUDY ATTITUDE on preferences, IQ, and control variables (gender and age FE) in the baseline specification and additionally on household environment variables (socio-demographics, parents' preferences, parents' IQ, and parenting style) in the household environment (HH env) specification.

FIGURE 2.G.2. Coefficient plot for outcome risky behaviors



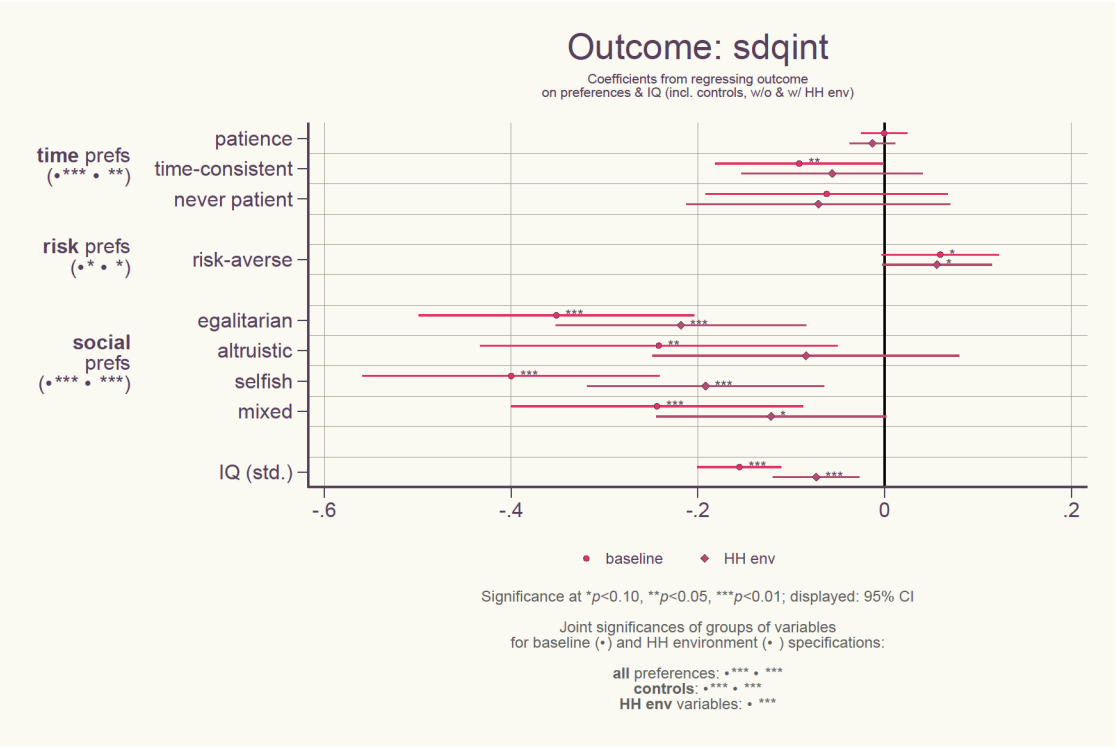
NOTES: Plot displays coefficients for main independent variables of interest (preferences & IQ) when regressing RISKY BEHAVIORS on preferences, IQ, and control variables (gender and age FE) in the baseline specification and additionally on household environment variables (socio-demographics, parents' preferences, parents' IQ, and parenting style) in the household environment (HH env) specification.

FIGURE 2.G.3. Coefficient plot for outcome prosociality



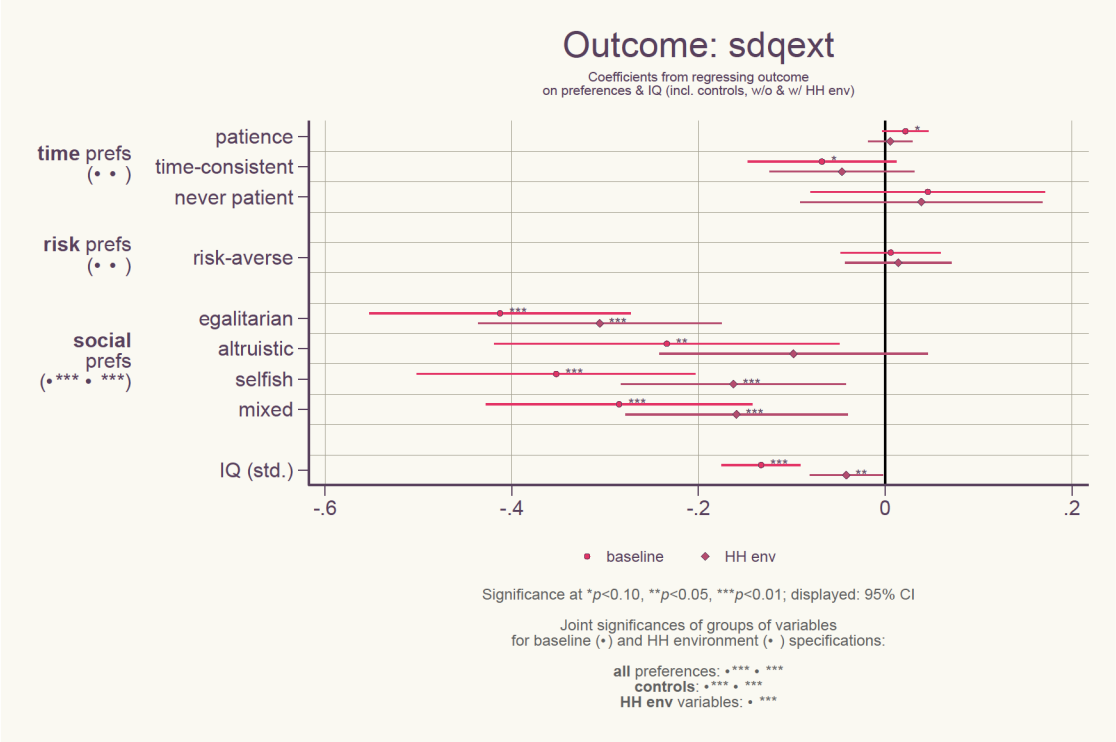
NOTES: Plot displays coefficients for main independent variables of interest (preferences & IQ) when regressing PROSOCIALITY on preferences, IQ, and control variables (gender and age FE) in the baseline specification and additionally on household environment variables (socio-demographics, parents' preferences, parents' IQ, and parenting style) in the household environment (HH env) specification.

FIGURE 2.G.4. Coefficient plot for outcome SDQ internalizing subscale



NOTES: Plot displays coefficients for main independent variables of interest (preferences & IQ) when regressing EMOTIONAL PROBLEMS (SDQ INTERNALIZING SUBSCALE) on preferences, IQ, and control variables (gender and age FE) in the baseline specification and additionally on household environment variables (socio-demographics, parents' preferences, parents' IQ, and parenting style) in the household environment (HH env) specification.

FIGURE 2.G.5. Coefficient plot for outcome SDQ externalizing subscale



NOTES: Plot displays coefficients for main independent variables of interest (preferences & IQ) when regressing BEHAVIORAL PROBLEMS (SDQ EXTERNALIZING SUBSCALE) on preferences, IQ, and control variables (gender and age FE) in the baseline specification and additionally on household environment variables (socio-demographics, parents' preferences, parents' IQ, and parenting style) in the household environment (HH env) specification.

Appendix 2.H Adding household environment variables

Table 2.H.1 displays estimation results of household environment (HH env) specifications for regressions of study attitude, risky behaviors, prosociality, and SDQ internalizing and externalizing subscales on preferences and controls.

Table notes. †Study attitude, risky behaviors, prosociality, as well as SDQ internalizing and externalizing subscales are defined as described in section 2.2.4. Children's preferences and cognitive skills measures are defined as described in sections 2.2.2 and 2.2.3. Outcome measures, IQ, and parenting style scales are standardized to a mean of zero and standard deviation of one across our children sample. ‡Comprises two variables: Female is an indicator for being a girl, age is measured in years and included as fixed effects (FE), i.e., in the form of dummy variables for each age except the base category. ††Household income is log transformed. Negative income values are set to zero and an indicator variable that equals one if income is positive is added. Income is measured in Bangladeshi Taka (Tk); 100 Taka ≈ 1 USD (January 2022). Total income values can be negative, if, for example, costs in agricultural businesses such as labor or feedings costs have been higher than income. Parents' literacy is measured by indicator variables for being able to read and write. Electricity, senior in household, and Muslim are also indicator variables for a working electricity connection, whether a grandparent is living in the household, and whether it is a Muslim household. ‡‡Parents' preferences are defined analogously to children's preferences and are described in appendix section 2.C. Within our children sample (5,989 observations), we do not have complete parental preferences for all children. For 72 percent of children (4,304 observations) both father and mother participated in the experiments. For 2 percent (142 observations) only the father participated, for 22 percent (1,314 observations) only the mother participated. The latter cases reflect the fact that often the father is away for work while the mother as the main caretaker is at home. Applying the missing-indicator method, an indicator is added for availability of father and/or mother values and missing values are set to zero (cf. footnote 23). Missing values are not set to zero if the parent has participated in the experiments but did not understand the respective game to match the definition of our regression children samples. ¶Parents' IQ is measured as described in section 2.2.3. Reference group for the standardization to a mean of zero and standard deviation of one are our children sample's fathers and mothers. §Parenting style comprises the six dimensions emotional warmth, inconsistent parenting, monitoring (intensity), negative communication, psychological control, and strict control as described in appendix section 2.D.

TABLE 2.H.1. Adding household environment variables to regressions of child outcomes on preferences

	(1) STUDY ATTITUDE†	(2) RISKY BEHAVIORS†	(3) PRO-SOCIALITY†	(4) SDQ INTERN.†	(5) SDQ EXTERN.†
Preferences†					
patience	**-0.013**	0.028*	0.027**	-0.013	**0.005**
time-consistent	**0.048**	-0.016	-0.006	-0.056	**-0.046**
never patient	**-0.029**	0.027	-0.004	-0.071	**0.039**
risk-averse	-0.006	**-0.054**	0.085***	**0.056***	**0.014**
egalitarian	0.211***	-0.116	**0.279*****	**-0.218*****	**-0.306*****
altruistic	0.166**	-0.100	**0.152***	**-0.084**	**-0.098**
selfish	0.168**	-0.061	**0.162****	**-0.192*****	**-0.163*****
mixed	0.163**	-0.059	**0.121***	**-0.121***	**-0.159*****
Cognitive skills†					
IQ	0.072***	-0.089***	0.030	-0.073***	-0.042**
Controls: gender & age‡	*not displayed due to limited space, see Tables 2.5 & 2.6 in main part*				
Household environment					
socio-demographics††					
logincome	0.021	-0.058**	0.022	-0.019	-0.005
dummy income positive	-0.506*	0.707**	-0.230	0.438	0.354
father: literacy	-0.056	-0.014	0.047	0.013	-0.089**
mother: literacy	0.041	-0.057	-0.083**	0.001	0.070*
father: age	-0.001	0.008**	-0.002	-0.003	0.005*
mother: age	0.001	-0.007	-0.003	0.003	-0.005
number of siblings	-0.031**	0.012	0.004	0.030**	0.034***
electricity connection	-0.093	0.025	-0.042	-0.035	0.097
senior in household	-0.037	-0.026	0.055	0.058	-0.016
Muslim	-0.065	-0.076	0.015	0.002	-0.145**
parents' preferences‡‡					
dummy father available	-0.074	0.220	-0.329**	0.201	0.194
father: patience	-0.003	-0.006	0.012**	-0.010*	-0.010*
father: time-consistent	-0.017	0.010	0.014	0.037	0.174***
father: never patient	0.022	-0.198**	0.203**	-0.127*	-0.266***
father: risk-averse	0.018	-0.025	-0.013	0.054	-0.020
father: egalitarian	0.128	-0.092	0.228*	-0.267**	-0.281**
father: altruistic	0.130	-0.108	0.149	-0.087	-0.100
father: selfish	0.090	-0.065	0.235**	-0.104	-0.195*
father: mixed	0.120	-0.072	0.250**	-0.082	-0.236**
dummy mother available	-0.387***	0.294	-0.586***	0.017	0.307
mother: patience	0.015***	-0.001	0.014***	-0.005	-0.007
mother: time-consistent	0.010	0.007	-0.057	0.113**	0.173***
mother: never patient	0.159**	-0.050	0.289***	-0.161**	-0.274***
mother: risk-averse	-0.064*	-0.092**	0.046	0.057	-0.032
mother: egalitarian	0.247***	-0.231**	0.247**	-0.280***	-0.407***
mother: altruistic	0.149	-0.230**	0.323***	-0.082	-0.267***
mother: selfish	0.171**	-0.170	0.139	-0.196**	-0.270***
mother: mixed	0.055	-0.101	0.102	-0.050	-0.219**
parents' IQ¶					
father: IQ	0.037*	-0.088***	0.073***	-0.045**	-0.029
mother: IQ	0.014	-0.005	0.056**	0.035	-0.020
parenting style†,§					
emotional warmth	0.054***	-0.030	0.207***	-0.197***	-0.171***
inconsistent parenting	0.087***	0.099***	0.026	-0.015	0.004
monitoring	0.030	-0.052**	0.156***	0.000	-0.040**
negative communication	-0.029	0.132***	-0.034	0.087***	0.084***
psychological control	-0.143***	0.104***	-0.115***	0.361***	0.282***
strict control	0.061***	-0.082***	0.052*	0.028	0.022
Observations	4,096	2,339	4,032	4,032	4,032
R^2	0.087	0.307	0.199	0.260	0.244
Adj. R^2	0.074	0.292	0.188	0.250	0.233
F	7.441	23.857	14.577	15.246	15.720

NOTES: Standard errors are clustered at the village level for all specifications. For table notes with detailed information on coefficients, see above (section 2.H). Significance at $^{*}p < 0.10$, $^{**}p < 0.05$, $^{***}p < 0.01$.

Appendix 2.I Robustness checks

2.I.1 Including children who did not understand (all) experiments

Tables 2.I.1, 2.I.2, and 2.I.3 display regression results when including children who did not understand all preferences games (as picked up by the control questions described in section 2.2.2). Note that samples vary by outcome due to missing entries in single variables or age restrictions. Table 2.I.1 presents baseline and household environment specifications when dropping only children who did not understand the time (risk) [social] preferences game when considering study attitude (risky behaviors) [prosociality]. Since SDQ outcomes are not linked to specific groups of preferences (cf. section 2.3 on hypotheses), SDQ specifications are not adjusted here to include children who understood some of the experiments but not all. Tables 2.I.2 and 2.I.3 show results when including all children for whom we elicited IQ, experimental or survey measures, no matter whether they understood the games according to control questions or not. So, included are children who either did not understand any game, who understood all games, or who understood only one or two of the three games to elicit time, risk, and social preferences. Overall, regression results remain similar.

Dropping children who did not understand the experiments, however, qualifies as main specification as children who did not understand the experiments are likely to choose options at random or at least not in a way such that their decisions reflect the underlying preferences the games are designed to capture. Comparing the sample of children who understood all games (5,079 observations) to the sample of all children participating in the experiments with t-tests (Table 2.I.4) strengthens our faith in the otherwise non-selective nature of the sample restriction process. Children who understood all experiments and hence enter our regression samples do in most characteristics not systematically differ from the sample of all children participating in the experiments. In terms of exogenous control variables and outcomes, children who understood all experiments are on average only somewhat older which is not surprising given they display a better understanding. They also exhibit a slightly better study attitude. Importantly however, samples are comparable in terms of basic household characteristics and cognitive skills with the latter being an essential part of the general ability to understand complex facts or to assess the consequences of one's actions. Given the number of t-tests run, the number of actual differences found is always below the number of differences we expect to find just by chance for a given significance level. For example, we expect to observe $43 \times 0.1 = 4.3$ differences at the 10 percent level and do observe 3 differences. Also, we expect to observe $43 \times 0.05 = 2.15$ differences at the 5 percent level and do observe 1 difference.

Running t-tests for different subsamples of children understanding only some but not all experiments as used in Table 2.I.1 yields similar results to those displayed in Table 2.I.4 (differences are even less pronounced).

TABLE 2.I.1. Adding children who did not understand experiments not in focus of outcome

	STUDY ATTITUDE†,‡		RISKY BEHAVIORS†,‡		PROSOCIALITY†,‡	
	(1) Baseline	(2) HH env	(3) Baseline	(4) HH env	(5) Baseline	(6) HH env
Preferences†						
patience	**-0.013**	**-0.012**	0.029**	0.026*	0.013	0.018
	(0.010)	(0.012)	(0.014)	(0.015)	(0.012)	(0.012)
time-consistent	**0.079****	**0.050**	-0.013	-0.012	0.018	0.000
	(0.039)	(0.043)	(0.042)	(0.044)	(0.037)	(0.038)
never patient	**-0.030**	**-0.029**	-0.038	0.021	0.004	-0.020
	(0.053)	(0.062)	(0.073)	(0.080)	(0.064)	(0.068)
risk-averse	0.017	0.003	**-0.056***	**-0.054**	0.132***	0.084***
	(0.027)	(0.029)	(0.033)	(0.037)	(0.030)	(0.028)
egalitarian	0.331***	0.219***	-0.158*	-0.116	**0.240*****	**0.263*****
	(0.063)	(0.067)	(0.092)	(0.090)	(0.064)	(0.065)
altruistic	0.288***	0.178**	-0.230**	-0.108	**0.177****	**0.130**
	(0.083)	(0.080)	(0.107)	(0.108)	(0.078)	(0.080)
selfish	0.322***	0.175***	-0.135	-0.070	**0.162*****	**0.150****
	(0.068)	(0.066)	(0.090)	(0.088)	(0.060)	(0.062)
Cognitive skills†,‡						
IQ	0.117***	0.075***	-0.133***	-0.088***	0.157***	0.035*
	(0.018)	(0.019)	(0.023)	(0.024)	(0.020)	(0.019)
Control variables: gender & age (FE)††						
female	0.034	0.034	-0.833***	-0.847***	0.104***	0.119***
age 6	*base*	*base*			*base*	*base*
age 7	0.153**	0.108			0.249***	0.049
age 8	0.157**	0.095			0.353***	0.180***
age 9	0.283***	0.241***			0.337***	0.143**
age 10	0.408***	0.346***	*base*	*base*	0.468***	0.266***
age 11	0.400***	0.335***	-0.066	-0.032	0.522***	0.316***
age 12	0.480***	0.418***	-0.133***	-0.134**	0.627***	0.349***
age 13	0.472***	0.360***	-0.196***	-0.122**	0.623***	0.356***
age 14	0.578***	0.517***	-0.357***	-0.294***	0.737***	0.490***
age 15	0.686***	0.590***	-0.433***	-0.376***	0.772***	0.522***
age 16	0.623***	0.499***	-0.540***	-0.439***	0.743***	0.516***
Household environment‡‡						
socio-demographics	✗	✓	✗	✓	✗	✓
parents' preferences	✗	✓	✗	✓	✗	✓
parents' IQ	✗	✓	✗	✓	✗	✓
parenting style	✗	✓	✗	✓	✗	✓
Observations	5,324	4,204	3,212	2,464	5,574	4,353
R^2	0.041	0.086	0.223	0.306	0.049	0.202
Adj. R^2	0.037	0.074	0.219	0.291	0.045	0.192
F	11.320	7.812	63.207	25.414	12.805	15.830

NOTES: Table displays results when adding children who did not understand experiments not in focus of outcome—STUDY ATTITUDE: adding children not understanding either risk or social preferences games, RISKY BEHAVIORS: adding children not understanding either time or social preferences games, PROSOCIALITY: adding children not understanding either time or risk preferences games. Standard errors (in parentheses) are clustered at the village level for all specifications. †Study attitude, risky behaviors, prosociality, preferences, and cognitive skills measures are defined as described in sections 2.2.2-2.2.4. ‡Outcomes and IQ are standardized to a mean of zero and standard deviation of one across our children sample. ††Female is an indicator for being a girl, age is measured in years and included as fixed effects (FE), i.e., in the form of dummy variables for each age except the base category. ‡‡Household (HH) socio-demographics comprise number of siblings in HH, HH income, parents' age and literacy, whether the HH has an electricity connection, whether a senior is living in the HH, and religion; parents' preferences and IQ comprise variables analogous to children's measures (see sections 2.2.2 and 2.2.3 as well as section 2.C in the appendix); parenting style comprises the six dimensions emotional warmth, inconsistent parenting, monitoring (intensity), negative communication, psychological control, and strict control as described in appendix section 2.D. All columns display OLS regressions, specifications in columns (2), (4) and (6) include HH environment variables. Significance at $^{*}p < 0.10$, $^{**}p < 0.05$, $^{***}p < 0.01$.

TABLE 2.I.2. Adding children who did not understand some or any experiments (i.e., including all children participating in experiments)—I

	STUDY ATTITUDE†,‡		RISKY BEHAVIORS†,‡	
	(1) Baseline	(2) HH env	(3) Baseline	(4) HH env
Preferences†				
patience	**-0.017***	**-0.010**	0.036**	0.030**
	(0.010)	(0.012)	(0.014)	(0.015)
time-consistent	**0.089****	**0.062**	-0.021	-0.016
	(0.037)	(0.042)	(0.041)	(0.044)
never patient	**-0.045**	**-0.040**	-0.008	0.033
	(0.050)	(0.062)	(0.072)	(0.078)
risk-averse	0.026	0.010	**-0.074****	**-0.065***
	(0.027)	(0.031)	(0.032)	(0.037)
egalitarian	0.344***	0.219***	-0.187**	-0.108
	(0.063)	(0.064)	(0.090)	(0.089)
altruistic	0.289***	0.181**	-0.199*	-0.105
	(0.082)	(0.078)	(0.103)	(0.106)
selfish	0.270***	0.126*	-0.156*	-0.073
	(0.065)	(0.064)	(0.086)	(0.086)
Cognitive skills†,‡				
IQ	0.095***	0.047**	-0.138***	-0.092***
	(0.019)	(0.021)	(0.022)	(0.023)
Control variables: gender & age (FE)††				
female	0.040	0.018	-0.819***	-0.840***
age 6	*base*	*base*		
age 7	0.109	0.049		
	(0.076)	(0.083)		
age 8	0.152**	0.057		
age 9	0.273***	0.206***		
age 10	0.396***	0.298***	*base*	*base*
age 11	0.373***	0.290***	-0.061	-0.031
age 12	0.488***	0.386***	-0.141***	-0.146***
age 13	0.429***	0.281***	-0.195***	-0.128**
age 14	0.549***	0.432***	-0.349***	-0.294***
age 15	0.644***	0.515***	-0.434***	-0.385***
age 16	0.599***	0.436***	-0.559***	-0.447***
Household environment‡‡				
socio-demographics	✗	✓	✗	✓
parents' preferences	✗	✓	✗	✓
parents' IQ	✗	✓	✗	✓
parenting style	✗	✓	✗	✓
Observations	5,986	4,509	3,422	2,524
R^2	0.037	0.071	0.221	0.302
Adj. R^2	0.033	0.059	0.217	0.287
F	12.131	8.666	65.341	25.392

NOTES: Standard errors (in parentheses) are clustered at the village level for all specifications. †Study attitude, risky behaviors, preferences, and cognitive skills measures are defined as described in sections 2.2.2-2.2.4. ‡Outcomes and IQ are standardized to a mean of zero and standard deviation of one across our children sample. ††Female is an indicator for being a girl, age is measured in years and included as fixed effects (FE), i.e., in the form of dummy variables for each age except the base category. ‡‡Household (HH) socio-demographics comprise number of siblings in HH, HH income, parents' age and literacy, whether the HH has an electricity connection, whether a senior is living in the HH, and religion; parents' preferences and IQ comprise variables analogous to children's measures (see sections 2.2.2 and 2.2.3 as well as section 2.C in the appendix); parenting style comprises the six dimensions emotional warmth, inconsistent parenting, monitoring (intensity), negative communication, psychological control, and strict control as described in appendix section 2.D. All columns display OLS regressions, specifications in columns (2) and (4) include HH environment variables. Coefficients of main explanatory variables of interest for each outcome (cf. section 2.3 on hypotheses) are printed in bold. Significance at $^{*}p < 0.10$, $^{**}p < 0.05$, $^{***}p < 0.01$.

TABLE 2.I.3. Adding children who did not understand some or any experiments (i.e., including all children participating in experiments)—II

	PROSOCIALITY†,‡		SDQ INTERN. SCALE†,‡		SDQ EXTERN. SCALE†,‡	
	(1) Baseline	(2) HH env	(3) Baseline	(4) HH env	(5) Baseline	(6) HH env
Preferences†						
patience	0.010	0.018	0.002	-0.014	**0.018**	**0.001**
	(0.012)	(0.012)	(0.011)	(0.012)	(0.012)	(0.012)
time-consistent	0.025	0.011	-0.076*	-0.046	**-0.053**	**-0.043**
	(0.037)	(0.038)	(0.040)	(0.047)	(0.036)	(0.037)
never patient	-0.022	-0.039	-0.046	-0.079	**0.054**	**0.025**
	(0.063)	(0.067)	(0.059)	(0.068)	(0.059)	(0.062)
risk-averse	0.138***	0.086***	**0.048***	**0.055***	**-0.016**	**0.013**
	(0.030)	(0.028)	(0.028)	(0.028)	(0.025)	(0.027)
egalitarian	**0.220*****	**0.245*****	**-0.284*****	**-0.193*****	**-0.348*****	**-0.278*****
	(0.062)	(0.065)	(0.070)	(0.063)	(0.067)	(0.064)
altruistic	**0.158****	**0.109**	**-0.188****	**-0.081**	**-0.175****	**-0.072**
	(0.076)	(0.079)	(0.089)	(0.078)	(0.087)	(0.072)
selfish	**0.139****	**0.143****	**-0.331*****	**-0.192*****	**-0.288*****	**-0.169*****
	(0.059)	(0.062)	(0.075)	(0.057)	(0.072)	(0.058)
Cognitive skills†,‡						
IQ	0.164***	0.042**	-0.154***	-0.076***	-0.151***	-0.053***
	(0.019)	(0.019)	(0.021)	(0.022)	(0.019)	(0.019)
Control variables: gender & age (FE)††						
female	0.096***	0.113***	0.031	0.012	-0.226***	-0.229***
age 6	*base*	*base*	*base*	*base*	*base*	*base*
age 7	0.292***	0.086	-0.151**	-0.083	-0.345***	-0.207***
age 8	0.378***	0.217***	-0.139**	-0.115*	-0.329***	-0.247***
age 9	0.380***	0.192***	-0.182***	-0.128*	-0.335***	-0.237***
age 10	0.519***	0.323***	-0.192***	-0.113*	-0.469***	-0.333***
age 11	0.575***	0.365***	-0.304***	-0.199***	-0.512***	-0.371***
age 12	0.677***	0.409***	-0.347***	-0.253***	-0.601***	-0.452***
age 13	0.668***	0.413***	-0.386***	-0.273***	-0.615***	-0.433***
age 14	0.779***	0.543***	-0.506***	-0.393***	-0.859***	-0.683***
age 15	0.810***	0.562***	-0.462***	-0.354***	-0.862***	-0.689***
age 16	0.777***	0.559***	-0.420***	-0.234**	-0.838***	-0.671***
Household environment‡‡						
socio-demographics	✗	✓	✗	✓	✗	✓
parents' preferences	✗	✓	✗	✓	✗	✓
parents' IQ	✗	✓	✗	✓	✗	✓
parenting style	✗	✓	✗	✓	✗	✓
Observations	5,790	4,435	5,790	4,435	5,790	4,435
R^2	0.051	0.199	0.038	0.250	0.066	0.238
Adj. R^2	0.047	0.189	0.035	0.240	0.062	0.228
F	14.903	15.762	9.083	15.330	23.199	15.853

NOTES: Standard errors (in parentheses) are clustered at the village level for all specifications. †Prosociality, SDQ subscales, preferences, and cognitive skills measures are defined as described in sections 2.2.2-2.2.4. ‡Outcomes and IQ are standardized to a mean of zero and standard deviation of one across our children sample. ††Female is an indicator for being a girl, age is measured in years and included as fixed effects (FE), i.e., in the form of dummy variables for each age except the base category. ‡‡Household (HH) socio-demographics comprise number of siblings in HH, HH income, parents' age and literacy, whether the HH has an electricity connection, whether a senior is living in the HH, and religion; parents' preferences and IQ comprise variables analogous to children's measures (see sections 2.2.2 and 2.2.3 as well as section 2.C in the appendix); parenting style comprises the six dimensions emotional warmth, inconsistent parenting, monitoring (intensity), negative communication, psychological control, and strict control as described in appendix section 2.D. All columns display OLS regressions, specifications in columns (2), (4) and (6) include HH environment variables. Coefficients of main explanatory variables of interest for each outcome (cf. section 2.3 on hypotheses) are printed in bold. Significance at $^{*}p < 0.10$, $^{**}p < 0.05$, $^{***}p < 0.01$.

TABLE 2.I.4. Comparison of children who understood all experiments with all children participating in experiments

	Mean u'stood	Std. dev.	Obs. u'stood	Obs. whole	Diff.§	Std. error
Cognitive skills						
IQ	20.952	6.919	5,079	5,989	0.014	0.132
Gender & age						
female	0.521	0.500	5,079	5,989	0.001	0.010
age	10.391	2.637	5,079	5,989	-0.090*	0.050
Outcomes						
study attitude	4.466	0.759	5,079	5,989	-0.032**	0.015
risky behaviors	0.189	0.164	2,970	3,424	0.000	0.004
prosociality	6.482	2.233	4,916	5,793	-0.001	0.044
SDQ intern	5.599	2.857	4,916	5,793	-0.026	0.055
SDQ extern	5.962	3.271	4,916	5,793	-0.016	0.063
HH environment						
income (in 100 Tk)	1945.383	2620.727	5,058	5,964	28.202	55.587
father: literacy	0.551	0.497	4,763	5,621	-0.000	0.010
mother: literacy	0.648	0.478	4,835	5,697	-0.001	0.009
father: age	43.168	8.152	4,763	5,621	-0.091	0.161
mother: age	36.028	6.274	4,835	5,697	-0.063	0.123
no of siblings	2.510	1.450	5,079	5,989	0.003	0.028
senior in HH	0.200	0.400	5,079	5,989	-0.001	0.008
homestead area (in sqm)	391.185	402.694	5,063	5,969	1.310	7.713
electricity	0.921	0.270	5,063	5,969	-0.003	0.005
Muslim	0.823	0.382	5,067	5,975	-0.001	0.007
father: patience	5.520	6.040	3,631	4,179	-0.051	0.137
father: time-consistent	0.665	0.472	3,631	4,179	0.001	0.011
father: never patient	0.401	0.490	3,631	4,179	0.004	0.011
father: risk-averse	0.398	0.490	3,623	4,141	0.007	0.011
father: egalitarian	0.186	0.389	3,680	4,294	0.002	0.009
father: altruistic	0.069	0.254	3,680	4,294	0.001	0.006
father: selfish	0.401	0.490	3,680	4,294	-0.005	0.011
father: mixed	0.298	0.457	3,680	4,294	0.004	0.010
mother: patience	5.431	5.821	4,493	5,107	0.023	0.119
mother: time-consistent	0.629	0.483	4,493	5,107	-0.005	0.010
mother: never patient	0.387	0.487	4,493	5,107	-0.008	0.010
mother: risk-averse	0.427	0.495	4,516	5,102	0.007	0.010
mother: egalitarian	0.195	0.396	4,603	5,316	0.003	0.008
mother: altruistic	0.074	0.262	4,603	5,316	-0.000	0.005
mother: selfish	0.381	0.486	4,603	5,316	-0.006	0.010
mother: spiteful	0.055	0.228	4,603	5,316	-0.004	0.005
mother: mixed	0.295	0.456	4,603	5,316	0.007	0.009
father: IQ	17.314	4.381	3,762	4,447	0.033	0.097
mother: IQ	15.992	4.182	4,739	5,578	0.027	0.083
style emotional warmth	3.246	0.760	5,012	5,913	0.024*	0.014
style incons. parenting	2.936	1.092	5,012	5,913	-0.018	0.021
style monitoring	2.864	0.665	5,012	5,913	0.008	0.013
style neg. communication	2.476	0.633	5,012	5,913	0.015	0.012
style psych. control	2.160	0.681	5,012	5,913	-0.019	0.013
style strict control	2.508	0.692	5,012	5,913	0.010	0.013

NOTES: §Difference = mean(*whole sample*: all children participating in experiments)—mean(*u'stood sample*: children who understood all experiments), i.e., negative values indicate a higher mean for the sample of children who understood all experiments. IQ and outcomes are standardized to a mean of zero and standard deviation of one across the whole children sample. For a detailed description see sections 2.2.3 and 2.2.4. Female as well as father literacy, mother literacy, senior in household, electricity and Muslim are dummy variables. Age is measured in years. Parents' preferences and IQ measures are analogous to children's preferences and IQ measures (see appendix section 2.C). For details on parenting style measures see appendix section 2.D. A comprehensive list and descriptions of variables as well as summary statistics can be found in sections 2.F and 2.H in the appendix. Significance at $^{*}p < 0.10$, $^{**}p < 0.05$, $^{***}p < 0.01$.

2.I.2 Reducing the sample in baseline regressions to children for whom household environment variables are available

Tables 2.I.5 and 2.I.6 display regression results when reducing the sample in baseline regressions to children for whom all household environment variables are available. For the ease of comparison, tables display baseline regressions with the full sample (cf. Tables 2.5 and 2.6 in section 2.5) and with the reduced sample for each outcome next to each other. Note that samples also vary by outcome due to missing entries or age restrictions. Overall, regression results remain similar except for the predictiveness of time-consistency.

Running t-tests comparing the sample of children for whom household environment variables are available to the whole sample of children appearing in baseline regressions (Table 2.I.7) shows that samples do not significantly differ in characteristics such as gender and age, in their preferences, IQ, and all five outcome measures.

TABLE 2.I.5. Baseline regressions sample comparison—I

	STUDY ATTITUDE†,‡		RISKY BEHAVIORS†,‡	
	(1) Full sample	(2) HH env sample	(3) Full sample	(4) HH env sample
Preferences†				
patience	**-0.014** (0.011)	**-0.011** (0.011)	0.031** (0.014)	0.044*** (0.015)
time-consistent	**0.087**** (0.041)	**0.061** (0.045)	-0.015 (0.044)	-0.041 (0.050)
never patient	**-0.026** (0.056)	**0.003** (0.063)	-0.041 (0.075)	0.018 (0.084)
risk-averse	0.006 (0.027)	-0.009 (0.032)	**-0.062*** (0.035)	**-0.088**** (0.040)
egalitarian	0.316*** (0.065)	0.269*** (0.072)	-0.182* (0.098)	-0.228** (0.102)
altruistic	0.279*** (0.086)	0.229** (0.096)	-0.250** (0.112)	-0.234* (0.119)
selfish	0.321*** (0.071)	0.257*** (0.079)	-0.147 (0.095)	-0.169* (0.100)
Cognitive skills†,‡				
IQ	0.114*** (0.018)	0.110*** (0.020)	-0.137*** (0.024)	-0.152*** (0.026)
Control variables: gender & age (FE)††				
female	0.031 (0.026)	0.025 (0.028)	-0.829*** (0.035)	-0.839*** (0.039)
age 6	*base*	*base*		
age 7	0.104 (0.079)	0.096 (0.084)		
age 8	0.104 (0.077)	0.057 (0.080)		
age 9	0.243*** (0.071)	0.221*** (0.073)		
age 10	0.352*** (0.073)	0.299*** (0.075)	*base*	*base*
age 11	0.334*** (0.079)	0.308*** (0.084)	-0.068 (0.056)	-0.029 (0.063)
age 12	0.422*** (0.079)	0.391*** (0.082)	-0.129** (0.052)	-0.149*** (0.057)
age 13	0.397*** (0.082)	0.320*** (0.083)	-0.190*** (0.049)	-0.138** (0.055)
age 14	0.513*** (0.076)	0.512*** (0.080)	-0.348*** (0.060)	-0.317*** (0.063)
age 15	0.617*** (0.086)	0.565*** (0.089)	-0.441*** (0.063)	-0.409*** (0.073)
age 16	0.548*** (0.103)	0.483*** (0.112)	-0.533*** (0.079)	-0.485*** (0.091)
Observations	5,076	4,096	2,968	2,339
R^2	0.038	0.033	0.220	0.232
Adj. R^2	0.034	0.029	0.216	0.227
F	9.381	6.537	54.597	44.939

NOTES: Standard errors (in parentheses) are clustered at the village level for all specifications. †Study attitude, risky behaviors, preferences, and cognitive skills measures are defined as described in sections 2.2.2-2.2.4. ‡Study attitude, risky behaviors, and IQ are standardized to a mean of zero and standard deviation of one across all available observations in our children sample. ††Female is an indicator for being a girl, age is measured in years and included as fixed effects (FE), i.e., in the form of dummy variables for each age except the base category. All columns display OLS regressions. Columns (1) and (3) display baseline regressions with the full sample, columns (2) and (4) display baseline regressions with reduced HH env sample, i.e., only including children for whom household environment variables as described in section 2.H in the appendix are available. Coefficients of main explanatory variables of interest for each outcome (cf. section 2.3 on hypotheses) are printed in bold. Significance at $^{*}p < 0.10$, $^{**}p < 0.05$, $^{***}p < 0.01$.

TABLE 2.I.6. Baseline regressions sample comparison—II

	PROSOCIALITY[†,‡]		SDQ INTERN. SCALE[†,‡]		SDQ EXTERN. SCALE[†,‡]	
	(1) Full sample	(2) HH env	(3) Full sample	(4) HH env	(5) Full sample	(6) HH env
Preferences[†]						
patience	0.019	0.031**	-0.000	-0.003	**0.022***	**0.020**
	(0.012)	(0.013)	(0.013)	(0.014)	(0.013)	(0.014)
time-consistent	0.014	-0.004	-0.091**	-0.072	**-0.068***	**-0.046**
	(0.041)	(0.047)	(0.046)	(0.051)	(0.040)	(0.044)
never patient	0.010	0.060	-0.062	-0.101	**0.046**	**0.011**
	(0.067)	(0.077)	(0.066)	(0.075)	(0.064)	(0.070)
risk-averse	0.119***	0.119***	**0.060***	**0.077****	**0.006**	**0.006**
	(0.031)	(0.034)	(0.032)	(0.034)	(0.027)	(0.030)
egalitarian	**0.269*****	**0.262*****	**-0.352*****	**-0.354*****	**-0.413*****	**-0.438*****
	(0.068)	(0.073)	(0.075)	(0.088)	(0.071)	(0.077)
altruistic	**0.203****	**0.233****	**-0.242****	**-0.239****	**-0.234****	**-0.261****
	(0.083)	(0.091)	(0.097)	(0.116)	(0.094)	(0.103)
selfish	**0.197*****	**0.253*****	**-0.400*****	**-0.432*****	**-0.352*****	**-0.385*****
	(0.064)	(0.073)	(0.081)	(0.094)	(0.076)	(0.084)
Cognitive skills[†,‡]						
IQ	0.142***	0.122***	-0.155***	-0.145***	-0.133***	-0.111***
	(0.021)	(0.023)	(0.023)	(0.025)	(0.021)	(0.022)
Control variables: gender & age (FE)[††]						
female	0.107***	0.121***	0.018	0.017	-0.229***	-0.228***
	(0.027)	(0.029)	(0.029)	(0.033)	(0.029)	(0.032)
age 6	*base*	*base*	*base*	*base*	*base*	*base*
age 7	0.234***	0.148*	-0.112	-0.071	-0.306***	-0.250***
	(0.080)	(0.084)	(0.082)	(0.083)	(0.087)	(0.089)
age 8	0.303***	0.196**	-0.050	-0.040	-0.235***	-0.192**
	(0.078)	(0.079)	(0.071)	(0.071)	(0.077)	(0.083)
age 9	0.287***	0.187**	-0.125*	-0.097	-0.270***	-0.224***
	(0.075)	(0.079)	(0.072)	(0.075)	(0.082)	(0.085)
age 10	0.385***	0.310***	-0.139	-0.101	-0.352***	-0.309***
	(0.074)	(0.077)	(0.086)	(0.088)	(0.084)	(0.085)
age 11	0.448***	0.384***	-0.270***	-0.236***	-0.457***	-0.413***
	(0.078)	(0.083)	(0.080)	(0.085)	(0.091)	(0.093)
age 12	0.519***	0.395***	-0.315***	-0.298***	-0.526***	-0.485***
	(0.081)	(0.083)	(0.083)	(0.086)	(0.090)	(0.090)
age 13	0.550***	0.430***	-0.324***	-0.260***	-0.529***	-0.455***
	(0.089)	(0.094)	(0.092)	(0.094)	(0.092)	(0.096)
age 14	0.657***	0.601***	-0.480***	-0.465***	-0.782***	-0.742***
	(0.086)	(0.092)	(0.085)	(0.092)	(0.081)	(0.092)
age 15	0.673***	0.599***	-0.406***	-0.401***	-0.759***	-0.736***
	(0.087)	(0.094)	(0.105)	(0.107)	(0.101)	(0.104)
age 16	0.657***	0.571***	-0.408***	-0.366***	-0.766***	-0.762***
	(0.114)	(0.120)	(0.119)	(0.126)	(0.113)	(0.116)
Observations	4,913	4,032	4,913	4,032	4,913	4,032
R^2	0.041	0.038	0.043	0.043	0.063	0.062
Adj. R^2	0.037	0.033	0.039	0.038	0.059	0.057
F	9.310	7.759	9.123	7.075	19.155	15.401

NOTES: Standard errors (in parentheses) are clustered at the village level for all specifications. [†]Prosociality, SDQ subscales, preferences, and cognitive skills measures are defined as described in sections 2.2.2-2.2.4. [‡]Prosociality, SDQ subscales, and IQ are standardized to a mean of zero and standard deviation of one across all available observations in our children sample. [††]Female is an indicator for being a girl, age is measured in years and included as fixed effects (FE), i.e., in the form of dummy variables for each age except the base category. All columns display OLS regressions. Columns (1) and (3) display baseline regressions with the full sample, columns (2) and (4) display baseline regressions with reduced HH env sample, i.e., only including children for whom household environment variables as described in section 2.H in the appendix are available. Coefficients of main explanatory variables of interest for each outcome (cf. section 2.3 on hypotheses) are printed in bold. Significance at $^{*}p < 0.10$, $^{**}p < 0.05$, $^{***}p < 0.01$.

TABLE 2.I.7. Comparison of children in HH environment sample with children in baseline sample

	Mean HH env	Std. dev.	Obs. HH env	Obs. BL	Diff.[§]	Std. error
Preferences[‡]						
patience	2.157	2.078	4,096	5,076	0.014	0.044
time-consistent	0.642	0.480	4,096	5,076	0.003	0.010
never patient	0.342	0.474	4,096	5,076	-0.003	0.010
risk-averse	0.407	0.491	4,096	5,076	0.002	0.010
egalitarian	0.190	0.392	4,096	5,076	0.000	0.008
altruistic	0.076	0.265	4,096	5,076	0.001	0.006
selfish	0.376	0.485	4,096	5,076	-0.001	0.010
spiteful	0.065	0.246	4,096	5,076	0.002	0.005
mixed	0.292	0.455	4,096	5,076	-0.003	0.010
Cognitive skills[†,‡]						
IQ	21.031	6.941	4,096	5,076	-0.078	0.146
Gender & age[††]						
female	0.521	0.500	4,096	5,076	-0.000	0.010
age	10.313	2.620	4,096	5,076	0.079	0.055
Outcomes[†,‡]						
study attitude	4.474	0.754	4,096	5,076	-0.008	0.016
risky behaviors	0.187	0.163	2,339	2,968	0.002	0.005
prosociality	6.489	2.229	4,032	4,913	-0.006	0.047
SDQ internalizing subscale	5.557	2.865	4,032	4,913	0.044	0.061
SDQ externalizing subscale	5.942	3.276	4,032	4,913	0.020	0.070
SDQ full score	11.499	5.354	4,032	4,913	0.064	0.114

NOTES: [§]Difference = mean(*BL*: baseline sample children)−mean(*HH env*: household environment sample children), i.e., negative values indicate a higher mean for children for whom HH environment variables are available. [†]IQ and outcome variables are standardized to a mean of zero and standard deviation of one across the whole children sample. [‡]For a detailed description of the measures for preferences, IQ, and outcomes see sections 2.2.2-2.2.4. [††]Female as well as father literacy, mother literacy, senior in household, electricity and Muslim are dummy variables. Age is measured in years. Significance at $^{*}p < 0.10$, $^{**}p < 0.05$, $^{***}p < 0.01$.

2.I.3 Using a different measure to capture risk preferences

Tables 2.I.8 and 2.I.9 display regression results when using a more differentiated measure to capture risk preferences. The risk preferences game is introduced in section 2.2.2. Here, the indicator for being *risk-averse* (choosing one of the first four gambles) is replaced by two indicator variables for being *risk-neutral* (choosing gamble 5) or *risk-seeking* (choosing gamble 6). Being risk-averse becomes the omitted base category. Results are comparable: risk preferences coefficients have the expected sign and are similar in size and significance. Other preferences' coefficients are hardly affected.

2.I.4 Using the full SDQ score

Table 2.I.10 shows regression results using the full SDQ score as an outcome variable instead of splitting it into its internalizing and externalizing subscales. As subscales address dimensions linked to different groups of preferences, using the full SDQ score obscures heterogeneous relations between child preferences and emotional and behavioral difficulties.

TABLE 2.I.8. Using a more differentiated risk measure in regressions of child outcomes on preferences—I

	STUDY ATTITUDE†,‡		RISKY BEHAVIORS†,‡	
	(1) Baseline	(2) HH env	(3) Baseline	(4) HH env
Preferences†				
patience	**-0.015**	**-0.014**	0.031**	0.028*
	(0.011)	(0.012)	(0.014)	(0.015)
time-consistent	**0.086****	**0.047**	-0.014	-0.017
	(0.041)	(0.044)	(0.044)	(0.045)
never patient	**-0.027**	**-0.030**	-0.040	0.027
	(0.056)	(0.063)	(0.075)	(0.081)
risk-neutral	-0.020	-0.022	**0.070***	**0.040**
	(0.032)	(0.035)	(0.040)	(0.045)
risk-seeking	0.009	0.033	**0.053**	**0.070**
	(0.033)	(0.037)	(0.044)	(0.046)
egalitarian	0.317***	0.212***	-0.183*	-0.116
	(0.065)	(0.068)	(0.097)	(0.092)
altruistic	0.278***	0.166**	-0.249**	-0.100
	(0.086)	(0.080)	(0.112)	(0.111)
selfish	0.320***	0.168**	-0.146	-0.061
	(0.071)	(0.065)	(0.096)	(0.091)
Cognitive skills†,‡				
IQ	0.115***	0.072***	-0.137***	-0.089***
	(0.018)	(0.020)	(0.024)	(0.024)
Control variables: gender & age (FE)††				
female	0.032	0.033	-0.829***	-0.847***
age 6	*base*	*base*		
age 7	0.104	0.071		
age 8	0.105	0.052		
age 9	0.245***	0.207***		
age 10	0.353***	0.295***	*base*	*base*
age 11	0.335***	0.283***	-0.068	-0.026
age 12	0.425***	0.369***	-0.130**	-0.132**
age 13	0.400***	0.299***	-0.190***	-0.113**
age 14	0.516***	0.470***	-0.349***	-0.283***
age 15	0.619***	0.539***	-0.442***	-0.378***
age 16	0.550***	0.440***	-0.534***	-0.412***
Household environment‡‡				
socio-demographics	✗	✓	✗	✓
parents' preferences	✗	✓	✗	✓
parents' IQ	✗	✓	✗	✓
parenting style	✗	✓	✗	✓
Observations	5,076	4,096	2,968	2,339
R^2	0.038	0.088	0.220	0.308
Adj. R^2	0.034	0.075	0.215	0.291
F	9.426	7.896	51.421	23.568

NOTES: Standard errors (in parentheses) are clustered at the village level for all specifications. †Study attitude, risky behaviors, preferences, and cognitive skills measures are defined as described in sections 2.2.2-2.2.4. Instead of an indicator variable for being risk-averse, two indicator variables for being risk-neutral (choosing risk gamble no. 5) or risk-seeking (choosing risk gamble no. 6) are included. ‡Study attitude, risky behaviors, and IQ are standardized to a mean of zero and standard deviation of one across all available observations in our children sample. ††Female is an indicator for being a girl, age is measured in years and included as fixed effects (FE), i.e., in the form of dummy variables for each age except the base category. ‡‡Household (HH) socio-demographics comprise the number of siblings in HH, HH income, parents' age and literacy, whether the HH has an electricity connection, whether a senior is living in the HH, and religion; parents' preferences and IQ comprise variables analogous to children's measures (see sections 2.2.2 and 2.2.3 as well as section 2.C in the appendix); parenting style comprises the six dimensions emotional warmth, inconsistent parenting, monitoring (intensity), negative communication, psychological control, and strict control as described in appendix section 2.D. All columns display OLS regressions, specifications in columns (2) and (4) include HH environment variables as described in section 2.H in the appendix. Coefficients of main explanatory variables of interest for each outcome (cf. section 2.3 on hypotheses) are printed in bold. Significance at $^{*}p < 0.10$, $^{**}p < 0.05$, $^{***}p < 0.01$.

TABLE 2.I.9. Using a more differentiated risk measure in regressions of child outcomes on preferences—II

	PROSOCIALITY[†,‡]		SDQ INTERN. SCALE[†,‡]		SDQ EXTERN. SCALE[†,‡]	
	(1) Baseline	(2) HH env	(3) Baseline	(4) HH env	(5) Baseline	(6) HH env
Preferences[†]						
patience	0.020	0.028**	-0.000	-0.013	**0.021***	**0.005**
	(0.012)	(0.012)	(0.013)	(0.012)	(0.013)	(0.012)
time-consistent	0.014	-0.004	-0.091**	-0.056	**-0.068***	**-0.047**
	(0.041)	(0.041)	(0.046)	(0.049)	(0.040)	(0.039)
never patient	0.013	-0.001	-0.061	-0.071	**0.044**	**0.037**
	(0.067)	(0.070)	(0.066)	(0.072)	(0.064)	(0.066)
risk-neutral	-0.092***	-0.040	**-0.047**	**-0.052**	**-0.021**	**-0.041**
	(0.033)	(0.031)	(0.035)	(0.034)	(0.030)	(0.034)
risk-seeking	-0.145***	-0.129***	**-0.072***	**-0.060**	**0.009**	**0.013**
	(0.043)	(0.039)	(0.041)	(0.037)	(0.037)	(0.035)
egalitarian	**0.269*****	**0.277*****	**-0.352*****	**-0.218*****	**-0.412*****	**-0.305*****
	(0.068)	(0.069)	(0.075)	(0.068)	(0.071)	(0.066)
altruistic	**0.205****	**0.153***	**-0.241****	**-0.084**	**-0.235****	**-0.099**
	(0.083)	(0.084)	(0.097)	(0.083)	(0.094)	(0.073)
selfish	**0.198*****	**0.162****	**-0.399*****	**-0.192*****	**-0.353*****	**-0.163*****
	(0.064)	(0.065)	(0.081)	(0.064)	(0.076)	(0.061)
Cognitive skills[†,‡]						
IQ	0.142***	0.029	-0.156***	-0.073***	-0.133***	-0.041**
	(0.022)	(0.020)	(0.023)	(0.023)	(0.021)	(0.020)
Control variables: gender & age (FE)[††]						
female	0.107***	0.120***	0.018	0.013	-0.229***	-0.228***
age 6	*base*	*base*	*base*	*base*	*base*	*base*
age 7	0.234***	0.067	-0.112	-0.007	-0.306***	-0.171**
age 8	0.300***	0.146*	-0.051	-0.004	-0.234***	-0.146*
age 9	0.285***	0.112	-0.126*	-0.024	-0.269***	-0.149**
age 10	0.383***	0.236***	-0.140	-0.045	-0.351***	-0.248***
age 11	0.446***	0.276***	-0.271***	-0.127	-0.456***	-0.303***
age 12	0.514***	0.284***	-0.317***	-0.166**	-0.523***	-0.364***
age 13	0.546***	0.317***	-0.326***	-0.164*	-0.527***	-0.348***
age 14	0.650***	0.430***	-0.483***	-0.291***	-0.778***	-0.592***
age 15	0.668***	0.457***	-0.408***	-0.252***	-0.756***	-0.599***
age 16	0.653***	0.440***	-0.410***	-0.154	-0.764***	-0.593***
Household environment[‡‡]						
socio-demographics	✗	✓	✗	✓	✗	✓
parents' preferences	✗	✓	✗	✓	✗	✓
parents' IQ	✗	✓	✗	✓	✗	✓
parenting style	✗	✓	✗	✓	✗	✓
Observations	4,913	4,032	4,913	4,032	4,913	4,032
R^2	0.041	0.201	0.043	0.260	0.063	0.244
Adj. R^2	0.037	0.189	0.039	0.249	0.059	0.233
F	8.956	14.368	8.888	15.260	18.415	16.779

NOTES: Standard errors (in parentheses) are clustered at the village level for all specifications. [†]Prosociality, SDQ subscales, preferences, and cognitive skills measures are defined as described in sections 2.2.2-2.2.4. Instead of an indicator variable for being risk-averse, two indicator variables for being risk-neutral (choosing risk gamble no. 5) or risk-seeking (choosing risk gamble no. 6) are included. [‡]Prosociality, SDQ subscales, and IQ are standardized to a mean of zero and standard deviation of one across all available observations in our children sample. [††]Female is an indicator for being a girl, age is measured in years and included as fixed effects (FE), i.e., in the form of dummy variables for each age except the base category. [‡‡]Household (HH) socio-demographics comprise the number of siblings in HH, HH income, parents' age and literacy, whether the HH has an electricity connection, whether a senior is living in the HH, and religion; parents' preferences and IQ comprise variables analogous to children's measures (see sections 2.2.2 and 2.2.3 as well as section 2.C in the appendix); parenting style comprises the six dimensions emotional warmth, inconsistent parenting, monitoring (intensity), negative communication, psychological control, and strict control as described in appendix section 2.D. All columns display OLS regressions, specifications in columns (2), (4) and (6) include HH environment variables as described in section 2.H in the appendix. Coefficients of main explanatory variables of interest for each outcome (cf. section 2.3 on hypotheses) are printed in bold. Significance at $^{*}p < 0.10$, $^{**}p < 0.05$, $^{***}p < 0.01$.

TABLE 2.I.10. Regressions of child outcomes on preferences and controls: SDQ full score vs. subscales

	SDQ FULL SCORE[†,‡]		SDQ INTERN. SCALE[†,‡]		SDQ EXTERN. SCALE[†,‡]	
	(1) Baseline	(2) HH env	(3) Baseline	(4) HH env	(5) Baseline	(6) HH env
Preferences[†]						
patience	0.013	-0.004	-0.000	-0.013	0.022*	0.005
	(0.013)	(0.012)	(0.013)	(0.012)	(0.013)	(0.012)
time-consistent	-0.091**	-0.059	-0.091**	-0.056	-0.068*	-0.046
	(0.042)	(0.042)	(0.046)	(0.049)	(0.040)	(0.039)
never patient	-0.005	-0.014	-0.062	-0.071	0.046	0.039
	(0.064)	(0.068)	(0.066)	(0.072)	(0.064)	(0.066)
risk-averse	0.036	0.039	0.060*	0.056*	0.006	0.014
	(0.030)	(0.028)	(0.032)	(0.030)	(0.027)	(0.029)
egalitarian	-0.444***	-0.307***	-0.352***	-0.218***	-0.413***	-0.306***
	(0.077)	(0.065)	(0.075)	(0.068)	(0.071)	(0.066)
altruistic	-0.275***	-0.106	-0.242**	-0.084	-0.234**	-0.098
	(0.102)	(0.077)	(0.097)	(0.083)	(0.094)	(0.073)
selfish	-0.433***	-0.203***	-0.400***	-0.192***	-0.352***	-0.163***
	(0.084)	(0.061)	(0.081)	(0.064)	(0.076)	(0.061)
Cognitive skills[†,‡]						
IQ	-0.166***	-0.065***	-0.155***	-0.073***	-0.133***	-0.042**
	(0.023)	(0.021)	(0.023)	(0.023)	(0.021)	(0.020)
Control variables: gender & age (FE)[††]						
female	-0.133***	-0.134***	0.018	0.013	-0.229***	-0.227***
age 6	*base*	*base*	*base*	*base*	*base*	*base*
age 7	-0.250***	-0.110	-0.112	-0.007	-0.306***	-0.171**
age 8	-0.173**	-0.094	-0.050	-0.004	-0.235***	-0.148*
age 9	-0.234***	-0.107	-0.125*	-0.024	-0.270***	-0.151**
age 10	-0.293***	-0.180**	-0.139	-0.045	-0.352***	-0.250***
age 11	-0.429***	-0.257***	-0.270***	-0.126	-0.457***	-0.305***
age 12	-0.495***	-0.317***	-0.315***	-0.165*	-0.526***	-0.369***
age 13	-0.502***	-0.306***	-0.324***	-0.163*	-0.529***	-0.352***
age 14	-0.743***	-0.526***	-0.480***	-0.290***	-0.782***	-0.598***
age 15	-0.689***	-0.509***	-0.406***	-0.252***	-0.759***	-0.603***
age 16	-0.695***	-0.453***	-0.408***	-0.154	-0.766***	-0.597***
Household environment[††]						
socio-demographics	✗	✓	✗	✓	✗	✓
parents' preferences	✗	✓	✗	✓	✗	✓
parents' IQ	✗	✓	✗	✓	✗	✓
parenting style	✗	✓	✗	✓	✗	✓
Observations	4,913	4,032	4,913	4,032	4,913	4,032
R^2	0.063	0.311	0.043	0.260	0.063	0.244
Adj. R^2	0.059	0.301	0.039	0.250	0.059	0.233
F	16.152	15.830	9.123	15.246	19.155	15.720

NOTES: Standard errors (in parentheses) are clustered at the village level for all specifications. [†]SDQ full score, SDQ subscales, preferences, and cognitive skills measures are defined as described in sections 2.2.2-2.2.4. [‡]SDQ full score, SDQ subscales, and IQ are standardized to a mean of zero and standard deviation of one across all available observations in our children sample. [††]Female is an indicator for being a girl, age is measured in years and included as fixed effects (FE), i.e., in the form of dummy variables for each age except the base category. [‡‡]Household (HH) socio-demographics comprise the number of siblings in HH, HH income, parents' age and literacy, whether the HH has an electricity connection, whether a senior is living in the HH, and religion; parents' preferences and IQ comprise variables analogous to children's measures (see sections 2.2.2 and 2.2.3 as well as section 2.C in the appendix); parenting style comprises the six dimensions emotional warmth, inconsistent parenting, monitoring (intensity), negative communication, psychological control, and strict control as described in appendix section 2.D. All columns display OLS regressions, specifications in columns (2), (4) and (6) include HH environment variables as described in section 2.H in the appendix. Significance at $^{*}p < 0.10$, $^{**}p < 0.05$, $^{***}p < 0.01$.

Chapter 3

Family First: Do Social Preferences Influence Behavior in Childhood? Comparing Siblings Using Family Fixed Effects*

3.1 Introduction

Prosociality, an attitude or behavior that reflects the intent to benefit others, becomes relevant whenever humans interact. Understanding what makes people care about the well-being of others and what drives prosocial behaviors is hence crucial for understanding decision-making in a society. By now, economists are frequently integrating social or other-regarding preferences into their models of decision-making (see, e.g., Fehr and Schmidt, 1999; Bolton and Ockenfels, 2000; Charness and Rabin, 2002; Bénabou and Tirole, 2006; Falk and Fischbacher, 2006), and for adults, there is ample empirical evidence that documents these preferences' predictive power for major life outcomes.[1] However, less is known about how relevant they are for the behavior of children and adolescents. We have made notable progress in our understanding of the formation of child preferences (see, e.g., Cunha and Heckman,

* I thank Hannah Schildberg-Hörisch for providing the conception of the initial idea and valuable feedback on the analysis and results. Further, I thank Shyamal Chowdhury, Shambhavi Priyam, Matthias Sutter, Lukas Kiessling, Daniel Kamhöfer, Fabian Kosse, Sule Ertac, Ulf Zölitz, Andreas Lichter, Tomáš Jagelka, and Henning Hermes for helpful comments and discussion. Financial support by the German Research Foundation (Deutsche Forschungsgemeinschaft, DFG) through grant SCHI-1377/1-1, project number 392529304, is gratefully acknowledged. IRB approval (Heinrich Heine University Düsseldorf) was granted under study number 6212.

1. Social preferences are related to cooperative behaviors, e.g., at the work place, donations, repayment of loans, and management of common pool resources (Karlan, 2005; Dohmen et al., 2009; Rustagi, Engel, and Kosfeld, 2010; Carpenter and Seki, 2011; Becker et al., 2012; Burks et al., 2016; Deming, 2017; Falk et al., 2018).

2007; Doepke and Zilibotti, 2017; Sutter, Zoller, and Glätzle-Rützler, 2019; Cappelen et al., 2020; Kosse et al., 2020; Falk et al., 2021; List, Petrie, and Samek, 2021, or Chapter 1 of this thesis on sensitive periods in the formation of socio-emotional skills), and the idea that, just as in adulthood, preferences are determinants of behavior already in childhood is appealing. However, how can we tell whether an early preference to behave prosocially also translates into prosocial behaviors in everyday life, where many influential factors such as institutions, family environment, and peers govern how a child acts?

This paper contributes to a better understanding of the link between children's and adolescents' social preferences and field behavior. To the best of our knowledge, we are the first to relate social preferences to contemporaneous outcomes in childhood. As children and adolescents are wholesome members of our society, understanding their decision-making is of prime interest. Childhood behavior directly impacts children's well-being since especially behavior in interactive situations leads to immediate reactions of children's social environments, where family members, teachers, and peers will reciprocate both friendly and unfriendly actions. Likewise, behavior in childhood foreshadows and influences individual life trajectories and opportunities, e.g., with lasting penalties for misbehavior. Lastly, children will grow into adults, and shedding light on their development and behavioral mechanisms is a first peek into the way they are going to decide and act as adults who are key market participants.[2]

To provide empirical evidence, we have collected experimental and survey data in rural Bangladesh. We used incentivized dictator games in which children allocated stars between themselves and another child to elicit social preferences, and combine decisions in these games into aggregate measures of how willing children are to share. We then link these revealed preferences to survey measures of prosocial field behavior and behavioral problems. To establish valid predictions of preferences for behavior, we carefully account for measurement error in our experimental social preferences data. Measurement error in experimental and survey data has been a well-known problem for decades (see, e.g., Bertrand and Mullainathan, 2001; Schennach, 2016; Blackwell, Honaker, and King, 2017; Gillen, Snowberg, and Yariv, 2019; Meijer, Oczkowski, and Wansbeek, 2021). If dependent variables are measured with error, this generally decreases the precision of estimates. More severe, however, are independent variables measured with error. If independent variables are measured with error, this provokes *attenuation bias*, where coefficients are biased towards zero. For variables of interest, this is often seen as a conservative bias as it goes against finding anything. However, as Gillen, Snowberg, and Yariv (2019) have recently shown, measurement error can also lead to overestimating effects and drawing wrong conclusions for main variables if covariates are measured with error and effects are falsely ascribed. Even though the existence and influence of measurement error have long been acknowledged, the difficulties in tackling

2. See Sutter, Zoller, and Glätzle-Rützler (2019) or List, Petrie, and Samek (2021) for comprehensive and inspiring discussions of why we should care about understanding children's preferences and decision processes.

it often lead to neglecting the problem. As Gillen, Snowberg, and Yariv (2019) point out, actions to reduce measurement error should best be already taken when designing experiments. Repeated measures can be used as instrumental variables to eliminate the endogeneity in linear regressions arising from classical measurement error. Our data allow us to generate two tantamount measures for social preferences and we can hence apply the authors' proposed instrumental variables strategy that takes care of measurement error in cases where there is no natural ordering of measures, which they term *obviously related instrumental variables* (ORIV) approach.

Irrespective of the problems emerging from measurement error, challenges in the interpretation of observed associations between child preferences and behavior arise from many facets of the family environment potentially being simultaneous determinants of preference formation and field behavior.[3] For example, if higher socio-economic status of a family translates into children forming more prosocial preferences and at the same time affects how prosocially they act, as parents may be able to invest more into their kids and pay more attention to their kids' actions, it remains unclear whether an observed correlation between children's other-regarding preferences and their behavior towards others in everyday life also represents a causal effect. Similarly, while very prosocial parents may induce children to also form more prosocial preferences, they will likely also step in and stop their child from hurting other children directly. We can draw on measures of almost 2,000 pairs of siblings, which enables us to estimate family fixed effects models that control for all characteristics of the family environment shared by siblings. So, to address concerns of unobserved confounders, we study within-family correlations: children's socio-economic status or their parents' preferences are kept constant, eliminating a large source of bias and leading to a cleaner interpretation of observed relations. It is plausible to assume that siblings share many household characteristics to a vast extent. At the same time, comprehensive and precise measurement of many of these characteristics is difficult in quantitative surveys. Therefore, including family fixed effects allows to control for shared characteristics in the most comprehensive possible manner.

While accounting for measurement error, we compare analyses without and with family fixed effects to understand better what drives child behaviors. More precisely, in a first step

3. There is empirical evidence for the role of socio-economic status (Dohmen et al., 2012; Kosse and Pfeiffer, 2012; Bauer, Chytilová, and Pertold-Gebicka, 2014; Almås et al., 2016; Brenoe and Epper, 2019; Falk et al., 2021), family structure (Detlefsen et al., 2018), parents' economic preferences (Bisin and Verdier, 2000; Dohmen et al., 2012; Kosse and Pfeiffer, 2012; Bauer, Chytilová, and Pertold-Gebicka, 2014; Almås et al., 2016; Alan et al., 2017; Campos-Vazquez, 2018; Brenoe and Epper, 2019; Falk et al., 2021; Chowdhury, Sutter, and Zimmermann, 2022), parenting style, parental time, monetary and further investments in their children (Cunha and Heckman, 2007; Guryan, Hurst, and Kearney, 2008; Heckman, 2008; Heckman and Mosso, 2014; Falk and Kosse, 2016; Doyle et al., 2017; Cobb-Clark, Salamanca, and Zhu, 2019; Falk et al., 2021), parental values and religiosity (see, e.g., Brañas-Garza, Espín, and Neuman, 2014), genetic contributions (e.g., Cesarini et al., 2009; Zyphur et al., 2009), and exposure to stress at the household level (e.g., Starcke and Brand, 2012; Buchanan and Preston, 2014; Haushofer and Fehr, 2014; Ceccato et al., 2018).

of our analysis, we use simple cross-sectional regression models to link social preferences to field behavior which is captured in terms of everyday prosocial behaviors and behavioral problems. We observe substantial predictive power of social preferences for both outcomes when adjusting estimates for measurement error via the ORIV approach. In a second step, we add family fixed effects to our ORIV specifications to effectively control for all family-invariant characteristics. As a result, the previously demonstrated predictive power of children's preferences dissolves to a very large extent. These repercussions question the interpretation of established findings on the link between preferences and contemporaneous outcomes. Our results suggest that child and teenage preferences can well predict field behavior, and they do so because they partly reflect the family environment which maps into both the formation of preferences and child behavior.

Our findings enrich the growing literature on experiments with children and the discourse on how much children's preferences relate to their immediate field outcomes (Castillo et al., 2011; Sutter et al., 2013; Castillo, Jordan, and Petrie, 2018, 2019). We contribute to this quickly evolving debate with novel data on 1,985 pairs of siblings. Our results emphasize the importance of the family environment for the formation of social preferences on the one hand (see, e.g., Doepke and Zilibotti, 2017; Kosse et al., 2020; Falk et al., 2021) and how children behave and feel on the other hand. During childhood and adolescence, the family environment seems to be an essential driver of both. Stepping back, this also relates to the question of what experimental measures of childhood preferences eventually capture. Measures are constructed from revealed preferences in well-defined and controlled contexts. For children, to a sizeable extent they seem to reflect the family environment.

Moreover, our results add to the empirical literature showing the apparent amount and consequences of measurement error which can threaten the identification of valid relationships. We apply ORIV to correct for measurement error which substantially increases the predictive power of our experimental measures for social preferences. Besides, since attenuation bias from measurement error is generally reinforced in fixed effects regressions, adding family fixed effects usually comes at the cost of smaller estimated effect sizes. Being able to account for measurement error allows for a more reliable interpretation of differences between sparse baseline and family fixed effects specifications, and hence the influence of the family environment. How to reduce the potential for measurement error should already be considered when designing a survey.

The remainder of the paper is structured as follows. Section 3.2 illustrates our empirical strategy. Section 3.3 describes sampling and data. Results are presented in section 3.4 and robustness checks in section 3.5. We discuss the implications of our findings and conclude in section 3.6.

3.2 Empirical strategy

We think of the relation between social preferences and outcomes using the following model:

$$y_{if} = \alpha + \beta P_{if} + \gamma C_{if} + \delta X_{if} + \mu_{if} + \phi_f + \varepsilon_{if} \tag{3.1}$$

where y_{if} is the outcome of individual i in family f (field behavior), P_{if} are social preferences, C_{if} captures cognitive skills (i.e., IQ), X_{if} is a vector of observable individual-specific exogenous control variables (gender and age), μ_{if} is a vector of unobservables that may vary between siblings, ϕ_f is the unobserved shared family background, and ε_{if} is the idiosyncratic error term. Based on this, we will introduce the problem of measurement error, how we account for measurement error, and the idea of adding family fixed effects (FE) to control for all family-invariant characteristics.

3.2.1 Measurement error

Working with experimental data, we assume that preferences are measured with error. Measurement error is ubiquitous in experimental research and its existence has long been acknowledged in the empirical economics literature. The term encompasses a wide range of problems when eliciting data: participants in surveys and experiments make mistakes regarding their choices, e.g., due to inattention or carelessness, interviewers make mistakes when entering choices, data are rounded, or participants cannot correctly recall. Also, the measure applied might only be a noisy empirical proxy of the underlying theoretical construct.[4] In regressions, measurement error can arise in both left-hand and right-hand side variables. If left-hand side, or dependent variables, are measured with error, this leads to less precise model estimations. However, measurement error in right-hand side, or explanatory variables, is more severe and a prime source of endogeneity bias. It typically results in *attenuation bias* (also termed *regression dilution*) where coefficients are biased towards zero (see, e.g., Wooldridge, 2010). Since, as a consequence, this makes researchers underestimate the effects of mismeasured variables, attenuation bias is often seen as a conservative bias: it goes against finding anything, and identifying an effect thus is only a lower bound of a variable's impact. Following this line of argumentation, measurement error is often acknowledged but regularly not addressed. To meaningfully compare specifications without and with fixed effects,[5] however, we are particularly interested in reliable estimates of the link between social preferences and field behavior. Consequently, in the following we exploit our data structure

4. As Jennings et al. (2022) point out, the distinction between incorrect data and a mismatch between theoretical construct and empirical proxy is not important for theoretically analyzing the impact of measurement error.

5. As discussed later, the problems arising from measurement error are mechanically aggravated in fixed effects estimations, leading to even larger degrees of attenuation.

to deal with the issue of measurement error. To begin with, we introduce the general framework, before we subsequently illustrate how we can alleviate the problem.

Errors-in-variables model. Given our setting, we assume social preferences to be measured with error: $\tilde{P} = P + u$, where P are the true, latent preferences, $\tilde{P}$ are measured preferences, and u denotes the measurement error. Following the literature (this section is based on Pischke, 2007), this constitutes a classical *errors-in-variables* model where the measurement error in $\tilde{P}$ becomes part of the error term in the regression equation thus creating an endogeneity bias (for simplicity, we drop control variables from the model presentation here). So, instead of estimating the true model

$$y = \alpha + \beta P + \varepsilon \tag{3.2}$$

the researcher estimates

$$y = \alpha + \beta(\tilde{P} - u) + \varepsilon = \alpha + \beta\tilde{P} + (\varepsilon - \beta u). \tag{3.3}$$

The OLS estimator for β is

$$\hat{\beta} = \frac{cov(\tilde{P}, y)}{var(\tilde{P})} = \frac{cov(P + u, \beta P + \varepsilon)}{var(P + u)} \tag{3.4}$$

and based on the common assumptions defining the classical errors-in-variables model that the measurment error u has mean zero, is uncorrelated with the true dependent and independent variables and with the general error term,

$$\text{plim}\ \hat{\beta} = \frac{\sigma_P^2}{\sigma_P^2 + \sigma_u^2}\beta = \lambda\beta \tag{3.5}$$

where σ_x^2 denotes the variance of x and, in the following, σ_{vw}^2 denotes the covariance of v and w. With λ being the *reliability* or *signal-to-total variance ratio*, $0 < \lambda < 1$, it follows that $\hat{\beta}$ will be biased towards zero. Theoretically, any instrumental variable (IV) z that is correlated with preferences P but not with the measurement error u can be used to identify the true coefficient.[6] To see this, one can derive the IV-estimator as

$$\hat{\beta}_{IV} = \frac{cov(y, z)}{cov(\tilde{P}, z)} = \frac{cov(\beta P + \varepsilon, z)}{cov(P + u, z)} \tag{3.6}$$

6. Also, knowledge about either the variance of P, the variance of the measurement error, or the attenuation factor λ would be sufficient. Hausman (2001) provides an overview of econometric strategies for dealing with measurement error.

with

$$\text{plim } \hat{\beta}_{IV} = \frac{\beta \sigma_{P_z}}{\sigma_{P_z}} = \beta. \tag{3.7}$$

Addressing measurement error with ORIV. We adopt the IV approach suggested by Gillen, Snowberg, and Yariv (2019). In their paper, the authors provide an excellent overview of how the economics community currently (not) deals with measurement error and why a neglect can lead to incorrect findings. They replicate influential empirical studies, and one of their key messages is that measuring control variables with error and not accounting for this can lead to spurious findings.[7] The authors propose both design adjustments as well as statistical tools to address the issue of measurement error. We follow their suggestion which combines repeated elicitations of a measure with an instrumental variable strategy and which they term *obviously related instrumental variables* (ORIV) approach. With their method, Gillen, Snowberg, and Yariv (2019) target settings in which there is no theoretical reason to favor one elicitation or measure over the other. Hence, multiple measures for a variable allow for multiple instrumentation strategies, which will generally lead to different results. In order to consolidate information from various instrumentation "directions," they estimate a stacked model, replicating each observation and thereby switching the main variable of interest (first measure) and the instrument (second measure). They show that this produces a consistent estimate of the true effect.

We implement ORIV using two tantamount measures derived from our social preferences games described in more detail in section 3.3.1. That is, we elicit similar measures capturing the same latent underlying concept of social preferences and use ORIV to obtain an estimate that is free from bias due to measurement error and extracts the common variance of possibly complementary facets.[8] Admittedly, uncorrelatedness of reporting errors and the premise of classical measurement error are strong assumptions. But at the same time, they are natural starting points for any exploration of bias from measurement error.[9]

Based on equation (3.1), for the moment abstracting from unobservables, we estimate a stacked model that can be written as

7. Consider estimating the effect of an explanatory variable of interest on some outcome and adding a further explanatory variable as control to that model. If this control variable is measured with error, its coefficient may be biased towards zero and, if the variable of interest is correlated with the latent control variable, it could pick up this control variable's effect on the outcome.

8. Reassuringly, ORIV has recently been applied in various studies with different measures and potential instrumental variable candidates at hand (see, e.g., Xue et al., 2020; Kiessling, 2021; Schneider and Sutter, 2021; Van Kippersluis et al., 2021).

9. Please note that for binary choices measurement error cannot be classical by construction: if the dummy is one, measurement error can only be negative; if the dummy is zero, it can only be positive. So, the measurement error is negatively correlated with the true variable. We are not using binary explanatory measures in our analysis, thereby excluding this potential source of bias.

$$\begin{pmatrix} y \\ y \end{pmatrix} = \begin{pmatrix} \alpha^a \\ \alpha^b \end{pmatrix} + \beta \begin{pmatrix} \tilde{P}^a \\ \tilde{P}^b \end{pmatrix} + \gamma \begin{pmatrix} C \\ C \end{pmatrix} + \delta \begin{pmatrix} X \\ X \end{pmatrix} + \varepsilon, \quad \text{instrumenting} \begin{pmatrix} \tilde{P}^a \\ \tilde{P}^b \end{pmatrix} \text{with } W = \begin{pmatrix} \tilde{P}^b & 0_N \\ 0_N & \tilde{P}^a \end{pmatrix} \tag{3.8}$$

where $\tilde{P}^a$ and $\tilde{P}^b$ are our two tantamount preferences measures a and b, respectively, N is the number of children, and 0_N is an $N \times 1$ zero matrix. According to Gillen, Snowberg, and Yariv (2019), this is equivalent to estimating a first stage for both instrumentation strategies (i.e., instrumenting measure a with measure b and vice versa), then estimating

$$\begin{pmatrix} y \\ y \end{pmatrix} = \begin{pmatrix} \alpha_1 \\ \alpha_2 \end{pmatrix} + \beta \begin{pmatrix} \hat{P}^a \\ \hat{P}^b \end{pmatrix} + \gamma \begin{pmatrix} C \\ C \end{pmatrix} + \delta \begin{pmatrix} X \\ X \end{pmatrix} + \varepsilon \tag{3.9}$$

as second stage, where $\hat{P}^a$ and $\hat{P}^b$ are the predicted values derived from the two first stage regressions. To take into account that replications of observations have the same source, we cluster standard errors at the level of the individual child as the authors suggest, as well as at the family level to allow errors to be correlated within families. As a robustness check, we also bootstrap standard errors, which leads to comparable results.

3.2.2 Model specifications to relate social preferences and field behavior

Having taken care of measurement error, we are ready to investigate the relationship between social preferences and contemporaneous field behavior of children. In a first step, we run regressions of child behavior on preferences as well as IQ, gender, and age as observable control variables to establish the predictive power of children's social preferences:

$$y_{if} = \alpha + \beta P_{if} + \gamma C_{if} + \delta X_{if} + \varepsilon_{if} \tag{3.10}$$

To empirically demonstrate the need for measurement error correction, we present results from regressions without and with the ORIV approach. In a second step, we include family fixed effects ϕ_f in our ORIV specifications, exploiting that our data encompass measures of social preferences and outcomes of 1,985 pairs of siblings:

$$y_{if} = \alpha + \beta P_{if} + \gamma C_{if} + \delta X_{if} + \phi_f + \varepsilon_{if} \tag{3.11}$$

Holding family environment constant. Including family fixed effects allows controlling for all characteristics of a family or household that are constant across siblings. Usually, fixed effects estimations are used in the context of panel data. Yet, instead of thinking about individuals or entities over time and controlling for time-invariant, unobserved factors using entity fixed effects, we are considering individuals in families. Sibling or twin studies (i.e., sibling or family fixed effects approaches) have been used regularly in social sciences and medicine as well

as in education, labor, and health economics.[10] Examples of characteristics that are constant across siblings range from all socio-demographic variables, household composition, parental characteristics (preferences, IQ, education, attitude towards their children) to shared worries, challenges, daily routines, local environment, and genetic influences, to name just a few. It seems plausible to assume that the vast majority of unobserved factors influencing both the formation of preferences as well as behavior are constant within families, i.e., are household-invariant. The applied family fixed effects models cannot control for unobserved confounders that possibly vary across siblings, such as peer or teacher effects, different cultural expectations (e.g., regarding gender roles) or if parents treat and educate their children differently.[11]

Estimating family fixed effects models is equivalent to either de-meaning the data by subtracting variable-wise from each observation the mean over both siblings or using sibling-differences and subsequently estimating these adjusted models via ordinary least squares (OLS). It is instructive to use these straightforward representations and reflect on family fixed effects in terms of differences between siblings,[12] with i and j denoting siblings within a family f:

10. Examples include analyses dealing with effects of schooling on health (e.g., Fujiwara and Kawachi, 2009; Lundborg, 2013; Madsen et al., 2014; Amin, Behrman, and Kohler, 2015), effects of physical and mental health on human capital accumulation and labor market outcomes (e.g., Currie and Stabile, 2006; Currie et al., 2010; Fletcher, 2013, 2014), effects of parental employment on children's educational attainment (e.g., Schildberg-Hörisch, 2011) or economic returns to schooling (e.g., Sandewall, Cesarini, and Johannesson, 2014). With more studies from different fields applying sibling designs, advantages and limitations of the approach have been discussed in greater detail in the last decade (see, e.g., Donovan and Susser, 2011; Gilman and Loucks, 2014; Boardman and Fletcher, 2015), and also more recent economics papers are exploiting available twin data (e.g., Xue et al., 2020). Twin data often allow for an even more comprehensive control since monocygotic twins share their genetic background to an even larger degree.

11. The literature on sibling differences has identified several factors associated with the concordance or discordance of outcomes among children who are raised in the same household (see, e.g., Gilman and Loucks, 2014). One of them is birth order since, for example, first born children tend to go to school longer. Detlefsen et al. (2018) show that birth order is also an important factor for risk, time, and trust preferences. In our data, birth order is not predictive of social preferences and, if controlling for age, also not of our two measures for field behavior. Additionally controlling for birth order in our regressions does not change our results.

12. In common statistical programs such as Stata, fixed effects estimations are typically implemented using de-meaned models, i.e., estimating $(y_{if} - \overline{y}_f) = \beta(P_{if} - \overline{P}_f) + \gamma(C_{if} - \overline{C}_f) + \delta(X_{if} - \overline{X}_f) + (\mu_{if} - \overline{\mu}_f) + (\varepsilon_{if} - \overline{\varepsilon}_f)$ with variables with bars indicating averages across siblings. This yields identical point estimates as the differenced model. Thinking about within-family differences, however, it is more intuitive to also look at the equivalent model in differences. A further way to estimate a (family) fixed effects model is to add a dummy variable for each family and estimate this model via OLS. This LSDV (least squares dummy variable) estimator is identical to the more common FE estimator. However, including a large set of dummy variables is computationally demanding.

$$
\begin{aligned}
y_{if} - y_{jf} &= (\alpha - \alpha) + \beta(P_{if} - P_{jf}) + \gamma(C_{if} - C_{jf}) + \delta(X_{if} - X_{jf}) \\
&\quad + (\mu_{if} - \mu_{jf}) + (\phi_f - \phi_f) + (\varepsilon_{if} - \varepsilon_{jf}) \qquad (3.12) \\
&= \beta(P_{if} - P_{jf}) + \gamma(C_{if} - C_{jf}) + \delta(X_{if} - X_{jf}) \\
&\quad + (\mu_{if} - \mu_{jf}) + (\varepsilon_{if} - \varepsilon_{jf}) \qquad (3.13)
\end{aligned}
$$

Taking differences, all characteristics that are constant across siblings drop out, leaving only unobserved characteristics that differ between siblings (μ) as a potential source of omitted variable bias (these are then subsumed in the error terms, which can still lead to endogeneity in our fixed effects estimations). Compared to traditional OLS regression models, the inclusion of family fixed effects is a big step forward towards a more credible causal identification strategy since they eliminate manifold sources of omitted variable bias usually present in analyses in cross-sectional settings. Even if controlling for a wide range of child and family characteristics in traditional OLS models, many unobservable factors such as genetics or family environment presumably influence both (the formation of) children's preferences as well as their behavior (that is, they are correlated with included regressors and at the same time determine the outcome variable).

Importantly, estimating family fixed effects specifications requires sufficiently strong variation of preferences and behavior within sibling pairs to be able to identify any effects of interest. Section 3.3.4 documents the overall variation in our data at hand as well as that sufficient variation within pairs of siblings is given. In short, correlations of social preferences between siblings are low, and variation in preferences is of similar magnitude between families and within. For field behavior, correlations are higher, and within-family variation is about half the size of variation between families.

Fixed effects and measurement error. Please note that, in general, measurement error raises important challenges for the family fixed effects analysis. Hence, accounting for measurement error is a necessary step for us to meaningfully interpret our estimations when linking preferences and field outcomes. When moving from baseline OLS to fixed effects estimations, we observe a reduction in coefficients. However, it is well known in the econometrics literature that adding fixed effects to a model aggravates the attenuation problem arising from measurement error. Intuitively, this is a consequence of the fact that differencing removes part of the signal, i.e., the variation in the true, underlying preferences, while leaving the noise component unchanged (Angrist and Pischke, 2015). This is particularly severe if we assume that the measurement error in preferences is uncorrelated across siblings while the true preferences are highly correlated—an assumption that seems plausible.[13]

13. If the measurement error was a fixed effect itself, i.e., if it was constant across siblings, differencing would eliminate the measurement completely (Pischke, 2007). Yet, this scenario seems not very likely: we have no reason to assume for the measurement error to be constant across siblings.

To combine measurement error correction and family fixed effects, we add family-stack fixed effects to the ORIV model. That way, we are conducting within-family comparisons within a data stack. Standard errors are again clustered at both the family as well as the individual level. Similar approaches are adopted by, e.g., Xue et al. (2020) or Van Kippersluis et al. (2021) who use twin data to link adults' locus of control to outcomes such as educational attainment, occupation and employment status, income, and healthy habits, or sibling data to predict educational attainment and height from genetic indicators (polygenic scores), respectively.

In brief, we provide a comparison of classical estimates and family fixed effects estimates to relate children's social preferences and their contemporaneous field behavior. We account for measurement error by applying the ORIV approach put forward by Gillen, Snowberg, and Yariv (2019). To illustrate the empirical relevance of this measurement error correction, we also present baseline estimates linking uncorrected social preferences measures to behavior.

3.3 Data

We collected data in the four rural districts Netrokona, Sunamganj, Chandpur, and Gopalganj in Bangladesh. These districts represent four of the eight administrative divisions of the country. In a previous survey, 11 subdistricts were chosen based on the availability of NGOs willing to collaborate and 150 villages were randomly drawn from these 11 subdistricts, followed by a random sampling of children and families (see especially Chapter 2 of this thesis for further details). Data were collected from March to May 2018 with the help of a local survey firm and, in total, we surveyed about 3,800 households. Via paper-and-pencil interviewing, we elicited economic preferences, personality traits, and cognitive skills from up to four household members (one or two children aged 6 to 16 and their parents). Additionally, mothers answered a questionnaire in which they also assessed their children's strengths and difficulties. A quantitative household survey on, e.g., socio-demographics, complemented the comprehensive measurement of skills.

3.3.1 Social preferences

To assess social preferences, children participated in well-established incentivized experiments. In these games, they were able to earn stars which were transformed into money afterwards using age-specific exchange rates (one star's value equals approximately half of a child's weekly pocket money). Experiments took place in one-on-one settings in the children's homes and the interviewers ensured that family members could not influence each other's decisions. All items were pre-tested in our context and we used standardized control questions to verify that participating children understood the instructions.

Games. We followed an experimental protocol inspired by Fehr, Bernhard, and Rockenbach (2008) which got extended by Bauer, Chytilová, and Pertold-Gebicka (2014). In four dictator games children had to make allocation choices dividing stars between themselves (x) and another child (y) of the same gender and roughly the same age, but unknown and unrelated (see Table 3.1). In each of the four choices (x,y), one option was always the allocation (1,1), while the alternative spoke to different motives that typically underlie actions in interpersonal situations. The games mirror decision situations where children are confronted with trade-offs between benefiting themselves, benefiting others, and/or attaining equal distributions, and provoke the revelation of motivations such as prosociality, egalitarianism, and envy. Acting prosocially and sharing stars comes at a cost for the child in the first game. In the second game, giving is not costly, yet not giving implies that the child is ahead, that is, has more than the other child. Similarly, in the third game giving is not costly, but goes along with having less than the other child. In the last game, enforcing an egalitarian distribution instead of being behind comes at a cost. Detailed instructions for the social preferences games and the decision sheets that were shown to the children (English versions) can be found in the final appendix chapter of this thesis.

TABLE 3.1. Social preferences games for children

1) Costly prosocial game	1 star for me 1 star for the other child (1,1)	**vs.**	2 stars for me 0 stars for the other child (2,0)
2) Costless prosocial game	1 star for me 1 star for the other child (1,1)	**vs.**	1 star for me 0 stars for the other child (1,0)
3) Costless envy game	1 star for me 1 star for the other child (1,1)	**vs.**	1 star for me 2 stars for the other child (1,2)
4) Costly envy game	1 star for me 1 star for the other child (1,1)	**vs.**	2 stars for me 3 stars for the other child (2,3)

NOTES: Own representation. Names of mini-games describe whether it is costly [costless] for the child to act prosocially and share more stars (first two mini-games) or generate an egalitarian outcome (last two mini-games).

Measures. From the four choices, we calculate two tantamount measures pairing games 1 and 4 into measure a and games 2 and 3 into measure b, which are good instruments for each other. The pairing of choices follows the objective of constructing two measures that equally encompass the different facets of social preferences (related to prosocial and envious/egalitarian behavior) captured by our four decision situations. In the first two games, prosociality in the sense of increasing the other one's outcome and the wish to have an egali-

tarian distribution align. In the last two games, giving more always implies an uneven distribution with the decision-maker being behind. Correlations of decisions in games confirm this intuition of two conflicting motivations: games 1 and 2 are positively related, just as games 3 and 4 (see Table 3.A.1 in the appendix). Across these groups, correlations are negative. A principal component analysis (PCA) of single games also results in two components with an eigenvalue larger than 1 (see appendix Table 3.A.2 and Figure 3.A.1). Magnitudes of factor loadings are comparable across games, but for the first component, signs of factor loadings for the first two games differ from the last two games.[14] Pairing games 1 and 3 as well as 2 and 4 as robustness checks (section 3.5) yields qualitatively similar results.

To take into account the different amounts of stars at stake in the single games, we aggregate games by calculating the share of stars given to the other child across the two respective games as[15]

$$\frac{\text{stars given to the other child}}{\text{stars given and kept}}.$$

That is,

$$\text{measure } a = \frac{\text{stars given in game 1 (1 or 0)} + \text{stars given in game 4 (1 or 3)}}{\text{stars given and kept in game 1 (2)} + \text{stars given and kept in game 4 (2 or 5)}}$$

and

$$\text{measure } b = \frac{\text{stars given in game 2 (1 or 0)} + \text{stars given in game 3 (1 or 2)}}{\text{stars given and kept in game 2 (2 or 1)} + \text{stars given and kept in game 3 (2 or 3)}}.$$

In our analysis, measures are standardized to have mean zero and standard deviation one across our sibling sample in order to put them on the same scale.

3.3.2 Cognitive skills

We measured IQ using the well-established Wechsler Intelligence Scale for Children (WISC-IV) which captures both crystallized and fluid IQ (Wechsler, 2003). The WISC IV as IQ measure has a longstanding history and has been designed to reflect cognitive skills across different contexts. It got adapted to meet the specific context of Bangladesh by local academics from the University of Dhaka. For our analysis, the IQ measure is standardized to have mean zero and standard deviation one across our sibling sample.

14. Yet, using PCA components in our ORIV estimations is not advisable as these are constructed in a way to generate maximum independence of components while retaining as much variation as possible. We are, however, looking for measures that can serve as instruments for each other and hence are interested in measures that are related and influence selected outcome measures in the same direction. Later, we will present results of using principal components instead of applying ORIV as an alternative approach to reduce measurement error (see section 3.5).

15. Taking the average of the share of stars given to the other child in the single games instead leads to comparable results, as we will document in section 3.5.

3.3.3 Field behavior

To measure children's contemporaneous field behavior, we use the well-established and widely used mother-rated Strengths and Difficulties Questionnaire (SDQ) that was developed by Goodman, Renfrew, and Mullick (2000).

SDQ prosociality scale. To depict children's behavior in the social domain, we use the prosociality scale of the SDQ. This standalone scale is designed to measure the extent to which children behave prosocially, i.e., interact with others in a positive and cooperative way in their daily routine. Mothers rated five items related to their children's prosocial behavior on a three-point scale, such as "My child is considerate of other people's feelings" or "My child shares readily with other children (treats, toys, pencils, etc.)." For a complete list of the prosociality items, see section 3.B.1 in the appendix.

Answers are combined with equal weighting into one scale. The variable is then standardized to have mean zero and standard deviation one across our sibling sample. We hypothesize that a higher degree of prosocial preferences also maps into children displaying more prosocial behaviors in their everyday life.

SDQ score. We further use the full SDQ score as a second outcome measure reflecting field behavior. The SDQ score captures behavioral and emotional difficulties and was originally developed by psychologists as a brief screening tool for mental health problems.[16] The full SDQ score comprises the four subscores "conduct problems," "hyperactivity," "peer problems," and "emotional symptoms." For each subscore, mothers rated five items on a three-point scale. Questions are referring to whether children tend to have temper tantrums or hot tempers, fight with others, lie, cheat, or steal, how well children can concentrate, whether they are easily worried, often nervous or unhappy, and how well children are socially embedded (see section 3.B.2 in the appendix for a complete list of items). Importantly, the SDQ score comprises many items reflecting how children behave in interpersonal situations, especially with respect to peers and in the conduct domain, which is why we consider it as a valuable outcome dimension here.

Answers are combined with equal weighting into the four subscores. In principal, higher values indicate more emotional or behavioral problems and hence a more negative outcome. To ease interpretation, we reverse the final score such that higher values indicate better outcomes, i.e., less problems. The measure is standardized to have mean zero and standard deviation one across our sibling sample. It seems plausible that a higher degree of prosocial

16. Its reliability and validity has been examined and confirmed in a number of studies across Europe, Asia, Australia, and South America (see, e.g., Hoosen et al., 2018, for an extensive overview). Bangladesh received special attention as data collected in its capital city Dhaka have played a particularly important role in documenting that the SDQ can be purposefully applied and interpreted in different cultural settings. In recent times, economists have frequently used the SDQ (Gupta and Simonsen, 2010; Flèche, 2017; Cornelissen and Dustmann, 2019; Attanasio et al., 2020; Briole, Le Forner, and Lepinteur, 2020; Kühnle and Oberfichtner, 2020).

preferences maps into children showing better conduct, getting along better with peers, and being more emotionally stable. The latter may be, for example, governed by a more stable social environment of children with more prosocial preferences.

3.3.4 Sample characteristics

To run family fixed effects regressions and compare siblings within families, we can only include households with full information on two children. For these siblings, all relevant variables (i.e., social preferences, SDQ, IQ, gender, and age) have to be available. These restrictions give us a sample size of 3,970 children from 1,985 families.

Child and family characteristics. Table 3.2 displays basic characteristics of the children who enter our analysis. Since a large number of households was sampled via elementary schools, the mean age of child participants is 10.4 years and 95 percent are able to read and write. The average age difference between siblings in a family is 3.5 years. The sample is well-balanced in terms of gender and there are about as many same-sex pairs of siblings as there are pairs of siblings with different sex. Table 3.C.2 in the appendix gives further descriptives and also documents that our restricted sample does not differ much from the randomly sampled and thus more representative full sample of children for whom we elicited data. Children in our sibling sample are slightly older and have slightly lower cognitive skills compared to the full sample. The age difference results from our sampling procedure: first, we randomly sampled children from elementary schools who were, in general, between 7 and 11 years old. From these children's families, we randomly sampled a second child between the ages of 6 and 16 for data collection (if available). In expectation, these siblings were older, thus raising the average age of sampled children in households with two kids in the age range of 6 to 16. Naturally, also the average number of children within a household is higher for families with at least two sampled siblings compared to the full sample that also comprises single-child households.

Variation in measures. Figures 3.D.1, 3.D.2, and 3.D.3 in the appendix graphically display distributions of measures. There is overall variation both in measures for field behavior as well as in our social preferences measures. Importantly, comparing siblings requires sufficient within-family variation especially in explanatory variables. Appendix Tables 3.D.1 and 3.D.2 document that there is variation in preferences both across and within families. Correlations of preferences among siblings that are shown in Table 3.D.1 are throughout positive, but small to moderate in size. This is conceivable given well-documented age trends and gender differences in preferences (see, e.g., Sutter, Zoller, and Glätzle-Rützler, 2019), but also commonly observed differences in preferences across siblings (see, e.g., Anger and Schnitzlein, 2017; Detlefsen et al., 2018). Analogous to panel data, variation in variables can be decomposed into between- and within-family variation. This information is summarized in Table 3.D.2. For our social preferences measures, there exists substantial variation of comparable size both

TABLE 3.2. Summary statistics for sample of siblings

	Mean	Std. dev.	Min.	Max.	Obs.
Preferences & field behavior					
share of stars given across games 1&4	0	1	-2.01	1.19	3,970
share of stars given across games 2&3	0	1	-1.86	1.27	3,970
share of stars given across all games	0	1	-2.57	1.53	3,970
prosociality	0	1	-2.85	1.56	3,970
SDQ	0	1	-1.99	3.85	3,970
Individual characteristics					
IQ	0	1	-2.44	5.29	3,970
female	0.52		0	1	3,970
age	10.44	2.65	6	16	3,970
literacy	0.95		0	1	3,952

NOTES: For preferences, field behavior, and IQ, standardized measures are displayed. Shared stars are calculated as described in section 3.3.1. Unstandardized prosociality ranges from 0 to 10, SDQ from 0 to 40. IQ is elicited on a scale from 4 to 76. Female is a dummy variable for being a girl, age is measured in years. Literacy is a dummy variable indicating the ability to read and write.

across and within families. As a further benchmark, we add IQ. Here, sibling correlations are higher which is also mirrored in a higher ratio of between- to within-variation.

3.4 Results

This section presents the results of our analysis regarding the link between children's social preferences and their field behavior. For this, we are regressing the SDQ prosociality scale as well as the reversed SDQ score on children's social preferences, IQ, and gender and age as exogenous control variables. As discussed in section 3.2, we compare specifications without and with family fixed effects (FE) which are both corrected for measurement error via the *obviously related instrument variables* (ORIV) approach. To empirically demonstrate the importance of accounting for measurement error, in a first step we document the change in coefficients when applying ORIV compared to running simple OLS regressions of behavior on preferences and controls.

3.4.1 Baseline specifications

We first examine the predictive power of children's social preferences in baseline specifications without family fixed effects. The first two columns in Table 3.3 display results when regressing either the prosociality scale (Panel A) or the reversed SDQ score (Panel B) on our two social preferences measures, IQ, gender, and age (full regression results for all coefficients are shown in Tables 3.E.1 and 3.E.2 in the appendix). In column (1), social preferences

are captured by the share of stars given to the other child across games 1 and 4 (social preferences measure *a*), in column (2) by the share of stars given across games 2 and 3 (measure *b*). For three out of four specifications, an increase in prosocial preferences of one standard deviation goes along with a 4 to 5 percent of a standard deviation increase in field behavior, with the exception of measure *a*, which is not predictive for the prosociality scale. However, these estimates still suffer from measurement error and are likely biased towards zero.

For more profound claims, we use the introduced ORIV approach to correct our explanatory preferences variables for measurement error.[17] Column (3) in Table 3.3 displays regression results when applying the method to our baseline specifications without family fixed effects. The change in effect magnitude is substantial: a one standard deviation increase in social preferences as captured by an IV-combination of measures *a* and *b* predicts a 14 percent of a standard deviation increase in prosociality ($p = 0.017$) and a 21 percent of a standard deviation increase in the reversed SDQ score ($p = 0.001$). The corrected coefficients are three to five times as high as the potentially attenuated effects observed in the first two columns.

3.4.2 Adding family fixed effects

Combining measurement error correction via ORIV with family fixed effects, as shown in column (4) in Table 3.3, now allows for a more confident statement regarding the importance of preferences for behavior in childhood: controlling for family environment and thus for all common family factors that are constant across siblings leads to notable reductions in the coefficients of social preferences, compared to column (3) results. For both outcomes, the social preferences coefficients are substantially smaller and no longer significant: for prosociality, the social preferences coefficient is reduced by about three-quarter, for the full SDQ by about a half ($p = 0.614$ with the prosociality scale and $p = 0.121$ with the full SDQ score as dependent variable). In general, both, IV estimations and fixed effects estimations, come along with higher standard errors. Yet, moving from ORIV regressions without family fixed effects to ORIV regressions with family fixed effects, we observe only a slight increase in standard errors but a considerable reduction in the sizes of coefficients which leads to them becoming insignificant in fixed effects specifications. These findings are supported by equally strong repercussions we see in the IQ measure. IQ coefficients in family fixed effects regressions in column (4) are reduced to about ten percent of their size from baseline regressions in columns (1) to (3). Reductions in coefficients of our social preferences measures hence

17. In section 3.2, we have already discussed that having multiple measures for the same explanatory variable allows for multiple instrumentation strategies which in general lead to different results. As Gillen, Snowberg, and Yariv (2019) state, with no theoretical foundation to prefer one estimate or the other, it is as likely that the smaller is too small as it is that the larger is too large. Table 3.E.3 in the appendix illustrates exactly these differences in IV results and compares conventional IV strategies, i.e., instrumenting either measure *a* with measure *b* or vice versa, with the ORIV approach.

TABLE 3.3. Main results

	(1) OLS:*a*	(2) OLS:*b*	(3) ORIV	(4) ORIV+FE
Panel A: outcome prosociality scale				
social preferences	0.014	0.049***	0.144**	0.036
	(0.017)	(0.016)	(0.060)	(0.071)
IQ	0.131***	0.134***	0.134***	0.013
	(0.018)	(0.018)	(0.018)	(0.017)
controls	yes	yes	yes	yes
ORIV	no	no	yes	yes
family FE	no	no	no	yes
Observations	3,970	3,970	7,940	7,940
Adj. R^2	0.043	0.045	–	–
F	36.658	39.367	27.319	35.661
First-stage *F*			128.048	30.508
Panel B: outcome SDQ (reversed)				
social preferences	0.054***	0.039**	0.214***	0.113
	(0.017)	(0.016)	(0.064)	(0.073)
IQ	0.144***	0.147***	0.149***	0.016
	(0.020)	(0.020)	(0.020)	(0.020)
controls	yes	yes	yes	yes
ORIV	no	no	yes	yes
family FE	no	no	no	yes
Observations	3,970	3,970	7,940	7,940
Adj. R^2	0.047	0.046	–	–
F	37.101	36.101	26.505	36.428
First-stage *F*			128.048	30.508

NOTES: Standard errors (in parentheses) are clustered at the family level in OLS regressions in columns (1) and (2) and both at the level of the individual and the family in stacked ORIV regressions in columns (3) and (4). Significance at *p<0.10, **p<0.05, ***p<0.01. Dependent variables, preferences, and IQ are standardized to have mean zero and standard deviation one across sample of siblings under study. The dependent outcome variable is the prosociality scale in Panel A and the full SDQ score (reversed) in Panel B. In column (1), the social preferences measure is the amount of shared stars across games 1 & 4 (measure *a*). In column (2), the social preferences measure is the amount of shared stars across games 2 & 3 (measure *b*). Control variables include a dummy for being female, age, and age^2. The first two columns display regular OLS regressions. In column (3), the two social preferences measures *a* and *b* are instrumented with one another following the ORIV approach. In the final column (4), this (ORIV) instrumentation is also applied to a specification including family fixed effects (FE).

do not seem to be pure artefacts of our way to measure social preferences or applying an IV strategy to assess their effects.[18]

This suggests that the estimates on the link between preference measures for children and their outcomes in part reflect their joint correlation with household environment characteristics. The reaction of estimated coefficients to the inclusion of family fixed effects points towards omitted variable bias.[19] Once we include family fixed effects, measures of child preferences no longer seem to contain enough independent and systematic variation to contribute significantly to explaining child outcomes.

3.5 Robustness and discussion

To assess the robustness of our results, we vary and discuss our measures of children's social preferences and field behavior. Also, we contrast our instrumental variables approach with other ways to potentially reduce measurement error. Lastly, Table 3.E.8 in the appendix documents that results are robust when we bootstrap standard errors in our main (OR)IV estimations.

3.5.1 Discussion of social preferences measures

Table 3.E.4 in the appendix shows our main specifications (as displayed in Table 3.3), when pairing social preferences games 1 and 3 (instead of 1 and 4) for measure a and games 2 and 4 (instead of 2 and 3) for measure b. As expected, predictive power in columns (1) and (2) differs from our preferred combination. However, focusing on the relevant comparison of columns (3) and (4), which is the difference between models without and with family fixed effects, both corrected for measurement error, reveals a similar pattern: controlling for family environment and thereby comparing siblings within families reduces the coefficients of social preferences by 50 to 90 percent.

18. Please note that for all (OR)IV regressions, the first-stage F-statistic, used to test for weak instruments, is well above the commonly applied threshold of 10.

19. As discussed for example by Li et al. (2007) or Xue et al. (2020), there might be a further driver for lower effects in family fixed effects estimations: within-family externalities. If the social preferences of one sibling influenced the field behavior of the other sibling (i.e., if the explanatory variable of sibling i influenced the dependent variable of sibling j), the fixed effects estimator would pick up both effects. For illustration, think of siblings i and j in family f and assume the effect of sibling i's social preferences on her or his field behavior would equal the external effect of sibling j's social preferences on i's behavior (for simplicity of the argument we abstract here from further influences and controls): $y_{if} = \alpha + \beta P_{if} + \theta P_{jf} + \phi_f + \varepsilon_{if}$ and $y_{jf} = \alpha + \beta P_{jf} + \theta P_{if} + \phi_f + \varepsilon_{jf}$ with $\beta = \theta$. Then taking differences would lead to the fixed effects estimator being zero since $(y_{if} - y_{jf}) = (\beta - \theta)(P_{if} - P_{jf}) + (\varepsilon_{if} - \varepsilon_{ij})$ is equal to zero in expectation. These within-family externalities are unlikely in our setting as it is well conceivable that the behavior of one sibling influences both the formation of preferences as well as the behavior of the other sibling, but there is no reason to expect a direct influence of one sibling's preferences on the other sibling's behavior. However, we note that if such externalities existed and the preferences effects of both sibling and co-sibling on a given sibling's outcome had the same sign, the family fixed effects estimator would under-estimate the true effect of preferences on the outcome.

Besides, in appendix Table 3.E.5, we replicate results for an alternative way of aggregating the share of stars. Here, we calculate the share of stars given to the other child in every single game first, and take the average of these shares either across games 1 and 4 (for measure *a*) or across games 2 and 3 (for measure *b*). Effects of adding family fixed effects to baseline models remain comparable, i.e., we observe substantial reductions in coefficients of social preferences.

3.5.2 Discussion of measures of field behavior

Given the full SDQ score is a rather broad measure of behavioral and emotional problems, we would a priori expect some items to be related to social preferences more than other items. In particular, it seems plausible that social preferences map into the subset of SDQ items referring to behavior in interpersonal situations. Table 3.E.6 displays results when using the conduct and peer problems subscales of the SDQ as dependent variables in our main regressions. Social preferences have predictive power for conduct (column (3) in Panel A) but not for peer (Panel B) problems as captured by the SDQ items. Including family fixed effects, however, not only comes along with further on insignificant coefficients in the peer domain but also leads to coefficients in the conduct domain becoming smaller and insignificant.

3.5.3 Addressing measurement error

Aggregating several measures into one, averaging across measures, or using dimensionality reduction techniques such as principal component analysis (PCA) are often followed avenues to reduce potential measurement error. Appendix Table 3.E.7 shows results of regressions of field behavior on social preferences without family fixed effects that compare different ways of extracting information from our social preferences games. First, we calculate the share of stars across all four games and use this (standardized) measure in specifications shown in column (1). Second, in column (2), we compute the standardized average across our standardized measures *a* and *b*. Third, we use PCA to generate two independent components reflecting our social preferences games. Details for the PCA are summarized in Table 3.A.2 and Figure 3.A.1, which document that PCA results in two components or eigenvectors with eigenvalues larger than 1. Factor loadings suggest that the first component relates to envy or egalitarian preferences, whereas the second component relates to prosocial behavior in the sense of maximizing the other child's output.

Coefficient sizes are similar to baseline results of single measures (first two columns of Table 3.3) when taking the above mentioned steps. Applying ORIV as in Table 3.E.7 column (4), however, yields by far the strongest changes. If having two tantamount measures for the same variable of interest (or two separate elicitations of the same measure), it seems to be most promising to use an IV strategy to correct for measurement error. ORIV here consolidates information from different ways of doing so.

3.6 Conclusion

At first sight, capturing prosociality seems straightforward: prosociality is an attitude or behavior meant to benefit others. If we spot prosocial behavior, we recognize it as such. And still, this so obviously prosocial behavior might be driven by a myriad of motivations or appear in a different light when embedded in a different context. Imagine a child sharing his or her toys with another child. Observing this act of giving, do we simply observe a friendly child full of concern for the well-being of the other child? Or is s/he trying to establish an atmosphere of giving to profit from later on? Does the child feel a warm glow when giving, follow a norm of giving, or was s/he just told to share?

This paper adds to a better understanding of the link between children's and adolescents' preferences and their field behavior. How do other-regarding preferences measured in incentivized experiments relate to children's observed everyday behavior? The importance of prosocial behavior for individuals themselves and for society as a whole has been documented in numerous studies. Prosocial behavior may, for example, produce positive and inclusive social interactions, and counteract social exclusion and conflict (Luengo Kanacri et al., 2021). It has been linked to labor market success worldwide (Kosse and Tincani, 2020) and incorporates acts of donation and volunteering decisions (Falk et al., 2018). Given path-dependency in attitudes as well as the consequences of (mis)behavior and emotional well-being in early life for outcomes later in life (think of, for example, mental health processes and development over the life course or the aftermath of juvenile delinquency as extreme cases), gaining a deeper understanding of what drives the behavior of children and adolescents is relevant. Research is providing more insights into the formation of (early) social preferences (see, e.g., Kosse et al., 2020). However, are social preferences in childhood driving behavior?

To gain more knowledge, we take advantage of having information on almost 2,000 pairs of siblings. These data allow for the first time analyzing the link between children's social preferences and field behavior in family fixed effects models that control for all family- or household-invariant characteristics shared by siblings. We establish the predictive power of other-regarding preferences measured in simple distribution games that abstract from strategic reasoning by using one-shot interactions between children and unknown counterparts. We relate these revealed preferences to prosocial behaviors in everyday life and behavioral difficulties that are captured by the well-established Strengths and Difficulties Questionnaire. To validate our assessment, we correct for measurement error by applying a comprehensive instrumental variables strategy (termed *obviously related instrumental variables* (ORIV) approach and put forward by Gillen, Snowberg, and Yariv, 2019). Holding the family environment constant, we observe a sharp decline in the predictive power of preferences for the field behavior under study. Thus, our contribution here is twofold: we add to the scarce literature on the link between children's preferences and behavior, especially in the social domain. At

the same time, we provide empirical evidence for the disturbing presence and consequences of measurement error in experimental work.

Our results are supportive of what earlier research has established. Previous studies have shown that family environment matters both for preference formation (Bauer, Chytilová, and Pertold-Gebicka, 2014; Alan and Ertac, 2017; Doepke and Zilibotti, 2017; Cobb-Clark, Salamanca, and Zhu, 2019; Kosse et al., 2020; Falk et al., 2021) and child outcomes (Currie, 2001; Bradley and Corwyn, 2002; Currie and Moretti, 2003; Ruhm and Waldfogel, 2012; Heckman and Mosso, 2014). In that sense, our results that the predictive power of childhood preferences decreases when controlling for the family environment that siblings share in the most comprehensive possible manner in the fixed effects specifications are not unexpected. The extent, however, may seem surprising and merits attention, given the recent evidence that also the social environment beyond the family plays a significant role in shaping children's preferences.[20] In our sample of children in rural villages in Bangladesh, the social environment—e.g., school and teachers, peers, village characteristics—might be shared by siblings to an even stronger degree than in other, e.g., more urban, contexts.

Taking a broader perspective, our findings raise the general question of what experimental measures of childhood preferences ultimately capture. Measures of children's and adolescents' preferences seem to partly reflect the family environment that is shared by siblings. This underlines the urgent need to include the family or household environment in investigations that aim to better understand child behavior. Besides, any study using experimental measures should thoroughly address the problem of measurement error.

In contrast to the malleable and still emerging preferences of children and adolescents, adult preferences are assumed to be largely stable (Heckman, 2007; Schildberg-Hörisch, 2018) and less responsive to family and social environment. Future research could aim at providing evidence whether, and if yes, to what extent, our results carry over to adults.

References

Alan, Sule, Nazli Baydar, Teodora Boneva, and Thomas F Crossley. 2017. "Transmission of Risk Preferences from Mothers to Daughters." *Journal of Economic Behavior & Organization* 134: 60–77. [131]

Alan, Sule, and Seda Ertac. 2017. "Belief in Hard Work and Altruism: Evidence from a Randomized Field Experiment." Working Paper. Mimeo. [150]

Almås, Ingvild, Alexander W Cappelen, Kjell G Salvanes, Erik Ø Sørensen, and Bertil Tungodden. 2016. "Willingness to Compete: Family Matters." *Management Science* 62 (8): 2149–62. [131]

20. For recent contributions, see Kosse et al. (2020) for the effect of an out-of-school mentoring program and Cappelen et al. (2020) for the effect of early education on social preferences. Rodríguez-Planas (2012) and Kautz et al. (2014) provide overviews on mentoring programs and childhood interventions and their impact on children's non-cognitive skills.

Amin, Vikesh, Jere R Behrman, and Hans-Peter Kohler. 2015. "Schooling Has Smaller or Insignificant Effects on Adult Health in the US than Suggested by Cross-Sectional Associations: New Estimates Using Relatively Large Samples of Identical Twins." *Social Science & Medicine* 127: 181–89. [137]

Anger, Silke, and Daniel D Schnitzlein. 2017. "Cognitive Skills, Non-Cognitive Skills, and Family Background: Evidence From Sibling Correlations." *Journal of Population Economics* 30 (2): 591–620. [143]

Angrist, Joshua D, and Jörn-Steffen Pischke. 2015. *Mastering 'Metrics: The Path from Cause to Effect.* Princeton University Press. [138]

Attanasio, Orazio, Richard Blundell, Gabriella Conti, and Giacomo Mason. 2020. "Inequality in Socio-Emotional Skills: A Cross-Cohort Comparison." *Journal of Public Economics* 191: 104171. [142]

Bauer, Michal, Julie Chytilová, and Barbara Pertold-Gebicka. 2014. "Parental Background and Other-regarding Preferences in Children." *Experimental Economics* 17 (1): 24–46. [131, 140, 150]

Becker, Anke, Thomas Deckers, Thomas Dohmen, Armin Falk, and Fabian Kosse. 2012. "The Relationship Between Economic Preferences and Psychological Personality Measures." *Annual Review of Economics* 4 (1): 453–78. [129]

Bénabou, Roland, and Jean Tirole. 2006. "Incentives and Prosocial Behavior." *American Economic Review* 96 (5): 1652–78. [129]

Bertrand, Marianne, and Sendhil Mullainathan. 2001. "Do People Mean What They Say? Implications for Subjective Survey Data." *American Economic Review* 91 (2): 67–72. [130]

Bisin, Alberto, and Thierry Verdier. 2000. ""Beyond the Melting Pot": Cultural Transmission, Marriage, and the Evolution of Ethnic and Religious Traits." *Quarterly Journal of Economics* 115 (3): 955–88. [131]

Blackwell, Matthew, James Honaker, and Gary King. 2017. "A Unified Approach to Measurement Error and Missing Data: Overview and Applications." *Sociological Methods & Research* 46 (3): 303–41. [130]

Boardman, Jason D, and Jason M Fletcher. 2015. "To Cause or Not to Cause? That is the Question, but Identical Twins Might Not Have All of the Answers." *Social Science & Medicine* 127: 198–200. [137]

Bolton, Gary E, and Axel Ockenfels. 2000. "ERC: A Theory of Equity, Reciprocity, and Competition." *American Economic Review* 90 (1): 166–93. [129]

Bradley, Robert H, and Robert F Corwyn. 2002. "Socioeconomic Status and Child Development." *Annual Review of Psychology* 53 (1): 371–99. [150]

Brañas-Garza, Pablo, Antonio M Espín, and Shoshana Neuman. 2014. "Religious Pro-Sociality? Experimental Evidence from a Sample of 766 Spaniards." *PLoS ONE* 9 (8): e104685. [131]

Brenoe, Anne Ardila, and Thomas Epper. 2019. "Parenting Values Moderate the Intergenerational Transmission of Time Preferences." IZA DP No. 12710. IZA Institute of Labor Economics. [131]

Briole, Simon, Hélène Le Forner, and Anthony Lepinteur. 2020. "Child's Socio-Emotional Skills: Is There a Quantity-Quality Trade-off?" *Labour Economics* 64: 101811. [142]

Buchanan, Tony W, and Stephanie D Preston. 2014. "Stress Leads to Prosocial Action in Immediate Need Situations." *Frontiers in Behavioral Neuroscience* 8 (5): 1–6. [131]

Burks, Stephen V, Daniele Nosenzo, Jon Anderson, Matthew Bombyk, Derek Ganzhorn, Lorenz Götte, and Aldo Rustichini. 2016. "Lab Measures of Other-Regarding Preferences Can Predict Some Related On-the-Job Behavior: Evidence from a Large Scale Field Experiment." IZA DP No. 9767. IZA Institute of Labor Economics. [129]

Campos-Vazquez, Raymundo M. 2018. "Intergenerational Persistence of Skills and Socioeconomic Status." *Journal of Family and Economic Issues* 39 (3): 509–23. [131]

Cappelen, Alexander, John List, Anya Samek, and Bertil Tungodden. 2020. "The Effect of Early-Childhood Education on Social Preferences." *Journal of Political Economy* 128 (7): 2739–58. [130, 150]

Carpenter, Jeffrey, and Erika Seki. 2011. "Do Social Preferences Increase Productivity? Field Experimental Evidence from Fishermen in Toyama Bay." *Economic Inquiry* 49 (2): 612–30. [129]

Castillo, Marco, Paul J Ferraro, Jeffrey L Jordan, and Ragan Petrie. 2011. "The Today and Tomorrow of Kids: Time Preferences and Educational Outcomes of Children." *Journal of Public Economics* 95 (11–12): 1377–85. [132]

Castillo, Marco, Jeffrey L Jordan, and Ragan Petrie. 2018. "Children's Rationality, Risk Attitudes and Field Behavior." *European Economic Review* 102: 62–81. [132]

Castillo, Marco, Jeffrey L Jordan, and Ragan Petrie. 2019. "Discount Rates of Children and High School Graduation." *Economic Journal* 129 (619): 1153–81. [132]

Ceccato, Smarandita, Sara E Kettner, Brigitte M Kudielka, Christiane Schwieren, and Andreas Voss. 2018. "Social Preferences under Chronic Stress." *PLoS ONE* 13 (7): e0199528. [131]

Cesarini, David, Christopher T Dawes, Magnus Johannesson, Paul Lichtenstein, and Björn Wallace. 2009. "Genetic Variation in Preferences for Giving and Risk Taking." *Quarterly Journal of Economics* 124 (2): 809–42. [131]

Charness, Gary, and Matthew Rabin. 2002. "Understanding Social Preferences with Simple Tests." *Quarterly Journal of Economics* 117 (3): 817–69. [129]

Chowdhury, Shyamal, Matthias Sutter, and Klaus F Zimmermann. 2022. "Economic Preferences across Generations and Family Clusters: A Large-Scale Experiment in a Developing Country." *Journal of Political Economy* 130 (9): 2361–410. [131]

Cobb-Clark, Deborah A, Nicolás Salamanca, and Anna Zhu. 2019. "Parenting Style as an Investment in Human Development." *Journal of Population Economics,* 1–38. [131, 150]

Cornelissen, Thomas, and Christian Dustmann. 2019. "Early School Exposure, Test Scores, and Noncognitive Outcomes." *American Economic Journal: Economic Policy* 11 (2): 35–63. [142]

Cunha, Flavio, and James J Heckman. 2007. "The Technology of Skill Formation." *American Economic Review* 97 (2): 31–47. [129, 131]

Currie, Janet. 2001. "Early Childhood Education Programs." *Journal of Economic Perspectives* 15 (2): 213–38. [150]

Currie, Janet, and Enrico Moretti. 2003. "Mother's Education and the Intergenerational Transmission of Human Capital: Evidence from College Openings." *Quarterly Journal of Economics* 118 (4): 1495–532. [150]

Currie, Janet, and Mark Stabile. 2006. "Child Mental Health and Human Capital Accumulation: The Case of ADHD." *Journal of Health Economics* 25 (6): 1094–118. [137]

Currie, Janet, Mark Stabile, Phongsack Manivong, and Leslie L Roos. 2010. "Child Health and Young Adult Outcomes." *Journal of Human Resources* 45 (3): 517–48. [137]

Deming, David J. 2017. "The Growing Importance of Social Skills in the Labor Market." *Quarterly Journal of Economics* 132 (4): 1593–640. [129]

Detlefsen, Lena, Andreas Friedl, Katharina Lima de Miranda, Ulrich Schmidt, and Matthias Sutter. 2018. "Are Economic Preferences Shaped by the Family Context? The Impact of Birth Order and Siblings' Sex Composition on Economic Preferences." IZA DP No. 11949. IZA Institute of Labor Economics. [131, 137, 143]

Doepke, Matthias, and Fabrizio Zilibotti. 2017. "Parenting With Style: Altruism and Paternalism in Intergenerational Preference Transmission." *Econometrica* 85 (5): 1331–71. [130, 132, 150]

Dohmen, Thomas, Armin Falk, David Huffman, and Uwe Sunde. 2009. "Homo Reciprocans: Survey Evidence on Behavioural Outcomes." *Economic Journal* 119 (536): 592–612. [129]

Dohmen, Thomas, Armin Falk, David Huffman, and Uwe Sunde. 2012. "The Intergenerational Transmission of Risk and Trust Attitudes." *Review of Economic Studies* 79: 645–77. [131]

Donovan, Stephen J, and Ezra Susser. 2011. "Commentary: Advent of Sibling Designs." *International Journal of Epidemiology* 40 (2): 345–49. [137]

Doyle, Orla, Colm Harmon, James J Heckman, Caitriona Logue, and Seong Hyeok Moon. 2017. "Early Skill Formation and the Efficiency of Parental Investment: A Randomized Controlled Trial of Home Visiting." *Labour Economics* 45: 40–58. [131]

Falk, Armin, Anke Becker, Thomas Dohmen, Benjamin Enke, David Huffman, and Uwe Sunde. 2018. "Global Evidence on Economic Preferences." *Quarterly Journal of Economics* 133 (4): 1645–92. [129, 149]

Falk, Armin, and Urs Fischbacher. 2006. "A Theory of Reciprocity." *Games and Economic Behavior* 54 (2): 293–315. [129]

Falk, Armin, and Fabian Kosse. 2016. "Early Childhood Environment, Breastfeeding and the Formation of Preferences." HCEO Working Paper No. 2016-036. Human Capital and Economic Opportunity Global Working Group (HCEO). [131]

Falk, Armin, Fabian Kosse, Pia Pinger, Hannah Schildberg-Hörisch, and Thomas Deckers. 2021. "Socio-Economic Status and Inequalities in Children's IQ and Economic Preferences." *Journal of Political Economy* 129 (9): 2504–45. [130–132, 150]

Fehr, Ernst, Helen Bernhard, and Bettina Rockenbach. 2008. "Egalitarianism in Young Children." *Nature* 454 (7208): 1079–83. [140]

Fehr, Ernst, and Klaus M Schmidt. 1999. "A Theory of Fairness, Competition, and Cooperation." *Quarterly Journal of Economics* 114 (3): 817–68. [129]

Flèche, Sarah. 2017. "Teacher Quality, Test Scores and Non-Cognitive Skills: Evidence from Primary School Teachers in the UK." CEP Discussion Paper No 1472 1472. Centre for Economic Performance (CEP). [142]

Fletcher, Jason M. 2013. "Adolescent Depression and Adult Labor Market Outcomes." *Southern Economic Journal* 80 (1): 26–49. [137]

Fletcher, Jason M. 2014. "The Effects of Childhood ADHD on Adult Labor Market Outcomes." *Health Economics* 23 (2): 159–81. [137]

Fujiwara, Takeo, and Ichiro Kawachi. 2009. "Is Education Causally Related to Better Health? A Twin Fixed-Effect Study in the USA." *International Journal of Epidemiology* 38 (5): 1310–22. [137]

Gillen, Ben, Erik Snowberg, and Leeat Yariv. 2019. "Experimenting with Measurement Error: Techniques with Applications to the Caltech Cohort Study." *Journal of Political Economy* 127 (4): 1826–63. [130, 131, 135, 136, 139, 145, 149]

Gilman, Stephen E, and Eric B Loucks. 2014. "Another Casualty of Sibling Fixed-Effects Analysis of Education and Health: An Informative Null, or Null Information?" *Social Science & Medicine (1982)* 118: 191–93. [137]

Goodman, Robert, D Renfrew, and Mohammad SI Mullick. 2000. "Predicting Type of Psychiatric Disorder from Strengths and Difficulties Questionnaire (SDQ) Scores in Child Mental Health Clinics in London and Dhaka." *European Child & Adolescent Psychiatry* 9 (2): 129–34. [142]

Gupta, Nabanita Datta, and Marianne Simonsen. 2010. "Non-Cognitive Child Outcomes and Universal High Quality Child Care." *Journal of Public Economics* 94 (1-2): 30–43. [142]

Guryan, Jonathan, Erik Hurst, and Melissa Kearney. 2008. "Parental Education and Parental Time with Children." *Journal of Economic Perspectives* 22 (3): 23–46. [131]

Haushofer, Johannes, and Ernst Fehr. 2014. "On the Psychology of Poverty." *Science* 344 (6186): 862–67. [131]

Hausman, Jerry. 2001. "Mismeasured Variables in Econometric Analysis: Problems from the Right and Problems from the Left." *Journal of Economic Perspectives* 15 (4): 57–67. [134]

Heckman, James J. 2007. "The Economics, Technology, and Neuroscience of Human Capability Formation." *Proceedings of the National Academy of Sciences (PNAS)* 104 (33): 13250–55. [150]

Heckman, James J. 2008. "Schools, Skills, and Synapses." *Economic Inquiry* 46 (3): 289–324. [131]

Heckman, James J, and Stefano Mosso. 2014. "The Economics of Human Development and Social Mobility." *Annual Review of Economics* 6 (1): 689–733. [131, 150]

Hoosen, Nikhat, Eugene Lee Davids, Petrus J de Vries, and Maylene Shung-King. 2018. "The Strengths and Difficulties Questionnaire (SDQ) in Africa: A Scoping Review of its Application and Validation." *Child and Adolescent Psychiatry and Mental Health* 12 (1): 6. [142]

Jennings, Jared N, Jung Min Kim, Joshua A Lee, and Daniel J Taylor. 2022. "Measurement Error, Fixed Effects, and False Positives in Accounting Research." Working Paper 3731197. Social Science Research Network (SSRN). [133]

Karlan, Dean S. 2005. "Using Experimental Economics to Measure Social Capital and Predict Financial Decisions." *American Economic Review* 95 (5): 1688–99. [129]

Kautz, Tim, James J Heckman, Ron Diris, Bas ter Weel, and Lex Borghans. 2014. "Fostering and Measuring Skills: Improving Cognitive and Non-Cognitive Skills to Promote Lifetime Success." OECD Education Working Paper No. 110. OECD Publishing, Paris. [150]

Kiessling, Lukas. 2021. "How Do Parents Perceive the Returns to Parenting Styles and Neighborhoods?" *European Economic Review* 139: 103906. [135]

Kosse, Fabian, Thomas Deckers, Pia Pinger, Hannah Schildberg-Hörisch, and Armin Falk. 2020. "The Formation of Prosociality: Causal Evidence on the Role of Social Environment." *Journal of Political Economy* 128 (2): 434–67. [130, 132, 149, 150]

Kosse, Fabian, and Friedhelm Pfeiffer. 2012. "Impatience Among Preschool Children and their Mothers." *Economics Letters* 115 (3): 493–95. [131]

Kosse, Fabian, and Michela M Tincani. 2020. "Prosociality Predicts Labor Market Success Around the World." *Nature Communications* 11 (1): 1–6. [149]

Kühnle, Daniel, and Michael Oberfichtner. 2020. "Does Starting Universal Childcare Earlier Influence Children's Skill Development?" *Demography* 57: 61–98. [142]

Li, Hongbin, Pak Wai Liu, Junsen Zhan, and Ning Ma. 2007. "Economic Returns to Communist Party Membership: Evidence from Urban Chinese Twins." *Economic Journal* 117 (523): 1504–20. [147]

List, John A, Ragan Petrie, and Anya Samek. 2021. "How Experiments with Children Inform Economics." NBER Working Paper 28825. National Bureau of Economic Research (NBER). Forthcoming in *Journal of Economic Literature*. [130]

Luengo Kanacri, Bernadette Paula, Nancy Eisenberg, Carlo Tramontano, Antonio Zuffiano, Maria Giovanna Caprara, Evangelina Regner, Liqi Zhu, Concetta Pastorelli, and Gian Vittorio Caprara. 2021. "Measuring Prosocial Behaviors: Psychometric Properties and Cross-National Validation of the Prosociality Scale in Five Countries." *Frontiers in Psychology* 12: 693174. [149]

Lundborg, Petter. 2013. "The Health Returns to Schooling—What Can we Learn from Twins?" *Journal of Population Economics* 26 (2): 673–701. [137]

Madsen, Mia, Per K Andersen, Mette Gerster, Anne-Marie N Andersen, Kaare Christensen, and Merete Osler. 2014. "Are the Educational Differences in Incidence of Cardiovascular Disease Explained by Underlying Familial Factors? A Twin Study." *Social Science & Medicine* 118: 182–90. [137]

Meijer, Erik, Edward Oczkowski, and Tom Wansbeek. 2021. "How Measurement Error Affects Inference in Linear Regression." *Empirical Economics* 60 (1): 131–55. [130]

Pischke, Jörn-Steffen. 2007. "Lecture Notes on Measurement Error." Unpublished Lecture Notes. London School of Economics. [134, 138]

Rodríguez-Planas, Núria. 2012. "Mentoring, Educational Services, and Incentives to Learn: What Do We Know about Them?" *Evaluation and Program Planning* 35 (4): 481–90. [150]

Ruhm, Christopher, and Jane Waldfogel. 2012. "Long-Term Effects of Early Childhood Care and Education." *Nordic Economic Policy Review* 1 (1): 23–51. [150]

Rustagi, Devesh, Stefanie Engel, and Michael Kosfeld. 2010. "Conditional Cooperation and Costly Monitoring Explain Success in Forest Commons Management." *Science* 330 (6006): 961–65. [129]

Sandewall, Örjan, David Cesarini, and Magnus Johannesson. 2014. "The Co-Twin Methodology and Returns to Schooling—Testing a Critical Assumption." *Labour Economics* 26: 1–10. [137]

Schennach, Susanne M. 2016. "Recent Advances in the Measurement Error Literature." *Annual Review of Economics* 8: 341–77. [130]

Schildberg-Hörisch, Hannah. 2011. "Does Parental Employment Affect Children's Educational Attainment?" *Economics of Education Review* 30 (6): 1456–67. [137]

Schildberg-Hörisch, Hannah. 2018. "Are Risk Preferences Stable?" *Journal of Economic Perspectives* 32 (2): 135–54. [150]

Schneider, Sebastian O, and Matthias Sutter. 2021. "Higher Order Risk Preferences: Novel Method, New Measures, Determinants and Field Behavior." Working Paper. Mimeo. [135]

Starcke, Katrin, and Matthias Brand. 2012. "Decision Making Under Stress: A Selective Review." *Neuroscience & Biobehavioral Reviews* 36 (4): 1228–48. [131]

Sutter, Matthias, Martin G Kocher, Daniela Glätzle-Rützler, and Stefan T Trautmann. 2013. "Impatience and Uncertainty: Experimental Decisions Predict Adolescents' Field Behavior." *American Economic Review* 103 (1): 510–31. [132]

Sutter, Matthias, Claudia Zoller, and Daniela Glätzle-Rützler. 2019. "Economic Behavior of Children and Adolescents – A First Survey of Experimental Economics Results." *European Economic Review* 111: 98–121. [130, 143]

Van Kippersluis, Hans, Pietro Biroli, Titus J Galama, Stephanie von Hinke, S Fleur W Meddens, Dilnoza Muslimova, Rita Pereira, and Cornelius A Rietveld. 2021. "Using Obviously-Related Instrumental Variables to Increase the Predictive Power of Polygenic Scores." Working Paper. bioRxiv. [135, 139]

Wechsler, David. 2003. *The Wechsler Intelligence Scale for Children.* 4th ed. Pearson. [141]

Wooldridge, Jeffrey M. 2010. *Econometric Analysis of Cross Section and Panel Data.* 2nd. Cambridge, Massachusetts; London, England: The MIT Press. [133]

Xue, Sen, Michael P Kidd, Anh T Le, Kathy Kirk, and Nicholas G Martin. 2020. "The Role of Locus of Control in Adulthood Outcomes: Evidence from Australian Twins." *Journal of Economic Behavior and Organization* 179: 566–88. [135, 137, 139, 147]

Zyphur, Michael J, Jayanth Narayanan, Richard D Arvey, and Gordon J Alexander. 2009. "The Genetics of Economic Risk Preferences." *Journal of Behavioral Decision Making* 22 (4): 367–77. [131]

Appendix 3.A Details on social preferences measures

TABLE 3.A.1. Correlations of social preferences measures and games

	(1) stars	(2) stars *a*	(3) stars *b*	(4) game 1	(5) game 2	(6) game 3	(7) game 4
stars across all games	1						
stars *a* (games 1&4)	0.865	1					
	[0.000]						
stars *b* (games 2&3)	0.658	0.218	1				
	[0.000]	[0.000]					
prosocial in game 1	0.672	0.776	0.113	1			
	[0.000]	[0.000]	[0.000]				
prosocial in game 2	0.544	0.258	0.690	0.315	1		
	[0.000]	[0.000]	[0.000]	[0.000]			
prosocial in game 3	0.304	-0.002	0.615	-0.193	-0.117	1	
	[0.000]	[0.886]	[0.000]	[0.000]	[0.000]		
prosocial in game 4	0.332	0.364	0.151	-0.252	-0.082	0.296	1
	[0.000]	[0.000]	[0.000]	[0.000]	[0.000]	[0.000]	

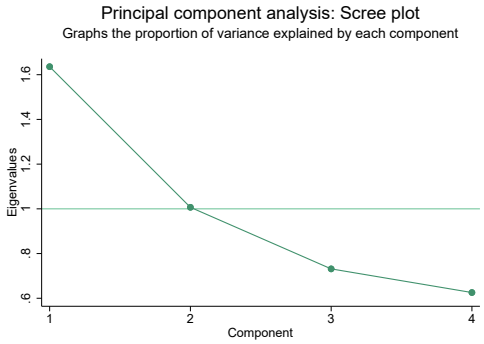
NOTES: Displayed are pairwise correlations between measures and games. Stars measures are aggregated as described in data section 3.3.1. Decisions in single games are coded such that the respective indicator variables equal one if the child acts more prosocially, i.e., maximizes the other child's amount of stars. This implies making the egalitarian choices in games 1 and 2 and the non-egalitarian choices in games 3 and 4. *p*-values in brackets, 3,970 observations for all combinations.

TABLE 3.A.2. Principal component analysis (PCA) of social preferences

	(1)	(2)	(3)
Panel A: eigenvalues			
Component	Eigenvalue	Proportion	Cumulative
component 1	1.635900	0.4090	0.4090
component 2	1.006920	0.2517	0.6607
component 3	0.731524	0.1829	0.8436
component 4	0.625664	0.1564	1.0000
Panel B: principal components (eigenvectors)			
Variable	Component 1	Component 2	Unexplained
prosocial in game 1	0.5637	0.3120	0.3822
prosocial in game 2	0.4341	0.5758	0.2318
prosocial in game 3	−0.4874	0.4625	0.3960
prosocial in game 4	−0.5062	0.4817	0.3471

NOTES: Displayed are results from a principal component analysis (PCA) of the four social preferences games. Decisions in single games are coded such that the respective indicator variables equal one if the child acts more prosocially, i.e., maximizes the other child's amount of stars. This implies making the egalitarian choices in games 1 and 2 and the non-egalitarian choices in games 3 and 4. 3,970 observations. The first two components have eigenvalues larger than 1. Columns (2) and (3) in Panel A give the proportion of variance that is explained by the single components (the eigenvalues of the components add up to the sum of the variances of the games dummies, i.e., the "total variance" of these variables). Columns (1) and (2) in Panel B give the corresponding eigenvectors of the first two components with the respective factor loadings of the four games (loadings are the correlations between the original variables and the unit-scaled components; the column-wise sum of the squares of the loadings is 1). Column (3) in Panel B gives the portion of the respective variance of the single games that is not explained by the first two components.

FIGURE 3.A.1. PCA scree plot



NOTES: Figure displays the eigenvalues of the components from the PCA.

Appendix 3.B Details on field behavior measures

3.B.1 SDQ prosociality scale

The prosociality scale is a standalone subscale of the Strengths and Difficulties Questionnaire (SDQ) and is elicited asking mothers about their children. Mothers rated five items related to prosocial behavior of their children on a three-point scale ("not true," "somewhat true," "certainly true"):

My child...

(1) Is considerate of other people's feelings
(2) Shares readily with other children (treats, toys, pencils, etc.)
(3) Is helpful if someone is hurt, upset or feeling ill
(4) Is kind to younger children
(5) Often volunteers to help others (parents, teachers, children)

3.B.2 SDQ score

The full SDQ score comprises the four subscores "conduct problems," "hyperactivity," "peer problems," and "emotional symptoms," and is elicited asking mothers about their children. For each subscale, mothers rated five items on a three-point scale ("not true," "somewhat true," "certainly true"). Items for conduct problems and hyperactivity can be grouped into an externalizing subscale, items for peer problems and emotional symptoms into an internalizing subscale.

Externalizing subscale

Conduct problems My child...

(1) Often has temper tantrums or hot tempers
(2) Is generally obedient, usually does what adults request (*reversed*)
(3) Often fights with other children or bullies them
(4) Often lies or cheats
(5) Steals from home, school or elsewhere

Hyperactivity My child...

(1) Is restless, overactive, cannot stay still for long
(2) Is constantly fidgeting or squirming
(3) Is easily distracted, concentration wanders
(4) Thinks things out before acting (*reversed*)
(5) Sees tasks through to the end, good attention span (*reversed*)

Internalizing subscale

Peer problems My child...

(1) Is rather solitary, tends to play alone
(2) Has at least one good friend (*reversed*)
(3) Is generally liked by other children (*reversed*)
(4) Is picked on or bullied by other children
(5) Gets on better with adults than with other children

Emotional symptoms My child...

(1) Often complains of headaches, stomach-ache or sickness
(2) Has many worries, often seems worried
(3) Is often unhappy, down-hearted or tearful
(4) Is nervous or clingy in new situations, easily loses confidence
(5) Has many fears, is easily scared

Appendix 3.C Additional summary statistics

TABLE 3.C.1. Additional summary statistics for sample of siblings

	Mean	Std. dev.	Min.	Max.	Obs.
Preferences & field behavior					
share of stars given across games 1&4	0.45	0.10	0.25	0.57	3,970
share of stars given across games 2&3	0.49	0.09	0.33	0.60	3,970
share of stars given across all games	0.47	0.07	0.29	0.58	3,970
prosociality	6.46	2.27	0	10	3,970
SDQ	11.57	5.31	1	32	3,970
Household characteristics					
income in 100 Taka	1,935.38	3,542.50	-12,449	102,789	3,960
homestead area (in sqm)	387.44	392.18	4	3,840	3,964
electricity connection	0.91		0	1	3,964
no of siblings	2.62	1.40	0	10	3,970
senior in household	0.20		0	1	3,970
Muslim household	0.82		0	1	3,964
Parents' characteristics					
father: age	43.05	7.64	27	85	3,776
mother: age	35.91	5.69	20	67	3,821
father: literacy	0.54		0	1	3,776
mother: literacy	0.64		0	1	3,821

NOTES: Table displays summary statistics for our sample of siblings under study. For preferences and behaviors, unstandardized measures are displayed. Shared stars are calculated as described in section 3.3.1. Prosociality ranges from 0 to 10, SDQ from 0 to 40. Electricity connection, senior in household, and Muslim household are dummy variables for households having an electricity connection, having a senior (grandparent) living in the household, or being a Muslim household. Parents' ages are measured in years and literacy is a dummy variable indicating the ability to read and write.

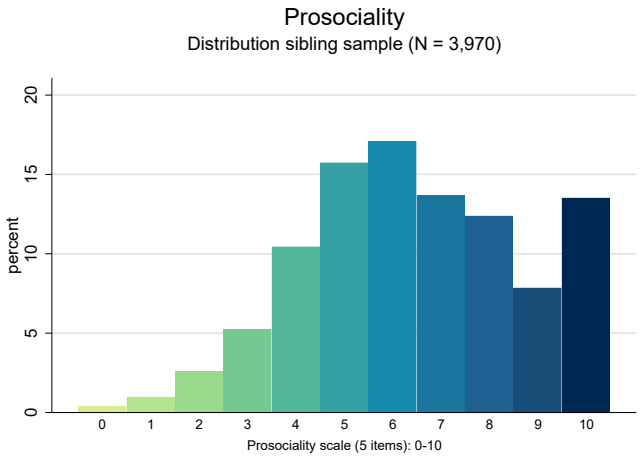
TABLE 3.C.2. Comparison of sample of siblings with full sample

	Mean siblings	Std. dev. siblings	Difference	Obs. siblings	Obs. whole
Preferences & behavior					
share of stars given across games 1&4 (*a*)	0.00	1.00	-0.00	3,970	5,765
share of stars given across games 2&3 (*b*)	0.01	1.00	-0.01	3,970	5,766
share of stars given across all games	0.01	1.00	-0.01	3,970	5,765
prosociality	-0.01	1.00	0.01	3,970	5,793
SDQ	0.01	1.01	-0.01	3,970	5,793
Individual characteristics					
IQ	-0.04	0.99	0.04*	3,970	5,989
female	0.52		0.01	3,970	5,989
age	10.44	2.65	-0.14***	3,970	5,989
literacy	0.95		0.00	3,952	5,933
Household characteristics					
income in 100 Taka	1,935.38	3,542.50	38.21	3,960	5,964
homestead area (in sqm)	387.44	392.18	5.06	3,964	5,969
electricity connection	0.91		0.00	3,964	5,969
no of siblings	2.62	1.40	-0.11***	3,970	5,989
senior in household	0.20		-0.00	3,970	5,989
Muslim household	0.82		0.00	3,964	5,975
Parents' characteristics					
father: literacy	0.54		0.01	3,776	5,621
mother: literacy	0.64		0.01	3,821	5,697
father: age	43.05	7.64	0.03	3,776	5,621
mother: age	35.91	5.69	0.06	3,821	5,697

NOTES: Table displays comparison of sibling sample (two siblings aged 6-16 in household with non-missing values for all relevant variables) with whole sample (all children aged 6-16 participating in experiments) via t-tests. For preferences, behavior, and IQ, measures are standardized to have mean zero and standard deviation one across the whole sample. Shared stars are calculated as described in section 3.3.1. Female is a dummy variable for being a girl, age is measured in years. Literacy is a dummy variable indicating the ability to read and write. Electricity connection, senior in household, and Muslim household are dummy variables for households having an electricity connection, having a senior (grandparent) living in the household, or being a Muslim household. Difference = mean(full sample)–mean(sibling sample), i.e., positive values indicate a lower mean for the sibling sample. Significance at $^{*}p<0.10$, $^{**}p<0.05$, $^{***}p<0.01$.

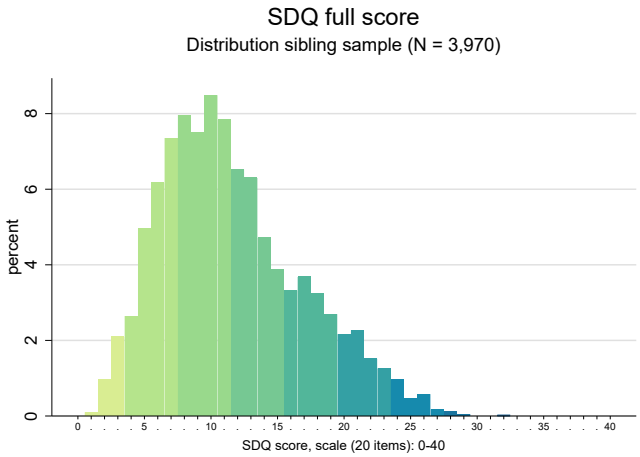
Appendix 3.D Distributions

FIGURE 3.D.1. Distribution of prosociality scale



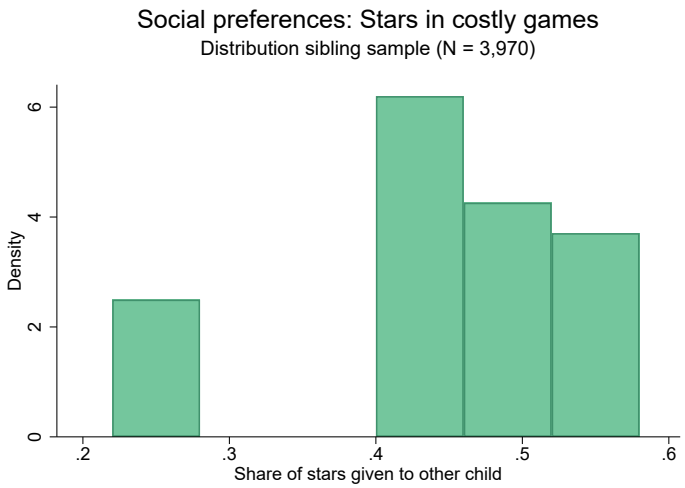
NOTES: Figure displays the distribution of the unstandardized SDQ prosociality scale (ranging from 0 to 10). For our analysis, the score is standardized to have mean zero and standard deviation one across our sample of siblings.

FIGURE 3.D.2. Distribution of SDQ score

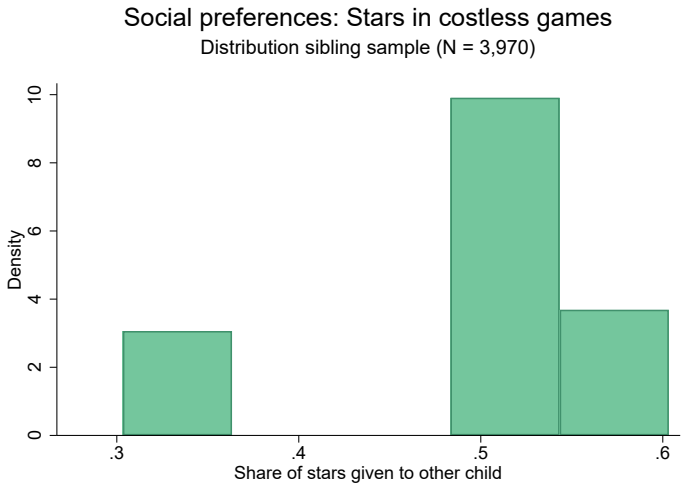


NOTES: Figure displays the distribution of the unstandardized SDQ score (ranging from 0 to 40). For our analysis, the score is reversed and standardized to have mean zero and standard deviation one across our sample of siblings.

FIGURE 3.D.3. Distributions of social preferences measures



(A) Measure *a*: share of stars given across ("costly") games 1&4



(B) Measure *b*: shared of stars given across ("costless") games 2&3

NOTES: Figures display the distributions of our two measures for social preferences (unstandardized): the share of stars given to the other child across games 1 & 4 (measure *a*: ranging from .25 to .57) as well as across games 2 & 3 (measure *b*: ranging from .33 to .6). For our analysis, the measures are standardized to have mean zero and standard deviation one across our sample of siblings.

TABLE 3.D.1. Correlations of preferences, IQ, and field behavior between siblings

Measure	Unadjusted/net	Correlation	*p*-value	Obs.
share of stars given across games 1&4 (*a*)	unadjusted	0.164	0.000	1,985
	net measures	0.164	0.000	1,985
share of stars given across games 2&3 (*b*)	unadjusted	0.086	0.000	1,985
	net measures	0.085	0.000	1,985
share of stars given across all games	unadjusted	0.187	0.000	1,985
	net measures	0.188	0.000	1,985
IQ	unadjusted	0.439	0.000	1,985
	net measures	0.416	0.000	1,985
prosociality	unadjusted	0.668	0.000	1,985
	net measures	0.664	0.000	1,985
SDQ	unadjusted	0.672	0.000	1,985
	net measures	0.672	0.000	1,985

NOTES: Displayed are Pearson correlation coefficients between measures for siblings. Unadjusted measures are simple correlations. Net measures are generated by regressing measures on gender, age, and age squared and predicting residual values. Correlations of unadjusted measures and measures net of gender and age are very similar.

TABLE 3.D.2. Variation in preferences, IQ, and field behavior between and within families

Measure	Variation	Mean	S.d.	Min.	Max.	Obs.
share of stars given acr. games 1&4 (a)	overall	0	1.000	−2.010	1.191	3,970
	between		.763	−3.010	1.191	1,985
	within		.647	−1.600	1.600	2
share of stars given acr. games 2&3 (b)	overall	0	1.000	−1.857	1.274	3,970
	between		.737	−1.857	1.274	1,985
	within		.676	−1.566	1.566	2
share of stars given across all games	overall	0	1.000	−2.575	1.529	3,970
	between		.770	−2.575	1.529	1,985
	within		.638	−2.052	2.052	2
IQ	overall	0	1.000	−2.438	5.290	3,970
	between		.838	−2.147	3.613	1,985
	within		.545	−2.187	2.187	2
prosociality	overall	0	1.000	−2.848	1.560	3,970
	between		.909	−2.628	1.560	1,985
	within		.418	−2.204	2.204	2
SDQ	overall	0	1.000	−1.991	3.847	3,970
	between		.910	−1.803	3.094	1,985
	within		.414	−1.977	1.977	2

NOTES: Each variable is decomposed into a (family) between ($\bar{x}_f$) and within ($x_{sf} - \bar{x}_f + \bar{x}$, with the global mean $\bar{x}$ being added back in to make results comparable) with f indicating the family and $s \in \{i, j\}$ siblings within families. For each measure, between- and within-variance hence add up to total variance: e.g., for social preferences measure a in the first row, (between-SD)^2 + (within-SD)^2 = (overall SD)^2, i.e., $0.763^2 + 0.647^2 = 1$.

Appendix 3.E Further results

TABLE 3.E.1. Full regression results for outcome prosociality

	Dependent variable: prosociality scale			
	(1) OLS:*a*	(2) OLS:*b*	(3) ORIV	(4) ORIV+FE
social preferences	0.014	0.049***	0.144**	0.036
	(0.017)	(0.016)	(0.060)	(0.071)
IQ	0.131***	0.134***	0.134***	0.013
	(0.018)	(0.018)	(0.018)	(0.017)
female	0.118***	0.115***	0.112***	0.169***
	(0.032)	(0.032)	(0.032)	(0.026)
age	0.179***	0.184***	0.189***	0.153***
	(0.043)	(0.043)	(0.043)	(0.034)
age^2	−0.005**	−0.005***	−0.005***	−0.005***
	(0.002)	(0.002)	(0.002)	(0.002)
ORIV	no	no	yes	yes
family FE	no	no	no	yes
Observations	3,970	3,970	7,940	7,940
R^2	0.044	0.046	–	–
Adj. R^2	0.043	0.045	–	–
F	36.658	39.367	27.319	35.661
First-stage F			128.048	30.508

NOTES: Standard errors (in parentheses) are clustered at the family level in OLS regressions in columns (1) and (2) and both at the level of the individual and the family in stacked ORIV regressions in columns (3) and (4). Significance at *p<0.10, **p<0.05, ***p<0.01. Outcome variable, preferences, and IQ are standardized to have mean zero and standard deviation one across sample of siblings under study. The dependent outcome variable is the SDQ prosociality scale. In column (1), the social preferences measure is the amount of shared stars across games 1 & 4 (measure *a*). In column (2), the social preferences measure is the amount of shared stars across games 2 & 3 (measure *b*). The first two columns display regular OLS regressions. In column (3), the two social preferences measures *a* and *b* are instrumented with one another following the ORIV approach. In the final column (4), this (ORIV) instrumentation is also applied to a specification including family fixed effects (FE). Constants are not displayed.

TABLE 3.E.2. Full regression results for outcome SDQ

	Dependent variable: SDQ (reversed)			
	(1) OLS:*a*	(2) OLS:*b*	(3) ORIV	(4) ORIV+FE
social preferences	0.054***	0.039**	0.214***	0.113
	(0.017)	(0.016)	(0.064)	(0.073)
IQ	0.144***	0.147***	0.149***	0.016
	(0.020)	(0.020)	(0.020)	(0.020)
female	0.152***	0.151***	0.145***	0.206***
	(0.032)	(0.032)	(0.032)	(0.026)
age	0.027	0.030	0.041	−0.021
	(0.043)	(0.043)	(0.043)	(0.036)
age^2	0.002	0.002	0.001	0.003*
	(0.002)	(0.002)	(0.002)	(0.002)
ORIV	no	no	yes	yes
family FE	no	no	no	yes
Observations	3,970	3,970	7,940	7,940
R^2	0.049	0.047	–	–
Adj. R^2	0.047	0.046	–	–
F	37.101	36.101	26.505	36.428
First-stage *F*			128.048	30.508

NOTES: Standard errors (in parentheses) are clustered at the family level in OLS regressions in columns (1) and (2) and both at the level of the individual and the family in stacked ORIV regressions in columns (3) and (4). Significance at *p<0.10, **p<0.05, ***p<0.01. Outcome variable, preferences, and IQ measure are standardized to have mean zero and standard deviation one across sample of siblings under study. The dependent outcome variable is the full SDQ score. To ease interpretation, we reverse the measure such that higher values indicate better outcomes (i.e., less problems). In column (1), the social preferences measure is the amount of shared stars across games 1 & 4 (measure *a*). In column (2), the social preferences measure is the amount of shared stars across games 2 & 3 (measure *b*). The first two columns display regular OLS regressions. In column (3), the two social preferences measures *a* and *b* are instrumented with one another following the ORIV approach. In the final column (4), this (ORIV) instrumentation is also applied to a specification including family fixed effects (FE). Constants are not displayed.

TABLE 3.E.3. Results when using conventional IV strategies vs. using ORIV

	Dep. variable: prosociality			Dep. variable: SDQ (reversed)		
	(1) IV:*a*=*b*	(2) IV:*b*=*a*	(3) ORIV:*a*&*b*	(4) IV:*a*=*b*	(5) IV:*b*=*a*	(6) ORIV:*a*&*b*
social preferences	0.225***	0.062	0.144**	0.178**	0.248***	0.214***
	(0.077)	(0.079)	(0.060)	(0.074)	(0.080)	(0.064)
IQ	0.129***	0.134***	0.134***	0.143***	0.156***	0.149***
	(0.019)	(0.018)	(0.018)	(0.020)	(0.021)	(0.020)
female	0.113***	0.114***	0.112***	0.149***	0.139***	0.145***
	(0.032)	(0.032)	(0.032)	(0.032)	(0.033)	(0.032)
age	0.185***	0.186***	0.189***	0.030	0.055	0.041
	(0.043)	(0.044)	(0.043)	(0.043)	(0.045)	(0.043)
age^2	−0.005***	−0.005***	−0.005***	0.002	0.001	0.001
	(0.002)	(0.002)	(0.002)	(0.002)	(0.002)	(0.002)
Observations	3,970	3,970	7,940	3,970	3,970	7,940
F	38.013	36.622	27.319	35.787	35.420	26.505
First-stage *F*	124.651	128.489	128.048	124.651	128.489	128.048

NOTES: Standard errors (in parentheses) are clustered at the family level in IV regressions in columns (1), (2), (4), and (5), and both at the level of the individual and the family in stacked ORIV regressions in columns (3) and (6). Significance at $^{*}p<0.10$, $^{**}p<0.05$, $^{***}p<0.01$. Outcome variables, preferences, and IQ are standardized to have mean zero and standard deviation one across sample of siblings under study. The dependent outcome variables are the SDQ prosociality scale in columns (1) to (4) and the full SDQ score in columns (5) to (8). To ease interpretation, we reverse the full SDQ score such that higher values indicate better outcomes (i.e., less problems). In columns (1) and (4), the social preferences measure *a* (the amount of shared stars across games 1 & 4) is instrumented with measure *b* (the amount of shared stars across games 2 & 3), and vice versa in columns (2) and (5). In columns (3) and (6), the two social preferences measures *a* and *b* are instrumented with one another following the ORIV approach. If regressions did not include any control variables, the ORIV coefficient would be the average of the two conventional IV coefficients. With control variables, it is a weighted average. Constants are not displayed.

TABLE 3.E.4. Replication of main results for alternative combination of games

	(1) OLS:*a*	(2) OLS:*b*	(3) ORIV	(4) ORIV+FE
Panel A: outcome prosociality scale				
social preferences	0.002	0.049***	0.181**	0.017
	(0.017)	(0.016)	(0.091)	(0.080)
IQ	0.132***	0.131***	0.134***	0.013
	(0.018)	(0.018)	(0.018)	(0.017)
controls	yes	yes	yes	yes
ORIV	no	no	yes	yes
family FE	no	no	no	yes
Observations	3,970	3,970	7,940	7,940
Adj. R^2	0.043	0.045	–	–
F	36.578	38.768	26.879	35.688
First-stage *F*			57.806	29.586
Panel B: outcome SDQ (reversed)				
social preferences	−0.002	0.097***	0.335***	0.162*
	(0.017)	(0.017)	(0.100)	(0.083)
IQ	0.145***	0.144***	0.149***	0.015
	(0.019)	(0.020)	(0.021)	(0.020)
controls	yes	yes	yes	yes
ORIV	no	no	yes	yes
family FE	no	no	no	yes
Observations	3,970	3,970	7,940	7,940
Adj. R^2	0.044	0.054	–	–
F	34.864	40.670	25.972	36.222
First-stage *F*			57.806	29.586

NOTES: Standard errors (in parentheses) are clustered at the family level in OLS regressions in columns (1) and (2) and both at the level of the individual and the family in stacked ORIV regressions in columns (3) and (4). Significance at *p<0.10, **p<0.05, ***p<0.01. Dependent variables, preferences, and IQ measure are standardized to have mean zero and standard deviation one across sample of siblings under study. The dependent outcome variable is the prosociality scale in Panel A and the full SDQ score (reversed) in Panel B. In column (1), the social preferences measure is the amount of shared stars across games 1 & 3 (alternative measure *a*). In column (2), the social preferences measure is the amount of shared stars across games 2 & 4 (alternative measure *b*). Control variables include a dummy for being female, age, and age^2. The first two columns display regular OLS regressions. In column (3), the two alternative social preferences measures *a* and *b* are instrumented with one another following the ORIV approach. In the final column (4), this (ORIV) instrumentation is also applied to a specification including family fixed effects (FE).

TABLE 3.E.5. Replication of main results for alternative aggregation of stars

	(1) OLS:*a*	(2) OLS:*b*	(3) ORIV	(4) ORIV+FE
Panel A: outcome prosociality scale				
social preferences	0.004	0.054***	0.113**	0.014
	(0.017)	(0.016)	(0.052)	(0.061)
IQ	0.131***	0.133***	0.133***	0.013
	(0.018)	(0.018)	(0.018)	(0.017)
controls	yes	yes	yes	yes
ORIV	no	no	yes	yes
family FE	no	no	no	yes
Observations	3,970	3,970	7,940	7,940
Adj. R^2	0.043	0.045	–	–
F	36.491	39.119	26.963	35.779
First-stage *F*			242.376	55.754
Panel B: outcome SDQ (reversed)				
social preferences	0.026	0.057***	0.163***	0.095
	(0.017)	(0.016)	(0.053)	(0.062)
IQ	0.145***	0.146***	0.148***	0.016
	(0.020)	(0.020)	(0.020)	(0.020)
controls	yes	yes	yes	yes
ORIV	no	no	yes	yes
family FE	no	no	no	yes
Observations	3,970	3,970	7,940	7,940
Adj. R^2	0.045	0.048	–	–
F	35.545	37.109	26.170	36.482
First-stage *F*			242.376	55.754

NOTES: Standard errors (in parentheses) are clustered at the family level in OLS regressions in columns (1) to (2) and both at the level of the individual and the family in stacked ORIV regressions in columns (3) and (4). Significance at $^{*}p<0.10$, $^{**}p<0.05$, $^{***}p<0.01$. Dependent variables, preferences, and IQ are standardized to have mean zero and standard deviation one across sample of siblings under study. The dependent outcome variable is the prosociality scale in Panel A and the full SDQ score (reversed) in Panel B. In column (1), the social preferences measure is the amount of shared stars across games 1 & 4 (measure *a*). In column (2), the social preferences measure is the amount of shared stars across games 2 & 3 (measure *b*). Control variables include a dummy for being female, age, and age^2. The first two columns display regular OLS regressions. In column (3), the two social preferences measures *a* and *b* are instrumented with one another following the ORIV approach. In the final column (4), this (ORIV) instrumentation is also applied to a specification including family fixed effects (FE).

TABLE 3.E.6. Main results for SDQ conduct and peer problems subscales

	(1) OLS:*a*	(2) OLS:*b*	(3) ORIV	(4) ORIV+FE
Panel A: outcome SDQ subscale conduct problems (reversed)				
social preferences	0.047***	0.049***	0.221***	0.140
	(0.017)	(0.017)	(0.064)	(0.087)
IQ	0.084***	0.086***	0.088***	0.013
	(0.018)	(0.018)	(0.019)	(0.024)
controls	yes	yes	yes	yes
ORIV	no	no	yes	yes
family FE	no	no	no	yes
Observations	3,970	3,970	7,940	7,940
Adj. R^2	0.043	0.043	–	–
F	37.132	37.593	26.925	33.796
First-stage *F*			128.048	30.508
Panel B: outcome SDQ subscale peer problems (reversed)				
social preferences	0.019	0.016	0.081	0.107
	(0.016)	(0.016)	(0.060)	(0.092)
IQ	0.131***	0.132***	0.133***	−0.019
	(0.019)	(0.019)	(0.019)	(0.025)
controls	yes	yes	yes	yes
ORIV	no	no	yes	yes
family FE	no	no	no	yes
Observations	3,970	3,970	7,940	7,940
Adj. R^2	0.026	0.026	–	–
F	19.700	19.438	13.994	7.044
First-stage *F*			128.048	30.508

NOTES: Standard errors (in parentheses) are clustered at the family level in OLS regressions in columns (1) and (2) and both at the level of the individual and the family in stacked ORIV regressions in columns (3) and (4). Significance at $^{*}p<0.10$, $^{**}p<0.05$, $^{***}p<0.01$. Dependent variables, preferences, and IQ are standardized to have mean zero and standard deviation one across sample of siblings under study. The dependent outcome variable is the SDQ conduct problems subscale (reversed) in Panel A and SDQ peer problems subscale (reversed) in Panel B. In column (1), the social preferences measure is the amount of shared stars across games 1 & 4 (measure *a*). In column (2), the social preferences measure is the amount of shared stars across games 2 & 3 (measure *b*). Control variables include a dummy for being female, age, and age^2. The first two columns display regular OLS regressions. In column (3), the two social preferences measures *a* and *b* are instrumented with one another following the ORIV approach. In the final column (4), this (ORIV) instrumentation is also applied to a specification including family fixed effects (FE).

TABLE 3.E.7. Results when applying alternative methods to address measurement error

	(1) Overall	(2) Average	(3) PCA	(4) ORIV
Panel A: outcome prosociality scale				
share of stars given across all games	0.033**			
	(0.017)			
average of measures *a* and *b*		0.040**		
		(0.017)		
principal component 1			0.026	
			(0.017)	
principal component 2			0.035**	
			(0.016)	
social preferences *a*&*b*				0.144**
				(0.060)
IQ	0.132***	0.132***	0.132***	0.134***
	(0.018)	(0.018)	(0.018)	(0.018)
Adj. R^2	0.044	0.044	0.044	–
F	37.780	38.277	31.853	27.319
Panel B: outcome SDQ (reversed)				
share of stars given across all games	0.058***			
	(0.018)			
average of measures *a* and *b*		0.060***		
		(0.017)		
principal component 1			0.032*	
			(0.017)	
principal component 2			0.054***	
			(0.017)	
social preferences *a*&*b*				0.214***
				(0.064)
IQ	0.146***	0.146***	0.146***	0.149***
	(0.020)	(0.020)	(0.020)	(0.020)
Adj. R^2	0.048	0.048	0.048	–
F	37.393	37.486	31.345	26.505
Controls	yes	yes	yes	yes
Observations	3,970	3,970	3,970	7,940

NOTES: Standard errors (in parentheses) are clustered at the family level in OLS regressions in columns (1) to (3) and both at the level of the individual and the family in stacked ORIV regressions in column (4). Significance at $^{*}p<0.10$, $^{**}p<0.05$, $^{***}p<0.01$. Dependent variables, preferences, and IQ are standardized to have mean zero and standard deviation one across sample of siblings under study. The dependent outcome variable is the prosociality scale in Panel A and the full SDQ score (reversed) in Panel B. In column (1), the social preferences measure is the amount of shared stars across all four games. In column (2), for the social preferences measure the average is taken across measures *a* and *b* (amount of shared stars across games 1 & 4 and 2 & 3, respectively). In column (3), the outcomes are regressed on the first two principal components predicted from the PCA w.r.t. the four games (for details, see section 3.3.1). In column (4), the two social preferences measures *a* and *b* are instrumented with one another following the ORIV approach. Control variables include a dummy for being female, age, and age^2.

TABLE 3.E.8. ORIV regressions using bootstrapped standard errors

	Dep. var.: prosociality		Dep. var.: SDQ (rev.)	
	(1) ORIV	(2) ORIV+FE	(3) ORIV	(4) ORIV+FE
social preferences	0.144**	0.036	0.214***	0.113
	(0.063)	(0.077)	(0.065)	(0.078)
IQ	0.134***	0.013	0.149***	0.016
	(0.018)	(0.017)	(0.020)	(0.019)
controls	yes	yes	yes	yes
ORIV	yes	yes	yes	yes
family FE	no	yes	no	yes
Observations	7,940	7,940	7,940	7,940

NOTES: Table shows main (OR)IV results using bootstrapped standard errors (in parentheses) from 1,000 repetitions. Bootstrapping is done clustered at family level, i.e., the sample drawn during each replication is a bootstrap sample of family clusters. Significance at $^{*}p<0.10$, $^{**}p<0.05$, $^{***}p<0.01$. Outcome variables, preferences, and IQ are standardized to have mean zero and standard deviation one across sample of siblings under study. The two social preferences measures *a* (amount of shared stars across games 1 & 4) and *b* (amount of shared stars across games 2 & 3) are instrumented with one another following the ORIV approach. In columns (2) and (4), this instrumentation is also applied to specifications including family fixed effects (FE). Please note that jackknife standard errors look very similar to bootstrapped standard errors (also with 1,000 repetitions), both when dropping clusters at the individual or the family level in single jackknife estimations.

Chapter 4

Positive Parenting Style and Skills of Children*

Joint with Shyamal Chowdhury, Shambhavi Priyam, Hannah Schildberg-Hörisch, and Matthias Sutter

4.1 Introduction

"We may not be able to prepare the future for our children, but we can at least prepare our children for the future."
—Franklin D. Roosevelt

Children are deeply influenced by how their parents raise them (Kaufmann et al., 2000; Milevsky et al., 2007; Doepke and Zilibotti, 2019). Parental investments thereby also affect children's formation of cognitive and non-cognitive skills, which has long-term consequences for the life outcomes of children, including their education, health, and labor market success (Cunha, Heckman, and Schennach, 2010; Francesconi and Heckman, 2016; Cobb-Clark, Salamanca, and Zhu, 2019). Parenting styles are one key factor of parental investments and matter a lot. Positive parenting styles—i.e., parenting styles characterized by positive attributes such as supportive or affirmative attention and care—have been shown to have positive associations with health and well-being (Ranson and Urichuk, 2008; Davids, Roman, and Leach, 2017), virtuous behavior (Chen et al., 2019), fewer risky behaviors (Borawski et al., 2003), academic achievement (Dornbusch et al., 1987; Pinquart, 2016, 2017; Pinquart and Kauser,

* Financial support by the German Research Foundation (Deutsche Forschungsgemeinschaft, DFG) through grant SCHI-1377/1-1, project number 392529304, is gratefully acknowledged. We declare no competing financial interests. IRB approval (Heinrich Heine University Düsseldorf) was granted under study number 6212. For useful comments and discussions we are grateful to Pranjal Dhole, participants of the NHH-MPI Workshop 2021, and members of the Experimental Economics Group at the MPI for Research on Collective Goods, Bonn.

2018), and increased self-esteem (Bun et al., 1988; Chang, 2007; Chan and Koo, 2011). Negative parenting styles—i.e., parenting styles predominantly characterized by parents behaving negatively or harshly towards their child—are negatively associated with these various forms of children's behavior and outcomes (Doepke and Zilibotti, 2017).[1]

Existing work has typically studied the relation between parenting styles and single outcomes, thus building up the evidence piece by piece—or outcome by outcome—rather than by looking at large sets of outcomes and behaviors simultaneously within a unified framework. A piece-wise approach, however, may overlook the scope that parenting styles have on children's development as a whole.

In this study, we use data from surveys and incentivized experiments with 5,351 children and their parents in rural Bangladesh to examine the relationship between parenting style and a very broad range of cognitive and non-cognitive skills of children. Different from previous work, we do not put our emphasis on behavioral outcomes which we only take into account along the way, but we focus on (underlying) cognitive and non-cognitive skills. We believe that focusing on skills can help better understand why parenting style is related to further outcomes assumed to be primarily shaped by children's cognitive and non-cognitive skills (Cunha and Heckman, 2008; Cunha, Heckman, and Schennach, 2010).

The respective survey module referred to five dimensions of parenting: emotional warmth, monitoring, negative communication, psychological control, and strict control (Richter et al., 2017). We apply linear discriminant analysis (LDA) to reduce the parenting style dimensions to a binary classification that turns out to relate well to what the literature recurrently terms positive and negative parenting (Maccoby and Martin, 1983). What we consequently also term "positive parenting" shows positive correlations with emotional warmth and monitoring, and negative correlations with negative communication, psychological control, and strict control. We analyze associations of positive parenting with a wide range of cognitive and non-cognitive skills measures, in particular IQ as a measure for cognitive abilities, economic risk, time, and social preferences, personality traits captured by the Big Five taxonomy, self-esteem, and self-control. For a comprehensive picture, we also link parenting style to children's study attitude, their engagement in risky behaviors in everyday life situations, prosociality, emotional and behavioral problems seized by the well-established Strengths and Difficulties Questionnaire (SDQ), and life satisfaction.

We find that positive parenting is positively related to IQ, to Big Five Openness, Conscientiousness, and Agreeableness, to self-esteem and self-control, to children's social preferences, that is, to their altruism, as well as to their study attitude, survey-measured prosociality, and

1. There exist different taxonomies of parenting style. A traditional classification in developmental psychology is differentiating between permissive parenting, authoritarian parenting, and authoritative parenting (Baumrind, 1966; Doepke, Sorrenti, and Zilibotti, 2019). However, our measures of parenting style better relate to a binary classification into positive and non-positive or negative parenting. Heterogeneous definitions of parenting styles make comparisons across studies generally difficult.

happiness. It is negatively associated with their Big Five Neuroticism, their patience as a measure of time preferences, their engagement in risky behaviors, as well as emotional and behavioral problems. These results confirm general findings in the literature.

The origin of our sample from Bangladesh as a non-WEIRD (western, educated, industrial, rich, and democratic) country is a special feature of our study. There are very few studies conducted in these areas on the topics that we study despite the majority of the world's population living in non-WEIRD countries. Therefore, we provide important evidence on skill formation of children in poorer countries, which, apart from being interesting in itself, also allows investigating whether the relationships between parenting style and children's skills in these countries look similar to the ones found in WEIRD countries.

4.2 Data

In this study, we use data from incentivized experiments and surveys with 5,351 children, between the ages of 6 and 16 years, and their parents from 3,389 families in rural Bangladesh. The data were collected in four different districts across four administrative divisions of Bangladesh between March and May 2018. The sample consists of families randomly drawn from 150 villages that got randomly selected in the course of a previous survey (from 2014 to 2016) as well as of families that were sampled via elementary schools attached to these 150 villages in 2018. Our data collection aimed at establishing a large sample of families in which we measure whole families' skills as comprehensively as possible. We elicited cognitive skills, economic preferences (time, risk, and social preferences), and personality traits of up to four household members. Furthermore, mothers answered questions about their children, and the household head, usually the father, participated in a general household survey which, among other things, captured general socio-economic information about the household. The data were collected by trained surveyors who visited each household. A full set of instructions for the surveyors is attached in the joint appendix section of this thesis. The data were collected manually on paper for the experimental modules and using electronic data collection tools on mobile tablets. Children and their parents were interviewed individually and separately at their homes to ensure independent responses. Importantly, the mothers, in general being the primary caregivers in these families, were surveyed regarding parenting style. The sample selected for this study consists of 1,962 households with two children who got interviewed and 1,427 households with one child who got interviewed.

For further details on the sampling and the scope of the data collection, please see Chapter 2 of this thesis. Table 4.A.1 summarizes the scales (and corresponding references) for the cognitive and non-cognitive skills and the outcomes that we measured. In the following, we will briefly depict each measure used here.

4.2.1 Parenting style measures

A survey module was administered to mothers regarding their parenting behavior. Mothers rated 15 items on a five-point scale from "never" to "very frequently," such as "I use words and gestures to show my child that I love her/him," "I talk to my child about things s/he has done, seen, or experienced when s/he was out," or "I shout at my child when s/he did something wrong." For a complete list of items, see section 4.A.1 in the appendix. These items were combined into five scales indicating the degree to which mothers' parenting is characterized by emotional warmth, monitoring, negative communication, psychological control, and strict control (Richter et al., 2017). An additional scale with three questions related to inconsistent parenting was administered; however, due to wrong interpretations in the translation of questions, the particular scale has been dropped from the analysis. Mothers rated the items on the family level, that is, once regarding all their children. Children from the same household hence have identical values for parenting style variables.

To meaningfully link our parenting style scales to outcomes, we use linear discriminant analysis (LDA) for dimensionality reduction. This leads to a binary classification of mother-child observations: while one group exhibits higher levels of warmer parenting styles (emotional warmth and monitoring) and lower levels of more controlling parenting styles (negative communication, psychological control, and strict control), the other group shows opposite behavior. According to official scale descriptions (Richter et al., 2017), emotional warmth and monitoring refer to the degrees of affirmative attention and care in parenting as well as to how well parents are informed about their child's activities and social contacts. Negative communication, psychological control, and strict control assess parents' negative intrusive thoughts, feelings, and behavior toward their child, and how much they employ harsh control and authoritarian behavior. Following these descriptions, we term our classification positive and non-positive or negative parenting.[2] About 50 percent of our observations fall into either category. A detailed technical account of this dimensionality reduction is given in section 4.3.1.

4.2.2 Outcome measures: skills and behaviors

For our analyses, all outcome measures are standardized to have a mean of zero and a standard deviation of one across the sample parts for whom the measures are available.

2. In psychology, there is ongoing discussion whether and how much supportive-positive and harsh-negative parenting behavior may overlap and interact (see, e.g., Dallaire et al., 2006; Rodriguez, Gowda Ferguson, and Gonzalez, 2022). With our approach, observations are classified as positive [negative] according to their tendency to show both high [low] levels of warm/supportive-positive parenting behavior and low [high] levels of harsh/coercive-negative parenting behavior.

4.2.2.1 Cognitive skills

To measure children's fluid and crystallized IQ, which together form overall IQ (Cattell, 1971), we used the standard progressive matrices, digit span, symbol search, and word similarities tests of the well-established Wechsler Intelligence Scale for Children (WISC-IV, see Wechsler, 2003). All tests got adapted to the specific context of Bangladesh by local academics. These components are used to construct the Full Scale Intelligence Quotient (FSIQ) as our IQ measure.

4.2.2.2 Economic preferences

All children played games to measure their time, risk, and social preferences, incentivized with stars which were exchanged for money (in Bangladeshi Takas; with exchange rates proportional to average weekly allowances). Our time preference measure is composed of (i) the number of patient choices made out of six decisions between smaller, sooner and larger, later rewards in the time preferences game (Bauer, Chytilová, and Morduch, 2012), and (ii) a survey question that asked participants how willing they were to give up something nice today in order to get something even nicer in the future. The risk measure consists of (i) an experimental game where the participants had to pick one out of six lotteries that differed in expected payoffs and variance of payoffs (Bauer, Chytilová, and Morduch, 2012), and (ii) the degree of agreement to the statement "I often take risks." For measuring social preferences, we counted the number of altruistic decisions in four dictator games in which children had to divide stars between themselves and another, yet unknown, child (Bauer, Chytilová, and Pertold-Gebicka, 2014). In each of the four choices (x,y), one option was always the allocation (1,1), while the alternative allocation benefited children differently ($y > x$ in two cases and $y < x$ in two cases).

For time and risk preferences, we first standardize both components of the respective measure, then obtain the mean and standardize the overall measure again. For social preferences, we can only draw on one experimental component.

4.2.2.3 Personality traits

Personality traits were measured using a ten-item Big Five scale for younger children, where mothers had to rank their child in comparison to other children of their age on an eleven-point scale (Weinert et al., 2007). For older children, a battery of 16 questions was used and children rated themselves on a scale from one to five (Gerlitz and Schupp, 2005). To construct the measure, each scale is standardized within the younger or older age group, then combined, and standardized across all age groups. Self-esteem was measured for children aged 9 to 16 using a four-point scale, where children rated themselves on ten statements concerning how they view their qualities and self-worth (Rosenberg, 1965). For children younger than nine years old, no self-esteem module was implemented. Self-control questions

for children aged 6 to 11 were answered by the mothers, where domain-specific impulsivity was measured by eight items on a five-point scale (Duckworth, Kim, and Tsukayama, 2013). Older children, aged 12 to 16, responded to a 13-item index on a five-point scale to measure their self-control (Tangney, Baumeister, and Boone, 2004).

4.2.2.4 Behavioral outcomes

We measured a child's study attitude as the five-point scale response to the statement "By working very hard, one can succeed at each area in life, for example at school or at work." For children aged 10 to 16, we also measured risky behaviors in everyday life by an index constructed from responses to how frequently a child took risks in 16 situations that are specific to rural Bangladesh (e.g., "Do you jump from a tree/a bridge into a river or canal?" or "Do you often get into physical fights?"). The set of questions was developed in focus group discussions with respondents similar to our sample survey respondents. The questions were also pre-tested in villages similar to our study villages. We used the well-established Strengths and Difficulties Questionnaire (SDQ) to measure emotional and behavioral problems. The full SDQ score comprises four subscales which are further broken down into "internalizing" (indicating emotional and peer problems) and "externalizing" (indicating hyperactivity and conduct problems) problems. The SDQ also contains a stand-alone prosociality scale to measure the extent to which children interact with others in a cooperative way in their daily routine (Goodman, Renfrew, and Mullick, 2000; Goodman, Lamping, and Ploubidis, 2010; Briole, Le Forner, and Lepinteur, 2020). Happiness (or life satisfaction) was elicited by asking "How happy are you most of the time?" Responses were collected using a visual Likert scale with five smiley faces from 'very unhappy' to 'very happy' (Haerpfer et al., 2020).

4.3 Empirical strategy

The results of the study are estimated using the following OLS regressions model:

$$y_{if} = \alpha + \beta_P P_{if} + \boldsymbol{\phi_X X_{if}} + \boldsymbol{\sigma_H H_f} + \boldsymbol{\lambda_{if}} + \varepsilon_{if} \tag{4.1}$$

where y_{if} is the outcome of individual i in family f, P_{if} is the positive parenting style dummy variable, $\boldsymbol{X}_{if}$ is a vector of control variables, and H_f is a vector of household sociodemographics. $\boldsymbol{\lambda_{if}}$ is the vector of fixed effects used at the district and age level and ε_{if} is the idiosyncratic error term. Standard errors are clustered at the village level.

To check for multiple hypothesis testing, we are implementing sharpened two-stage *q*-values.[3] Main results refer to specifications for children of all ages pooled together. The sample is also split up to check for age-group specific effects. For this, outcomes are standardized separately by age groups, with 6 to 9 years as younger children and 10 to 16 years as older children.

4.3.1 Positive parenting categorization

As described in section 4.2.1, the survey module on parenting style consisted of five dimensions of parenting style. Based on linear discriminant analysis (LDA), these are divided into two categories of parenting: positive and non-positive or negative parenting.

LDA is a supervised learning model commonly applied to reduce dimensionality. In general, discriminant analysis is a classificatory technique (Fisher, 1936) that is used to classify cases or observations into pre-existing groups based on similarities between that case and the other cases belonging to the respective group. LDA assumes that groups or classes are linearly separable and creates a multiple linear discriminant function (which represents hyperplanes in the feature space) to distinguish classes. If there are two classes, as in our setting, LDA draws one hyperplane and projects the data onto this hyperplane in a way such that the separation of the two classes is maximized by maximizing the ratio of the between-class variance and the within-class variance (Mohanty et al., 2013; Vaibhaw, Sarraf, and Pattnaik, 2020).[4]

As a supervised model, LDA is based on a priori knowledge about the classification being formed: class-labeled data are provided and the algorithm looks to maximize the difference between these classes. In our case, this classification is a higher versus lower income divide. We use income split at the median as the supervising class since previous literature has noted a relation of income and/or socio-economic status as a combination of income and parental education, and parenting style (Barrera Jr et al., 2002; Lee et al., 2009; Ponnet et al., 2016; Cobb-Clark, Salamanca, and Zhu, 2019). It seems plausible that high income, for example, allows parents to allocate more attention and cognitive resources to parenting with more and richer exchanges between parent and child, while low family income is associated with increased parental stress or conflicts within the family, leading to negative parenting behaviors. Also, the family stress model emphasizes that economic hardships directly impact parenting

3. See Anderson (2008) for the application of adjusted *p*-values using False Discovery Rate (FDR) as per Benjamini, Krieger, and Yekutieli (2006). The FDR is the expected proportion of rejections that are type I errors (false rejections).

4. Principal component analysis (PCA) as another prominent dimensionality-reduction method also aims at reducing the number of variables of a data set, while preserving as much information as possible. Contrary to LDA, PCA is an unsupervised linear transformation technique that ignores classes. I.e., as a clustering method in contrast to a classification method, it has no discriminatory power and does not take into account whether a dataset represents features from one or more classes. Applying PCA, the interpretation of associations of principal components with outcome variables is not as clear-cut as with the LDA approach.

competency (Kim and Chung, 2021).[5] The LDA uses this group separation to classify observations based on parenting style data. The final classification can then be investigated, whether it reflects the two assumed parenting style categories of positive and negative parenting.

4.3.2 LDA model

The goal of LDA is to classify observations as clearly as possible according to underlying groups. That is, we aim at classifying child observations according to whether they belong to a positive parenting or a negative parenting group. LDA is based on the following model assumptions, with the parenting style dimensions being the independent variables:

1. Means of the independent variables are significantly different across the two groups.
2. The independent variables from the groups have a common variance-covariance matrix, i.e., equal group covariances.
3. The independent variables are not highly correlated.
4. The independent variables are normally distributed.

The *linear discriminant equation* that links the independent variables (parenting style dimensions) to the binary parenting style classification is given by:

$$D = \phi_1 x_1 + \phi_2 x_2 + ... + \phi_n x_n \tag{4.2}$$

D is the discriminant score, ϕ_n are model coefficients, and x_n are the measurements of independent variables. Classification of observations is done based on their discriminant scores.

LDA looks for coefficients (i.e., linear combinations of parenting style dimensions or new data axes) that maximize the *linear score function*. This linear score function comprises the two simultaneous goals of LDA of maximizing the group differences (between-class scatter) and minimizing the variance (within-class scatter) for optimal separation.

5. A further rationale to use household income as the supervising variable is that a family's income has been linked to children's cognitive and non-cognitive skills as well as child behavioral outcomes, comparable to the outcomes we use in our analyses of parenting style, in earlier studies (Fletcher, 2010; Noonan, Burns, and Violato, 2018). However, the role of financial status may not be exclusive of other parental inputs that income does not capture (Anger and Schnitzlein, 2017), which once more calls for the investigation of further family building blocks such as parenting style.

It is given by:

$$S(\phi) = \frac{(\phi'\mu_1 - \phi'\mu_2)^2}{\phi'\Sigma\phi} \tag{4.3}$$

where

μ_1 = (parenting style data) means of group with low (i.e., below-median) income
μ_2 = (parenting style data) means of group with high (i.e., above-median) income
Σ = pooled variance-covariance matrix
ϕ' = transpose of ϕ.

LDA uses the linear score function to obtain the classification rule. It will stratify the sample units (mother-child pairs) into two classes that are clustered on different sides of the separating hyperplane.

4.3.2.1 LDA descriptive results

To validate our approach, in the following we empirically test the model assumptions stated above.[6]

Assumption 1. Table 4.1 summarizes the standardized (across all children) parenting style data for the two income groups. The low-income group shows lower means for the positive parenting style dimensions (emotional warmth and monitoring) and higher means for the negative parenting style dimensions (negative communication, psychological control, and strict control) than the high-income group. Tests of equality of group means confirm that parenting style dimensions significantly differ in the two income groups.

Assumption 2. We perform the Box's M test of homogeneous covariance matrices. As the p-value < 0.05, we reject the null hypothesis that there exist homogeneous covariance matrices of the parenting style dimensions by the two income groups. However, LDA is assumed to be not overly sensitive to heterogeneous covariance matrices (Melton, 1963).

6. Some literature on LDA (e.g., Lachenbruch and Goldstein, 1979, as an early contribution) lists independent sampling of observations as a fifth assumption. Families in our data are independently sampled, yet, siblings within families (also having the same values for parenting style) are drawn together. Running the LDA on family level leads to identical classification of individual observations into positive and negative parenting.

TABLE 4.1. Group descriptive statistics

Income group		Emotional warmth	Monitoring	Negative communication	Psychological control	Strict control
Low	Obs.	2,675	2,675	2,675	2,675	2,675
	Mean	-0.023	-0.044	0.064	0.035	0.024
	Std. dev.	0.98	0.979	0.992	1.013	1.007
High	Obs.	2,676	2,676	2,676	2,676	2,676
	Mean	0.023	0.044	-0.064	-0.035	-0.024
	Std. dev.	1.019	1.019	1.004	0.986	0.992
Test of equality of group means						
	F	2.73	10.52	22.23	6.64	3.21
	p-value	0.099	0.001	0.000	0.010	0.073

NOTES: The table shows descriptive statistics for each of the parenting style dimensions corresponding to the income categories. The low-income category is composed of those households that have less than median monthly income. The lower panel displays *F*-statistics and *p*-values for tests of equality of group means for the different parenting style dimensions.

Assumption 3. Table 4.2 shows the pairwise correlations between the parenting style dimensions, where we find low to moderate correlations (all below .5). As expected, the two dimensions of "warm" parenting as well as the three dimensions of "negative" parenting show higher correlations within than across these two categories.

TABLE 4.2. Pairwise correlations between parenting style dimensions

	Emotional warmth	Monitoring	Negative communication	Psychological control	Strict control
Emotional warmth	1				
Monitoring	0.367	1			
Negative communication	0.070	0.175	1		
Psychological control	0.010	0.217	0.363	1	
Strict control	0.051	0.230	0.424	0.388	1

NOTES: Displayed are Pearson correlation coefficients. Observations for all pairs: 5,351. Correlations are significant at the 1 percent level, except for emotional warmth and negative communication (10 percent level), emotional warmth and psychological control (not significant), and emotional warmth and strict control (5 percent level).

Assumption 4. Table 4.3 shows the results of a test for normality of the parenting style dimensions based on skewness and kurtosis. As most p-values < 0.05, we reject the null hypothesis that dimensions are normally distributed. However, visual inspection of dimensions (see Figure 4.C.1 in the appendix) reveals no large divergence.

TABLE 4.3. Skewness and kurtosis test for normality

	Skewness	Kurtosis	*p*-value
Emotional warmth	0.000	0.001	0.000
Monitoring	0.014	0.206	0.022
Negative communication	0.000	0.612	0.000
Psychological control	0.000	0.000	0.000
Strict control	0.000	0.000	0.000

NOTES: Table displays results from skewness and kurtosis tests for normality of parenting style dimensions.

In sum, our data largely fulfill the assumptions for the LDA to take place.

4.3.2.2 Linear discriminant analysis function

Table 4.4 contains the unstandardized discriminant function coefficients for the LDA (ϕ, see equation 4.2). The structure matrix, as displayed in the same Table, is a transpose of the first column and gives the correlations between the values of the independent variables and those of the discriminant function. These correlations are like factor loadings in factor analysis. One can understand how to interpret (and name) each function by identifying the largest absolute correlation associated with each discriminant function. Variables with bigger values in the structure matrix play a more significant role in the discriminant function analysis. The last table column gives pairwise correlations between the parenting style dimensions and the new classification.

TABLE 4.4. Canonical discriminant function coefficients, structure matrix, and pairwise correlations of parenting style classes and underlying dimensions

	(1) CDF Coefficients	(2) Structure Matrix	(3) Pairwise Correlations
Emotional warmth	−0.067	−0.254	0.227
Monitoring	−0.669	−0.498	0.379
Negative communication	0.747	0.724	−0.585
Psychological control	0.267	0.396	−0.343
Strict control	0.014	0.275	−0.254
Constant	0.000		

NOTES: Table displays the unstandardized LDA canonical discriminant function (CDF) coefficients in column (1), the structure matrix in column (2), and the pairwise correlation coefficients between the parenting style dimensions and the new parenting style classification where 1 = positive parenting and 0 = negative parenting in column (3).

LDA successfully separated our data into two different categories that can be predicted by the five measured parenting style dimensions. This separation has a straightforward interpretation supported by the correlations displayed in Table 4.4, which allow us to label it as positive and non-positive or negative parenting: positive parenting is positively associated with emotional warmth and monitoring, and negatively associated with negative communication, psychological control, and strict control.

Table 4.5 shows how the LDA classification of positive and negative parenting relates to the income groups used as inputs for the LDA.[7] The LDA classification substantially deviates from the income classes and thus contains and uses information (from the parenting style dimensions) that go beyond the classification of families according to income.[8]

TABLE 4.5. Income categories and categorization based on LDA

Income category	Classified		Total
	0 (neg. parenting)	1 (pos. parenting)	
0 (low)	1,422 53.16%	1,253 46.84%	2,675 100%
1 (high)	1,201 44.88%	1,475 55.12%	2,676 100%
Total	2,623 49.02%	2,728 50.98%	5,351 100%

NOTES: The median split by monthly income was N = 2,675 for low income households, and N = 2,676 for high income households (p50 and above = 1, below = 0). The classified values show how the LDA splits the two groups based on the five parenting style dimensions.

4.4 Results

Table 4.6 displays our main results. It shows associations of positive parenting with the dependent variables listed in the left-most column. We show the underlying full regressions (including control variables) in appendix section 4.C.1.

7. In order to check model accuracy, we create a random 80:20 data split to create training and testing data. We repeat the LDA over ten iterations and use a support-vector machine classifier to test model accuracy. The data is presented in the visual matrix in Figure 4.B.1 in appendix section 4.B where we see that the model is able to correctly predict the categories (positive parenting = 1) of observations with only parenting style data.

8. This is also supported by a different (and not as predictive, both in terms of effect sizes and significance) mapping of income into our outcome variables, as can be seen in Table 4.C.4 in the appendix.

TABLE 4.6. Children's outcomes and positive parenting for children aged 6 to 16

	(1)	(2)	(3)	(4)	(5)
	Positive parenting				
Dependent variable	Coefficient	Std. error	R^2	q-value	Obs.
Cognitive skills					
IQ	0.098**	(0.033)	0.273	0.002	5,351
Non-cognitive skills					
Economic preferences					
patience	−0.078*	(0.035)	0.006	0.006	5,351
risk-taking	−0.056	(0.038)	0.023	0.027	5,351
altruism	0.114***	(0.032)	0.008	0.001	5,351
Personality traits					
Big Five Openness	0.302***	(0.036)	0.056	0.001	5,351
Big Five Conscientiousness	0.362***	(0.036)	0.060	0.001	5,351
Big Five Extraversion	0.037	(0.030)	0.050	0.031	5,351
Big Five Agreeableness	0.399***	(0.035)	0.059	0.001	5,351
Big Five Neuroticism	−0.279***	(0.036)	0.036	0.001	5,351
self-esteem	0.375***	(0.043)	0.125	0.001	3,814
self-control	0.455***	(0.045)	0.095	0.001	5,336
Behavioral outcomes					
study attitude	0.190***	(0.037)	0.043	0.001	5,351
risky behaviors	−0.219***	(0.041)	0.257	0.001	3,071
prosociality	0.376***	(0.043)	0.072	0.001	5,351
SDQ internalizing behavior	−0.410***	(0.046)	0.096	0.001	5,351
SDQ externalizing behavior	−0.465***	(0.044)	0.125	0.001	5,351
happiness	0.098**	(0.034)	0.030	0.002	5,351

NOTES: The table shows results for OLS regressions of children's outcomes on parenting style for children aged 6 to 16. The left-most column states the dependent variables in separate OLS regressions. Column (1) shows coefficients for the LDA-based parenting category where 1 = positive parenting, 0 = non-positive or negative parenting. Column (4) shows the false discovery rate adjusted q-values that display significance changes from multiple hypothesis testing. Controls include gender, age fixed effects, number of siblings, family income, literacy of father, literacy of mother, and district fixed effects. Standard errors are clustered at the village level. Significance at $^{*}p<.05$, $^{**}p<.01$, $^{***}p<.001$.

4.4.1 Cognitive skills

Positive parenting is significantly positively related to children's IQ, with an effect size of about 10 percent of a standard deviation ($p < 0.01$). This finding is in line with previous work documenting, e.g., a positive relationship between time parents spend with their chil-

dren doing educational activities and children's cognitive skills (Fiorini and Keane, 2014). However, the authors cannot establish a link between mothers' parenting style and cognitive skills. Our finding also relates to reported positive associations between parental involvement and academic achievement of children (WHO, 2009).[9] Interestingly, splitting the sample into younger (6 to 9) and older (10 to 16) children reveals that parenting style is only predictive of IQ at young ages (see appendix Tables 4.C.2 and 4.C.3).[10]

4.4.2 Non-cognitive skills

Economic preferences. Positive parenting is also associated with economic preferences. Children from families who adopt a positive parenting style are more altruistic (by 12 percent of a standard deviation, $p < 0.01$, driven by older children). While there is no significant relationship between risk-taking and parenting style, positive parenting is negatively aligned with children's patience (8 percent of a standard deviation, $p < 0.005$). While this may look surprising in comparison to evidence from WEIRD countries, where more parental involvement is typically associated with a higher degree of patience in children (Falk et al., 2021), this observation is in line with earlier evidence from poor countries with respect to how patience relates to parenting. In an unrelated study from Bangladesh (Kiessling et al., 2021), positive parenting has been found to be positively correlated with paternalism of parents (measured by the extent to which parents interfere in the decision-making of their children). More paternalistic parents made fewer patient choices for their children, thus establishing the same negative link between positive parenting and children's patience as we find here.

Personality traits. Positive parenting significantly relates to children's personality traits. Among the five dimensions captured by the Big Five, Openness, Conscientiousness, and Agreeableness are all significantly positively associated with positive parenting (in the range of 30 to 40 percent of a standard deviation; $p < 0.001$), and Neuroticism has a negative relationship (in the order of 28 percent of a standard deviation). Only for Extraversion, we find no significant coefficient for our parenting score in the overall sample. Yet, this might be driven by two offsetting, heterogeneous effects: the coefficient turns significantly negative if we only consider the sample of younger children (in appendix Table 4.C.2, $\beta = -0.191$, $p < 0.001$), and significantly positive for the sample of older children (Table 4.C.3, $\beta = 0.302$, $p < 0.001$). Positive parenting is also significantly positively associated with children's self-

9. Parental involvement is frequently named as an important factor for producing both cognitive and non-cognitive skills (Doepke, Sorrenti, and Zilibotti, 2019). However, empirical evidence specifically linking parenting style and cognitive skills is scarce.

10. This observation is in accordance with younger ages having been identified as a sensitive period for the acquisition of cognitive skills, as, e.g., reported by Cunha and Heckman (2008). The authors use US data to estimate skill returns to parental investments for children of different ages. During sensitive periods, returns to investments are particularly high (Cunha and Heckman, 2007).

esteem (38 percent of a standard deviation; $p < 0.001$) as well as with their self-control (46 percent of a standard deviation, $p < 0.001$).[11]

4.4.3 Behavioral outcomes

Positive parenting is positively associated with a better study attitude of children (19 percent of a standard deviation, $p < 0.001$), suggesting that it creates an attitude in children to believe in the value of hard work for success (as the survey item is framed; more so for older than younger children, see appendix Tables 4.C.2 and 4.C.3). Again, this goes well together with the positive relationship that was found earlier between parental involvement and academic achievement of children (WHO, 2009) as well as with reported associations of respectful parenting with positive educational outcomes of youths (Cobb-Clark, Salamanca, and Zhu, 2019).

Further, in our data, risk-taking behavior in the field is less often observed with positive parenting (22 percent of a standard deviation, $p < 0.001$), while prosocial behavior of children (like helping others or sharing goods) is more often observed with positive parenting (38 percent of a standard deviation, $p < 0.001$). In a similar vein, Cobb-Clark, Salamanca, and Zhu (2019) find respectful parenting also to be related to less risky behaviors of youths. Additionally, the monitoring component of their parenting style measure is associated with significantly fewer risky behaviors.

We also document positive parenting to be negatively related to emotional and behavioral problems. This holds true both for children's internalizing SDQ score as well as their externalizing SDQ score; in both cases, positive parenting is linked to more than 40 percent of a standard deviation ($p < 0.001$) lower levels of problems. Finally, positive parenting and children's happiness are positively associated (10 percent of a standard deviation, $p < 0.01$). In line with our results on prosociality, emotional, and behavioral problems, Fiorini and Keane (2014) observe mothers' parenting style to be related to similar indices of good relationships, emotional, and behavioral problems, for the most part with warmer and more effective parenting being associated with more favorable outcomes.

4.5 Discussion

Parenting has been recognized as an essential contributor to the health and well-being of children, as well as their cognitive and non-cognitive development (Cobb-Clark, Salamanca, and

11. Especially the psychology literature documents relations between parenting style and children's personality traits, such as the Big Five, self-esteem, or self-control. However, findings are mainly established using the split into permissive, authoritarian, and authoritative parenting (as introduced in section 4.1). In general, findings across studies and contexts are difficult to compare due to a lack of standardization in the measurement of parenting style and parental investments.

Zhu, 2019; Doepke, Sorrenti, and Zilibotti, 2019). Despite the existence of several sources of influencing factors on the life outcomes of young people—ranging from their peer groups to teachers and the neighborhood environment—the way children are raised and treated by their parents remains of prime importance.

This study adds to the empirical evidence that meaningful relationships exist between parenting style and a wide range of children's skills and behaviors. Contrary to previous studies, we study a very broad range of outcomes and relate them to parenting at the same time. After condensing five different dimensions of parenting style through a linear discriminant analysis into a binary variable that we denote as positive parenting (as it loads on emotional warmth and monitoring, but in the opposite direction on negative communication, psychological control, and strict control), we find persistent patterns. Positive parenting has significant associations with a plethora of cognitive and non-cognitive skills, as well as behavioral field outcomes, including IQ, economic preferences, the Big Five, self-esteem and self-control, study attitude, risky behaviors, prosociality, emotional and behavioral problems, and happiness. All of these variables have been shown to have a profound relationship with later life outcomes as adults (Golsteyn, Grönqvist, and Lindahl, 2014; Falk et al., 2018; Kosse and Tincani, 2020). While the relationship between positive parenting and each of these variables individually may be considered to be of minor importance for a child's later life, the persistent pattern of positive parenting potentially affecting so many cognitive and non-cognitive skills and behavioral outcomes at once, and in almost all cases also in the same direction, could leave a lasting imprint on a child's life. This makes our encompassing results so important. Furthermore, if skills cross-fertilize each other (Cunha and Heckman, 2007), single effects may reinforce each other and therefore have an even larger joint effect.

Given our cross-sectional setting, we cannot make causal claims here. Apart from parenting style influencing children, child behavior may lead to parents adapting their parenting style, or non-observable factors could drive both child skills and behavior as well as their parents' way of parenting. However, we provide suggestive evidence that positive parenting can be helpful for children's lives. If this was the case, this might be particularly important for poor countries (like Bangladesh), where inputs through good parenting might positively affect skill formation and emotional stability, and may thus help in fighting poverty.

Overall, our study results emphasize the deep connection between parenting style and human development of children across various ages. If parenting style enters the human capital production function as an input factor (Cobb-Clark, Salamanca, and Zhu, 2019), this has immediate policy implications by highlighting the importance of effective parenting techniques. The latter can be molded, as some work shows that parenting style can be modified for better health outcomes of children (WHO, 2009) or to improve their prosociality (Cappelen et al., 2020). In addition to addressing parenting style directly, our findings also stress the importance of parents for the development of their children more generally. This insight, in turn, also has implications for labor market policies. Understanding that parenting can be

crucial for child development may provide a push for the formulation of labor market policies that reduce parental stress, for example, by allowing for flexible working hours or reducing the number of unplanned meetings. A reduction in stress has been found to have positive effects on parenting style (Neece, 2014; Parent et al., 2016) and may, through this channel, then improve the development and life outcomes of children.

References

Anderson, Michael L. 2008. "Multiple Inference and Gender Differences in the Effects of Early Intervention: A Reevaluation of the Abecedarian, Perry Preschool, and Early Training Projects." *Journal of the American Statistical Association* 103 (484): 1481–95. [181]

Anger, Silke, and Daniel D Schnitzlein. 2017. "Cognitive Skills, Non-Cognitive Skills, and Family Background: Evidence From Sibling Correlations." *Journal of Population Economics* 30 (2): 591–620. [182]

Barrera Jr, Manuel, Hazel M Prelow, Larry E Dumka, Nancy A Gonzales, George P Knight, Marcia L Michaels, Mark W Roosa, and JennYun Tein. 2002. "Pathways from Family Economic Conditions to Adolescents' Distress: Supportive Parenting, Stressors Outside the Family, and Deviant Peers." *Journal of Community Psychology* 30 (2): 135–52. [181]

Bauer, Michal, Julie Chytilová, and Jonathan Morduch. 2012. "Behavioral Foundations of Microcredit: Experimental and Survey Evidence from Rural India." *American Economic Review* 102 (2): 1118–39. [179]

Bauer, Michal, Julie Chytilová, and Barbara Pertold-Gebicka. 2014. "Parental Background and Other-regarding Preferences in Children." *Experimental Economics* 17 (1): 24–46. [179]

Baumrind, Diana. 1966. "Effects of Authoritative Parental Control on Child Behavior." *Child Development,* 887–907. [176]

Benjamini, Yoav, Abba M Krieger, and Daniel Yekutieli. 2006. "Adaptive Linear Step-up Procedures that Control the False Discovery Rate." *Biometrika* 93 (3): 491–507. [181]

Borawski, Elaine A, Carolyn E Ievers-Landis, Loren D Lovegreen, and Erika S Trapl. 2003. "Parental Monitoring, Negotiated Unsupervised Time, and Parental Trust: The Role of Perceived Parenting Practices in Adolescent Health Risk Behaviors." *Journal of Adolescent Health* 33 (2): 60–70. [175]

Briole, Simon, Hélène Le Forner, and Anthony Lepinteur. 2020. "Child's Socio-Emotional Skills: Is There a Quantity-Quality Trade-off?" *Labour Economics* 64: 101811. [180]

Bun, John R, Peggy A Louiselle, Thomas M Misukanis, and Rebecca A Mueller. 1988. "Effects of Parental Authoritarianism and Authoritativeness on Self-Esteem." *Personality & Social Psychology Bulletin* 14 (2): 271–82. [176]

Cappelen, Alexander, John List, Anya Samek, and Bertil Tungodden. 2020. "The Effect of Early-Childhood Education on Social Preferences." *Journal of Political Economy* 128 (7): 2739–58. [190]

Cattell, Raymond B. 1971. *Abilities: Their Structure, Growth, and Action.* Houghton Mifflin. [179]

Chan, Tak Wing, and Anita Koo. 2011. "Parenting Style and Youth Outcomes in the UK." *European Sociological Review* 27 (3): 385–99. [176]

Chang, Mimi. 2007. "Cultural Differences in Parenting Styles and Their Effects on Teens' Self-Esteem, Perceived Parental Relationship Satisfaction, and Self-Satisfaction." Thesis. Carnegie Mellon University. [176]

Chen, Ying, Jess Haines, Brittany M Charlton, and Tyler J van der Weele. 2019. "Positive Parenting Improves Multiple Aspects of Health and Well-Being in Young Adulthood." *Nature Human Behaviour* 3 (7): 684–91. [175]

Cobb-Clark, Deborah A, Nicolás Salamanca, and Anna Zhu. 2019. "Parenting Style as an Investment in Human Development." *Journal of Population Economics,* 1–38. [175, 181, 189, 190]

Cunha, Flavio, and James J Heckman. 2007. "The Technology of Skill Formation." *American Economic Review* 97 (2): 31–47. [188, 190]

Cunha, Flavio, and James J Heckman. 2008. "Formulating, Identifying and Estimating the Technology of Cognitive and Noncognitive Skill Formation." *Journal of Human Resources* 43: 738–82. [176, 188]

Cunha, Flavio, James J Heckman, and Susanne M Schennach. 2010. "Estimating the Technology of Cognitive and Noncognitive Skill Formation." *Econometrica* 78 (3): 883–931. [175, 176]

Dallaire, Danielle H, Ashley Q Pineda, David A Cole, Jeffrey A Ciesla, Farrah Jacquez, Beth LaGrange, and Alanna E Bruce. 2006. "Relation of Positive and Negative Parenting to Children's Depressive Symptoms." *Journal of Clinical Child & Adolescent Psychology* 35 (2): 313–22. [178]

Davids, Eugene Lee, Nicolette Vanessa Roman, and Lloyd Leach. 2017. "The Link Between Parenting Approaches and Health Behavior: A Systematic Review." *Journal of Human Behavior in the Social Environment* 27 (6): 589–608. [175]

Doepke, Matthias, Giuseppe Sorrenti, and Fabrizio Zilibotti. 2019. "The Economics of Parenting." *Annual Review of Economics* 11: 55–84. [176, 188, 190]

Doepke, Matthias, and Fabrizio Zilibotti. 2017. "Parenting With Style: Altruism and Paternalism in Intergenerational Preference Transmission." *Econometrica* 85 (5): 1331–71. [176]

Doepke, Matthias, and Fabrizio Zilibotti. 2019. *Love, Money, and Parenting: How Economics Explains the Way We Raise Our Kids.* Princeton and Oxford: Princeton University Press. [175]

Dornbusch, Sanford M, Philip L Ritter, P Herbert Leiderman, Donald F Roberts, and Michael J Fraleigh. 1987. "The Relation of Parenting Style to Adolescent School Performance." *Child Development* 58 (5): 1244–57. [175]

Duckworth, Angela Lee, Betty Kim, and Eli Tsukayama. 2013. "Life Stress Impairs Self-Control in Early Adolescence." *Frontiers in Psychology* 3. [180]

Falk, Armin, Anke Becker, Thomas Dohmen, Benjamin Enke, David Huffman, and Uwe Sunde. 2018. "Global Evidence on Economic Preferences." *Quarterly Journal of Economics* 133 (4): 1645–92. [190]

Falk, Armin, Fabian Kosse, Pia Pinger, Hannah Schildberg-Hörisch, and Thomas Deckers. 2021. "Socio-Economic Status and Inequalities in Children's IQ and Economic Preferences." *Journal of Political Economy* 129 (9): 2504–45. [188]

Fiorini, Mario, and Michael P Keane. 2014. "How the Allocation of Children's Time Affects Cognitive and Noncognitive Development." *Journal of Labor Economics* 32 (4): 787–836. [188, 189]

Fisher, Ronald A. 1936. "The Use of Multiple Measurements in Taxonomic Problems." *Annals of Eugenics* 7 (2): 179–88. [181]

Fletcher, Jason M. 2010. "Adolescent Depression and Educational Attainment: Results Using Sibling Fixed Effects." *Health Economics* 19 (7): 855–71. [182]

Francesconi, Marco, and James J Heckman. 2016. "Child Development and Parental Investment: Introduction." *Economic Journal* 126 (596): F1–F27. [175]

Gerlitz, Jean-Yves, and Joergen Schupp. 2005. "Zur Erhebung der Big-Five-basierten Personlichkeitsmerkmale im SOEP. Dokumentation der Instrumententwicklung BFI-S auf Basis des SOEP-Pretests 2005." Dokumentation. Deutsches Institut für Wirtschaftsforschung (DIW Berlin). [179]

Golsteyn, Bart HH, Hans Grönqvist, and Lena Lindahl. 2014. "Adolescent Time Preferences Predict Lifetime Outcomes." *Economic Journal* 124 (580): F739–F761. [190]

Goodman, Anna, Donna L Lamping, and George B Ploubidis. 2010. "When to Use Broader Internalising and Externalising Subscales Instead of the Hypothesised Five Subscales on the Strengths and Difficulties Questionnaire (SDQ): Data from British Parents, Teachers and Children." *Journal of Abnormal Child Psychology* 38 (8): 1179–91. [180]

Goodman, Robert, D Renfrew, and Mohammad SI Mullick. 2000. "Predicting Type of Psychiatric Disorder from Strengths and Difficulties Questionnaire (SDQ) Scores in Child Mental Health Clinics in London and Dhaka." *European Child & Adolescent Psychiatry* 9 (2): 129–34. [180]

Haerpfer, C, R Inglehart, A Moreno, C Welzel, K Kizilova, J Diez-Medrano, M Lagos, et al. 2020. "World Values Survey: Round Seven—Country-Pooled Datafile." Survey Documentation. JD Systems Institute & WVSA Secretariat. [180]

Kaufmann, Dagmar, Ellis Gesten, Raymond C. Santa Lucia, Octavio Salcedo, Gianna Rendina-Gobioff, and Ray Gadd. 2000. "The Relationship Between Parenting Style and Children's Adjustment: The Parents' Perspective." *Journal of Child and Family Studies* 9 (2): 231–45. [175]

Kiessling, Lukas, Shyamal Chowdhury, Hannah Schildberg-Hörisch, and Matthias Sutter. 2021. "Parental Paternalism and Patience." IZA DP No. 14030 14030. IZA Institute of Labor Economics. [188]

Kim, Kyoung Min, and Un Sun Chung. 2021. "Can Money Buy Happiness for a Family? Family Income, Parenting Style, and Life Satisfaction in Parents and Adolescents." *Clinical Child Psychology and Psychiatry* 26 (3): 823–38. [182]

Kosse, Fabian, and Michela M Tincani. 2020. "Prosociality Predicts Labor Market Success Around the World." *Nature Communications* 11 (1): 1–6. [190]

Lachenbruch, PA, and M Goldstein. 1979. "Perspectives in Biometry." *Biometrics* 35 (1): 69–85. [183]

Lee, Chih-Yuan S, Jared R Anderson, Jason L Horowitz, and Gerald J August. 2009. "Family Income and Parenting: The Role of Parental Depression and Social Support." *Family Relations* 58 (4): 417–30. [181]

Maccoby, Eleanor, and John Martin. 1983. "Socialization in the Context of the Family: Parent-Child Interaction." In *Handbook of Child Psychology: Vol. IV. Socialization, Personality and Social Development,* 4th, 1–101. New York: Wiley. [176]

Melton, Richard S. 1963. "Some Remarks on Failure to Meet Assumptions in Discriminant Analyses." *Psychometrika* 28 (1): 49–53. [183]

Milevsky, Avidan, Melissa Schlechter, Sarah Netter, and Danielle Keehn. 2007. "Maternal and Paternal Parenting Styles in Adolescents: Associations with Self-Esteem, Depression and Life-Satisfaction." *Journal of Child and Family Studies* 16: 39–47. [175]

Mohanty, N, A Lee-St John, R Manmatha, and TM Rath. 2013. "Shape-Based Image Classification and Retrieval." In *Handbook of Statistics,* 31: 249–67. Elsevier. [181]

Neece, Cameron L. 2014. "Mindfulness-Based Stress Reduction for Parents of Young Children with Developmental Delays: Implications for Parental Mental Health and Child Behavior Problems." *Journal of Applied Research in Intellectual Disabilities* 27 (2): 174–86. [191]

Noonan, Katharine, Richeal Burns, and Mara Violato. 2018. "Family Income, Maternal Psychological Distress and Child Socio-Emotional Behaviour: Longitudinal Findings From the UK Millennium Cohort Study." *SSM - Population Health* 4: 280–90. [182]

Parent, Justin, Laura G McKee, Jennifer N Rough, and Rex Forehand. 2016. "The Association of Parent Mindfulness With Parenting and Youth Psychopathology Across Three Developmental Stages." *Journal of Abnormal Child Psychology* 44 (1): 191–202. [191]

Pinquart, Martin. 2016. "Associations of Parenting Styles and Dimensions With Academic Achievement in Children and Adolescents: A Meta-Analysis." *Educational Psychology Review* 28 (3): 475–93. [175]

Pinquart, Martin. 2017. "Associations of Parenting Dimensions and Styles With Internalizing Symptoms in Children and Adolescents: A Meta-Analysis." *Marriage & Family Review* 53 (7): 613–40. [175]

Pinquart, Martin, and Rubina Kauser. 2018. "Do the Associations of Parenting Styles With Behavior Problems and Academic Achievement Vary by Culture? Results From a Meta-Analysis." *Cultural Diversity and Ethnic Minority Psychology* 24 (1): 75–100. [175]

Ponnet, Koen, Edwin Wouters, Tim Goedemé, and Dimitri Mortelmans. 2016. "Family Financial Stress, Parenting and Problem Behavior in Adolescents: An Actor-Partner Interdependence Approach." *Journal of Family Issues* 37 (4): 574–97. [181]

Ranson, Kenna E, and Liana J Urichuk. 2008. "The Effect of Parent-Child Attachment Relationships on Child Biopsychosocial Outcomes: A Review." *Early Child Development and Care* 178 (2): 129–52. [175]

Richter, David, Julia Rorher, Maria Metzing, Wiebke Nestler, Michael Weinhardt, and Joergen Schupp. 2017. "SOEP Scales Manual (Updated for SOEP-Core v32.1)." SOEP Survey Papers 432. DIW. [176, 178, 196]

Rodriguez, Christina M, Anjali Gowda Ferguson, and Samantha Gonzalez. 2022. "Mediators between Positive and Negative Parenting and Child Depressive and Anxious Symptoms: Findings from a Diverse, At-Risk Sample." *Children* 9 (3): 350. [178]

Rosenberg, Morris. 1965. *Society and the Adolescent Self-Image.* Princeton Legacy Library. Princeton, NJ: Princeton University Press. [179]

Tangney, June P, Roy F Baumeister, and Angie Luzio Boone. 2004. "High Self-Control Predicts Good Adjustment, Less Pathology, Better Grades, and Interpersonal Success." *Journal of Personality* 72 (2): 271–324. [180]

Vaibhaw, Jay Sarraf, and PK Pattnaik. 2020. "Chapter 2: Brain–Computer Interfaces and their Applications." In *An Industrial IoT Approach for Pharmaceutical Industry Growth,* edited by Valentina Emilia Balas, Vijender Kumar Solanki, and Raghvendra Kumar, 2: 31–54. Academic Press. [181]

Wechsler, David. 2003. *The Wechsler Intelligence Scale for Children.* 4th ed. Pearson. [179]

Weinert, Sabine, Jens B Asendorpf, Andreas Beelmann, Hildegard Doil, Sabine Frevert, Arnold Lohaus, and Marcus Hasselhorn. 2007. "Expertise zur Erfassung von psychologischen Personmerkmalen bei Kindern im Alter von fünf Jahren im Rahmen des SOEP." DIW Data Documentation 20. Deutsches Institut fuer Wirtschaftsforschung (DIW). [179]

WHO. 2009. *Preventing Violence Through the Development of Safe, Stable and Nurturing Relationships Between Children and Their Parents and Caregivers.* WHO Press. [188–190]

Appendix 4.A Outcome measurement

TABLE 4.A.1. Outcome measures

Outcome	Components	Scale	Resp.	Standardization	Source
IQ	fluid and crystallized IQ	WISC IV, modified for local context	children	across age groups	Wechsler (2003)
patience	number of patient choices	out of 6 incentivized choices	children	standardized mean of two components across age groups	Bauer et al. (2012)
	question on time pref.	Likert scale (5-point)	children		Falk et al. (2018), modified
risk	choice of gambles	out of 6 incentivized gambles	children	standardized mean of two components across age groups	Binswanger (1980)
	question on risk pref.	Likert scale (5-point)	children		Falk et al. (2018), modified
altruism	number of altruistic choices	out of 4 incentivized games	children	across age groups	Bauer et al. (2014)
Big Five (age 6-9)	10-item questionnaire	Likert scale (11-point)	mothers	within age group	Weinert et al. (2007)
Big Five (age 10-16)	16-item questionnaire	Likert scale (5-point)	children	within age group	Weinert et al. (2007)
self-esteem (age 9-16)	10-item questionnaire	Likert scale (5-point)	children	across age groups	Rosenberg (1965)
self-control (age 6-11)	8-item questionnaire	Likert scale (5-point)	mothers	within age group	Tsyukayama et al. (2013)
self-control (age 12-16)	13-item questionnaire	Likert scale (5-point)	children	within age group	Tangney et al. (2004)
study attitude	question on value of hard work	Likert scale (5-point)	children	across age groups	Rotter (1966)
risky behaviors (age 10-16)	16-item index of risky behaviors	yes/no	children	across age groups	using local FGD's
prosociality	5-item subscale of SDQ on prosocial acts of children	Likert scale (3-point)	mothers	across age groups	Goodman (1997)
SDQ internalizing behaviors	subscale containing emotional problems and peer problems	Likert scale (3-point); two 5-item subscales	mothers	across age groups	Goodman (1997)
SDQ externalizing behaviors	subscales containing hyperactivity and conduct problems	Likert scale (3-point); two 5-item subscales	mothers	across age groups	Goodman (1997)
happiness	question on general happiness	visual Likert scale (5-point)	children	across age groups	World Values Survey, modified

NOTES: Table summarizes outcome measures used.

4.A.1 Parenting style

Mothers were rating 18 items on a five-point scale, stating the frequency of different actions when raising their children ("never" to "nery frequently"). The questionnaire was answered once for each household, so values are identical for siblings. These items are combined into six scales (in general three items per scale), indicating for each mother how much parenting style is characterized by emotional warmth, inconsistent parenting, monitoring, negative communication, psychological control, and strict control.

Emotional warmth encompassed the degree of affirmative attention and care in parenting. *Inconsistent parenting* points to inconsistencies in parents' behavior when bringing up their children. *Monitoring* refers to how well parents are informed about activities and social contacts of their children. *Negative communication* indicates the degree of negative behavior of parents towards their children. *Psychological control* assesses parents' negative intrusive thoughts, feelings, and behavior towards their children with parents potentially building up psychological pressure. *Strict control* encompasses how rigorously and harshly parents interact with their children. For an overview and a detailed description of the parenting style measures, see Richter et al. (2017) and the references therein.

Emotional warmth

(1) I use words and gestures to show my child that I love her/him.
(2) I comfort my child when s/he feels sad.
(3) I praise my child.

Inconsistent parenting

(1) I threaten my child with punishment, but don't actually follow through with it.
(2) I reduce punishments or lift them ahead of time.
(3) It is hard for me to be consistent in my childrearing.[12]

Monitoring

(1) I talk to my child about things s/he has done, seen, or experienced when s/he was out.
(2) When my child is outside the home, I know exactly where s/he is.
(3) I try to actively influence my child's circle of friends.

12. Due to a translation issue, the dimension "inconsistent parenting" is reduced to item number 3: "It is hard for me to be consistent in my childrearing." Translation of the other two items into Bengali did not properly convey the true meaning. As a consequence, we dropped the subscale from our analyses.

Negative communication

(1) I criticize my child.
(2) I shout at my child when s/he did something wrong.
(3) I scold my child when I am angry at her/him.

Psychological control

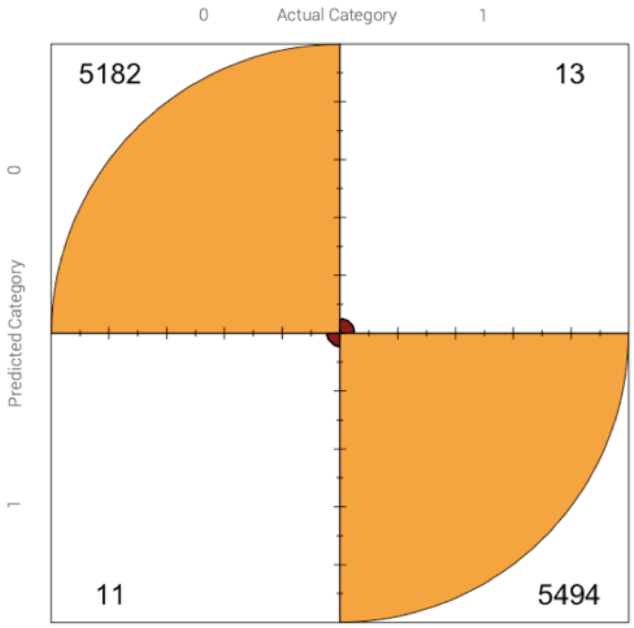
(1) I feel that my child is ungrateful because s/he disobeys.
(2) I stop talking to my child for a while when s/he did something wrong.
(3) I am disappointed and sad when my child misbehaves.

Strict control

(1) I punish my child when s/he was disobedient.
(2) I tend to be strict with my child.
(3) I make it clear to my child that s/he should not oppose orders and decisions.

Appendix 4.B Linear discriminant analysis (LDA)

FIGURE 4.B.1. LDA model accuracy



NOTES: The matrix above shows the accuracy of the linear discriminant analysis using an SVM model. The orange areas show instances where the model was correctly specified, and red areas show instances when the model was incorrectly specified for the data. The results presented are of a random 20 percent split of the data (testing set), over 10 iterations. 80 percent of the data was used as the training set in each iteration.

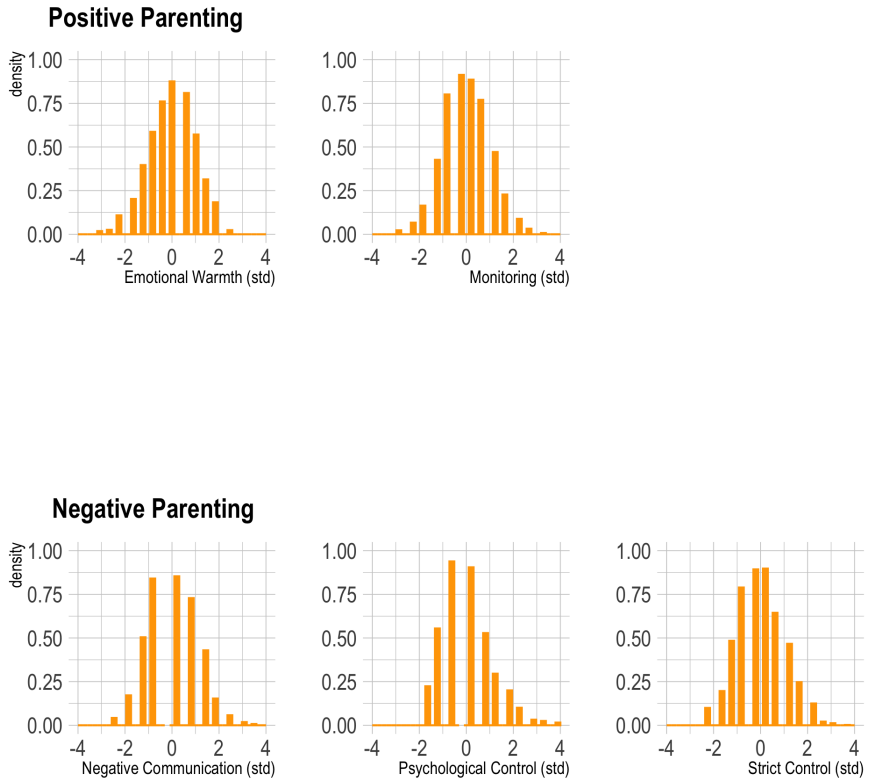
Appendix 4.C Additional results

TABLE 4.C.1. Summary statistics

	Mean	Std. dev.	Min.	Max.	Obs.
Socio-economic characteristics					
female	0.518		0	1	5,351
age (in years)	10.253	2.627	6	16	5,351
number of siblings	2.479	1.432	0	10	5,351
log income	11.535	1.964	0	16.146	5,351
father's literacy	0.550		0	1	5,351
mother's literacy	0.654		0	1	5,351
Cognitive skills					
IQ	44.718	4.127	40	70	5,351
Non-cognitive skills					
Economic preferences					
patience	0	1	-2.011	1.981	5,351
risk-taking	0	1	-2.508	2.071	5,351
altruism	0	1	-2.189	1.971	5,351
Personality traits					
Big Five Openness	0	1	-3.631	1.926	5,351
Big Five Conscientiousness	0	1	-3.572	1.550	5,351
Big Five Extraversion	0	1	-3.705	2.376	5,351
Big Five Agreeableness	0	1	-3.932	1.949	5,351
Big Five Neuroticism	0	1	-1.653	3.655	5,351
self-esteem	0	1	-4.237	2.337	3,814
self-control	0	1	-4.159	2.320	5,336
Behavioral outcomes					
study attitude	0	1	-4.337	0.718	5,351
risky behaviors	0	1	-1.172	3.823	3,071
prosociality	0	1	-2.858	1.558	5,351
SDQ internalizing behavior	0	1	-1.997	4.129	5,351
SDQ externalizing behavior	0	1	-1.828	4.020	5,351
happiness	0	1	-5.320	0.667	5,351

NOTES: The table provides summary statistics for the sample of this study, children aged 6 to 16.

FIGURE 4.C.1. Distribution of parenting style dimensions



NOTES: The figures above show the distributions of the five components of parenting styles: emotional warmth, monitoring, negative communication, psychological control, and strict control. A full explanation and a list of survey items are provided in sections 4.2.1 and 4.A.1.

TABLE 4.C.2. Children's outcomes and positive parenting for children aged 6 to 9

	(1)	(2)	(3)	(4)	(5)
	Positive parenting				
Dependent variable	Coefficient	Std. error	R^2	q-value	Obs.
Cognitive skills					
IQ	0.153***	(0.044)	0.228	0.001	2,311
Non-cognitive skills					
Economic preferences					
patience	−0.065	(0.047)	0.007	0.047	2,311
risk-taking	−0.018	(0.045)	0.011	0.138	2,311
altruism	0.018	(0.040)	0.010	0.138	2,311
Personality traits					
Big Five Openness	0.262***	(0.047)	0.061	0.001	2,311
Big Five Conscientiousness	0.329***	(0.045)	0.061	0.001	2,311
Big Five Extraversion	−0.191***	(0.041)	0.092	0.001	2,311
Big Five Agreeableness	0.352***	(0.048)	0.065	0.001	2,311
Big Five Neuroticism	−0.255***	(0.050)	0.038	0.001	2,311
self-esteem	0.215**	(0.070)	0.135	0.002	774
self-control	0.277***	(0.051)	0.066	0.001	2,311
Behavioral outcomes					
study attitude	0.092	(0.051)	0.026	0.033	2,311
risky behaviors	−0.828*	(0.371)	0.446	0.017	31
prosociality	0.415***	(0.058)	0.066	0.001	2,311
SDQ internalizing behavior	−0.232***	(0.047)	0.068	0.001	2,311
SDQ externalizing behavior	−0.383***	(0.049)	0.087	0.001	2,311
happiness	0.100*	(0.046)	0.032	0.017	2,311

NOTES: The table shows results for OLS regressions of children's outcomes on parenting style for younger children aged 6 to 9. The left-most column states the dependent variables in separate OLS regressions. Column (1) shows coefficients for the LDA-based parenting category where 1 = positive parenting, 0 = non-positive or negative parenting. Column (4) shows the false discovery rate adjusted q-values that display significance changes from multiple hypothesis testing. Controls include gender, age fixed effects, number of siblings, family income, literacy of father, literacy of mother, and district fixed effects. Standard errors are clustered at the village level. Significance at $^{*}p<.05$, $^{**}p<.01$, $^{***}p<.001$.

TABLE 4.C.3. Children's outcomes and positive parenting for children aged 10 to 16

	(1)	(2)	(3)	(4)	(5)
	Positive parenting				
Dependent variable	Coefficient	Std. error	R^2	q-value	Obs.
Cognitive skills					
IQ	−0.001	(0.043)	0.149	0.132	3,040
Non-cognitive skills					
Economic preferences					
patience	−0.113*	(0.044)	0.009	0.004	3,040
risk-taking	−0.034	(0.041)	0.017	0.055	3,040
altruism	0.112**	(0.043)	0.008	0.004	3,040
Personality traits					
Big Five Openness	0.311***	(0.045)	0.071	0.001	3,040
Big Five Conscientiousness	0.329***	(0.047)	0.068	0.001	3,040
Big Five Extraversion	0.302***	(0.044)	0.071	0.001	3,040
Big Five Agreeableness	0.329***	(0.044)	0.045	0.001	3,040
Big Five Neuroticism	−0.278***	(0.044)	0.042	0.001	3,040
self-esteem	0.430***	(0.047)	0.129	0.001	3,040
self-control	0.478***	(0.050)	0.101	0.001	3,025
Behavioral outcomes					
study attitude	0.221***	(0.048)	0.037	0.001	3,040
risky behaviors	−0.191***	(0.039)	0.256	0.001	3,040
prosociality	0.322***	(0.053)	0.055	0.001	3,040
SDQ internalizing behavior	−0.481***	(0.052)	0.108	0.001	3,040
SDQ externalizing behavior	−0.492***	(0.051)	0.125	0.001	3,040
happiness	0.088*	(0.040)	0.035	0.011	3,040

NOTES: The table shows results for OLS regressions of children's outcomes on parenting style for older children aged 10 to 16. The left-most column states the dependent variables in separate OLS regressions. Column (1) shows coefficients for the LDA-based parenting category where 1 = positive parenting, 0 = non-positive or negative parenting. Column (4) shows the false discovery rate adjusted q-values that display significance changes from multiple hypothesis testing. Controls include gender, age fixed effects, number of siblings, family income, literacy of father, literacy of mother, and district fixed effects. Standard errors are clustered at the village level. Significance at $^{*}p<.05$, $^{**}p<.01$, $^{***}p<.001$.

TABLE 4.C.4. Children's outcomes and income (median split) for children aged 6 to 16

	(1)	(2)	(3)	(4)
	Income category			
	Coefficient	Std. error	R^2	N
Cognitive skills				
IQ	0.096**	(0.03)	0.273	5,351
Non-cognitive skills				
Economic preferences				
patience	−0.009	(0.032)	0.004	5,351
risk-taking	−0.040	(0.035)	0.022	5,351
altruism	0.024	(0.032)	0.005	5,351
Personality traits				
Big Five Openness	0.056	(0.036)	0.035	5,351
Big Five Conscientiousness	0.047	(0.034)	0.029	5,351
Big Five Extraversion	0.009	(0.032)	0.049	5,351
Big Five Agreeableness	0.023	(0.037)	0.021	5,351
Big Five Neuroticism	−0.043	(0.035)	0.017	5,351
self-esteem	0.115**	(0.041)	0.094	3,814
self-control	0.085*	(0.037)	0.047	5,336
Behavioral outcomes				
study attitude	0.022	(0.036)	0.034	5,351
risky behaviors	−0.151***	(0.043)	0.250	3,071
prosociality	0.060	(0.035)	0.039	5,351
SDQ internalizing behavior	−0.056	(0.042)	0.056	5,351
SDQ externalizing behavior	−0.064	(0.035)	0.073	5,351
happiness	0.072	(0.033)	0.029	5,351

NOTES: The table shows results for OLS regressions of children's outcomes on income categories for children aged 6 to 16. Income is calculated as the family's monthly income, the categories are created by splitting at median (p50 and above = 1, below = 0). The left-most column states the dependent variables from separate OLS regressions, column (1) shows the coefficients of the income category variable. Controls include gender, age fixed effects, number of siblings, continuous family income, literacy of father, literacy of mother, and district fixed effects. Standard errors are clustered at the village level. Significance at $^{*}p<.05$, $^{**}p<.01$, $^{***}p<.001$.

4.C.1 Complete regression tables

TABLE 4.C.5. Association between cognitive skills and positive parenting

	(1)	(2)
	IQ	
	Coefficient	Std. error
positive parenting	0.098**	(0.033)
female	0.091***	(0.023)
number of siblings	−0.042***	(0.010)
log income	0.013	(0.007)
father's literacy	0.126***	(0.032)
mother's literacy	0.291***	(0.028)
i.district		
Chandpur	0.269***	(0.062)
Sunamganj	0.102	(0.064)
Gopalganj	0.440***	(0.053)
i.age		
age in years = 7	−1.039***	(0.070)
age in years = 8	−0.794***	(0.069)
age in years = 9	−0.933***	(0.065)
age in years = 10	−1.187***	(0.067)
age in years = 11	−1.442***	(0.070)
age in years = 12	−1.332***	(0.071)
age in years = 13	−1.415***	(0.076)
age in years = 14	−1.520***	(0.073)
age in years = 15	−1.396***	(0.080)
age in years = 16	−1.681***	(0.089)
constant	0.548***	(0.098)
Observations	5,351	
R^2	0.273	

NOTES: The table above shows results for OLS regressions of children's standardized IQ on the LDA-based parenting category where 1 = positive parenting, 0 = non-positive or negative parenting. Female and parents' literacy are dummy variables where 1 = true. Base categories for district and age fixed effects are Netrokona and age 6, respectively. Standard errors are clustered at the village level. Significance at $^{*}p<.05$, $^{**}p<.01$, $^{***}p<.001$.

TABLE 4.C.6. Association between economic preferences and positive parenting

	(1) Patience	(2) Risk-taking	(3) Altruism
positive parenting	−0.078*	−0.056	0.114***
	(0.035)	(0.038)	(0.032)
female	0.018	−0.091***	0.044
	(0.031)	(0.027)	(0.031)
number of siblings	−0.008	0.014	−0.000
	(0.012)	(0.012)	(0.011)
log income	−0.004	0.010	0.004
	(0.009)	(0.008)	(0.007)
father's literacy	−0.029	−0.053	−0.064
	(0.035)	(0.035)	(0.035)
mother's literacy	−0.019	0.042	−0.005
	(0.035)	(0.033)	(0.034)
i.district			
Chandpur	−0.012	0.048	−0.070
	(0.059)	(0.064)	(0.045)
Sunamganj	0.069	0.232***	−0.083
	(0.074)	(0.062)	(0.047)
Gopalganj	−0.049	−0.031	−0.049
	(0.049)	(0.048)	(0.040)
i.age			
age in years = 7	−0.043	0.025	0.013
	(0.070)	(0.070)	(0.077)
age in years = 8	0.035	0.095	−0.043
	(0.067)	(0.065)	(0.070)
age in years = 9	−0.006	0.071	−0.036
	(0.067)	(0.066)	(0.068)
age in years = 10	0.074	0.263***	−0.090
	(0.063)	(0.069)	(0.065)
age in years = 11	0.028	0.277***	−0.102
	(0.066)	(0.068)	(0.068)
age in years = 12	−0.057	0.198**	−0.106
	(0.071)	(0.069)	(0.073)
age in years = 13	0.024	0.244**	−0.064
	(0.067)	(0.074)	(0.077)
age in years = 14	−0.046	0.268***	−0.031
	(0.083)	(0.074)	(0.080)
age in years = 15	−0.032	0.220**	0.057
	(0.085)	(0.083)	(0.085)
age in years = 16	0.111	0.343***	−0.210*
	(0.108)	(0.100)	(0.095)
constant	0.127	−0.253*	0.005
	(0.127)	(0.118)	(0.103)
Observations	5,351	5,351	5,351
R^2	0.006	0.023	0.008

NOTES: The table above shows results for OLS regressions of children's standardized preferences on the LDA-based parenting category where 1 = positive parenting, 0 = non-positive or negative parenting. Female and parents' literacy are dummy variables where 1 = true. Base categories for district and age fixed effects are Netrokona and age 6, respectively. Standard errors are clustered at the village level. Significance at $^{*}p<.05$, $^{**}p<.01$, $^{***}p<.001$.

TABLE 4.C.7. Association between Big Five personality traits and positive parenting

	(1)	(2)	(3)	(4)	(5)
	Openness	Conscientiousness	Extraversion	Agreeableness	Neuroticism
positive parenting	0.302***	0.362***	0.037	0.399***	−0.279***
	(0.036)	(0.036)	(0.030)	(0.035)	(0.036)
female	0.038	0.119***	−0.171***	0.136***	0.083**
	(0.026)	(0.026)	(0.027)	(0.030)	(0.028)
number of siblings	−0.037***	−0.001	−0.002	−0.012	−0.007
	(0.010)	(0.011)	(0.011)	(0.010)	(0.011)
log income	0.017*	−0.001	−0.004	−0.003	−0.002
	(0.008)	(0.007)	(0.007)	(0.008)	(0.007)
father's literacy	0.059	0.028	0.020	0.015	−0.034
	(0.038)	(0.038)	(0.031)	(0.036)	(0.036)
mother's literary	0.104**	0.066*	0.002	0.074*	−0.033
	(0.031)	(0.030)	(0.034)	(0.031)	(0.030)
i.district					
Chandpur	−0.126*	−0.230**	0.172**	−0.224**	0.211*
	(0.063)	(0.084)	(0.058)	(0.082)	(0.087)
Sunamganj	−0.170**	−0.378***	−0.113	−0.222**	0.334***
	(0.053)	(0.070)	(0.071)	(0.067)	(0.069)
Gopalganj	0.085*	−0.176***	0.427***	−0.079	0.093
	(0.037)	(0.048)	(0.051)	(0.041)	(0.058)
i.age					
age in years = 7	0.125	0.141*	−0.136*	0.107	−0.020
	(0.069)	(0.069)	(0.065)	(0.069)	(0.068)
age in years = 8	0.176**	0.175**	−0.105	0.12	−0.045
	(0.063)	(0.062)	(0.065)	(0.066)	(0.065)
age in years = 9	0.136*	0.198**	−0.142*	0.091	−0.054
	(0.066)	(0.063)	(0.070)	(0.066)	(0.069)
age in years = 10	0.100	0.124	−0.118	0.093	−0.029
	(0.068)	(0.067)	(0.078)	(0.072)	(0.072)
age in years = 11	0.077	0.068	−0.119	0.085	−0.035
	(0.068)	(0.069)	(0.074)	(0.067)	(0.071)
age in years = 12	0.14	0.206**	−0.078	0.117	−0.072
	(0.077)	(0.077)	(0.080)	(0.076)	(0.076)
age in years = 13	0.158*	0.12	−0.117	0.080	0.001
	(0.080)	(0.073)	(0.085)	(0.076)	(0.074)
age in years = 14	0.254**	0.248**	−0.038	0.059	−0.056
	(0.080)	(0.086)	(0.086)	(0.072)	(0.080)
age in years = 15	0.324***	0.290***	−0.042	0.156	−0.039
	(0.087)	(0.082)	(0.088)	(0.082)	(0.088)
age in years = 16	0.458***	0.187	−0.044	0.271**	−0.004
	(0.099)	(0.098)	(0.108)	(0.095)	(0.103)
constant	−0.494***	−0.302**	0.062	−0.262*	0.109
	(0.122)	(0.113)	(0.111)	(0.120)	(0.113)
Observations	5,351	5,351	5,351	5,351	5,351
R^2	0.056	0.060	0.050	0.059	0.036

NOTES: The table above shows results for OLS regressions of children's standardized Big Five personality traits on the LDA-based parenting category where 1 = positive parenting, 0 = non-positive or negative parenting. Female and parents' literacy are dummy variables where 1 = true. Base categories for district and age fixed effects are Netrokona and age 6, respectively. Standard errors are clustered at the village level. Significance at $^{*}p<.05$, $^{**}p<.01$, $^{***}p<.001$.

TABLE 4.C.8. Association between personality traits as well as happiness and positive parenting

	(1) Self-esteem	(2) Self-control	(3) Happiness
positive parenting	0.375***	0.455***	0.098**
	(0.043)	(0.045)	(0.034)
female	0.042	0.151***	0.054
	(0.029)	(0.027)	(0.029)
number of siblings	−0.026*	0.017	−0.034**
	(0.013)	(0.011)	(0.011)
log income	−0.003	0.011	−0.003
	(0.008)	(0.008)	(0.007)
father's literacy	0.047	0.111**	−0.031
	(0.041)	(0.035)	(0.034)
mother's literacy	0.130***	0.069*	0.051
	(0.034)	(0.032)	(0.032)
i.district			
Chandpur	−0.061	−0.251*	−0.139**
	(0.102)	(0.102)	(0.051)
Sunamganj	−0.588***	−0.480***	−0.278*
	(0.113)	(0.087)	(0.111)
Gopalganj	0.222***	−0.210**	−0.312***
	(0.052)	(0.067)	(0.044)
i.age			
age in years = 7	0.972**	0.196**	0.073
	(0.298)	(0.074)	(0.073)
age in years = 8	1.192***	0.168*	0.100
	(0.171)	(0.065)	(0.067)
age in years = 9	1.267***	0.181**	0.132
	(0.058)	(0.068)	(0.076)
age in years = 10	1.226***	0.174*	0.125
	(0.059)	(0.069)	(0.077)
age in years = 11	1.214***	0.288***	0.129
	(0.057)	(0.065)	(0.076)
age in years = 12	1.192***	0.187*	0.021
	(0.067)	(0.078)	(0.080)
age in years = 13	1.089***	0.032	−0.002
	(0.068)	(0.074)	(0.086)
age in years = 14	1.259***	0.225**	−0.003
	(0.069)	(0.077)	(0.092)
age in years = 15	1.380***	0.334***	−0.077
	(0.078)	(0.079)	(0.091)
age in years = 16	1.189***	0.204*	−0.210
	(0.089)	(0.097)	(0.121)
constant	−1.409***	−0.611***	0.110
	(0.114)	(0.128)	(0.109)
Observations	3,814	5,336	5,351
R^2	0.125	0.095	0.030

NOTES: The table above shows results for OLS regressions of children's standardized personality traits as well as happiness on the LDA-based parenting category where 1 = positive parenting, 0 = non-positive or negative parenting. Female and parents' literacy are dummy variables where 1 = true. Base categories for district and age fixed effects are Netrokona and age 6, respectively. Standard errors are clustered at the village level. Significance at $^{*}p<.05$, $^{**}p<.01$, $^{***}p<.001$.

TABLE 4.C.9. Association between behavioral outcomes and positive parenting

	(1) Study attitude	(2) Risky behaviors	(3) Prosociality	(4) SDQ intern. behavior	(5) SDQ extern. behavior
positive parenting	0.190***	−0.219***	0.376***	−0.410***	−0.465***
	(0.037)	(0.041)	(0.043)	(0.046)	(0.044)
female	0.033	−0.843***	0.112***	0.031	−0.231***
	(0.026)	(0.033)	(0.027)	(0.025)	(0.026)
number of siblings	−0.011	0.010	−0.001	0.021	0.013
	(0.012)	(0.013)	(0.012)	(0.012)	(0.012)
log income	−0.008	−0.020	0.001	0.011	−0.000
	(0.008)	(0.014)	(0.008)	(0.009)	(0.009)
father's literacy	0.044	−0.036	0.026	0.013	−0.007
	(0.037)	(0.042)	(0.037)	(0.039)	(0.038)
mother's literacy	0.030	−0.054	0.122**	−0.039	−0.143***
	(0.031)	(0.035)	(0.038)	(0.034)	(0.035)
i.district					
Chandpur	−0.191*	−0.344***	−0.089	−0.010	0.162
	(0.091)	(0.090)	(0.088)	(0.086)	(0.083)
Sunamganj	−0.319***	0.102	−0.191**	0.530***	0.439***
	(0.068)	(0.096)	(0.073)	(0.089)	(0.079)
Gopalganj	−0.162**	−0.317***	0.015	−0.103*	0.283***
	(0.050)	(0.076)	(0.076)	(0.047)	(0.055)
i.age					
age in years = 7	−0.001	0.063	0.116	0.015	−0.179**
	(0.079)	(0.252)	(0.070)	(0.068)	(0.068)
age in years = 8	0.064	−0.729*	0.252***	−0.027	−0.216***
	(0.071)	(0.353)	(0.063)	(0.058)	(0.064)
age in years = 9	0.189**	−0.402	0.223***	−0.054	−0.197**
	(0.063)	(0.252)	(0.061)	(0.062)	(0.063)
age in years = 10	0.267***	−0.275**	0.324***	−0.034	−0.297***
	(0.064)	(0.090)	(0.058)	(0.065)	(0.063)
age in years = 11	0.210**	−0.292***	0.340***	−0.076	−0.304***
	(0.068)	(0.085)	(0.061)	(0.065)	(0.071)
age in years = 12	0.349***	−0.430***	0.440***	−0.146*	−0.399***
	(0.069)	(0.091)	(0.064)	(0.070)	(0.071)
age in years = 13	0.279***	−0.455***	0.427***	−0.221**	−0.441***
	(0.070)	(0.097)	(0.069)	(0.076)	(0.073)
age in years = 14	0.383***	−0.548***	0.534***	−0.263***	−0.624***
	(0.079)	(0.087)	(0.072)	(0.072)	(0.068)
age in years = 15	0.527***	−0.654***	0.556***	−0.247**	−0.647***
	(0.082)	(0.088)	(0.071)	(0.088)	(0.077)
age in years = 16	0.442***	−0.725***	0.494***	−0.136	−0.621***
	(0.092)	(0.108)	(0.092)	(0.103)	(0.098)
constant	−0.139	1.354***	−0.622***	0.092	0.564***
	(0.117)	(0.171)	(0.122)	(0.129)	(0.123)
Observations	5,351	3,071	5,351	5,351	5,351
R^2	0.043	0.257	0.072	0.096	0.125

NOTES: The table above shows results for OLS regressions of children's standardized behavioral outcomes on the LDA-based parenting category where 1 = positive parenting, 0 = non-positive or negative parenting. Female and parents' literacy are dummy variables where 1 = true. Base categories for district and age fixed effects are Netrokona and age 6, respectively. Standard errors are clustered at the village level. Significance at $^{*}p<.05$, $^{**}p<.01$, $^{***}p<.001$.

Experimental Instructions

Children experiments and individual survey

General setting

- **Age:** Children aged 6 to 16 will participate in a sequence of three experiments:
  a. Time preferences
  b. Risk preferences
  c. Social preferences
- **Order:** The order of the experiments will be randomly determined by the administrators, which is explained at the beginning of the experiments.
- **Incentive:** Each child will receive a token (a star) as a show-up fee, which s/he will be able to convert into money at the end of the experiments. In addition, children can earn money during the experiment as all experiments are incentivized. However, for each child, only one of the experiments will be paid out. Which experiment will be paid will be determined through a lottery that will be explained soon.
- **Exchange rate for incentives:** The exchange rate between stars and money will be age-specific and will be communicated at the beginning of the experiment. The conversion table is included here.
- **Venue:** The experiments will take place in children's home; a male administrator will deal with boys and a female administrator will deal with girls.
- **Instructions:** All enumerators/instructors must memorize the instructions and explain the game to the child. While they will not read the text word by word, they will stick closely to the wording of the experimental instructions. In addition, the explanation will involve control questions to check for understanding.
- **Timing:** Members who belong to the same household will sit simultaneously in separate parallel sessions. It is an important task of the interviewer to ensure that the decisions of a household member truly reflect his/her own decision only and that other household members do not try to influence the decisions, e.g. place them back to back or in separate rooms.
- **Control questions that check children's understanding:** Children's understanding of the rules of the various experiments will be documented.

General instructions

My name is ... Today I have prepared three games for you. In these games, you can earn money. Before we start, I will explain the rules of our games. How much money you will earn depends mainly on your decisions. At the end, only one of the games will be paid. Which game will be paid will be determined randomly after playing all three games. You will roll a die to determine which of the three games gets paid. The rolled number will determine whether the first, second, or third game will be paid for. Each game is equally likely to be paid.

It is important that you understand the rules of all our games and play each of them carefully because each of them could be the one that is paid. Please listen carefully now. I will frequently stop during my explanation and allow you to ask questions. Therefore, please interrupt me anytime in case you have a question.

Are you okay so far? *Leave time for questions and answer them privately.*

1. Determine the sequence by rolling a die, and write the sequence in which experiments are conducted:

1 = risk, time, social
2 = risk, social, time
3 = time, risk, social
4 = time, social, risk
5 = social, time, risk
6 = social, risk, time

Time preferences

Let us start with this game. Before we start, let me explain the rules of our game. In this game you can earn stars, which you can convert into money. Each star is equal to Taka … (*use the age appropriate exchange rate*). The more stars you earn, the more money you get. That's why it is important that you understand the rules of our game. Please interrupt me anytime in case you have a question.

Are you okay so far? *Leave time for questions and answer them privately.*

1. Determine the order of explanation by rolling a die (blue, green, yellow) and write it down:

1 = blue, green, yellow
2 = blue, yellow, green
3 = green, blue, yellow
4 = green, yellow, blue
5 = yellow, blue, green
6 = yellow, green, blue

Within each part (color) the order is fixed, i.e. always use blue sheet 1 before blue sheet 2, green sheet 1 before green sheet 2, yellow sheet 1 before yellow sheet 2.

The game works as follows:

The game consists of six parts. Two blue parts, two yellow parts and two green parts (*when mentioning the parts please point at the respective decision sheets*). In each part, you will need to make one decision. For example, in this green part you have to decide whether you prefer receiving 2 stars (*please point at the stars on the decision sheet*) tomorrow, in this case please tick THIS box (*point at the respective box*), or whether you prefer receiving 3 stars in 3 weeks, in that case please tick THAT box (point at the respective box). 3 weeks means 21 days and 21 nights. If you go for 2 stars tomorrow, you will get the money tomorrow. One of us will come to your home and deliver the money in an envelope with your name marked on it. If you wait, you will get money for 3 stars after 3 weeks. Again, one of us will come to your home and deliver the money in an envelope with your name marked on it.

In the second green part you have to decide whether you prefer receiving 2 stars (*please point at the stars on the decision sheet*) tomorrow, in this case please tick THIS box (*point at the respective box*), or whether you prefer receiving 4 stars in 3 weeks, in that case please tick THAT box (*point at the respective box*). If you go for 2 stars, you will get the money tomorrow. One of us will come to your home and deliver the money in an envelope with your name marked on it.

If you wait, you will get money for 4 stars after 3 weeks. Again, one of us will come to your home and deliver the money in an envelope with your name marked on it.

Could you please repeat the rules of the game? *If the child is unable to repeat, please explain the game again; the child has to be able to repeat the correct meaning of the game autonomously.*

2. Child understood the game after: ❒

1 = first explanation, 2 = second explanation, 3 = third explanation, 4 = did not understand

The yellow parts are very similar to the green part. Here you see one of the decision sheets for the blue part. Again, 2 stars on the left-hand side, and 3 stars on the right-hand side. If you prefer receiving 2 stars tomorrow, you need to tick the left box. However, now if you prefer receiving 3 stars in 3 months, you need to tick the right box. 3 months means that about 90 days and nights will pass before you will get the money. On the second yellow sheet, again 2 stars on the left-hand side, and 4 stars on the right-hand side. If you prefer receiving 2 stars tomorrow, you need to tick the left box. However, now if you prefer receiving 4 stars in 3 months, you need to tick the right box. What do you think will happen if you tick THIS box? (*Please point at the box with the immediate (tomorrow) reward.*) What do you think will happen if you tick THAT box? (*Please point at the box with the delayed reward of 3 stars; the child has to answer the questions correctly, otherwise the experimenter has to repeat the explanation.*)

3. Child understood the game after: ❒

1 = first explanation, 2 = second explanation, 3 = third explanation, 4 = did not understand

The blue parts are very similar to the green and yellow parts. Here you see the first decision sheet for the blue part. Again, 2 stars on the left-hand side, and 3 stars on the right-hand side. However, now the earlier payment takes place in 1 month, which means after 30 days and nights have passed. The later payment takes place in 4 months, which means after 120 days and nights have passed. If you decide to receive 2 stars, you need to wait 1 month, and if you decide to receive 3 stars, you need to wait 4 months. On the second blue sheet, again 2 stars on the left-hand side, and 4 stars on the right-hand side. If you prefer receiving 2 stars in 1 month, you need to tick the left box. However, if you prefer receiving 4 stars in 4 months, you need to tick the box on the right. What do you think will happen if you tick THIS box? (*Please point at the box with the reward in 1 month.*) What do you think will happen if you tick THAT box? (*Please point at the box with the delayed reward of 4 stars; the child has to answer the questions correctly, otherwise the experimenter has to repeat the explanation.*)

4. Child understood the game after: ❒

1 = first explanation, 2 = second explanation, 3 = third explanation, 4 = did not understand

If this game is paid, only one of the six decisions counts. That means you will receive the stars for one of the six parts only. The decisions are numbered from 1 to 6. After your decisions, you will roll a die (*please demonstrate*). Assume that it shows number 5. Now decision sheet 5 (the first blue sheet) is played for real. If you have checked the box on the left-hand side, you will receive the money for 2 stars in one month. If you have checked the box on the right-hand side, you will receive money for 3 stars in 4 months. The other five sheets do not count in this case. However, you need to make a decision for each of the six sheets because you do not know yet which part will be drawn at the end of the game. Could you please repeat the last part? Will you receive the stars for all six sheets? Do you need to make a decision for each of the six sheets? If the child answers incorrectly the experimenter has to repeat the explanation of this part.

5. Child understood the game after: ❐

1 = first explanation, 2 = second explanation, 3 = third explanation, 4 = did not understand

Please take your decision for each of the six sheets now (*place the decision sheets side by side on the table; the child should fill out the decision sheets from left to right*). Start with this part (*point at the first decision sheet (depending on the order of explanation)*) and continue with this part (*point at the second decision sheet*) and finally make your decision in this part (*point at the final decision sheet*). Take as much time as you need. In the meantime, I will turn around so that I do not disturb you. Just call me when you are done or have any questions.

6. Decision taken on Green sheet 1: ❐ 1 = tomorrow, 2 = 3 weeks

7. Decision taken on Green sheet 2: ❐ 1 = tomorrow, 2 = 3 weeks

8. Decision taken on Yellow sheet 1: ❐ 1 = tomorrow, 2 = 3 months

9. Decision taken on Yellow sheet 2: ❐ 1 = tomorrow, 2 = 3 months

10. Decision taken on Blue sheet 1: ❐ 1 = 1 month, 2 = 4 months

11. Decision taken on Blue sheet 2: ❐ 1 = 1 month, 2 = 4 months

Roll a die to determine which decision sheet would be paid if this game got selected for payoff in the end.

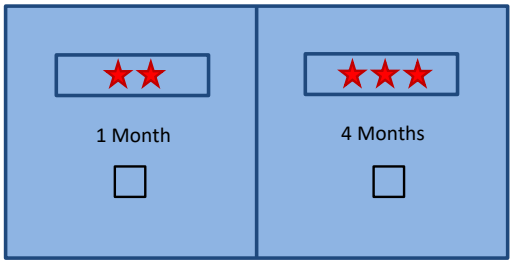
Decision sheet 1
(Green sheet 1)

Decision sheet 2
(Green sheet 2)

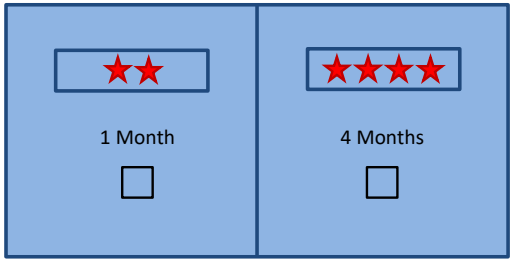
Decision sheet 3
(Yellow sheet 1)

Decision sheet 4
(Yellow sheet 2)

Decision sheet 5
(Blue sheet 1)



Decision sheet 6
(Blue sheet 2)



Risk preferences

Let us start with this game. Before we start, I will explain the rules of our game. Similar to other games, you can earn money in this game as well. How much money you will earn depends mainly on your decisions. That's why it is important that you understand the rules of our game. Please listen carefully now. I will frequently stop during my explanation and allow you to ask questions. Please interrupt me anytime in case you have a question.

Are you okay so far? *Leave time for questions and answer them privately.*

In this game, you need to select the gamble you would like to play from among six different gambles, which are listed below. You must select one and only one of these gambles.

If this game is selected for payment, you will have a 1-in-6 chance of receiving the money. The selection will be made by rolling a 6-sided die twice—first, you will roll the die to decide the gamble, and the second to decide the outcome of the particular gamble. For example, if you selected gamble number 4, then if the first roll of the die is 4, you would receive one of the payoffs of gamble number 4, which will be determined in the second roll. If the first roll of the die is not 4 and you have chosen gamble number 4, you would not receive any payments. Depending on the outcome of the first roll, the second roll would determine the outcome of the selected gamble. Each gamble has two possible outcomes—low and high. If 1, 2 or 3 is rolled, the outcome of the selected gamble is the low one, and if 4, 5 or 6 is rolled, the outcome of the gamble is the high one, and you would receive money accordingly.

Notice that the low outcome is decreasing and the high outcome is increasing for each successive gamble. For example, in the first gamble, both outcomes are identical. If you select it and then this number is rolled in the first roll, your payoff would be 25 (*please adjust for the appropriate age*) Taka. If on the other hand, you had selected gamble number 2, and if it is rolled on the first roll, your payoff could be 22 (*please adjust*) Taka or 48 (*please adjust*) Taka. In the second roll, if 1, 2 or 3 is rolled, you would receive 22 (*please adjust*) Taka, whereas if 4, 5 or 6 is rolled, you would receive 48 (*please adjust*) Taka.

Ask the child to repeat the game.

1. Child understood the game after: ❒

1 = first explanation, 2 = second explanation, 3 = third explanation, 4 = did not understand

Before you select the actual gamble involving money, we will have a practice session with candies. There are two gambles from which you need to select one:

	Outcome	Payoff	Chances	Your Selection
Gamble 1	LOW	1	50%	
	HIGH	1	50%	
Gamble 2	LOW	0	50%	
	HIGH	2	50%	

Both gambles have two outcomes. The first gamble pays 1 candy in both states, while the second gamble pays no (0) candy in the low state and 2 candies in high state. Which gamble would you like to play? Once you make your selection, you will first roll the die to decide the gamble, and then again roll the die to decide the outcome of the particular gamble. For example, if you selected gamble number 2, then if the first roll of the die is 2, you would receive one of the payoffs of gamble number 2, which will be determined in the second die roll. In the second die roll, if 1, 2 or 3 is rolled, the outcome of the selected gamble is the low one, which is 0 in gamble number 2. That means, you will not receive any candy. However, if 4, 5 or 6 is rolled, the outcome of the gamble is the high one, and you will receive 2 candies. Let us start this now.

Are you okay so far? *Leave time for questions and answer them privately.*

2. Gamble number picked involving candies: ❐

Roll a die to determine whether gamble number 1 or gamble number 2 is payoff-relevant. If you have rolled a 1 or a 2, please roll the die a second time to determine whether the low or the high payoff is realized.

3. Select the table with the appropriate age:

❐

1 = age 6-7
2 = age 8-9
3 = age 10-11
4 = age 12-13
5 = age 14-15
6 = age 16

4. Gamble number picked: ❒

Roll a die to determine which gamble is payoff-relevant. If the outcome of the first die roll equals the gamble number picked, please roll the die a second time to determine whether the low or the high payoff is realized.

Table 1: Age 6-7

Mark the gamble you like best with an X in the last column "Your Selection"
(mark only one of the six gambles):

	Outcome	Payoff	Chances	Your Selection
Gamble 1	LOW	13	50%	
	HIGH	13	50%	
Gamble 2	LOW	11	50%	
	HIGH	24	50%	
Gamble 3	LOW	10	50%	
	HIGH	30	50%	
Gamble 4	LOW	8	50%	
	HIGH	38	50%	
Gamble 5	LOW	3	50%	
	HIGH	48	50%	
Gamble 6	LOW	0	50%	
	HIGH	50	50%	

Table 2: Age 8-9

Mark the gamble you like best with an X in the last column "Your selection"
(mark only one of the six gambles):

	Outcome	Payoff	Chances	Your Selection
Gamble 1	LOW	19	50%	
	HIGH	19	50%	
Gamble 2	LOW	17	50%	
	HIGH	36	50%	
Gamble 3	LOW	15	50%	
	HIGH	45	50%	
Gamble 4	LOW	11	50%	
	HIGH	56	50%	
Gamble 5	LOW	4	50%	
	HIGH	71	50%	
Gamble 6	LOW	0	50%	
	HIGH	75	50%	

Table 3: Age 10-11

Mark the gamble you like best with an X in the last column "Your selection"
(mark only one of the six gambles):

	Outcome	Payoff	Chances	Your Selection
Gamble 1	LOW	25	50%	
	HIGH	25	50%	
Gamble 2	LOW	22	50%	
	HIGH	48	50%	
Gamble 3	LOW	20	50%	
	HIGH	60	50%	
Gamble 4	LOW	15	50%	
	HIGH	75	50%	
Gamble 5	LOW	5	50%	
	HIGH	95	50%	
Gamble 6	LOW	0	50%	
	HIGH	100	50%	

Table 4: Age 12-13

Mark the gamble you like best with an X in the last column "Your selection"
(mark only one of the six gambles):

	Outcome	Payoff	Chances	Your Selection
Gamble 1	LOW	38	50%	
	HIGH	38	50%	
Gamble 2	LOW	33	50%	
	HIGH	72	50%	
Gamble 3	LOW	30	50%	
	HIGH	90	50%	
Gamble 4	LOW	23	50%	
	HIGH	113	50%	
Gamble 5	LOW	8	50%	
	HIGH	143	50%	
Gamble 6	LOW	0	50%	
	HIGH	150	50%	

Table 5: Age 14-15

Mark the gamble you like best with an X in the last column "Your selection"
(mark only one of the six gambles):

	Outcome	Payoff	Chances	Your Selection
Gamble 1	LOW	44	50%	
	HIGH	44	50%	
Gamble 2	LOW	39	50%	
	HIGH	84	50%	
Gamble 3	LOW	35	50%	
	HIGH	105	50%	
Gamble 4	LOW	26	50%	
	HIGH	131	50%	
Gamble 5	LOW	9	50%	
	HIGH	166	50%	
Gamble 6	LOW	0	50%	
	HIGH	175	50%	

Table 6: Age 16

Mark the gamble you like best with an X in the last column "Your selection"
(mark only one of the six gambles):

	Outcome	Payoff	Chances	Your Selection
Gamble 1	LOW	63	50%	
	HIGH	63	50%	
Gamble 2	LOW	55	50%	
	HIGH	120	50%	
Gamble 3	LOW	50	50%	
	HIGH	150	50%	
Gamble 4	LOW	38	50%	
	HIGH	188	50%	
Gamble 5	LOW	13	50%	
	HIGH	238	50%	
Gamble 6	LOW	0	50%	
	HIGH	250	50%	

Social preferences

In this game you can earn stars, which you can convert into money. Each star is equal to Taka … (*use the age appropriate exchange rate*). The more stars you will earn, the more money you will get. That's why it is important that you understand the rules of our game. Please listen carefully now. I will frequently stop during my explanation and allow you to ask questions. Therefore, please interrupt me anytime in case you have a question.

Are you okay so far? *Leave time for questions and answer them privately.*

In this game you have to decide how to divide stars between yourself and another child similar to you but from a different village. You will never know who exactly the other child is and the other child will not get to know you. However, I will ensure that the other child does indeed receive the money that corresponds to the stars that you will give to him/her. You will get four different decision sheets. You will need to decide how to divide stars between yourself and another child similar to you.

Are you okay so far? *Leave time for questions and answer them privately.*

There are two possible ways to allocate the stars: the option on the left-hand side and the option on the right-hand side. Please look at the decision sheet. With option "left" you get 1 star and the child from another village gets 1 star. 1 star equals … Taka (*depending on the age group*). With option "right" you get 2 stars and the child from another village gets 0 stars.

Are you okay so far? *Leave time for questions and answer them privately.*

Depending on which option you want to choose, you should check the box at the left- or the right-hand side. You can choose either option "left" or option "right". If you would like to divide the stars according to option "right", which box would you have to check? Right, the box at the "right" side.

How much would you earn and how much would the child from the other village with whom you are randomly matched earn in this case? Right, you would get … Taka (*depending on the age group*) and the other child similar to you would get nothing.

1. Child understood the game after: ❒

1 = first explanation, 2 = second explanation, 3 = third explanation, 4 = did not understand

Are you okay so far? *Leave time for questions and answer them privately.*

As I mentioned earlier, you will get four decision sheets. The decision sheets differ from each other in the amount of stars that can be divided between you and the other child. Please choose one of the two options for each decision sheet. At the end of the game, you will roll a die (*show the process*). Here the number you roll corresponds to the sheet you will get paid for, meaning if you roll 1, you get paid for decision sheet 1 etc. If this game is selected for payment, you and the other child will be paid according to the selected decision sheet. If you roll a 5 or 6, no decision sheet will be paid.

Hand over the decision sheets one after another (displayed below) and let children play the games.

2. Decision on first sheet: ❐ 1 = left, 2 = right

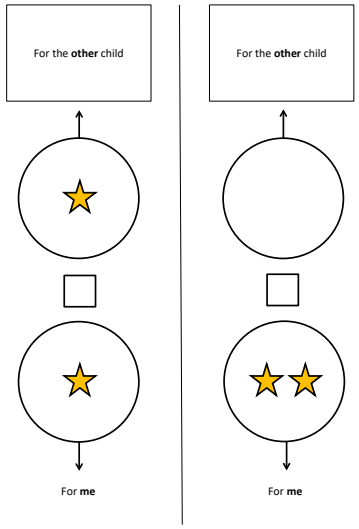
3. Decision on second sheet: ❐ 1 = left, 2 = right

4. Decision on third sheet: ❐ 1 = left, 2 = right

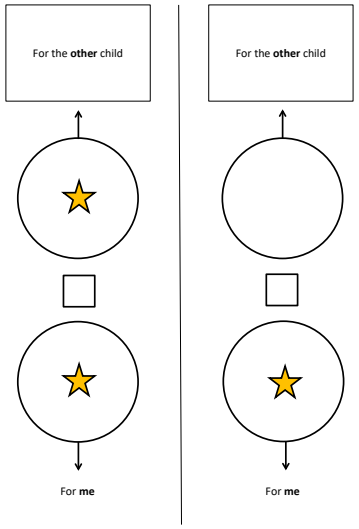
5. Decision on fourth sheet: ❐ 1 = left, 2 = rights

Roll a die to determine which decision sheet would be paid if this game got selected for payoff in the end.

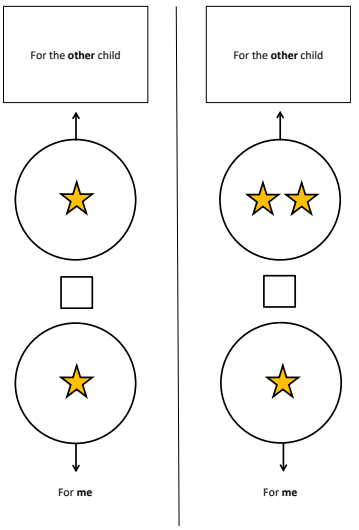
Decision sheet 1



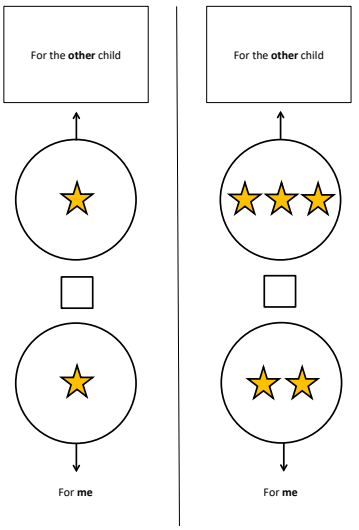
Decision sheet 2



Decision sheet 3



Decision sheet 4



5-point, visualized Likert scale

Oral introduction by interviewer: I will now read a few statements and will ask you afterwards whether these statements apply to you. For example, one statement is "I like rice." Some children think that this statement (*point at scale*)...

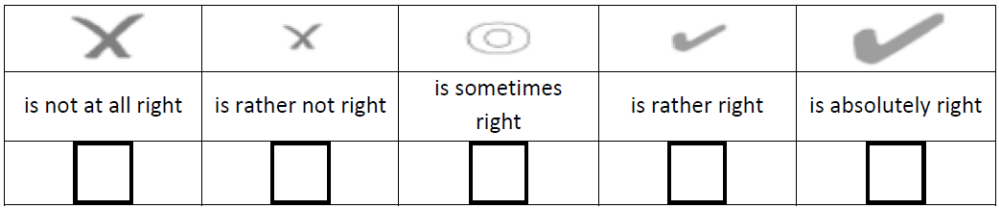
...is not at all right
...is rather right
...is sometimes right
...is rather right
...is absolutely right

Importantly, there are no right or wrong answers. Back to our example, "I like rice." How about you: Do you think that this statement...

...is not at all right
...is rather right
...is sometimes right
...is rather right
...is absolutely right

Graphical scale as below will be printed on extra sheet that interviewers will carry with them (*interviewers will point at the scale when introducing the possible answers*):

Do you find that the following statement...



I will now read several statements. Please tell me after each statement whether you think that the statement applies to you. If you do not understand the question, I am happy to repeat it for you.

Are you okay so far? *Leave time for questions and answer them privately.*

Please rate the following items/statements, using the 5-point, visualized Likert scale from above for all measures except the risky behaviors and happiness items.

Locus of control

(all children)

1. By working very hard, one can succeed at each area in life, for example at school or in the job.
2. I get into trouble even if I am not responsible.
3. The best way to deal with most problems is not to think about them at all.
4. Parents listen to what their children would like to tell them.
5. I often think that working hard will not pay off anyhow because the other children are smarter than me.

Time preferences question

(all children)

> I am good at giving up something nice today (e.g., a reward) in order to get something even nicer in the future (e.g., a larger reward).

Risk preferences question

(all children)

> I often take risks. (*give examples, e.g. quickly crossing a street although a car is approaching*)

Trust

(all children)

> One can trust unknown people.

Self-control

(children aged 12 to 16)

1. I am good at resisting temptation.
2. I have a hard time breaking bad habits. (*reversed item*)
3. I am lazy. (*reversed item*)
4. I say inappropriate things. (*reversed item*)
5. I do certain things that are bad for me, if they are fun. (*reversed item*)
6. I refuse things that are bad for me.
7. I wish I had more self-discipline. (*reversed item*)
8. People would say I have iron self-discipline.
9. Pleasure and fun sometimes keep me from getting work done. (*reversed item*)
10. I have trouble concentrating. (*reversed item*)
11. I am able to work effectively towards long-term goals.
12. Sometimes, I cannot stop myself from doing something, even if I know it is wrong. (*reversed item*)
13. I often act without thinking through all the alternatives. (*reversed item*)

Risky behaviors

(children aged 10 to 16)

Scale: 1 = yes, 2 = no

1. Do you smoke?
2. Do you eat pan/jorda/supari?
3. Do you gamble/bet/play lottery?
4. Do you play on the road with car tires?
5. Do you jump from a tree/bridge/saqo/troller to a river or canal?
6. Do you run behind a motorbike/car/trolley?
7. Do you play danguli?
8. Do you get up in the tree or on your house roof?
9. Do you dive in a pond/river?
10. Do you bring flowers or fruits without permission from someone else's garden?
11. Do you play somersault?
12. Do you blow fire-works?
13. Do you play ha-du-du?
14. Do you use marijuana/ganja/hashish?
15. Do you drive a car/motorbike?
16. Do you often get into physical fights?

BIG FIVE

(children aged 10 to 16)

Using the scale provided, please indicate how much each of the following statements reflects how you typically are (1 = "does not apply to me at all" to 5 = "applies to me perfectly"):

I see myself as someone who...

1. ...does a thorough job.
2. ...is communicative, talkative.
3. ...is sometimes somewhat rude to others.
4. ...is original, comes up with new ideas.
5. ...worries a lot.
6. ...has a forgiving nature, *that means I accept apologies quickly.*
7. ...tends to be lazy.
8. ...is outgoing, sociable.
9. ...values artistic, aesthetic experiences, *that means I enjoy painting or playing music, I love going to theater or to visit a museum.*
10. ...gets nervous easily.
11. ...does things effectively and efficiently.
12. ...is reserved.
13. ...is considerate and kind to others.
14. ...has an active imagination, *that means I am well at imagining things and I enjoy (day)dreaming.*
15. ...is relaxed, handles stress well.
16. ...is eager for knowledge.

Self-esteem

(children aged 9 to 16)

Below is a list of statements dealing with your general feelings about yourself. Using the scale provided, please indicate how much each of the following statements reflects your thoughts and feelings (1 = "strongly disagree" to 5 = "strongly agree"):

1. On the whole, I am satisfied with myself.
2. At times, I think I am no good at all. (*reversed item*)
3. I feel that I have a number of good qualities.
4. I am able to do things as well as most other people.
5. I feel I do not have much to be proud of. (*reversed item*)
6. I certainly feel useless at times. (*reversed item*)
7. I feel that I'm a person of worth, at least on an equal plane with others.
8. I wish I could have more respect for myself. (*reversed item*)
9. All in all, I am inclined to feel that I am a failure. (*reversed item*)
10. I take a positive attitude toward myself.

Happiness

(all children)

Scale: 1 = "extremely unhappy" to 5 = "extremely happy"

I still have another question for you: How happy are you most of the time? (*explain scale by pointing at and explaining extreme faces*). The face on the extreme left means I am so unhappy that it is impossible to be even more unhappy. The face on the extreme right means I am so happy that it is impossible to be even more happy. The other faces are in between.

extremely unhappy extremely happy

Please note that there is no right or wrong answer.

Mothers about children survey

Impulsivity/self-control

(mothers about all children aged 6 to 13)

Scale:

1 = almost never
2 = about once per month
3 = about 2 to 3 times per month
4 = about once per week
5 = at least once per day

1. My child interrupts other people.
2. My child says something rude.
3. My child loses temper.
4. My child talks back when upset.
5. My child forgets something needed for school.
6. My child cannot find something because of mess.
7. My child does not remember what someone said to do.
8. My child's mind wanders.

Big Five

(mothers about all children aged 6 to 11)

How would you rank your child in comparison to other children of the same age? The further to the left you make the X, the more the characteristic on the left side applies. The further to the right you make the X, the more the characteristic on the right side applies.

My child...

1.	...is rather talkative	1	2	3	4	5	6	7	8	9	10	11	...is rather quiet
2.	...is messy	1	2	3	4	5	6	7	8	9	10	11	...is neat
3.	...is good-natured	1	2	3	4	5	6	7	8	9	10	11	...is irritable
4.	...is disinterested	1	2	3	4	5	6	7	8	9	10	11	...is curious to learn
5.	...is self-confident	1	2	3	4	5	6	7	8	9	10	11	...is insecure
6.	...is withdrawn	1	2	3	4	5	6	7	8	9	10	11	...is outgoing
7.	...is focused	1	2	3	4	5	6	7	8	9	10	11	...is easily distracted
8.	...is disobedient	1	2	3	4	5	6	7	8	9	10	11	...is obedient
9.	...is quick at learning new things	1	2	3	4	5	6	7	8	9	10	11	...needs more time
10.	...is timid	1	2	3	4	5	6	7	8	9	10	11	...is fearless

Strengths and Difficulties Questionnaire

(mothers about all children aged 6 to 16)

Scale:

1 = not true
2 = somewhat true
3 = certainly true

My child...

1. ...is considerate of other people's feelings.
2. ...is restless, overactive, cannot stay still for long.
3. ...often complains of headaches, stomach-aches or sickness.
4. ...shares readily with other children (treats, toys, pencils, etc.).
5. ...often has temper tantrums or hot tempers.
6. ...is rather solitary, tends to play alone.
7. ...is generally obedient, usually does what adults request.
8. ...has many worries, often seems worried.
9. ...is helpful if someone is hurt, upset or feeling ill.
10. ...is constantly fidgeting or squirming.
11. ...has at least one good friends.
12. ...often fights with other children or bullies them.
13. ...is often unhappy, down-hearted or tearful.
14. ...is generally liked by other children.
15. ...is easily distracted, concentration wanders.
16. ...is nervous or clingy in new situations, easily loses confidence.
17. ...is kind to younger children.
18. ...often lies or cheats.
19. ...is picked on or bullied by other children.
20. ...often volunteers to help others (parents, teachers, other children).
21. ...thinks things out before acting.
22. ...steals from home, school or elsewhere.
23. ...gets on better with adults than with other children.
24. ...has many fears, is easily scared.
25. ...sees tasks through to the end, has good attention span.

Parenting style

(answered once for all children in the household)

Scale:

1 = never
2 = seldom
3 = sometimes
4 = frequently
5 = very frequently

How often do the following things occur?

1. I use words and gestures to show my child that I love her/him.
2. I criticize my child.
3. I talk to my child about things s/he has done, seen, or experienced when s/he was out.
4. I punish my child when s/he was disobedient.
5. I threaten my child with punishment, but don't actually follow through with it.
6. When my child is outside the home, I know exactly where s/he is.
7. I tend to be strict with my child.
8. I comfort my child when s/he feels sad.
9. I shout at my child, when s/he did something wrong.
10. I feel that my child is ungrateful because s/he disobeys.
11. I stop talking to my child for a while when s/he did something wrong.
12. I make it clear to my child that s/he should not oppose orders and decisions.
13. I praise my child.
14. I scold my child when I am angry at her/him.
15. I try to actively influence my child's circle of friends.
16. I reduce punishments or lift them ahead of time.
17. I am disappointed and sad when my child misbehaves.
18. It is hard for me to be consistent in my childrearing.

Adults experiments

Time preferences

Let us start with this game. Before we start, let me explain the rules of our game. In this game you can earn money. That's why it is important that you understand the rules of our game. Please interrupt me anytime in case you have a question.

Are you okay so far? *Leave time for questions and answer them privately.*

1. Determine the order of explanation by rolling a die (blue, green, yellow) and write it down:

1 = choice set 1, choice set 2, choice set 3
2 = choice set 1, choice set 3, choice set 1
3 = choice set 2, choice set 3, choice set 1
4 = choice set 2, choice set 1, choice set 3
5 = choice set 3, choice set 1, choice set 2
6 = choice set 3, choice set 2, choice set 2

The game works as follows:

The game consists of three choice sets. There are six choices in each choice set. You need to make a choice between two payment options: Option A or Option B. In each choice set, there are six such decisions that you need to make. Each decision is a paired choice between Option A and Option B. You will be asked to make a choice between these two payment options in each decision row. For example, (*assuming the first choice set is being randomly picked first*) in the first row, you need to make a choice between payment Option A and payment Option B where payment Option A pays you Taka 100 tomorrow and Option B pays you Taka 105 after 3 months from today. In the second choice, Option A pays you Taka 100 tomorrow, and Option B pays you Taka 110 in 3 months. In the third choice, Option A pays you Taka 100 tomorrow, and Option B pays you Taka 120 in 3 months. Notice that Option A remains unchanged while Option B is increasing.

If you go for Taka 100 tomorrow, you will need to tick Option A. If selected, one of us will come to your home and to deliver the money in an envelope with your name marked on it. If you wait, you will get Taka 105 after 3 months. Again, one of us will come to your home and to deliver the money in an envelope with your name marked on it.

Could you please repeat the rules of the game? *If the respondent is unable to repeat, please explain the game again; the respondent has to be able to repeat the correct meaning of the game autonomously.*

2. Respondent understood the game after: ❒

1 = first explanation, 2 = second explanation, 3 = third explanation, 4 = did not understand

The second choice set is very similar to the first choice set. However, Option A now pays in 1 month, and Option B pays in 4 months. If you go for Taka 100 in 1 month, you will need to tick Option A. If selected, one of us will come to your home and deliver the money in an envelope with your name marked on it. If you wait 4 months, you will get Taka 105 after 4 months. Again, one of us will come to your home and deliver the money in an envelope with your name marked on it.

Could you please repeat the rules of the game? *If the respondent is unable to repeat, please explain the game again; the respondent has to be able to repeat the correct meaning of the game autonomously.*

3. Respondent understood the game after: ❒

1 = first explanation, 2 = second explanation, 3 = third explanation, 4 = did not understand

The third choice set is very similar to the second and first choice set. However, Option A now pays in 1 year, and Option B pays in 1 year and 3 months. If you go for Taka 100 in 1 year, you will need to tick Option A. If selected, one of us will come to your home and to deliver the money in an envelope with your name marked on it. If you wait 1 year 3 months, you will get Taka 105 after 1 year 3 months. Again, one of us will come to your home and to deliver the money in an envelope with your name marked on it.

If this game is paid, only one of the three choice sets counts. The selection will be made by rolling a 6-sided die twice – first to decide the set, and second to decide the choice. You will roll the die after your decisions (*please demonstrate*). In the first die roll, if 1, 2 or 3 is rolled, you will receive the money from the particular choice set, if 4, 5 or 6 is rolled, you will not receive any money. Depending on the outcome of the first die roll, the second die roll would determine the particular choice that you would be paid for. For example, if 3 is rolled in the second roll, you will receive the money from your decision concerning the third payoff alternative (*third row*) of the relevant choice set.

Could you please repeat the rules of the game? *If the respondent is unable to repeat, please explain the game again; the respondent has to be able to repeat the correct meaning of the game autonomously.*

4. Respondent understood the game after: ❒

1 = first explanation, 2 = second explanation, 3 = third explanation, 4 = did not understand

Please take your decision for each of the choice sets now (*place the decision sheets side by side on the table*). Start with this part (*point at the first decision sheet (depending on the order of explanation)*) and continue with this part (*point at the second decision sheet*) and finally make your decision in this part (*point at the final decision sheet*). Take as much time as you need. In the meantime, I will turn around so that I do not disturb you. Just call me when you are done or have any questions.

Roll a die to determine which decision sheet would be paid if this game got selected for payoff in the end.

Choice set 1

Payoff alternative	**Payment Option A** (pays amount below **tomorrow**)	**Payment Option B** (pays amount below **after 3 months**)	Annual interest rate in %	Preferred Payment Option (A or B)
1	100	105	20%	
2	100	110	40%	
3	100	120	80%	
4	100	125	100%	
5	100	150	200%	
6	100	200	400%	

Choice set 2

Payoff alternative	**Payment Option A** (pays amount below **after 1 month**)	**Payment Option B** (pays amount below **after 4 months**)	Annual interest rate in %	Preferred Payment Option (A or B)
1	100	105	20%	
2	100	110	40%	
3	100	120	80%	
4	100	125	100%	
5	100	150	200%	
6	100	200	400%	

Choice set 3

Payoff alternative	**Payment Option A** (pays amount below **after 1 year**)	**Payment Option B** (pays amount below **after 1 year 3 months**)	Annual interest rate in %	Preferred Payment Option (A or B)
1	100	105	20%	
2	100	110	40%	
3	100	120	80%	
4	100	125	100%	
5	100	150	200%	
6	100	200	400%	

Risk preferences

Let us start with this game. Before we start, I will explain the rules of our game. Similar to the other games, you can earn money in this game as well. How much money you will earn depends mainly on your decisions. That's why it is important that you understand the rules of our game. Please listen carefully now. I will frequently stop during my explanation and allow you to ask questions. Therefore, please interrupt me anytime in case you have a question.

Are you okay so far? *Leave time for questions and answer them privately.*

In this game, you need to select the gamble you would like to play from among six different gambles, which are listed below. You must select one and only one of these gambles.

If this game is selected for payment, you will have a 1-in-6 chance of receiving the money. The selection will be made by rolling a 6-sided die twice—first, you will roll the die to decide the gamble, and the second to decide the outcome of the particular gamble. For example, if you selected gamble number 4, then if the first roll of the die is 4, you would receive one of the payoffs of gamble 4, which will be determined in the second roll. If the first roll of the die is not 4 and you have chosen gamble number 4, you would not receive any payments. Depending on the outcome of the first roll, the second roll would determine the outcome of the selected gamble. Each gamble has two possible outcomes—low and high. If 1, 2 or 3 is rolled, the outcome of the selected gamble is the low one, and if 4, 5 or 6 is rolled, the outcome of the gamble is the high one, and you would receive money accordingly.

Notice that the low outcome is decreasing and the high outcome is increasing for each successive gamble. For example, in the first gamble, both outcomes are identical. If you select it and then this number is rolled in the first roll, your payoff would be 125 Taka. If on the other hand, you had selected gamble number 2, and if it is rolled on the first roll, your payoff could be 110 Taka or 240 Taka. In the second roll, if 1, 2 or 3 is rolled, you would receive 110 Taka, whereas if 4, 5 or 6 is rolled, you would receive 240 Taka.

Ask the respondent to repeat the game.

1. Respondent understood the game after: ❒

1 = first explanation, 2 = second explanation, 3 = third explanation, 4 = did not understand

Before you select the actual gamble involving money, we will have a practice session with candies. There are two gambles from which you need to select one:

	Outcome	**Payoff**	**Chances**	**Your Selection**
Gamble 1	LOW	1	50%	
	HIGH	1	50%	
Gamble 2	LOW	0	50%	
	HIGH	2	50%	

Both gambles have two outcomes. The first gamble pays 1 candy in both states, while the second gamble pays no (0) candy in the low state and 2 candies in high state. Which gamble would you like to play? Once you make your selection, you will first roll the die to decide the gamble, and then again roll the die to decide the outcome. For example, if you selected gamble number 2, then if the first roll of the die is 2, you would receive one of the payoffs of gamble number 2, which will be determined in the second die roll. In the second roll, if 1, 2 or 3 is rolled, the outcome of the selected gamble is the low one, which is 0 here. That means, you will not receive any candy. However, if 4, 5 or 6 is rolled, the outcome of the gamble is the high one, and you will receive 2 candies. Let us start this now.

Are you okay so far? *Leave time for questions and answer them privately.*

2. Gamble number picked involving candies: ❐

Roll a die to determine whether gamble number 1 or gamble number 2 is payoff-relevant. If you have rolled a 1 or a 2, please roll the die a second time to determine whether the low or the high payoff is realized.

3. Gamble number picked: ❐

Roll a die to determine which gamble is payoff-relevant. If the outcome of the first die roll equals the gamble number picked, please roll the die a second time to determine whether the low or the high payoff is realized.

Mark the gamble you like best with an X in the last column "Your Selection"
(mark only one of the six gambles):

	Outcome	Payoff	Chances	Your Selection
Gamble 1	LOW	125	50%	
	HIGH	125	50%	
Gamble 2	LOW	110	50%	
	HIGH	240	50%	
Gamble 3	LOW	100	50%	
	HIGH	300	50%	
Gamble 4	LOW	75	50%	
	HIGH	375	50%	
Gamble 5	LOW	25	50%	
	HIGH	475	50%	
Gamble 6	LOW	0	50%	
	HIGH	500	50%	

Social preferences

In this game you can earn stars, which you can convert into money. Each star is equal to Taka 100. The more stars you will earn, the more money you will get. That's why it is important that you understand the rules of our game. Please listen carefully now. I will frequently stop during my explanation and allow you to ask questions. Therefore, please interrupt me anytime in case you have a question.

Are you okay so far? *Leave time for questions and answer them privately.*

In this game you have to decide how to divide stars between yourself and another person similar to you but from a different village. You will never know who exactly the other person is and the other person will not get to know you. However, I will ensure that the other person does indeed receive the money that corresponds to the stars that you will give to him/her.

You will get four different decision sheets. You will need to decide how to divide stars between yourself and this person similar to you.

Are you okay so far? *Leave time for questions and answer them privately.*

There are two possible ways to allocate the stars: the option on the left-hand side and the option on the right-hand side.

Please look at the decision sheet. With option "left" you get one star and the person from another village with whom you are randomly matched gets 1 star. One star equals 100 Taka. With option "right" you get 2 stars and the person from another village gets 0 stars.

Are you okay so far? *Leave time for questions and answer them privately.*

Depending on which option you want to choose, you should check the box at the left- or the right-hand side. You can choose either option "left" or option "right". If you would like to divide the stars according to option "right", which box would you have to check? Right, the box at the "right" side.

How much would you earn and how much would the person from the other village with you are randomly matched earn in this case? Right, you would get 100 Taka and the other person similar to you would get nothing.

1. Respondent understood the game after: ❐

1 = first explanation, 2 = second explanation, 3 = third explanation, 4 = did not understand

Are you okay so far? *Leave time for questions and answer them privately.*

As I mentioned earlier, you will get four decision sheets. The decision sheets differ from each other in the amounts of stars that can be divided between you and the other person. Please choose one of the two options for each decision sheet. At the end of the game, you will roll a die to determine the decision sheet out of four (*show the process*). Here the number you roll corresponds to the sheet you will get paid for, meaning if you roll 1, you get paid for decision sheet 1. If this game is selected for payment, you and the other person will be paid according to the selected decision sheet. If you roll a 5 or 6, no decision sheet will be paid.

Hand over the decision sheets one after another (displayed below) and let participant play the games.

2. Decision on first sheet: ❐ 1 = left, 2 = right

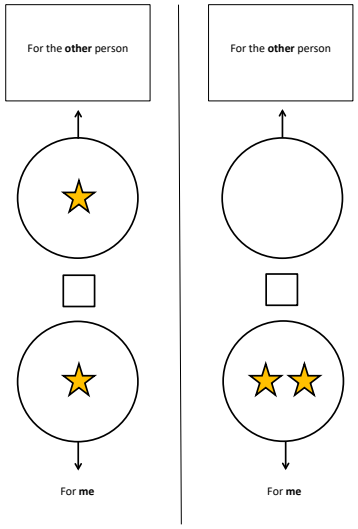
3. Decision on second sheet: ❐ 1 = left, 2 = right

4. Decision on third sheet: ❐ 1 = left, 2 = right

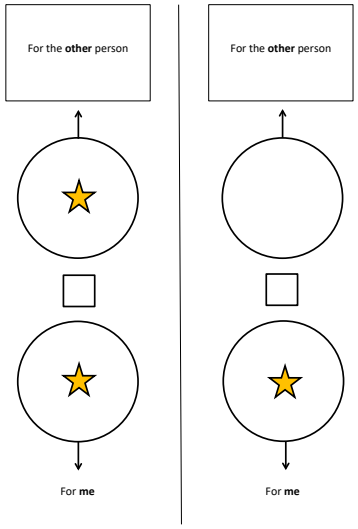
5. Decision on fourth sheet: ❐ 1 = left, 2 = right

Roll a die to determine which decision sheet would be paid if this game got selected for payoff in the end.

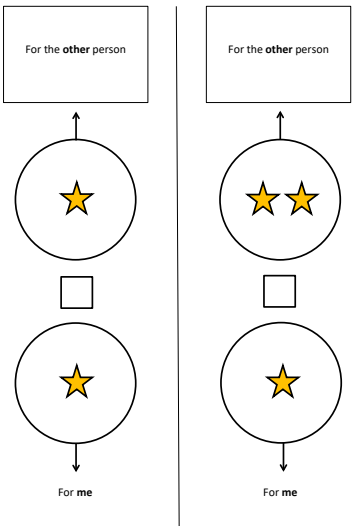
Decision sheet 1



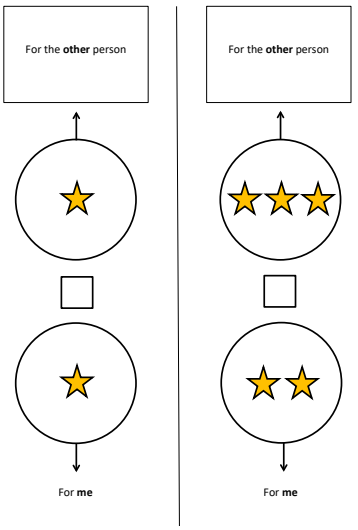
Decision sheet 2



Decision sheet 3



Decision sheet 4



Declaration of Authorship

Eidesstattliche Versicherung

Ich, Frau M.Sc. Laura Breitkopf, versichere an Eides statt, dass die vorliegende Dissertation von mir selbstständig und ohne unzulässige fremde Hilfe unter Beachtung der „Grundsätze zur Sicherung guter wissenschaftlicher Praxis an der Heinrich-Heine-Universität Düsseldorf“ erstellt worden ist.

1. August 2022

Laura Breitkopf