Socioeconomic status shapes parental beliefs about child academic achievement: Novel evidence from India, Kenya, Ghana, and the USA

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Abstract

Parental beliefs about their child's academic achievement may guide educational investment decisions and influence their child's eventual outcomes. Whether parental beliefs systematically differ along socioeconomic lines, or whether socioeconomic status itself causally shapes such beliefs remains less well known. This research makes progress on this question by combining datasets from India, Kenya, Ghana, and the USA, each featuring three elements core to the analysis: detailed measures of household socioeconomic status, stated parental beliefs about child academic achievement, and measures of actual child performance. In a pattern common to all four contexts, socioeconomically advantaged parents are more likely to believe their children are above average academically, while socioeconomically disadvantaged parents are more likely to believe their children are below average. These patterns persist after accounting for actual performance, suggesting that disparities in beliefs outpace any disparities in performance along socioeconomic lines. Causal evidence from India and Kenya suggests that economic circumstances may fundamentally shape parental beliefs about child academic achievement. Parental beliefs respond negatively to negative shocks driven by adverse rainfall in India, and positively to receipt of a randomized early-life health intervention that leads to improved economic circumstances in Kenya. Finally, parents in the USA are more likely to believe male children are above average in math compared to equally-performing females, a pattern not observed in either Kenya or Ghana. To the extent that parental beliefs guide educational investment decisions, disparities in parental beliefs along socioeconomic lines or by child gender could contribute to perpetuating inequalities.

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1 Introduction

Parental beliefs about child academic achievement serve as key inputs that guide educational investment decisions and shape eventual child outcomes. Such beliefs may influence the perceived costs and benefits associated with educational investments, impact motivation and effort (Bénabou and Tirole, 2002, 2016), or trigger self-fulfilling prophesies that facilitate or impede learning (Papageorge et al., 2020; Hill and Jones, 2021). Indeed, existing research reveals a causal link between parental beliefs about academic achievement and educational investment decisions (Dizon-Ross, 2019) and shows that child self-beliefs influence educational aspirations (Guyon and Huillery, 2021). Related research explores disparities in parental beliefs about the importance and role of educational and human capital investments along socioeconomic lines (Cunha et al., 2013, 2020; List et al., 2021; Cunha et al., 2023; Boneva and Rauh, 2018). However, little research explores whether parental beliefs about child academic achievement also differ along socioeconomic lines; if any differences exist, these could contribute to well-documented disparities in investments and outcomes along these same lines (Blanden et al., 2022; Guryan et al., 2008; Kalil et al., 2012; Kalil, 2015; Dotti Sani and Treas, 2016).

This research asks whether parental beliefs about academic achievement differ by socioeconomic status or child gender and explores whether socioeconomic status causally shapes parental beliefs. I document substantial disparities in parental beliefs along socioeconomic lines, a pattern common across India, Kenya, Ghana, and the USA. Analysis leveraging a natural experiment in India and a randomized intervention in Kenya supports a causal link between household economic circumstances and parental beliefs. I also find evidence of disparities in subject-specific beliefs by child gender in the USA, but not in Kenya or Ghana. Finally, I explore and discuss potential mechanisms that could explain these patterns.

The analysis relies on three essential components present in datasets from from all four contexts. These include parental beliefs about child academic achievement (whether parents report their child is average, above average, or below average academically), measures of actual child performance, and measures of household socioeconomic status. In India, Ghana, and the USA, existing longitudinal surveys included questions eliciting parental beliefs for other purposes; in Kenya, these questions were newly integrated into an ongoing longitudinal survey for this research. Stated parental beliefs are then paired with objective measures of actual child performance and household socioeconomic status for cross-sectional analysis.

In a core finding of the paper, I find evidence of substantial disparities in the nature of parental beliefs along socioeconomic lines, a robust pattern common to all four contexts. Socioeconomically-advantaged parents are more likely to believe their child is above average

academically, while socioeconomically-disadvantaged parents are more likely to believe their child is below average. These patterns emerge to varying degrees along different dimensions of socioeconomic status including household economic circumstances, parent educational attainment, and caste (in India) or racial group (in the USA). For example, above-average beliefs are up to 6 percentage points more likely and below-average beliefs are up to 3 percentage points less likely for parents at the 75th compared to the 25th percentile of the income distribution. These patterns persist after controlling for actual child performance, suggesting that disparities in parental beliefs along socioeconomic lines outpace disparities in child performance along these lines.

Results from analysis leveraging a natural experiment in India and a randomized intervention in Kenya show that parental beliefs respond to the same sources of exogenous variation that impact household economic circumstances, supporting the idea that economic circumstances may play a causal role in shaping parental beliefs.

Analysis in the Indian context leverages exogenous variation in rainfall using a household fixed effects estimation strategy and finds that adverse rainfall decreases agricultural income and negatively impacts parental beliefs. In response to negative rainfall events, above-average beliefs become 5 percentage points less likely, while below-average beliefs become 9 percentage points more likely. The analysis rule out that concurrent performance declines or changes in educational investments are responsible for these impacts on parental beliefs; instead, other mechanisms associated with negative shocks must be at play.

In Kenya, parental beliefs respond positively to receipt of a randomized early-life health intervention which was shown to have lasting positive impacts on household circumstances. School-based childhood deworming led to improved schooling and health in the short run (Miguel and Kremer, 2004), and greater educational attainment and improved labor market outcomes in the long run (Baird et al., 2016; Hamory et al., 2021b). In adulthood, recipients are 5 percentage points less likely to believe their children are below average and 11 percentage points more likely to believe they will perform above average in the future. Together, evidence from both contexts supports the idea that both temporary and lasting changes in economic circumstances shape parental beliefs.

While disparities in parental beliefs along socioeconomic lines are strikingly similar across contexts, notable differences emerge with respect to disparities by child gender, particularly in the USA. In most contexts, parents of female children are more likely to believe they are above average. However, parents in the USA – but not in Ghana or Kenya – are more likely to believe females are above average in reading but less likely to believe females are above average in math compared to equally-performing males. In the same way that the socioeconomic disparities documented here could contribute to disparities in educational

investments and outcomes along socioeconomic lines, disparities in math-related beliefs could both reflect and reinforce gender-based norms and stereotypes around participation in math and STEM-related fields in the USA.

Next, I show that parental beliefs correlate positively with actual educational investments in all four contexts, and with educational expectations and measures of subject-specific child self-confidence where available. While these analyses reflect only correlational relationships, these findings are consistent with research showing that parental beliefs shape actual investment behavior, and with the notion that parental beliefs may impact other inputs to child educational outcomes such as confidence, motivation, or effort.

Finally, I discuss and explore available evidence for mechanisms that could explain the observed disparities in beliefs along socioeconomic lines or by child gender. Disparities in access to information could impact how much parents rely on assumptions about other similar children, assumptions which may in turn be influenced by access to role models, stereotypes, or the salience of external constraints and opportunities. Lastly, I present suggestive evidence for a link between parental beliefs and psychological factors such as depression, hopelessness, and self-efficacy.

This research contributes to several areas of the literature. First, this research relates to the vast literature documenting socioeconomic disparities in educational and human capital investments (Blanden et al., 2022; Guryan et al., 2008; Kalil et al., 2012; Kalil, 2015; Dotti Sani and Treas, 2016) and exploring how poverty or economic disadvantage influence educational investment decisions (see Attanasio et al. (2022) for an excellent review). This literature explores how disparities in beliefs about how investments translate into outcomes (Cunha et al., 2013, 2020), the importance of early childhood investments (List et al., 2021; Cunha et al., 2023; Boneva and Rauh, 2018), the availability of educational opportunities (Guyon and Huillery, 2021), or the returns to education (Jensen, 2010) can all contribute to disparities in investments along socioeconomic lines. I complement this research by providing novel evidence related to the link between socioeconomic status and another key input to educational investment decisions: parental beliefs about child academic achievement.

This research also relates closely to the literature exploring how information shapes parental beliefs and related perceptions, and how these in turn impact educational investments. Information frictions can contribute to inaccurate beliefs in high income (Kinsler and Pavan, 2021) and low income contexts (Dizon-Ross, 2019), with adverse consequences for subsequent investments. However, this research also shows that beliefs update in response to information, and that investments shift in response to updated beliefs. Providing clear information about performance can alleviate information frictions among parents of young children (Dizon-Ross, 2019) and of college-bound young adults (Gan, 2021), with positive

impacts on the type and level of investments made. Relatedly, correcting misperceptions about the returns to education can lead to higher educational attainment (Jensen, 2010), while providing information about the importance of early investments can lead to increased investments and improvements in child outcomes (List et al., 2021; Cunha et al., 2023).

Existing research shows that parental beliefs influence actual investment decisions and documents gaps in parental beliefs about the role of investments along socioeconomic lines. However, little research explores whether parental beliefs about academic achievement – beliefs complementary to but distinct from beliefs about the role of investments – also differ along socioeconomic lines.[1] This paper builds on existing work by documenting socioeconomic disparities in parental beliefs common across four disparate contexts, providing evidence to support a causal link between economic circumstances and parental beliefs, and exploring potential determinants of socioeconomic disparities.

This research also relates to the literature exploring feedback between material and psychological constraints associated with socioeconomic disadvantage. This literature explores how economic disadvantage imposes psychological constraints that can adversely impact economic outcomes, including diminished aspirations and self efficacy (Appadurai, 2004; Genicot and Ray, 2020; Dalton et al., 2016; Ray, 2006; La Ferrara, 2019; Wuepper and Lybbert, 2017) or higher depression and hopelessness (De Quidt and Haushofer, 2016; Ridley et al., 2020; Haushofer and Fehr, 2014; Lybbert and Wydick, 2018; Duflo, 2012; Lybbert and Wydick, 2022). In contrast, programs designed to alleviate material constraints can alleviate psychological constraints (Banerjee et al., 2015; Haushofer et al., 2020; Bedoya et al., 2019; Haushofer and Shapiro, 2016; Baird et al., 2013), and vice versa (Baranov et al., 2020; Angelucci and Bennett, 2021). I contribute to this literature by exploring parental beliefs about academic achievement as another area where psychological constraints could both result from and reinforce socioeconomic disadvantage.

Finally, this paper contributes to the literature documenting and exploring gender-based disparities in participation in math and STEM-related fields. Females tend to participate less and (in some contexts) perform worse in math and STEM-related fields (Kahn and Ginther, 2017; Stoet and Geary, 2013). These patterns could be driven not by differences in ability, but by subject-specific cultural and gender norms (Friedman-Sokuler and Justman, 2016; Friedman-Sokuler and Senik, 2020) or by psychological factors such as the fact that females tend to be less confident in their math ability compared to equally-performing male peers

[1] Dizon-Ross (2019) does document that information frictions are more severe and beliefs are less accurate among less educated parents, but does not explore in depth whether less educated parents are more likely to overestimate or underestimate their child's performance. Guyon and Huillery (2021) argue that underestimation of own ability leads socioeconomically disadvantaged students in France to aspire to lower levels of education, consistent with the findings presented in this paper.

(Bharadwaj et al., 2016). I build on this literature by suggesting that gender-based disparities in parental beliefs could be another factor contributing to gender-based disparities in math and STEM participation across males and females. Gender-based norms and stereotypes may influence parental beliefs along gendered lines, and such beliefs may alter the way parents engage with or invest in their children, the expectations they set, and perhaps even the way children perceive their own subject-specific capabilities.

Taken together, this research sheds light on how socioeconomic status and gender-based social norms may fundamentally shape parental beliefs. To the extent that these parental beliefs serve as a key input to subsequent educational investment decisions or directly influence child motivation and effort, such disparities could contribute to deepening disparities in outcomes across socioeconomic or gender lines.

I describe the data in Section 2, present the main results in Section 3, explore potential mechanisms in Section 4, then discuss policy lessons and conclude in Section 5.

2 Data

This research draws on datasets from four different contexts, each featuring common elements core to the analysis: stated parental beliefs about a child's academic achievement, child test performance, measures of educational investments, and household characteristics. Data for the Indian context come from the India Human Development Survey (IHDS), and for the Ghanaian context come from the Ghana Socioeconomic Panel Survey (GSPS). For Kenya, I make use of original data collection as part of the Kenya Life Panel Survey, Round 4 (KLPS-4), and for the USA, I draw on the Early Childhood Longitudinal Studies Program: Kindergarten Class of 1998-1999 Study (ECLS-K). These datasets are described in more detail below, including a discussion of where and how these key elements differ across contexts. Key variables are summarized in Table A1.

2.1 Datasets and sample

2.1.1 India

Data for this portion of the analysis come primarily from the India Human Development Survey (IHDS), a nationally-representative panel dataset covering urban and rural areas across 33 Indian states. Over 200,000 individuals from over 40,000 households were surveyed across two waves (the first from November 2004 to October 2005 and the second from November 2011 to November 2012), with a resurvey rate of 83% of households.

Measures of child test performance and parental beliefs related to child academic achievement were collected for up to two children per household between 8 and 11 years of age, resulting in a sample of 22,726 children across 17,452 households. Because children aged out of the 8 to 11 years age range in between waves, the same children are never observed in both waves. In contrast, certain households are observed in both waves (1,870 households, corresponding to 4,456 distinct children). Much of the cross-sectional analysis that follows pools the data across waves, while the section exploring the impact of rainfall shocks restricts the sample to a balanced panel of rural households observed in both waves.

2.1.2 Kenya

The data used for the final set of analyses come from original data collection conducted as part of the fourth round of the Kenya Life Panel Survey (KLPS). KLPS is a unique longitudinal dataset covering a sample of approximately 7,500 Kenyan individuals over four rounds of data collection spanning 1998 to 2021.[2] The data collected are wide-ranging and extensive; various modules capture household earnings, labor market outcomes, schooling, fertility, and migration histories, risk and time preferences, social and political attitudes, depression, and other psychological outcomes.

During the fourth round of KLPS, data collection expanded to capture early childhood investments and cognition among the next generation. Up to two biological children between 3 to 8 years of age were selected per KLPS respondent. These children completed an extensive battery of assessments in math, reading, and executive function. Their designated primary caregivers provided detailed information on the home environment, educational investments, and health investments through a primary caregiver (PC) module.[3]

In the second of two waves of data collection, the PC module incorporated a set of questions designed to measure parental beliefs. The main sample used in this analysis includes children of KLPS respondents for whom both test performance and parental beliefs were collected in wave two of round four for a total of 2,401 children across 1,894 KLPS respondents.

2.1.3 Ghana

Analyses related to the Ghanaian context use data collected as part of the third wave of the Ghana Socioeconomic Panel Survey (GSPS). The GSPS is a nation-wide panel survey

[2]Approximately 84% of original respondents were tracked in the fourth round of data collection, representing a remarkable data collection effort (Hamory et al., 2021b)

[3]In 61% of cases, the primary caregiver was the KLPS respondent; in 39% of cases, the primary caregiver was someone else, often the spouse of the KLPS respondent

of over 5,000 households (19,000 individuals).

Parental beliefs were collected during the third wave of the GSPS (in 2018) for a sample of 2,291 children between ages 9 and 18 who had not yet entered secondary school. These data were collected to serve as the baseline for an intervention implemented as part of a randomized controlled trial (RCT) testing how beliefs, aspirations, and investments in girls's math education respond to various information treatments alternately provided to mothers, fathers, or both. The analysis in this paper makes use of beliefs data elicited prior to the intervention for cross-sectional analysis, but does not make use of post-intervention data nor any variation induced by the intervention.[4]

2.1.4 USA

Data for the next set of analyses come from the Early Childhood Longitudinal Studies Program: Kindergarten Class of 1998-1999 Study (ECLS-K), a longitudinal dataset covering a nationally representative sample of children who started kindergarten in 1998. Over 21,000 children across over 1,200 schools were first surveyed in the fall and spring of their kindergarten and first grade, then in the spring of third, fifth, and eight grade. The analysis here focuses on data collected in kindergarten, first grade, and third grade since parental beliefs are unavailable and/or high attrition limits the sample in the later grades.

The sample used for the analysis includes children with the relevant test scores and parental beliefs available during any of rounds required for the corresponding analysis (even if they were not observed in kindergarten, or if they were not observed in all three rounds),[5] resulting in 44,198 child-by-round observations corresponding to 19,491 children. Certain secondary analyses draw on data from different grades, depending on data availability. For example, analysis of subject-specific beliefs uses data from the first and third grades, and analysis involving child self-confidence uses data from children observed in third grade.

2.2 Parental beliefs about academic achievement

2.2.1 Primary measure

The primary outcomes of interest include parental beliefs about their child's overall academic achievement, specifically, whether parents believe their child performs above average,

[4]This intervention is described in more detail on the AEA Social Science Registry. Sincere thanks to Ashley Wong and Francesca Truffa for making the data collected as part of their project "Effect of Beliefs and Gender Roles on Girls' Math Education" available online.

[5]Results are robust to using alternative samples, such as restricting to the sample of children observed in at least kindergarten, or restricting to the sample of children observed in all three rounds, as discussed in the appendix.

average, or below average academically. In India and Kenya, parents were asked an identical question during the survey: "Is/was [name] an average student, better than average or below average?"[6] In India, the "parent" providing replies was a knowledgeable adult (typically a female between 15 to 49 years), while in Kenya, the "parent" providing replies was the child's designated primary caregiver (someone who knows the child well and spends a substantial amount of time with the child, often a biological parent). In the analogous question in the USA, parents (primarily mothers) were asked "does [name] learn, think, and solve problems" "better than other children his/her age," "as well as other children," "slightly less well than other children," or "much less well than other children." For direct comparability, responses are classified as indicating whether parents believe their child is above average, average, or below average (grouping "slightly less well" and "much less well" within the below average category).

While the questions eliciting parental beliefs were similar in India, Kenya, and the USA, beliefs were elicited in a slightly different way in Ghana. Here, parents were asked to rank how they believe their child performed on math and reading (English) assessments taken earlier in the survey, relative to ten other typical Ghanaian in the same grade. For comparability with the measures from India, Kenya, and the USA, the math and reading rankings are averaged to compute a composite rank, with parents ranking their child as one of the top three performers considered as believing their child is above average, those ranking their child as one of the bottom three performers as below average, and those in the middle as average. The main analyses can also be replicated with the raw ranks, with a measure of belief error (relative to actual ranks) and for subject-specific beliefs, as discussed below. In the Ghanaian contexts, beliefs are elicited from mothers and/or fathers as a feature of the intervention design; this analysis uses maternal beliefs by default in cases where both are available.

The core advantage of these various ways of measuring overall beliefs across contexts is that parents provide beliefs about their child's academic achievement relative to other children. However, the centrality of these measures to the analysis warrants a brief discussion of differences across contexts and potential limitations. First, in India and Kenya, parents were asked to make a relative comparison without specifying a reference group, while in Ghana and the USA, parents were asked to compare their children to others in the same grade or of the same age. Questions eliciting beliefs without clearly specifying the reference group could introduce ambiguity and allow parents to interpret and respond to the question in different ways. Additional questions developed in partnership with the KLPS team and

[6]In Kenya, for children who were not yet of school-going age, parents were asked how their child compares in terms of their learning and development.

expressly included in the Kenyan survey (clearly specifying, and also varying the reference group) help to alleviate these concerns and validate the use of these question as the primary measure of overall parental beliefs.[7] Second, while the questions providing measures of overall beliefs are identical in India and Kenya, the question differs slightly in the USA, and more substantially in Ghana. Importantly, the interpretation is arguably similar in all four contexts, where responses can be considered to reflect parental beliefs about their child's academic achievement broadly defined and in relative terms, rather than about their child's absolute score on a particular test or school term (as in Dizon-Ross (2019), for example). Further, the main empirical patterns are similar across contexts, despite the variety of ways of capturing overall beliefs.

These measures as described serve as the primary measures of parental beliefs about academic achievement overall available in all four contexts. Additional measures of overall beliefs are also available in Kenya, beliefs about future academic achievement in Kenya and Ghana, and beliefs about subject-specific performance in Kenya, Ghana, and the USA.

2.2.2 Future beliefs

In Kenya and Ghana, parental beliefs about future academic achievement expand on what we learn about current beliefs from the primary measure. In Kenya, parents were asked to estimate what score their child will earn on Kenya's high-stakes primary school leaving exam (the Kenya Certificate of Primary Education or KCPE exam) in the future, and to indicate how they think their child's performance will compare to other children of the same age. In Ghana, parents were asked to predict how their child would perform on similar math and reading tests in a year's time.[8]

[7] This set of additional questions elicits beliefs relative to a series of clearly specified reference groups, facilitating a test for whether stated beliefs shift depending on the reference group specified. Parents were asked how their child compares relative to children (a) of the same age in similar neighborhoods in their county, (b) of the same age within the same neighborhood, (c) of the same age in households with a similar financial situation in similar neighborhoods, and (d) in their class. Parents could select one of five options ranging from "much worse"' to "much better," with "much worse" and "a little worse" classified as believing below average, "about the same" or "a little better" as average, and "much better" as above average. More details are provided in Appendix A. In practice, within-parent responses vary little as the specified reference group shifts, suggesting that responses may be similar whether a reference group is clearly specified or not. Further, neither household nor child characteristics predict those less common cases where parents do provide different responses across different reference groups, helping to alleviate concerns that disparities in beliefs along socioeconomic lines could come from systematic differences in assumed reference groups.

[8] Given differences in response options, parents indicating their child would be one of the top (bottom) four performers are considered as believing above (below) average, with those in between as average.

2.2.3 Subject-specific beliefs

In Kenya, Ghana, and the USA, parents also provide subject-specific beliefs, facilitating an analysis of how parental beliefs differ not just by socioeconomic status, but across subjects for male and female children. In all three cases, parents are asked to compared their child relative to a single, clear reference group. Ghanaian parents were asked to rank their child's performance in math and reading relative to other children in the same grade (as described above). In the USA, parents were asked to compare their child's performance in math and in reading/language arts compared to others in their child's class.[9] In Kenya, parents are asked each of the additional shifting-reference group questions for academic achievement in math and reading/language arts, in addition to the overall beliefs described above. For close comparability with Ghana and the USA, the Kenyan analysis makes use of the questions where parents are asked to compare their child relative to others in the same class.

The below table summarizes the four samples and measures of parental beliefs.

	India (IHDS)	Kenya (KLPS)	Ghana (GSPS)	USA (ECLS-K)
Sample size	22,726	2,401	2,291	44,198
Age/grade range	Ages 8-11	Ages 3-8	Ages 9-18	Grades K, 1, 3
Overall beliefs				
Scale	As a student: Above average, average, or below average	As a student: Above average, average, or below average	Average of math and reading rank on in-survey test	Learns, thinks, solves problems: Better, as well, slightly or much less well
Reference group	None	None	Same grade	Same age
Future beliefs				
Scale	–	Performance on KCPE: Much worse to much better	Average of math and reading rank on future test	–
Reference group	–	Same class	Same grade	–
Subject-specific beliefs				
Scale	–	Much worse to much better	Rank	Much worse to much better
Reference group	–	Same class	Same grade	Same class

[9]The specific question is: "Compared to other children in your child's class, how well do you think he/she is doing in school this spring in math?" and "in reading/language arts?", and parents could choose from "much worse," "a little worse," "about the same," "a little better," and "much better" to respond to each of these questions. Here, "much worse" and "a little worse" are classified as believing below average, " about the same" or "a little better" as average, and "much better" as above average.

2.2.4 Belief accuracy

Finally, measures of belief accuracy can be constructed by comparing parents' stated beliefs about child academic achievement with measures of actual test performance. In Ghana, the rank-based elicitation of beliefs allows for two measures of belief accuracy: the gap between the rank parents believe their child attains and their child's actual rank based on test performance, and the absolute value of this gap. The former captures the direction and size of parents' errors (whether parents overestimate or underestimate their child's performance, and in which direction), while the latter only captures how far off parents are in their estimation, regardless of direction. The data only allow for more granular measures of belief accuracy in India, Kenya, and the USA. In these contexts, composite scores within one standard deviation of the age-specific or grade-specific mean are classified as "average," while those at least one standard deviation above or below are characterized as "above average" or "below average" respectively. These measures of actual performance can then be directly compared with parental beliefs to characterize those beliefs as accurate, underestimates, or overestimates. Most of the analysis to follow uses raw measures of parental beliefs (whether parents believe their child is average, below average, or above average, rather than these measures of belief accuracy) as a more transparent approach. The main results are largely robust to using these constructed measures of belief accuracy instead.

2.3 Child performance

Measures of actual child performance in math and reading are available in all four contexts. In India and Ghana, the assessments provided very basic measures of achievement, while in Kenya and the USA, the assessments were more extensive. In all contexts, math and reading scores are standardized relative to children of the same age (India, Kenya) or grade (Ghana, USA), then combined into a composite score and restandardized in the same way to construct a measure of absolute performance. These measures can be included as controls in the analysis to account for actual child performance or directly compared with stated parental beliefs to characterize belief accuracy. Finally, measures of relative performance are constructed by comparing child scores with average scores in the same village (India) or school (USA). The assessments and standardization procedures are described in more detail below.

2.3.1 Absolute performance

In India, children completed a simple assessment designed to capture basic achievement in math, reading, and writing. These assessments are similar to those used for India's Annual

Status of Education Report (ASER) survey and were developed in collaboration with the organization Pratham (see Appendix A). To construct a measure of overall performance, I standardize math and reading scores relative to scores among children of the same age, then average across subjects and standardize the resulting composite score in the same way. All findings are robust to instead standardizing with respect to same-age children within the same district and urban status,[10] or to using a raw measure of performance.[11]

For the Kenyan context, scores are available from an extensive set of assessments designed to capture math achievement, reading achievement, and executive function. A rich battery of assessments were adapted for this context, then extensively tested and refined in an iterative pilot phase prior to the launch of the fourth round. Separate age-appropriate assessments were administered to younger children (ages 3 to 5) and older children (ages 6 to 8).[12] I standardize scores on each assessment relative to children of the same age, average across assessments and restandardize to get subject-specific scores, then average across subjects and restandardize to construct composite scores.

In Ghana, all household members age 9 and above complete a brief math and reading test. The math test consists of eight basic addition, subtraction, multiplication, and division problems, while the reading test consists of seven simple reading comprehension questions based on a short story which respondents were given to read. For alignment with the corresponding beliefs question, math and reading scores are standardized relative to children in the same grade (imputing with the modal grade for children of a specific grade in cases where the child is not enrolled in school or grades are otherwise missing). Standardized math and scores scores are averaged and re-standardized to construct a composite score.

Item Response Theory (IRT) scores from math and reading assessments are available for children in the USA sample. These assessments were adaptive, so that early questions routed children to later questions of the appropriate difficulty. IRT scores provide a measure of stu-

[10] Standardizing with respect to same-age children within the same district and sector characterizes performance relative to a group of children who may face similar circumstances in terms of educational and other resources common to those in that same district and sector, and may also characterize the reference group that may best approximate the set of peers against whom parents are likely to assess their child's relative performance.

[11] To construct the raw measure, I divide each of the math and reading scores by their maximum possible score, then take an equally-weighted average of these two components that ranges from 0 to 1.

[12] For the math subject, younger children are assessed on a "mental transformation" task (UNICEF et al., 2017) and older children are assessed using the Early Grade Mathematics Assessment (EGMA) (Platas et al., 2014). For reading, all children are assessed using the Peabody Picture Vocabulary Test (PPVT) (Dunn and Dunn, 2007). Younger children are also assessed using the Malawi Developmental Assessment Tool (MDAT) (Gladstone et al., 2010) and older children also complete the Early Grade Reading Assessment in Swahili (EGRA-SWA) (Gove and Wetterberg, 2011; Dubeck and Gove, 2015). A subset of older children (aged 7-8) also complete the Early Grade Reading Assessment in English (EGRA-ENG), but these scores are not included. More details on each of these assessments and be found in the corresponding pre-analysis plan (Fernald et al., 2021).

dent performance on the full set of questions included in the test by taking into consideration performance on the set of questions they did complete, and inferring expected performance on the set of questions they did not complete.[13] Math and reading IRT scores are standardized relative to other children within the same grade, then averaged and restandardized in the same way to construct composite scores.

2.3.2 Relative performance

Scores relative to children of the same age and in the same village (India) or school (USA) capture performance relative to peers in a similar context or with similar educational opportunities. These measures have the advantage of capturing actual performance relative to the set of children parents might have in mind when assessing their child's relative achievement. In both contexts, relative performance is calculated as the difference between each child's raw composite score and the age-specific village mean or grade-specific school mean, leaving out each child's own contribution to the mean and requiring there to be at least two same-age or same-grade peers within the same village or school.[14]

2.4 Household socioeconomic status

Measures of household economic circumstances and parental educational attainment serve as the primary proxies for socioeconomic status, and these terms are used interchangeably throughout. As is common in Low and Middle Income Countries (LMICs), per capita consumption is used to capture household economic circumstances in the Indian, Kenyan, and Ghanaian samples, while per capita income is used in the USA.[15]. The consumption measures in India, Kenya, and Ghana are derived by aggregating over an extensive set of consumption categories, using modules similar to those in India's National Sample Survey (NSS) and the widely used World Bank Living Standards Measurement Surveys (LSMS). In keeping with related work, total consumption is divided evenly by the number of individuals in the house-

[13] More details are available in the extensive accompanying documentation (Tourangeau et al., 2009).

[14] In India, 8 and 9 year olds are grouped and 10 and 11 year olds are grouped together to minimize data loss. Using this procedure, relative performance is defined for approximately 75% of the sample at the village level. (In contrast, relative performance is defined for only 55% of the sample at the school level; performance relative to peers in the same village is thus the preferred measure of relative performance in the Indian context). In the USA, close to 94% of the sample can be linked to peers within the same school given that the target number of children sampled per school was 24 (Tourangeau et al., 2009).

[15] Results are robust to instead using measures of income or earnings in India and Kenya where these alternate measures are available. IHDS documentation confirms that household consumption effectively captures a household's economic status or standard of living, stating "the total expenditure is often used as the best measure of the household's current economic level."

hold, trimming the top 1% of the distribution.[16] In the USA, parents reported household income by selecting from one of thirteen categories instead of providing an exact figure. Each household is assigned the midpoint of the indicated range, using just above the the lower bound for the top-most bracket; as such, household income is essentially (and conservatively) top-coded at $300,000.[17] Parental education takes on the average years of education across both parents in India, Ghana, and the USA, while in Kenya, parental education refers to the primary KLPS respondents' years of education, for consistency with other research using this data. Finally, while the analysis focuses primarily on household economic circumstances and parental educational attainment as proxies for socioeconomic status, sociodemographic measures such as membership in a Scheduled Caste or Scheduled Tribe in India or racial group in the USA) capture another meaningful dimension of socioeconomic status in these contexts.

2.5 Other

2.5.1 Educational investments

In addition to exploring the link between socioeconomic status and parental beliefs, the analysis also explores correlation between parental beliefs and concrete measures of educational investments as available in all four contexts. In India, total annual spending on education-related activities sums over reported spending on school fees, materials, transportation, and tutoring. Time spent on educational activities sums over the typical number of hours dedicated each week to instruction, homework, and tutoring. The data include whether the child receives any private tutoring, private school attendance, recent school absences, and whether the child goes on to complete any secondary school or selects a technical subject in senior secondary school.[18]. In Kenya and Ghana, educational investments include educational spending, time, private school enrollment, and attendance, and in Kenya, parents additionally report the number of books and play materials in the home, and whether the parent and child play together. In the USA, parents provided information on children's books in the home, whether the parent reads daily with the child or takes the child on

[16] See Hamory et al. (2021b) and Baird et al. (2017) for more details on the construction of consumption measures in KLPS. Special thanks to the researchers at the Global Poverty Research Lab and others involved with the ISSER-Northwestern-Yale Long Term Ghana Socioeconomic Panel Survey for providing household consumption measures for wave 3 of the GSPS.

[17] When children were in Kindergarten, parents did report an exact figure, instead of selecting the appropriate category. Based on incomes reported at that time, mean income among households that would fall into the top-most bracket was well over $350,000. $300,000 is thus a conservative choice for the top-most bracket.

[18] Technical subjects include commerce, science, engineering, or another technical or vocational subject. These future-schooling outcomes are only available for children in the sample in wave 1 who are later observed in wave 2

outings, whether the child participates in sports and other activities, how often children do homework, and whether they receive any tutoring.

2.5.2 Educational expectations and child self-confidence

Similarly, the analysis also explores if and how parental beliefs correlate with educational expectations and child self-confidence, concepts that may both guide and reflect indirect inputs to educational investments such as motivation and effort. In Ghana, parents were asked how likely they think it is that their child will go to secondary school (taking into consideration the family's financial and other constraints), and children were asked the same. In the USA, parents were asked the maximum level of education they expect their child will attain.

In addition to these educational expectations, the analysis also explores how parental beliefs correlate with measures capturing how children view their own academic achievement and potential. In Ghana, children were asked to indicate what rank they would attain relative to other Ghanaian children of the same age in a question identical to that asked of parents as described above. In the USA, children in third grade completed a self-description questionnaire designed to capture "academic self-concept" (Marsh, 1992). This questionnaire elicited each child's interest and perceived competence overall and within subjects, by asking children to indicate how closely they identify with statements such as "I like reading long chapter books" (for reading), "work in math is easy for me" (for math), and "I am good at all school subjects" (for overall). These measures (child self-beliefs in Ghana and academic self-concept in the USA) can be considered as concepts closely related to child self-confidence in that they quantify both perceived competence or achievement (in both contexts) and interest (in the USA).

2.5.3 Parental perceptions and psychological well-being

Other questions asked of parents during the surveys provide data that help to explore potential mechanisms linking socioeconomic status and parental beliefs, including survey questions eliciting parental perspectives on access to information, confidence, and the role of external factors in shaping eventual outcomes, as well as rich measures of psychological well-being. In Kenya, a short series of questions were added to the primary caregiver survey to capture parental confidence in terms of knowledge about their child's achievement, how their child compares to other children, and whether they receive information about their child from teachers and other adults. Other questions ask whether parents believe that external factors and circumstances versus their own choices, actions, and effort or their child's ability

and effort play a greater role in determining eventual outcomes.

The analysis also explores potential links between parental beliefs and dimensions of psychological well-being including depression, hopefulness, self-efficacy, and stress). Comparable measures of parental depression are available in Kenya and the USA, collected using the Center for Epidemiologic Studies Depression Short Form (CESD-10).[19] The Ghanaian data include measures of psychological distress (primarily reflecting symptoms of anxiety and depression) captured using the Kessler Psychological Distress Scale (K10) for a subset of parents.[20]. Finally, the Kenyan data include measures of self-efficacy, perceived stress, and hopefulness for the 61% of primary caregivers who were themselves the KLPS respondent.[21]

2.6 Other data sources

In India, educational mobility data made available by Asher et al. (2021) are merged with the IHDS data at the district level, the smallest administrative unit at which the IHDS data are identified and so can be merged with external data sources. Finally, precipitation data from the Center for Climatic Research at the University of Delaware provide measures of historical and recent rainfall at the district level to identify positive and negative rainfall shocks for the analysis in Section 3.2.

3 Results

The first cross-sectional analysis documents a robust relationship between household socioeconomic status and parental beliefs common to all four contexts. In India, Kenya, Ghana, and the USA, measures of socioeconomic advantage (including household economic circumstances, educational attainment, and caste or race) correlate positively with above-average beliefs and negatively with below-average beliefs. This relationship persists after

[19]Scores on the ten-item CESD-10 range from 0 to 30, with scores of 10 or above indicating symptoms consistent with depression (Radloff, 1977; Andresen et al., 1994).

[20]The K10 module was administered to the household head, their spouse, and one other (randomly-chosen) household member. In practice, measures of parental psychological distress are available for 82% of the sample. Scores on the ten item K10 scale range from 10 to 50, with scores of 25 or above indicative of moderate or severe psychological distress.

[21]Self-efficacy is captured using the ten item Generalized Self-Efficacy Scale (Schwarzer and Jerusalem, 1995) and perceived stress using the four item Perceived Stress Scale (Cohen et al., 1983; Warttig et al., 2013). Fatalism is measured using a question similar to that from the World Values Survey, which asks respondents to indicate on a scale ranging from 1 to 10 how closely they agree that "everything in life is determined by fate" versus "people shape their fate themselves" (Inglehart et al., 2014). Finally, subjective current socioeconomic status and aspired future status are measured using the MacArthur ladder, which asks respondents to indicate their current perceived relative socioeconomic status and which relative status they would like to achieve in their life on a scale ranging from 1 to 10 (Adler et al., 2000).

accounting for child performance, and strengthens in urban and high educational mobility contexts.

Further, analysis leveraging exogenous variation from a natural experiment in India and a randomized controlled trial in Kenya supports that the observed relationship reflects in part a causal link.

Next, while above-average overall beliefs are more common for female than male children in India, Kenya, and the USA, I find evidence of substantial subject-specific disparities across genders, a pattern unique to the USA but not observed in Ghana or Kenya. Parents in the USA are more likely to believe males are above average in math compared to equally-performing females, and more likely to believe females are above average in reading compared to equally-performing males.

Finally, parental beliefs correlate with measures of educational investments in all four contexts, consistent with the idea that parental beliefs influence actual investment decisions. Parental beliefs also correlate with measures of children's own subject-specific self-confidence in Ghana, and with academic self-concept in the USA. While not reflecting a causal link, these findings are nevertheless suggestive of some transmission of beliefs and expectations across generations, an important intermediate process if it is the case that parental beliefs influence confidence, motivation, and effort among children.

3.1 Socioeconomic status and parental beliefs

3.1.1 Raw patterns

Figures 1, 2, 3, and 4 illustrate the relationship between household socioeconomic status and parental beliefs about academic achievement as evident in all four contexts. Each depicts local linear regressions of beliefs on relative performance (India, USA[22]) or absolute performance (Kenya, Ghana), separately by household economic circumstances (high/low consumption or income) (India, Kenya, Ghana, USA), by caste group (India), or by racial group (USA).

These figures illustrate two key points. First, the slopes indicate that parental beliefs reflect actual child achievement as captured by performance in relative or absolute terms: the likelihood of above-average beliefs increases with higher performance, and the likelihood of below-average beliefs decreases with higher performance. Second, the gaps by household economic circumstances and by caste or racial group reflect stark disparities in parental

[22]In India, relative performance is measured as each child's score relative to others of the same age in the same village, while in the USA, relative performance is measured as each child's score relative to others in the same grade and school; patterns are similar when using absolute rather than relative performance.

beliefs along socioeconomic lines. For most levels of actual performance, parents in socioeconomically advantaged households are more likely to believe their children are above average, while those in socioeconomically disadvantaged households are more likely to believe their children are below average. These patterns appear in each of India, Kenya, Ghana, and the USA, with some differences across contexts.

The strongest relationships emerge in India, Ghana, and the USA for beliefs about current academic achievement. Throughout the actual performance distribution, high consumption or high income parents are more likely to believe their children are above average, and less likely to believe their children are below average in all four contexts (Panels A and B of Figures 1, 2, and 3). Strikingly similar disparities exist across parents belonging to historically advantaged or disadvantaged castes in India (Scheduled Castes or Scheduled Tribes; SCST) (Figure 1, Panels C and D), and across black and white parents in the USA (Figure 2, Panels C and D).

In Kenya and Ghana, the strongest disparities emerge with respect to beliefs about *future* academic achievement. Panel A of Figure 4 shows that for those scoring within half a standard deviation of the age-specific mean score, high consumption parents predict that their child will attain marginally higher scores on the KCPE than their low consumption peers. Disparities in whether parents believe children will score much better (Panel B) or the same or worse (Panel C) on the KCPE compared to peers appear much more muted. Similarly in Ghana, high-consumption parents are more likely to believe their child will be above average in the future throughout much of the current performance distribution (Panel C of Figure 3), with fewer differences in below-average beliefs (Panel D).

Taken together, these results suggest a striking relationship between household socioeconomic status and the nature of parental beliefs common to these four disparate contexts. Accounting for performance, households with stronger economic circumstances and those belonging to more advantaged caste or racial groups hold more positive beliefs about their child's current academic achievement (India, Ghana, and the USA) and future academic potential (Ghana and Kenya).

3.1.2 Cross-sectional regression analysis

I next show that these patterns persist after taking into account other household and contextual characteristics in a regression framework. I start by running essentially the same regression in all four contexts, with some differences to account for context-specific factors or data limitations. The basic approach uses OLS to estimate regressions of parental beliefs (believe above average, believe below average, etc.) on child and household characteristics,

with geographical and survey-related fixed effects using the following specification:

$$\text{India:} \quad Y_{ihvw} = \alpha + \beta_1 X1_h + \beta_2 X2_i + \delta_v + \phi_w + \varepsilon_{ihvw} \tag{1}$$

$$\text{Kenya:} \quad Y_{ihc} = \alpha + \beta_1 X1_h + \beta_2 X2_i + \delta_c + \varepsilon_{ihc} \tag{2}$$

$$\text{Ghana:} \quad Y_{ihd} = \alpha + \beta_1 X1_h + \beta_2 X2_i + \delta_d + \varepsilon_{ihd} \tag{3}$$

$$\text{USA:} \quad Y_{ihsg} = \alpha + \beta_1 X1_h + \beta_2 X2_i + \delta_s + \theta_g + \varepsilon_{ihsg} \tag{4}$$

In all four contexts, $Y_{ih(vw/sg/d/c)}$ correspond to parental beliefs for child i in household h. $X1_h$ represents a vector of household and parental characteristics, including log per capita household consumption (India, Kenya, Ghana) or income (USA), years of parent education, and caste (India) or racial (USA) group, indicators for urban status (Kenya, Ghana), and indicators for whether the parent providing beliefs is the child's mother (Kenya, Ghana), the primary KLPS respondent (Kenya), and whether the child coresides with the KLPS respondent (Kenya). $X2_i$ are child characteristics including standardized composite scores, indicators for age (India, Kenya, Ghana), whether the child is female, and oldest child status.[23] In India, village fixed effects δ_v account for time-invariant village characteristics and wave fixed effects ϕ_w account for year-specific shocks common across villages.[24] In Kenya, county fixed effects δ_c account for any time-invariant county-specific characteristics, and similarly in Ghana, δ_d account for district-specific characteristics. In the USA, δ_s and θ_g are school and grade fixed effects,[25]. Standard errors are clustered by household (India, Kenya, Ghana) or child (USA).

In a core finding of the paper, the results in Table 1 show that the observed relationship between socioeconomic status and parental beliefs persists after accounting for child performance and other relevant contextual characteristics. The relationship emerges with respect to various dimensions of socioeconomic status, including household economic circumstances (consumption or income), parent education, and to some extent, caste or racial group.

These results first confirm that parental beliefs reflect actual test performance, an unsurprising but reassuring result. In all four contexts, composite scores correlate positively with above-average beliefs and negatively with below-average beliefs. For each standard deviation increase in actual performance, above-average beliefs are 3/6/5/17 (India/Kenya/Ghana/USA) percentage points more likely and below-average beliefs 9/3/7 (India/Kenya/USA) percent-

[23] In Kenya, oldest child status is relative to all biological siblings. In India, Ghana, and the USA, the oldest child status is relative to all co-resident siblings, due to data limitations. Results are robust to excluding this control.

[24] Results are robust to instead including year fixed effects; close to 90% of the full sample and 85% of the children sample were surveyed in 2005 instead of 2004 (for wave 1) and 2012 instead of 2011 (for wave 2)

[25] Results are robust to instead using school by grade fixed effects.

age points less likely.

The relationship between SES and beliefs is strongest in India, where a doubling of household consumption is associated with a 3.6 percentage point increase in the likelihood of above-average beliefs (a 20% increase relative to the mean), with a similar decrease in the likelihood of below-average beliefs (a 13% decrease).[26] Similarly, above-average beliefs are 2 percentage points less likely, and below-average beliefs are 2 percentage points more likely among parents from historically disadvantaged castes, even after accounting for performance and household economic circumstances. Estimates from regressions fully interacting SCST membership with all controls indicate that the relationship between household consumption and above-average beliefs attenuates substantially among SCST parents, with no disparities for below-average beliefs (Table A2).

In the USA, a doubling of household income is associated with a (marginally-significant) 1 percentage point increase in the likelihood of above-average beliefs and a 2 percentage point reduction in the likelihood of below-average beliefs (a 15% decrease).[27]

In Ghana, beliefs about current academic achievement are more strongly correlated with parental education than with household consumption, reflecting that this dimension of socioeconomic status may be more meaningful in this context. Each additional year of education is associated with a 1 percentage point increase (decrease) in the likelihood of above-average (below-average) beliefs.

In both Kenya and Ghana, these measures of socioeconomic status correlate most strongly with beliefs about future academic achievement, consistent with the patterns depicted in 4 and 3. In Kenya, each doubling of household consumption is associated with approximately 5 percentage point increase in the likelihood that parents believe their children will score above average on the Kenya Certificate of Primary Education (KCPE; a high-stakes primary exit exam) compared to peers (an 8% increase relative to the mean).[28] In Ghana, household

[26] Patterns are similar using below poverty line status instead of log consumption: by this measure, parents in impoverished households are 1.6 percentage points less likely to believe children are above average, and 4.6 percentage points more likely to believe children are below average (Table A3, column (3)).

[27] Measurement error in terms of income may play some role in attenuating estimates from the USA, given that income is measured not in precise terms, but instead computed as the midpoint of the selected income bin. Disparities along racial lines in the USA do not appear as strong after accounting for household characteristics and other contextual factors such as school attended with this specification. They do, however, in a version of this specification using *relative* instead of absolute performance. Further, though not the focus of this paper, immigrant parents are more likely to believe their children are above average and less likely to believe their children are below average, after accounting for child performance, household income, and context.

[28] In contrast, household consumption does not correlate with above-average or below-average current beliefs. One potential explanation for the lack of a clear relationship with current beliefs in this context could be that beliefs elicitation took place shortly after schools were reopened following nine months of pandemic-related school closures. Parents may have felt greater uncertainty and/or were less confident about their child's academic achievement across the board. With this in mind, beliefs about current achievement in

consumption and parental education both strongly predict above-average beliefs, where a doubling of household income is associated with a 7 percentage point increase in above-average beliefs and each additional year of parental education with a 2 percentage point increase in above-average beliefs (both significant at 1%).

Finally, results are robust to using alternative measures for socioeconomic status or child performance, to estimation on different subsamples (Table A3), and are largely robust to using measures of belief accuracy, overestimation, or underestimation instead of raw beliefs (Table A4).

3.1.3 Relative performance and parental beliefs by socioeconomic status

I next turn to exploring if and how the relationship between child performance and parental beliefs differs by socioeconomic status. I estimate similar regressions, but use relative in place of absolute performance to capture how each child's performance compares to that of local peers. In India this includes children of the same age in the same village and in the USA this includes children in the same grade and school. Regressions include village or school fixed effects to account for average performance and other characteristics among local peers, with all controls fully interacted with measures of household economic circumstances (above-median consumption or income), caste, or racial identity.

Results in Table 2 reveal disparities along socioeconomic lines in how closely beliefs about child academic achievement align with actual child performance. In India, the strength of the relationship between performance relative to children in the same village and above-average beliefs nearly doubles for high consumption compared to low consumption households (column (1) of Panel A). In the USA, the relationship is marginally stronger among high income households, but only weakly significantly so (column (3) of Panel A).

Greater disparities along socioeconomic lines emerge with respect to below-average beliefs. For each standard deviation below the village average a child scores[29], parents in India are approximately 7 percentage points more likely to believe their children are below average, a relationship that attenuates by 2 percentage points for high consumption parents (column (1) of Panel B). In the USA, below-average beliefs are 1 percentage point more likely for each standard deviation below the peer group mean a child scores among low income parents, but only 5 percentage points more likely among high income parents (column (3 of Panel B)).

While the remaining analysis focuses primarily on the economic dimension of socioeconomic status, these results also highlight disparities along other dimensions, namely caste

this context may need to be interpreted with some caution.

[29] In Panel B of Table 2, relative score is computed as the village or school average score minus the child's score to ease interpretation.

and racial group. The relationship between relative performance and above-average beliefs is marginally weaker for SCST and black parents (columns (2) and (4) of Panel A), while the relationship between relative performance and below-average beliefs is substantially stronger for black parents (column (4) of Panel B).

While the results in Table 1 established the existence of disparities in the likelihood of above-average and below-average beliefs by socioeconomic status conditional on performance, results in Table 2 suggest disparities in how actual child performance and beliefs about achievement relate. In other words, the gaps across high and low consumption/income parents depicted in the raw data (in Figures 1 and 2) persist after accounting for child characteristics and contextual factors, and the slopes differ for at least some portion of the performance distributions.

3.1.4 Context and parental beliefs

In a similar exercise, I next turn to exploring how the relationship between socioeconomic status and parental beliefs differs according to characteristics of the broader context as captured by urban status, degree of educational mobility, and prevalence of poverty in the Indian context. In this analysis, I first modify the main regression by using relative performance[30] including urban status, educational mobility, or prevalence of poverty as controls and interpreting the corresponding coefficients as level differences in beliefs associated with these contextual features.[31] I then fully interact all controls with these measures and interpret their interaction with household consumption to explore if and how the relationship between socioeconomic status and parental beliefs differs across these potentially-meaningful characteristics of a child's context.

While the likelihood of above-average beliefs differs little across contexts, below-average beliefs are substantially less likely in certain favorable contexts. Such beliefs are 3 percentage points less likely in high mobility districts, and 6 percentage points less likely in low poverty districts (accounting for child performance, household consumption, etc.; columns (5) and (6) of Panel A in Table 3).

Panel B shows that in urban and high educational mobility contexts, the relationship

[30] Results are very similar when using absolute instead of relative performance.

[31] Districts are classified as high or low poverty based on a median split of the fraction of households living below the poverty line. District educational mobility is captured using measures from Asher et al. (2021), who develop a method appropriate for computing educational mobility ("bottom half mobility") in a context where low levels of educational attainment may be common among older cohorts. These researchers generously made available measures of urban and rural mobility at the district level in India as well as code used to construct these measures. I make use of the former for the purposes of this research, averaging across urban and rural mobility measures, then classifying districts as above or below median mobility based on a median split.

between socioeconomic status and parental beliefs strengthens. In urban and high mobility contexts, above-average beliefs are 6 to 7 percentage points more likely for each 100% increase in household consumption; in rural and low mobility contexts, above-average beliefs are only 3 percentage points more likely for the same increase in consumption (columns (1)-(3)). No such disparity exists with respect to below-average beliefs (columns (4)-(6)).

Taken together, these results reveal a link between context and parental beliefs in general (below-average beliefs are less likely in favorable contexts), with suggestive evidence that context and socioeconomic status could interact in meaningful ways (above-average beliefs are even more common for high income households in favorable contexts).

3.2 Causal evidence: Economic circumstances and parental beliefs

The next analysis leverages two sources of exogenous variation to test whether the observed cross-sectional relationship between socioeconomic status and parental beliefs in part reflects a causal link. I find that parental beliefs respond negatively to adverse rainfall shocks in India, and positively to receipt of a randomized early-life health intervention that led to improved economic circumstances in Kenya. While I am unable to pinpoint exact mechanisms, these findings suggest that (shocks to) household economic circumstances may fundamentally shape parental beliefs.

3.2.1 Evidence from a natural experiment in India

The first analysis exploits the panel nature of the dataset with a household fixed effects identification strategy to test whether rainfall-driven income shocks also impact parental beliefs in rural India. Rainfall conditions may strongly influence agricultural production and agricultural income among rural households who rely on rainfall during the rainy ("kharif") season for crop irrigation. If a causal link between household economic circumstances and parental beliefs exists, rainfall conditions may also influence parental beliefs. Many papers use a similar empirical strategy, exploiting exogenous rainfall conditions to test for impacts on wages (Jayachandran, 2006), wage rigidity (Kaur, 2019), consumption (Hossain and Ahsan, 2018), sectoral allocation (Emerick, 2018), children's educational performance and schooling attainment (Shah and Steinberg, 2017), and later life outcomes (Maccini and Yang, 2009). All but the latter adopt this strategy for the Indian context, and several provide direct evidence for the link between rainfall and crop production or agricultural output (Jayachandran, 2006; Shah and Steinberg, 2017; Emerick, 2018).

Rainfall shocks are defined to capture unusually positive or negative deviations from

district-level historical average rainfall.[32] Positive rainfall shocks are cases where the total rainfall in the preceding rainfall year (from June in the previous year to May in the current year) exceeds the 80th percentile of historical average rainfall (over the period from 1969 to 2003) within each district, similar to the approach in Jayachandran (2006) and Kaur (2019). Similarly, negative rainfall shocks are cases where recent rainfall is less than the 20th percentile of historical rainfall within each district.[33]

I first confirm the link between rainfall shocks and agricultural income, then estimate the reduced form relationship between rainfall shocks and beliefs. Finally, I test whether rainfall shocks impact child performance, child agricultural work, or educational investments made; if there are short-term impacts on test scores (through changes in nutrition, increased agricultural work, reduced school attendance, etc.), these could account in part for any observed shifts in beliefs. The analysis focuses on (children in) rural households present in both waves using the following regressions:

$$I_{hdy} = \alpha + \lambda_1 PRS_{dy} + \lambda_2 NRS_{dy} + \theta_h + \phi_y + \varepsilon_{hdy} \tag{5}$$

$$Y_{ihdy} = \alpha + \lambda_1 PRS_{dy} + \lambda_2 NRS_{dy} + \beta_2 X2_i + \theta_h + \phi_y + \varepsilon_{ihdy} \tag{6}$$

I_{hdy} includes agricultural earnings from crop production, animal husbandry, rented land, and other sources net of input costs[34], and Y_{ihdy} refers to above-average and below-average beliefs, child performance,[35], child participation in agricultural work, and various measures of educational investments. PRS_{dy} and NRS_{dy} indicate positive and negative rainfall shocks in district d and year y. All regressions include household fixed effects θ_h to account for time-invariant household characteristics and year fixed effects ϕ_y to account for year-specific shocks, with standard errors clustered by district and year to allow for correlation within districts in a particular year.[36] $X2_i$ includes the usual child-level controls (indicators for age, female, oldest child status, and (where appropriate) standardized scores). λ_1 and λ_2 capture how outcomes vary in response to a positive or negative rainfall shock in a particular district and year, holding constant other household-specific factors that may shape agricultural income, beliefs, child performance, child agricultural work, or educational investments.

The results presented in Table 4 show that negative rainfall shocks reduce agricultural

[32] Figure A2 maps the spatial distribution of rainfall deviations, pooling 2004 with 2005 and 2011 with 2012.

[33] Results are robust to instead defining rainfall shocks based on rainfall in the preceding wet season (June to November) and controlling for rainfall in the preceding dry season (December to May) in the analysis, as per Emerick (2018).

[34] For consistency with other income- and consumption-related measures, the top and bottom 1% of the distribution are trimmed.

[35] Results are robust to using standardized composite scores instead of raw scores as the dependent variable.

[36] Results are robust to instead using year and month, year by month, year and season, or year by season fixed effects, where the month and season fixed effects account for seasonality.

income and negatively impact parental beliefs, suggesting a causal link between transient negative shocks and parental beliefs. A negative rainfall shock reduces agricultural income by 37% (column (1) of Panel A), a dramatic decrease that confirms the hypothesized link between rainfall conditions and agricultural income among rural households in India. The same negative rainfall shocks lead to a 5 percentage point decline in the likelihood of above-average beliefs (an over 60% decline relative to the mean) and a (marginally-significant) 9 percentage point increase in the likelihood of below-average beliefs (a roughly 45% increase relative to the mean) (columns (2) and (3) of Panel A). While income and beliefs appear responsive to negative rainfall shocks, positive rainfall shocks have no corresponding impact.

I fail to detect any impact of negative rainfall shocks on child performance, the likelihood of working in agriculture (columns (4) and (5) of Panel A), or educational investments (Panel B), helping to rule out that performance declines or adjustments of educational investments in response to negative rainfall shocks explain the observed shifts in parental beliefs. On the one hand, this is perhaps encouraging; responses to transient negative shocks could be harmless if they only briefly impact beliefs, and if beliefs eventually revert without any tangible consequences for performance or investments. On the other hand, these findings suggest that the shift in parental beliefs stems not from declines in actual performance, but from some other factors associated with adverse rainfall and worse economic circumstances. For example, negative income shocks could make material constraints associated with socioeconomic status more salient, or could trigger a psychological response that accounts for some portion of the observed effects, as discussed in Section 4.

3.2.2 Evidence from a randomized early childhood health intervention in Kenya

I next present evidence that parental beliefs also shift in response to a randomized early-life health intervention shown to have lasting positive impacts on household economic circumstances. A randomized school-based deworming intervention was launched in Busia, Kenya in 1998; the KLPS was in part established to track participants throughout their lives. The deworming intervention has since been extensively researched and found to have a wide range of positive impacts including improvements in schooling and health in the short run (Miguel and Kremer, 2004), increases in educational attainment and labor supply after 10 years (Baird et al., 2016), and increases in consumption, hourly earnings, non-agricultural employment, and urban residence after 20 years (Hamory et al., 2021b).

Though parental beliefs were not one of the pre-specified outcomes, I adopt a pre-specified empirical strategy to estimate the impact of additional years of exposure to early-life deworming on parental beliefs later in life. I regress parental beliefs on an indicator for whether the KLPS participant (parent) attended one of the schools assigned to early receipt of school-

based deworming, with a set of pre-specified controls standard for related analyses[37] and indicators for child age, whether the child is female, and oldest child status.[38] The sample includes biological children of KLPS participants (parents) who took part in the school-based deworming intervention but not in one of a number of other past interventions.[39]

Results presented in Table 5 show that additional years of exposure to deworming during childhood has a positive impact on later-life household economic circumstances and on beliefs about child academic achievement. Consumption is over 300 Shillings higher for individuals in households where a KLPS participant received additional years of childhood deworming (column (1)).[40] Further, parents in deworming treatment households are 5 percentage points less likely to believe their children are below average (column (3)) and 11 percentage points more likely to believe their child will do much better on the KCPE exam (column (4)).

Results are similar when restricting to parents who were themselves the deworming participant (columns (1)-(3) of Table SA3).[41] Finally, treatment effects appear stronger among KLPS parents who were older during the intervention (columns (4)-(6) of Table SA3), consistent with published work finding stronger treatment effects for this cohort in other domains.[42]

These results complement those presented in the previous subsection and lend further support to the notion that household economic circumstances may fundamentally shape parental beliefs. Results from India showed sensitivity of parental beliefs to short-term, negative shocks, while these results show that beliefs also shift in response to longer-term, positive interventions. Neither analysis, however, is able to explain how and why household

[37] These include an indicator for whether the KLPS parent was assigned to the cost-sharing treatment group (those in the cost-sharing group exhibited much lower take up of the deworming treatment, and so are distinct from those in non-cost-sharing schools who thus had a higher effective treatment rate), treatment saturation among schools within 6 kilometers of the KLPS parent's school (to capture the impact of local spillovers (Baird et al., 2016)), KLPS parent gender, grade at the time of the deworming program, the total density of primary school children within 6 kilometers of the parent's school, an indicator for the zone of the parent's school, population of the parent's school, average test scores at the parent's school, an indicator for being in the vocational education or cash grants program sample, gender of interviewer, and months since the start of the survey wave.

[38] Results are robust to omitting these child-specific controls.

[39] The other interventions include a girl's scholarship program between 2000 and 2001, and vocational training and cash grants programs between 2009 and 2014. These sample restrictions follow guidelines outlined in pre-analysis plans for estimating the long run (Baird et al., 2017) and intergenerational impacts (Fernald et al., 2021) of the primary school deworming project (PSDP).

[40] These results replicate those in in Table 1 of Hamory et al. (2021b).

[41] The long-run gains associated with the deworming treatment extend beyond benefits to recipient health to also include broad improvements in later-life outcomes such as better labor market outcomes, higher earnings, and greater likelihood of urban residence, which could be shared by both KLPS parents and others in the same household. In this way it is encouraging, but not surprising, that results are similar when estimating treatment effects over the full sample or restricting to KLPS parents themselves.

[42] Stronger treatment effects among older cohorts were first detected when analyzing outcomes 10 years after the deworming program (Baird et al., 2016), and appear to have persisted until 20 years after the deworming program (Hamory et al., 2021b).

economic circumstances or socioeconomic status more broadly influence parental beliefs, something I discuss and explore in Section 4.

3.3 Child gender and parental beliefs

While the relationship between socioeconomic status and parental beliefs appears strikingly similar across all four contexts, differences do emerge in terms of how child gender and parental beliefs relate.

Returning to the main results presented in Table 1, parents appear if anything more likely to hold above-average beliefs for female children in terms of overall academic achievement in India, Kenya, and the USA; in Ghana, no differences emerge in terms across genders. Coefficient estimates presented in this table indicate that above-average overall beliefs are up to 4 percentage points more common among parents of female than male children (columns (1)-(4) of Panel A1), and below-average beliefs are no more likely for female children (columns (1)-(4) of Panel B1), conditional on overall performance.[43]

In the USA, however, this pattern masks striking disparities in subject-specific beliefs across male and female children. Conditioning on subject performance, parents in the USA are more likely to believe male children are above average in math and female children are above average in reading; in Kenya and Ghana, no such disparities exist across subjects.

3.3.1 Raw patterns

Figure 5 depicts raw patterns in the data in Kenya, Ghana, and the USA. In the USA, for a given relative math score, parents are more likely to believe their male children are above average in math, particularly at the upper end of the performance distribution (Panel A). In contrast, parents are more likely to believe their female children are above average in reading (Panel B). No such gender-based disparities appear in the Kenyan or Ghanaian contexts (Panels C, D, E, and F).[44]

[43] Encouragingly, Figure A1 shows virtually no differences in overall parental beliefs across the full performance distribution for male and female children in India; these findings suggest that disparities in parental beliefs likely play little to no role in driving well-documented disparities in educational and other investments by gender in this context (Azam and Kingdon, 2013; Barcellos et al., 2014; Kingdon, 2005). Subject-specific beliefs are not available in this context, so subject-specific disparities remain unexplored.

[44] Particularly in Kenya, the shallower slope of these lines suggests a weaker link between subject-specific performance and beliefs; in any case, beliefs about current achievement in this context may need to be interpreted with caution, as discussed in section 3.1.2.

3.3.2 Subject-specific parental beliefs by child gender

These gender-based patterns persist with the inclusion of relevant controls in a regression framework. Panels A1 and B1 of Table 6 present coefficient estimates associated with a female child indicator in a version of the main specification (equations 1 - 2) regressing subject-specific beliefs on subject-specific performance, along with the other usual controls.[45] In the USA, this overall pattern masks the disparities in subject-specific beliefs portrayed in Figure 5. Parents in the USA are 4 percentage points more likely to believe female children are above average in reading (Panel A1, column (4), but 3 percentage points *less* likely to believe female children are above average in math (column (1)), conditioning on actual math or reading performance. This same pattern fails to emerge in Kenya (columns (2) and (6)) or in Ghana with respect to either current or future beliefs (columns (3)-(4) and (7)-(8)). (In Kenya, subject-specific beliefs are consistent with the pattern for overall beliefs. Here, parents are 4 percentage points more likely to believe female children are above average in reading, though the estimate coefficient is only significant at the 10% level, and no gender-based differences are observed with respect to math.)

The next piece of the analysis tests for differences in the strength of the relationship between subject-specific performance and beliefs across male and female children, in addition to the disparities in levels observed (or not observed) in the data. This analysis estimates regressions similar to before, here fully interacting all controls with an indicator for whether the child is female. Coefficient estimates corresponding to the interaction between the female indicator and performance indicate whether the relationship between subject-specific performance and subject-specific parental beliefs differs by child gender.

Results from this analysis reinforce the existence of substantial disparities in subject-specific beliefs across male and female children in a pattern unique to the USA. The relationship between actual math performance and above-average beliefs about math achievement is weaker for female than male children (column (1) of Panels A2), while the relationship between math performance and below-average math beliefs is stronger for female than male children (column (1) of Panels B2). In contrast, the relationship between reading performance and below-average reading beliefs attenuates for female compared to male children (column (5) of Panel B2). In Kenya and Ghana, there are no differences in the relationship between math performance and beliefs about current or future math achievement across male and female children (columns (2)-(4) of Panels A1 and A2), though the analogous relationship appears somewhat stronger with respect to reading in Kenya (column (6) of Panel A2).

[45] Results are robust to using measures of relative performance in India and USA.

Taken together, these results suggest that in certain contexts such as the USA, prevailing gender biases could influence and even distort subject-specific parental beliefs. The observed patterns are what we might expect to see if parents rely on social norms and related heuristics – among them the belief that males tend to be better at math and females tend to be better at reading – in the formation of beliefs about their children's subject-specific achievement. These disparities could have consequences in terms of how parents choose to invest in their male and female children, which courses of study they encourage their male and female children to pursue, and even how children view themselves (Carlana and Corno, 2022; Eble and Hu, 2022).

For completeness, Table A5 shows some differences in the results related to socioeconomic status and beliefs across male and female children. In India and Kenya the link between socioeconomic status and above-average beliefs appears stronger for female children (columns (1) and (2)), while in the USA, the reverse appears to be the case (columns (4) and (10)). Few disparities emerge across genders in Ghana (columns (3) and (9)) or in Ghana and Kenya with respect to future beliefs (columns (5) and (6)).

Finally, in analysis presented in Appendix B, I find that gender-based disparities in subject-specific beliefs are more pronounced in mixed-sex compared to single-gender sibling households. These findings are perhaps consistent with research finding that a mixed-sex school environment leads women to make educational choices more in line with traditional gender-based stereotypes (Favara, 2012) or that females growing up with male siblings are less likely to choose a STEM-related major or field (Brenøe, 2017; Oguzoglu and Ozbeklik, 2016; Anelli and Peri, 2015).

3.4 Educational investments, parental expectations, and child self-confidence

Beliefs about academic achievement could influence educational outcomes to the extent they influence the investments parents make towards their children's education or shape child confidence, motivation, and effort. This section briefly presents analysis showing that parental beliefs correlate with actual educational investments and with child self-confidence, factors that could in turn correlate with confidence, motivation, and effort.

3.4.1 Educational investments

In all four contexts, measures of educational investments correlate positively with above-average beliefs and negatively with below-average beliefs, even controlling for household socioeconomic status, child performance, and other relevant factors. Table A6 presents

estimates corresponding to regressions of various measures of education-related investments on indicators for above-average and below-average beliefs along with the usual controls. With some differences across contexts, above-average beliefs correlate positively with various measures of schooling investments (spending, time, private school enrollment, attendance) and the home environment (books, materials, parent-child interaction). As examples, parents in India who believe their child is above (below) average dedicate 2 percentage points more (less) of household spending towards their child's education relative to those who believe their children are average (column (1) of Panel A). In Kenya and Ghana, children of parents with below-average beliefs dedicate between 20 to 30 minutes less time on educational activities each day (column (2) of Panels B and C). In the USA, parents who hold above-average beliefs are more likely to read daily with their child and take them on outings (columns (4) and (5) of Panel D), while in the USA, children of parents with below-average beliefs are absent from school more frequently and are less likely to engage in play activities with caregivers (columns (4) and (7) of Panel B).

These findings are purely correlational and likely overstate any causal impact of parental beliefs on investments, since omitted factors influence both beliefs and investments, and parents who have the resources to invest more in their child's education may be more likely to hold above-average beliefs as a result.[46] Nevertheless, these correlations suggest a link between beliefs and investments, consistent with other evidence which shows that exogenous shifts in beliefs impact actual investment decisions (among them, for example, Dizon-Ross (2019) and List et al. (2021)).

3.4.2 Parental expectations and child self-confidence

The next analysis serves to demonstrate that parental beliefs correlate not only with direct measures of educational investments, but also with factors that could indirectly influence child educational outcomes. In Ghana, parents who believe their children are above average are more likely to expect their children will continue on to secondary school relative to those who believe their children are average, and their children are more likely to believe the same (Table A7, columns (1) and (2)). Similarly, in the USA, parents with above-average (below-average) beliefs are more (less) likely to expect their children will complete college or beyond (Table A7, columns (3) and (4)).

Parental beliefs and expectations could also influence child self-confidence, motivation, and effort in the classroom. In Ghana, children were asked to estimate how they believe they

[46] Regressions presented in Table SA4 replicate the primary cross-sectional analysis from Table 1, only now also including many of these investment-related measures as controls. Even with their inclusion, the relationship between household socioeconomic status and beliefs persists.

performed in math and reading relative to other children in the same grade. In the USA, children were asked a series of questions capturing perceived competence and interest in various subjects, with responses providing a measure of child academic self-concept (Marsh, 1992). Table A8 presents coefficient estimates associated with regressions of these measures of child self-confidence on indicators for whether the parent believes the child is above average overall, in the same subject, or in the other subject, along with subject-specific performance and the usual controls.

The analysis reveals a strong link between parental beliefs and child self-beliefs or self-concept, particularly for beliefs within subject. In the USA, overall parental beliefs correlate positively with overall child academic self-concept (column (5) of Table A8), and subject-specific beliefs and child self-concept correlate even more strongly (columns (6) and (8) of Table A8). Children whose parents believe they are above average in math (reading) score 0.25 (0.2) points higher on the 4-point measure of child academic self-concept, conditional on subject-specific performance. These relationships are substantially weaker with respect to parental beliefs in the other subject, where children whose parents believe they are above average in math report only marginally higher interest and competency in reading, and vice versa (columns (7) and (9)). In Ghana, above-average self-beliefs in either subject are substantially more likely among children whose parents believe their children are above average in either subject (Columns (1)-(4) of Table A8). (In the USA, the correlation in academic self-concept across subjects is much weaker than in Ghana, which – as an indication of fundamental differences in the concepts of self-beliefs versus academic self-concept – could account for these differences across contexts).

Consistent with the gender-based disparities presented earlier, female children in the USA report lower interest and competency in math and higher interest and perceived competency in reading, even controlling for actual subject-specific performance and for subject-specific parental beliefs. As was the case with parental beliefs, female child in Ghana are no more or less likely to report believing they are above average in either math or reading compared to male children.

While purely correlational, these results suggest that parental beliefs may truly matter in terms of shaping children's own self-confidence, both overall and across subjects. Findings from both contexts support a strong relationship between parental beliefs and measures of child self-confidence, suggesting some intergenerational transmission of these closely related beliefs. That female children demonstrate weaker self-concept in math and stronger self-concept in reading in USA, with no gender-based differences in child self-beliefs in Ghana is consistent with the patterns observed among parents. To the extent that children intuit their parents' beliefs and expectations, subject-based disparities in these beliefs and expectations

could influence decisions to pursue STEM-related fields where those skills are more or less rewarded. Indeed, research shows that parental (and teacher) beliefs and expectations may shape children's interest in math, self-perceived math ability, and eventual math performance (Carlana and Corno, 2022; Jacobs et al., 2005; Gunderson et al., 2012), consistent with other research arguing that disparities in eventual participation in STEM-related fields may originate not from differences in math ability across males and females, but in part due to the influence of gender-based social norms (Friedman-Sokuler and Justman, 2016) or perceived ability (Bharadwaj et al., 2016).

4 Discussion of potential mechanisms

After documenting disparities in parental beliefs along socioeconomic lines in Section 3.1, providing evidence that beliefs respond to exogenous changes in household economic circumstances in Section 3.2, and documenting gender-based disparities in subject-specific beliefs in Section 3.3, I next discuss mechanisms that could potentially explain these relationships.

A simplified framework describing how parents might form beliefs about their child's academic achievement helps to frame the discussion. Parents may draw on available information about their child's academic achievement, but in the absence of complete information, may make inferences based on assumptions about how children from a similar background tend to perform. These assumptions could be influenced by access (or lack of access) to role models, by positive or negative stereotypes, or by perceptions of the external constraints and opportunities associated with socioeconomic status, so that parents overstate actual gaps in child performance along socioeconomic lines.

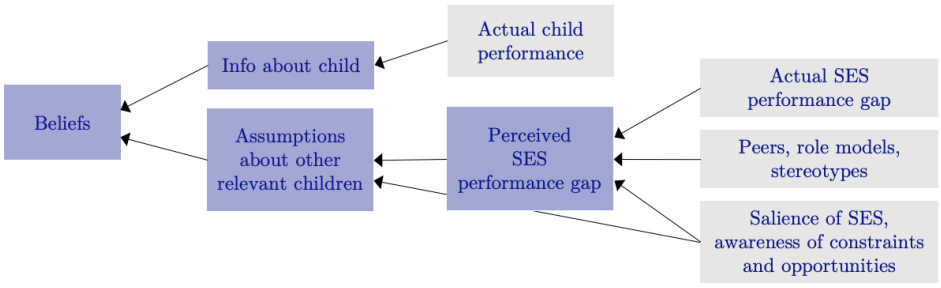


Figure: Simplified framework linking socioeconomic status to parental beliefs

Key factors that could differ by socioeconomic status in this simplified description of the beliefs-formation process include (1) the degree to which parents rely on information about their own child versus assumptions about other children, (2) the degree to which

parents magnify or overstate actual gaps in child performance by socioeconomic status, and (3) how salient parents perceive socioeconomic status to be. First, parents from more socioeconomically disadvantaged backgrounds may have less access to information, which could increase reliance on assumptions about how other relevant children perform. Second, children from more advantaged backgrounds do tend to perform better academically on average, likely due to disparities in resources and other inputs throughout childhood that foster child development; however, observed experiences of others from a similar background, the availability of role models, or prevailing stereotypes could all lead parents to overestimate these SES-based performance gaps. Finally, the more salient parents perceive socioeconomic status and associated constraints and opportunities to be, the more they may overestimate SES-based performance gaps, and the more attention they may pay to (perceived) SES-group specific average performance as the counterpart to the information about their child.

Separately, psychological factors associated with socioeconomic status could shape parental beliefs, so that well-documented disparities in psychological health along socioeconomic lines contribute to disparities in parental beliefs along these same lines.

While the discussion focuses on how socioeconomic status may influence parental beliefs, worth noting is that similar processes could be at play with respect to child gender and subject-specific beliefs in the USA. Prevailing gender-based stereotypes and the overrepresentation of males in STEM-related fields may lead parents to overestimate male-female performance gaps in math, and parents who view child gender as more salient may pay more attention to assumptions about gender-specific performance accordingly.

Each of these potential mechanisms are described in more detail below, along with discussions of related research and new analysis where available. While any analysis in this section remains purely exploratory, insights from this analysis will help inform ongoing and future research aimed at better understanding how socioeconomic status or child gender shapes parental beliefs.

4.1 Differential access to information

Differential access to information could contribute to disparities in parental beliefs along socioeconomic lines, if lower socioeconomic status parents face greater barriers to obtaining or interpreting information about their child, and so rely more on assumptions about other similar children to inform beliefs. In Kenya, parents with one additional year of education are 1 percentage point more likely to report that they receive information about their child's ability from teachers and other adults, and to report confidence in knowing their child's academic ability (Table A9, column (1) and (3)). Reinforcing these cross-sectional patterns,

deworming treatment recipient parents are 8 percentage points more likely to report they receive information about their child's ability, and are 6 percentage points more likely to have accurate beliefs, the latter effect only significant at the 10% level (Table A9, column (2) and (6)). (The effects on accuracy are driven by deworming treatment recipient parents being less likely to underestimate their child's academic achievement.)

While these results provide compelling evidence that differential access to information plays some role in contributing to the observed disparities in parental beliefs along socioeconomic lines, informational disparities alone cannot fully account for observed patterns. Differential access to information could lead to differences in belief accuracy – counterfactual to what the results indicate (Table A4)[47] – but would not necessarily lead to the patterns observed here. Instead, it must also be the case that the other factors informing parents' beliefs lead higher (lower) socioeconomic status to specifically overstate (understate) their child's academic achievement.

4.2 Peers, role models, and prevailing stereotypes

Factors such as the observed experience of peers, the availability of role models, and prevailing stereotypes could lead parents to overstate performance gaps along socioeconomic lines. To the extent that parents rely on the resulting assumptions about how children from a similar background perform, parents may overstate or understate their own child's academic performance accordingly. Parents from more advantaged socioeconomic backgrounds may see many examples of children from similarly-advantaged backgrounds continuing on to secondary school, college, or having their pick of employment opportunities. In contrast, parents from disadvantaged socioeconomic backgrounds may not see as many examples of others from a similar background progressing in the same way (due to constraints associated with their circumstances), and may be exposed to fewer role models. Just as evidence shows that exposure to geographically-proximate peers or role models with similar characteristics influences aspirations (Nguyen, 2008; Beaman et al., 2012; Tanguy et al., 2014; Fernández, 2021; La Ferrara, 2019),[48] the observed experience of peers and availability of role models could similarly influence beliefs. Further, parents may rely on (harmful) stereotypes about how children from various backgrounds tend to perform academically, consistent with evidence showing that stereotypes impact such perceptions among teachers (Farfan Bertran

[47] Relatedly, there also does not appear to be a clear link between measures of parental cognition and belief accuracy, according to results presented in Table SA1.

[48] Ray (2006) argues in the context of aspirations formation that "there is no experience quite as compelling as the experience of your immediate family, and more broadly, those in your socio-economic and spatial neighborhood" and that "individuals look at others around them, and their experiences and achievements shape their desires and goals" (Genicot and Ray, 2020).

et al., 2021) and children (Hoff and Pandey, 2006; Mukherjee, 2017).

Again, worth noting is that similar principles could lead to disparities in subject-specific beliefs by gender. Prevailing narratives around male dominance in math, coupled with a disproportionate number of male role models in math and STEM-related fields could contribute to the subject-specific disparities in beliefs by gender as observed in the USA.

4.3 Salience of socioeconomic status

An acute awareness of the constraints and opportunities associated with socioeconomic status could lead parents to overstate performance gaps along socioeconomic lines, and to pay more attention to such gaps when forming beliefs about their own child's academic achievement. This could be especially true for lower socioeconomic status parents, for whom external constraints and opportunities may be more salient.

Parents many internalize the external constraints and opportunities associated with socioeconomic status, assuming that children from more advantaged circumstances tend to have access to ample educational investments and greater support, while children from more disadvantaged circumstances do not benefit from the same. In this way, beliefs could to some extent reflect expectations about the type and quality of education children have received so far and will continue to receive in the future. Indeed, some of the strongest links between socioeconomic status and beliefs exist related to beliefs about *future* academic achievement, both in terms of performance (in Kenya and Ghana; Table 1) and expectations for future educational attainment (in Ghana and the USA; Table SA2).

While far from conclusive, the findings discussed in discussed in Section 3.1.4 could be consistent with there being a relationship between external constraints or opportunities and parental beliefs. These results showed that below-average beliefs are less common among parents in certain favorable contexts (high educational mobility or low poverty districts), and that the relationship between socioeconomic status and above-average beliefs was even stronger among parents in certain favorable contexts (urban areas and high educational mobility districts). Parents in favorable contexts may expect that their children will have access to high quality schooling, and supportive and well-trained teachers to support their child's learning. That high consumption parents exhibit even higher beliefs in these contexts could reflect that these parents know they will be able to complement high quality schooling with additional investments and inputs.

Evidence from Kenya suggests that the constraints and opportunities associated with external circumstances may loom larger for low socioeconomic parents, while higher socioeconomic parents may put more stock in their own efforts and those in their child. Each

doubling of household consumption is associated with a 5 percentage point decline (a 23% decline relative to the mean) in the likelihood parents state that external factors such as the quality of schools will determine outcomes, as opposed to stating that their own child's ability and effort will determine outcomes (Table A9, panel A, column (7)). Similarly, each additional year of parent education is associated with a 1 percentage point increase in parents agreeing that their own choices, actions, and effort as a parent will determine child outcomes (column (9)). While far from conclusive, this does at least suggest that higher socioeconomic status parents perceive their child's ability and effort as primary determinants of outcomes, perhaps paying less attention to external factors. In contrast, lower socioeconomic status parents may be more acutely aware of the constraints associated with socioeconomic status, leading them to overstate socioeconomic performance gaps and underestimate their own child's academic achievement.

Finally, a light-touch pilot activity conducted in partnership with an organization that provides phone-based support to primarily low-income parents in Delhi, India (Saajha) provides suggestive evidence that awareness of the constraints and opportunities associated with socioeconomic status could shape parental beliefs. In this pilot activity, a sample of parents engaged with the platform were asked to complete a short survey eliciting beliefs about their child and related impressions over Whatsapp. Parents were randomly assigned to receive one of several pre-survey messages designed to make economic circumstances top-of-mind or to encourage parents that they have the resources required to effectively support their children. The sample was selected (those who had at some point been involved with Saajha), response rates were low (8% of the sample started, and 5% of the sample completed the survey), and there were some implementation issues (for example, certain survey questions were not included for certain treatment arms). With these caveats in mind, the results suggest that the salience of socioeconomic status and associated resource constraints could have some impact on parental beliefs. Parents receiving a socioeconomic status salience message designed to make perceived relative poverty more salient[49] were 11 percentage points (over 25%) less likely to report feeling confident that they had the resources to support their child's education (Table A9, Panel B, column (2)). In contrast, while parents receiving a message designed to encourage confidence in having resources to support their child's education[50] had

[49]The socioeconomic status prime is a procedure used by other scholars (Fair et al., 2018; Kosec and Mo, 2021) to increase awareness of their relative income or socioeconomic standing. In these studies, researchers ask individuals to estimate how much they earn, or how much their household earns in total. Response categories are set either as usual (in the first condition), or inflated (in the second condition) so that for the same level of actual earnings, individuals in the second condition are more likely to select the lowest category. In this case, parents were asked "Taking into consideration all sources of income, does your household earn more or less than 25,000 RS per month?" 77% of respondents reported earning less, 5% reported earning more, and 18% were unsure.

[50]The encouragement message, "Studies have shown that simply spending short amounts of time on a regular

no impact on reported confidence, treated parents were less likely to believe their children are below average or will be so in the future (columns (6) and (8)). While these results need to be interpreted with caution, they at least suggest that (awareness of) the constraints associated with socioeconomic status could influence parental beliefs.

4.4 Psychological factors

Finally, socioeconomic disparities in psychological factors could also contribute to disparities in parental beliefs. Parents from less socieconomically-advantaged backgrounds may disproportionately experience depression, hopelessness, and low self-efficacy (De Quidt and Haushofer, 2016; Ridley et al., 2020; Lybbert and Wydick, 2018; Duflo, 2012; Lybbert and Wydick, 2022), psychological factors which could similarly foster less positive beliefs.

In support of this hypothesis, evidence from the USA and Kenya reveals a link between socioeconomic status with various measures of psychological health, and between these same measures with parental beliefs. In both contexts, higher socioeconomic parents on average exhibit significantly fewer depressive symptoms, and in Kenya, they exhibit higher self-efficacy, greater hopefulness, and lower levels of stress (Table A10).[51] Many of these same measures of psychological health correlate strongly with parental beliefs. Table A11 presents coefficient estimates associated with independent regressions of parental beliefs on measures of depression, stress, self-efficacy, and hopefulness, including the usual set of child-level controls.[52]

Taken together, the results suggest a strong link between parental beliefs and stress, self-efficacy, and hopefulness, with the evidence on depression being more mixed. In the USA, parents experiencing symptoms of depression are more likely to believe their child is below average; in Kenya, more depressed parents are marginally *more* likely to believe their

basis with your child (reading, speaking, playing) can help them to learn and develop academic skills" was intended to encourage parents by reducing perceived barriers to supporting their children. Simple light-touch encouragement messages have been shown to improve parental engagement and child development in other contexts (York et al., 2019).

[51] Depressive symptoms and rates of depression are substantially higher among Kenyan than parents from the USA. Considering those CESD scores higher than 10 (out of 30) as indicative of depression, 35% of Kenyan parents but only 10% of those in the USA are considered depressed. While depression scores are available for all parents, due to the data collection strategy used, other measures are only available the approximately 61% of cases where the primary parent is KLPS participant.

[52] Measures of depression, stress, and self-efficacy are standardized to be mean zero with standard deviation of one to facilitate comparison. Results are robust to instead using raw measures. Hopefulness (personal) and hopefulness (Kenya) are not measured using standard scales as are the other measures; instead these reflect whether parents indicate they expect their own personal financial situation will be better in the future (as opposed to staying the same or worsening) and whether they expect Kenya's financial situation will be better in the future. Results are similar with including the full set of usual controls. Estimated coefficients decline only minimally with their inclusion, suggesting that these psychological measures have similar explanatory power even when household economic circumstances are taken into consideration.

child is currently above average, but substantially less likely to believe their child will be above average in the future. Much more consistent patterns appear with respect to stress, self-efficacy, and hopefulness, where both current and future beliefs are more positive (above-average more common, below-average less common) among parents with greater self-efficacy and those who exhibit more hopefulness (As an exception, future beliefs are more positive among less stressed parents, with no differences in terms of current beliefs.) In general, measures of psychological health correlate most strongly with beliefs about future performance in Kenya (column (4)), consistent with the finding that future beliefs correlate most strongly with socioeconomic status in this context. Self efficacy captures "beliefs in one's capabilities to organize and execute the courses of action required to produce given attainments" (Bandura, 1997); positive beliefs about one's child may be a natural corollary of holding positive beliefs about one's own capabilities. Similarly, factors like depression or hopefulness could influence beliefs about how their children currently perform and expectations about how they will fare in the future.

While this analysis remains purely exploratory, these findings suggest that various psychological factors which are influenced by socioeconomic status could contribute to disparities in parental beliefs along socioeconomic lines. The findings related to depression are mixed, and the evidence on "hope" only suggestive, nevertheless these could be meaningful channels for future research, particularly given relatively high rates of depression and hopelessness among parents in at least the Kenyan sample and globally (Collins et al., 2011; WHO, 2017).

5 Conclusion

This paper documents a robust relationship between socioeconomic status and parental beliefs about child academic achievement, a pattern common across India, Kenya, Ghana, and the USA. In all four contexts, above-average beliefs are more likely among socioeconomically advantaged parents, and below-average beliefs are more likely among socioeconomically disadvantaged parents. These patterns persist when accounting for child performance and a range of other household characteristics, suggesting that disparities in parental beliefs along socioeconomic lines outpace disparities in performance along these same lines.

Further, evidence from India and Kenya supports a causal link between household economic circumstances and parental beliefs. Parental beliefs respond both to short-term, transient negative shocks and to long-term, lasting improvements in household economic circumstances, suggesting that such circumstances may fundamentally shape parental beliefs. In India, beliefs among rural parents respond negatively to exogenous shocks that reduce agricultural income. In Kenya, above-average beliefs are more common and below-average beliefs

less common among recipients of a randomized early-life intervention that led to later-life improvements in labor market outcomes and earnings.

I also find evidence of substantial disparities in subject-specific parental beliefs by child gender, a pattern unique to the USA, but not found in either Kenya or Ghana. Consistent with prevailing gender-based stereotypes, parents are less likely to believe females are above average in math compared to equally-performing males.

Finally, parental beliefs correlate with actual educational investments (in all four contexts) and educational expectations (in Ghana and the USA), and that subject-specific beliefs correlate with subject-specific self-confidence (in Ghana and the USA).

Taken together, these findings suggest that disparities in overall parental beliefs along socioeconomic lines and in subject-specific beliefs by child gender could play some role in reinforcing disparities in outcomes along these same lines. If parents from socioeconomically disadvantaged backgrounds are more likely to believe their children are below average, they may underinvest in their children's education, leading to worse outcomes at the individual level and missed opportunities for growth on an economy-wide level (Bell et al., 2019; Hsieh et al., 2019). If parents underestimate female achievement in math, they may set expectations and make investments accordingly, contributing to lower female participation in math and STEM-related fields.

While the discussion and evidence around potential mechanisms that might explain these patterns remains suggestive, rigorously exploring evidence for these and other potential mechanisms could be a promising avenue for future research, particularly if such mechanisms also drive socioeconomic disparities in beliefs relevant to other areas of economic decision making. For example, decisions about migrating to an urban center for employment opportunities may depend on beliefs about expected wage gains, and decisions about investing in a new agricultural technology may rely on expected productivity gains. If socioeconomic disadvantage leads individuals to underestimate outcomes such as wage or productivity gains, this could adversely impact economic decision making.

Finally, even without a clear understanding of the specific mechanisms linking socioeconomic status and parental beliefs, the findings presented in this and related research suggest a role for policies and interventions that may equip parents not only with the material resources, but also with the psychological resources, to best support their children's learning.

References

Adler, N. E., Epel, E. S., Castellazzo, G., and Ickovics, J. R. (2000). Relationship of subjective and objective social status with psychological and physiological functioning: Preliminary data in healthy, white women. *Health psychology*, 19(6):586.

Andresen, E. M., Malmgren, J. A., Carter, W. B., and Patrick, D. L. (1994). Screening for depression in well older adults: Evaluation of a short form of the CES-D. *American journal of preventive medicine*, 10(2):77–84.

Anelli, M. and Peri, G. (2015). Gender of siblings and choice of college major. *CESifo Economic Studies*, 61(1):53–71.

Angelucci, M. and Bennett, D. (2021). The economic impact of depression treatment in India. *IZA Discussion Paper*.

Appadurai, A. (2004). The capacity to aspire: Culture and the terms of recognition. *Culture and Public Action*, 59:62–63.

Asher, S., Novosad, P., and Rafkin, C. (2021). Intergenerational mobility in India: New methods and estimates across time, space, and communities. *Working Paper*.

Attanasio, O., Cattan, S., and Meghir, C. (2022). Early childhood development, human capital, and poverty. *Annual Review of Economics*, 14:853–892.

Azam, M. and Kingdon, G. G. (2013). Are girls the fairer sex in India? Revisiting intra-household allocation of education expenditure. *World Development*, 42:143–164.

Baird, S., De Hoop, J., and Özler, B. (2013). Income shocks and adolescent mental health. *Journal of Human Resources*, 48(2):370–403.

Baird, S., Hamory Hicks, J., Kremer, M., Miguel, E., and Walker, M. (2017). Pre-analysis plan for "The 20-year impacts of child deworming in Kenya". AEA RCT Registry. July 18. https://doi.org/10.1257/rct.1191-11.1.

Baird, S., Hicks, J. H., Kremer, M., and Miguel, E. (2016). Worms at work: Long-run impacts of a child health investment. *The quarterly journal of economics*, 131(4):1637–1680.

Bandura, A. (1997). *Self-efficacy: The exercise of control*. W.H. Freeman and Company, New York.

Banerjee, A., Duflo, E., Goldberg, N., Karlan, D., Osei, R., Parienté, W., Shapiro, J., Thuysbaert, B., and Udry, C. (2015). A multifaceted program causes lasting progress for the very poor: Evidence from six countries. *Science*, 348(6236):1260799.

Baranov, V., Bhalotra, S., Biroli, P., and Maselko, J. (2020). Maternal depression, women's empowerment, and parental investment: evidence from a randomized controlled trial. *American economic review*, 110(3):824–59.

Barcellos, S. H., Carvalho, L. S., and Lleras-Muney, A. (2014). Child gender and parental investments in India: Are boys and girls treated differently? *American Economic Journal: Applied Economics*, 6(1):157–89.

Beaman, L., Duflo, E., Pande, R., and Topalova, P. (2012). Female leadership raises aspirations and educational attainment for girls: A policy experiment in india. *Science*, 335(6068):582–586.

Bedoya, G., Coville, A., Haushofer, J., Isaqzadeh, M., and Shapiro, J. P. (2019). No household left behind: Afghanistan targeting the ultra poor impact evaluation. *National Bureau of Economic Research*.

Bell, A., Chetty, R., Jaravel, X., Petkova, N., and Van Reenen, J. (2019). Who becomes an inventor in america? the importance of exposure to innovation. *The Quarterly Journal of*

Economics, 134(2):647–713.

Bénabou, R. and Tirole, J. (2002). Self-confidence and personal motivation. *The Quarterly Journal of Economics*, 117(3):871–915.

Bénabou, R. and Tirole, J. (2016). Mindful economics: The production, consumption, and value of beliefs. *Journal of Economic Perspectives*, 30(3):141–64.

Bharadwaj, P., De Giorgi, G., Hansen, D., and Neilson, C. A. (2016). The gender gap in mathematics: evidence from Chile. *Economic Development and Cultural Change*, 65(1):141–166.

Blanden, J., Doepke, M., and Stuhler, J. (2022). Educational inequality. *National Bureau of Economic Research Working Paper 29979*.

Boneva, T. and Rauh, C. (2018). Parental Beliefs about Returns to Educational Investments—The Later the Better? *Journal of the European Economic Association*, 16(6):1669–1711.

Brenøe, A. A. (2017). Sibling gender composition and participation in stem education. *Working Paper*.

Carlana, M. and Corno, L. (2022). Shaping gender-stereotypical beliefs in education: The role of parents and peers. *Working Paper*.

Cohen, S., Kamarck, T., and Mermelstein, R. (1983). A global measure of perceived stress. *Journal of Health and Social Behavior*, 24(4):385–396.

Collins, P. Y., Patel, V., Joestl, S. S., March, D., Insel, T. R., Daar, A. S., Bordin, I. A., Costello, E. J., Durkin, M., Fairburn, C., et al. (2011). Grand challenges in global mental health. *Nature*, 475(7354):27–30.

Cools, A. and Patacchini, E. (2017). Sibling gender composition and women's wages. *IZA Discussion Paper 11001*.

Cunha, F., Elo, I., and Culhane, J. (2013). Eliciting maternal expectations about the technology of cognitive skill formation. *National Bureau of Economic Research Working Paper 19144*.

Cunha, F., Elo, I., and Culhane, J. (2020). Maternal subjective expectations about the technology of skill formation predict investments in children one year later. *Journal of Econometrics*.

Cunha, F., Gerdes, M., Hu, Q., and Nihtianova, S. (2023). Language environment and maternal expectations: An evaluation of the LENA Start program. *National Bureau of Economic Research Working Paper 30837*.

Dalton, P. S., Ghosal, S., and Mani, A. (2016). Poverty and aspirations failure. *The Economic Journal*, 126(590):165–188.

De Quidt, J. and Haushofer, J. (2016). Depression for economists. *National Bureau of Economic Research Working Paper 22973*.

Desai, S. and Vanneman, R. (2018). India human development survey (IHDS) 1 (2005) and 2 (2012). The University of Maryland and the National Council of Applied Economic Research, New Delhi. https://doi.org/10.3886/ICPSR22626.v12, https://doi.org/10.3886/ICPSR36151.v6.

Dizon-Ross, R. (2019). Parents' beliefs about their children's academic ability: Implications for educational investments. *American Economic Review*, 109(8):2728–65.

Dotti Sani, G. M. and Treas, J. (2016). Educational gradients in parents' child-care time across countries, 1965–2012. *Journal of Marriage and Family*, 78(4):1083–1096.

Dubeck, M. M. and Gove, A. (2015). The early grade reading assessment (EGRA): Its

theoretical foundation, purpose, and limitations. *International Journal of Educational Development*, 40:315–322.

Duflo, E. (2012). Hope as capability in: Tanner lectures on human values. *Harvard University, Cambridge, USA*.

Dunn, L. and Dunn, D. (2007). PPVT-4: Peabody picture vocabulary test. Pearson Assessments, Minneapolis, MN.

Eble, A. and Hu, F. (2022). Gendered beliefs about mathematics ability transmit across generations through children's peers. *Nature Human Behaviour*, 6(6):868–879.

Emerick, K. (2018). Agricultural productivity and the sectoral reallocation of labor in rural india. *Journal of Development Economics*, 135:488–503.

Fair, C. C., Littman, R., Malhotra, N., and Shapiro, J. N. (2018). Relative poverty, perceived violence, and support for militant politics: Evidence from Pakistan. *Political Science Research and Methods*, 6(1):57–81. Publisher: Cambridge University Press.

Farfan Bertran, M. G., Holla, A., and Vakis, R. (2021). Poor expectations: Experimental evidence on teachers' stereotypes and student assessment. *The World Bank Policy Research Working Paper 9593*.

Favara, M. (2012). The cost of acting'girly': Gender stereotypes and educational choices. *IZA Discussion Paper 7037*.

Fernald, L., Hamory Hicks, J., Kariger, P., Miguel, E., and Walker, M. (2021). Pre-analysis plan for "Estimating causal intergenerational impacts of parent human capital interventions in Kenya". AEA RCT Registry. May 22. https://doi.org/10.1257/rct.3995.

Fernández, A. B. (2021). Neighbors' effects on university enrollment. *Working Paper*.

Friedman-Sokuler, N. and Justman, M. (2016). Gender streaming and prior achievement in high school science and mathematics. *Economics of Education Review*, 53:230–253.

Friedman-Sokuler, N. and Senik, C. (2020). From pink-collar to lab coat: Cultural persistence and diffusion of socialist gender norms. *IZA Discussion Paper 13385*.

Gan, T. (2021). How parents' beliefs about their children's academic ability affect educational investments. *Working Paper*.

Genicot, G. and Ray, D. (2020). Aspirations and economic behavior. *Annual Review of Economics*, 12(1):715–746.

Gladstone, M., Lancaster, G. A., Umar, E., Nyirenda, M., Kayira, E., van den Broek, N. R., and Smyth, R. L. (2010). The malawi developmental assessment tool (MDAT): the creation, validation, and reliability of a tool to assess child development in rural African settings. *PLoS medicine*, 7(5):e1000273.

Gove, A. K. and Wetterberg, A. (2011). *The early grade reading assessment: Applications and interventions to improve basic literacy*. RTI Press.

Gunderson, E. A., Ramirez, G., Levine, S. C., and Beilock, S. L. (2012). The role of parents and teachers in the development of gender-related math attitudes. *Sex roles*, 66(3):153–166.

Guryan, J., Hurst, E., and Kearney, M. (2008). Parental education and parental time with children. *Journal of Economic Perspectives*, 22(3):23–46.

Guyon, N. and Huillery, E. (2021). Biased aspirations and social inequality at school: Evidence from French teenagers. *The Economic Journal*, 131(634):745–796.

Hamory, J., Miguel, E., Walker, M., Kremer, M., and Baird, S. (2021a). Replication data for: Twenty year economic effects of deworming. Harvard Dataverse. https://doi.org/10.7910/DVN/TTYMHI.

Hamory, J., Miguel, E., Walker, M., Kremer, M., and Baird, S. (2021b). Twenty-year economic impacts of deworming. *Proceedings of the National Academy of Sciences*, 118(14).
Haushofer, J. and Fehr, E. (2014). On the psychology of poverty. *Science*, 344(6186):862–867.
Haushofer, J., Mudida, R., and Shapiro, J. P. (2020). The comparative impact of cash transfers and a psychotherapy program on psychological and economic well-being. *National Bureau of Economic Research Working Paper 28106*.
Haushofer, J. and Shapiro, J. (2016). The short-term impact of unconditional cash transfers to the poor: experimental evidence from Kenya. *The Quarterly Journal of Economics*, 131(4):1973–2042.
Hill, A. J. and Jones, D. B. (2021). Self-fulfilling prophecies in the classroom. *Journal of Human Capital*, 15(3):400–431.
Hoff, K. and Pandey, P. (2006). Discrimination, social identity, and durable inequalities. *American Economic Review*, 96(2):206–211.
Hossain, F. and Ahsan, R. (2018). When it rains, it pours: Estimating the spatial spillover effect of rainfall. *Working Paper*.
Hsieh, C.-T., Hurst, E., Jones, C. I., and Klenow, P. J. (2019). The allocation of talent and us economic growth. *Econometrica*, 87(5):1439–1474.
Inglehart, R., Haerpfer, C., Moreno, A., Welzel, C., Kizilova, K., Diez-Medrano, J., Lagos, M., Norris, P., E, P., and Puranen et al., B. (2014). World values survey: Round five documentation. www.worldvaluessurvey.org/WVSDocumentationWV5.jsp.
Jacobs, J. E., Davis-Kean, P., Bleeker, M., Eccles, J. S., and Malanchuk, O. (2005). I can, but I don't want to. *The impact of parents, interests, and activities on gender differences in math. In A. Gallagher & J. Kaufman (Eds.), Gender difference in mathematics*, pages 246–263.
Jayachandran, S. (2006). Selling labor low: Wage responses to productivity shocks in developing countries. *Journal of Political Economy*, 114(3):538–575.
Jensen, R. (2010). The (perceived) returns to education and the demand for schooling. *The Quarterly Journal of Economics*, 125(2):515–548.
Kahn, S. and Ginther, D. (2017). Women and STEM. *National Bureau of Economic Research Working Paper*.
Kalil, A. (2015). Inequality begins at home: The role of parenting in the diverging destinies of rich and poor children. In *Families in an era of increasing inequality*, pages 63–82. Springer.
Kalil, A., Ryan, R., and Corey, M. (2012). Diverging destinies: Maternal education and the developmental gradient in time with children. *Demography*, 49(4):1361–1383.
Kaur, S. (2019). Nominal wage rigidity in village labor markets. *American Economic Review*, 109(10):3585–3616.
Kingdon, G. G. (2005). Where has all the bias gone? Detecting gender bias in the intrahousehold allocation of educational expenditure. *Economic Development and Cultural Change*, 53(2):409–451.
Kinsler, J. and Pavan, R. (2021). Local distortions in parental beliefs over child skill. *Journal of Political Economy*, 129(1):81–100.
Kosec, K. and Mo, C. H. (2021). Does Relative Deprivation Condition the Effects of Social Protection Programs on Political Support? Experimental Evidence from Pakistan. *American Journal of Political Science*. Publisher: Wiley Online Library.
La Ferrara, E. (2019). Presidential address: Aspirations, social norms, and development.

Journal of the European Economic Association, 17(6):1687–1722.
List, J. A., Pernaudet, J., and Suskind, D. (2021). It all starts with beliefs: Addressing the roots of educational inequities by shifting parental beliefs. *National Bureau of Economic Research Working Paper 29394*.
Lybbert, T. J. and Wydick, B. (2018). Poverty, aspirations, and the economics of hope. *Economic Development and Cultural Change*, 66(4):709–753.
Lybbert, T. J. and Wydick, B. (2022). Hope and poverty in development economics: Emerging insights and frontiers. *CEGA Working Paper Series No. WPS-211.*
Maccini, S. and Yang, D. (2009). Under the weather: Health, schooling, and economic consequences of early-life rainfall. *American Economic Review*, 99(3):1006–26.
Marsh, H. W. (1992). Self description questionnaire (sdq) ii: A theoretical and empirical basis for the measurement of multiple dimensions of adolescent self-concept: An interim test manual and a research monograph. *New South Wales, Australia: University of Western Sydney, Faculty of Education*, pages 53–63.
Miguel, E. and Kremer, M. (2004). Worms: identifying impacts on education and health in the presence of treatment externalities. *Econometrica*, 72(1):159–217.
Mukherjee, P. (2017). The effects of social identity on aspirations and learning outcomes. *International Growth Centre Working Paper S-35120-INC-7*.
National Center for Education Statistics, U.S. Dept. of Education, Institute of Education Sciences (2009). Early Childhood Longitudinal Study, Kindergarten Class of 1998-99 (ECLS-K) Kindergarten through eighth grade. https://nces.ed.gov/ecls/dataproducts.asp.
Nguyen, T. (2008). Information, role models and perceived returns to education: Experimental evidence from Madagascar. *Working Paper*.
Oguzoglu, U. and Ozbeklik, S. (2016). Like father, like daughter (unless there is a son): Sibling sex composition and women's stem major choice in college. *IZA Discussion Paper 10052*.
Papageorge, N. W., Gershenson, S., and Kang, K. M. (2020). Teacher expectations matter. *Review of Economics and Statistics*, 102(2):234–251.
Peter, N., Lundborg, P., Mikkelsen, S., and Webbink, D. (2018). The effect of a sibling's gender on earnings and family formation. *Labour Economics*, 54:61–78.
Platas, L. M., Ketterlin-Gellar, L., Brombacher, A., and Sitabkhan, Y. (2014). Early grade mathematics assessment (EGMA) toolkit. *RTI International, Research Triangle Park, NC*.
Radloff, L. S. (1977). The CES-D scale: A self-report depression scale for research in the general population. *Applied Psychological Measurement*, 1(3):385–401.
Ray, D. (2006). Aspirations, poverty, and economic change. *Understanding Poverty*, 1:409–421.
Ridley, M., Rao, G., Schilbach, F., and Patel, V. (2020). Poverty, depression, and anxiety: Causal evidence and mechanisms. *Science*, 370(6522).
Robert Osei and Isaac Osei-Akoto and Ernest Aryeetey and Fred Dzanku and Christopher Udry and Economic Growth Center (2022). ISSER-Northwestern-Yale Long Term Ghana Socioeconomic Panel Survey (GSPS). Version 1. UNF:6:JLtXxepgNXfzyX0ThGLDiw==. Harvard Dataverse. https://doi.org/10.7910/DVN/E5QP0F [Accessed: (March 2023)].
Schwarzer, R. and Jerusalem, M. (1995). Generalized self-efficacy scale. *J. Weinman, S. Wright, & M. Johnston, Measures in health psychology: A user's portfolio. Causal and control beliefs*, 35:37.

Shah, M. and Steinberg, B. M. (2017). Drought of opportunities: Contemporaneous and long-term impacts of rainfall shocks on human capital. *Journal of Political Economy*, 125(2):527–561.

Stoet, G. and Geary, D. C. (2013). Sex differences in mathematics and reading achievement are inversely related: Within- and across-nation assessment of 10 years of PISA data. *PLOS ONE*, 8(3):1–10.

Tanguy, B., Dercon, S., Orkin, K., and Taffesse, A. S. (2014). The future in mind: Aspirations and forward-looking behaviour in rural Ethiopia. *CEPR Discussion Paper No. DP10224*.

Tourangeau, K., Nord, C., Lê, T., Sorongon, A. G., Najarian, M., and Germino, H. E. (2009). Combined user's manual for the ECLS-K eighth-grade and K–8 full sample data files and electronic codebooks. National Center for Education Statistics https://nces.ed.gov/ecls/dataproducts.asp.

UNICEF et al. (2017). Overview: MELQO: Measuring early learning quality and outcomes. *UNESCO Publishing*.

Warttig, S. L., Forshaw, M. J., South, J., and White, A. K. (2013). New, normative, english-sample data for the short form perceived stress scale (PSS-4). *Journal of health psychology*, 18(12):1617–1628.

WHO (2017). Depression and other common mental disorders: global health estimates. *World Health Organization*.

Willmott, C. J. and Matsuura, K. (2018). Terrestrial air temperature and precipitation: Monthly and annual time series. University of Delaware Center for Climatic Research. http://climate.geog.udel.edu.

Wuepper, D. and Lybbert, T. J. (2017). Perceived self-efficacy, poverty, and economic development. *Annual Review of Resource Economics*, 9:383–404.

York, B. N., Loeb, S., and Doss, C. (2019). One step at a time the effects of an early literacy text-messaging program for parents of preschoolers. *Journal of Human Resources*, 54(3):537–566.

Tables

Table 1: Socioeconomic Status and Parental Beliefs

	Current: Believe above average				Future: Above average		Current: Believe below average			
	India (IHDS)	Kenya (KLPS)	Ghana (GSPS)	USA (ECLS-K)	Kenya (KLPS)	Ghana (GSPS)	India (IHDS)	Kenya (KLPS)	Ghana (GSPS)	USA (ECLS-K)
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
Log consumption or income	0.04***	0.0004	0.04	0.007*	0.05**	0.07***	-0.03***	0.005	0.01	-0.02***
	(0.007)	(0.02)	(0.03)	(0.004)	(0.02)	(0.03)	(0.008)	(0.009)	(0.02)	(0.003)
Parent education in years	0.004***	0.003	0.008*	0.010***	0.005	0.02***	-0.003***	-0.003	-0.006**	-0.003***
	(0.0008)	(0.004)	(0.004)	(0.002)	(0.004)	(0.004)	(0.001)	(0.003)	(0.003)	(0.001)
Composite score	0.03***	0.06***	0.05***	0.2***	0.08***	0.08***	-0.09***	-0.04***	-0.01	-0.07***
	(0.003)	(0.01)	(0.01)	(0.003)	(0.01)	(0.02)	(0.004)	(0.008)	(0.01)	(0.002)
Child female	0.02***	0.04*	-0.007	0.03***	0.02	0.01	0.01	-0.03**	-0.0009	-0.03***
	(0.006)	(0.02)	(0.03)	(0.005)	(0.02)	(0.03)	(0.007)	(0.01)	(0.02)	(0.004)
Scheduled Caste or Tribe	-0.02**						0.02**			
	(0.007)						(0.010)			
Black				0.006						-0.001
				(0.01)						(0.009)
Sample	Ages 8-11	Ages 3-8	Ages 9-18	Grades K, 1, 3	Ages 3-8	Ages 9-18	Ages 8-11	Ages 3-8	Ages 9-18	Grades K, 1, 3
Fixed effects	Village	County	District	School	County	District	Village	County	District	School
Mean	0.12	0.26	0.36	0.32	0.46	0.43	0.16	0.09	0.14	0.09
Mean for below avg perf	0.06	0.19	0.29	0.12	0.30	0.30	0.36	0.15	0.17	0.26
Mean for avg perf	0.11	0.25	0.36	0.30	0.46	0.43	0.13	0.09	0.13	0.07
Mean for above avg perf	0.23	0.35	0.44	0.64	0.60	0.53	0.05	0.03	0.16	0.01
100% incr cons/inc rel to mean	0.20	0.00	0.08	0.02	0.07	0.11	-0.13	0.04	0.07	-0.15
Δ Y: 25-75th pctl cons/inc	0.03	0.00	0.04	0.01	0.05	0.06	-0.03	0.00	0.01	-0.02
Δ Y: 10-90th pctl cons/inc	0.06	0.00	0.08	0.02	0.09	0.12	-0.05	0.01	0.02	-0.05
R^2	0.25	0.04	0.23	0.25	0.06	0.25	0.27	0.05	0.26	0.23
Observations	22726	2401	2280	44198	2249	2282	22726	2401	2280	44198

India: Data for regressions in columns (1) and (7) are from the India Human Development Survey. Regressions include controls for log per capita household consumption, parent education in years, SCST group membership, standardized composite test scores, and indicators for child female, age, oldest child status, and wave, as well as indicators for missing household consumption, parent education, SCST group membership, or oldest child status. Includes village fixed effects. Uses appropriate sampling weights. Standard errors clustered by household. **Kenya:** Data for regressions in columns (2), (5), and (8) are from wave 2 of round 4 of the Kenya Life Panel Survey. Regressions include controls for log per capita household consumption, parent education in years, indicators for urban status, whether the primary caregiver is the child's mother whether the primary caregiver is the KLPS respondent, whether the child lives with the KLPS respondent, standardized composite test scores, and indicators for child female, age, and oldest child status, as well as indicators for missing household consumption, parent education, urban status, primary caregiver-related variables, child age, and oldest child status. Includes county fixed effects. Uses appropriate sampling weights. Standard errors clustered by household. **Ghana:** Data for regressions in columns (3), (6), and (9) are from wave 3 of the Ghana Socioeconomic Panel Survey. Regressions include controls for log per capita household consumption, parent education in years, an indicator for whether parental beliefs are elicited from the child's mother, standardized composite test scores, and indicators for child female, age, and oldest child status, as well as indicators for missing household consumption, parent education, or oldest child status. Includes district fixed effects. Uses appropriate sampling weights. Standard errors clustered by household. **USA:** Data for regressions in columns (4) and (10) are from the Early Childhood Longitudinal Studies Program: Kindergarten. Regressions include controls for log per capita household income, parent education in years, standardized composite test scores, and indicators for racial category, child gender, child grade, and oldest child status, as well as indicators for missing household consumption, parent education, racial category, or oldest child status. Includes school fixed effects. Uses appropriate sampling weights. Standard errors clustered by child.

Table 2: Relative Performance and Parental Beliefs by Socioeconomic Status

	Believe above average			
	India (IHDS)		USA (ECLS-K)	
Panel A	(1)	(2)	(3)	(4)
Relative score	0.02***	0.03***	0.16***	0.17***
	(0.00)	(0.00)	(0.00)	(0.00)
Relative score × High consumption or income	0.02**		0.01*	
	(0.01)		(0.01)	
Relative score × SCST		-0.01		
		(0.01)		
Relative score × Black				-0.02*
				(0.01)
Fixed effects	Village	Village	School	School
Observations	22726	22726	44198	44198
	Believe below average			
	India (IHDS)		USA (ECLS-K)	
Panel B	(1)	(2)	(3)	(4)
(-1) ∗ Relative score	0.06***	0.06***	0.10***	0.07***
	(0.01)	(0.01)	(0.00)	(0.00)
(-1) ∗ Relative score × High consumption or income	-0.01*		-0.04***	
	(0.01)		(0.00)	
(-1) ∗ Relative score × SCST		-0.01		
		(0.01)		
(-1) ∗ Relative score × Black				0.03***
				(0.01)
Fixed effects	Village	Village	School	School
Observations	22726	22726	44198	44198

India: In Panel A, relative score is computed as child score minus mean score among others of the same age in the same village. In panel B, relative score is computed as the reverse (mean score in the same village minus own score, capturing how far below the village mean each child scores). Includes same controls as Table 1, omitting log consumption or caste and child composite score. All controls fully interacted with indicator for high (above-median) consumption household (column (1)) or an indicator for belonging to a Scheduled Caste or Scheduled Tribe (SCST) (column (2)). **USA:** In Panel A, relative score is computed as child score minus mean score among others in the same grade and school. In panel B, relative score is computed as the reverse. Includes the same set of controls as Table 1, omitting log income or race and child composite score. All controls fully interacted with indicator for high (above-median) income household (column (3)) or an indicator for black (column (4)).

Table 3: Context and Parental Beliefs

	India (IHDS)					
	Believe above average			Believe below average		
	Context: Urban	Context: High mobility district	Context: Low poverty district	Context: Urban	Context: High mobility district	Context: Low poverty district
Panel A: Controlling for context	(1)	(2)	(3)	(4)	(5)	(6)
Log consumption	0.04***	0.05***	0.05***	-0.05***	-0.05***	-0.04***
	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)
Context	0.01	0.01	0.00	-0.01	-0.04***	-0.06***
	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)
Panel B: Interacting context	(1)	(2)	(3)	(4)	(5)	(6)
Log consumption	0.03***	0.04***	0.04***	-0.06***	-0.07***	-0.05***
	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)
Log consumption × Context	0.04***	0.03***	0.02	0.02*	0.03**	0.02
	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)
Fixed effects	District	State	State	District	State	State
Observations	20394	18889	22726	20394	18889	22726

Includes the same controls as Table 1. In Panel A, indicators characterizing context (urban, high mobility district, low poverty district) are included as controls. In Panel B, all controls are fully interacted with indicators characterizing context (urban, low mobility district, high poverty district). Regressions in columns (1) and (4) include district fixed effects. Regressions in columns (2)-(3) and (5)-(6) include state fixed effects. Includes appropriate sampling weights. Standard errors clustered by household.

Table 4: Rainfall Shocks, Agricultural Income, and Parental Beliefs

	India (IHDS)				
Panel A: Agri Income, Beliefs, Performance, Work	Log agricultural income (1)	Believe above average (2)	Believe below average (3)	Composite score (4)	Agricultural work (5)
Positive rainfall shock	-0.24	0.01	-0.02	0.02	0.07***
	(0.15)	(0.02)	(0.04)	(0.02)	(0.03)
Negative rainfall shock	-0.47***	-0.05**	0.09*	0.01	-0.00
	(0.15)	(0.02)	(0.05)	(0.03)	(0.02)
Sample	Full	Child	Child	Child	Child
Unit of observation	HH-wave	Child-wave	Child-wave	Child-wave	Child-wave
Fixed effects	HH	HH	HH	HH	HH
Mean for rural households	5.32	0.08	0.20	0.48	0.09
Observations	54397	3282	3282	3282	3282
Panel B: Educational Investments	Annual spending (%) (1)	Weekly minutes educational activities (2)	Any tutoring (3)	Attends private school (4)	Absence last 30 days (5)
Positive rainfall shock	0.59	234.39***	-0.03	0.01	0.62
	(1.49)	(86.62)	(0.04)	(0.03)	(0.89)
Negative rainfall shock	0.22	-80.05	0.04	0.00	-0.29
	(1.43)	(93.36)	(0.04)	(0.04)	(1.04)
Sample	Child	Child	Child	Child	Child
Unit of observation	Child-wave	Child-wave	Child-wave	Child-wave	Child-wave
Fixed effects	HH	HH	HH	HH	HH
Mean for rural households	10.91	2396.60	0.16	0.29	4.61
Observations	3227	2993	3032	3242	3187

Positive (negative) rainfall shocks are defined as cases when district-level rainfall over the past rainfall year (from June to May) is above the 80th percentile (below the 20th percentile) of historical rainfall in that district. The regression in column (1) of panel A restricts to rural households observed in both waves. All remaining regressions restrict to rural households in the child sample observed in both waves. All regressions aside from those in column (1) of panel A include as controls: standardized composite scores (not included in the regression in column (4) of panel A), indicators for child female, age, and oldest child status. All regressions include rainfall year and household fixed effects, with standard errors clustered by district-year.

Table 5: Deworming Treatment and Parental Beliefs

	Kenya (KLPS)			
	Per capita consumption	Believe above average	Believe below average	Future above average
	(1)	(2)	(3)	(4)
Deworming treatment	327*	0.01	-0.05**	0.11***
	(166)	(0.03)	(0.02)	(0.04)
Sample	Full	Child	Child	Child
Unit of observation	HH	Child	Child	Child
Control mean	2173.24	0.28	0.09	0.42
Observations	4794	1786	1786	1673

Sample includes children of deworming treatment participants. Controls include cost-sharing treatment assignment, local treatment saturation among schools within 6 kilometers of the deworming (PSDP) participant's school, total density of primary school children within 6 kilometers of the PSDP participant's school, an indicator for being in the vocational education or cash grants program sample, PSDP participant gender, PSDP participant grade at the time of the deworming program, zone indicator for PSDP participant school, population of PSDP participant school, and average test scores at PSDP participant's school. The regression in column (1) also includes an indicator for year, month of interview, and tracking wave (in keeping with related analyses). Regressions in columns (2)-(4) also include gender of interviewer and months since the start of the survey wave (as specified in the pre-analysis plan corresponding to the research exploring the intergenerational impacts of the deworming treatment) and indicators for whether the child is female, child age, and oldest child status. All regressions include appropriate weights to ensure representativeness of the original population, taking into consideration the exclusion of the GSP, vocational education, and cash grants programs. Standard errors clustered by PSDP school.

Table 6: Gender and Subject-Specific Parental Beliefs

	Believe above average							
	Math				Reading			
	USA (ECLS-K)	Kenya (KLPS)	Ghana: Current (GSPS)	Ghana: Future (GSPS)	USA (ECLS-K)	Kenya (KLPS)	Ghana: Current (GSPS)	Ghana: Future (GSPS)
Panel A1: Controlling for gender	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Female	-0.03***	0.03	-0.00	-0.01	0.04***	0.04*	0.02	0.03
	(0.01)	(0.02)	(0.03)	(0.03)	(0.01)	(0.02)	(0.03)	(0.03)
Panel A2: Interacting gender								
Subject score	0.15***	0.04**	0.01	0.05***	0.18***	0.06***	0.05***	0.08***
	(0.01)	(0.02)	(0.02)	(0.02)	(0.01)	(0.02)	(0.02)	(0.02)
Subject score × Female	-0.02***	0.03	0.03	0.02	0.01	0.05**	-0.04	-0.03
	(0.01)	(0.02)	(0.02)	(0.03)	(0.01)	(0.02)	(0.03)	(0.03)

	Believe below average							
	Math				Reading			
	USA (ECLS-K)	Kenya (KLPS)	Ghana: Current (GSPS)	Ghana: Future (GSPS)	USA (ECLS-K)	Kenya (KLPS)	Ghana: Current (GSPS)	Ghana: Future (GSPS)
Panel B1: Controlling for gender	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Female	0.00	-0.02	-0.01	0.02	-0.01**	-0.01	0.01	-0.00
	(0.00)	(0.01)	(0.02)	(0.02)	(0.00)	(0.01)	(0.02)	(0.02)
Panel B2: Interacting gender								
(-1) ∗ Subject score	0.06***	0.03***	0.02	-0.05***	0.10***	0.03**	-0.02	-0.07***
	(0.00)	(0.01)	(0.02)	(0.01)	(0.00)	(0.01)	(0.02)	(0.02)
(-1) ∗ Subject score × Female	0.01***	0.00	-0.02	0.01	-0.01*	0.01	0.04*	0.01
	(0.01)	(0.01)	(0.02)	(0.02)	(0.01)	(0.02)	(0.02)	(0.03)
Sample	Grades 1, 3	Ages 3-8	Ages 9-18	Ages 9-18	Grades 1, 3	Ages 3-8	Ages 9-18	Ages 9-18
Fixed effects	School	County	District	District	School	County	District	District
Observations	26831	2043	2278	2275	26539	2063	2274	2276

Regressions in panels A1 and B1 include the same controls, fixed effects, weighting approach, and clustering of standard errors as Table 1, replacing standardized composite scores with standardized subject-specific scores. Regressions in panels A2 and B2 includes the same controls as panels A1 and B1, each fully interacted with a female indicator.

Figures

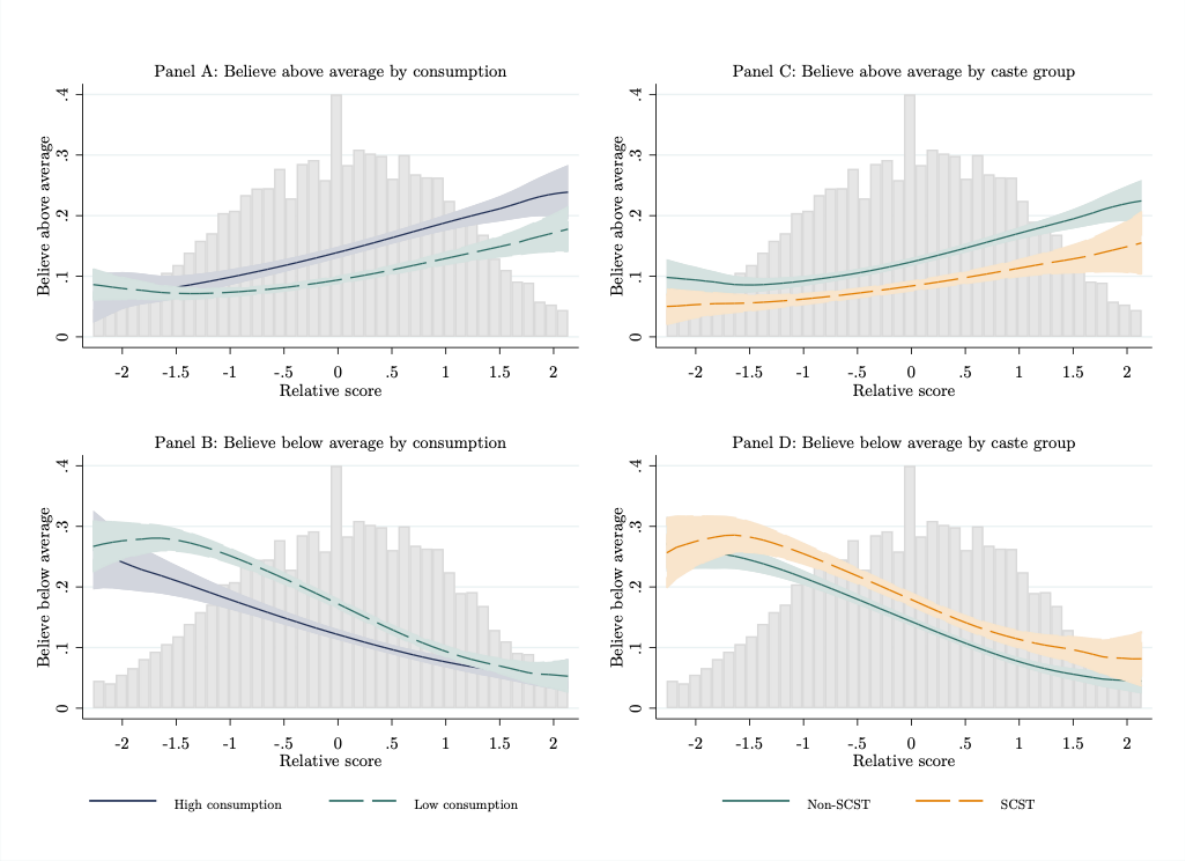


Figure 1: India: Parental Beliefs by Consumption and Caste Group

Note: This figure shows local linear regressions of parental beliefs on relative scores, separately for high and low consumption households (panels A and B) and by caste group (panels C and D). Lightly shaded areas represent 95% confidence intervals. Grey bars depict the distribution of relative scores. Relative scores are computed as the child's own score minus the average score within the same village and age. Data are from the India Human Development Survey (IHDS).

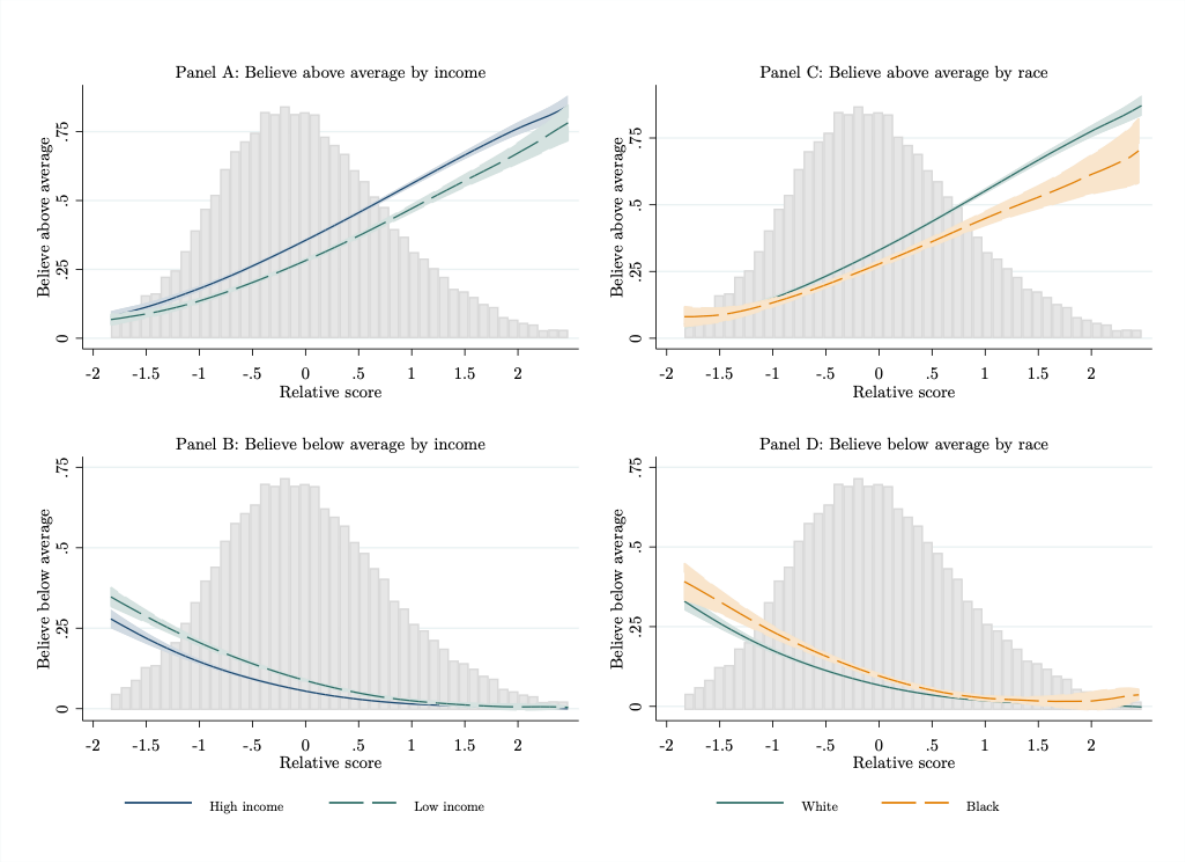


Figure 2: USA: Parental Beliefs by Income and Racial Group

Note: This figure shows local linear regressions of parental beliefs on relative scores, separately for high and low income households (panels A and B) and by racial group (panels C and D). Lightly shaded areas represent 95% confidence intervals. Grey bars depict the distribution of relative scores. Relative scores are computed as the child's own score minus the average score within the same school and grade. Data are from the Early Childhood Longitudinal Study, Kindergarten (ECLS-K).

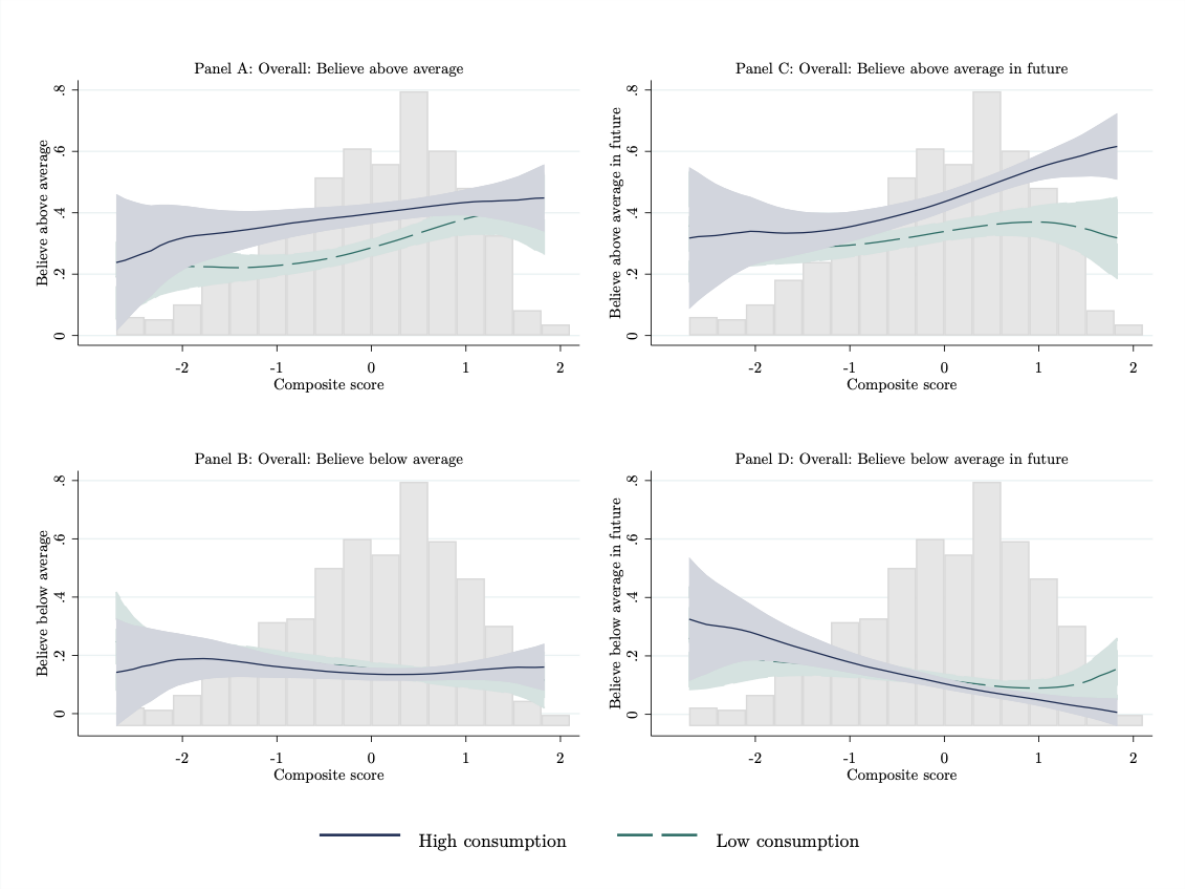


Figure 3: Ghana: Current and Future Beliefs by Consumption

Note: This figure shows local linear regressions of parental current beliefs (panels A and B) and future beliefs (panels C and D) on standardized composite scores, separately for high and low consumption households. Lightly shaded areas represent 95% confidence intervals. Grey bars depict the distribution of standardized composite scores. Data are from the Ghana Socioeconomic Panel Survey (GSPS).

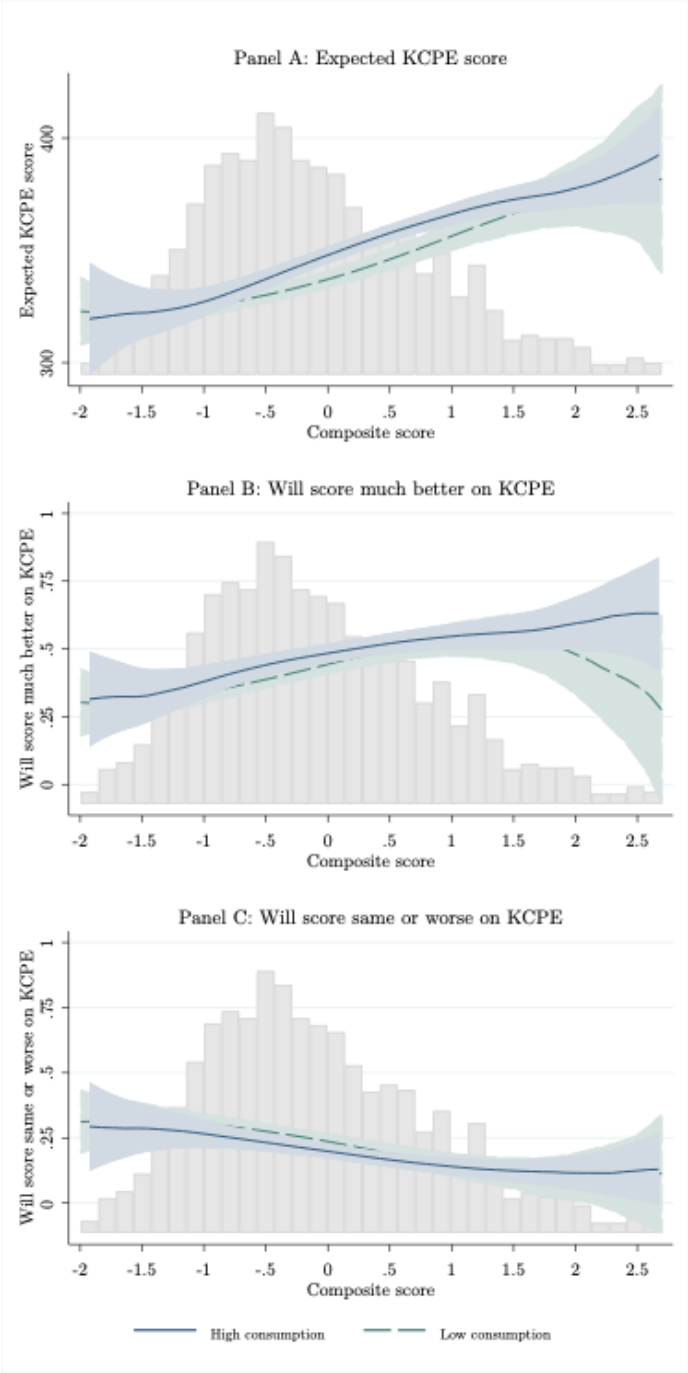


Figure 4: Kenya: Future Beliefs by Consumption

Note: This figure shows local linear regressions of parental expectations of children's future KCPE score (panel A), whether the child will score much better on the KCPE compared to peers (panel B), and whether the child will score the same or worse on the KCPE compared to peers (panel C) on standardized composite scores, separately for high and low consumption households. Lightly shaded areas represent 95% confidence intervals. Grey bars depict the distribution of standardized composite scores. Data are from the Kenya Life Panel Survey (KLPS).

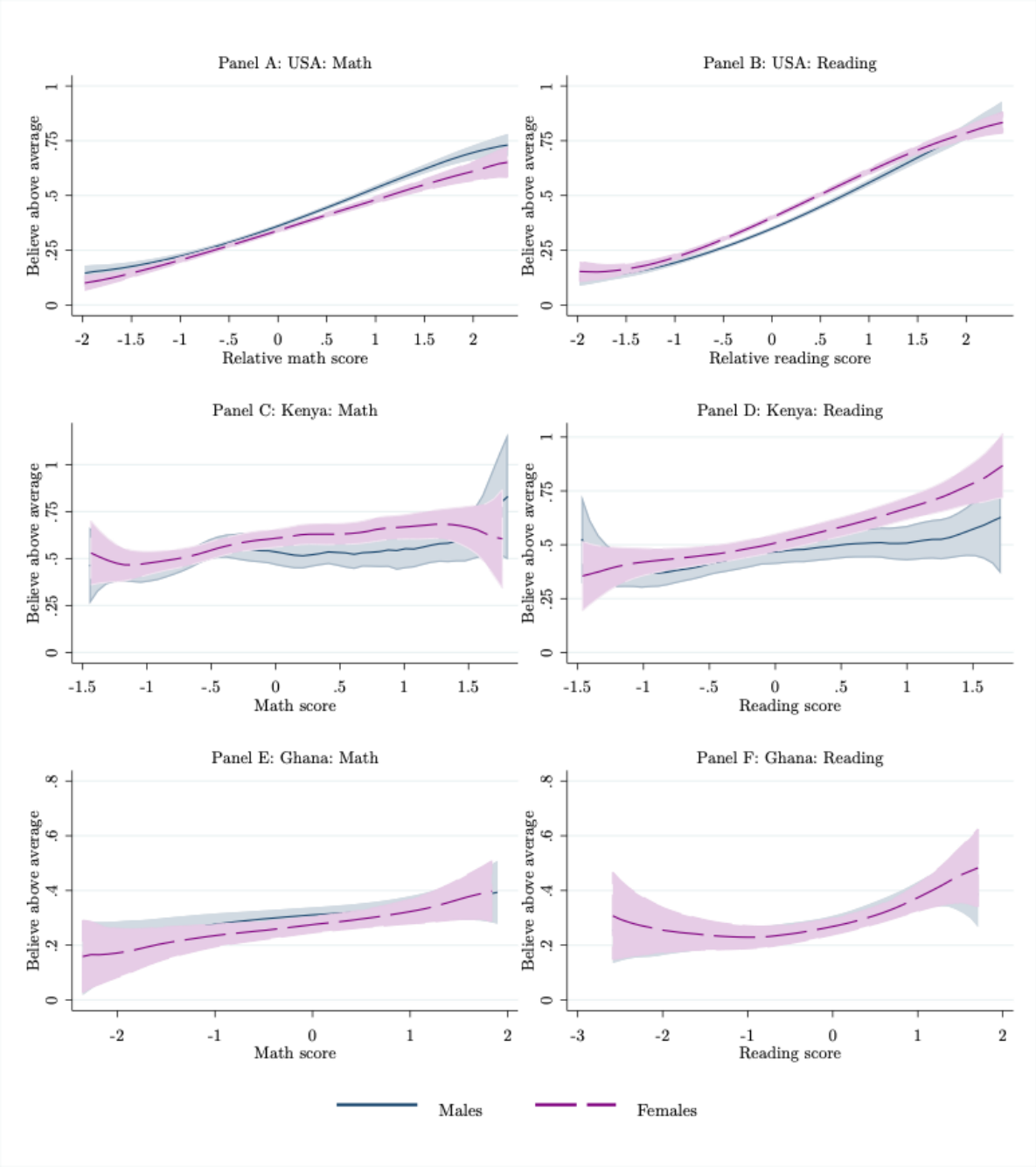


Figure 5: USA, Kenya, and Ghana: Subject-Specific Beliefs by Gender

Note: This figure shows local linear regressions of whether parents believe their children are above average in math or reading on relative (USA) or absolute (Kenya, Ghana) performance in that same subject, separately for male and female children. Lightly shaded areas represent 95% confidence intervals. Data in panels A and B are from the Early Childhood Longitudinal Study, Kindergarten (ECLS-K), data in panels C and D are from the Kenya Life Panel Survey (KLPS), and data in panels E and F are from the Ghana Socioeconomic Panel Survey (GSPS).

Appendix Tables

Appendix Table A1: Summary Statistics

	India (IHDS)			Kenya (KLPS)			Ghana (GSPS))			USA (ECLS-K)		
	Mean	SD	N	Mean	SD	N	Mean	SD	N	Mean	SD	N
Panel A: Child characteristics & parental beliefs	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)
Child age in years	9.50	1.06	22,726	5.67	1.71	2,401	12.69	2.50	2,291	6.68	1.48	44,151
Child female	0.48	0.50	22,726	0.51	0.50	2,401	0.46	0.50	2,291	0.49	0.50	44,198
Believe above average	0.12	0.33	22,726	0.26	0.44	2,401	0.36	0.48	2,280	0.32	0.47	44,198
Believe average	0.72	0.45	22,726	0.65	0.48	2,401	0.49	0.50	2,280	0.59	0.49	44,198
Believe below average	0.16	0.37	22,726	0.09	0.28	2,401	0.14	0.35	2,280	0.09	0.29	44,198
Future above average	.	.	0	0.78	0.42	2,249	0.43	0.50	2,282	.	.	0
Panel B: Household and caregiver characteristics	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)
Total consumption/income (2017 USD PPP)	6,451	5,137	18,861	6,527	5,621	1,670	39,414	31,138	1,338	76,328	72,232	44,198
Consumption/income per capita (2017 USD PPP)	1,071	822	18,861	1,706	1,633	1,670	7,240	4,349	1,338	18,017	17,187	44,198
Household size	6.38	2.58	18,908	4.69	2.04	1,684	5.28	1.93	1,367	4.54	1.38	44,198
Average parent education in years	5.64	4.55	18,495	9.71	2.99	1,891	5.87	4.20	1,330	13.00	2.31	43,940
Urban	0.26	0.44	18,908	0.55	0.50	1,681	0.41	0.49	1,234	0.79	0.41	43,753
SCST	0.31	0.46	18,908	.	.	0	.	.	0	.	.	0
White	.	.	0	.	.	0	.	.	0	0.58	0.49	44,165
Black	.	.	0	.	.	0	.	.	0	0.16	0.36	44,165
Other	.	.	0	.	.	0	.	.	0	0.26	0.44	44,165
Depressed	.	.	0	0.37	0.48	1,893	0.16	0.37	1,130	0.11	0.32	12,300

Table presents summary statistics for key variables at the child level (in Panel A) and at the household level (in Panel B).

Appendix Table A2: Socioeconomic Status, Caste, Race, and Parental Beliefs

	Current: Believe above average		Current: Believe below average	
	India (IHDS)	USA (ECLS-K)	India (IHDS)	USA (ECLS-K)
	(1)	(2)	(3)	(4)
Log consumption or income	0.04***	0.01*	-0.03***	-0.02***
	(0.01)	(0.00)	(0.01)	(0.00)
Log consumption or income × SCST	-0.03***		-0.02	
	(0.01)		(0.02)	
Log consumption or income × Black		-0.00		-0.00
		(0.01)		(0.01)
Fixed effects	Village	School	Village	School
Observations	22726	44198	22726	44198

India: Includes the same set of controls, weights, and clustered standard errors as Table 1. All controls fully interacted with an indicator for belonging to a Scheduled Caste or Scheduled Tribe (columns (1) and (3)). **USA:** Includes the same set of controls, weights, and clustered standard errors as Table 1. All controls fully interacted with and indicator for whether the child is black (columns (2) and (4)).

Appendix Table A3: Socioeconomic Status and Parental Beliefs: Robustness

	India (IHDS)					Kenya (KLPS)			Ghana (GSPS)			USA (ECLS-K)			
	Main result	Log income	Below poverty line	Raw scores	Relative scores	Main result	Log income	KLPS parent caregiver	Main result	Raw scores	Ages 15 and below	Main result	Below poverty line	Raw scores	Relative scores
Panel A: Believe above average	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)	(15)
Composite or relative or raw score	0.03***	0.04***	0.04***	0.12***	0.02***	0.06***	0.06***	0.07***	0.05***	0.25***	0.05***	0.17***	0.17***	0.00***	0.17***
	(0.00)	(0.00)	(0.00)	(0.01)	(0.00)	(0.01)	(0.01)	(0.02)	(0.01)	(0.06)	(0.02)	(0.00)	(0.00)	(0.00)	(0.00)
Log consumption or income	0.04***	0.01***		0.04***	0.04***	0.00	0.01*	0.02	0.04	0.04	0.05	0.01*		0.01**	0.01*
	(0.01)	(0.00)		(0.01)	(0.01)	(0.02)	(0.01)	(0.02)	(0.03)	(0.03)	(0.03)	(0.00)		(0.00)	(0.00)
Below poverty line			-0.01**										0.01		
			(0.01)										(0.01)		
Parent education in years	0.00***	0.01***	0.01***	0.00***	0.01***	0.00	0.00	0.01	0.01*	0.01	0.01	0.01***	0.01***	0.01***	0.01***
	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.01)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)
Panel B: Believe below average	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)	(15)
Composite or relative or raw score	-0.09***	-0.09***	-0.09***	-0.29***	-0.06***	-0.04***	-0.04***	-0.02**	-0.01	-0.06	-0.01	-0.07***	-0.07***	-0.00***	-0.07***
	(0.00)	(0.00)	(0.00)	(0.01)	(0.00)	(0.01)	(0.01)	(0.01)	(0.01)	(0.05)	(0.01)	(0.00)	(0.00)	(0.00)	(0.00)
Log consumption or income	-0.03***	-0.00		-0.03***	-0.04***	0.00	-0.00	-0.00	0.01	0.01	0.03	-0.02***		-0.02***	-0.02***
	(0.01)	(0.00)		(0.01)	(0.01)	(0.01)	(0.01)	(0.01)	(0.02)	(0.02)	(0.02)	(0.00)		(0.00)	(0.00)
Below poverty line			0.05***										0.03***		
			(0.01)										(0.01)		
Parent education in years	-0.00***	-0.00***	-0.00***	-0.00***	-0.01***	-0.00	-0.00	-0.01*	-0.01**	-0.01**	-0.01***	-0.00***	-0.00***	-0.00***	-0.00***
	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)
Fixed effects	Village	Village	Village	Village	Village	County	County	County	District	District	District	School	School	School	School
Observations	22726	22726	22726	22726	22726	2401	2401	1472	2280	2280	1891	44198	44198	44198	44198
Panel C: Future above average	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)	(15)
Composite or relative or raw score						0.08***	0.08***	0.09***	0.08***	0.40***	0.07***				
						(0.01)	(0.01)	(0.02)	(0.02)	(0.06)	(0.02)				
Log consumption or income						0.05**	0.02**	0.03	0.07***	0.06**	0.10***				
						(0.02)	(0.01)	(0.03)	(0.03)	(0.03)	(0.03)				
Parent education in years						0.00	0.00	0.01*	0.02***	0.01***	0.02***				
						(0.00)	(0.00)	(0.01)	(0.00)	(0.00)	(0.00)				
Fixed effects						County	County	County	District	District	District				
Observations	22726	22726	22726	22726	22726	2249	2249	1382	2282	2282	1892				

Regressions include the same set of controls, weights, and clustered standard errors as Table 1, with differences as noted. **India:** Column (1) replicates the main result. In column (2), regression includes log per capita income instead of log per capita consumption. In column (3), regression includes an indicator for below poverty line instead of log per capita consumption. In column (4), regression controls for raw scores instead of standardized composite scores. In column (5), regression controls for relative scores instead of standardized composite scores. **Kenya:** Column (6) replicates the main result. In column (7), regression controls for log per capita income instead of log per capita consumption. In column (8), regression restricts to cases where the child's primary caregiver is the KLPS parent. **Ghana:** Column (9) replicates the main result. In column (10), regression controls for raw scores instead of standardized composite scores. In column (11), regression restricts to children age 15 and below. **USA:** Column (12) replicates the main result. In column (13), regression includes an indicator for below poverty line instead of log per capita income. In column (14), regression controls for raw scores instead of standardized composite scores. In column (15), regression controls for relative scores instead of standardized composite scores.

Appendix Table A4: Socioeconomic Status and Parental Beliefs: Accuracy

	Accurate			Error	Absolute Error	Overestimate			Underestimate		
	India (IHDS)	Kenya (KLPS)	USA (ECLS-K)	Ghana (GSPS)	Ghana (GSPS)	India (IHDS)	Kenya (KLPS)	USA (ECLS-K)	India (IHDS)	Kenya (KLPS)	USA (ECLS-K)
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)
Log consumption or income	-0.00	0.02	0.01*	0.05	0.09	0.03***	-0.02	0.01	-0.03***	0.01	-0.01***
	(0.01)	(0.02)	(0.00)	(0.15)	(0.11)	(0.01)	(0.02)	(0.00)	(0.01)	(0.01)	(0.00)
Parent education in years	-0.00	0.01	-0.00*	0.05**	0.03**	0.00***	0.00	0.01***	-0.00***	-0.01***	-0.01***
	(0.00)	(0.00)	(0.00)	(0.02)	(0.02)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)
Fixed effects	Village	County	School	District	District	Village	County	School	Village	County	School
Observations	22726	2401	44198	2280	2280	22726	2401	44198	22726	2401	44198

All regressions include the same set of controls, fixed effects, weighting approach, and clustering of standard errors as Table 1. Overestimate is an indicator for believing child is above average when the child scores less than one standard deviation above the mean, or believing the child is average when the child scores less than one standard deviation below the mean. Underestimate is an indicator for believing child is below average when the child scores above one standard deviation below the mean, or believing the child is average when the child scores above one standard deviation above the mean. Accurate is an indicator for believing the child is above average when the child scores one standard deviation above the mean, believing the child is average when the child scores within one standard deviation of the mean, or believing the child is below average when the child scores below one standard deviation below the mean.

Appendix Table A5: Socioeconomic Status, Gender, and Parental Beliefs

	Current: Believe above average				Future: Above average		Current: Believe below average			
	India (IHDS)	Kenya (KLPS)	Ghana (GSPS)	USA (ECLS-K)	Kenya (KLPS)	Ghana (GSPS)	India (IHDS)	Kenya (KLPS)	Ghana (GSPS)	USA (ECLS-K)
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
Log consumption or income	0.03***	-0.03	0.05	0.01***	0.08***	0.06*	-0.02**	0.00	0.01	-0.03***
	(0.01)	(0.02)	(0.03)	(0.00)	(0.03)	(0.03)	(0.01)	(0.02)	(0.02)	(0.00)
Log consumption or income × Child female	0.02*	0.06**	0.00	-0.01*	-0.06	0.05	-0.01	0.00	0.00	0.01**
	(0.01)	(0.03)	(0.05)	(0.01)	(0.04)	(0.04)	(0.01)	(0.02)	(0.03)	(0.00)
Fixed effects	Village	County	District	School	County	District	Village	County	District	School
Observations	22726	2401	2280	44198	2249	2282	22726	2401	2280	44198

All regressions include the same set of controls, weighting approach, and clustered standard errors as Table 1. All controls fully interacted with female indicator.

Appendix Table A6: Parental Beliefs and Investments

	Current schooling					Future schooling	
Panel A: India (IHDS)	Educational spending (%) (1)	Educational time last week (minutes) (2)	Attends private school (3)	Absence last 30 days (4)	Any tutoring (5)	Any secondary school (6)	Science or tech track (7)
Believe above average	2.35***	48.34**	0.06***	-0.05	0.05***	0.02	0.07***
	(0.56)	(22.22)	(0.01)	(0.15)	(0.01)	(0.02)	(0.02)
Believe below average	-1.71***	-47.27**	-0.05***	0.73***	-0.00	-0.07***	0.01
	(0.48)	(18.88)	(0.01)	(0.19)	(0.01)	(0.02)	(0.01)
Wave	1 & 2	1 & 2	1 & 2	1 & 2	1 & 2	1	1 & 2
Mean	13.62	2475.61	0.35	3.81	0.21	0.59	0.13
Observations	22372	20967	22469	21906	21142	8623	8492

	Schooling				Home environment		
Panel B: Kenya (KLPS)	Schooling cost last month (1)	Educational time last day (minutes) (2)	Attends private school (3)	Days attended last week (4)	Total books at home (5)	Play materials in home (6)	Play activities with caregiver (7)
Believe above average	172.37**	9.41	0.02	-0.11	0.91	0.13*	0.28
	(86.79)	(8.57)	(0.03)	(0.09)	(0.62)	(0.08)	(0.17)
Believe below average	-150.66**	-27.35**	-0.07	-0.33**	0.98	-0.39***	-0.72***
	(59.65)	(11.72)	(0.04)	(0.17)	(0.91)	(0.13)	(0.23)
Ages	5-8	3-8	3-8	5-8	3-8	3-8	3-8
Mean	810.76	459.14	0.45	3.69	6.76	5.13	4.16
Observations	2011	2061	2011	2400	2400	2399	2401

	Schooling			
Panel C: Ghana (GSPS)	Educational spending (%) (1)	Educational time last week (minutes) (2)	Attends private school (3)	Any absence last week (4)
Believe above average	0.89*	204.29**	0.05*	-0.05**
	(0.46)	(84.78)	(0.03)	(0.02)
Believe below average	0.92	47.63	0.04	0.03
	(0.58)	(87.07)	(0.03)	(0.04)
Ages	9-18	9-18	9-18	9-18
Mean	5.60	1668.72	0.25	0.10
Observations	2068	1307	2280	1300

	Homework and schooling		Home environment				
Panel D: USA (ECLS-K)	Days doing homework (1)	Any tutoring (2)	Number childrens books (3)	Reads together daily (4)	Any outings (5)	Any regular activities (6)	Parental engagement index (7)
Believe above average	-0.02	-0.02***	7.31***	0.04***	0.20***	0.03***	0.03***
	(0.02)	(0.01)	(1.05)	(0.01)	(0.01)	(0.01)	(0.01)
Believe below average	-0.01	0.10***	0.86	-0.01	-0.14***	-0.01	-0.04***
	(0.04)	(0.01)	(1.60)	(0.01)	(0.02)	(0.02)	(0.01)
Grades	1,3	1,3	K,1,3	K,1,3	K,1,3	3	1,3
Mean	3.70	0.13	88.46	0.38	0.01	0.77	0.74
Observations	27049	27052	43686	44187	44196	12300	27067

All regressions include the same set of controls, weights, and clustered standard errors as Table 1, along with indicators for whether the parent believes the child is above average or below average. **India:** Educational spending in column (1) expressed as a percent of log per capita household consumption. Future schooling investments in columns (6) and (7) are collected in wave 2 for children surveyed in wave 1. **Kenya:** Schooling cost last month in column (1) is in Kenyan Shillings. Play materials at home in column (6) is the sum of indicators for the presence of 6 sources of play materials: (1) homemade toys, (2) manufactured toys, (3) music player or radio, (4) musical instruments, (5) paper and pen or art supplies, (6) any children's books and indicators for (7) whether the child plays games of strategy, and (8) whether the child makes toys. Play activities in column (7) is the sum of indicators over 12 possible activities the caregiver and child participate in: (1) reading books, (2) telling stories, (3) singing songs, (4) playing, (5) constructing objects or art, (6) naming, counting, or drawing things, (7) helping the child with homework, (8) talking about what the child learned in school, (9) teaching vocabulary words in English or Swahili, (10) teaching vocabulary words in a local language, (11) playing sports or other physical activities, (12) taking the child on a fun outing. **Ghana:** Educational spending in column (1) is expressed as a percent of log per capita household consumption. **USA:** Number of children's books in column (3) is winsorized at the 99th percentile. Any outings in column (3) is an indicator for taking the child on any of the following outings within the last month: (1) to a play, concert, or live show, (2) to an art gallery, museum, or historical site, (3) to a zoo, acquarium, or petting farm, (4) to an athletic or sporting event. Any regular activities in column (4) is an indicator for whether the child regularly participates in any activity such as dance lessons, sports, organized clubs, music lessons, art classes, or performing arts programs. The parental engagement index in column (7) is an index standardized within grade consisting of the frequency parents and children engage in any of the following activities together: (1) telling stories, (2) singing songs, (3) arts and crafts, (4) involving the child in household chores, (5) playing games or doing puzzles, (6) talking about nature or doing science projects, (7) building something or playing with construction toys, (8) playing a sport or exercising together, (9) reading, writing, or working with numbers. Days doing homework in column (6) is over the last week.

Appendix Table A7: Parental Beliefs and Future Expectations

	Ghana (GSPS)		USA (ECLS-K)	
	Parent expects secondary school likely	Child expects secondary school likely	Parent expects college	Parent expects more than college
	(1)	(2)	(3)	(4)
Believe above average	0.08***	0.06**	0.07***	0.09***
	(0.03)	(0.03)	(0.01)	(0.01)
Believe below average	-0.05	-0.09**	-0.12***	-0.04***
	(0.04)	(0.04)	(0.01)	(0.01)
Composite score	0.05***	0.07***	0.04***	0.02***
	(0.01)	(0.01)	(0.00)	(0.00)
Fixed effects	District	District	School	School
Mean	0.54	0.53	0.74	0.26
R^2	0.27	0.25	0.28	0.22
Observations	2264	2238	44005	44005

All regressions include the same set of controls, weights, and clustered standard errors as Table 1, along with indicators for whether the parent believes the child is above average or below average.

Appendix Table A8: Parental Beliefs and Child Academic Self-Concept

	Child Self-Beliefs				Child Academic Self-Concept				
	Ghana (ECLS-K)				USA (ECLS-K)				
	Believe above: Math		Believe above: Reading		Overall	Math		Reading	
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
Believe above average in same subject (or overall)	0.39***		0.39***		0.15***	0.26***		0.18***	
	(0.03)		(0.03)		(0.02)	(0.02)		(0.02)	
Believe above average in other subject		0.34***		0.36***			0.06***		0.05**
		(0.03)		(0.03)			(0.02)		(0.02)
Child female	0.01	0.00	0.02	0.03	0.05***	-0.10***	-0.12***	0.08***	0.09***
	(0.02)	(0.02)	(0.02)	(0.02)	(0.02)	(0.02)	(0.02)	(0.02)	(0.02)
Sample	Ages 9-18	Ages 9-18	Ages 9-18	Ages 9-18	Grade 3	Grade 3	Grade 3	Grade 3	Grade 3
Fixed effects	District	District	District	District	School	School	School	School	School
Mean	0.38	0.38	0.37	0.37	2.93	3.13	3.13	3.27	3.27
Observations	2260	2256	2251	2255	12287	12103	12095	12095	12103

All regressions include the same set of controls, weights, and clustered standard errors as Table 1, along with indicators for whether the parent believes the child is above average overall, in the same subject, or in the other subject, as noted. (For self-beliefs or academic self-concept in math (reading), believe above average in same subject refers to parental beliefs in math (reading), while other subject refers to parental beliefs in reading (math).) USA sample includes observations in grade 3.

Appendix Table A9: Access to Information and Salience of Socioeconomic Status

	Access to Information						Salience of Socioeconomic Status			
	Receives info about child		Confident knows child ability		Accurate beliefs		External factors more important		Own choices, actions, effort determine outcomes	
Panel A: Kenya (KLPS)	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
Log consumption or income	-0.00		-0.01		0.02		-0.05***		-0.01	
	(0.02)		(0.02)		(0.02)		(0.02)		(0.02)	
Parent education in years	0.01***		0.01***		0.01		0.00		0.01***	
	(0.00)		(0.00)		(0.00)		(0.00)		(0.00)	
Deworming treatment		0.08**		0.03		0.06*		-0.01		0.04
		(0.04)		(0.03)		(0.03)		(0.03)		(0.03)
Fixed effects	County	County	County	County	County	County	County	County	County	County
Mean	0.71	0.68	0.75	0.74	0.54	0.52	0.22	0.22	0.83	0.83
Observations	2401	1786	2401	1786	2401	1786	2401	1786	2401	1786

	Access to Information	Salience of Socioeconomic Status			Beliefs			
	Adequate information	Confidence in resources	Education quality high	Optimistic future	Believe above average	Believe below average	Future above average	Future below average
Panel B: India (Pilot Activity)	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
SES salience treatment	0.02	-0.11**	-0.03	0.01	-0.04	-0.05	0.05	-0.04
	(0.05)	(0.05)	(0.05)	(0.05)	(0.05)	(0.03)	(0.04)	(0.03)
Encouragement message treatment	0.10*	0.01		-0.01	0.01	-0.07*	0.04	-0.06**
	(0.05)	(0.05)		(0.05)	(0.05)	(0.03)	(0.05)	(0.03)
Control Mean	0.45	0.40	0.41	0.71	0.49	0.15	0.71	0.08
Observations	856	893	675	826	987	987	938	938

Regressions in columns (1), (3), (5), (7), and (9) of Panel A include the same controls, fixed effects, weighting approach, and clustering of standard errors as Table 1, omitting composite performance. Regressions in columns (2), (4), (6), (8), and (10) or Panel A restrict to children of deworming treatment participants, and include the same controls, weighting approach, and clustering of standard errors as Table 5. Regressions in Panel B restrict to pilot respondents who completed any of the survey. Outcomes in columns (1)-(8) correspond to survey questions described in Table SA5. Includes controls for two other treatment arms (coefficients not displayed) and an indicator for whether part of a cross-cutting program (RM group).

Appendix Table A10: Summary Statistics: Psychological Factors

	Kenya (KLPS)				USA (ECLS-K)			
	Overall mean	High cons mean	Low cons mean	P-value difference	Overall mean	High income mean	Low income mean	P-value difference
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Depression score (0 to 30)	7.82	7.41	8.12	0.01	5.06	4.14	6.24	0.00
	[5.54]	[5.50]	[5.43]		[5.73]	[4.55]	[6.774]	
	1881	793	864		32354	18172	14182	
Depressed (10+)	0.35	0.33	0.37	0.08	0.11	0.07	0.16	0.00
	[0.48]	[0.47]	[0.48]		[0.31]	[0.25]	[0.371]	
	1881	793	864		32354	18172	14182	
Stress (0 to 16)	7.19	6.89	7.30	0.04	.	.	.	.
	[3.19]	[3.21]	[3.18]		[.]	[.]	[.]	
	1165	446	595		.	.	.	
Self efficacy (10 to 40)	33.76	34.58	33.21	0.00	.	.	.	.
	[5.12]	[4.53]	[5.38]		[.]	[.]	[.]	
	1150	442	589		.	.	.	
Hopefulness (personal) (0 to 1)	0.60	0.66	0.57	0.01	.	.	.	.
	[0.49]	[0.47]	[0.50]		[.]	[.]	[.]	
	849	311	443		.	.	.	
Hopefulness (Kenya) (0 to 1)	0.38	0.38	0.37	0.86	.	.	.	.
	[0.48]	[0.49]	[0.48]		[.]	[.]	[.]	
	847	310	442		.	.	.	

This table presents means for each of the parental traits of interest within the samples from Kenya and the USA. Means are presented for the full samples (in columns (1) and (5)) and separately for high and low consumption (columns (2) and (3)) or high and low income (columns (6) and (7)) households. Standard deviations are reported in brackets with observation counts below the means. The unit of observation are parents (who provide care for one or two children). P-values from a test of equality of means are in columns (4) and (8).

Appendix Table A11: Psychological Factors and Parental Beliefs

	Kenya (KLPS)				USA (ECLS-K)		
	Current beliefs			Future beliefs	Current beliefs		
	Believe above average	Believe average	Believe below average	Future above average	Believe above average	Believe average	Believe below average
	(1)	(2)	(3)	(4)	(5)	(6)	(7)
Depression	0.02*	-0.02**	0.00	-0.03***	0.00	-0.02***	0.01***
	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)	(0.00)
Stress	-0.00	-0.01	0.01	-0.05***			
	(0.01)	(0.02)	(0.01)	(0.02)			
Self-efficacy	0.03**	-0.00	-0.03**	0.06***			
	(0.01)	(0.02)	(0.01)	(0.01)			
Hopefulness (personal)	0.06*	0.02	-0.08***	0.08**			
	(0.03)	(0.03)	(0.02)	(0.04)			
Hopefulness (Kenya)	0.05	0.00	-0.05***	0.09**			
	(0.03)	(0.04)	(0.02)	(0.04)			
Fixed effects	County	County	County	County	School	School	School
Mean	0.26	0.67	0.07	0.46	0.33	0.56	0.11
Observations (depression)	2401	2401	2401	2249			
Observations (others)	1472	1472	1472	1382	12300	12300	12300

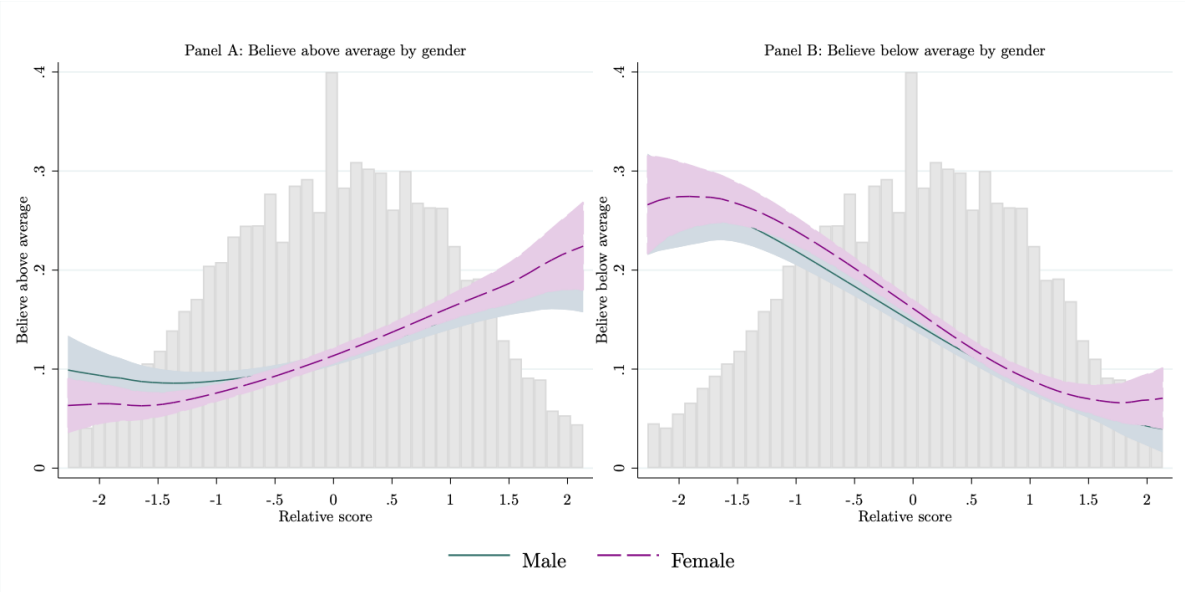
Each row represents a separate regression of the dependent variable on the parent psychological measure listed in the row (with the corresponding coefficient displayed), an indicator for missing parent psychological measure, and child controls. All parent characteristics are measures based on the scales described in the Table A10, here standardized to be mean zero with standard deviation of one. **Kenya:** Child controls include standardized scores, and indicators for female, oldest child status, and age. Includes county fixed effects. Includes appropriate weights to ensure representativeness of the original population. Standard errors clustered by household. **USA:** Child controls include standardized scores, and indicators for female, oldest child status, and grade. Includes school fixed effects. Uses appropriate sampling weights. Standard errors are clustered by child.

Appendix Table A12: Kenya: Parental Beliefs Questions

1	Is/was ... an average student, better than average, or below average? (If child has never been enrolled in school: Is ... average, better than average, or below average in terms of their learning and development?) Options: Below average, average, above average
2a	Now please think about other children of the same age in neighborhoods similar to your neighborhood in all of your county. How does your child's ability in math/reading/overall compare to other children of the same age in similar neighborhoods in your county?
2b	Now think about other children of the same age in all of your neighborhood. How does your child's academic ability in math/reading/overall compare to other children of the same age in your neighborhood?
2c	Please think about other children of the same age in neighborhoods similar to your neighborhood in all of your county in households with a similar financial situation as your household. How does your child's ability in math/reading/overall compare to other children of the same age in households with a similar financial situation in similar neighborhoods in your county?
2d	Compared to other children in your child's class, how well do you think your child is doing in school in math, reading, and overall? Do you think he/she is doing: Options: Much worse, a little worse, about the same, a little better, much better
3	When it comes time for your child to take the KCPE/PLE, he/she will receive a total score across all subjects. Please take a moment to think about how your child will perform when he/she takes the exam in the future based on what you know about his/her ability. Now think about how other children of the same age in neighborhoods similar to your neighborhood in all of your county will perform. How do you think your child will score compared to other children of the same age in similar neighborhoods in your county? Options: Much worse, a little worse, about the same, a little better, much better
4	Out of a minimum of 0 and a maximum of 500, what score do you think your child will most likely earn based on his/her ability? (For respondents in Uganda, out of a minimum of 0 and a maximum of 34 points, what score do you think your child will most likely earn in the PLE based on his/her ability?) Please make your best guess.
	Please indicate your level of agreement with the following:
5a	I feel confident that I understand my child's ability.
5b	I feel confident that I know how my child's ability compares to other children of the same age in my county.
5c	I receive information about my child's general abilities or how my child does in school from teachers, school representatives, or other adults in my community.
5d	My choices, actions, and effort as a parent/caregiver will determine how my child will do in school and in life.
6	Please tell me which statement is closest to your view. Please choose Statement A or B. Options: Agree very strongly with A, agree with A, agree with B, agree very strongly with B, agree with neither A. My child's ability and effort will determine how well he/she will do in school and life. B. External factors such as the quality of my child's school will determine how well he/she will do in school and in life.

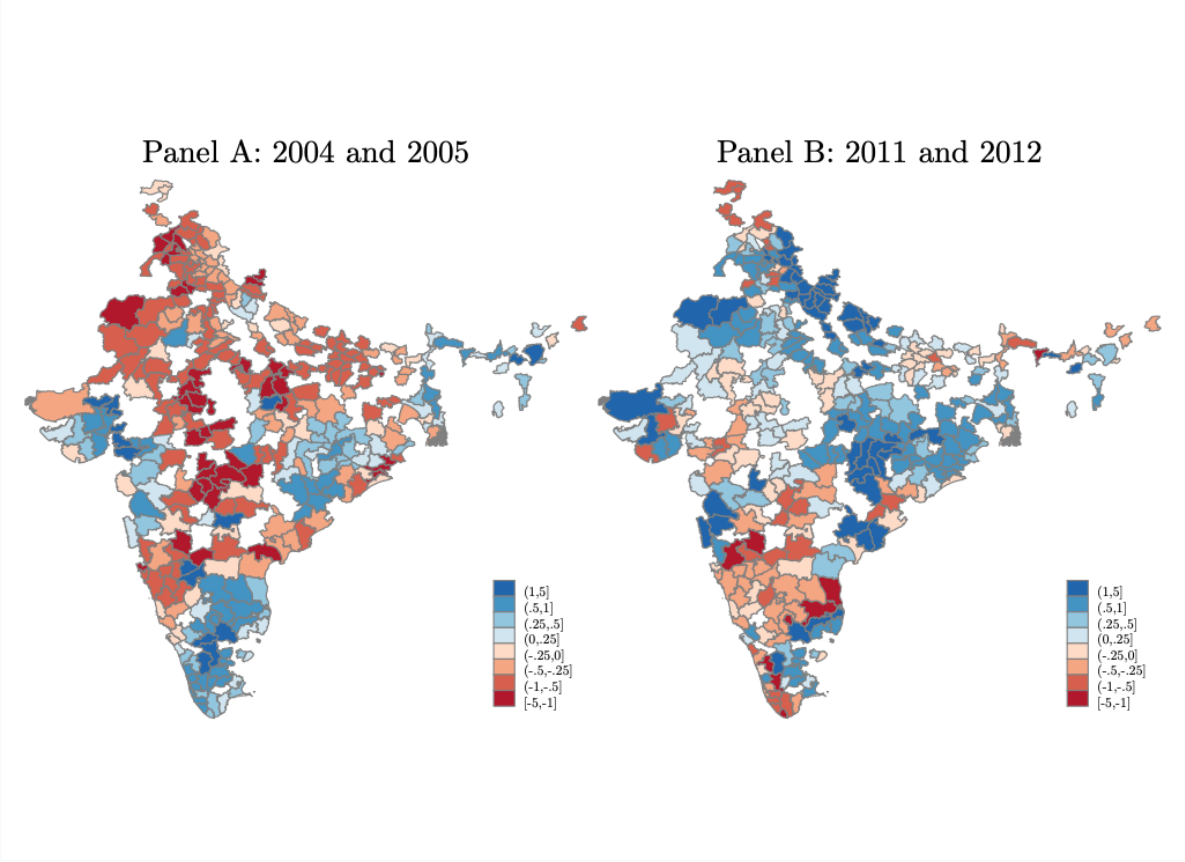
Note that questions eliciting beliefs with respect to a specific reference group (2) or about future performance (3,4) were only asked of parents of school-going children.

Appendix Figures



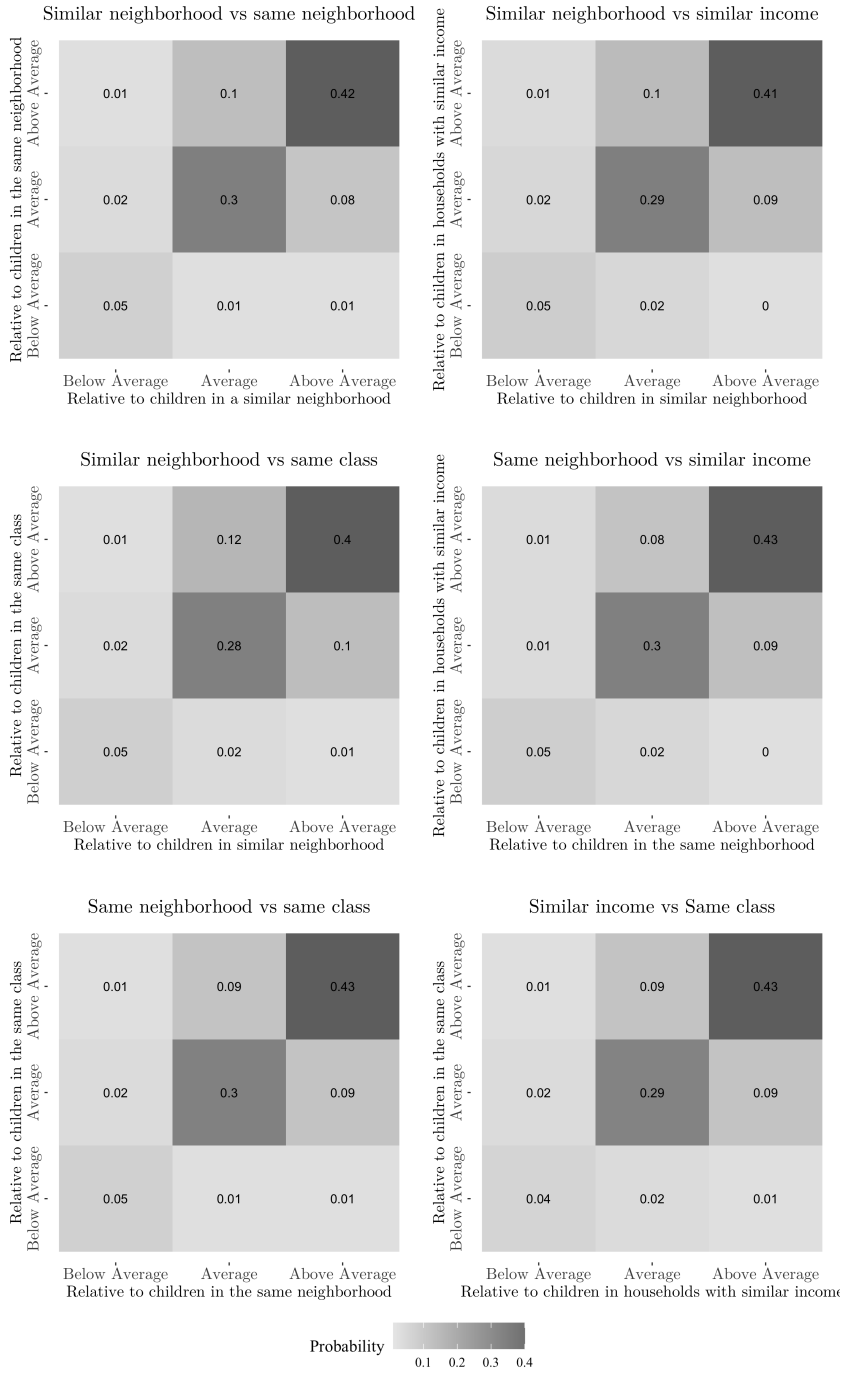
Appendix Figure A1: India: Parental Beliefs by Gender

Note: This figure shows local linear regressions of parental beliefs on relative scores, separately for male and female children. Lightly shaded areas represent 95% confidence intervals. Grey bars depict the distribution of relative scores. Relative scores are computed as the child's own score minus the average score within the same village and age. Data are from the India Human Development Survey (IHDS).



Appendix Figure A2: India: Distribution of Normalized Rainfall Deviations

Note: This figure shows how rainfall deviations in rainfall years corresponding to 2004-2005 and 2011-2012 varies across districts observed in the IHDS data. Normalized deviations are measured as deviations of recent rainfall from historical averages divided by the standard deviation of historical rainfall. Data are from the Center for Climatic Research at the University of Delaware.



Appendix Figure A3: Beliefs responses across different specified reference groups

Note: This figure compares responses across each of the different reference group questions ("how does your child's overall ability compare to other children of the same age in ... ?"). Numbers and shading represent the probability of responding in the equivalent categories across the two questions. Data are from the Kenya Life Panel Survey (KLPS).

A Data and Measurement

A.1 USA: Alternative samples

The primary sample used for this analysis is the "full sample," as described in the main sample. Alternative samples include the "panel sample" and the "base year sample," each described below:

Panel sample: There was considerable attrition across rounds, with over 4,400 children observed in kindergarten leaving the sample by spring of first grade and over 3,400 additional children leaving the sample by spring of third grade. Attrition picks up after third grade and so fifth grade and eighth grade are not included in the sample, even though test scores and overall parental beliefs are collected in those grades. Close to 7,000 of the children observed in the fall of kindergarten are not observed in fifth grade, and over 8,000 of the children observed in the fall of kindergarten are not observed in eighth grade. The primary results are robust to excluding those children who attrit over time (and so restricting to only those children observed in all of the relevant rounds). I refer to this alternate sample as the "panel sample."

Base year sample: Over 2,000 children enter the sample in spring of first grade or spring of third grade, in one of three ways. First, many non-respondents during the fall of kindergarten were converted to respondents by the spring of kindergarten. Second, a small number children (among them, those who were not enrolled for kindergarten in the previous year and so were not present in the kindergarten sample) were deliberately added to the sample in time for first grade using a "freshening procedure." Finally, a small number of children not observed in the spring of first grade were again observed in spring of third grade. The primary results are robust to excluding children added to the sample over time and instead focusing on children present in at least kindergarten (for the analysis involving kindergarten, first grade, and third grade) or at least first grade (for the analysis involving first grade and third grade). This sample selection is similar to other research using this dataset, for example Kinsler and Pavan (2021). I refer to this alternate sample as the "base year sample."

Information on the number of children observed with corresponding test scores and parental beliefs available in each round are presented in the following table.

Sample	Description	K Fall	1st Spring	3rd Spring
Full sample	Observed in any of K, 1, 3	17,131	14,767	12,300
Base year sample	Observed in at least K	17,131	12,698	10,521
	Observed in at least 1		14,444	11,081
Panel sample	Observed in all of K, 1, 3	9,854	9,854	9,854
	Observed in both of 1, 3		11,081	11,081
Other	Attrited this round		4,433	3,425
	Entered this round		2,069	291
	Returned this round			667

A.2 Kenya: Measurement of Parental Beliefs

A.2.1 Comparing responses across three-option and five-option questions

Comparing responses from the no reference group question to any of the specific reference group questions requires calibrating these to the same scale. The former allows three possible responses (average, above average, below average) while the latter allows five (much worse, a little worse, about the same, a little better, and much better). One intuitive grouping would be to consider "about the same" as equivalent to "average," "much worse" and "a little worse" as equivalent to "below average," and "a little better" and "much better" equivalent to "above average." Panel A of Figure SA1 makes clear that this makes for a poor alignment across the the no reference group question and the specific reference group questions (using "relative to children in the same neighborhood overall" to illustrate). Instead, when "a little better" is considered equivalent to "average," the three-option and five-option scales look remarkably similarly distributed, as shown in Panel B of Figure SA1.

Given this, when using when using responses to a five-option question (for example, subject-specific beliefs), "much better" equates to "above average," "about the same" or "a little better" equate to "average," and "a little worse" or "much worse" equate to "below average."

A.2.2 Analyzing parental beliefs reported based on different reference groups

Reported parental beliefs differ little when given no reference group or when prompted to think about a specific reference group, as shown in Figure SA2.

Further, no household characteristics systematically predict those cases where reported beliefs do shift based on the reference group specified. Table SA6 presents estimates corresponding to regressions where the "outcomes" of providing a different response between the no reference group and each of the specific reference group questions are regressed on a set of controls capturing household and child characteristics.

A.3 India: Measurement of Child Performance

In India, math and reading assessments are scored according to the following scale:

Math:	Level 0: Beginner (No recognition of double digit numbers)
	Level 1: Can recognize double digit numbers
	Level 2: Can solve subtraction problem
	Level 3: Can solve division problem
Reading:	Level 0: Beginner (No recognition of letters)
	Level 1: Can recognize letters
	Level 2: Can read words
	Level 3: Can read paragraph
	Level 4: Can read story

B Additional Results

B.1 USA: Household composition and subject-specific beliefs

This analysis first explores how the sibling gender composition relates to parental beliefs, then adopts an approach common in the literature to identify the causal impact of second born siblings of the opposite sex (relative to siblings of the same sex) on parental beliefs corresponding to first born children.

The first analysis estimates the following regression, separately for males and females and for different samples following the four approaches described below:

$$Beliefs_{igs} = \alpha + \pi OppositeSexSibling_i + \beta \widetilde{X}_i + \theta_g + \delta_s + \varepsilon_{igs} \tag{7}$$

All components are as before, only now $OppositeSexSibling_i$ indicates the presence of a male sibling for female children or the presence of a female sibling for male children. $\widetilde{X}_i^j$ excludes the female and first born indicators and includes subject-specific standardized scores.

The first approach restricts the sample to children with siblings of any kind, older or younger, following one of several strategies used in Oguzoglu and Ozbeklik (2016), Cools and Patacchini (2017) and Anelli and Peri (2015). The female-only regressions essentially compare beliefs across females with only sisters to females with at least one brother. Similarly, the male-only regressions compare beliefs across males with only brothers to those with at least one sister.

In the second approach, I restrict to younger children and explore how parental beliefs differ in the presence of opposite-sex older siblings, similar to another approach adopted in Anelli and Peri (2015). In the third approach, I do the reverse, restricting to older children and examining how beliefs differ in the presence of opposite-sex younger siblings.

I then leverage an approach common in the literature to explore how the presence of an opposite-sex sibling impacts parental beliefs, following Brenøe (2017), Peter et al. (2018), and Cools and Patacchini (2017). The first three approaches described above do not reflect the causal effect of opposite-sex siblings on parental beliefs, since fertility decisions may be influenced by the sex of existing siblings, leading to endogeneity in the sex composition of siblings. However, conditional on the decision to have (at least) a second child, the gender of that second child could be considered exogenous. This fourth approach thus focuses on first-born children and compares those with second-born siblings of the opposite sex to those with second-born siblings of the same sex.

The results from this analysis are presented in Table SA7, where the two rows within each panel present estimates of π for separate regressions with believe above average (top row) or believe below average (bottom row) as the dependent variable. Panel A shows that above-average overall beliefs are 2 percentage points higher for females with any brothers compared to females with only sisters (column 1), with no such differences for males (columns 2).

Turning to specific domains, we can see that math-specific beliefs are 2 percentage points higher for male children with a sister compared to male children with only brothers (column 4), and reading-specific beliefs are 2 percentage points higher for female children with a brother compared to those with only sisters (column 5). One interpretation of these findings

is that the presence of an opposite-sex sibling reinforces traditional gender-based norms: when male children have a sister, those male children are seen as more proficient in math, and when female children have a brother, those female children are seen as more proficient in reading. These findings could also reflect that families who make fertility decisions aiming for mix of sexes are more likely to hold these traditional domain-based beliefs. These relationships are tentative, however (only significant at the 10% level), and no apparent differences emerge with respect to below-average beliefs.

Comparing the results in panels B and C, these disparities appear strongest for younger siblings based on the sex composition of older siblings (that is, comparing those with older siblings of the opposite sex to those with older siblings of the same sex) and virtually disappear for older siblings based on the sex composition of younger siblings (comparing those with younger siblings of the opposite sex to those with only same-sex younger siblings). This perhaps makes sense, if the presence of older siblings tends to be more influential for shaping parental beliefs, or if some of the younger siblings are too young for any domain-specific gender-based biases to necessarily be relevant.[53]

Estimates in panel D of Table SA7 show only weak evidence for differences in parental beliefs corresponding to first borns with an opposite-sex next born sibling compared to those with a same-sex next born sibling. Parents of first born females with a second born brother are almost 2 percentage points less likely to believe that their first born female is below average overall compared to those with a second born sister, though this difference is only marginally significant. No clear differences emerge with respect to domain-specific beliefs.

Several notes of caution are worth keeping in mind when interpreting the results from this final approach. First, these estimates only speak to the specific experience of being a first born child. Being the oldest child correlates strongly with both overall and domain-specific beliefs. Perhaps for oldest children, that first child status dominates what would be a more marginal impact of any domain-specific biases. In that case, a more appropriate analysis may be to explore the impact of opposite-sex third born children on second born children. Second, this empirical approach may be more well-suited to exploring later life outcomes, such as occupational choice or later life earnings as is common in this literature, as opposed to these more early life outcomes, particularly given that many of the younger siblings considered are quite young, perhaps having not even started their education.

Taken together, these results provide suggestive evidence for meaningful interactions between family structure and parental beliefs, particularly for female children and for beliefs across domains. The first set of results shows that above-average overall beliefs are more common among parents of females in the presence of an opposite-sex sibling. However, these results also hint that a mixed-sex sibling composition may foster more pronounced domain-based gender biases; above-average math beliefs are higher for males in mixed-sex families, while above-average reading beliefs are higher for females in mixed-sex families. Finally results from the more rigorous fourth approach indicate that the presence of a second born brother (as opposed to a second born sister) leads to a reduction in below-average overall beliefs among first born females, though these estimates are only marginally significant and should be interpreted with caution.

[53]For example, approximately half of younger siblings are four years of age or younger.

Supplemental Appendix Tables

Supplemental Appendix Table SA1: Explore Results: Belief Accuracy and Parent Cognition

	Ghana (GSPS)								Kenya (KLPS)	
	Belief error				Absolute belief error				Accurate	
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
Log consumption or income		0.09		0.06		0.21*		0.10		0.01
		(0.14)		(0.15)		(0.11)		(0.11)		(0.03)
Parent education in years		0.04*		0.05*		0.03**		0.01		0.01
		(0.02)		(0.03)		(0.02)		(0.02)		(0.01)
Parent Raven's score	-0.15	0.05			0.04	0.06			0.03*	0.03
	(0.10)	(0.08)			(0.06)	(0.06)			(0.02)	(0.02)
Parent composite score			-0.21	0.06			-0.01	0.07		
			(0.14)	(0.12)			(0.09)	(0.09)		
Fixed effects	District	District	District	District	District	District	District	District	County	County
Mean	1.15	1.15	1.18	1.18	2.77	2.77	2.73	2.73	0.55	0.55
R^2	0.33	0.54	0.30	0.52	0.16	0.23	0.16	0.22	0.02	0.03
Observations	2003	2003	2280	2280	2003	2003	2280	2280	1472	1472

All regressions include the same set of controls, weighting approach, and clustered standard errors as Table 1, additionally controlling for parent's Raven's score (columns (1), (2), (5), (6), (9), and (10) or parent's standardized composite score (columns (3), (4), (7), and (8)).

Supplemental Appendix Table SA2: Socioeconomic Status and Future Expectations

	Ghana (GSPS)		USA (ECLS-K)	
	Parent expects secondary school likely	Child expects secondary school likely	Parent expects college	Parent expects more than college
	(1)	(2)	(3)	(4)
Log consumption or income	0.01	0.03	0.05***	0.01***
	(0.03)	(0.03)	(0.00)	(0.00)
Parent education in years	0.01***	0.00	0.03***	0.01***
	(0.00)	(0.00)	(0.00)	(0.00)
Composite score	0.06***	0.07***	0.06***	0.04***
	(0.01)	(0.01)	(0.00)	(0.00)
Child female	-0.03	-0.02	0.03***	0.02***
	(0.03)	(0.03)	(0.01)	(0.01)
Fixed effects	District	District	School	School
Mean	0.54	0.53	0.74	0.26
R^2	0.26	0.24	0.27	0.22
Observations	2275	2249	44005	44005

All regressions include the same set of controls, weights, and clustered standard errors as Table 1.

Supplemental Appendix Table SA3: Deworming Treatment and Parental Beliefs: Robustness

	Kenya (KLPS)								
	Caregivers who were deworming participants			Older cohort deworming participants			Younger cohort deworming participants		
	Believe above average	Believe below average	Future above average	Believe above average	Believe below average	Future above average	Believe above average	Believe below average	Future above average
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
Deworming treatment	-0.03	-0.07***	0.08*	0.05	-0.04	0.15***	0.01	-0.05*	0.05
	(0.05)	(0.02)	(0.05)	(0.04)	(0.03)	(0.05)	(0.04)	(0.03)	(0.05)
Control mean	0.28	0.08	0.42	0.26	0.10	0.41	0.28	0.08	0.44
Observations	1057	1057	990	868	868	822	902	902	837

Columns (1)-(3) restrict to caregivers who were themselves the deworming (PSDP) participant. Columns (4)-(6) restrict to PSDP participants who were older (above age 12) at baseline. Columns (7)-(9) restrict to PSDP participants who were younger (below age 12) at baseline. Controls include cost-sharing treatment assignment, local treatment saturation among schools within 6 kilometers of the PSDP participant's school, total density of primary school children within 6 kilometers of the PSDP participant's school, an indicator for being in the vocational education or cash grants program sample, PSDP participant gender, PSDP participant grade at the time of the deworming program, zone indicator for PSDP participant school, population of PSDP participant school, and average test scores at PSDP participant's school, gender of interviewer and months since the start of the survey wave, and indicators for whether the child is female, child age, and first child status. All regressions include appropriate weights to ensure representativeness of the original population, taking into consideration the exclusion of the GSP, vocational education, and cash grants programs. Standard errors clustered by PSDP school.

Supplemental Appendix Table SA4: Socioeconomic Status and Beliefs: With Investment Controls

	Current: Believe above average				Future: Above average		Current: Believe below average			
	India (IHDS)	Kenya (KLPS)	Ghana (GSPS)	USA (ECLS-K)	Kenya (KLPS)	Ghana (GSPS)	India (IHDS)	Kenya (KLPS)	Ghana (GSPS)	USA (ECLS-K)
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
Log consumption or income	0.03***	-0.01	0.06**	0.01*	0.04**	0.08***	-0.03***	0.01	0.02	-0.02***
	(0.01)	(0.02)	(0.03)	(0.00)	(0.02)	(0.03)	(0.01)	(0.01)	(0.02)	(0.00)
Parent education in years	0.00***	0.00	0.01	0.01***	0.00	0.01***	-0.00**	-0.00	-0.01**	-0.00*
	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)
Fixed effects	Village	County	District	School	County	District	Village	County	District	School
Observations	22726	2401	2280	44198	2249	2282	22726	2401	2280	44198

All regressions include the same set of controls, weighting approach, and clustering of standard errors as Table 1, with additional controls for the relevant investments from Table A6, described as follows. **India:** Additional controls include annual spending on education (as a percent of total consumption), minutes spent on educational activities each week, an indicator for participation in any tutoring, an indicator for attending private school, and number of days absent over the last 30 days. **Kenya:** Additional controls include total schooling cost, educational time, private school attendance, days attended last week, books at home, play materials at home, and play activities with the parent. **Ghana:** Additional controls include annual spending on education (as a percent of total consumption), educational time, private school attendance, and absence in the last week. **USA:** Additional controls include the number of days doing homework, whether the child receives any tutoring, the number of childrens books, whether the parent reads with the child daily, whether the parent takes the child on outings, whether the child participates in any regular activities, and a parental engagement index.

Supplemental Appendix Table SA5: Saajha Pilot Survey Questions

Welcome	Hello! We would like to ask you a few questions about your child's education. This is because we would like to improve our work and help you better. Answering these questions will take only about 5 minutes of your time. Your responses will help us to understand you better and provide better help as mentioned before. Whatever you share with us, will be kept among us. Would you like to proceed ahead in this process?
1	What is the highest level of education you have completed? *1. Did not complete primary (grade 5); 2. Completed primary (grade 5) but did not complete secondary (grade 10); 3. Completed secondary (grade 10) or more*
2	T1 (Low income prime): Taking into consideration all sources of income, does your household earn more or less than 8,000 RS per month? *1: More, 2: Less, 3: Not sure* T2 (High income prime): Taking into consideration all sources of income, does your household earn more or less than 25,000 RS per month? *1: More, 2: Less, 3: Not sure* T3 (Identity prime) Please think for a moment about how you describe/view yourself. Besides being Indian, which specific group do you feel you belong to first and foremost? *1: Class or occupation, 2: Caste, 3: Other, please mention* T4 (Positive messaging): Studies have shown that simply spending short amounts of time on a regular basis with your child (reading, speaking, playing) can help them to learn and develop academic skills. On that positive note...
Transition	Now we would like to ask you some questions about the child you are most likely to support using Saajha. If you use Saajha for more than one child, please think about the oldest of your children who uses support services of Saajha.
3	Is your child an average student, better than average, or below average? *1: Average, 2: Better than average, 3: Below average*
4	Five years from now, do you expect your child will be an average student, better than average, or below average? *1: Average, 2: Better than average, 3: Below average*
5	What is the highest standard you expect your child to complete? *1. Did not complete primary (grade 5); 2. Completed primary (grade 5) but did not complete secondary (grade 10); 3. Completed secondary (grade 10) or more*
6	How confident do you feel that you have the capabilities and resources to support your child's education? *1: Very confident, 2: Moderately confident, 3: Not very confident*
7	How adequate do you feel the information you receive about how your child is doing in school from teachers or others is? *1: Very adequate, 2: Moderately adequate, 3: Not very adequate*
8	How would you describe the quality of the education your child is currently receiving? *1: High quality, 2: Moderate quality, 3: Low quality*
9	How optimistic do you feel when you think about the employment and other opportunities your child will have once they complete their education? *1: Very optimistic, 2: Moderate optimistic, 3: Not very optimistic*
Thanks!	Our question and answer ends here. Thank you for giving us your valuable time, your answers help us to improve our work.

Supplemental Appendix Table SA6: Reported Parental Beliefs across Different Reference Groups

	(A) No reference group specified versus specified reference group of:							
	(B) Children in similar neighborhoods		(B) Children in this neighborhood		(B) Children in similar income households		(B) Children in same class	
	Higher beliefs with no ref group (A)	Higher beliefs with ref group (B)	Higher beliefs with no ref group (A)	Higher beliefs with ref group (B)	Higher beliefs with no ref group (A)	Higher beliefs with ref group (B)	Higher beliefs with no ref group (A)	Higher beliefs with ref group (B)
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Composite score	0.00	-0.02*	-0.00	-0.01	0.01	-0.02*	-0.00	-0.01
	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)
Log consumption	0.00	-0.01	0.00	0.02	-0.01	0.02	0.01	0.01
	(0.01)	(0.01)	(0.02)	(0.01)	(0.01)	(0.01)	(0.02)	(0.02)
Years parent education	-0.00	-0.00	-0.00	0.00	-0.00	-0.00	-0.01**	-0.00
	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)
Higher no ref group (A)	0.18		0.18		0.20		0.18	
No change (A=B)	0.71		0.70		0.69		0.69	
Higher with ref group (B)	0.11		0.12		0.11		0.12	
Observations	2158	2158	2159	2159	2160	2160	2064	2064

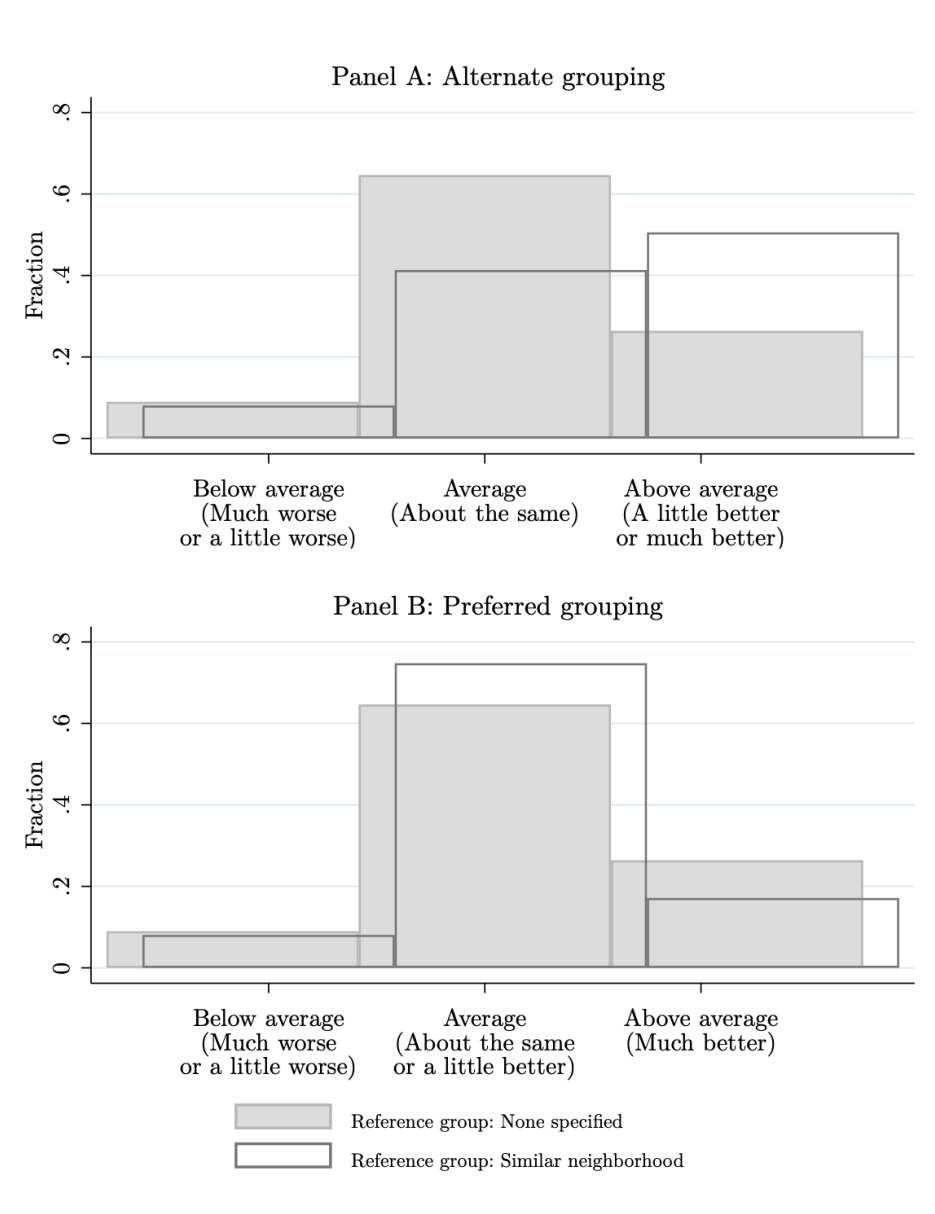
Regressions include controls for log per capita household consumption, parent education in years, indicators for urban status, whether the primary caregiver is the child's mother whether the primary caregiver is the KLPS respondent, whether the child lives with the KLPS respondent, standardized composite test scores, and indicators for child female, age, and oldest child status, as well as indicators for missing household consumption, parent education, urban status, primary caregiver-related variables, child age, and oldest child status. Includes county fixed effects. Uses appropriate sampling weights. Standard errors clustered by household.

Supplemental Appendix Table SA7: Household Composition and Subject-Specific Parental Beliefs

	Overall		Math		Reading	
	Females	Males	Females	Males	Females	Males
Panel A: All Siblings	(1)	(2)	(3)	(4)	(5)	(6)
Any opposite sex sibling: Above	0.02**	0.01	0.01	0.02*	0.02*	0.01
	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)
Any opposite sex sibling: Below	0.00	0.00	0.00	-0.01	0.00	-0.00
	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)
Observations	17991	18723	11003	11543	10893	11400
Panel B: Younger Siblings Only	(1)	(2)	(3)	(4)	(5)	(6)
Opposite sex older sibling: Above	0.03**	0.01	0.00	0.03*	0.02	0.03
	(0.01)	(0.01)	(0.02)	(0.02)	(0.02)	(0.02)
Opposite sex older sibling: Below	-0.00	-0.00	0.01	-0.02**	-0.00	-0.02
	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)
Observations	11898	12449	7053	7441	6989	7344
Panel C: Older Siblings Only	(1)	(2)	(3)	(4)	(5)	(6)
Opposite sex younger sibling: Above	0.01	0.01	0.02	0.02	0.02	-0.00
	(0.01)	(0.01)	(0.02)	(0.02)	(0.02)	(0.02)
Opposite sex younger sibling: Below	-0.02*	0.00	-0.00	0.01	0.00	0.01
	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)
Observations	9980	10326	6382	6650	6308	6561
Panel D: Oldest Siblings Only	(1)	(2)	(3)	(4)	(5)	(6)
Opposite sex next born: Above	0.03*	-0.01	0.03	0.01	0.01	-0.02
	(0.02)	(0.02)	(0.02)	(0.02)	(0.02)	(0.02)
Opposite sex next born: Below	-0.02*	-0.01	0.00	-0.01	0.00	-0.01
	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)	(0.02)
Fixed Effects	School	School	School	School	School	School
Observations	6093	6274	3950	4102	3904	4056

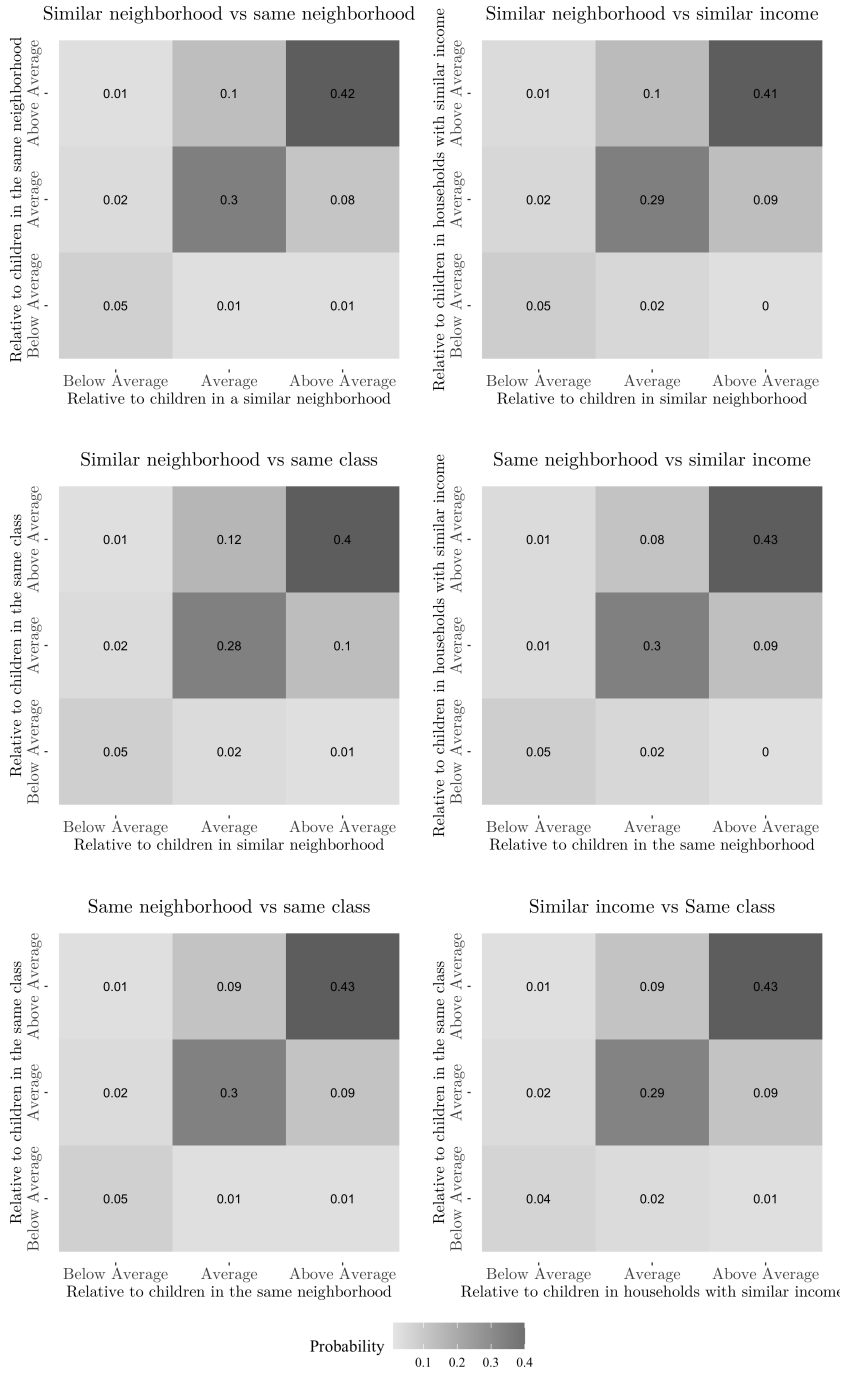
The first row in each panel displays coefficients on the independent variable indicated (type of opposite sex sibling) for regressions where the dependent variable is believe above average. The second row in each panel displays coefficients on the independent variable indicated (type of opposite sex sibling) for regressions where the dependent variable is believe below average. Panel A includes children with at least one sibling of any kind (older or younger). Panel B restricts to children with at least one older sibling. Panel C restricts to children with at least one younger sibling. Panel D restricts to oldest children with at least one younger sibling. All regressions include children with test scores and parental beliefs available in first grade and/or third grade. Includes the usual controls described in Table 1, aside from first born status and female. Standard errors clustered by child. Includes appropriate weights.

Supplemental Appendix Figures



Appendix Figure SA1: Response comparison across questions

Note: This figure compares the distribution of responses across the no reference group question ("is your child an average student, better than average, or below average") and one of the specific reference group questions ("how does your child's overall ability compare to other children of the same age in similar neighborhoods in your county?"). In panel A, responding "much worse" and "a little worse" to the second question is classified as equivalent to "below average" on the first, responding "about the same" as equivalent to "average", and responding "a little better" or "much better" as equivalent to "above average." In panel B, all classifications are the same, except "a little better" is grouped with "about the same" in the "average" category. Data are from the Kenya Life Panel Survey (KLPS).



Appendix Figure SA2: Beliefs responses across different specified reference groups

Note: This figure compares responses across each of the different reference group questions ("how does your child's overall ability compare to other children of the same age in ... ?"). Numbers and shading represent the probability of responding in the equivalent categories across the two questions. Data are from the Kenya Life Panel Survey (KLPS).