



Choosing tournament for children: Parenting style and information intervention

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ABSTRACT

Information plays a crucial role in shaping parental decisions on nurturing their children's skills. However, empirical evidence is scarce on how parents determine their parenting style in response to information. To address this gap, we conduct a lab-in-the-field experiment focusing on the context of competitiveness. Our findings highlight a noticeable gender disparity in parental decision-making regarding participation in tournament schemes for children. Specifically, parents exhibit a significantly stronger inclination towards tournament schemes for boys than girls. Furthermore, our results indicate that the provision of information has a significant impact on parents' parenting styles. Interestingly, parents' response to information suggests a greater emphasis on promoting children's autonomy in competition rather than monetary rewards potentially obtained from the task. Analysis of the children's experiments reveals that parents valuing autonomy positively influence their children's motivation to enhance performance. Lastly, we observe a gender-based heterogeneity in the effect of information intervention, with a stronger influence observed among parents of boys compared to parents of girls. Our experiment underscores the importance of children's autonomy as a motivational factor and highlights the effectiveness of authoritative parenting. Additionally, our findings emphasize the role of information in updating biased beliefs, which can help mitigate the gender gap.

1. Introduction

Family interaction and parental involvement play crucial roles in children's development, where parents shape their attitude towards children or act as role models to follow (Bisin & Verdier, 2001; Brenøe & Epper, 2022; Dohmen, Falk, Huffman, & Sunde, 2012; Francesconi & Heckman, 2016; Ljunge, 2014). Based on the technology of skill formation theory built by Cunha and Heckman (2007) and a series of their work (Cunha, Heckman, & Schennach, 2010; Heckman, Pinto, & Savelyev, 2013; Heckman & Mosso, 2014), the empirical literature has expansive discussion on the impact of monetary and time investment on children's human capital development (Akee, Copeland, Costello, & Simeonova, 2018; Attanasio, Cattani, Fitzsimons, Meghir, & Rubio-Codina, 2020; Aucejo & James, 2021; Carneiro et al., 2021; Chi & Qian, 2016; Del Boca, Flinn, & Wiswall, 2014; Fé, Gill, & Prowse, 2022; Guryan, Hurst, & Kearney, 2008).

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Despite these insights, the interaction within the family and the mechanism of nurturing children's skills are not fully understood. Several theoretical models have been proposed to understand parent-child interaction and parental investment strategy (Agostinelli, Doepke, Sorrenti, & Zilibotti, 2022; Cobb-Clark, Salamanca, & Zhu, 2019; Doepke & Zilibotti, 2017; Seror, 2022). Moreover, experimental economists attempt to unravel the black box by designing experiments to generate unique datasets to understand how parents affect children's behavior and mold their preferences (Ben-Ner, List, Putterman, & Samek, 2017; Brouwer, Galeotti, & Villeval, 2023; Chowdhury, Sutter, & Zimmermann, 2022; Falk, Kosse, Pinger, Schildberg-Hörisch, & Deckers, 2021; Sutter & Untertrifaller, 2020; Zumbuehl, Dohmen, & Pfann, 2021).

In this paper, we design a lab-in-the-field experiment to observe how parents and children make decisions together in a competitive environment. We focus on an educational setting, where potential competition under this scenario is inevitable. The gender gap in willingness to compete, which is evident in literature (Gneezy & Rustichini, 2004; Markowsky & Beblo, 2022; Niederle & Vesterlund, 2007), can affect children's everyday behavior and effort they exert in the classroom, often in comparison with their peers. In settings of lab experiments, Fornwagner, Pompeo and Serdarevic (2023) and Ifcher and Zarghamee (2023) both find that making decisions on behalf of others can reduce the gender gap in competition entry, suggesting this is a possible strategy to bridge the disparity. Therefore, parents, as decision-makers for young children or influential examples, could potentially narrow the gender gap by making decisions for them or guiding their decision-making process.

To observe interaction within the family, we design interactive experiments consisting of a parent experiment and a child experiment in the classroom. Children engage in a two-round calculation task. In the first round, they are compensated by a piece rate scheme. In the second round, they are given a choice to either stick with the piece rate scheme or opt into a tournament scheme. For the parent experiment, parents are asked to decide whether to intervene in children's experimental decisions and how to intervene. Parental decisions not only reflect parental inclination towards the scheme for children but also reveal the parenting style when intervening in children's behavior, resulting in different family interaction patterns. Parents with inclination can either designate a payment scheme for children or recommend it to children, while parents without inclination can opt out of the intervention process and let children decide for themselves. As a result, the final scheme that children perform in the second round is a fruit of family interaction.

We also investigate the role of information provision as a form of treatment in our experiment. Field experiments indicate that parents, particularly in rural areas or disadvantaged socio-economic statuses, can be behaviorally biased by their attitudes and beliefs (Mayer, Kalil, & Klein, 2020). Thus, information interventions could assist them in recalibrating their investment strategies regarding their children's academic abilities (Bergman, 2021; Dizon-Ross, 2019; Rogers & Feller, 2018; Wang, Cheng, & Smyth, 2022). However, research on how information affects parents' involvement on children's non-academic preferences or noncognitive skills is limited (Tungodden & Willén, 2023). This gap in the literature motivates us to investigate whether biases exist in parental decisions and to what extent information provision treatments can modify parental decisions related to their children. This analysis aims to enhance our comprehension of family-based interventions and their efficacy in child development.

The information provision in our study includes both within-subject design and between-subject design. In the within-subject design, parents decide before and after being exposed to children's math scores from the previous year, which indicates the children's potential mathematical performance in the classroom experiment. This approach captures how parents update their beliefs based on performance-related information, reflecting how they respond to such feedback when making educational choices. For the between-subject design, we focus on two types of information related to the experimental context. The first concerns the math scores of the children's peers from the previous year. Since a tournament is a scheme where relative performance is more crucial than absolute performance, knowledge about competitors becomes vital in competitive contexts. This information could assist parents in assessing the potential gains or losses associated with opting for the tournament over the piece-rate scheme. The second type of information is children's willingness to compete. This enables us to evaluate how parents consider their children's preferences or autonomy. Given that there may be a discrepancy between parents' perceptions of their children and the children's actual perspectives, understanding the children's willingness to compete could bridge this divide and alert parents to their children's preferences.

The lab-in-the-field methodology combines the highly controlled conditions of laboratory experiments with the authentic context of field experiments (Gneezy & Imas, 2017). This approach is particularly useful when studying the effects of information provision, which are most pronounced when subjects are imperfectly informed. To this end, we selected a rural prefecture in a central province of China and randomly chose a primary school in a township for our experimental site. It is important to note that the National Education Ministry prohibits the disclosure of children's rankings in primary school, meaning that parents have access only to their children's grades, not to those of others. This context provides us with a unique opportunity to administer an information provision experiment where Chinese parents, often referred to as "tiger moms", are known for their diligent oversight of their children's academic performance (Zhang, Qin, & Zhou, 2020). In other words, while parents may know their children's academic achievement well, they lack specific knowledge about where their children stand relative to their peers.

Our research has yielded several noteworthy findings. First, prior to receiving information about their children's grades, parents are more likely to choose tournament schemes for boys and less so for girls. However, this gender disparity vanishes once grade information is provided. This change suggests that parent-child interactions and decisions diverge from the general decision-making for others (DMfO) framework when considering the family context. Second, while parents generally display a conservative attitude towards competition, children's willingness to compete has a significant impact, leading to higher competition levels than the control group. The mild impact of information on peers' grades suggests that parents' decisions are more influenced by their children's willingness to compete than by the potential benefits of competition. As a result, autonomy turns into motivation that inspires children to perform better. Lastly, there is a heterogeneous response to information between parents of boys and parents of girls. Boys' parents tend to adjust their decisions based on the children's willingness, while girls' parents show a relatively insensible response to such

information.

Our paper contributes to three strands of literature. First, it broadens the current understanding of parental involvement in children's decision-making, shifting the lens from direct intervention to parenting style and further discussing the role of information. While our experimental design takes cues from [Tungodden and Willén \(2023\)](#), our conceptual framework diverges by factoring in children's autonomy and parents' regard for this autonomy—a consideration absent from theirs. Existing literature on parenting styles typically revolves around theoretical models or relies on empirical evidence derived from observational data. With only a few studies exploring the channel of family interaction, [Brouwer et al. \(2023\)](#) report that parents are more inclined to punish norm violators and help strangers when accompanied by their children—highlighting parents are aware of their modeling effect on children, akin to an authoritative parent shaping children's social preferences. Our research, however, goes a step further by examining the impact of information interventions. In doing so, we illuminate how the information provision can modify the parenting approach, potentially guiding policymakers in the design of family-based interventions.

Secondly, our study provides real-world evidence of gender differences in tournament entry. According to the meta-analysis of [Markowsky and Beblo \(2022\)](#), characteristics of a “lab-in-the-field” approach, coupled with parent-child paired subjects, render our research a rarity within this topic area. While our experimental design deviates somewhat from the classic three-round elicitation established by [Niederle and Vesterlund \(2007\)](#), it refines the competitive decision-making process within a specific field context. Interestingly, our findings do not reveal a marked gender difference in children's initial willingness to compete but rather a gender disparity among parents, implying that competitive attitudes are more likely shaped through socialization.

Lastly, we bridge the distinctive parent-child context with the general framework of DMfO. We find that parents are willing to modify their choices upon learning about their children's competitive preferences, demonstrating respect for their children's autonomy. This mirrors findings from [Ambuehl, Bernheim, and Ockenfels \(2021\)](#), where approximately half of the choice architects (also referred to as principals in other studies) opt not to interfere with the choosers' choice sets, acknowledging the importance of the agents' autonomy. However, in the DMfO literature, aligning principals' incentives with agents' is crucial for the outcomes. From this angle, the parent-child interaction can be seen as a unique form of incentive linkage, reminiscent of Becker's Rotten Kid Theorem.

The structure of the paper is laid out as follows: [Section 2](#) outlines the implementation and the recruitment of subjects in the field. [Section 3](#) describes the experimental design, detailing both the children's and parents' experiments. [Section 4](#) presents the results derived from our data analysis. Finally, [Section 5](#) concludes our study and discusses our policy insights regarding family-based interventions.

2. Implementation and recruitment

In order to investigate how parental decision-making and parenting styles are influenced by information, we specifically target subjects who may possess little knowledge about their children and the school environment. Recognizing that Chinese parents in major cities are often associated with authoritative and even helicopter parenting styles, we explored the family dynamic within rural China, a less-studied context. For this purpose, we established contact with the Education Bureau of a prefecture in a central province of China for assistance. With the assistance of local Education Bureau officials, we were provided with a list of all primary schools in the prefecture. We focused our selection on schools not situated in the core area of the prefecture and those with mid-level infrastructure quality compared to other primary schools in the region.² Through a simple random sampling, we selected a central primary school of a township. While this school's infrastructure might fall below the prefecture's average standards, it surpasses that of rural village schools. It is important to note that being the central primary school in a rural township means that the incidence of left-behind children is lower than in rural village schools, allowing us easier access to children's parents.³

To narrow sample attrition, we design an online survey experiment for parents and a classroom experiment for children during a school day. This way, parents do not need to come to school to attend the experiment. The parent experiment and children experiment are interconnected: Once parents complete their survey and submit it, we match the parent to their child using the child's name as identification. Then, children begin their experiment in the classroom under the guidance of experimenters. In doing so, we apply different recruitment rules for parents and children.

2.1. Recruitment of parents

We target children in the fourth and fifth grades and distribute online surveys to every class in these grades. Thanks to the support of the principals and head teachers in Grade 4 and 5, we are able to distribute online questionnaires through WeChat groups for each class. In the WeChat group, head teachers announce that this questionnaire seeks parental permission for a classroom activity that uses monetary incentives as prizes. The parents' responses to the questionnaire will affect their children's participation and potential rewards. Moreover, the head teachers emphasize that this questionnaire should be filled out by parents or, if necessary, the primary caregiver instead of other family members. Parents are asked to click the provided link and access the experiment by correctly entering

² To minimize the potential manipulation of the list, we stressed that our experiment and data collected would only be used in academic research and would not aim to evaluate the school or the local education system. We only disclosed the parent part of our study to the selected school after finalizing our pool selection, preventing officials from manipulating the list or school selection for any specific objectives.

³ A bunch of literature discussed the impact on parental migration on left-behind children, both cognitively and non-cognitively, for example, [Ao, Chen, and Zhao \(2022\)](#), [Zhou, Chen, Chen, and Volland \(2022\)](#), and [Luo and Wang \(2023\)](#).

their child's name. This ensures that each parent's experimental ID matches their child's name and remains unique within the class.

2.2. Recruitment of children

There are four classes in Grade 4 and five in Grade 5. We randomly selected four classes, two from Grade 4 and two from Grade 5 to conduct children's part. The experiment was conducted at the class level, so all students in the selected classes are recruited for our experiment unless their parents choose to opt out of the experiment for them. Given the fact that not all parents completed the survey on time, some children make the decision to participate in the classroom experiment independently of their parents. To minimize the potential influence that the absence of parental participation might exert on the experimental outcomes, we selected an additional fifth-grade class to serve as a control class. This control class was chosen specifically because it did not involve parental participation in any form. Students in this control class participated solely in the classroom-based aspects of the experiment, without any corresponding involvement from their parents in the survey component of the study.

The experiment was carried out from June 6 to June 9, during the spring semester of the 2022–2023 school year. The final sample pool included 233 respondents from parents (or other caregivers) and 354 from children. The response rates for the online questionnaire among parents were 71.79% in Grade 4 and 56.06% in Grade 5. Across the experimental classes, the overall response rate was 62.99%.

3. Experimental design

Our experiment consists of a parent experiment and a child experiment. Parents are introduced to the children's task to make educational decisions, so we introduce the experimental design backwards from the timeline. Fig. 1 illustrates the timeline of the implementation of two-part experiments.

3.1. Experiment design for children

The experiment comprises several parts, but only two are relevant to family interaction and the topic addressed in this paper.⁴ The first part is designed to gauge children's risk attitudes by a bomb risk elicitation task. The second part requires subjects to engage in real-effort tasks, which constitute the primary focus of this paper. The exchange rate is 10 points for RMB 1 yuan.

3.1.1. Two-round real-effort task

In the experiment, the real-effort task consists of summing a series of three randomly selected two-digit numbers within three minutes—a task that is particularly challenging for fourth and fifth graders in rural areas. Diverging from the standard routine established by Niederle and Vesterlund (2007), we have the children perform the real-effort tasks only twice. The final payoff for this part of the experiment is determined by the experimental program, which randomly selected the results from either Round 1 or Round 2 to calculate the payoff.

In the first round, participants are instructed to perform the task under a piece-rate payment system, earning a fixed rate of 1 point for each correct answer. The experiment program presents tasks on five pages, each containing ten individual tasks. Subjects can flip through the pages and select tasks they prefer to work on. While the program tracks and displays the total number of tasks children finish, it does not reveal the number of correct responses during the activity. Children will only be informed of their accuracy and payoff of the task when they receive their earnings based on their performance before departing the classroom. This round measures children's initial abilities and helps them become familiar with the task.

In the second phase of the experiment, we introduce an optional scheme choice where children interact with potential parental guidance. Unlike prior research, where decisions are often made for subjects, our study grants children the autonomy to choose within the framework of parenting style. Specifically, the decision regarding which incentive scheme to choose in the second round is shaped by the degree of parenting, if any, and the children's own choice.

In light of skepticism regarding competitiveness as a distinct trait and Markowsky and Beblo's (2022) findings on the context-specific nature of competitive tasks in a meta-analysis, our experiment takes advantage of the field setting to provide children with additional information about their competitors. Before deciding on their payment scheme, the program reveals the name of the randomly chosen peer in the class they are paired with and inquires if they would like to opt for a piece rate or tournament-style incentive.

Children are instructed that "winning" in the tournament scheme is defined by outperforming their peers' performance from Round 1. Suppose their performance in Round 2 surpasses their counterpart's piece rate score from the previous round. In that case, they will be the tournament winner and rewarded with 3 points for each correct answer. On the flip side, if they do not manage to outdo their peers' performance, they will not triumph in the tournament, leading to a situation where they do not receive any points for the second round. Moreover, when a child opts for the tournament scheme and their performance in the second round is identical to their peers in

⁴ The experiment is composed of four distinct parts: the first involves a series of tasks aimed at eliciting preferences; the second, which is the central focus of this study, consists of a set of real-effort tasks; the third part allows peers to discuss their preference choices from the first set of tasks; and the fourth and final part comprises a questionnaire designed to collect demographic information, as well as insights into the children's attitudes towards selecting friends and interacting with their family.

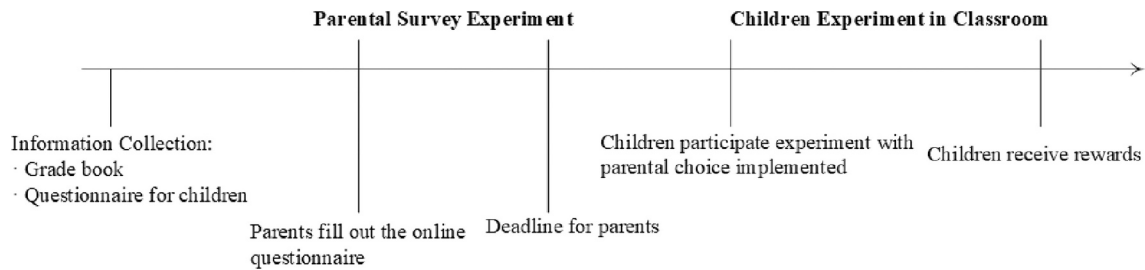


Fig. 1. The timeline of the interactive experiments.

the first round, the program will randomly decide the winner.

3.1.2. Step of choice on optimal payment scheme

After being instructed on the rule of payment in the real-effort task, the steps of the scheme choice elicitation are as follows:

1. Children are introduced to the tournament scheme after finishing the sum-up task under the piece rate scheme in Round 1. To ensure their understanding of the two schemes, they are required to answer two control questions on screen about hypothetical situations under the piece rate and tournament schemes.
 2. Children are permitted to proceed only after correctly answering the hypothetical questions. They are then shown the name of their paired peer on the screen and asked to select their preferred scheme for the second round. This diverges from previous studies, where children's independent entry decisions, resembling survey questions, would not be actualized in the experiment.
 3. Following the elicitation of children's willingness to compete with their counterparts, the recommendations of parents or caregivers (if any) are displayed. If a parent has chosen to be authoritarian, the intervention will not be visible on the screen but will be applied after the child's final decision. In a word, according to the parenting style that parents choose, children make their final scheme choice with or without the displayed parental input and submit their decision.
 4. The program then presents the final payment scheme to the children, based on the parents' imposed restrictions and children's final choice, and instructs them to exert the second round of sum-up tasks, with a time limit of three minutes.
 5. When children finish the second round, the experiment will elicit beliefs on whether they have won the tournament (for those who have chosen it) or would have won the tournament (for those who have chosen the piece rate scheme).
- With this, the real-effort task part of the experiment, the core experimental task for children, is concluded. The children's earnings from this part are disclosed after completing all segments of the classroom experiment.

3.1.3. Elicitation of risk preference

In the initial phase of our experiment, we assessed the risk preferences of children using a bomb risk elicitation task (Crosetto & Filippin, 2013; Holzmeister & Pfurtscheller, 2016; Chen, Schonger, & Wickens, 2016). As risk preference is a significant predictor of competitive behavior, we use the data from this task to account for the children's risk tendencies. According to the literature, the task involves children deciding how many out of 100 boxes to collect, with one box concealing a bomb. The potential reward from this task increases with each additional box gathered, but it drops to zero if the box with the bomb is selected. This task is incentivized, with the payment structure thoroughly explained at the outset of the experiment.

3.2. Experiment design for parents

The primary focus of examining parents' decisions lies in the educational choices they make for their children, as well as the possible influence of information provision on these decisions when selecting a payment scheme. Therefore, gathering information about the children before initiating the parental component and the overall experimental procedure is essential. We can create tailored information for the parents of each child in the classroom under the respective information conditions only after we have completed this preliminary information collection.

In this subsection, we first introduce the information collection process, laying out how we obtained data relevant to our study. Following this, we will elaborate on the parent survey experiment, detailing how it was conducted.

3.2.1. Information collection preparation

Before the formal parental survey begins, we collect three types of information from children to develop information treatments in parental survey: their historical academic performance, peer group composition, and willingness to compete.

Firstly, students' math scores are typically a strong indicator of their academic performance and, thus, should be a good predictor of performance in real-effort tasks. We obtain students' historical academic records from the administrative office. However, due to COVID-19 restrictions, the school did not conduct the end-of-term exams for the autumn semester of the 2022–2023 school year. Consequently, we only have access to grade information from the previous spring semester, which was already a year ago at the time of the experiment. This gap has resulted in some missing grade information with students transferring in during the year.

Secondly, within the context of the children's experiment, competitive decisions are framed within a specific scenario where peers

are randomly selected by the programmer in the class. Parents' belief in their children's counterpart's performance is crucial when making choices for their children or offering guidance. Once the programmer executes the random peer selection process, we attempt to match the peers' math grades using the previous year's grade book, provided their names are present.

Lastly, parenting style is a significant factor in parents' decision-making processes, setting our study apart from other research. Acting as altruistic planners within the family, parents are concerned about their children's well-being and happiness. Therefore, understanding children's competitive willingness might influence the parents' choices. To gather data on the children's competitive willingness without revealing the detailed design of the experiment, we devised a brief questionnaire comprising two questions about their general attitude to compete. The head teachers of experiment classes assisted us by distributing this survey on paper, informing the children of an upcoming "interesting game" in the following days but without disclosing the survey's purpose or the specific tasks of experiment.⁵

3.2.2. Parent survey experiment

To facilitate convenient implementation and to capture parental decisions as comprehensively as possible within budgetary constraints, we design the parental part of the study as a survey experiment. The experiment is incentivized for parents by the knowledge that their responses will influence their children's potential earnings in a subsequent classroom experiment.

At the beginning of the survey, we introduce the real-effort task in the children's experiment to parents. We inform them that their survey responses will be recorded on the experiment server and will directly influence the classroom experiment—that is, their decisions could potentially determine their children's payment options. Parents are thus made aware that their involvement will affect their children's earnings unless they choose not to intervene, in which case the children can make their own decisions without parental guidance.

The pivotal decision we ask parents to make revolves around whether to intervene in the payment scheme for their children's upcoming real-effort tasks in the classroom. They have five options: to assign a tournament-based payment scheme; to assign a piece-rate scheme; to recommend the tournament scheme; to recommend the piece-rate scheme; or to abstain from intervention, allowing the child to decide independently. In addition to these choices, the survey also elicits parents' preferences for the bomb risk task and their beliefs about their children's choices regarding the same task, revealing both the parents' risk attitudes and their perceptions of their children's risk attitude, which may influence their decisions made for the children.

In order to address potential information frictions regarding children's abilities, our approach to eliciting parental decisions employs a within-subject design: initially, parents make their choices without the provision of additional information from the survey. They are also asked to guess whether their children would win if they participate in a competitive game. Following the first stage, we reveal the children's math grades to the parents and invite them to reconsider their initial decisions with the newly disclosed information. The choices confirmed in the second stage are recorded as the parents' final decisions, which are subsequently factored into the design of the upcoming classroom experiment.

Finally, before completing the survey, we gather demographic data and information regarding the parents' attitudes towards family interactions and their involvement with their children's activities. This data contributes to a fuller understanding of the familial context within which the parental decisions are made.

3.2.3. Information treatment

One of the key contributions of our experiment to the literature is the exploration of the information treatment on parental decision-making in the context of competition. Unlike [Tungodden and Willén \(2023\)](#), who conducted a parental survey and a children's real-effort task similar to our approach, our experiment delves deeper into the informational context of parental decision-making. Within our parent-child experimental framework, we carefully design information treatments to understand how information affects parental choices and results in family interaction and children's performance at school.

As detailed in [Section 3.2.1](#), we introduce two types of novel types of information treatments in a between-subject design. The first type of information is the math score of children's matched peer, which may help parents with the benefit-cost analysis of tournament payment scheme when they are deciding for or intervening in their children, related to the literature on parent-child decision model ([Doepke & Zilibotti, 2017](#)).

The second type of information is children's initial willingness to compete. While men and women have different competitive preferences, making decision for subjects of different gender may mitigate the gender gap in competition entry ([Fornwagner, Pompeo, & Serdarevic, 2023](#); [Ifcher & Zarghamee, 2023](#)). However, our experiment differs from the general settings of these two studies in that parents, unlike agents in previous experiments, possess more knowledge about their children and their concerns of intervention are more complex. Thus, parents might place greater emphasis on their children's willingness to compete, which is linked to parenting styles and the autonomy given to children in decision-making. [Ambuehl, Bernheim and Ockenfels \(2021\)](#) examined how information about the chooser's time preference influenced the choice architect's paternalistic decisions. Building on this foundation, our research goes beyond existing literature and investigates whether a child's willingness to compete is a significant factor for parents.

With two types of information, we employ a 2×2 information design resulting in four distinct information conditions: a baseline group with no additional information; a single-information treatment informed solely of peers' math scores (short as Peer Information); another single-information informed only of children's competitive willingness (short as Willingness Information); and a dual-

⁵ Head teachers were also unaware of the experiment's aim and design. They were not informed of the experiment's purpose before its commencement, nor were they briefed post-experiment.

information treatment that is provided both two types of information (short as Both Information). These two dimensions of information are given initially when parents first respond to the five options in the survey, and this information remains in the second stage, namely, from the first stage's outset, the parental subjects' information conditions diverge across these treatments.

Besides the between-subject design, we also consider a within-subject design for each parent subject, as mentioned in the parental survey experiment. Theoretical models sometimes simplify parents as rational agents with full knowledge of the world and their children (Seror, 2022). However, real-world parents, particularly those from disadvantaged backgrounds, may exhibit behavioral tendencies, such as a lack of understanding of grade reports or a propensity for overconfidence and conservatism in updating their beliefs (Bergman, 2021; Dizon-Ross, 2019; Mayer et al., 2020). To address potential biases in parental beliefs about their children's abilities, we implement a within-subject information design, disclosing each child's previous year's math score.

To fully understand the impact of different information conditions, especially how two types of information affect parent-child interaction, we postulate our main empirical model on the basis of the null hypothesis that the information treatment makes no impact as follows:

$$y_i = \alpha_0 + \alpha_1 Info_P + \alpha_2 Info_W + \alpha_3 Info_P \times Info_W + \beta Gender_i + \gamma Control_i + \varepsilon_i,$$

where y_i denotes the experimental outcome of interest, which could be an indicator of parental inclination to the tournament scheme, or a measure of their parenting style within the experimental context. The variables $Info_P$ and $Info_W$, along with their interaction term $Info_P \times Info_W$, are binary indicators reflecting the information status of the participants: baseline subjects are coded as 0 for both $Info_P$ and $Info_W$, and consequently for their interaction; subjects informed solely about peers' math scores are coded as 1 for $Info_P$ and 0 for $Info_W$; likewise, those who only receive information regarding children's willingness are coded as 0 for $Info_P$ and 1 for $Info_W$; and subjects who are presented with both types of information are coded as 1 for all three indicators. The interaction term allows us to test whether substitutive or complementary effects between the types of information provided. Additionally, the model incorporates $Gender_i$ to account for and control for any potential gender-based effects on the outcomes, recognizing the significance of gender in competitive contexts. The vector $Control_i$ includes additional control variables such as parental risk attitudes, their beliefs about their children, and the historical math scores of the children, among others. These controls are introduced to isolate the specific effect of the information treatment from other influencing factors.

4. Result

4.1. Descriptive summary and balance check

Panel A of Table 1 presents the demographics of family respondents to the online parental questionnaire. Most respondents are mothers, followed by fathers, together accounting for 91.67% of the participants. A minor proportion of questionnaires are completed by the children's grandparents or other relatives, indicating a negligible departure from the anticipated respondent. Notably, other family members who participate in the survey are often the primary caregivers, which does not significantly alter the general findings. For consistency and ease of reference, the term "parents" will henceforth denote subjects who joined the parent experiment part. Most respondents are the primary caregivers, responsible for the children's daily needs, and presumably possess a more intimate understanding of children. The educational background of most respondents aligns with a middle education level, typically corresponding to 7 years of schooling.

Panel B of Table 1 illustrates children's demographic and baseline characteristics. The average age is approximately 11 years, a pivotal stage marking the transition from late childhood to early adolescence. There is a slightly higher ratio of boys to girls, consistent with the gender imbalance observed in China, particularly in rural regions. Most children included in the research have siblings, with only a minor fraction being only children in their households, who are more likely to shy away from competition (Yang & Yu, 2016). In terms of academic performance, the average math score from the previous year is 75.94, with boys outperforming girls (Wilcoxon Mann-Whitney test, $z = -1.652$, $p = 0.0985$). This difference in performance reinforces traditional gender stereotypes.

Then we check whether data are balanced across treatment status with respect to a series of characteristics of parents and children, collected at the initial stage of the experiment and through a post-experiment survey as control variables. Since there are multiple treatment groups in the experiment, we adopt ordinary least squares (OLS) regressions of control variables on the treatment dummies. The randomized nature of group assignments suggests that treatment dummies are exogenous, and ideally, their coefficients should not significantly differ from zero, indicating initial experimental decisions and demographic characteristics are not related to the impact of information treatments.

Table 2 shows results from parent subjects. Taking the baseline treatment as a control group, we test each characteristic variable across treatment groups. The table reports the coefficients of the treatment dummies derived from the OLS regressions and their statistical significance column by column. The findings suggest no significant differences across treatments for most variables, with the exception of the dummy of Willingness Information on parental risk attitude at a 10% significance level.⁶ Consequently, we will incorporate parental risk attitude as a control variable in later analyses focusing on parental interventions.

⁶ The observed variation could potentially be attributed to chance occurrences. To further assess the balance of 'risk attitude' across the four treatments, we conducted a Kruskal-Wallis rank test, a non-parametric statistical test. The test yielded a χ^2 value of 3.944 and a p -value of 0.2675, indicating that there is no statistically significant difference across the four treatments, thus confirming balance.

Table 1
Descriptive Summary

Panel A: family respondent					
	Father	Mother	Grandparents		Other relatives
Relations with children	22.55%	69.12%	6.86%		1.47%
% Primary caregivers	32.61%	68.79%	71.43%		33.3%
Educational background	No education	Primary school	Middle school	High School	University
	0.98%	10.78%	45.59%	32.35%	10.29%
Per capita disposable income (<i> yuan</i>)	< 7500	7500–15,000	15,000–30,000		> 30,000
	46.08%	22.55%	12.75%		18.63%

Panel B: children's characteristics					
	#Observations	Scale	Mean	Standard Deviation	
Age	354	Years	11.06	1.46	
Gender	354	Dummy	0.58	0.49	
Single child	354	Dummy	0.07	0.26	
Math score	331	Points	75.94	20.38	

Notes: For children's gender, Male = 1 and Female = 0; for the numbers of children at home, the only child = 1 and with siblings = 0.

Table 2
Balance Check: Parents

	(1)	(2)	(3)	(4)	(5)	(6)	(7)
	Belief about child's competitiveness	Risk attitude	Income level	Relations	Primary caregivers	Educational background	Math score
Peer information	0.008 (0.09)	5.928 (7.16)	-0.019 (0.09)	-0.027 (0.13)	-0.016 (0.09)	0.140 (0.16)	1.550 (3.65)
Willingness information	0.106 (0.10)	15.265* (7.98)	-0.036 (0.10)	0.096 (0.14)	0.055 (0.10)	0.140 (0.18)	4.943 (4.13)
Both information	0.040 (0.09)	0.719 (7.16)	-0.097 (0.09)	0.112 (0.13)	-0.121 (0.09)	0.012 (0.16)	3.927 (3.64)
Constants	0.357*** (0.07)	53.491*** (5.21)	0.352*** (0.06)	1.852*** (0.09)	0.630*** (0.07)	3.333*** (0.12)	75.057*** (2.67)
N	223	220	204	204	204	204	214

Notes: Coefficients from OLS regressions. The variables are constructed as follows: Belief about child's competitiveness is a binary variable, reflecting the belief of parents on general competitive preferences of children, compete = 1 and not compete = 0; risk attitude is the number of boxes to collect in bomb risk elicitation task, ranging from 0 to 100; for relations, children's mother = 1, children's father = 2, paternal grandparents = 3, maternal grandparents = 4; other relatives = 5; for primary caregivers, be primary caregiver = 1 and not primary caregiver = 0; for income level, < 7500 = 1, 7500–15,000 = 2; 15,000–30,000 = 3; > 30,000 = 4; for educational background, No education = 1; Primary school = 2; Middle school = 3; High School = 4; University = 5. Math scores are used to construct information intervention. Some respondents didn't finish the demographic questionnaire after finishing the experiment part. Standard errors are in parentheses. * $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$.

The balance test for children is somewhat different from that of parents. Specifically, the control group of children is composed of two distinct segments: children whose parents did not participate in the survey experiment, and those who are in the control class without parental intervention. As detailed in Table 3, we report OLS regression results by column, with coefficients of the four treatment dummies. Unexpectedly, the dummy variable of Willingness Information and Both Information demonstrate significant effects at a level of 10%. While children's math scores are balanced across treatments as shown in Table 2, the significance observed in these treatments might be accidental.⁷ Despite math scores not being directly involved in the children's experimental tasks, they are only used to construct information provided to parents. To mitigate any unintended effects of math scores on children's task performance, we control for these scores as a covariate in the regression analyses.

4.2. How parents decide: Effect of information intervention

In this subsection, we investigate parental decision-making processes regarding their children's choice of payment schemes and the role of information for parents in this context. We specifically analyze the impact of parental choices within opt-in choice of tournament and parenting styles on children's academic performance.

⁷ In Kruskal-Wallis rank test of math score among all child subjects, the test yielded a χ^2 value of 7.241 and a p -value of 0.1237, indicating that there is no statistically significant difference across four treatments and the control group, thus confirming balance.

Table 3
Balance Check: Children

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
	Tournament choice	Risk attitude	Questions solved	Number of correct answers	Gender	Age	Single child	Math Score
Control	−0.049 (0.07)	−2.893 (4.12)	−0.433 (0.49)	−0.082 (0.49)	−0.121 (0.08)	−0.240 (0.23)	−0.058 (0.04)	2.022 (3.37)
Peer information	−0.043 (0.07)	−0.403 (3.96)	−0.403 (0.47)	−0.064 (0.47)	−0.016 (0.08)	0.012 (0.23)	0.003 (0.04)	3.572 (3.21)
Willingness information	0.119 (0.08)	−3.956 (4.62)	−0.816 (0.54)	−0.559 (0.55)	0.007 (0.09)	−0.066 (0.26)	0.021 (0.05)	7.018* (3.80)
Both information	−0.075 (0.07)	2.074 (3.96)	−0.212 (0.47)	0.269 (0.47)	−0.016 (0.08)	−0.035 (0.23)	0.003 (0.04)	5.950* (3.19)
Constants	0.710*** (0.04)	47.053*** (2.25)	8.450*** (0.27)	6.779*** (0.27)	0.603*** (0.04)	11.115*** (0.13)	0.076*** (0.02)	73.034*** (1.88)
N	354	354	354	354	354	354	354	331

Notes: Coefficients from OLS regressions. The variables are constructed as follows: tournament choice is a binary variable, reflecting children's general competitive preference with a randomly unknown peer, to choose the tournament scheme = 1 and to choose the piece rate scheme = 0; risk attitude is the number of boxes to collect in bomb risk elicitation task, ranging from 0 to 100; questions solved and number of correct answers counts the task that children complete and correctly finish on the first stage under a piece rate payment scheme. Gender, age, and single child are binary variables, as introduced in Table 1. Standard errors are in parentheses. * $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$.

4.2.1. Distribution of parental decisions

Fig. 2 illustrates the distribution of parental decisions and change between two stages: prior to parents receiving information about their children's historical performance in mathematics (Stage 1) and after being informed (Stage 2). In both stages, approximately 50% of parents choose not to intervene, indicating a preference for children's autonomy or no inclination to either piece rate or tournament scheme. Among the parents who do intervene, there is a conservative stance towards the tournament scheme, with a greater tendency to choose or recommend the piece rate option.

Parents appear to prefer designating a payment scheme rather than recommending one. Following the definitions from Doepke and Zilibotti (2017), we classify parents who designate a payment scheme for their children as exhibiting authoritarian parenting. In contrast, those who recommend either a tournament or a piece rate scheme are identified as authoritative parents, while parents who choose not to intervene, allowing their children to select their scheme, are considered permissive. Notably, the proportion of authoritarian parents surpasses that of authoritative parents. This gap widens further after parents are informed of their children's previous performance in mathematics.

4.2.2. Parental competitive decisions: Tournament or piece rate

Our analysis begins by examining the payment schemes that parents either choose for their children or recommend to them, thus focusing on the parents' specific scheme inclinations for their children. While permissive parents may take significant consideration in their children's autonomy, they exhibit no clear preference for tournament versus piece rate schemes within the real-effort task. Consequently, in examining parental competitive decisions, we omit permissive parents, coding their preferred scheme as "none". Therefore, the analysis in this part includes only the remaining half of the parent subjects—those who prefer a tournament or piece rate scheme, whether through direct authoritarian intervention or authoritative recommendation to their children.

Table 4 presents the distinct effects of two information conditions on parents' choice of competitions for their children. In Column 1, information regarding peers' grades notably increases parents' propensity to opt for tournaments. However, this trend significantly diminishes once information about their children's grades is introduced in the second stage (in Column 5). Conversely, information on children's willingness to compete does not appear to influence parental decisions at either stage. Importantly, this observed pattern persists even when factors such as the parents' risk preference, parents' beliefs about their children's chances of winning and their belief about their children's risk preference in the first stage are considered in the analysis (in Column 2).

Moreover, we control the kid's gender when performing the regression above in Columns 1–2 and 5–6. The results reveal a gender disparity in parents' inclination to tournament for children — before parents receive information on their children's scores — with a 10% significance level across four treatments. This gender gap becomes even more pronounced after controlling parents' belief of their children's likelihood of winning. Although Fornwagner, Pompeo and Serdarevic (2023) and Ifcher and Zarghamee (2023) find that decision-making for others in competing entry can narrow and even mitigate the gender gap of competition entry, Tungodden and Willén (2023) still find a gender gap when parents decide for children, consistent with our result. However, these gender-related patterns and disparities vanish in the second stage after last year's math scores are provided.

Further exploration into how children's gender affects parents' decisions towards tournaments with subsamples is reflected in Columns 3–4 and 7–8 of Table 4. For parents of boys, both pieces of information provided significantly bolster their inclination towards tournaments before the release of the math scores, and the interaction between the two suggests they act as substitutes. However, this influence disappears once the math scores are provided. In stark contrast, the information given to girls' parents lacks statistical significance and has a negligible economic influence on their decisions before grade information is provided. But parents' inclination to tournament for girls increases when the math scores and the willingness information are available. The heterogeneous impact of information in the two stages could potentially explain the disappearance of the gender disparity above.

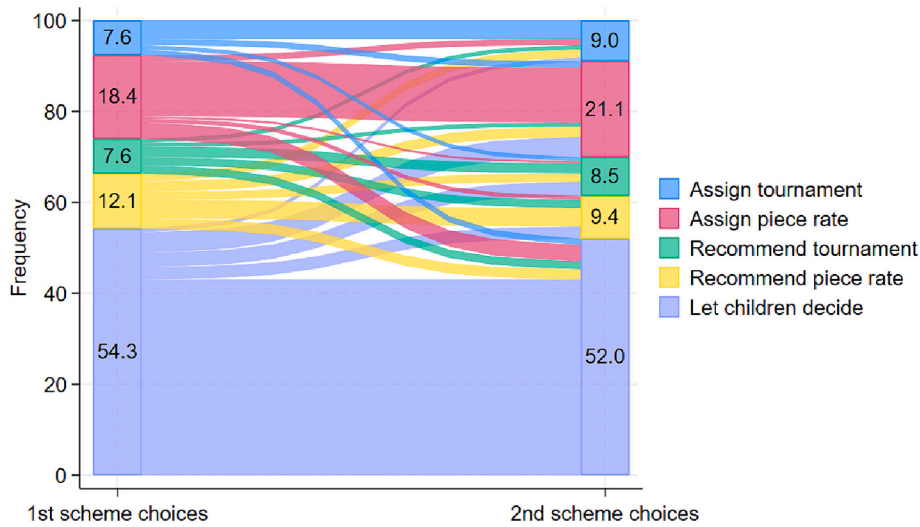


Fig. 2. Change of parental decision between two stages.

Table 4
Parents' Scheme Choice

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
	1st Scheme choice: opt for Tournament				2nd Scheme choice: opt for Tournament			
	All	All	Boys	Girls	All	All	Boys	Girls
Peer information	1.527** (0.67)	2.172*** (0.78)	3.509*** (1.32)	0.730 (1.10)	0.588 (0.55)	0.765 (0.58)	0.032 (0.78)	1.486 (0.96)
Willingness information	0.800 (0.81)	1.079 (0.93)	3.855** (1.73)	0.107 (1.41)	0.698 (0.78)	1.015 (0.84)	-10.814 (1243.52)	1.976* (1.06)
Both information	-0.891 (0.96)	-1.594 (1.13)	-4.704** (2.04)	0.943 (1.74)	-0.199 (0.94)	-0.769 (1.00)	11.169 (1243.52)	-1.396 (1.38)
Child's gender	0.762* (0.46)	1.168** (0.51)			-0.088 (0.43)	-0.174 (0.46)		
Risk attitude		-0.010 (0.01)	-0.036** (0.02)	0.009 (0.01)		-0.017** (0.01)	-0.027** (0.01)	-0.011 (0.01)
Belief: winning		17.714 (2024.67)	19.319 (2560.49)	14.468 (1730.61)		0.644 (0.77)	0.317 (1.06)	1.029 (1.31)
Belief: child's risk attitude		-0.002 (0.01)	0.016 (0.02)	-0.023 (0.02)		0.009 (0.01)	0.018 (0.02)	0.005 (0.01)
Math score		0.023 (0.02)	0.070** (0.03)	-0.019 (0.02)		0.002 (0.01)	0.023 (0.02)	-0.022 (0.02)
Constants	-2.167*** (0.61)	-21.302 (2024.67)	-25.930 (2560.49)	-14.192 (1730.61)	-1.094** (0.46)	-1.473 (1.17)	-2.479 (1.93)	-0.772 (1.76)
N	102	99	50	49	107	102	55	47

Notes: Coefficients from Logistic regressions. Standard errors are in parentheses. * $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$.

Finding 1: A gender gap exists in parents' tournament scheme choices for children. However, the gap can be mitigated by providing parents with information on their children's historical math scores.⁸

4.2.3. Parenting style and autonomy

Autonomy is a critical factor when considering decision-making on behalf of others or the delegation of choices (Ambuehl et al., 2021; Bartling, Fehr, & Herz, 2014; Falk & Kosfeld, 2006; Fehr, Herz, & Wilkening, 2013). Within family interactions, how parents either make decisions for their children or guide their behavior reflects a concern for children's autonomy, defined as parenting style. Parenting styles are reflected by actions or interventions parents employ to shape their children's behavior and even preferences. Both authoritative and permissive parents value children's autonomy. Authoritative parents, while valuing autonomy, actively monitor

⁸ The gender of parents also plays a significant role in deciding whether to opt for a tournament scheme for their children. Fathers, interestingly, exhibit a negative attitude towards the tournament scheme. They are even less likely to choose or suggest the tournament option for their sons as compared to their daughters. We present these results in Appendix Table A1.

their children's behavior. They invest considerable effort in molding their children's preferences, preferring to guide choices rather than restrict them. Permissive parents also support children's autonomy but with minimal intervention or guidance. In contrast, authoritarian parents impose a restricted choice set on children's behaviors on their children, often enforcing strict rules and harsh punishments. This style of parenting places less value on a child's autonomy, focusing on obedience and conformity to predetermined expectations instead.

As the distribution of parental decisions suggests, parents in our experiment can be categorized into three types of parenting. We focus on being authoritarian and being permissive, leaving authoritative parenting as a middle area. On the other hand, authoritarian and permissive parenting are not merely opposites on a linear scale; instead, they represent different philosophies concerning children's autonomy. This conceptual distinction allows us to use two different dependent variables to support the robustness of our results when estimating the impact of information provision on parental decisions.

Table 5 presents effects of the treatment on the authoritarian choices, namely to assign children to either tournament or piece rate payment scheme. The impact of information on designation choices reveals a distinct pattern in parenting style. Children's willingness to compete is an influential factor only at stage 2 when parents are informed about their children's historical math scores (in Column 5 and 6); otherwise, this information seems silent to parents (in Column 1 and 2). Additionally, the data suggest that parenting styles are not directly related to the children's gender, indicating parents do not distinguish their parenting due to the children's gender.

Despite this, when analyzing subgroups of boys and girls separately, we observe gender-based differences in how the treatment affects parenting towards boys and girls. In the initial stage, the treatment effect appears negligible for both subgroups. However, the negative impact observed in the second stage is primarily driven by the boys' parents, suggesting that they are more likely to alter their approach in response to information about willingness (in Column 7). Conversely, the parents of girls do not actively respond to the information given in stage 2, and even information on past math scores has a minor influence on their parenting decisions towards girls, according to the similar coefficients observed during the two stages (in Column 4 and 8). Interestingly, the information leads to an entirely opposite reaction from the parents of girls compared to the parents of boys, but this effect does not achieve statistical significance.

Table 6 reports the treatment impacts on parents' permissive choice, namely, whether parents do not assign or recommend any payment scheme and leave the choice to the children. It's important to note that being a permissive parent is mutually exclusive with being authoritarian. Consequently, information treatment exerts a contrary influence on the parental decision to adopt a permissive style - the willingness information significantly amplifies the likelihood of permissive parenting, as shown in Columns 5 and 6. Likewise, the effectiveness of information becomes prominent only in stage 2, echoing the pattern observed in Table 5. When parents are informed of their children's competitive inclination, they are more inclined to allow their children the autonomy to decide whether to enter the tournament.

The result of subsample regression also reveals the heterogeneity between parents of boys and girls. While the tendency observed in the total sample in stage 2 are mainly driven by boys' parents, they exhibit an active reaction to the willingness information even before the grade information was provided. On the contrary, girls' parents still show limited responses to similar information, irrespective of whether the grade information is available or not.

Finding 2: Parents adjust to a less authoritarian parenting style when they receive information about their children's willingness to compete, especially after being reminded of the children's abilities. When making competitive decision, parents prioritize their children's autonomy over monetary gains.

Finding 3: The impact of information on parenting style is greater for parents of boys than girls. Parents of boys significantly change their approach when provided information about their children's willingness to compete, whereas the same information influences parents of girls less.⁹

In summary, both analyses on parental competitive decisions and parenting styles suggest a divergent responsiveness to information between boys' and girls' parents. Boys' parents are more sensitive to information, whether in choosing tournament payment or parenting style, while information conditions can hardly change girls' parents.

4.3. How children react: Response to parental interventions

In this subsection, we explore children's response to parental intervention. Initially, we assess the impact of information intervention on children's final payment scheme in the second round of real-effort task. Subsequently, we examine the effects of parental intervention and parenting style on children's performance and earnings in the task, which reflect benefits that children receive through family interaction.

4.3.1. Final payment scheme across treatments

Children's decisions about the payment scheme are influenced by parental interventions and their inclinations towards competitiveness. Children with authoritarian parents initially select their preferred payment scheme independently, without knowing their parents' choice. Subsequently, they are informed of their parents' chosen payment scheme, and regardless of their initial choice, they are required to perform the task under the scheme selected by their authoritarian parents. In contrast, children with authoritative

⁹ While fathers don't differ significantly from mothers in terms of parenting style, they tend to adopt a less permissive approach towards their daughters and more likely to exhibit an authoritative style after receiving their daughters' grade information. These results are presented in Appendix Tables A2 and A3.

Table 5
Parenting Style: Authoritarian

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
	1st Parenting style: authoritarian				2nd Parenting style: authoritarian			
	All	All	Boys	Girls	All	All	Boys	Girls
Peer information	0.202 (0.42)	0.091 (0.43)	0.282 (0.61)	-0.114 (0.64)	0.038 (0.38)	0.007 (0.40)	0.065 (0.56)	-0.130 (0.60)
Willingness information	-0.294 (0.50)	-0.605 (0.56)	-1.423 (0.92)	-0.008 (0.76)	-1.171** (0.52)	-1.246** (0.58)	-17.973 (2866.50)	0.248 (0.73)
Both information	0.286 (0.64)	0.719 (0.69)	1.441 (1.06)	0.057 (0.98)	0.807 (0.65)	0.978 (0.70)	17.776 (2866.50)	-0.745 (0.97)
Child's gender	-0.161 (0.31)	-0.157 (0.32)			-0.029 (0.30)	0.051 (0.32)		
Risk attitude		0.001 (0.01)	0.002 (0.01)	-0.002 (0.01)		-0.004 (0.01)	-0.006 (0.01)	-0.001 (0.01)
Belief: winning		-0.528 (0.61)	-0.247 (0.86)	-0.541 (0.99)		0.251 (0.50)	0.617 (0.74)	0.418 (0.76)
Belief: child's risk attitude		0.003 (0.01)	0.006 (0.01)	0.003 (0.01)		0.004 (0.01)	-0.002 (0.01)	0.010 (0.01)
Math score		-0.008 (0.01)	-0.020* (0.01)	0.007 (0.01)		-0.018** (0.01)	-0.028** (0.01)	-0.016 (0.01)
Constants	-1.022*** (0.34)	-0.140 (0.85)	0.165 (1.11)	-1.004 (1.49)	-0.574* (0.31)	0.553 (0.74)	1.586 (1.09)	-0.291 (1.21)
N	223	211	118	93	223	211	118	93

Notes: Coefficients from Logistic regressions. Standard errors are in parentheses. * $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$.

Table 6
Parenting Style: Permissive

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
	1st Parenting style: permissive				2nd Parenting style: permissive			
	All	All	Boys	Girls	All	All	Boys	Girls
Peer information	0.105 (0.37)	0.248 (0.39)	0.324 (0.54)	0.324 (0.57)	0.253 (0.37)	0.425 (0.39)	0.652 (0.56)	0.382 (0.60)
Willingness information	0.318 (0.42)	0.527 (0.46)	1.832*** (0.71)	-1.201 (0.78)	1.477*** (0.46)	1.569*** (0.49)	4.084*** (1.15)	-0.392 (0.74)
Both information	-0.492 (0.55)	-0.859 (0.59)	-1.973** (0.86)	0.607 (0.96)	-1.345** (0.58)	-1.555** (0.62)	-4.283*** (1.26)	0.625 (0.94)
Child's gender	0.395 (0.27)	0.389 (0.29)			0.108 (0.28)	-0.016 (0.30)		
Risk attitude		-0.005 (0.00)	-0.005 (0.01)	-0.005 (0.01)		0.000 (0.00)	0.001 (0.01)	-0.002 (0.01)
Belief: winning		1.160* (0.63)	0.914 (0.83)	0.981 (1.18)		-0.652 (0.48)	-1.224 (0.76)	-1.051 (0.73)
Belief: child's risk attitude		0.002 (0.01)	0.002 (0.01)	0.003 (0.01)		0.001 (0.01)	0.013 (0.01)	-0.008 (0.01)
Math score		0.008 (0.01)	0.014 (0.01)	0.009 (0.01)		0.019** (0.01)	0.021* (0.01)	0.026* (0.01)
Constants	-0.118 (0.30)	-1.791** (0.85)	-1.900* (1.13)	-1.495 (1.53)	-0.413 (0.30)	-1.361* (0.73)	-2.310** (1.09)	-0.698 (1.22)
N	223	211	118	93	223	211	118	93

Notes: Coefficients from Logistic regressions. Standard errors are in parentheses. * $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$.

parents are aware of their parents' recommendations from the outset yet retain the autonomy to decide whether to follow those suggestions. Meanwhile, those with permissive parents are given complete freedom to choose their payment scheme, with no explicit pressure to conform to parental expectations.

Table 7 indicates the effect of information conditions on children's choices. Column 1 demonstrates that information regarding the willingness to compete significantly increases the likelihood of children choosing to enter a tournament. In contrast, peers' grade information appears to exert a minor influence on this choice. We also consider the potential impact of children's initial payment scheme preferences prior to parental intervention. When this control is applied, the importance of willingness information remains evident (in Column 2).

However, the regression pattern reveals distinct patterns when considering gender heterogeneity. The regression outcomes for boys and girls, detailed in Column 3 and Column 4, respectively, suggest that while both types of information affect the entry of the tournament in subsamples, they do so in gender-specific ways. Information on willingness to compete has a pronounced impact on boys, whereas girls are more influenced by information concerning their peers' grades. It is important to note that this regression

Table 7
Final Scheme for Children

	(1)	(2)	(3)	(4)
	Tournament	Tournament	Tournament	Tournament
Peer information	0.247 (0.37)	0.451 (0.47)	-0.153 (0.63)	1.425* (0.78)
Willingness information	1.484*** (0.46)	1.481** (0.60)	1.784** (0.89)	1.142 (0.89)
Both information	-1.030* (0.59)	-0.626 (0.78)	-0.695 (1.07)	-0.721 (1.20)
Child's scheme choice		3.474*** (0.46)	3.573*** (0.67)	3.528*** (0.70)
Child's gender		0.048 (0.38)		
Number of correct answers		0.030 (0.07)	-0.035 (0.09)	0.147 (0.12)
Child's risk attitude		-0.003 (0.01)	-0.003 (0.01)	-0.002 (0.01)
Math score		0.004 (0.01)	0.009 (0.01)	-0.003 (0.02)
Constants	-0.215 (0.27)	-3.259*** (0.97)	-2.982** (1.39)	-3.885*** (1.51)
N	223	214	120	94

Notes: Coefficients from Logistic regressions. Standard errors are in parentheses. * $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$.

reports the correlation between the information intervention to parents and their ultimate impact on children's payment scheme in the classroom experiment, similar to a parent-based policy aiming to promote children's human capital investment (Barrera-Osorio, Gonzalez, Lagos, & Deming, 2020; Escueta, Nickow, Oreopoulos, & Quan, 2020; Gallego, Malamud, & Pop-Eleches, 2020; Sylvia et al., 2021). Consequently, the observed heterogeneous effects predominantly reflect the varied reactions of parents to the information and

Table 8
Children's performance and parents' scheme choice

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
	Number of correct answers				Earned points			
	All	All	Boys	Girls	All	All	Boys	Girls
Assign tournament	-1.069 (0.84)	0.184 (0.54)	0.393 (0.77)	0.324 (0.80)	-1.247 (3.36)	2.996 (2.68)	4.845 (3.59)	-0.519 (4.33)
Recommend tournament	1.562* (0.86)	0.947* (0.57)	1.644* (0.91)	0.674 (0.73)	6.385* (3.43)	4.260 (2.80)	9.953** (4.21)	-1.693 (3.94)
Assign piece rate	-0.974 (0.60)	-0.135 (0.40)	-0.150 (0.61)	0.270 (0.55)	-7.729*** (2.40)	-5.335*** (1.99)	-7.015** (2.84)	-3.973 (2.97)
Recommend piece rate	-0.396 (0.83)	0.412 (0.55)	0.495 (0.77)	0.589 (0.81)	-0.461 (3.29)	3.739 (2.70)	3.715 (3.56)	2.728 (4.36)
Parents Participated	-0.067 (0.44)	-0.283 (0.41)	-0.640 (0.63)	-0.229 (0.56)	-0.733 (1.77)	-0.645 (2.04)	-1.458 (2.92)	-0.572 (2.99)
Gender	0.366 (0.38)	0.402 (0.25)			2.168 (1.50)	2.046* (1.22)		
Child's scheme choice		0.296 (0.27)	0.429 (0.38)	0.174 (0.40)		8.515*** (1.33)	10.466*** (1.77)	6.040*** (2.14)
Peer information		-0.032 (0.42)	0.084 (0.61)	0.065 (0.58)		0.889 (2.07)	-0.431 (2.83)	3.435 (3.11)
Willingness information		-0.404 (0.49)	0.502 (0.73)	-1.523** (0.69)		-0.903 (2.40)	-1.383 (3.38)	1.727 (3.73)
Both information		-0.162 (0.63)	-0.982 (0.93)	0.898 (0.89)		-1.817 (3.12)	-0.672 (4.31)	-4.732 (4.81)
Previous number of correct answers		0.645*** (0.05)	0.635*** (0.07)	0.659*** (0.07)		1.988*** (0.24)	1.915*** (0.31)	2.136*** (0.38)
Risk attitude		0.002 (0.00)	0.000 (0.01)	0.005 (0.01)		-0.019 (0.02)	-0.006 (0.03)	-0.015 (0.04)
Math score		0.053*** (0.01)	0.056*** (0.01)	0.050*** (0.01)		0.104*** (0.04)	0.126*** (0.05)	0.058 (0.06)
Constants	8.016*** (0.38)	-0.572 (0.58)	-0.345 (0.76)	-0.496 (0.91)	14.479*** (1.51)	-12.401*** (2.86)	-12.666*** (3.53)	-9.118* (4.89)
N	354	331	189	142	354	331	189	142

Notes: Coefficients from OLS regressions. Standard errors are in parentheses. * $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$.

influence children's final payment choices through parental interventions rather than directly affecting the children's decisions.

Findings 4: Compared to the control group with only grade information provided, boys enter the tournament more when parents are provided information on children's willingness to compete. At the same time, girls enter the tournament more when information on peer grades is provided. This aligns with prior observations that boys' autonomy has a more significant impact on parental decisions, result in their final choice of tournament scheme.

4.3.2. Performance and payoff with parenting

Another perspective to analyze how parents affect children's behavior is to focus on the impact of parent's specific interventions on children's performance and their payoff in the experiment. Recall that children whose parent didn't participate in our survey experiment served as the control group without parental intervention. In this way, we compare the impact of parental intervention with the control group, wherein children make their own decisions independently.

On the basis of our empirical strategy, we incorporate parental intervention dummies into the regression, comparing children's performance and final payoff in the experiment with their counterparts whose parents didn't participate in the experiment. We differentiate between children whose parents participated in the experiment and those in the control group using the 'Parents Participated' dummy. Note that the permissive parents neither request nor recommend in the family interaction experiment. In other words, children whose parents didn't participate in the experiment share some similarities with children whose parents are permissive. Both choose payment schemes based on their own preference and their decision under the specific paired circumstance, without any parental intervention. Thus, 'Parents Participated' is how we distinguish these two types of subjects.

Table 8 demonstrates parental impact on children's performance in Columns 1–4 and the impact on children's payoff in Columns 5–8. The influence of parents on their children's performance in the real-effort task is multifaceted, with their inclination towards competition and their parenting style playing crucial roles.

Parents' inclination to tournament affects children differently with being authoritarian and authoritative. As shown in Column 1, a parent's recommendation for competition generally boosts a child's performance. However, when parents directly impose the tournament scheme, it can negatively affect children's performance, although this is not statistically significant. This distinction becomes less pronounced when controlling children's performance in the piece rate setting, as illustrated in Column 2, suggesting that the negative impact of imposed competition might be linked to a misalignment with the child's abilities. Since the preview grade information does not perfectly reflect children's ability in the specific experimental task, parents might unintentionally steer their child into a competition that does not suit their skill level. This is especially disadvantageous for children who perform less well than their peers in the experimental task, with their suboptimal performance being more apparent in the payment outcomes.

On the contrary, parents' inclination of the piece rate scheme tend to demotivate children. Designation to the piece rate scheme discourages children from exerting effort, resulting in a significant decrease in experimental payoff. This decrease remains significant even after controlling for previous performance. Consequently, designating the piece rate scheme lowers the children's payoff than they could have entered the competition, indicating that steering children towards a piece rate scheme is not advisable for parents to promote children's performance.

Moreover, children whose parents did not participate in the experiment do not significantly differ from those with permissive parents. However, based on the coefficients, the absence of parental participation can negatively impact children's performance and payoff, suggesting that family interaction with parents can still be beneficial, even in instances where parents may exhibit bias.

It is worth noting that gender disparities also exist in the interaction between parenting styles and children's responses. Parental interventions tend to be more effective with boys than with girls. Recommendations about either payment scheme could improve boys' performance, whereas authoritarian designation undermines boys' motivation. As a result, recommendations on tournament schemes largely improve boys' payoff, whereas authoritarian intervention also leads to improvements, though not statistically significant. Meanwhile, the parental recommendation to piece rate does not necessarily have a negative impact on payoff, but assigning the piece rate scheme detracts from boys' payoff, causing them to miss out on potential benefits from winning the tournament. On the other hand, parental interventions have a subtler impact on girls. Although any interventions may increase girls' performance in Round 2, none significantly improve girls' payoff under parental intervention. This could exacerbate the gender gap in settings where tournament entry is optional.

Children's initial choice of payment scheme implies some sight of the various impacts of parenting styles on children's performance. Before parents' decisions are implemented in the program, children are asked to choose a scheme according to their preferences. Unsurprisingly, children's initial choice of tournament correlates with their eventual scheme under permissive or authoritative parenting, thus translating into greater rewards. Moreover, the initial competitive choice motivates their performance even if their performance in the piece rate scheme is controlled, suggesting the autonomy of scheme choosing motivates children (Bartling et al., 2014; Falk & Kosfeld, 2006; Fehr et al., 2013). This is also consistent with the literature on competition (Dechenaux, Kovenock, & Sheremeta, 2015; Lazear, 2018) that the competitive nature of tournaments drives individuals to exert more effort, thereby earning higher rewards from completing tasks. Moreover, the data indicate that this effect is particularly pronounced in boys, consistent with the gender disparity in how parental intervention influences children's performance. Even after controlling the performance, the improved performance in Round 2 is largely driven by boys' initial competitive motivation. Conversely, girls do not seem motivated by their initial preference for competition. As a result, overlooking children's autonomy may stifle children's motivations and potentially lead to poorer performance outcomes.

Findings 5: There is no definitive answer for parents on whether to guide children towards a tournament or piece-rate scheme, thus, children's autonomy matters in their motivation to exert effort. While allowing children to choose for themselves, as permissive parents do, may not always yield the best outcomes, providing recommendations authoritatively could motivate children and help

them find their optimal path.¹⁰

5. Conclusion and discussion

Parenting style provides a dynamic lens to investigate how parents shape children's behavior and mold their preferences. Economists often employ rational models to understand the decisions parents make for their children and parent-child interactions that contribute to human capital development. While young children may make mistakes, parents too may exhibit behavioral biases, deviating from the rational family planner who allocates resources such as time and attention optimally with perfect information. Moreover, the journey of nurturing a child's development cannot be simplified to a single "correct" approach, especially when it comes to the development of non-cognitive or socio-emotional abilities. Thus, understanding how parental intervention is determined and its impact on children's behavior is essential.

We design a lab-in-the-field experiment to bridge the gap between information and parenting style. The experiment, conducted in a primary school in China's rural areas, involves a two-round real-effort task with an optional payment scheme. Parents make their educational decisions for children based on the information provided. Sequentially, children exert effort and receive rewards under an optional payment scheme, reflecting their own preferences and parental interventions.

Our experiment finds that, firstly, there is a distinct gender gap when parents choose payment schemes for their children. Parents are inclined to choose more tournaments for boys and fewer for girls, consistent with [Tungodden and Willén \(2023\)](#). However, the gender disparity disappears with information on children's preview math scores. Secondly, parents care more about children's autonomy. With information on children's willingness to compete, parents tend to be less authoritarian and grant more room for children to make their own decisions. Since children show more inclination towards the tournament scheme than their parents initially assume, parents choose more competitive schemes after learning about their children's competitive preferences. Lastly, we find gender-based heterogeneity in how parents respond to information, contributing to the literature on the origin of gender differences in willingness to compete. Our findings indicate that while parenting styles do not directly correlate with the children's gender, parental interventions when faced with additional information, do vary asymmetrically between boys and girls. Our lab-in-the-field experiment, while academically oriented, has implications for everyday educational practice and parenting-related public policy. Firstly, our research underscores the importance of feedback concerning children's performance and behaviors. Although academic performance is often heavily emphasized in China, our findings suggest that feedback on children's behavior may be equally, if not more, valuable to parents than traditional grade reports. The provision of accurate information assists parents in updating their beliefs, moving beyond potential biases influenced by stereotypes or imperfect memories ([Mayer, Kalil, Oreopoulos, & Gallegos, 2019](#)).

The advancement of digital technology, coupled with infrastructure improvements in China, facilitates parent-teacher interactions, making personalized informational interventions both feasible and economical—even in rural areas, such as the township where our experimental school is located. Hence, schools and the education system should leverage these technological advancements to enhance the flow of information to parents ([Bergman & Chan, 2021](#); [Doss, Fahle, Loeb, & York, 2019](#); [Escueta et al., 2020](#)), thereby reinforcing familial educational involvement and interactions.

Another significant implication of our study is the recognition of children's autonomy. Despite improved information flows from schools, parents may still lack perfect insight into their children's perspectives, and the disclosures of children's attitudes can be misinterpreted. Consequently, there is always a trade-off when making decisions for children. An altruistic parent decides in consideration of both parental and children's perspectives, with potential conflicts. Our findings advocate for an authoritative approach to parenting, striking a balance between guiding children and affording them the autonomy to make choices. This approach not only motivates children but also empowers them to act independently, which our results suggest is an effective strategy for fostering both motivation and self-determination in children.

Our research, centered on family dynamics in context of tournament entry, has unveiled intriguing patterns of gender heterogeneity in information treatment. However, a deeper understanding of the processes driving these patterns and their broader implications calls for additional research. Existing literature has explored the impact of parenting style on children's cognitive and non-cognitive abilities in China ([Deng & Tong, 2020](#); [Zhang et al., 2020](#)). Still, the unique family dynamics in rural China need further attention. Apart from the phenomenon of left-behind children and grandparenting, behavioral biases in parents' educational decision-making present a common challenge, particularly for those struggling to balance income generation with quality time with their children. Our study has made strides by implementing a lab-in-the-field experiment in a rural primary school, but additional experiments and comprehensive datasets on rural China are essential for a more nuanced understanding of these dynamics.

Additionally, while our findings indicate gender-based heterogeneity in information treatment, our experimental pool was limited to a single primary school. This makes it challenging to ascertain whether our results are driven by gender stereotypes, son preference in investment, or the specific competitive context. Future research should explore how family interaction evolves concerning gender and strive to enhance the generalizability of our findings.

¹⁰ Despite men generally showing a greater willingness to enter tournaments ([Markowsky & Beblo, 2022](#); [Niederle & Vesterlund, 2007](#)), fathers in our sample pool exhibit a conservative tendency towards the tournament scheme. This avoidance of tournaments is reflected in their parental intervention when interacting with their children, consequently having a negative impact on both the children's performance and their final payoff. Please refer to Appendix Table A4 for these results.

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Table A1
Parents' Scheme Choice

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
	1st Scheme choice: opt for Tournament				2nd Scheme choice: opt for Tournament			
	All	All	Boys	Girls	All	All	Boys	Girls
Peer information	1.812** (0.79)	2.566*** (0.96)	4.804** (2.28)	2.211 (1.58)	1.037 (0.64)	1.259* (0.69)	0.558 (0.99)	2.015* (1.13)
Willingness information	0.792 (0.95)	1.522 (1.06)	6.572** (2.76)	1.050 (1.70)	0.956 (0.88)	1.206 (0.96)	-11.409 (2781.22)	2.262* (1.25)
Both information	-1.080 (1.14)	-2.108 (1.33)	-7.632** (3.41)	0.535 (2.29)	-0.947 (1.07)	-1.470 (1.17)	11.686 (2781.22)	-2.593 (1.66)
Child's gender	1.262** (0.55)	1.586*** (0.62)			-0.065 (0.51)	-0.176 (0.55)		
Parent's gender	-1.226* (0.72)	-1.055 (0.80)	-3.292** (1.66)	-1.175 (1.36)	-1.406** (0.62)	-1.334** (0.66)	-2.208* (1.27)	-0.737 (0.85)
Risk attitude		-0.013 (0.01)	-0.082** (0.04)	0.004 (0.02)		-0.025*** (0.01)	-0.051** (0.02)	-0.020 (0.01)
Belief: winning		17.576 (1460.94)	21.279 (3281.85)	13.659 (1670.83)		0.800 (0.92)	0.544 (1.37)	1.030 (1.34)
Belief: child's risk attitude		-0.004 (0.01)	0.060* (0.03)	-0.049* (0.03)		0.020* (0.01)	0.052* (0.03)	0.007 (0.02)
Math score		0.032 (0.02)	0.102* (0.06)	-0.017 (0.04)		-0.003 (0.01)	0.019 (0.03)	-0.020 (0.02)
Constants	-2.387*** (0.75)	-22.010 (1460.94)	-30.690 (3281.86)	-13.162 (1670.83)	-1.040* (0.60)	-1.474 (1.45)	-3.281 (2.78)	-0.751 (1.97)
N	83	83	40	43	89	86	44	42

Notes: Coefficients from Logistic regressions. Standard errors are in parentheses. * $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$.

Table A2
Parenting Style: Authoritarian

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
	1st Parenting style: authoritarian				2nd Parenting style: authoritarian			
	All	All	Boys	Girls	All	All	Boys	Girls
Peer information	0.144 (0.46)	0.136 (0.47)	0.309 (0.69)	0.224 (0.68)	0.058 (0.41)	0.144 (0.44)	0.160 (0.63)	0.097 (0.67)
Willingness information	-0.434 (0.56)	-0.407 (0.58)	-1.720 (1.09)	0.218 (0.81)	-1.209** (0.57)	-1.069* (0.60)	-17.730 (1409.70)	0.604 (0.77)
Both information	0.314 (0.73)	0.340 (0.75)	1.545 (1.23)	-0.700 (1.08)	0.824 (0.71)	0.692 (0.75)	17.396 (1409.70)	-1.242 (1.06)
Child's gender	-0.310 (0.35)	-0.273 (0.36)			-0.160 (0.33)	-0.114 (0.35)		
Parent's gender	-0.013 (0.40)	-0.016 (0.43)	-0.404 (0.64)	0.395 (0.60)	0.426 (0.36)	0.432 (0.40)	-0.232 (0.64)	1.201** (0.59)
Risk attitude		0.000 (0.01)	0.000 (0.01)	-0.003 (0.01)		-0.005 (0.01)	-0.007 (0.01)	-0.001 (0.01)
Belief: winning		-0.431 (0.66)	0.647 (1.06)	-1.049 (1.10)		0.211 (0.57)	1.211 (0.89)	-0.104 (0.85)
Belief: child's risk attitude		0.000 (0.01)	0.005 (0.01)	-0.001 (0.01)		0.001 (0.01)	-0.004 (0.01)	0.005 (0.01)
Math score		-0.016* (0.01)	-0.040*** (0.01)	0.003 (0.01)		-0.022** (0.01)	-0.045*** (0.02)	-0.018 (0.01)
Constants	-0.983** (0.38)	0.637 (0.96)	0.951 (1.28)	-0.111 (1.78)	-0.596* (0.35)	1.106 (0.82)	2.701** (1.30)	0.235 (1.40)
N	187	180	101	79	187	180	101	79

Notes: Coefficients from Logistic regressions. Standard errors are in parentheses. * $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$.

Table A3

Parenting Style: Permissive

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
	1st Parenting style: permissive				2nd Parenting style: permissive			
	All	All	Boys	Girls	All	All	Boys	Girls
Peer information	0.068 (0.40)	0.092 (0.42)	0.330 (0.59)	-0.148 (0.63)	-0.009 (0.41)	0.052 (0.43)	0.330 (0.60)	-0.143 (0.68)
Willingness information	0.245 (0.45)	0.214 (0.48)	1.645** (0.74)	-1.750* (0.91)	1.287*** (0.49)	1.204** (0.51)	3.882*** (1.20)	-0.933 (0.79)
Both information	-0.355 (0.61)	-0.397 (0.64)	-1.773* (0.91)	1.611 (1.12)	-0.850 (0.63)	-0.767 (0.66)	-3.689*** (1.31)	1.822* (1.07)
Child's gender	0.566* (0.30)	0.577* (0.32)			0.304 (0.31)	0.259 (0.32)		
Parent's gender	0.059 (0.35)	-0.047 (0.38)	0.265 (0.54)	-0.505 (0.58)	-0.623* (0.36)	-0.648* (0.39)	0.089 (0.57)	-1.974*** (0.73)
Risk attitude		-0.003 (0.01)	-0.001 (0.01)	-0.005 (0.01)		0.002 (0.01)	0.001 (0.01)	-0.000 (0.01)
Belief: winning		1.339* (0.70)	0.617 (0.86)	15.606 (1419.48)		-0.509 (0.54)	-1.494* (0.84)	-0.221 (0.84)
Belief: child's risk attitude		0.005 (0.01)	0.002 (0.01)	0.010 (0.01)		0.002 (0.01)	0.010 (0.01)	-0.004 (0.01)
Math score		0.011 (0.01)	0.020* (0.01)	0.009 (0.01)		0.018** (0.01)	0.028* (0.01)	0.023 (0.02)
Constants	-0.157 (0.34)	-2.445** (0.97)	-2.299* (1.19)	-16.266 (1419.48)	-0.261 (0.34)	-1.494* (0.81)	-2.220* (1.17)	-1.095 (1.54)
N	187	180	101	79	187	180	101	79

Notes: Coefficients from Logistic regressions. Standard errors are in parentheses. * $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$.

Table A4

Children's Performance and Parents' Scheme Choice

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
	Number of correct answers				Earned points			
	All	All	Boys	Girls	All	All	Boys	Girls
Assign tournament	-1.337 (0.86)	-0.090 (0.60)	0.205 (0.85)	0.336 (0.92)	-1.698 (3.33)	2.295 (2.81)	4.042 (3.99)	0.408 (4.30)
Recommend tournament	1.293 (0.96)	0.789 (0.70)	1.691 (1.11)	0.920 (0.96)	6.395* (3.74)	3.886 (3.27)	11.307** (5.24)	-1.957 (4.47)
Assign piece rate	-1.140* (0.63)	-0.259 (0.46)	-0.377 (0.68)	0.641 (0.68)	-6.836*** (2.43)	-5.177** (2.13)	-7.175** (3.20)	-3.352 (3.15)
Recommend piece rate	0.112 (0.83)	0.618 (0.60)	0.963 (0.86)	1.062 (0.91)	1.906 (3.22)	4.592 (2.79)	4.453 (4.05)	3.382 (4.23)
Gender	0.958** (0.48)	0.545 (0.35)			3.573* (1.87)	1.262 (1.64)		
Parent's gender	-0.782 (0.57)	-0.722* (0.41)	-0.605 (0.57)	-1.328** (0.65)	-4.824** (2.22)	-3.423* (1.92)	-3.203 (2.68)	-2.633 (3.03)
Child's scheme choice		-0.010 (0.37)	-0.449 (0.55)	0.699 (0.55)		7.674*** (1.74)	9.180*** (2.57)	5.803** (2.56)
Peer information		-0.111 (0.47)	-0.213 (0.66)	0.038 (0.67)		2.002 (2.17)	-0.762 (3.12)	5.494* (3.12)
Willingness information		-0.711 (0.53)	0.235 (0.78)	-2.226*** (0.82)		-1.355 (2.49)	-1.942 (3.66)	0.610 (3.83)
Both information		0.088 (0.70)	-0.612 (0.99)	1.425 (1.08)		-2.518 (3.26)	-0.771 (4.67)	-5.893 (5.03)
Previous number of correct answers		0.570*** (0.07)	0.565*** (0.09)	0.594*** (0.09)		1.757*** (0.31)	1.752*** (0.44)	1.932*** (0.44)
Risk attitude		0.003 (0.01)	0.007 (0.01)	-0.002 (0.01)		-0.013 (0.03)	0.017 (0.05)	-0.041 (0.05)
Math score		0.058*** (0.01)	0.066*** (0.01)	0.049*** (0.02)		0.103** (0.05)	0.114* (0.07)	0.075 (0.08)
Constants	7.924*** (0.45)	-0.309 (0.88)	-0.562 (1.33)	-0.000 (1.30)	13.929*** (1.75)	-10.104** (4.12)	-11.037* (6.28)	-8.421 (6.06)
N	187	180	101	79	187	180	101	79

Notes: Coefficients from OLS regressions. Standard errors are in parentheses. * $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$.

Declaration of competing interest

The authors declare that there are no conflicts of interest regarding the publication of this paper.

Data availability

Data will be made available on request.

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References

- Agostinelli, F., Doepke, M., Sorrenti, G., & Zilibotti, F. (2022). When the great equalizer shuts down: Schools, peers, and parents in pandemic times. *Journal of Public Economics*, 206, Article 104574. <https://doi.org/10.1016/j.jpubeco.2021.104574>
- Akee, R., Copeland, W., Costello, E. J., & Simeonova, E. (2018). How does household income affect child personality traits and behaviors? *American Economic Review*, 108(3), 775–827. <https://doi.org/10.1257/aer.20160133>
- Ambuehl, S., Bernheim, B. D., & Ockenfels, A. (2021). What motivates paternalism? An experimental study. *American Economic Review*, 111(3), 787–830. <https://doi.org/10.1257/aer.20191039>
- Ao, X., Chen, X., & Zhao, Z. (2022). Is care by grandparents or parents better for children's non-cognitive skills? Evidence on locus of control from China. *China Economic Review*, 71, Article 101734. <https://doi.org/10.1016/j.chieco.2021.101734>
- Attanasio, O., Cattani, S., Fitzsimons, E., Meghir, C., & Rubio-Codina, M. (2020). Estimating the production function for human capital: Results from a randomized controlled trial in Colombia. *American Economic Review*, 110(1), 48–85. <https://doi.org/10.1257/aer.20150183>
- Aucejo, E., & James, J. (2021). The path to college education: The role of math and verbal skills. *Journal of Political Economy*, 129(10), 2905–2946. <https://doi.org/10.1086/715417>
- Barrera-Osorio, F., Gonzalez, K., Lagos, F., & Deming, D. J. (2020). Providing performance information in education: An experimental evaluation in Colombia. *Journal of Public Economics*, 186, Article 104185. <https://doi.org/10.1016/j.jpubeco.2020.104185>
- Bartling, B., Fehr, E., & Herz, H. (2014). The intrinsic value of decision rights. *Econometrica*, 82(6), 2005–2039. <https://doi.org/10.3982/ECTA11573>
- Ben-Ner, A., List, J. A., Putterman, L., & Samek, A. (2017). Learned generosity? An artefactual field experiment with parents and their children. *Journal of Economic Behavior & Organization*, 143, 28–44. <https://doi.org/10.1016/j.jebo.2017.07.030>
- Bergman, P. (2021). Parent-child information frictions and human capital investment: Evidence from a field experiment. *Journal of Political Economy*, 129(1), 286–322. <https://doi.org/10.1086/711410>
- Bergman, P., & Chan, E. W. (2021). Leveraging parents through low-cost technology the impact of high-frequency information on student achievement. *Journal of Human Resources*, 56(1), 125–158. <https://doi.org/10.3368/jhr.56.1.1118-9837R1>
- Bisin, A., & Verdier, T. (2001). The economics of cultural transmission and the dynamics of preferences. *Journal of Economic Theory*, 97(2), 298–319. <https://doi.org/10.1006/jeth.2000.2678>
- Brenøe, A. A., & Epper, T. (2022). Parenting values and the intergenerational transmission of time preferences. *European Economic Review*, 148, Article 104208. <https://doi.org/10.1016/j.eurocorev.2022.104208>
- Brouwer, T., Galeotti, F., & Villevall, M. C. (2023). Teaching norms: Direct evidence of parental transmission. *The Economic Journal*, 133(650), 872–887. <https://doi.org/10.1093/ej/ueac074>
- Carneiro, P., Kraftman, L., Mason, G., Moore, L., Rasul, I., & Scott, M. (2021). The impacts of a multifaceted prenatal intervention on human capital accumulation in early life. *American Economic Review*, 111(8), 2506–2549. <https://doi.org/10.1257/aer.20191726>
- Chen, D. L., Schonger, M., & Wickens, C. (2016). oTree—An open-source platform for laboratory, online, and field experiments. *Journal of Behavioral and Experimental Finance*, 9, 88–97. <https://doi.org/10.1016/j.jbef.2015.12.001>
- Chi, W., & Qian, X. (2016). Human capital investment in children: An empirical study of household child education expenditure in China, 2007 and 2011. *China Economic Review*, 37, 52–65. <https://doi.org/10.1016/j.chieco.2015.11.008>
- Chowdhury, S., Sutter, M., & Zimmermann, K. F. (2022). Economic preferences across generations and family clusters: A large-scale experiment in a developing country. *Journal of Political Economy*, 130(9), 2361–2410. <https://doi.org/10.1086/720395>
- Cobb-Clark, D. A., Salamanca, N., & Zhu, A. (2019). Parenting style as an investment in human development. *Journal of Population Economics*, 32(4), 1315–1352. <https://doi.org/10.1007/s00148-018-0703-2>
- Crosetto, P., & Filippin, A. (2013). The “bomb” risk elicitation task. *Journal of Risk and Uncertainty*, 47(1), 31–65. <https://doi.org/10.1007/s11166-013-9170-z>
- Cunha, F., & Heckman, J. (2007). The Technology of Skill Formation. *American Economic Review*, 97(2), 31–47. <https://doi.org/10.1257/aer.97.2.31>
- Cunha, F., Heckman, J. J., & Schennach, S. M. (2010). Estimating the Technology of Cognitive and Noncognitive Skill Formation. *Econometrica*, 78(3), 883–931. <https://doi.org/10.3982/ECTA6551>
- Dechenaux, E., Kovenock, D., & Sheremeta, R. M. (2015). A survey of experimental research on contests, all-pay auctions and tournaments. *Experimental Economics*, 18(4), 609–669. <https://doi.org/10.1007/s10683-014-9421-0>
- Del Boca, D., Flinn, C., & Wiswall, M. (2014). Household choices and child development. *The Review of Economic Studies*, 81(1), 137–185. <https://doi.org/10.1093/restud/rdt026>
- Deng, L., & Tong, T. (2020). Parenting style and the development of noncognitive ability in children. *China Economic Review*, 62, Article 101477. <https://doi.org/10.1016/j.chieco.2020.101477>
- Dizon-Ross, R. (2019). Parents' beliefs about their Children's academic ability: Implications for educational investments. *American Economic Review*, 109(8), 2728–2765. <https://doi.org/10.1257/aer.20171172>
- Doepke, M., & Zilibotti, F. (2017). Parenting with style: Altruism and paternalism in intergenerational preference transmission. *Econometrica*, 85(5), 1331–1371. <https://doi.org/10.3982/ECTA14634>
- Dohmen, T., Falk, A., Huffman, D., & Sunde, U. (2012). The intergenerational transmission of risk and trust attitudes. *The Review of Economic Studies*, 79(2), 645–677. <https://doi.org/10.1093/restud/rdr027>
- Doss, C., Fahle, E. M., Loeb, S., & York, B. N. (2019). More than just a nudge supporting kindergarten parents with differentiated and personalized text messages. *Journal of Human Resources*, 54(3), 567–603. <https://doi.org/10.3368/jhr.54.3.0317-8637R>
- Escueta, M., Nickow, A. J., Oreopoulos, P., & Quan, V. (2020). Upgrading education with technology: Insights from experimental research. *Journal of Economic Literature*, 58(4), 897–996. <https://doi.org/10.1257/jel.20191507>
- Falk, A., & Kosfeld, M. (2006). The hidden costs of control. *American Economic Review*, 96(5), 1611–1630. <https://doi.org/10.1257/aer.96.5.1611>

- Falk, A., Kosse, F., Pinger, P., Schildberg-Hörisch, H., & Deckers, T. (2021). Socioeconomic status and inequalities in Children's IQ and economic preferences. *Journal of Political Economy*, 129(9), 2504–2545. <https://doi.org/10.1086/714992>
- Fé, E., Gill, D., & Prowse, V. (2022). Cognitive skills, strategic sophistication, and life outcomes. *Journal of Political Economy*, 130(10), 2643–2704. <https://doi.org/10.1086/720460>
- Fehr, E., Herz, H., & Wilkening, T. (2013). The lure of authority: Motivation and incentive effects of power. *American Economic Review*, 103(4), 1325–1359. <https://doi.org/10.1257/aer.103.4.1325>
- Fornwagner, H., Pompeo, M., & Serdarevic, N. (2023). Choosing competition on behalf of someone Else. *Management Science*, 69(3), 1555–1574. <https://doi.org/10.1287/mnsc.2022.4413>
- Francesconi, M., & Heckman, J. J. (2016). Child development and parental investment: Introduction. *The Economic Journal*, 126(596), F1–F27. <https://doi.org/10.1111/ecoj.12388>
- Gallego, F. A., Malamud, O., & Pop-Eleches, C. (2020). Parental monitoring and children's internet use: The role of information, control, and cues. *Journal of Public Economics*, 188, Article 104208. <https://doi.org/10.1016/j.jpubeco.2020.104208>
- Gneezy, U., & Imas, A. (2017). Lab in the field. In , Vol. 1. *Handbook of economic field experiments* (pp. 439–464). Elsevier. <https://doi.org/10.1016/bs.hefe.2016.08.003>
- Gneezy, U., & Rustichini, A. (2004). Gender and competition at a young age. *American Economic Review*, 94(2), 377–381. <https://doi.org/10.1257/0002828041301821>
- Guryan, J., Hurst, E., & Kearney, M. (2008). Parental education and parental time with children. *Journal of Economic Perspectives*, 22(3), 23–46. <https://doi.org/10.1257/jep.22.3.23>
- Heckman, J., Pinto, R., & Savellyev, P. (2013). Understanding the mechanisms through which an influential early childhood program boosted adult outcomes. *American Economic Review*, 103(6), 2052–2086. <https://doi.org/10.1257/aer.103.6.2052>
- Heckman, J. J., & Mosso, S. (2014). The economics of human development and social mobility. *Annual Review of Economics*, 6(1), 689–733. <https://doi.org/10.1146/annurev-economics-080213-040753>
- Holzmeister, F., & Pfurtscheller, A. (2016). oTree: The “bomb” risk elicitation task. *Journal of Behavioral and Experimental Finance*, 10, 105–108. <https://doi.org/10.1016/j.jbef.2016.03.004>
- Ifcher, J., & Zarghamee, H. (2023). Does decision making for others close the gender gap in competition? *Management Science*. <https://doi.org/10.1287/mnsc.2023.4861>
- Lazear, E. P. (2018). Compensation and incentives in the workplace. *Journal of Economic Perspectives*, 32(3), 195–214. <https://doi.org/10.1257/jep.32.3.195>
- Ljunge, M. (2014). Trust issues: Evidence on the intergenerational trust transmission among children of immigrants. *Journal of Economic Behavior & Organization*, 106, 175–196. <https://doi.org/10.1016/j.jebo.2014.07.001>
- Luo, J., & Wang, X. (2023). Leave behind or migrate? Evidence from a field experiment in China concerning the impact of being left behind/migrating status on children's behaviour and preferences. *China Economic Review*, 79, Article 101982. <https://doi.org/10.1016/j.chieco.2023.101982>
- Markowsky, E., & Beblo, M. (2022). When do we observe a gender gap in competition entry? A meta-analysis of the experimental literature. *Journal of Economic Behavior & Organization*, 198, 139–163. <https://doi.org/10.1016/j.jebo.2022.03.030>
- Mayer, S. E., Kalil, A., & Klein, N. (2020). Behavioral insights and parental decision-making. In *Confronting inequality: How policies and practices shape children's opportunities* (pp. 99–117). American Psychological Association. <https://doi.org/10.1037/0000187-005>
- Mayer, S. E., Kalil, A., Oreopoulos, P., & Gallegos, S. (2019). Using behavioral insights to increase parental engagement the parents and children together intervention. *Journal of Human Resources*, 54(4), 900–925. <https://doi.org/10.3368/jhr.54.4.0617.8835R>
- Niederle, M., & Vesterlund, L. (2007). Do women shy away from competition? Do men compete too much?*. *The Quarterly Journal of Economics*, 122(3), 1067–1101. <https://doi.org/10.1162/qjec.122.3.1067>
- Rogers, T., & Feller, A. (2018). Reducing student absences at scale by targeting parents' misbeliefs. *Nature Human Behaviour*, 2(5), 335–342. <https://doi.org/10.1038/s41562-018-0328-1>
- Seror, A. (2022). Child development in parent-child interactions. *Journal of Political Economy*, 130(9), 2462–2499. <https://doi.org/10.1086/720398>
- Sutter, M., & Untertrifaller, A. (2020). Children's heterogeneity in cooperation and parental background: An experimental study. *Journal of Economic Behavior & Organization*, 171, 286–296. <https://doi.org/10.1016/j.jebo.2020.01.010>
- Sylvia, S., Warrinnier, N., Luo, R., Yue, A., Attanasio, O., Medina, A., & Rozelle, S. (2021). From quantity to quality: Delivering a home-based parenting intervention through China's family planning cadres. *The Economic Journal*, 131(635), 1365–1400. <https://doi.org/10.1093/ej/ueaa114>
- Tungodden, J., & Willén, A. (2023). When parents decide: Gender differences in competitiveness. *Journal of Political Economy*, 131(3), 751–801. <https://doi.org/10.1086/721801>
- Wang, H., Cheng, Z., & Smyth, R. (2022). Parental misbeliefs and household investment in children's education. *Economics of Education Review*, 89, Article 102284. <https://doi.org/10.1016/j.econedurev.2022.102284>
- Yang, F., & Yu, L. (2016). With or without siblings: Sorting into competition in the experimental labor market. *China Economic Review*, 41, 284–298. <https://doi.org/10.1016/j.chieco.2016.10.008>
- Zhang, H., Qin, X., & Zhou, J. (2020). Do tiger moms raise superior kids? The impact of parenting style on adolescent human capital formation in China. *China Economic Review*, 63, Article 101537. <https://doi.org/10.1016/j.chieco.2020.101537>
- Zhou, Y., Chen, S., Chen, Y., & Vollan, B. (2022). Does parental migration impede the development of the cooperative preferences in their left-behind children? Evidence from a large-scale field experiment in China. *China Economic Review*, 74, Article 101826. <https://doi.org/10.1016/j.chieco.2022.101826>
- Zumbuehl, M., Dohmen, T., & Pfann, G. (2021). Parental involvement and the intergenerational transmission of economic preferences, attitudes and personality traits. *The Economic Journal*, 131(638), 2642–2670. <https://doi.org/10.1093/ej/ueaa141>