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Abstract

Using surveys with Danish students transitioning to secondary education, we study mental models of how gender and parental education shape academic performance. Students hold heterogeneous beliefs about performance gaps by gender and parental background, which appear to be shaped by within-family transmission and broader social environments. Open-text responses reveal that respondents link strong performance by girls and less socioeconomically privileged students to effort, while attributing privileged students' success to external advantages. Mental models matter: beliefs about performance gaps predict enrollment in upper secondary education by gender and parental education and causally affect students' self-assessments, intended effort, and educational aspirations, as shown in an information experiment with girls. We highlight two mechanisms: updating about the returns to effort and about gender-specific effort costs in response to observed gender performance gaps. Our findings advance the understanding of education choices and shed light on the determinants and effects of mental models in a high-stakes setting.

JEL-Codes: D83, D84, I24

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1 Introduction

Educational performance varies systematically across sociodemographic groups. On average, girls and students from more privileged socioeconomic backgrounds achieve higher school grades, even after controlling for prior performance evaluations (Almås et al., 2016; Autor et al., 2019; Buchmann and DiPrete, 2006; Falch and Strøm, 2013; Murnane, 2013).[1] These disparities have attracted considerable attention from both researchers and policymakers (e.g., OECD, 2024). But how do adolescents themselves perceive these differences in educational success? This question is important because young people's beliefs about systematic performance gaps—whether they attribute them to structural barriers or personal factors—may shape their own success expectations and educational track choices.

This paper examines adolescents' "mental models" of how gender and parental education—our measure of socioeconomic status (SES)—shape educational success. We think of mental models as individuals' internal representations of how social group characteristics, in particular gender and SES, influence academic outcomes. These models combine perceived patterns (e.g., who tends to succeed) with causal beliefs (e.g., why that difference exists), and serve as frameworks through which individuals can interpret, explain, and predict school success. Concretely, we shed light on (i) beliefs about the role of gender and parental education in predicting educational success and (ii) beliefs about the underlying drivers of success gaps along these two dimensions.

Our setting is Denmark, where we focus on the transition from compulsory to secondary education—the first major branching point in the Danish system. Up until this transition, reached around age 15–16, all students attend elementary school, following a standardized curriculum. At this point, they choose between academically oriented upper secondary education ("high school") and a set of more applied alternatives, including vocational education. This decision moment provides us with the ideal setting to study the decision-relevance of mental models of school success. The Danish education system is similar to many others in key respects. First, high school is the most ambitious track, both in terms of students' prior performance and their future outcomes. Second, performance in this track is key to university admission and long-term opportunities. Third, girls and students with highly educated parents tend to receive more favorable performance evaluations in this track, even conditional on prior performance.

The backbone of our study is a survey with adolescents at the transition to secondary education. It features clearly defined quantitative questions on high school "success rates" among different subgroups of a slightly older cohort. Specifically, we ask respon-

[1] Gender differences in performance typically vary by subject, with boys often performing better in, e.g., math, while girls tend to hold a comparative advantage in stereotypically female domains like language (Bertrand and Pan, 2013; Pope and Sydnor, 2010). When considering a range of subjects or general measures such as GPA and graduation rates, females outperform males in various settings (OECD, 2023).

dents to estimate how many out of 100 students from different subgroups who enrolled in upper secondary education graduated with a GPA of 7 or higher. This threshold corresponds to a median performance and to the most commonly assigned individual grade on the Danish grading scale. The subgroups vary along one randomly chosen sociodemographic characteristic (gender or parental education) and their elementary school performance. This design allows us to infer individual perceptions of the role of gender and parental education for high school success, conditional on past performance.

Afterwards, respondents answer an open-ended follow-up question—referring back to their previously reported quantitative beliefs—asking *why* they think one sociodemographic group performs better than (or the same as) the other in high school, even after accounting for elementary school grades. Finally, we elicit respondents' expected personal success chances, their planned study effort if they were to enter high school in the upcoming school year, as well as their planned track choice.

For our main data collection, we contacted a random sample ($\approx$ 12,000) of adolescents expected to soon complete elementary school, along with their parents. We distributed survey invitations via the official communication channel of the Danish administration—an approach known for high data quality and broad population coverage (Hvidberg et al., 2023). Our main sample consists of more than 1,000 students, and we have a parent sample of 2,000 mothers and nearly 1,000 fathers. We present five key results.

(1) Perceived success differences: Overall, students have a reasonably accurate understanding of the performance patterns associated with gender and parental education: a clear majority of our sample correctly believes that (i) girls have higher success rates than boys, and (ii) students with two high school-educated parents outperform those without any, conditional on past performance. Moreover, average perceived quantitative success differences are close to the true benchmarks: the estimated girl–boy and high–low SES gaps in success rates deviate by only about one percentage point from the actual values (using weights that reflect the actual distribution of past performance levels). At the same time, there is substantial heterogeneity. In our sample, 27% (48%) of perceived gender (SES) differences in success rates are off by at least 10 percentage points.

(2) Perceived drivers of success differences: Based on open-ended survey responses, we find that gender differences—and in particular a perceived "girl advantage"—are typically attributed to differences in effort, motivation, and effort-related character traits such as perseverance and diligence. All of these factors are commonly considered meritocratic (Andre, 2025; Cappelen et al., 2020), suggesting that students believe in "legitimate" reasons behind gender differences in school performance. At the same time, the patterns are in line with a prevailing stereotype that attributes female academic achievement to hard work rather than raw talent (Bian et al., 2017; Leslie et al., 2015). When it comes to socioeconomic differences in school success, the most frequently cited driver

is active parental support—particularly help with homework—followed by more passive and less intentional factors, such as the home environment and role models. The vast majority of perceived drivers of SES-differences lie beyond the influence of the individual, i.e., one might think of them as non-meritocratic.

(3) Origins of mental models: Linking our survey data to detailed administrative records, we find that students' social environments appear to play an important role in shaping beliefs about group differences. Those exposed to a higher share of female teachers or to higher relative earnings of women at the local level tend to expect a higher relative performance of girls. For SES-related beliefs, local inequality and family experiences appear to be particularly important: students from areas with high income inequality are more likely to perceive an advantage for high-SES peers, whereas adolescents growing up in upwardly mobile families are more likely to believe in a low-SES advantage. To examine the role of families more directly, we compare adolescents' mental models to those of their parents. Mothers' and children's beliefs align on SES but not gender, consistent with our findings on the role of family experiences in shaping SES-beliefs. In contrast, fathers' and children's beliefs appear uncorrelated, adding to previous research that indicates a more central role of mothers in children's socialization (Dohmen et al., 2012; Grönqvist et al., 2017).

(4) Mental models and decisions: We present both correlational and causal evidence on the role of students' mental models in shaping their self-perceptions and (planned) decisions. Correlationally, girls who believe in a stronger academic edge for girls report higher own success expectations—approximately 0.2 percentage points higher for each percentage-point increase in the perceived girl advantage. For boys, the relationship is reversed: a greater perceived female advantage is associated with lower expectations of their own success if they were to enroll in high school. These patterns carry over to the enrollment intentions and to actual high school applications of girls, but not of boys. Moreover, girls, but not boys, who perceived a higher girl advantage plan to exert more study effort, in line with our finding that girls' success is more often attributed to effort than boys'. Similarly, a larger perceived high-SES advantage is associated with increased SES gaps in both own success expectations and actual high school enrollment, which are mostly driven by a strong discouraging effect on low-SES students.

We complement these correlational findings using a survey experiment with a new sample to identify the *causal* effect of perceived systematic success gaps on students' own success beliefs and aspirations. In the experiment, a randomly selected group of respondents receive information—based on administrative data—about the actual girl advantage in a slightly older cohort with similar elementary school grades as the respondent. For ethical reasons, boys were excluded from the study and we ran our intervention *after* secondary schooling decisions were taken. Treated respondents update their expectations about the girl advantage in their own cohort in line with the provided information.

Importantly, they strongly extrapolate to their own high school success expectations—an effect that persists at a similar magnitude, though less precisely estimated, in a one-week follow-up survey and that is robust to a success measure immune to numerical anchoring. Planned effort provision seems to be a key mechanism: more optimistic beliefs about the girl advantage increase girls' planned study effort. Lastly, changes in beliefs pass through to college aspirations. In sum, mental models of gender causally shape girls' personal success expectations and planned decisions.

(5) Mechanisms: Finally, we explore a set of mechanisms through which perceived group-level performance patterns may influence students' own perceived success prospects and decisions. A supplementary vignette experiment reveals that students infer key parameters of the production function of academic success from observed gender performance differences. When girls outperform boys, students conclude that effort yields higher returns than in an otherwise identical setting where boys outperform girls. Female respondents also infer lower effort costs for girls—both intrinsic and in terms of social stigma—while boys perceive higher stigma-related costs for their own gender. These inferences help explain our findings on the decision-relevance of mental models described above: girls increase planned effort when perceiving a female advantage, whereas for boys, higher inferred returns are likely offset by higher perceived effort stigma, consistent with boys' unchanged effort plans. In the Appendix, we show that these patterns can be rationalized in a unified model.

Contribution and related literature: Our study is motivated by a large literature documenting systematic inequalities in education trajectories by family background and gender (Almås et al., 2016; Chetty et al., 2017; Murnane, 2013). Students from less privileged backgrounds often shy away from ambitious tracks, receive lower grades, and are more likely to drop out (Hoxby and Avery, 2013). Similar patterns are true for boys compared to girls (Fortin et al., 2015). Existing research in economics and other fields has uncovered important mechanisms behind systematic gaps in education trajectories, including young adults' beliefs about their past academic performance (Bobba and Frisancho, 2022; Bobba et al., 2025; Hakimov et al., 2023).[2] We take a novel approach by examining how students' *anticipation* of inequality in educational success shapes their decision-making. Our findings suggest that existing inequalities can become self-reinforcing: expected inequality appears to raise the planned effort and enrollment intentions of members of higher-performing groups, potentially exacerbating final gaps in educational attainment.

Prior work on success expectations provides compelling evidence that students are over-optimistic about their prospects when entering education programs, but revise their

[2]Other studies have documented a role for financial and bureaucratic constraints (Angrist et al., 2022; Bettinger et al., 2012), mentoring (Carlana et al., 2022; Falk et al., forthcoming), as well as parental preferences and knowledge (Dizon-Ross, 2019; Müller, 2024; Tungodden and Willén, 2023).

beliefs in response to performance feedback (Stinebrickner and Stinebrickner, 2014, 2012; Zafar, 2011).[3] Still, little is known about how students form their initial success expectations. We study how mental models—beliefs about the roles of gender and SES in educational success—shape students' success expectations, and how these models are shaped by social environments. By focusing on students' *first* track choice, we offer a comprehensive view of the origins and consequences of these mental models.

At a more general level, our work advances our understanding of how anticipated (structural) inequality affects life choices. In concurrent work, Lepage et al. (2025) document that anticipated discrimination in STEM is prevalent among female college students and predicts their choice of major. Other studies document a higher propensity of female students to voluntarily report relatively poor grades to potential employers (Exley et al., 2025) and a lower propensity of female job seekers to negotiate salaries (Capozza, 2024; Cortés et al., 2024)—patterns that may reflect women's anticipation of gender-based discrimination, though alternative explanations are possible.[4] We provide direct evidence on the perceived role of sociodemographic characteristics in shaping educational success and on beliefs about underlying mechanisms. Our focus on mental models is complementary to existing work that focuses on the role of *implicit biases*—those that are not necessarily consciously recognized—for decision-making (see, e.g., Batruch et al., 2017; Carlana, 2019; Coffman, 2014; Désert et al., 2009; Steele, 1997).

Moreover, our evidence on mechanisms—indicating that students update about the underlying production function of success when observing gender differences in performance—adds a new perspective to the literature on how individuals interpret observed group differences in outcomes. Prior work has shown that such differences are used to form beliefs about group traits, such as motivation or competence (e.g., Bordalo et al., 2016; Eagly et al., 2012). Our results demonstrate that adolescents draw inferences about decision-relevant fundamentals—in particular the returns and costs of effort.

Finally, our findings contribute to a growing body of work in economics that seeks to understand the role of mental models and narratives in applied "real-life" contexts. While prior research has examined how mental models influence macroeconomic expectations and political beliefs (Andre et al., 2022, 2024, 2023; Chinoy et al., forthcoming; Stantcheva, 2021), our paper is among the first in the context of a high-stakes life decision. Importantly, we extend previous insights on the role of personal experiences (Andre et al., 2022; Chinoy et al., forthcoming; Stantcheva, 2022) by leveraging rich linked survey-register data to explore how social environments shape mental models.

[3] A broader literature on beliefs in educational decision-making studies perceived educational returns, choice sets, admission chances and job prospects (Arteaga et al., 2022; Belfield et al., 2020; Bleemer and Zafar, 2018; Boneva et al., 2022; Conlon and Patel, 2023; Guyon and Huillery, 2021; Hoxby and Turner, 2015; Jensen, 2010; Wiswall and Zafar, 2015); see Giustinelli (2023) for a recent overview.

[4] See also Parsons et al. (2011) and Dickerson et al. (2024) who study the effects of anticipated racial discrimination on the behavior of MLB pitchers, job applicants and minority students, respectively.

2 Research Design and Data

To study mental models of high school success, we conducted a large-scale survey among students in their final year of elementary school in Denmark and their parents. In this section, we outline key features of the Danish education system, describe our survey design, and present our main sample.

2.1 The Education System in Denmark

All students in Denmark complete ten years of compulsory education, including a preschool year known as "grade 0". While compulsory schooling is guided by a standardized national curriculum, education trajectories start to diverge after 9th grade, the final year of compulsory schooling, when students make their first educational track choice. Approximately 40% of students in a cohort enter upper secondary education—referred to as high school throughout the paper—directly after compulsory school. Around 50% instead opt for an additional voluntary year of elementary school, referred to as "10th grade". The 10th grade is widely seen as an opportunity to consolidate academic skills and mature personally, and most students continue with an education afterwards.[5] Approximately 6% pursue vocational training immediately after 9th grade while the remainder follow alternative paths, including exiting formal education altogether.[6]

We focus on the decision of whether to attend upper secondary school after 9th grade—the most ambitious choice in terms of both prior academic performance and future labor market outcomes (see Appendix Figure A.1). There are three main types of upper secondary school: STX (general curriculum), HHX (economics/business focus), or HTX (technical focus). While they differ in curricular focus, they are similar in terms of workload, academic difficulty, and perceived prestige.[7] The admission process is organized through a centralized digital platform, where students submit a preference ranking for their next educational step before a nationwide deadline. Admission to high school is subject to low entry requirements, with possible exceptions, and there are no formal teacher recommendations (Ministry of Children and Education, 2025a).

[5]When asked about their plans after 10th grade, 68% of students report intending to enroll in high school, while the remainder are split between those planning to pursue vocational education and those who are still undecided (Danmarks Evalueringsinstitut, 2018).

[6]See Danmarks Evalueringsinstitut (2018); Ministry of Children and Education (2023, 2024, 2025b) for further details on the Danish education system and empirical track choices.

[7]A fourth option for upper secondary education, HF, is a two-year program that can only be chosen after 10th grade (Ministry of Children and Education, 2025a). It provides limited university access and is more common for adults with work experience than for adolescents. In our survey, we define upper secondary education ("gymnasial uddannelse") as STX, HHX, and HTX.

2.2 Survey Design

This subsection describes the design of our main survey. Students and their parents are invited to separate surveys with identical structure (see Appendix Figure A.2). All survey items are worded similarly for adolescents and parents and all randomizations are performed at the household level. Appendix D presents the complete survey instructions for the main survey. In addition, we conducted two supplementary experiments with students, which we outline in Sections 3.5 and 3.6 alongside the corresponding findings.

Personal characteristics The survey starts with questions about the student's gender, family composition, parental education, current grade attendance and past (9th grade) school performance.

Definition and validity of success measure Throughout the survey, we elicit respondents' beliefs about the high school success rates of different groups. While avoiding the term "success", we rely on a probabilistic success measure: the likelihood of graduating within the standard three years with a GPA of 7 or higher. This measure has several advantages. First, it captures both the extensive margin (completion vs. dropout) and the intensive margin (performance conditional on completion). A GPA of 7 corresponds to the median among high school graduates and closely aligns with many relevant, but ex-ante unknown, university admission cutoffs.[8] Second, the measure is intuitive. Respondents were generally able to express their beliefs meaningfully and consistently using our probabilistic scale. In particular, expected own success is strongly correlated with expected own GPA ($\rho = 0.65$) and planned high school enrollment ($\rho = 0.43$), and participants demonstrate a sound grasp of the grade distribution (Appendix Figure A.3). Finally, the success measure is highly predictive of later life outcomes: ten years after graduation age, individuals with a GPA of 7 or higher earn 17% more than those who enrolled in high school but did not meet this threshold ($p < 0.001$; cohort born in 1992).

Quantitative module: Population-level success rates Our core survey item elicits beliefs about the predictive power of gender and parental education for high school success, holding past performance constant. Respondents are asked to consider individuals in Denmark who were born in 2000——the most recent cohort with observable high school outcomes in administrative data at the time of our survey. Each respondent is presented with four subgroups from this cohort, varying along two dimensions: (i) gender or parental education, and (ii) prior academic performance. For each subgroup, respondents estimate how many out of 100 students who enrolled in high school after elementary school graduated with a GPA of 7 or higher. An example survey screen is shown in Appendix Figure A.4.

[8] In 2022, exemplary GPA thresholds included 7 for biochemistry at the University of Copenhagen, 8 for law at Aalborg University, and 10 for medicine or psychology at any Danish university. These cutoffs vary yearly based on supply and demand, and applicants do not know them in advance.

To keep the survey concise while covering a broad range of profiles, each respondent is randomly assigned to one of ten experimental conditions. These stem from a 2×5 design: one dimension varies the social category (gender or SES), the other selects one of five grade tuples that define low and high prior performance. In the gender condition, respondents assess four groups defined by gender (boys vs. girls) and performance level. In the SES condition, the four subgroups vary by parental education—either "youth without a parent with a high school degree" or "youth whose parents both have at least a high school degree"—again crossed with two past performance levels. The low vs. high performance levels are drawn from five concrete grade tuples on the Danish grading scale: 2 vs. 7, 2 vs. 10, 4 vs. 10, 4 vs. 12, and 7 vs. 12.[9]

We conceptualize past performance as students' grades in "Math (without help)" and "Danish (writing)" in 9th grade, referring to students who had the same grade in both subjects.[10] This measure is a strong, though imperfect, predictor of future academic success and was selected for balance: by assigning equal grades in math and Danish within each subgroup, we reduce the risk that group-level success beliefs are confounded by perceived comparative advantages, such as boys' relatively stronger math performance.

By comparing how the same respondent estimates success rates for different sociodemographic groups, while holding past performance constant, we can infer the perceived predictive power of sociodemographic characteristics at each level of past performance. This approach of relying on within-subject *differential* survey responses abstracts from heterogeneity in the level of perceived success rates across individuals. Moreover, it mitigates measurement error arising from respondents' potential uncertainty about the scale on which the outcome of interest—in this case high school success rates—is measured (Ansolabehere et al., 2013). In addition, our approach facilitates the open-ended elicitation of people's qualitative reasoning about the role of gender and parental education for future high school success, which we describe below.

We incentivize accurate responses based on true high school performance of different subgroups as observed in the administrative data. In total, we raffle 50 gift cards worth DKK 1,000 each (approximately USD 150): 10 among all survey completers, and 40 among those with responses close to true benchmarks. The high value of the prizes is intended to increase respondents' attention and to reduce bias due to, e.g., motivated beliefs about success rates.

Open-text questions: Role of sociodemographic characteristics After the quantitative module, respondents answer an open-ended question. They are reminded of their earlier estimates for two individuals who share the same (randomly chosen high or low) elementary school performance but differ in terms of gender or, respectively, parental

[9]The Danish grading scale consists of seven levels: -3, 0, 2 (lowest passing grade), 4 (≈10th percentile), 7 (median), 10, and 12 (≈90th percentile).

[10]In Danish, we refer to "Matematik (uden hjælpemidler)" and to "Dansk (Skriftlig fremstilling)" (Ministry of Children and Education, 2025c). There is no formal 8th or 9th grade GPA in Denmark.

education. We then ask *why* they expect individuals from the two different groups (boys. vs. girls, respectively high- vs. low-SES students) to have different (or similar) success rates. Respondents are told that there are no right or wrong answers and that we are interested in their personal views. Using an open-ended question rather than a structured multiple choice question to elicit perceived mechanisms avoids priming through displayed response options and ensures that we capture respondents' reasoning in a naturalistic way (Haaland et al., 2025).

Survey-based outcomes In the rest of the survey, we elicit respondents' beliefs about their own chances of success, assuming high school enrollment in the coming year. We measure both the perceived probability of graduating with a GPA of 7 or higher and expected GPA. Respondents also report their intended track choice and planned weekly study time, conditional on choosing high school.

2.3 Procedures and Data

Survey procedures The survey targets individuals born in 2008, expected to be in their final year of compulsory education (grade 9) at the time of our data collection, along with their registered parents. Statistics Denmark provided contact information for a 20% sample (about 12,000 adolescents and their parents). We sent survey invitations in February 2024—a few weeks before the nationwide track choice deadline—via the centralized electronic mailing system used by Danish public authorities. All Danish residents aged 15 and older have access to this system and are legally required to monitor it. The survey was programmed in oTree and distributed through personalized links. We pre-registered our data collection at `https://osf.io/k43m9`.

Additional data sources We complement the survey with detailed administrative records for three purposes. First, we use register data to construct objective benchmarks of high school success among students in the reference cohort, against which we compare survey respondents' beliefs (Section 3.1). Second, we leverage rich information on respondents' social environments to study the experiential origins of mental models (Section 3.3). Third, to assess the decision relevance of mental models, we link survey responses to individual-level data on adolescents' actual track choices from the national digital application system for secondary education (Section 3.4). We focus on whether students rank high school (STX, HHX, or HTX) as their first choice.[11]

Sample characteristics Our main sample consists of 1,163 adolescents born in 2008. In addition, 1,990 mothers and 941 fathers participated in the parent survey. We observe

[11] In the target cohort, 96% of students who ranked high school first did not list any other school type among lower-ranked options. Among these students, 64% selected another high school as their second choice, 32% did not submit a second choice, and only small shares chose alternatives such as vocational training (2%) or 10th grade (2%). This supports the use of first choices as proxies for actual enrollment.

both the adolescent and the mother in 387 cases, and both the adolescent and the father in 195 cases. The median survey completion time was 14 minutes for adolescents and 13 minutes for parents. Importantly, our sample spans the full range of elementary school performance and parental backgrounds (see Appendix Table A.1, Column 3). While female respondents are somewhat overrepresented, the sample is fairly representative in terms of socioeconomic background and elementary school grades (Columns 2 and 3).

Overall response quality is high. Unlike in many commercial samples, we observe no "speeders", and a comparison of register and survey-based information suggests that students report their personal characteristics accurately (Columns 3 and 4). Linked survey–register data confirm that 99% report the same gender as recorded in the registers and 79% match the register indicator for having at least one high school-educated parent; Section 3.4 shows that our results are robust to misreporting of parental education. Finally, comparing the 2000 reference cohort used in our core questions with the 2008 study cohort, we find very similar population compositions (Columns 1 and 2), suggesting that neither demographic change nor grade inflation affects comparability.

3 Results

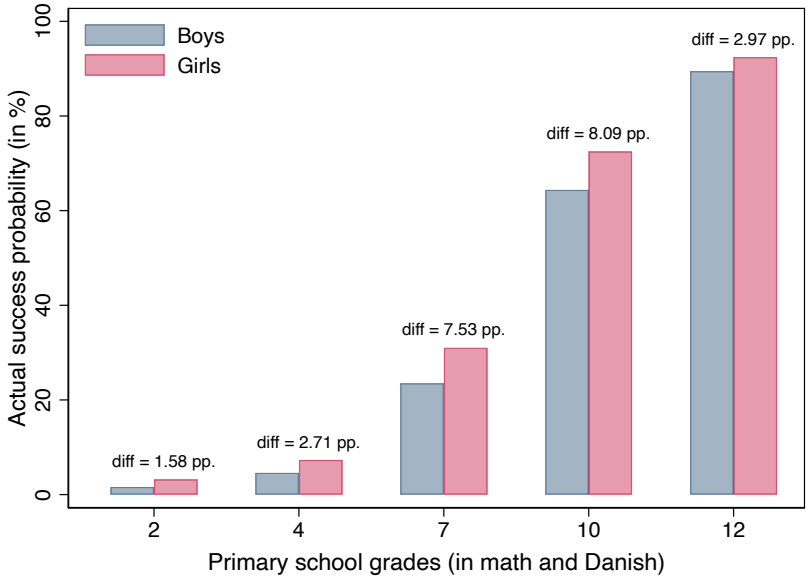
3.1 Characterizing Mental Models of High School Success

Objective benchmarks Before turning to the survey results, we document the *actual* role of gender and parental education in predicting success in upper secondary education, based on administrative data for the reference cohort born in 2000. Figure 1 displays the share of students who, conditional on enrolling, completed high school with a GPA of 7 or higher. These shares are reported for each primary school grade level, separately by gender (Panel A) and parental education (Panel B). Depending on prior performance, girls have two to eight percentage points higher success rates than boys. Similarly, students with two parents who completed high school had two to 15 percentage points higher success rates than students without any high school-educated parent. Weighted by the distribution of prior performance in our benchmark cohort, the average "girl advantage" amounts to 6.7 percentage points and the average "high-SES advantage" to 12.1 percentage points. These magnitudes are substantial: they correspond to 15% and 27% of the average high school success rate, or to increases of 0.26 and 0.47 standard deviations in average prior performance (across math and Danish), respectively.

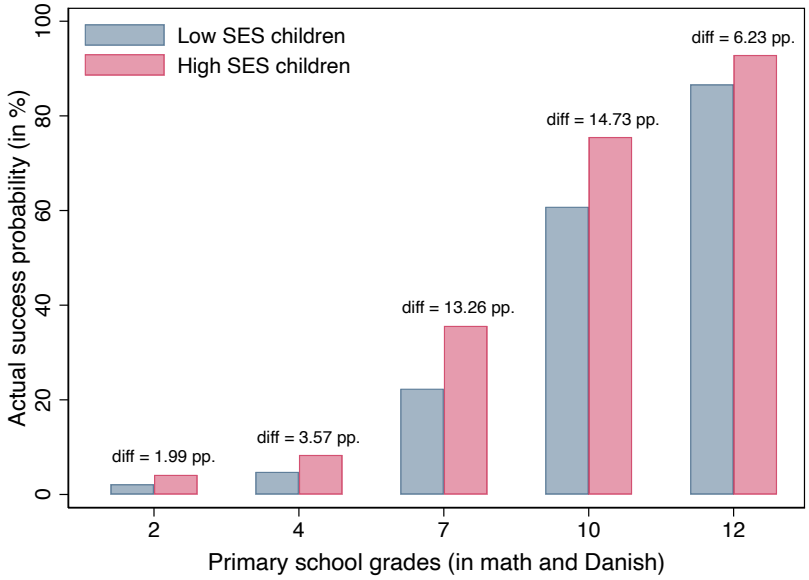
Quantitative mental models We infer *perceived* gender and SES gaps in high school success rates from respondents' differential responses in the core survey module. For each respondent in the gender arm, we compute two measures of the perceived girl advantage—the difference in estimated success rates between girls and boys—one for the low and one for the high prior performance level specified in the survey. Similarly,

Figure 1: Actual high school success rates across groups

(A) Gender x past performance



(B) SES x past performance

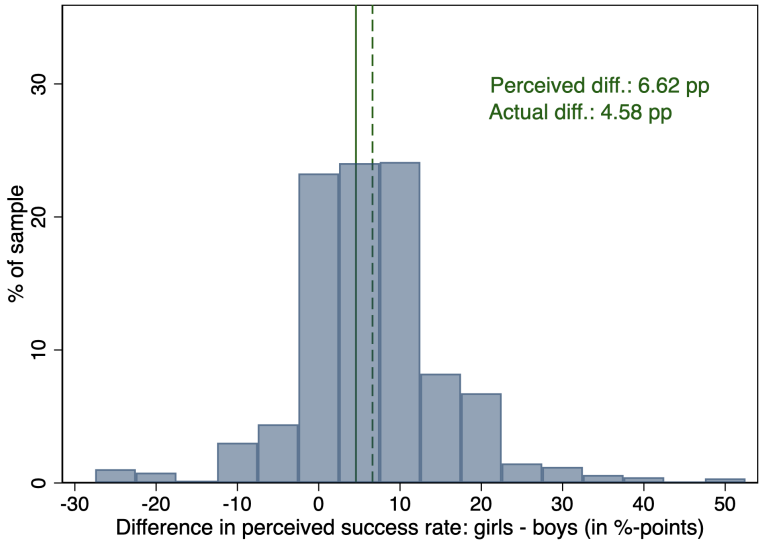


Note: The figure displays actual success rates in upper secondary education—defined as graduating within three years with a GPA of 7 or higher—for individuals born in the reference year 2000. To increase precision in smaller cells, the sample is supplemented with individuals born in 1998–1999. Panel A (B) includes 218 (162) students with a math and Danish grade of 2; 3,550 (2,451) with a grade of 4; 13,354 (8,528) with a grade of 7; 11,821 (7,492) with a grade of 10; and 3,544 (2,520) with a grade of 12.

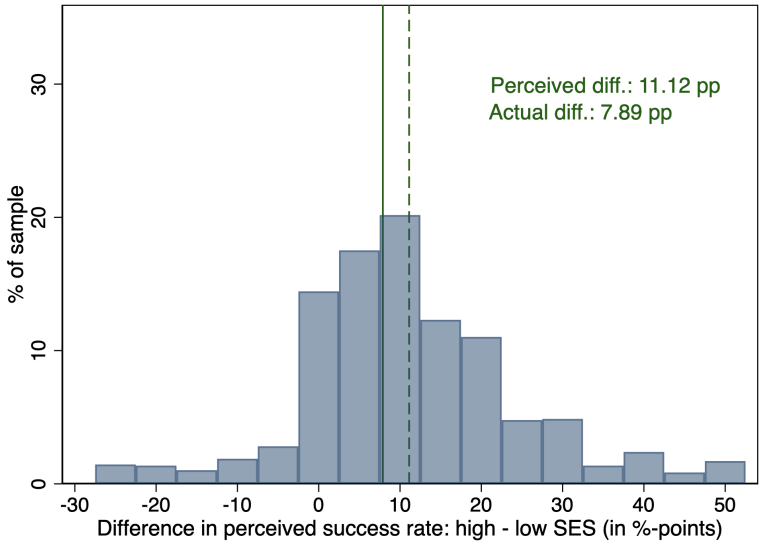
for respondents in the SES arm, we calculate two measures of the perceived high-SES advantage. Figure 2 shows the distribution of these perceived differences for gender (Panel A) and SES (Panel B), pooling the two observations per individual.

Figure 2: Students' perceptions of gender and SES success gaps

(A) Perceived gender differences



(B) Perceived SES differences



Note: The figure shows the distribution of students' perceived population-level success gaps between (A) girls and boys ($N = 578$) and (B) students from high- and low-SES backgrounds ($N = 585$). Solid vertical lines indicate the actual differences in success rates between the corresponding groups, measured as unweighted averages across the past grades shown in the survey. Dashed vertical lines indicate the corresponding average beliefs. Perceived population-level success gaps are winsorized at -25 and 50 percentage points.

Qualitatively, students' mental models are largely in line with patterns observed in the administrative data. In the gender arm, 72% of responses correctly indicate a perceived girl advantage, 11% a boy advantage, and 17% a precise zero gender difference

in success rates.[12] On average, respondents assign success rates to girls that are 6.6 percentage points higher than for boys—overestimating the true unweighted girl advantage of 4.6 percentage points based on the register data. Weighting the data by actual past performance levels in the population yields more accurate beliefs: respondents assign a 6.0 percentage point advantage to girls, close to the true weighted benchmark of 6.7 percentage points. However, this average accuracy in the perceived girl advantage masks substantial heterogeneity. For instance, an unweighted 27% of responses deviate by at least 10 percentage points from the objective benchmarks. Moreover, girls are significantly more (over-)optimistic about relative female performance than boys (see Appendix Table A.2).

Beliefs about SES differences generally follow a similar pattern, with 80% of survey responses indicating a perceived high-SES advantage, 11% pointing to no SES gradient in success rates, and 9% to a low-SES advantage.[13] The average perceived high-SES advantage is 11 percentage points, again exceeding the observed administrative difference of approximately eight percentage points. As with gender, perceptions are more accurate for common performance levels: when weighting by the actual grade distribution, the perceived high-SES advantage is 11.1 percentage points, close to the 12.1-point benchmark. Finally, heterogeneity in students' perceptions is even more pronounced than in the gender arm, with an unweighted 48% of estimates deviating by at least 10 percentage points from the true values. At the same time, students' own parental background does not systematically predict their views on SES differences (see Appendix Table A.2), indicating that these perceptions are broadly shared across socioeconomic groups.

A comparison of the student and parent samples reveals a high degree of similarity in quantitative mental models (see Appendix Figure A.7). For instance, we cannot reject the null hypothesis that the distribution of the perceived gender and SES difference in success rates is the same in the student and parent samples ($p = 0.670$ and $p = 0.584$, respectively; Kolmogorov–Smirnov test).

We summarize our first main result as follows:

Result 1. *Most students qualitatively recognize that girls and high-SES students tend to outperform their peers in high school, and on average, beliefs about relative performance align closely with objective benchmarks. However, this aggregate accuracy masks substantial heterogeneity in individual perceptions.*

[12] These perceptions vary with the specified prior performance of girls and boys in the survey scenarios (see Appendix Figure A.5): when presented with low to medium primary school grades (2 to 7), 80% report a girl advantage, whereas with high grades (10 or 12) the share falls to 61%.

[13] Perceptions of a high-SES advantage are again more frequent when the question refers to students with low to medium, rather than high, previous grades (see Appendix Figure A.6). This gradient is less pronounced than for gender, suggesting that students view the high-SES advantage as more universal.

3.2 Perceived Drivers of Success Gaps: Evidence from Textual Data

We next examine perceived drivers of gender and SES differences in high school success, drawing on respondents' written explanations for their quantitative beliefs.

To analyze the textual data, we developed a detailed coding scheme comprising 34 categories of perceived drivers of performance gaps, ranging from individual-level factors (e.g., effort, intelligence, character traits) to structural conditions (e.g., cultural and social norms, home environments, role models). Based on the coding scheme and a set of coding rules (see Appendix C), Danish-speaking research assistants manually coded all responses after training on pilot data.[14] To reflect the interpretive depth of responses, multiple codes could be assigned to each response. Two assistants independently coded each statement, with discrepancies resolved by a third. Inter-rater reliability was relatively high: coders assigned the same detailed code (e.g., "effort", "extrinsic motivation", or "academic support") in 68% of cases. Aggregating codes to broader summary categories such as "behavior", "characteristics" and "external factors", this fraction equals 83%. Empty or nonsensical responses were rare, underlining the high response quality.

Figure 3 presents the distributions of students' explanations for gender differences (Panel A) and SES differences (Panel B), pooling all responses regardless of the perceived direction of group differences.

Gender differences Students mostly attribute anticipated gender differences in high school success to effort and motivation (blue bars in Figure 3), as well as to more deeply-rooted character traits (yellow bars). For instance, approximately 26% of all adolescent respondents mention effort levels in school, as in the following example:

> *I feel that girls tend to be more involved in class. In the schools I've attended, the boys didn't do much in class and often asked the girls for help.*

A total of 34% point to differences in motivation—whether extrinsic (e.g., grades or career goals), intrinsic, or unspecific, such as the following respondent:

> *Because boys don't care about school, they only care about parties.*

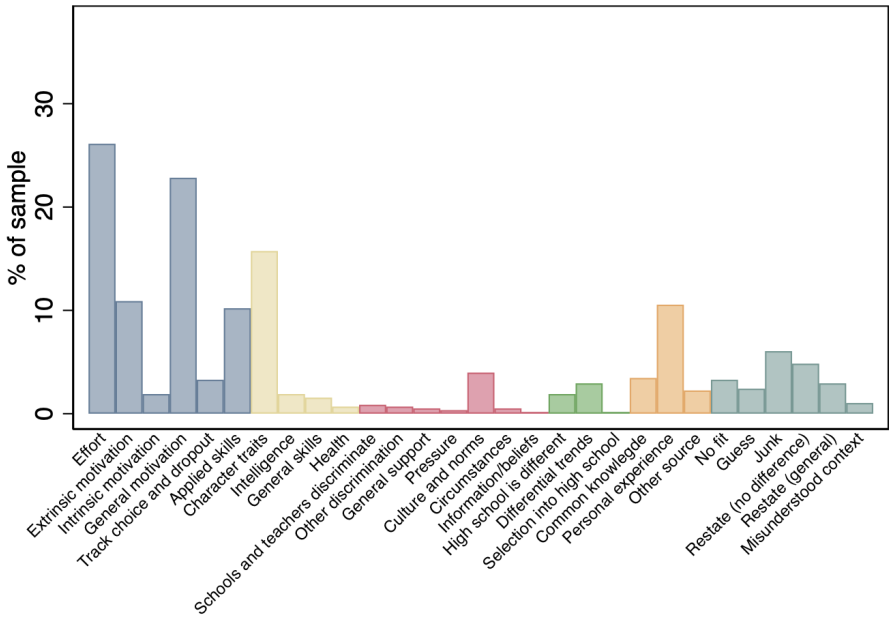
In addition, 10% of respondents cite differences in applied skills, such as academic knowledge acquired through prior effort and favorable learning techniques, while 16% mention character traits like conscientiousness, perseverance, or diligence:

> *Girls are often more mature than boys of the same age, so I think they have more perseverance.*

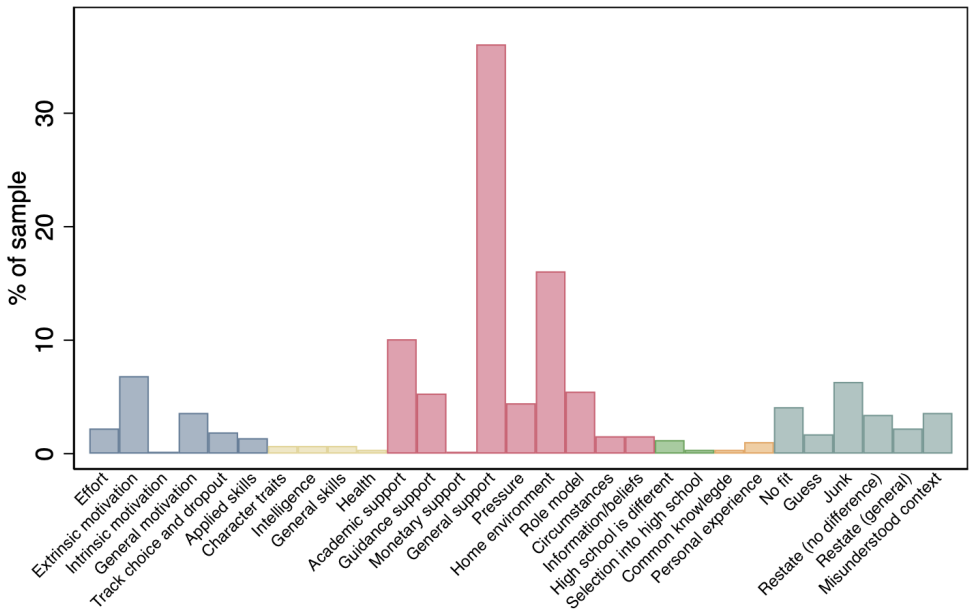
[14] At the time of our data collection, internal data protection regulations at the University of Copenhagen did not permit us to use of cloud-based AI tools such as large language models (LLMs). Aside from these constraints, human coding is particularly well suited to our data, as responses are often nuanced and frequently rely on implicit knowledge of the Danish school system.

Figure 3: Perceived drivers of differences in high school success

(A) Gender



(B) SES



Note: The figure displays the distribution of students' reported reasons for differences in their quantitative beliefs about the success probabilities of (A) girls versus boys ($N = 578$) and (B) high- versus low-SES students ($N = 585$), based on the coding scheme described in Appendix C. Colors indicate broader summary categories: blue bars denote factors related to students' behavior; yellow bars denote other personal factors such as character traits and ability; red bars denote impersonal factors; green bars denote dynamics associated with transitions to high school; orange bars denote information sources; and teal bars denote responses not attributable to specific factors.

As shown in prior research, most people would classify all of these factors as "meritocratic", i.e., as deserving of rewards (Andre, 2025; Bartling et al., forthcoming; Cappelen et al., 2022, 2020).

In contrast, external factors (red bars), such as discrimination by teachers, play a minor role in students' explanations of gender differences in success rates (see, e.g., Lavy and Sand, 2018; Terrier, 2020, for related evidence). Overall, only 6% of all responses refer to any external factor. The most frequently mentioned external factor in the gender context is "culture and social norms". This category subsumes examples like a lower acceptance of visible study effort among male peers vs. a culture of perfection among girls (Bursztyn et al., 2019):

> *I have noticed that boys sometimes pressure each other to get worse grades. It's a bit like they think it's cooler to get bad grades. Whereas with girls, it's a bit the opposite.*

Lastly, around 11% of all respondents mention some personal experience or observation that informs their belief about gender success gaps.

SES differences Students' reasoning about SES-based success gaps differs markedly from their explanations of gender disparities. Respondents primarily cite external factors (Figure 3, Panel B, red category): more than half mention forms of external support—academic, financial, or unspecified—as illustrated by the following example:

> *Because parents who have completed their high school exams can help/guide their children through it.*

16% refer to the home environment, including parents' attitudes or the frequently used term "social heritage":

> *I just think it's a bit like if your mother or father was an alcoholic, there's a greater chance that you'll become an alcoholic too, because that's what you grew up with, so I think it's a bit the same concept.*

Meritocratic explanations (blue and yellow categories), by contrast, are rare. Notably, although the perceived drivers of SES gaps are largely beyond the control of the individual student, they are in theory still modifiable during adolescence. More structural influences emphasized in the academic literature, such as early-life developmental gaps or genetic factors, go unmentioned (Biroli et al., 2026; Cunha et al., 2006; Heckman, 2006). Finally, in contrast to the gender dimension, students barely seem to draw on their episodic memory (only 1% overall mention a personal experience or observation), possibly because parental background is less easily observable than gender.

Perceived drivers and quantitative mental models How do different perceived mechanisms relate to students' quantitative mental models? For the gender dimension, most meritocratic factors—particularly effort, motivation, and character traits such as conscientiousness and perseverance—are positively associated with a perceived girl advantage (see Appendix Table A.3, Panel A). In contrast, it is more difficult to identify a distinct success narrative underlying perceptions of a boy advantage: both "applied skills" and "differential trends" (the idea that groups are on different trajectories, with one group expected to develop more favorably than the other) emerge as gender-neutral mechanisms. If anything, "intelligence" seems to be a perceived mechanism predicting a belief in a boy advantage (Column 1, $p = 0.075$). Overall, adolescents' thoughts reflect the stereotype of males succeeding through talent and females through effort (Bian et al., 2017; Cappelen et al., forthcoming; Leslie et al., 2015).

For the SES dimension, external factors are commonly cited to explain why high-SES students outperform their low-SES peers: parental support, the home environment, the presence of role models, but also pressure, are all strongly related to the perceived high-SES advantage (Appendix Table A.3, Panel B).[15] In contrast, meritocratic factors—in particular "effort"—predict a perceived low-SES advantage (Column 1, $p = 0.007$).

Mental models in the making Appendix Figure A.8 shows the distribution of perceived mechanisms among parents. Overall, the patterns mirror those observed among adolescents: gender gaps are linked to meritocratic factors and SES gaps to external ones. However, parents more often cite deeper, more fundamental drivers. For example, in the gender domain, they mention effort (12%) and motivation (26%) less frequently than adolescents (26% and 34%, respectively), while references to character traits are nearly twice as common (31% vs. 16%). Assuming that cohort effects are minor, these findings suggest that mental models become more refined over the life course.

In sum, our second main result is the following:

Result 2. *Expected gender differences in high school success are often attributed to meritocratic factors, such as study effort and motivation. By contrast, perceived high-SES advantages are attributed almost exclusively to external or non-meritocratic factors, in particular parental support.*

3.3 Origins of Mental Models

What shapes adolescents' mental models? A growing body of evidence highlights the formative role of past experiences in shaping beliefs (e.g., Malmendier, 2021), suggesting

[15] In unreported regressions, we find nuanced patterns: students without high school-educated parents are more likely to cite active parental support, while their more privileged peers rather point to the home environment. Thus, while quantitative beliefs about the role of SES are similar, the perceived underlying mechanisms differ across groups.

that adolescents may be influenced by their social environments. We explore this notion from two angles. First, we match our survey data with administrative records to provide a comprehensive picture of the role of students' social environments (Section 3.3.1). Second, we explore the role of intra-family transmission by linking student and parent responses at the household level (Section 3.3.2).

3.3.1 Role of the social environment

We distinguish three key dimensions of students' social environments: family characteristics, the local environment, and the school environment. The local environment is defined at the level of the parish ("sogn"), the smallest administrative unit in the Danish registers (2,158 in total). Table 1 shows how aspects of each dimension relate to students' perceived continuous girl advantage (Column 1) and high-SES advantage (Column 4). Moreover, we consider indicator variables for perceiving a qualitative girl or boy advantage (Columns 2 and 3) and a high- or low-SES advantage (Columns 5 and 6).

We first examine how gender earnings gaps among the adult population relate to adolescents' expectations about gender differences in high school success. While the family level appears irrelevant, local disparities are strongly predictive: a one standard deviation increase in the local gender earnings gap raises the likelihood of a perceived boy advantage by 3.4 percentage points ($p = 0.014$, Column 3) and lowers the likelihood of a perceived girl advantage by 3.2 percentage points ($p = 0.074$, Column 2). These patterns are consistent with the idea that adolescents calibrate their mental models based on observable gender-related cues from their broader local environment, mirroring patterns in the formation of gender role attitudes (Ayyar et al., 2025).

For the SES dimension, upward social mobility—measured by the income rank difference between one's father and grandfather—shifts mental models away from a perceived high-SES advantage ($p = 0.051$, Column 5) and toward a perceived low-SES advantage ($p = 0.042$, Column 6), possibly reflecting narratives transmitted within the family.[16] At the local level, a one standard deviation increase in income inequality decreases the probability of a perceived low-SES advantage by 3.9 percentage points ($p = 0.030$, Column 6) and increases the perceived continuous high-SES advantage by 2.2 percentage points ($\approx 40\%$, $p = 0.017$, Column 4). These associations are in line with the empirical relationship between inequality and immobility—the Great Gatsby Curve (Corak, 2013; Kearney and Levine, 2016)—suggesting that adolescents internalize signals of limited opportunity.

Within schools, we find suggestive evidence for a role of teachers' gender: a one-standard-deviation increase (about 13 percentage points) in the share of female teachers in the later elementary school years is associated with a 0.8-percentage-point rise in the

[16] These patterns suggest that experienced mobility may reinforce mobility, if mental models influence upper secondary enrollment. Section 3.4 provides supporting evidence on this pass-through.

Table 1: Social environments predict mental models

	Beliefs in gender arm			Beliefs in SES arm		
	Δ success (G–B) (1)	Girls better (2)	Boys better (3)	Δ success (H–L) (4)	High-SES better (5)	Low-SES better (6)
Local characteristics:						
Male-female income gap in local area	-0.83*	-3.20*	3.44**	0.48	1.22	-1.70
	(0.47)	(1.79)	(1.40)	(0.65)	(2.11)	(1.29)
Standard deviation of income in local area	-0.02	-2.94	-1.69	2.15**	2.34	-3.89**
	(0.58)	(2.81)	(1.93)	(0.90)	(2.39)	(1.79)
Family characteristics:						
Father-mother income gap	-0.47	0.05	-1.41	-0.53	-1.32	0.09
	(0.63)	(2.72)	(1.91)	(0.87)	(2.23)	(1.65)
Rank difference income of father-grandfather[(a)]	-0.48	-0.35	1.29	-0.35	-2.56*	2.05**
	(0.30)	(1.49)	(0.96)	(0.44)	(1.31)	(1.01)
Earned income father	1.59***	3.43	-1.30	0.71	1.60	1.04
	(0.58)	(2.71)	(1.88)	(0.93)	(2.46)	(1.79)
Elementary school characteristics:						
Share of female teachers[(b)]	0.80**	-0.20	-1.77*	-0.06	0.26	0.28
	(0.36)	(1.42)	(0.92)	(0.45)	(1.32)	(0.80)
Share of high SES teachers[(b)]	-0.20	0.22	-1.40	0.04	0.58	0.90
	(0.30)	(1.55)	(0.93)	(0.47)	(1.32)	(0.80)
Private school	-0.42	-2.66	1.68	2.48***	6.04**	-3.25*
	(0.73)	(3.29)	(2.25)	(0.94)	(2.92)	(1.96)
Performance girls-boys in school cohort[(c)]	0.06	1.98	-2.68**	-0.14	0.70	-0.14
	(0.33)	(1.56)	(1.16)	(0.44)	(1.43)	(0.99)
Performance high-low SES in school cohort[(c)]	-0.10	-1.69	1.43	-0.55	0.58	0.18
	(0.33)	(1.48)	(0.97)	(0.40)	(1.52)	(0.87)
No. of observations	1156	1156	1156	1170	1170	1170
R^2-adjusted	0.07	0.09	0.05	0.07	0.06	0.05
Mean dep. variable	6.56	71.97	10.81	11.12	79.66	9.32

Note: The table reports associations between students' social environments and their mental models of the role of gender (Columns 1–3) and parental education (Columns 4–6) in shaping high school success. In Column 1, the dependent variable is the perceived continuous girl advantage; Columns 2 and 3 use indicators—scaled to 0–100—for whether respondents perceive a positive girl or boy advantage, respectively. Columns 4–6 apply the same structure to the SES dimension. We pool two observations per respondent, corresponding to the high and low prior performance levels shown in the survey. Local characteristics are measured at the parish level. All explanatory variables are standardized to have mean zero and unit variance, except for the indicator for private school attendance. All specifications control for the randomly assigned prior grade tuple in the survey, interacted with an indicator for whether the belief refers to the high or low prior performance level. Additional controls include respondent gender, parental education, primary school grades (math and Danish), migration background, the share of female students and high-SES students in the school cohort, mean cohort performance, and mean local income. Standard errors are clustered at the individual level. */**/*** indicates statistical significance at the 10%/5%/1% level.

[(a)] The father–grandfather income rank difference is defined as the difference between the father's age-specific national income rank in 2023 and the grandfather's income rank at age 55.

[(b)] The share of female (high-SES) teachers is measured over the last two years of elementary school (grades 8 and 9).

[(c)] Performance differences between girls and boys (high- and low-SES students) are measured using the average of math and Danish grades at the school-by-cohort level.

perceived girl advantage ($p = 0.026$, Column 1), and a marginally significant decrease in the likelihood of a perceived boy advantage ($p = 0.055$, Column 3). These patterns

are consistent with role model effects on female students' educational decision-making (Porter and Serra, 2020; Riley, 2024). In contrast, teacher SES is uncorrelated with students' mental models (Columns 4–6) but attending a private school is associated with stronger perceived benefits of having highly educated parents (Columns 4–6).

Finally, we examine the role of peers. A higher relative performance of females in one's school cohort reduces the likelihood of perceiving a boy advantage (by 2.7 percentage points for every standard deviation increase, $p = 0.021$, Column 3). In contrast, the relative performance of high- vs. low-SES classmates shows no significant association.

3.3.2 Intra-family transmission

The patterns described above suggest that families may shape adolescents' beliefs about SES, whereas gender-related beliefs are associated with broader impressions from the local and school environment. To study the role of intra-family transmission more directly, we turn to our matched student-parent sample, which includes 387 mother–child and 195 father–child pairs. Table 2 shows to what extent adolescents' beliefs about success differences across groups correlate with those of their parents. We pool all four quantitative success beliefs from the core module, which refer to the success rates of girls and boys (high- and low-SES students) with high and low previous performance. To isolate variation in beliefs *across* the two sociodemographic groups referenced in each survey item, we estimate the following fixed-effects model:

$$(1) \qquad \textsc{SuccessBelief}_{iqps} = \beta_0 + \beta_1 \textsc{SuccessBeliefParent}_{iqps} + \delta_{qps} + \gamma_{ip} + \varepsilon_{iqps},$$

where $\textsc{SuccessBelief}_{iqps}$ ($\textsc{SuccessBeliefParent}_{iqps}$) is the quantitative success belief of student i (student i's parent) for population subgroup ps (past performance level p and sociodemographic group s), elicited through version q of the questionnaire. δ_{qps} are questionnaire-by-subgroup fixed effects that account for any mechanical parent-child correlation in beliefs arising from the fact that (i) all variable elements of the questionnaire were randomized at the household level and (ii) parents' and children's four success estimates refer to the same population subgroup, respectively.[17] γ_{ip} are household-by-performance-level-shown fixed effects, accounting for (i) the shared level of optimism vs. pessimism about high school success rates in parent-child pairs and (ii) the shared variation from differences in success beliefs across the two past performance levels the parent-child pair was exposed to in the survey. Thus, the coefficient of interest, β_1, iso-

[17] The questionnaire fixed effects q are defined by (i) one of five grade tuples, (ii) the gender vs. the SES condition, and (iii) two ways of ordering survey items. We interact fixed effects for the resulting 20 versions with fixed effects for four population subgroups ps elicited in each survey. Empirically, the size of qps-cells ranges between 11 and 29 for our mother-child pairs, and between four and 14 for our father-child pairs, i.e., singleton cells are not a concern.

lates the parent-child correlation in perceived success rate differences between the two sociodemographic population subgroups defined by gender or by SES, respectively.

Table 2: Correlations of population-level beliefs within households

	Student's population-level success beliefs		
	(1)	(2)	(3)
(A) Mother-child pairs			
Variation by gender and SES displayed			
Mother's pop-level success belief	0.10**		
	(0.04)		
Variation by gender displayed			
Mother's pop-level success belief		-0.04	
		(0.05)	
Variation by SES displayed			
Mother's pop-level success belief			0.14***
			(0.05)
No. of observations	1548	740	808
No. of households	387	185	202
(B) Father-child pairs			
Variation by gender and SES displayed			
Father's pop-level success belief	0.03		
	(0.05)		
Variation by gender displayed			
Father's pop-level success belief		0.02	
		(0.08)	
Variation by SES displayed			
Father's pop-level success belief			0.04
			(0.06)
No. of observations	780	356	424
No. of households	195	89	106
Sample	Full sample	Gender arm	SES arm
Household x grade shown FE	YES	YES	YES
Questionnaire x item FE	YES	YES	YES

Note: The table reports correlations between parents' and students' population-level success beliefs estimated from the fixed-effects regression in Equation (1). Standard errors reported in parentheses are two-way clustered: one dimension accounts for clustering by shared questionnaire, past performance, and sociodemographic group; the other accounts for clustering at the household–past-performance level. */**/*** indicates statistical significance at the 10%/5%/1% level.

Pooling the gender and SES arms, we find a significant correlation between adolescents' and their mothers' success estimates (Panel A, Column 1). If a mother perceives a ten-percentage-point higher success rate difference between the relevant sociodemographic groups, her child's corresponding perception is one percentage point higher ($p = 0.012$). Columns 2 and 3 separate the gender and SES arms, estimating the same specification. We find that mothers' and children's beliefs about the role of gender are unrelated (Panel A, Column 2), but perceptions of the role of parental education are significantly correlated. When a mother perceives a ten-percentage-point higher advantage for high-SES students, her child's perception is 1.4 percentage points higher ($p = 0.005$). Combined, these patterns are consistent with our evidence reported in Ta-

ble 1, suggesting that family experiences shape adolescents' mental models of SES, while gender-related beliefs appear to be shaped more by the broader social environment.

Panel B of Table 2 shows no statistically significant correlation between fathers' and children's mental models. In our smaller sample of father–child pairs, we can rule out correlation coefficients above 0.17 at the 95% confidence level (see the estimate in Column 2), in contrast to the significant associations for mother–child pairs. Appendix Table A.4 provides further evidence using beliefs about the child's own success: mothers' and children's views are strongly correlated, whereas father–child pairs show no such correlation. Overall, our findings align with prior research highlighting the central role of mothers in children's socialization (Dohmen et al., 2012; Grönqvist et al., 2017).

Our third main result summarizes our findings on the origins of mental models:

Result 3. *Students' mental models appear to be shaped by domain-specific aspects of social environments. For gender—an easily observed trait—gender-related cues, such as local earnings gaps and classmates' performance patterns, matter for expected success differences. For SES, family upward mobility predicts greater optimism about the success prospects of low-SES students, whereas local income inequality has the opposite effect. Within families, the mental models of adolescents and their mothers are significantly correlated when it comes to the perceived role of SES, but not of gender, in shaping educational success.*

3.4 Decision-Relevance of Mental Models: Correlational Evidence

Do students' mental models influence (i) their perceived own chances of success in high school and (ii) their decision of whether or not to enroll in this most ambitious track? To answer this, we first present correlational evidence linking individually perceived gender and SES gradients in high school success to personal outcomes, allowing for heterogeneity by students' own group membership. In Section 3.5, we then provide additional causal evidence from an information experiment with a new cohort of girls.

For the correlational analysis, we estimate the following specification:

$$\begin{aligned} Y_i = \alpha_0 &+ \alpha_1 \textsc{SuccessGapBelief}_{ip} \cdot \mathbb{I}_{\text{GroupA}_i} \\ &+ \alpha_2 \textsc{SuccessGapBelief}_{ip} \cdot \mathbb{I}_{\text{GroupB}_i} \\ &+ \alpha_3 \textsc{BaselineSuccessBelief}_{ip} + \alpha_4 \mathbb{I}_{\text{GroupA}_i} + \Theta_i \gamma + \epsilon_i \end{aligned} \tag{2}$$

where Y_i denotes the outcome of interest and $\textsc{SuccessGapBelief}_{ip}$ denotes respondent i's belief about the success gap between the two sociodemographic groups of interest, i.e., the perceived girl advantage in the gender arm and the perceived high-SES advantage in

the SES arm—given previous performance p in the hypothetical scenario. The indicators $\mathbb{I}_{\text{GroupA}_i}$ and $\mathbb{I}_{\text{GroupB}_i}$ denote the respondent's own group membership.[18]

BASELINESUCCESSBELIEF$_i$ controls for the respondent's belief about the success rate of the other group (e.g., girls' belief about boys' success rate in the gender arm) while Θ_i is a vector of additional controls, including the respondent's own prior performance, gender, and parental education. Each respondent contributes two observations—one for each of the two performance levels p specified in the survey—and standard errors are clustered at the individual level.

Our coefficients of interest, α_1 and α_2, capture how perceived group advantages relate to outcomes, conditional on one's own group. In the gender arm, they reflect how the perceived girl advantage correlates with outcomes for girls (α_1) and boys (α_2). In the SES arm, they capture analogous patterns for high- and low-SES students.

Gender differences Students' mental models are systematically correlated with their self-perceptions. Girls who believe in a ten-percentage-point larger girl advantage report a two-percentage-point higher own success chance in high school ($p = 0.011$, Table 3, Column 1). For boys, the relationship is reversed: the same increase in the perceived girl advantage is associated with a 2.9-percentage-point drop in their own expected success ($p = 0.003$). Estimates for expected GPA are less precise and statistically insignificant for girls, but follow the same directional pattern (Column 2), suggesting that concerns related to numerical anchoring are secondary.

Do shifts in own success beliefs translate into track choices? For girls they do. For every ten-percentage-point increase in the perceived girl advantage, female students are four percentage points more likely to plan to enroll in high school in the coming school year ($p = 0.011$, Column 3), and 4.7 percentage points more likely to actually list high school as their top choice in the application system—a correlation equivalent in size to about 13% of the sample mean ($p = 0.010$, Column 4). In contrast, boys' enrollment decisions appear unaffected by variation in their mental models.

Finally, girls who perceive a larger female advantage also plan to study more. A ten-point increase in the perceived girl advantage predicts 0.45 additional weekly study hours ($\approx 6\%$; $p = 0.025$; Column 5), with no effect for boys. This pattern is in line with the main explanations students give for girls' success, namely effort and motivation. In Section 3.6, we explore the mechanisms underlying the link between the perceived girl advantage and girls'—but not boys'— planned effort provision.

SES differences In Panel B, we report results from analogous specifications for the SES-dimension.[19] Students with at least one parent holding a high school diploma are

[18] In the gender arm, $\mathbb{I}_{\text{GroupA}_i} = 1$ if the respondent is female, $\mathbb{I}_{\text{GroupB}_i} = 1$ if male. In the SES arm, $\mathbb{I}_{\text{GroupA}_i} = 1$ for high-SES students, and $\mathbb{I}_{\text{GroupB}_i} = 1$ for low-SES students.

[19] As shown in Appendix Table A.5, we obtain very similar results when defining respondents' SES using parental education from register data instead of the self-reported survey measures.

Table 3: Mental models, self-perception, and choices: correlational evidence

	Expected own success (0 – 100) (1)	Expected own GPA (-3 to 12) (2)	Plans to enroll in high school (0 – 100) (3)	Actual high school enrollment (0 – 100) (4)	Planned effort (hours/week) (5)
(A) Gender arm					
Perceived girl advantage (in 10pp)					
× respondent is male (a)	-2.87***	-0.17**	1.42	0.11	0.03
	(0.95)	(0.08)	(1.85)	(1.75)	(0.18)
× respondent is female (b)	2.01**	0.09	4.05**	4.73**	0.45**
	(0.79)	(0.09)	(1.60)	(1.84)	(0.20)
Respondent is female	-0.26	-0.08	-3.70	-5.19	-0.87*
	(2.11)	(0.18)	(4.52)	(4.51)	(0.45)
Baseline belief (other gender, in 10pp)	1.43***	0.05	-0.32	-0.39	-0.05
	(0.35)	(0.03)	(0.71)	(0.69)	(0.08)
P-value: (a) = (b)	0.000	0.035	0.281	0.069	0.112
No. of observations	1156	1156	1156	1156	1156
R^2-adjusted	0.280	0.261	0.115	0.131	0.054
Mean dep. variable	73.59	7.55	36.33	37.02	7.31
SD dep. variable	24.04	2.08	48.12	48.31	4.64
(B) SES arm					
Perceived high SES-advantage (in 10pp)					
× resp. has no parent with HS degree (c)	-2.42	-0.21*	-6.23***	-5.61**	0.04
	(1.85)	(0.12)	(2.40)	(2.64)	(0.30)
× resp. has a parent with HS degree (d)	3.24***	0.08*	2.21*	1.62	0.03
	(0.54)	(0.04)	(1.17)	(1.17)	(0.12)
Respondent has a parent with HS degree	0.17	-0.19	7.06	3.09	-0.78
	(3.51)	(0.27)	(5.78)	(6.14)	(0.65)
Baseline belief (other SES-group, in 10pp)	1.94***	0.02	1.82**	1.00	-0.10
	(0.37)	(0.03)	(0.71)	(0.73)	(0.07)
P-value: (c)=(d)	0.004	0.022	0.002	0.015	0.991
No. of observations	1170	1170	1170	1170	1170
R^2-adjusted	0.344	0.361	0.145	0.153	0.051
Mean dep. variable	72.97	7.39	39.32	41.37	7.09
SD dep. variable	26.62	2.22	48.87	49.27	4.60

Note: The table reports the relationship between adolescents' mental models and their perceived own success chances, track choices, and planned study effort. The main independent variables are respondents' perceived continuous girl advantage (Panel A) and high-SES advantage (Panel B). We pool two observations per individual, one for the high and one for the low prior performance level fixed in the survey. The dependent variables are respondents' perceived success probability if they were to enroll in high school in the coming school year (Column 1); their expected GPA if enrolled (Column 2); an indicator for whether they intend to enroll in high school in the coming school year, scaled to take values of 0 and 100 (Column 3); an indicator for whether high school is ranked as the top choice in the online application system, also scaled to 0 and 100 (Column 4); and respondents' planned study effort in weekly hours (winsorized at the 95th percentile) if enrolled in the coming school year (Column 5). In all specifications, we include the full set of controls used in Table 1. In Panel A, we additionally control for respondents' success estimates for the other gender (e.g., boys' success when the respondent is female), while in Panel B these controls are replaced by success estimates for the other SES group. Robust standard errors, clustered at the respondent level, are shown in parentheses. */**/*** indicates statistical significance at the 10%/5%/1% level.

significantly more optimistic about their own success prospects when they anticipate a larger advantage for high-SES students (+3.2 percentage points; $p < 0.001$, Column 1).

These effects are robust to using expected GPA as an alternative proxy for own anticipated success prospects (Column 2). For students from the low-SES group, we find more noisily measured but similarly large *negative* associations with own success expectations.

Anticipated performance gaps are also linked to widening enrollment gaps, mainly driven by discouragement among low-SES students: their intended enrollment drops by 6.2 percentage points for every ten-percentage-point increase in the high-SES advantage ($p = 0.010$, Column 3), and actual enrollment falls by 5.6 percentage points ($p = 0.034$, Column 4). In contrast, high-SES students show a modest increase in both enrollment intentions ($p = 0.060$) and actual enrollment ($p = 0.167$). The resulting SES gap in high school enrollment amounts to a striking 17% of the sample mean. Notably, students' intended study effort is unaffected (Column 5), consistent with the belief that SES differences operate mainly through parental support rather than students' own effort (see Section 3.2).

In sum, moving from gender-neutral and SES-neutral mental models to correctly perceived performance gaps is associated with a boost for girls' success expectations and enrollment decisions, while discouraging students from low-SES backgrounds.

3.5 Causal Evidence on the Relevance of Mental Models

The correlational evidence suggests that mental models matter for students' decision-making, but it could be confounded by omitted variables or reverse causality. For instance, students might extrapolate from themselves to their group. To isolate the *causal* effect of students' mental models, we conducted a survey experiment in 2025—one year after our main data collection—with a new cohort (born in 2009) approaching the end of compulsory school. The experiment (AEARCTR-0015963) provides a random subset of respondents with information that creates exogenous variation in their mental models, enabling us to study causal effects on self-assessments and planned behavior.

Sample Due to restrictions on the number of students we were allowed to contact, we focused on the gender rather than the SES dimension, as it is more straightforward for students to self-identify. To avoid ethical concerns about exposing boys to potentially discouraging information, we limited participation to girls. Moreover, we ran the experiment after the official secondary schooling choice deadline to ensure that it would not influence respondents' track choices.

Of 5,814 invited girls, 799 completed the baseline survey, and 391 also completed our follow-up survey. As expected, the majority of the sample self-report to attend the final year of compulsory school. Moreover, the sample is comparable to our main sample in terms of family composition and past performance. Randomization was successful,

with treatment and control groups balanced on observable characteristics (Appendix Table A.6, Columns 1–8).[20]

Experimental design The survey begins by collecting respondents' background information, including recent math and Danish grades. We then elicit prior beliefs about the quantitative girl advantage in high school using our success measure, defined as the probability of completing high school with a GPA of 7 or higher. Each respondent is first shown the high school success rate of boys in a slightly older reference cohort (born in 2002) who enrolled in high school and had elementary school performance similar to their own.[21] On the same screen, we ask all respondents to estimate the success rate of girls with similar prior performance.

Next, we randomly assign half of the respondents to a treatment group that receives truthful information about the actual success rate of girls born in 2002.[22] Post-treatment, we measure respondents' perceptions of girls' and boys' success chances in their own cohort, from which we infer posterior beliefs about the girl advantage. We also elicit our main outcomes of interest: respondents' expected success chances, GPA and study effort in the case of high school enrollment, as well as college aspirations. Finally, in a one-week follow-up survey, we re-elicit personal success expectations to assess the persistence of treatment effects. Appendix E presents the complete survey instructions.

Empirical strategy The treatment should affect respondents differently depending on initial beliefs about the girl advantage. To capture this heterogeneity, we calculate each respondent's perception gap—the difference between the true girl advantage and the respondent's prior belief—and divide the sample into three groups (see Appendix Figure A.11). To form these groups, we followed two guiding principles: first, to ensure the groups are roughly similar in size; and second, to split the sample at a zero perception gap, as individuals above and below this threshold receive qualitatively different information when treated. This procedure yields three groups. Two groups consist of respondents who overestimate the girl advantage relative to the ground truth: one with a strong overestimation of 12 percentage points or more and one with a weaker overestimation. The third group, comprising 28% of the sample, includes respondents whose prior beliefs are accurate or underestimate the girl advantage.

We estimate the following regression:

[20] A technical issue during a short period of the data collection prevented some respondents in the treatment group from progressing past the treatment screen, whereas control respondents were unaffected. We include all completed responses in our main analysis but confirmed that all results hold when excluding respondents who took the survey during the time window of the technical issue.

[21] We calculate each respondent's average self-reported math and Danish grade and assign them to a "population peer group" of individuals born in 2002 in the register data whose identical math and Danish grades most closely match the respondent's average.

[22] The information is illustrated by a bar chart contrasting boys' and girls' success rates in the reference cohort. Appendix Figure A.9 shows screenshots of the survey interface for the prior belief elicitation (Panel A) and the information treatment (Panel B), while Appendix Figure A.10 documents the gender-specific success rates presented to respondents.

$$
\begin{aligned}
Y_i = \; & \beta_0 + \beta_1 T_i \cdot \mathbb{I}_{\text{StrongOverestimator}_i} + \beta_2 T_i \cdot \mathbb{I}_{\text{WeakOverestimator}_i} + \beta_3 T_i \cdot \mathbb{I}_{\text{Underestimator}_i} \\
& + \; \beta_4 \mathbb{I}_{\text{StrongOverestimator}_i} + \; \beta_5 \mathbb{I}_{\text{WeakOverestimator}_i} + \beta_6 \mathbb{I}_{\text{Underestimator}_i} + \Theta_i \gamma + \varepsilon_i. \qquad (3)
\end{aligned}
$$

Here, T_i indicates assignment to the treatment group; $\mathbb{I}_{\text{StrongOverestimator}_i}$, $\mathbb{I}_{\text{WeakOverestimator}_i}$ and $\mathbb{I}_{\text{Underestimator}_i}$ denote the three perception-gap groups; and Θ_i represents a vector of control variables. The coefficients β_1, β_2 and β_3 capture the treatment effects for respondents in the respective groups.

Results Table 4 reports the estimated treatment effects on our outcomes of interest. As intended, the intervention shifts treated respondents' beliefs about the girl advantage in their own cohort in the direction implied by their perception gap for the reference cohort (Column 1). Initially strongly overoptimistic respondents reduce their perceived girl advantage by seven percentage points on average ($p < 0.001$). In contrast, the treatment has no detectable effect on the beliefs of respondents who weakly overestimated the girl advantage, while it increases the perceived girl advantage of initially pessimistic respondents by nearly four percentage points ($p = 0.001$). Overall, these results indicate that respondents understood the information provided about the 2002 cohort and extrapolated it to their own cohort. The implied learning rate of 28% lies within the range commonly observed in information-provision experiments (Haaland et al., 2023).

Among girls who strongly overestimated the girl advantage, the treatment significantly lowers their own expectations for success by 6.2 percentage points ($p = 0.028$, Column 2) and their expected GPA by 0.52 points (a 6.8% decrease; $p = 0.036$, Column 3). Treated respondents in this group also plan to spend 1.4 fewer hours per week studying (a 19% decrease; $p = 0.027$; Column 4) and reduce their expected likelihood of attending university by 11.8 percentage points (a 17% decrease; $p = 0.047$, Column 5).

By contrast, we find no significant treatment effects for those who weakly overestimated or underestimated the girl advantage. A likely explanation is that initial updating in these groups is closer to zero, as their perception gaps were substantially smaller than those of strong overestimators (–5.2pp and +6.9pp on average, compared to -28pp). Nonetheless, the estimated differences in treatment effects across groups mostly point in the expected direction and are statistically significant for expected GPA and planned effort (Columns 3 and 4).

A remaining concern is that our treatment effects reflect short-lived phenomena such as unconscious numerical anchoring, experimenter demand effects, or spontaneous emotional reactions to the treatment (de Quidt et al., 2018; Haaland et al., 2023). Since these side-effects should dissipate over time, we examine the persistence of treatment effects on success expectations in a one-week follow-up survey. Appendix Table A.7 reports results for (i) the pre-specified sample (Panel A) and (ii) an extended sample that includes

Table 4: Effects of information treatment on mental models, self-perception, and choices

	Perceived girl advantage (-100 – 100) (1)	Expected own success (0 – 100) (2)	Expected own GPA (-3 to 12) (3)	Planned effort (hours/week) (4)	Plans to attend college (0 – 100) (5)
Assigned to treatment group					
× strong overestimators (a)	-7.05***	-6.21**	-0.52**	-1.38**	-11.76**
[avg. perception gap = −28.4]	(1.59)	(2.83)	(0.25)	(0.62)	(5.92)
× weak overestimators (b)	-0.48	-2.58	0.28	0.24	-3.14
[avg. perception gap = −5.2]	(1.08)	(2.30)	(0.19)	(0.57)	(5.01)
P-value: (a) = (b)	0.00	0.31	0.01	0.05	0.26
× underestimators (c)	3.91***	-1.08	0.30	-0.17	-1.19
[avg. perception gap = 6.9]	(1.20)	(3.04)	(0.23)	(0.62)	(6.15)
P-value: (a) = (c)	0.00	0.21	0.01	0.16	0.21
Strong overestimators	15.06***	27.83***	3.97***	8.53***	14.54
	(2.81)	(5.38)	(0.53)	(1.13)	(10.42)
Weak overestimators	9.14***	23.62***	3.71***	8.54***	16.69
	(2.87)	(5.68)	(0.55)	(1.17)	(10.75)
Underestimators	3.72	17.80***	3.52***	8.18***	12.63
	(2.81)	(5.29)	(0.53)	(1.17)	(10.47)
No. of observations	799	799	799	799	799
R^2-adjusted	0.60	0.93	0.96	0.73	0.74
Mean dep. variable	12.41	72.05	7.64	7.52	68.34
SD dep. variable	11.44	25.08	2.05	4.63	46.55

Note: The table reports the effects of the information treatment conducted among girls from the cohort born in 2009. We show separate treatment effects on three groups defined based on their prior perception gap—the difference between the true girl advantage and the respondent's prior belief about the reference cohort born in 2002. The dependent variables are respondents' beliefs about the girl advantage in their own cohort (Column 1); their perceived success probability if they were to enroll in high school in the coming school year (Column 2); their expected GPA if enrolled (Column 3); their planned study effort if they were to enroll, measured in weekly hours and winsorized at the same cutoff as in Table 3 (Column 4); and their perceived probability of attending college later in life (Column 5). In all specifications, we additionally control for respondents' past performance in math and Danish, an indicator for whether at least one parent has completed a high school degree, current grade attendance, and an indicator for the period affected by a survey-related technical issue. Robust standard errors are shown in parentheses. */**/*** indicates statistical significance at the 10%/5%/1% level.

data from a pilot with slightly older girls (Panel B).[23] In both samples, treatment effects persist with a similar magnitude, although they mostly miss statistical significance in the smaller follow-up sample. Overall, these findings suggest that numerical anchoring, demand effects, or other short-lived responses are unlikely to drive our results.

Our fourth main result is as follows:

Result 4. *Mental models matter. Girls who perceive a stronger advantage to being a girl are more optimistic about their own success chances, more likely to apply for high school in the*

[23]We report results for both samples because the pre-specified follow-up sample was unexpectedly small due to the technical issue described above.

coming school year, and plan to exert more study effort. A supplementary experiment with female students shows that girls causally extrapolate from information about the prevailing girl advantage to their own success chances, planned study effort and college aspirations. Boys' own success expectations are negatively correlated with their beliefs about the girl advantage, but their planned effort choices and enrollment decisions appear inelastic. Finally, a larger perceived high-SES advantage is associated with wider socioeconomic gaps in both own success expectations and high school enrollment.

3.6 Mechanisms

Our evidence on the decision-relevance of mental models suggests that anticipated systematic differences in outcomes across groups exert a powerful influence on adolescents' self-beliefs and decision-making. What mechanisms drive this influence? In this final section, we explore the idea that individuals interpret systematic inequality through the lens of fundamental parameters of a new environment—such as secondary school—about which they have incomplete information. Concretely, we examine how students draw conclusions about the underlying production function of academic success when observing gender-based performance differences.

The qualitative evidence presented in Section 3.2 suggests that students attribute girls' academic success, more than boys', to effort and effort-related traits. Building on this evidence, we hypothesize that adolescents observing a higher relative performance of girls compared to boys update (i) positively about the underlying returns to effort and (ii) negatively (positively) about the effort costs of girls (boys) (AEARCTR-0017048).

Sample In October 2025, we contacted a 20% random sample of the 2009 cohort, at the transition from elementary to secondary education, for another online survey.[24] Our final sample consists of 443 girls and 591 boys and is broadly comparable to our other two samples in terms of observable characteristics (see Appendix Table A.8).

Experimental design Each survey respondent is presented with two hypothetical scenarios in random order. In both scenarios, we describe a Danish high school class and ask respondents to consider all students who received a final grade of 7 in an unspecified subject in the final year of compulsory school. The scenarios further state that these students are now taking their first high school exam in the same subject. The key difference between the scenarios lies in the performance pattern on that exam: in one scenario, girls in the described subgroup score an average grade of 10 while boys score 7; in the other scenario, this pattern is reversed, with boys scoring 10 and girls scoring 7 on average. Using hypothetical scenarios rather than real-world performance data allows us

[24]The girls in this sample were already invited to our causal survey described in Section 3.5. All results presented below are robust to dropping those (172 out of 443) girls who had already participated in this earlier survey.

to generate exogenous within-subject variation in the relative performance of boys and girls, enabling us to causally assess how students interpret performance differences.

Immediately after each scenario, we elicit respondents' beliefs about the returns to effort in the hypothetical exam. The survey question asks: *"Do you think the exam was such that it paid off to work hard and study in preparation? (I.e., if a student put in a lot of effort and studied for 10 hours rather than only one hour, would that student obtain a better grade?)"* Responses are recorded on a scale from *0 ("effort did not pay off")* to *100 ("effort paid off a lot")*. To provide additional evidence on students' gendered reasoning about high school success, we also elicit perceived returns to intelligence—a factor that, according to our qualitative evidence, adolescents associate weakly with boys' school success (see Appendix F for question wording).

Also following each scenario, we ask similar questions about perceived gender-specific effort costs using separate items for (i) social norms around study effort—that is, the extent to which studying is associated with stigma—and (ii) the perceived intrinsic (dis)utility of exerting study effort. Female (male) respondents are asked about the effort costs faced by female (male) students in the hypothetical school class.

Empirical Strategy We estimate regressions of the following form:

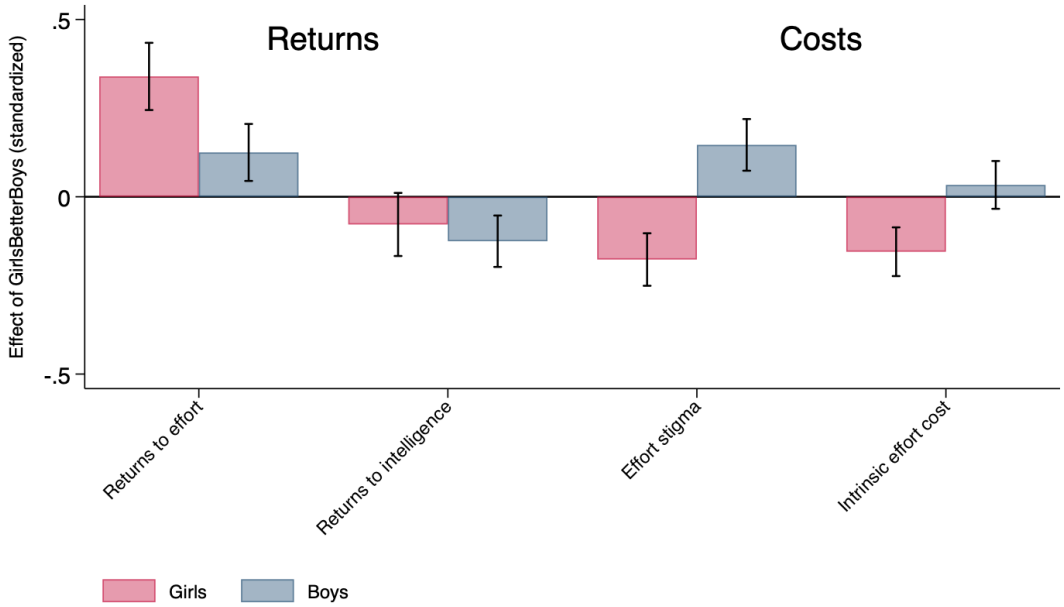
$$Y_{is} = \delta_0 + \delta_1 \mathbb{I}_{\text{Girls>Boys}_{is}} + \kappa_i + \varepsilon_{is} \tag{4}$$

where Y_{is} denotes respondent i's belief in scenario s about the returns to effort or intelligence, or about effort costs. The indicator $\mathbb{I}_{\text{Girls>Boys}_{is}}$ equals one when girls outperform boys in scenario s, while κ_i denotes individual fixed effects. The coefficient of interest, δ_1, captures the extent to which the belief Y_{is} differs in the scenario where girls outperform boys compared to the scenario where boys perform better.

Results As hypothesized, students generally associate higher relative performance by girls with higher returns to effort and lower returns to intelligence (Figure 4). While the perceived returns to effort are highly elastic, especially in the female subsample ($\delta_1 = +0.34$ standard deviations, $p < 0.001$), students' updating about the returns to intelligence is noticeably weaker and reaches a 5% significance level only in the male subsample ($\delta_1 = +0.12$ standard deviations, $p = 0.002$).

Moreover, when observing a higher relative performance of female students in one scenario compared to the other, girls infer that visible study effort is more socially acceptable ($\delta_1 = -0.18$ standard deviations, $p < 0.001$) and more intrinsically enjoyable for their gender group ($\delta_1 = -0.16$ standard deviations, $p < 0.001$). Boys show the opposite reaction, but only for social norms: higher female performance leads them to see studying hard as more stigmatized for boys ($\delta_1 = 0.15$ standard deviations, $p < 0.001$).

Figure 4: Effect of a better female vs. male performance on perceived fundamentals



Note: Each panel reports the estimated coefficient δ_1 from Equation (4). The leftmost panel captures perceived returns to effort, while the second panel from the left captures perceived returns to intelligence. The second panel from the right focuses on perceived social costs of putting in effort, and the rightmost panel shows the perceived intrinsic cost of studying. We report separate estimates for female respondents ($N = 443$) and male respondents ($N = 591$). All specifications include individual fixed effects, and the 95% confidence intervals are based on cluster-robust standard errors.

Overall, our findings indicate that students map observed gender performance differences into beliefs about underlying primitives relevant for their own decision-making.[25] Appendix B presents a simple theoretical framework showing that the empirical patterns documented in Sections 3.4, 3.5 and 3.6 can be rationalized within a unified model. Girls who observe a larger girl advantage update positively about the returns to effort and negatively about female effort costs, resulting in higher optimal study effort and better expected own high school performance. In contrast, boys' effort does not adjust, as higher perceived returns to effort are offset by higher perceived effort costs.

Our fifth and final result can be summarized as follows:

Result 5. *Students respond to observed gender performance gaps by updating their beliefs about the underlying production function of academic success. Girls seeing a female performance advantage infer higher returns to effort and lower social and intrinsic costs of studying. Boys, by contrast, expect higher returns to effort but also greater social stigma from studying.*

[25] Drawing on additional survey items, we find that students' perceptions of gender-specific effort costs and returns are strongly correlated with their own perceived effort costs ($\rho = 0.69$) and returns ($\rho = 0.52$), consistent with the idea that students extrapolate from group-level beliefs to their own perceived production function for success.

4 Conclusion

Education trajectories are marked by systematic inequality, particularly along the lines of gender and socioeconomic background. Yet little is known about how students navigating their own education trajectories perceive and make sense of such inequalities. More broadly, observed disparities are a central feature of many social environments, but how their anticipation shapes personal expectations and decision-making remains poorly understood. Our study combines survey data on students' perceptions of inequality in educational success with administrative data on their social environments and educational decisions. This combination allows us to study both the origins and the decision-making consequences of students' mental models of gender- and SES-based inequality in educational achievement.

Our results highlight that adolescents generally hold mental representations of sociodemographic groups and believe that group membership predicts educational outcomes. Students' mental models are heterogeneous and appear to be shaped by social environments and within-family transmission. Mental models, in turn, shape decisions: students extrapolate from group-level patterns to their own success expectations and aspirations. Moreover, larger perceived systematic advantages of one group over another are associated with increasing gaps in enrollment across groups. One mechanism behind these patterns seems to be that individuals draw conclusions about the underlying production function of success from observed gender differences in educational performance.

These findings have important implications for understanding the persistence of educational inequality: mental models appear to constitute a channel through which inequalities in the social environment are internalized and subsequently shape educational decisions and outcomes. Our findings offer a new perspective on prior evidence documenting that some sociodemographic groups—for instance, high-performing students from socioeconomically underprivileged backgrounds—tend to refrain from pursuing educational paths that would seem optimal based on their past performance alone (Graetz et al., 2023; Hakimov et al., 2023). Our results suggest a new "forward-looking" mechanism, namely that such students may be acting on anticipations of systematic inequality in outcomes and engage in "statistical self-discrimination". This perspective underscores the urgency of addressing the underlying inequalities that make such anticipations reasonable in the first place. An open question is whether, given the status quo, students with correct mental models are well advised to engage in forward-looking behavior or whether they should better act blind to their group membership. Assessing welfare implications will require further (structural) work using long-run data on students' trajectories.

Another direction for future research is to examine the role of beliefs about systematic inequality in shaping other key lifecycle decisions, such as at the transition from education to the labor market. Gathering further evidence on the role of such mental models in other decision contexts may help to further clarify how social environments shape behavior through beliefs, rather than constraints alone.

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Online Appendix

Mental Models of High School Success

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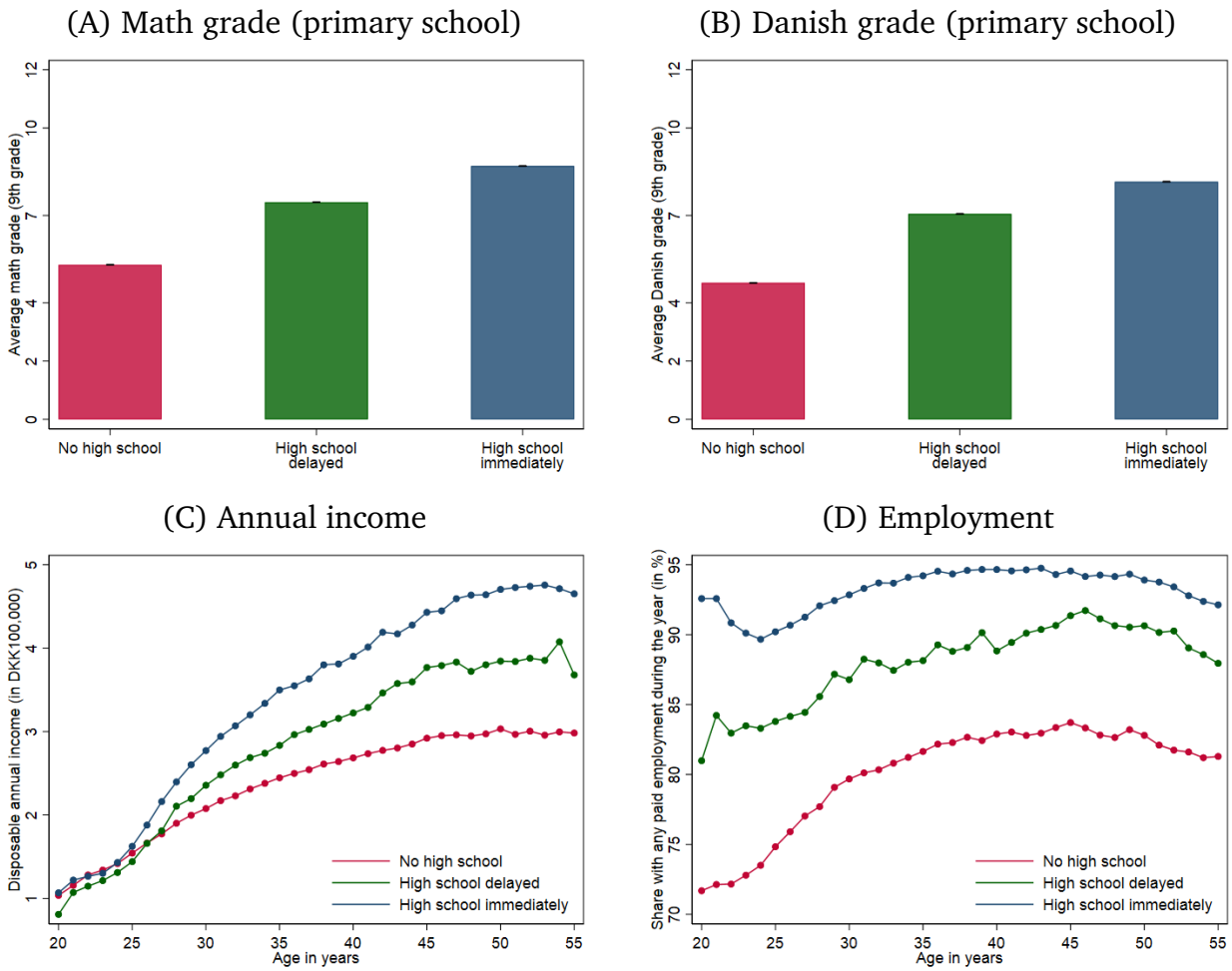
Sonja Settele Helene Willadsen

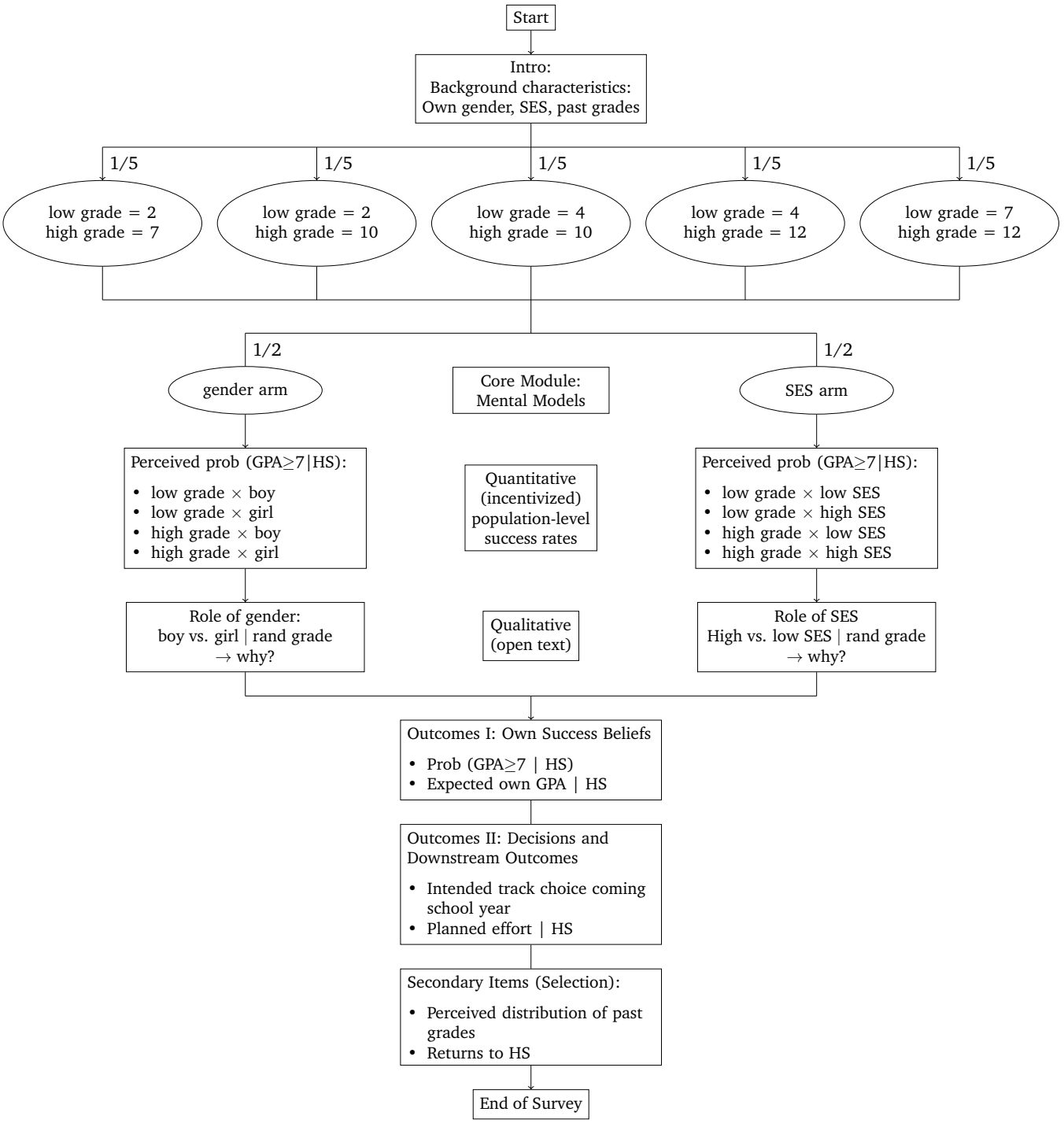
A Additional Figures and Tables

Figure A.1: Primary school grades and labor market outcomes by track choice



Note: The figure compares individuals' primary school grades and their subsequent labor market outcomes differentiated by their choice of secondary education.
Panels A and B show the average math and Danish grades (including 95% confidence intervals) that students received in 9th grade, their final year of compulsory school. We distinguish between three groups: (1) students who apply to high school in the same year in which they completed 9th grade, (2) those who apply after completing the optional 10th grade, and (3) those who did not choose high school but instead applied for other tracks. The sample includes all students who used the online application tool for secondary education in the years 2009 to 2023, the years for which we have application data.
Panels C and D display individuals' annual income and employment probability by age using administrative records for the full Danish population in 2021. We distinguish between individuals who (1) enrolled in high school in the same year they completed primary school (blue line), (2) enrolled at a later point, and (3) never enrolled in high school.

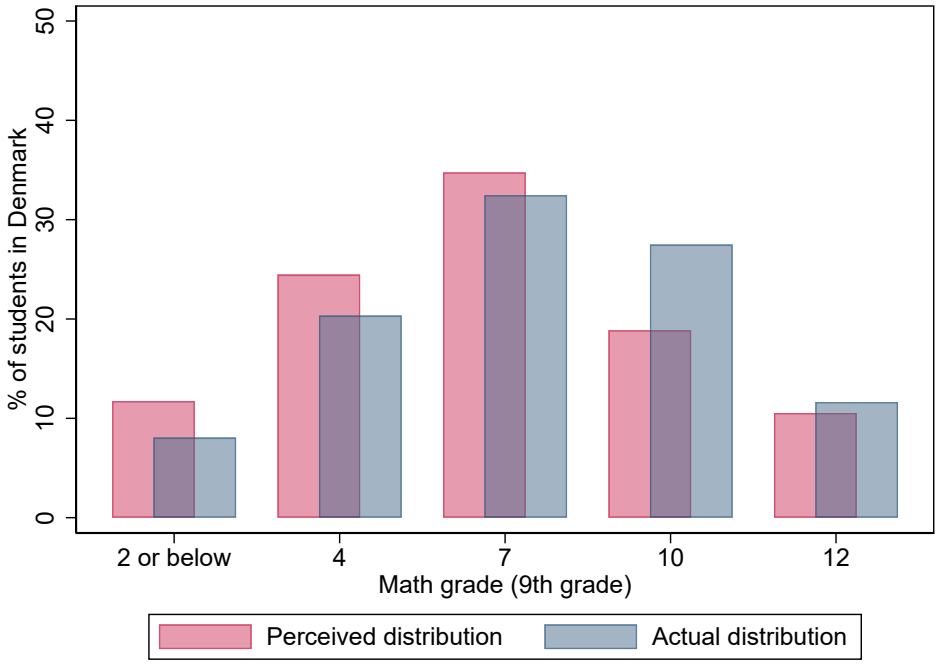
Figure A.2: Outline of main survey



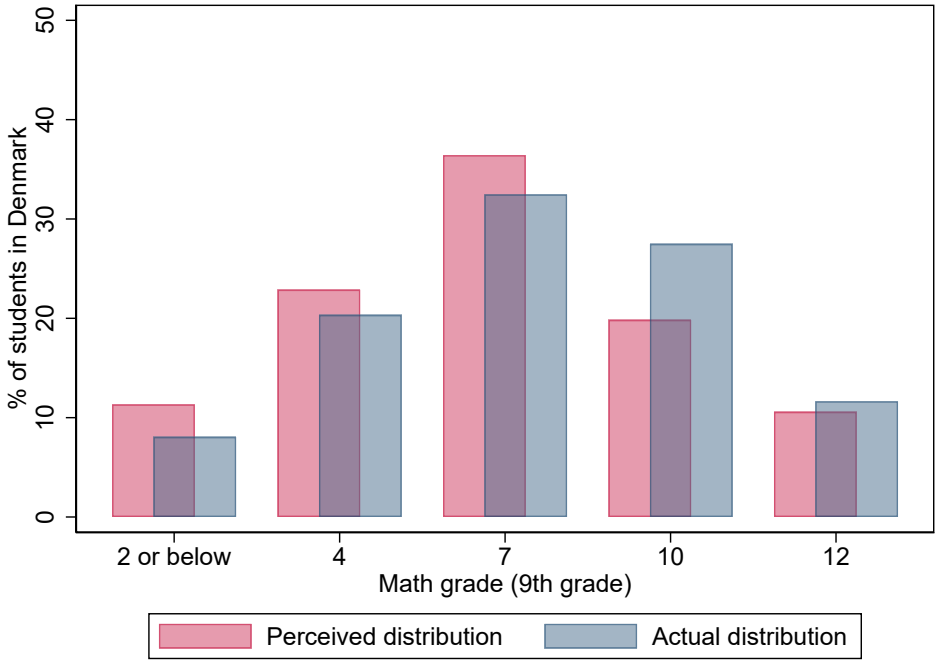
Note: The figure illustrates the design of our main survey and highlights its core elements. The design applies to both the student and parent surveys. All randomizations were conducted at the household level, such that students and their parents were exposed to identical values of the randomized elements. Low-SES students are defined as those without any parent holding a high school degree, while high-SES students are defined as those with two parents holding at least a high school degree. Additional items and the exact ordering of questions in "Outcomes I", "Outcomes II" and "Secondary Items" are documented in the survey instructions in Appendix D.

Figure A.3: Perceived and actual distribution of elementary school grades (math)

(A) Students



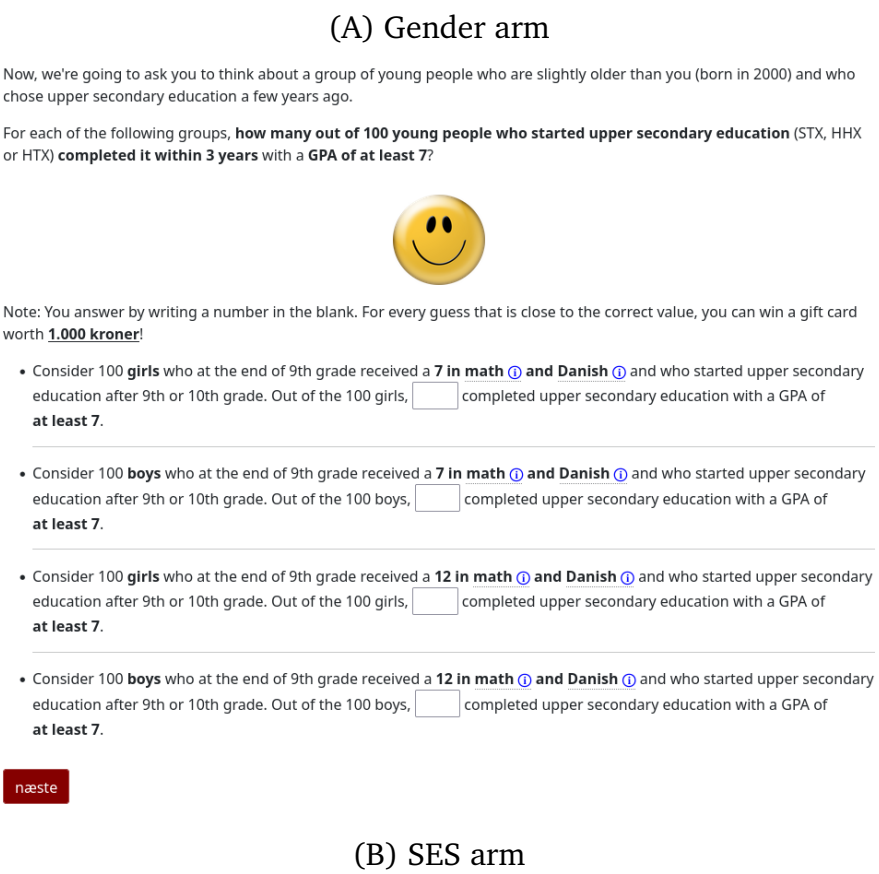
(B) Parents



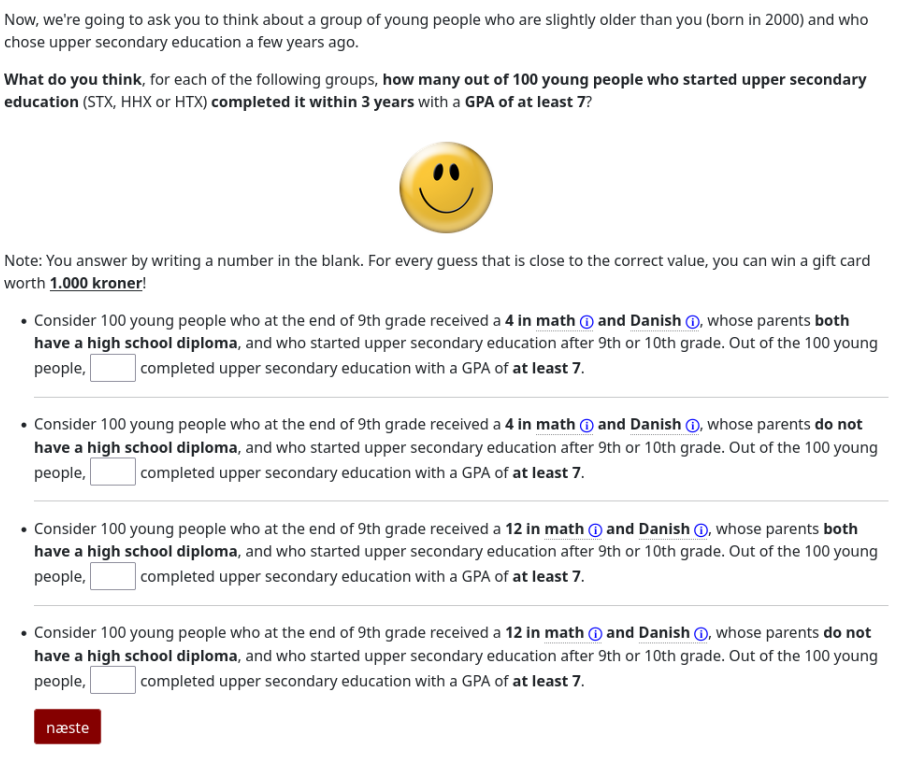
Note: The figure compares perceived and actual distributions of primary school math grades. Panel A shows students' perceptions, while Panel B shows parents'. Red bars show the perceived distribution elicited in the main survey, in which respondents report their beliefs about the share of students in the 2000 reference cohort receiving different math grades in their final year of elementary school (9th grade). Blue bars show the corresponding actual distribution observed in the register data.

Figure A.4: Survey interface core module

(A) Gender arm

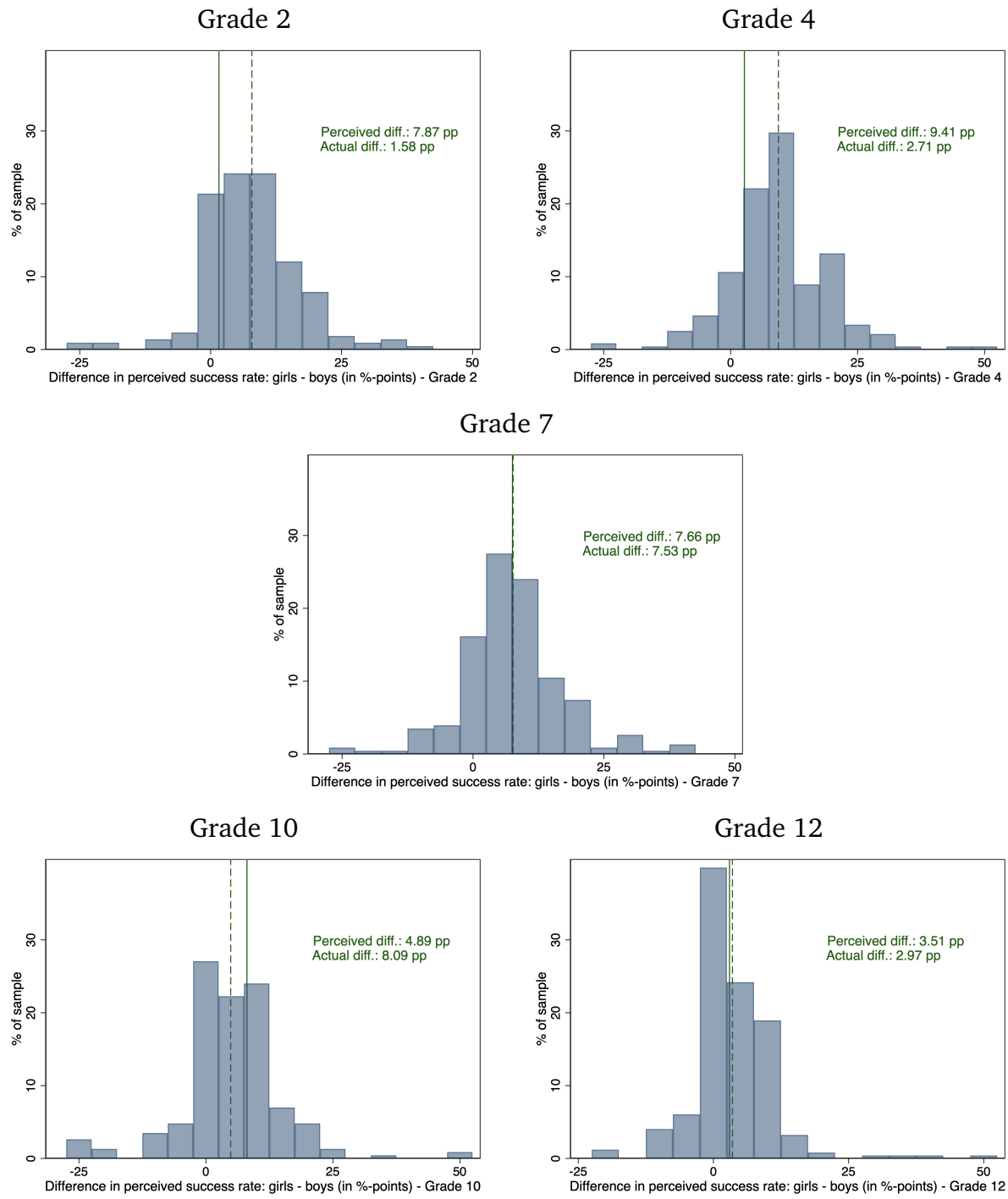


(B) SES arm



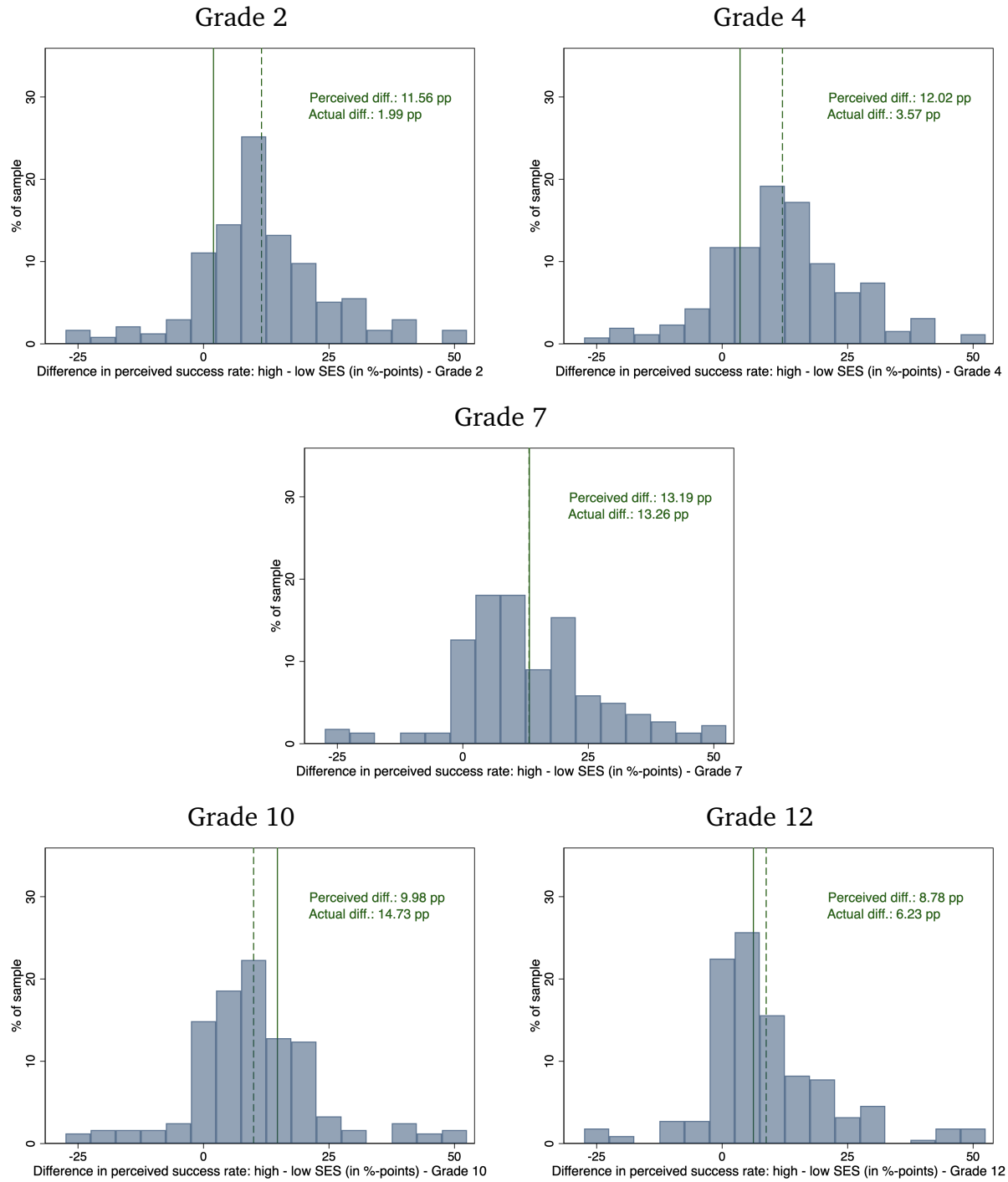
Note: The figure displays screenshots of the interface for the core survey item as presented on a desktop device (English translation). Panel A corresponds to the gender condition, and Panel B corresponds to the SES condition. Both screens correspond to the randomly drawn grade tuple (7 vs. 12).

Figure A.5: Students' perceptions of gender success gaps by grade



Note: The figure shows the distribution of students' perceived population-level success gaps between girls and boys for different past performance levels displayed in the survey. Solid vertical lines indicate the actual differences in success rates between the corresponding groups, measured as unweighted averages across the past grades shown in the survey. Dashed vertical lines indicate the corresponding average beliefs. Perceived population-level success gaps are winsorized at -25 and 50 percentage points.

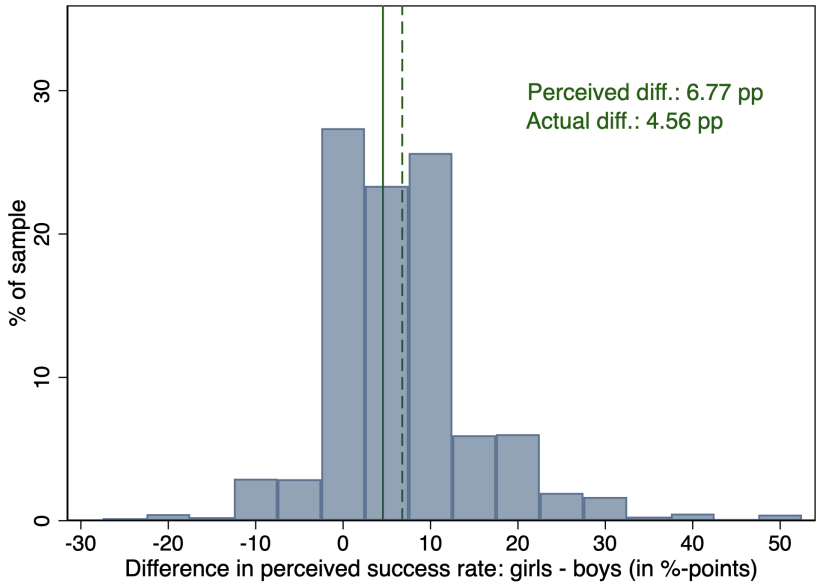
Figure A.6: Students' perceptions of SES success gaps by grade



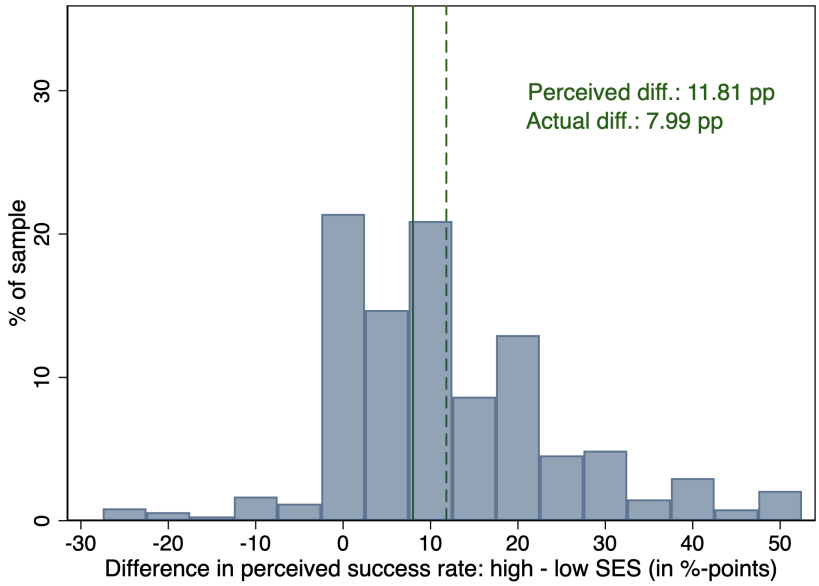
Note: The figure shows the distribution of students' perceived population-level success gaps between students from high- and low-SES backgrounds for different past performance levels displayed in the survey. Solid vertical lines indicate the actual differences in success rates between the corresponding groups, measured as unweighted averages across the past grades shown in the survey. Dashed vertical lines indicate the corresponding average beliefs. Perceived population-level success gaps are winsorized at -25 and 50 percentage points.

Figure A.7: Parents' perceptions of gender and SES success gaps

(A) Perceived gender differences



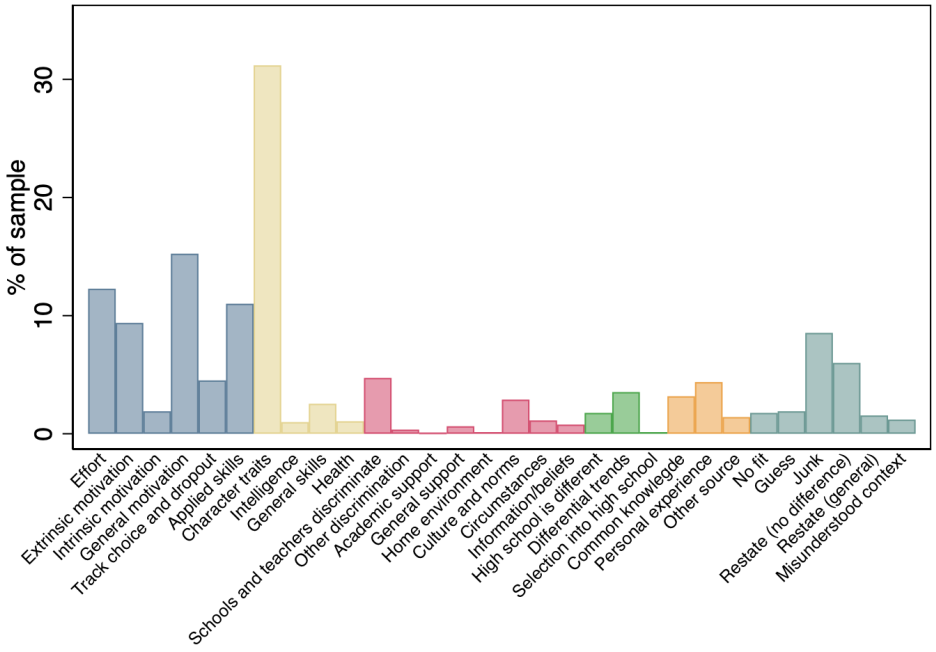
(B) Perceived SES differences



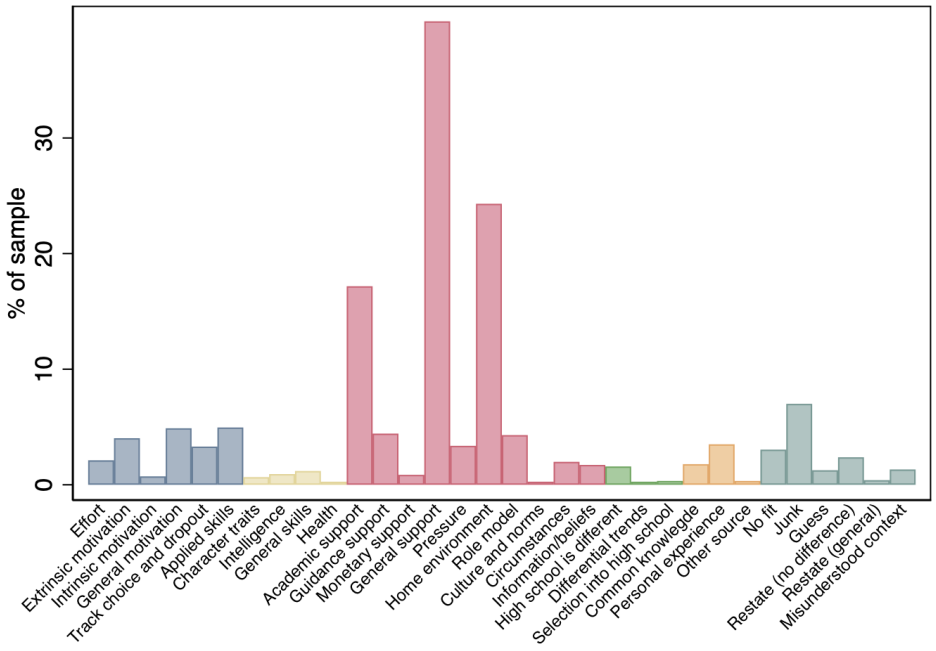
Note: The figure shows the distribution of parents' perceived population-level success gaps between (A) girls and boys ($N = 1,417$) and (B) students from high- and low-SES backgrounds ($N = 1,514$). Solid vertical lines indicate the actual differences in success rates between the corresponding groups, measured as unweighted averages across the past grades shown in the survey. Dashed vertical lines indicate the corresponding average beliefs. Perceived population-level success gaps are winsorized at -25 and 50 percentage points.

Figure A.8: Parents' perceived drivers of differences in high school success

(A) Gender

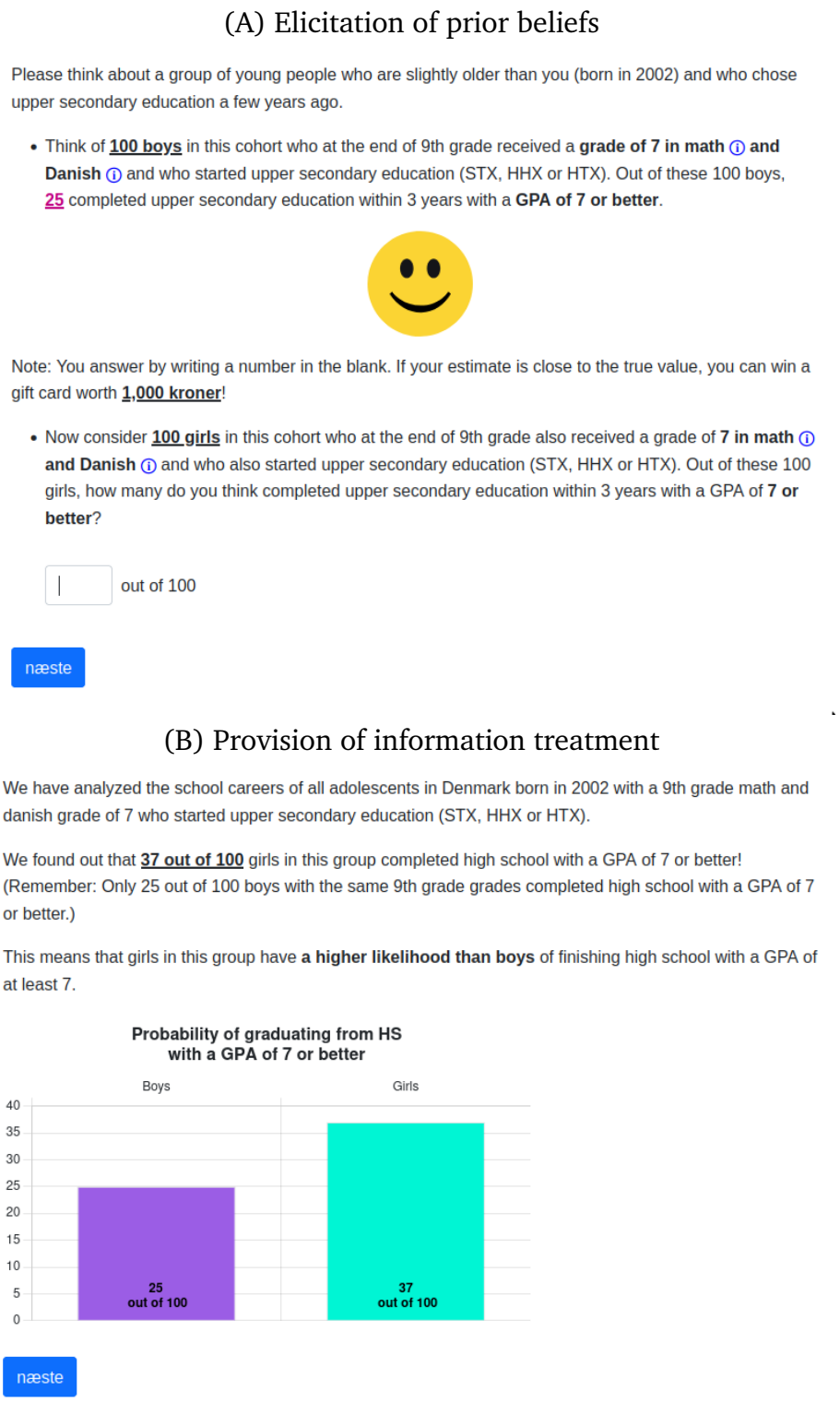


(B) SES



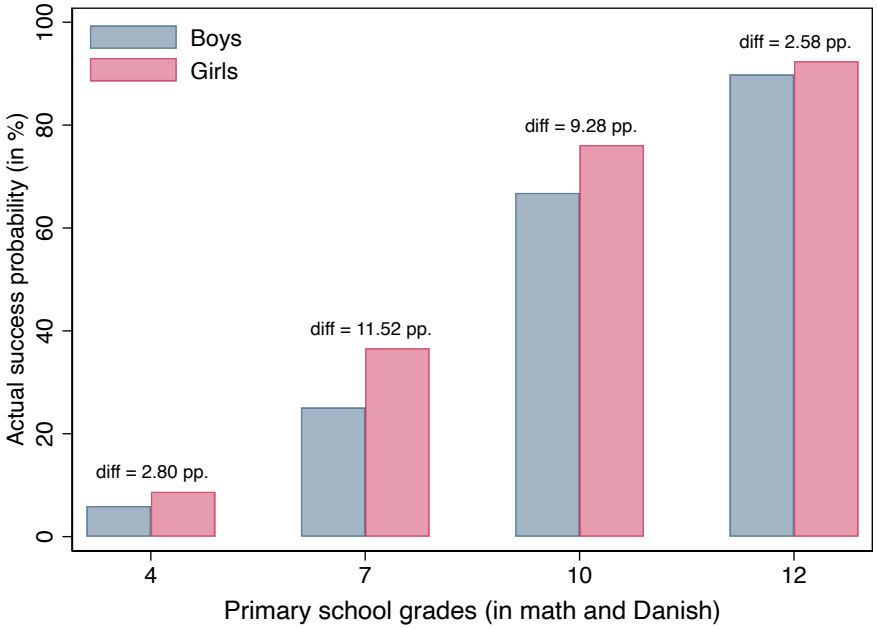
Note: The figure displays the distribution of parents' reported reasons for differences in their quantitative beliefs about the success probabilities of (A) girls versus boys ($N = 1,417$) and (B) high- versus low-SES students ($N = 1,514$), based on the coding scheme described in Appendix C. Colors indicate broader summary categories: blue bars denote factors related to students' study behavior; yellow bars denote other personal factors such as character traits and ability; red bars denote impersonal factors; green bars denote dynamics associated with transitions to high school; orange bars denote knowledge and memory; and teal bars denote responses not attributable to specific factors.

Figure A.9: Survey interface causal survey



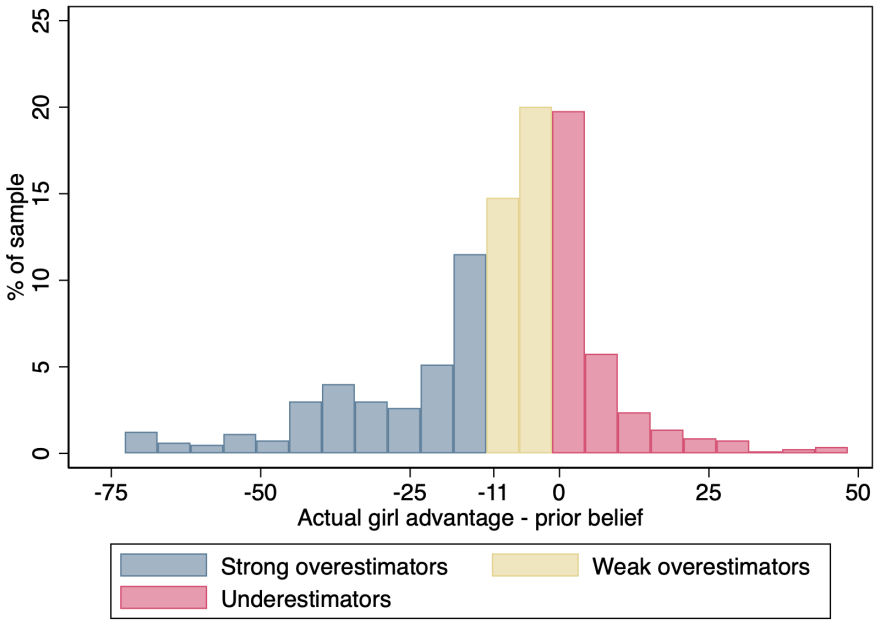
Note: The figure displays screenshots of the survey interface as presented on a desktop device (English translation). Panel A illustrates the screen used to elicit prior beliefs about girls' relative success rates, and Panel B shows the information treatment. Both panels correspond to the interface shown to respondents whose prior performance was closest to an average math and Danish grade of 7. Appendix Figure A.10 provides a complete overview of all past performance levels, including the success rates shown for both girls and boys.

Figure A.10: Actual high school success by gender for the 2002 cohort



Note: The figure displays the actual success rates in upper secondary education—defined as graduating within three years with a GPA of 7 or higher—for individuals born in the reference year 2002. To increase precision in smaller cells, the sample is supplemented with individuals born in 2001 and 2000. The sample includes 3,887 students with a grade of 4, 14,814 with a grade of 7, 13,195 with a grade of 10, and 4,266 with a grade of 12.

Figure A.11: Definition of belief groups for experimental analysis



Note: The figure displays the distribution of students' pre-treatment perception gaps (the difference between actual and perceived girl advantage), winsorized at -75 and 50. The sample consists of girls born in 2009. We define three groups: strong overestimators (277 respondents) have perception gaps less than -11; weak overestimators (297 respondents) have perception gaps between -11 and 0; and underestimators (225 respondents) have perception gaps greater than or equal to 0.

Table A.1: Summary statistics and representativeness of the population

	Register data			Survey data		
	2000 (full) (1)	2008 (full) (2)	2008 (survey) (3)	Student (4)	Mother (5)	Father (6)
Student characteristics						
Female	0.49	0.49	0.61	0.61	0.49	0.50
No. of parents with high school degree						
None	0.53	0.43	0.39	0.17	0.17	0.14
One parent	0.25	0.27	0.27	0.36	0.36	0.29
Two parents	0.21	0.29	0.34	0.47	0.47	0.58
Grade attendance at age 15						
8th grade	0.18	0.00	0.02	0.00	0.00	0.00
9th grade	0.80	0.98	0.96	0.98	0.98	0.98
10th grade	0.02	0.02	0.02	0.02	0.02	0.02
Math grade in 9th grade						
0 or below	0.01	0.02	0.03	0.01	0.01	0.01
2	0.07	0.08	0.04	0.05	0.06	0.04
4	0.20	0.21	0.13	0.15	0.18	0.13
7	0.32	0.33	0.30	0.31	0.32	0.33
10	0.27	0.25	0.29	0.29	0.31	0.35
12	0.12	0.12	0.21	0.18	0.13	0.14
Danish grade in 9th grade						
0 or below	0.02	0.02	0.04	0.01	0.01	0.01
2	0.08	0.08	0.03	0.04	0.04	0.04
4	0.23	0.22	0.14	0.15	0.19	0.16
7	0.34	0.35	0.32	0.32	0.37	0.35
10	0.25	0.26	0.33	0.35	0.31	0.35
12	0.08	0.08	0.14	0.14	0.08	0.09
No. of observations	63,023	58,395	1,163	1,163	1,990	940

Note: This table reports summary statistics for different samples. Columns (1) and (2) show background characteristics from register data for all Danish children born in 2000 (our reference sample) and 2008 (our study population). Column (3) presents register-based information for our survey sample of adolescents—a subsample of the 2008 birth cohort—while Column (4) displays their self-reported characteristics from the survey. Columns (5) and (6) report background characteristics provided by mothers and fathers, respectively, in the corresponding parental survey samples.

Table A.2: Correlates of perceived population-level differences

	Beliefs in gender arm			Beliefs in SES arm		
	Δ success (G–B) (1)	Girls better (2)	Boys better (3)	Δ success (H–L) (4)	High-SES better (5)	Low-SES better (6)
Respondent is female	2.07***	12.48***	-6.11***	0.30	0.18	-3.31*
	(0.65)	(3.03)	(2.12)	(0.99)	(2.81)	(1.93)
Respondent has a parent with HS degree	0.91	6.85*	-1.45	1.09	0.87	-2.64
	(0.81)	(4.09)	(2.77)	(1.24)	(4.27)	(2.91)
Respondent's primary school GPA (math/Danish)	0.13	1.81***	-1.51***	0.33*	2.75***	-1.03***
	(0.14)	(0.61)	(0.43)	(0.18)	(0.57)	(0.36)
High grade was displayed	-4.26***	-19.03***	5.36***	-2.56***	-4.10**	-0.51
	(0.61)	(2.18)	(1.66)	(0.74)	(1.78)	(1.53)
No. of observations	1156	1156	1156	1170	1170	1170
R^2-adjusted	0.051	0.086	0.036	0.018	0.038	0.011
Mean dep. variable	6.56	71.97	10.81	11.12	79.66	9.32

Note: The table reports correlations between students' characteristics and their mental models of the role of gender (Columns 1–3) and parental education (Columns 4–6) in shaping high school success. In Column 1, the dependent variable is the perceived continuous girl advantage; Columns 2 and 3 use indicators—scaled to 0–100—for whether respondents perceive a positive girl or boy advantage, respectively. Columns 4–6 apply the same structure to the SES dimension. We pool two observations per respondent, corresponding to the high and low prior performance levels shown in the survey. Additional controls include the survey order and the assigned grade tuples. Robust standard errors, clustered at the respondent level, are shown in parentheses. */**/*** indicates statistical significance at the 10%/5%/1% level.

Table A.3: Perceived drivers and quantitative mental models

	(A) Beliefs in gender arm	
	Girls better	Δ success (G–B)
	(1)	(2)
Effort	0.21***	3.66***
	(0.04)	(1.04)
Motivation (pooled)	0.17***	3.74***
	(0.04)	(0.90)
Character traits	0.35***	4.85***
	(0.03)	(0.85)
Applied skills	0.01	1.51
	(0.06)	(1.40)
Intelligence	-0.27*	-0.86
	(0.15)	(2.20)
Culture and norms	0.12*	-0.98
	(0.06)	(1.26)
Differential trends	-0.13	-1.89
	(0.12)	(3.01)
Personal experience	0.14***	-0.50
	(0.05)	(0.98)
No. of observations	578	578
R^2-adjusted	0.146	0.054
Mean dep. variable	0.728	6.543
	(B) Beliefs in SES arm	
	High-SES better	Δ success (H–L)
	(3)	(4)
Support (pooled)	0.35***	6.91***
	(0.03)	(1.19)
Home environment	0.29***	6.29***
	(0.04)	(1.44)
Role model	0.30***	8.03***
	(0.04)	(2.92)
Pressure	0.21***	5.18**
	(0.07)	(2.40)
Effort	-0.26***	-5.25
	(0.10)	(3.22)
Motivation (pooled)	-0.09	-3.03
	(0.06)	(2.02)
No. of observations	585	585
R^2-adjusted	0.253	0.084
Mean dep. variable	0.802	11.470

Note: The table reports correlates between explanations for (A) gender and (B) SES differences mentioned by respondents and their quantitative beliefs about the corresponding group gaps. We restrict attention to explanations that are frequently mentioned overall or within the super-categories highlighted by the color coding in Figure 3. Sub-codes related to motivation (intrinsic, extrinsic, or general) and support (academic, guidance, monetary, or general) are pooled. The dependent variables are indicators for a positive girl advantage (Column 1) and a positive high-SES advantage (Column 3), as well as the perceived girl (Column 2) and SES advantages (Column 4) measured in levels. */**/*** indicates statistical significance at the 10%/5%/1% level.

Table A.4: Correlations of self-beliefs within households

	Student's perceived own success chance	
	Mothers	**Fathers**
	(1)	(2)
Parent's success belief for child	0.28***	0.07
	(0.06)	(0.07)
No. of observations	387	195
No. of households	387	195
Sample	Mother-child pairs	Father-child pairs
Household x grade shown FE	NO	NO
Adolescent's characteristics	YES	YES
Questionnaire FE	YES	YES
Questionnaire x item FE	NO	NO

Note: The table reports correlations between parents' and students' beliefs about the student's own likelihood of success. We estimate the following specification: $\text{SuccessBelief}_{iq} = \beta_0 + \beta_1 \text{SuccessBeliefParent}_{iq} + \delta_q + \Theta_i\gamma + \varepsilon_{iq}$. $\text{SuccessBelief}_{iq}$ ($\text{SuccessBeliefParent}_{iq}$) denotes the student's (the parent's) response to a question about the success chances of the student if they were to enroll in high school in the coming school year, measured on a 0–100 scale. We have one observation per parent-child pair and account for survey fixed effects, δ_q, and for a set of characteristics of the adolescent, Θ_i, including elementary school performance, gender, and SES. */**/*** indicates statistical significance at the 10%/5%/1% level.

Table A.5: Robustness: register-based definition of SES

	Expected own success (0 – 100) (1)	Expected own GPA (-3 to 12) (2)	Plans to enroll in high school (0 – 100) (3)	Actual high school enrollment (0 – 100) (4)	Planned effort (hours/week) (5)
Perceived high SES-advantage (in 10pp)					
× resp. has no parent with HS degree (a)	-1.86*	-0.04	-5.22***	-4.97***	0.06
	(1.13)	(0.07)	(1.75)	(1.78)	(0.20)
× resp. has a parent with HS degree (b)	3.80***	0.07	3.21**	2.71**	0.06
	(0.58)	(0.05)	(1.28)	(1.29)	(0.13)
Respondent has parent with HS degree	-1.49	0.06	-3.90	-6.25	-0.92*
	(2.75)	(0.22)	(5.25)	(5.27)	(0.53)
Baseline belief (other SES-group, in 10pp)	1.93***	0.02	1.77**	0.96	-0.09
	(0.37)	(0.03)	(0.71)	(0.73)	(0.07)
P-value: (a)=(b)	0.000	0.204	0.000	0.001	0.992
No. of observations	1170	1170	1170	1170	1170
R^2-adjusted	0.347	0.359	0.140	0.153	0.052
Mean dep. variable	72.97	7.39	39.32	41.37	7.09
SD dep. variable	26.62	2.22	48.87	49.27	4.60

Note: The table reports a robustness check corresponding to Table 3, Panel B, where respondents' SES is defined using parental education from register data instead of the self-reported survey measure. The main independent variable is respondents' perceived high-SES advantage. We pool two observations per individual, one for the high prior performance level fixed in the survey, and one for the low level. The dependent variables are respondents' perceived success probability if they were to enroll in high school in the coming school year (Column 1); their expected GPA if enrolled (Column 2); an indicator for whether they intend to enroll in high school in the coming school year, scaled to take values of 0 and 100 (Column 3); an indicator for whether high school is ranked as the top choice in the online application system, also scaled to 0 and 100 (Column 4); and respondents' planned study effort, measured in weekly hours, if they were to enroll in high school in the coming school year (Column 5). In all specifications, we include the full set of controls used in Table 1. In Panel A, we additionally control for respondents' success estimates for the other gender (e.g., boys' success when the respondent is female), while in Panel B these controls are replaced by success estimates for the other SES group. Robust standard errors, clustered at the respondent level, are shown in parentheses. */**/*** indicates statistical significance at the 10%/5%/1% level.

Table A.6: Sample characteristics and treatment balance in pre-registered and pooled samples

	Pre-registered sample								Pooled sample (pre-registered + pilot)							
	Main survey				Follow-up survey				Main survey				Follow-up survey			
	Full (1)	T (2)	C (3)	p-value (4)	Full (5)	T (6)	C (7)	p-value (8)	Full (9)	T (10)	C (11)	p-value (12)	Full (13)	T (14)	C (15)	p-value (16)
Student characteristics																
Female	1.00	1.00	1.00		1.00	1.00	1.00		1.00	1.00	1.00		1.00	1.00	1.00	
No. of parents with high school degree																
No parent	0.18	0.18	0.17	0.690	0.16	0.16	0.16	0.977	0.19	0.20	0.18	0.224	0.17	0.17	0.16	0.585
One parent	0.34	0.33	0.34	0.718	0.30	0.31	0.30	0.898	0.34	0.33	0.34	0.535	0.32	0.32	0.32	0.926
Two parents	0.48	0.48	0.48	0.971	0.53	0.53	0.54	0.889	0.47	0.47	0.48	0.715	0.52	0.51	0.53	0.623
Grade attendance at age 15																
8th grade	0.05	0.05	0.04	0.484	0.04	0.04	0.04	0.989	0.02	0.02	0.02	0.910	0.02	0.02	0.03	0.701
9th grade	0.86	0.85	0.87	0.354	0.86	0.86	0.87	0.713	0.46	0.40	0.50	0.000	0.52	0.47	0.56	0.013
10th grade	0.02	0.02	0.01	0.544	0.03	0.03	0.02	0.403	0.26	0.28	0.26	0.333	0.24	0.27	0.23	0.225
Other education	0.07	0.08	0.07	0.724	0.07	0.07	0.07	0.973	0.26	0.30	0.23	0.000	0.21	0.25	0.18	0.056
Math grade in 9th grade																
	7.84	7.98	7.76	0.332	8.19	8.29	8.13	0.602	7.82	7.89	7.77	0.427	8.21	8.33	8.11	0.358
Danish grade in 9th grade																
	8.49	8.43	8.53	0.641	8.76	8.66	8.82	0.599	8.34	8.31	8.35	0.760	8.63	8.68	8.60	0.732
No. of observations	799	281	518		391	146	245		1643	681	962		666	281	385	

Notes: Columns 1 to 3, 5 to 7, 9 to 11, and 13 to 15 show sample means for the denoted subgroups. Columns 4, 8, 12, and 16 show p-values from t-tests comparing the mean of each variable between subjects that received any information treatment to those that received none. The joint F-test statistics (p-values) of all covariates are 0.51 (p = 0.8250) for the pre-registered main survey sample, 0.24 (p = 0.9741) for the pre-registered follow-up sample, 3.51 (p = 0.0026) for the pooled main survey sample , and 1.26 (p = 0.2693) for the pooled follow-up sample. These results indicate no systematic imbalance within the pre-registered subsamples, but some imbalance when pooling the main survey. To account for this and prevent distortions, we control for covariates in all specifications.

Table A.7: Persistence of treatment effects over time

	Perceived girl advantage (-100 – 100) (1)	Expected own success (0 – 100) (2)	Expected own GPA (-3 to 12) (3)
(A) Main sample – main data collection			
Assigned to treatment group			
× strong overestimators (a)	-3.86*	-2.66	0.01
[avg. perception gap = −28.4]	(2.00)	(4.28)	(0.33)
× weak overestimators (b)	1.75	1.57	0.29
[avg. perception gap = −5.2]	(1.95)	(2.99)	(0.27)
P-value: (a) = (b)	0.05	0.41	0.50
× underestimators (c)	2.14	4.43	0.14
[avg. perception gap = 6.9]	(1.51)	(4.08)	(0.33)
P-value: (a) = (c)	0.01	0.22	0.78
Strong overestimators	9.85***	20.37**	2.52***
	(3.27)	(8.35)	(0.62)
Weak overestimators	7.58**	17.97**	2.48***
	(3.00)	(7.97)	(0.61)
Underestimators	4.82	14.55*	2.20***
	(3.11)	(7.87)	(0.61)
No. of observations	376	391	391
R^2-adjusted	0.57	0.93	0.96
Mean dep. variable	10.86	71.83	7.75
SD dep. variable	10.78	24.09	2.08
(B) Pooled sample – main and pilot data collection			
Assigned to treatment group			
× strong overestimators (d)	-4.10***	-4.61*	-0.16
[avg. perception gap = −30.2]	(1.32)	(2.79)	(0.24)
× weak overestimators (e)	0.90	-0.16	0.12
[avg. perception gap = −5.4]	(1.26)	(2.28)	(0.21)
P-value: (d) = (e)	0.01	0.21	0.37
× underestimators (f)	2.13*	3.66	0.11
[avg. perception gap = 6.2]	(1.15)	(2.86)	(0.25)
P-value: (d) = (f)	0.00	0.04	0.44
Strong overestimators	9.21**	35.71***	2.73***
	(3.68)	(9.69)	(0.98)
Weak overestimators	5.59	31.97***	2.58***
	(3.68)	(9.53)	(0.99)
Weak underestimators	3.07	28.30***	2.30**
	(3.71)	(9.51)	(0.99)
No. of observations	664	666	666
R^2-adjusted	0.58	0.94	0.96
Mean dep. variable	10.64	73.02	7.77
SD dep. variable	10.05	23.38	2.11

Note: The table reports treatment effects measured in a follow-up survey conducted one week after the main survey. Panel A presents regressions based on the pre-registered experimental sample of girls from the 2009 birth cohort, while Panel B uses a pooled sample that combines this pre-registered sample with data from a pilot sample of girls from the 2008 birth cohort. We show separate treatment effects on three groups defined based on their prior perception gap—the difference between the true girl advantage and the respondent's prior belief about the reference cohort. The dependent variables are respondents' beliefs about the girl advantage in their own cohort (Column 1); their perceived success probability if they were to enroll in high school in the coming school year (Column 2); their expected GPA if enrolled (Column 3). In all specifications, we additionally control for respondents' past performance in math and Danish, an indicator for whether at least one parent has completed a high school degree, and current educational status. Robust standard errors are shown in parentheses. */**/*** indicates statistical significance at the 10%/5%/1% level.

Table A.8: Sample characteristics of mechanism sample

	(1)
Student characteristics	
Female	0.43
No. of parents with high school degree	
No parent	0.19
One parent	0.34
Two parents	0.47
Grade attendance at age 15	
8th grade	0.00
9th grade	0.07
10th grade	0.37
STX, HHX or HTX	0.37
Other education	0.19
Math grade in 9th grade	
0 or below	0.02
2	0.06
4	0.16
7	0.29
10	0.28
12	0.20
Danish grade in 9th grade	
0 or below	0.01
2	0.06
4	0.15
7	0.33
10	0.30
12	0.15
No. of observations	1034

Note: The table reports sample means for the full sample of the mechanism experiment.

B Theoretical Framework

This section shows how the main findings in the paper regarding the belief updating of boys and girls in response to a female performance advantage can be rationalized in a simple theoretical framework.

Setup

Consider a student i belonging to group $g \in \{\text{boy}, \text{girl}\}$. Students differ in two latent characteristics: intelligence a_i and motivation m_i. Motivation makes students more successful because it affects the cost of exerting effort, while intelligence directly maps into educational success. Time consists of two periods. In period 1 (elementary school), students observe academic outcomes and form beliefs. In period 2 (beginning of high school), students choose study effort based on these beliefs.

Educational success

Educational success in high school is determined by

$$Y_{ig,2} = \alpha + \theta a_i + \beta e_{ig,2} + \varepsilon_{ig,2}, \tag{5}$$

where $e_{ig,2}$ denotes effort, $\theta > 0$ is the return to intelligence, $\beta > 0$ is the return to effort, and $\varepsilon_{ig,2}$ is a mean-zero shock.

Effort costs

Students' effort in high school entails convex costs that depend on motivation:

$$C_{ig,2}(e_{ig,2}, m_i) = \frac{1}{2} c(m_i) e_{ig,2}^2, \tag{6}$$

with $c(m_i) > 0$ and $c'(m_i) < 0$, so that more motivated students face lower marginal effort costs.

Beliefs

Students at the end of elementary school do not know the true parameters and instead hold *beliefs* about the determinants of educational success in high school. Let $\hat{\theta}_{g,t}$ denote the perceived return to intelligence, $\hat{\beta}_{g,t}$ the perceived return to effort, $\hat{c}_{g,t}(m_i)$ the perceived effort cost parameter, and $\hat{\psi}_{g,t}$ a perceived marginal disutility ("stigma") from exerting effort for group g at time t.

At the end of period 1, after observing information about relative performance, beliefs are updated once. We denote pre-shock beliefs by $(\hat{\theta}_{g,0}, \hat{\beta}_{g,0}, \hat{c}_{g,0}, \hat{\psi}_{g,0})$ and post-information beliefs by $(\hat{\theta}_{g,1}, \hat{\beta}_{g,1}, \hat{c}_{g,1}, \hat{\psi}_{g,1})$. In what follows, all effort and success decisions in period 2 are taken under the post-information beliefs $(\hat{\theta}_{g,1}, \hat{\beta}_{g,1}, \hat{c}_{g,1}, \hat{\psi}_{g,1})$.

Given post-information beliefs, individual i's expected educational success in high school is

$$\mu_{ig,1}(e_{ig,2}) = \alpha + \hat{\theta}_{g,1} a_i + \hat{\beta}_{g,1} e_{ig,2}. \tag{7}$$

Utility

In period 2, students derive utility from expected educational success net of effort costs and stigma:

$$U_{ig,2}(e_{ig,2}) = \gamma_g \mu_{ig,1}(e_{ig,2}) - \frac{1}{2}\hat{c}_{g,1}(m_i) e_{ig,2}^2 - \hat{\psi}_{g,1} e_{ig,2}, \tag{8}$$

where $\gamma_g > 0$ captures the weight placed on educational success for group g.

Dropping terms that do not depend on effort, the effort-choice problem can be written as

$$\tilde{U}_{ig,2}(e_{ig,2}) = \gamma_g \hat{\beta}_{g,1} e_{ig,2} - \frac{1}{2}\hat{c}_{g,1}(m_i) e_{ig,2}^2 - \hat{\psi}_{g,1} e_{ig,2}. \tag{9}$$

Optimal effort

Students choose $e_{ig,2} \geq 0$ to maximize $\tilde{U}_{ig,2}(e_{ig,2})$. The first-order condition is

$$\frac{\partial \tilde{U}_{ig,2}(e_{ig,2})}{\partial e_{ig,2}} = \gamma_g \hat{\beta}_{g,1} - \hat{c}_{g,1}(m_i) e_{ig,2} - \hat{\psi}_{g,1} = 0. \tag{10}$$

Solving for $e_{ig,2}$ yields optimal effort:

$$e_{ig,2}^* = \frac{\gamma_g \hat{\beta}_{g,1} - \hat{\psi}_{g,1}}{\hat{c}_{g,1}(m_i)}. \tag{11}$$

Beliefs about gender differences

In section 3.2, we observed that if students believe that girls do better they attribute this to a difference in motivation. That is, if students believe girls do better they ascribe this to girls being more motivated. On the other hand, if they believe boys do better this is mostly attributed to boys being more intelligent. We thus assume that:

$$E[m_i \mid g = \text{girl}] > E[m_i \mid g = \text{boy}], \tag{12}$$

so that girls are on average believed to be more motivated, and

$$E[a_i \mid g = \text{boy}] > E[a_i \mid g = \text{girl}], \tag{13}$$

so that boys are believed to have higher intelligence.

Because motivation lowers the marginal cost of exerting effort, the belief in (12) translates into a belief that girls exert more effort in equilibrium. This is what the patterns suggest in the open text answers in section 3.2. Formally, taking expectations over individual characteristics under these beliefs,

$$E[e^*_{ig,2} \mid g = \text{girl}] > E[e^*_{ig,2} \mid g = \text{boy}], \tag{14}$$

where $e^*_{ig,2}$ is given by (11).

Information and belief updating

At the end of period 1 (elementary school), students observe information about relative academic performance—either because they observe the performance of their classmates (as is suggested in section 3.3.1) or because they directly receive that information as in section 3.5 or section 3.6. This information can be summarized by an information shock $\Delta > 0$, where a positive realization means that the girl advantage is higher than previously expected; Δ is the unexpected part of the girl advantage.

Students interpret this information through the lens of their beliefs stated in (12–14). In particular, because they believe that girls are more motivated and therefore exert more effort in equilibrium, observing that girls perform substantially better than expected is attributed to effort being more productive than previously believed.

As a result, perceived returns to effort are revised upward for both girls and boys (see the left pair of bars in Figure 4):

$$\hat{\beta}_{g,1} = \hat{\beta}_{g,0} + \eta_g \Delta, \qquad \eta_g \geq 0. \tag{15}$$

At the same time, conditional on the prior that boys are more intelligent but girls work harder, a larger-than-expected girl advantage suggests that intelligence differences explain less of the observed gap than previously thought. Students therefore downweight the role of intelligence and revise perceived returns to intelligence downward (see the second pair of bars in Figure 4):

$$\hat{\theta}_{g,1} = \hat{\theta}_{g,0} - \rho_g \Delta, \qquad \rho_g \geq 0. \tag{16}$$

Finally, beliefs about effort costs and stigma adjust asymmetrically across genders (see the two right pairs of bars in Figure 4):

$$\hat{c}_{\text{girl},1}(m_i) = \hat{c}_{\text{girl},0}(m_i) - \zeta_{\text{girl}}\Delta, \qquad \hat{c}_{\text{boy},1}(m_i) = \hat{c}_{\text{boy},0}(m_i) + \zeta_{\text{boy}}\Delta, \tag{17}$$

and

$$\psi_{\text{girl},1} = \psi_{\text{girl},0} - \kappa_{\text{girl}}\Delta, \qquad \psi_{\text{boy},1} = \psi_{\text{boy},0} + \kappa_{\text{boy}}\Delta, \tag{18}$$

with all parameters $\eta_g, \rho_g, \zeta_g, \kappa_g$ weakly positive. The shifts in $\hat{c}_{g,1}(m_i)$ in (17) apply uniformly at all motivation levels m_i, so a positive shock ($\Delta > 0$) moves perceived costs for all girls down and for all boys up, on top of the baseline motivation effect $c'(m_i) < 0$.

Implications

Assume there is a positive information shock about the girl advantage, $\Delta > 0$, at the end of elementary school, meaning that students learn that girls perform better relative to boys than previously expected. Following this shock, students revise their beliefs before entering high school. In particular, perceived returns to effort increase for both girls and boys, while perceived returns to intelligence decrease. In addition, beliefs about effort costs and stigma shift asymmetrically across genders, lowering perceived costs and stigma for girls and (weakly) raising them for boys.

High-school effort choices are determined by equation (11) from above. For girls, the elementary-school shock raises the perceived return to effort ($\hat{\beta}_{girl,1} \uparrow$) and lowers perceived effort costs ($\hat{c}_{girl,1} \downarrow$) and stigma ($\hat{\psi}_{girl,1} \downarrow$). As a result, girls plan to exert more effort in high school. Note that this result is in line with our findings displayed in Tables 3 and 4.

For boys, the increase in perceived returns to effort ($\hat{\beta}_{boy,1} \uparrow$) is offset by higher perceived effort costs ($\hat{c}_{boy,1} \uparrow$) and stigma ($\hat{\psi}_{boy,1} \uparrow$). As a result boys' planned high-school effort does not change, which is in line with the zero association between a higher girl bonus and boys' planned effort displayed in the last column of Table 3.

Perceived expected high-school success is formed at the end of elementary school and given by

$$\mu_{ig,1} = \alpha + \hat{\theta}_{g,1} a_i + \hat{\beta}_{g,1} e^*_{ig,2}. \tag{19}$$

For boys, a higher perceived girl advantage is associated with lower success expectations despite unchanged effort intentions (see Table 3). This pattern is consistent with the interpretation that the effect of the elementary-school shock on expected success may operate through belief updating about the return to intelligence. The downward revision

in the perceived return to intelligence,

$$\hat{\theta}_{\text{boy},1} = \hat{\theta}_{\text{boy},0} - \rho_{\text{boy}}\Delta,$$

reduces expected success, and this effect is quantitatively more important for boys because they are believed to have higher intelligence on average, $E[a_i \mid g = \text{boy}] > E[a_i \mid g = \text{girl}]$. Given that actual effort choices are not related to the girl advantage (see Table 3), our theoretical framework would suggest that the increase in the believed return to effort does not compensate for the reduction in the perceived return to intelligence.[1] For boys, the "intelligence channel" thus dominates the effort channel in

$$\frac{\partial \mu_{i,\text{boy},1}}{\partial \Delta} < 0,$$

leading to the fact that a higher perceived girl advantage reduces boys' expected high school success (see Table 3).

For girls, planned effort increases following the elementary-school shock and the downward revision in the perceived return to intelligence has a relatively smaller effect on their expected success. The increase in effort therefore dominates, implying that girls update positively about their expected high-school success, i.e.

$$\frac{\partial \mu_{i,\text{girl},1}}{\partial \Delta} > 0.$$

Taken together, a positive information shock about the girl advantage leads girls to increase planned effort and become more optimistic about their future educational outcomes (see Tables 3 and Table 4), while boys do not adjust effort and become more pessimistic about their expected success (compare Table 3).[2]

[1] Another reason could be gender differences in belief updating. In Figure 4 we indeed see that girls update more about the return to effort, while boys update somewhat more about the return to intelligence.

[2] Note that for simplicity we make the arguably strong assumption that educational success is additively separable in intelligence and effort. Allowing for moderate complementarity would not overturn the results as long as the perceived increase in effort productivity is not disproportionately concentrated among boys and the downward revision in the perceived return to intelligence remains quantitatively important for boys.

C Coding scheme

Table C.1: Overview of the coding scheme

Category	Explanation	Example
Effort	This is a relatively broad code for superficial statements relating to work/effort (in contrast to somewhat deeper statements alluding to underlying motivation to work, work ethic, ambition etc. in which cases the codes related to motivation apply). Do **not use** this code whenever the respondent mentions a specific skill or character trait (see e.g., *applied skills* or *character traits*). Specifically, do not use this code when the respondent suggests that certain groups have or lack the ability to concentrate/work hard/to focus or if they find it easy/hard to concentrate/work hard etc. (use *character traits* code in this case). In case of doubt whether *effort* or a code relating to motivation applies, choose *effort*.	- "They work hard(er)." - "They concentrate (more/better)." - "Trying hard to succeed" - "Making an effort to perform well" - "I think girls are probably still a bit more engaged in class and get their homework done." - "Girls generally focus on completing their tasks better and fine-tuning the smallest mistakes." - "Girls concentrate more than boys." - "They seek help from, for example, parents." - "Girls/boys may give up faster."
Extrinsic Motivation	Use this code when motivation stemming from external factors is mentioned Note: Distinction between this code and *home environment* can be tricky. Our decision rule is this: Whenever the agent in the statement is the adolescent, use *extrinsic motivation*. Whenever the agent in the statement is the parent who e.g. imposes pressure/expectations, use *home environment*. The only cases where we would code both categories are those where the parent does something/has certain characteristics which acts as a motivation for the child.	- Other external rewards - (Willingness to) fight for good grades - Explicit mention of (long-run) goals s.o. works for - Mention other/competing extrinsic motivations (e.g. earning money) are stronger than e.g. motivation to study. - "Want to make parents proud." - "They feel greater pressure to make it" - "Group A thinks more about the future than group B."
Intrinsic Motivation	Use this code when intrinsic motivation to engage with school subjects is mentioned. Also use this code when respondents mention that other intrinsic interests (e.g. hobbies, social life) are more important than school.	- Interest in materials that are taught in school - "X is only interested in math, while Y is also interested in other subjects." - "Because they are more into it/into school."
General Motivation	Use this code whenever effort and/or motivation is mentioned without specifying whether it is due to internal or external factors. This is also captures work ethic and general ambition. Do **not use** this code whenever the respondent mentions a specific skill or character trait (see categories related to skills and character traits below). This code should be used whenever one is in doubt whether a statement refers to a fixed trait or not.	- Being careless about school Caring about schooling - Taking education seriously - Having focus on school -Attitudes (towards school) - Values - (Lack of) ambition - Being determined/dedicated - Having/setting high/low expectations for oneself (e.g. "They don't want to set their expectations too high.") - "*Willingness to* work (hard)" [without the qualifier in italics, this would go into the effort category.] - "I can see a difference in the amount of school interest." - "X is more motivated than Y" - "They may feel that school is not necessary."

Notes: This table provides an overview of the different codes in our coding scheme, an explanation for each code, and example responses from each of our different surveys.

Table continued on next page.

Table C.1 *(continued)*: Overview of the coding scheme

Category	Explanation	Example
Track Choice and Dropout	This code captures "choices" that are being mentioned, such as choices of a school track (for example high school or vocational training), as well as dropout decisions and choices of subjects in school.	- Dropout [In the sense of not enrolling in a certain track in the first place or in the sense of dropping out after enrolling.] - "They won't choose anything else, once they have started something." - "Deep down they know that HS is not for them, but they still choose to do it." - "There are some people who choose wrong."
Applied skills	Use this code whenever "applied" skills are mentioned, i.e. things you know how to do but which are not fundamental/underlying traits like intelligence or character traits. Use this code when the "academic level" is mentioned, or when applied skills are implicitly referred to, which make it easier for the child to do well in school.	- Ability to perform well in school - Better/worse handle of school - Also use this code when respondents refer to the "method" of learning or learning styles - Learning ability - Mentioning of higher academic level or skill - Better academic prerequisites - Language skills (also due to immigrant status) - Weak reader [Not: dyslexic → *health*] - Having an easy time getting through high school/through a high school exam. - "How easy they find school." - "I think girls are better at writing than boys and vice versa boys are better at mathematics" - "Group A probably does better in other subjects (not math and Danish) than Group B."
Character traits	Use this code when respondent refer to fixed character traits. In theory, the difference between a fixed character trait and an observed behavior like effort is clear, i.e., the character trait is the fundamental driver of the behavior. In practice, it can be hard to interpret open text responses and to decide whether they refer to a character trait ("given"/ hard to influence) or to more superficial "effort/motivation". We have to draw a line somewhere, and the examples below illustrate where we draw the line. As a rule of thumb, non-cognitive skills and character traits go into this category, cognitive skills go into *intelligence*, and very "applied" skills go into *applied skills*. Do **not use** this code when: - respondent refers to intelligence (→ *intelligence*) - respondent mentions behavior without a reference to deeper underlying reasons, like "(lack of) concentration" or "willingness to work hard". In case of doubt whether the respondent refers to a character trait or not, use *effort* - e.g. "Girls concentrate more than boys.", → *effort/general motivation* - e.g. "They gain/lose self confidence in response to feedback." → *Feedback* (because the trait self-confidence is seen as explicitly malleable, whereas we think of character traits as stable over time)	- Willpower - Discipline - Conscientious - Diligent - Maturity - Social skills - Self-regulation - Being dutiful - Perseverance - Grit - Finding it *easy/difficult* to pay attention - Finding it *easy/difficult* to concentrate - Finding it *easy/difficult* to work hard - "I think boys have a *harder/easier* time concentrating than girls do" - "They get distracted *easily*" - *Naturally* concentrate more - Concentrate more *easily* - *Being able* to concentrate better/more - "They are better at sitting still." - "They are better at absorbing knowledge." **Note:** Without the qualifiers in italics → *effort*

Notes: This table provides an overview of the different codes in our coding scheme, an explanation for each code, and example responses from each of our different surveys.

Table continued on next page.

Table C.1 *(continued)*: Overview of the coding scheme

Category	Explanation	Example
Intelligence	Use this code whenever the respondent explicitly mentions that certain groups are smarter or more intelligent than others. This code is quite narrowly defined. As a rule of thumb, cognitive skills go into this category. In case of doubt whether this or *applied skills* should be coded, rather use *applied skills*.	- (Higher/lower) intellectual level - "They are smarter."
General skills	Use this code when skills or fixed traits are mentioned that do not fit either *intelligence*, *character traits* or *applied skills*.	- Genetics - Talent [unspecified] - Skills [unspecified]
Health	This code refers to mentions of health. This includes mental or physical health (problems) affecting performance. Also use this code when the respondent talks about fear/worry/anxiety of not performing well enough in the future. Use this code for terms like "dyslexia" and use *applied skills* more for "good/bad at reading".	- Stress - Mental health issues - Dyslexia - ADHD - "They are scared to fail."
Schools and teachers discriminate	Use this code when the respondent mentions discrimination, or differential treatment of one group compared to another by schools or teachers. We use discrimination in a broad sense, i.e., for all cases where different groups or individuals are treated differently for no apparent reason. Do **not use** discrimination code when the respondent himself/herself has different expectations towards a certain group. For example: "Girls just expect more from themselves." → *general motivation*.	- Teachers support certain groups more than others. - Teachers evaluate certain groups better than others [explicitly mentioning similar performance, or implicitly suggesting similar performance]. - "School is more focused on X than Y." - "Teachers expect more from group X than from group Y."
Other discrimination	Use whenever discrimination/differential treatment is mentioned but the agent is NOT schools or teachers but, for example peers or parents. Also use when society/culture is mentioned.	- Society having different expectations towards one group compared to another - "There may be social or cultural factors at play, such as gender role expectations or differences in the way boys and girls are treated or encouraged to participate in schoolwork."
Academic support	Use this code when response refers to direct academic support. For example, family members or others invest time and effort into children, e.g., helping them with homework, or actively sharing their knowledge with their kids. Use this code when the respondent refers to active/intentional/purposeful support received from family, friends, teachers, social network. Do **not use** if family/friends/teachers/social network provide resources without actively intending it.	- "Having been to HS themselves, parents are better able to help their children with *homework*." [Key word here is "homework". Without the qualifier "homework" → *general support*.]

Notes: This table provides an overview of the different codes in our coding scheme, an explanation for each code, and example responses from each of our different surveys.

Table continued on next page.

Table C.1 *(continued)*: Overview of the coding scheme

Category	Explanation	Example
Guidance support	Use this code for mentions of support in the form of guidance and advice for decision making. Use this code when the respondent refers to active/intentional/purposeful support received from family, friends, teachers, social network. Do **not use** if family/friends/teachers/social network provide resources without actively intending it.	- "...guiding their child in their choices."
Monetary support	Use this code when it is mentioned that parents (or other family members) support their children through things that cost money rather than time. Use this code when the respondent refers to active/intentional/purposeful support received from family, friends, teachers, social network. Do **not use** if family/friends/teachers/social network provide resources without actively intending it.	- Private tutoring - Paid help with homework
General support	Use this code when it is not clear what kind of support the response refers to. Use this code when the respondent refers to active/intentional/purposeful support received from family, friends, teachers, social network. Do **not use** if family/friends/teachers/social network provide resources without actively intending it.	- "They get better help." [unless specified that it is help with homework/exam preparation] - "Having been to HS themselves, parents are better able to help their children." - "Having been to HS themself, parents are better able to motivate their children."
Pressure	Use this code for active/purposeful interventions that are less "supportive/adding resources", but instead "restrictive".	- "Parents are stricter with rules." - "They have parents who put pressure."
Home environment	This code applies for all aspects of the home environment that do NOT relate to family members being role models for their children. In our hierarchy, *role models* beats *home environment*. It also captures learning that happens at home/from parents, but not because parents actively invest time, money or energy, rather because of things that happen automatically.	- Parents' attitude towards school. - Parents' expectations - "You often get the same attitudes as your guardian/parents." [Also code *general motivation* because of "attitudes".] - "Children can learn from their parents." - "There is a culture of learning at home." - "Social heritage" - "Parents value good grades more."
Role models	This code refers to the idea that role models make a difference for e.g. school performance. We use a generous definition, meaning that examples like the following ones would be subsumed under this code.	- "They want to be like their parents." - "They look up to their parents."
Culture and norms	Use this code when respondents mention that school performance is influenced by cultural factors/society, including social norms, peer effects and or stereotypes unless in the context of discrimination. (Whenever the statement relates to discrimination, use the discrimination code instead.)	- Peer pressure - "It is not cool for boys to study." - "It is a part of youth culture."

Notes: This table provides an overview of the different codes in our coding scheme, an explanation for each code, and example responses from each of our different surveys.

Table continued on next page.

Table C.1 *(continued)*: Overview of the coding scheme

Category	Explanation	Example
Circumstances	This code refers to other types of external circumstances or external constraints that are not captured by *health* or codes relating to support, social environment or discrimination. Those are also beyond the individual's control and might influence, e.g., behavior or performance.	- Financial constraints [which are not related to codes capturing support], f.ex. Lack of money forcing students to work. - General hardships / tough time [not included in *health*] - Other opportunities [other than school] - Blaming "the system", for example: "With the current public school law, I understand that many young people are not motivated in school work."
Information/ beliefs	This code captures any mention of the child/adolescent being better/worse informed or holding certain beliefs in relation to high school (for example about the difficulty/requirements of HS or the expected returns from HS).	- "They know what is expected from them." - "They are better informed." - "He/she understands the importance of education."
High school is different	This code captures the idea that past (performance) signals do not capture everything that matters. Specifically, it captures the simple idea that high school is different from elementary school or more difficult than elementary school.	- High school requiring different skills than primary school. - New social environment will impact academic performance - "Because in high school you get the subjects you decide and you have them many times a week." - "The requirements (in high school) become overwhelming."
Differential trends	This code captures the idea that past (performance) signals do not capture everything that matters. Specifically, we use this code for two different types of reasons: i) Past performance signals over- or under-value the actual performance/ability of different groups, ii) different groups will develop differentially in the future even though they might have looked similar in the past. There is an important distinction between ii) different groups will develop differentially in the future and different groups holding different skills that are constant over time. If the skills are constant over time, use *applied skills* or *character traits*. Only if the skills/behavior are expected to change over time, use *differential trends* in addition.	- "In high school, X will take education more seriously." [also code *effort/general motivation* in addition] - "Boys start taking school seriously in high school, whereas girls have always taken it seriously." [Implying or stating that boys will improve their performance while girls won't; code *effort/general motivation* in addition]
Selection into high school	This code refers to (differential) selection into high school across different groups. Just to fix ideas, think of a model in which we have observed predictors of performance (in our case, past grades) but also "latent" unobserved variables that predict future performance potential. In a selection model, within each past performance group we sort all adolescents based on their latent performance and the one with the highest potential enrolls first, then the one with the second highest potential, up to some cut-off. If in one group the top 10% enroll whereas in another group the top 90% enroll, we have to take into account that success rates conditional on enrollment do not reflect unconditional success rates in these two groups. Answers which convey this kind of idea (in much simpler words) are captured by this code.	- "Girls who got 2 in math in primary school, but still move on to high school, are study-motivated and can probably get a decent grade on average." [Conveys the idea that those in this group who choose to enroll in High school probably know why they do, i.e., because they can perform high. Should also receive *general motivation*.]

Notes: This table provides an overview of the different codes in our coding scheme, an explanation for each code, and example responses from each of our different surveys.

Table continued on next page.

Table C.1 *(continued)*: Overview of the coding scheme

Category	Explanation	Example
Common knowledge	Use this code when the respondent refers to the source of information he/she provides. Mentions of scientific/empirical evidence media reports, common knowledge or social media	- "Studies have shown that . . . " - "It is a well known fact that . . . " - "I have read that . . . "
Personal experience	Mentions of own experience/observation that certain groups perform better than others.	- "From what I have seen. . . " - "Knowing the girls in my class,..." - "This is true at least for my classmates." - "In my peer group X performs better than Y..."
Other source	Any other sources of info that don't fit common knowledge or personal experience	- "My mother/father works at school and told me that. . . " - "From what I have heard. . . " [Not clear whether this refers to common knowledge which the person heard from someone, or whether she refers to personal experience in e.g. her own classroom]
No fit	Use this category for "exotic" cases that make sense in response to the question, but for which we don't have a category that fits. Note: If respondent makes several statements, do not use the *no fit* code for each individual statement that doesn't fit into any category. Instead, use it only when there is no statement that fits into any of our categories.	- "Academic subjects are not for them." (not clear why, i.e., motivation, skills, other?)
Guess	This code applies whenever the respondent states that she just guessed in her quantitative response.	- "It's just a guess." - "I gave a so-so answer."
Junk	Use this code whenever i) the respondents leaves the field blank or almost blank, or ii) the respondent writes "don't know", iii) the respondent writes something that is not understandable/nonsensical, iv) it becomes clear, from the response given, that the respondent misunderstands the question at hand. Do **not use** in case the respondent writes something that makes sense, but which does not fit into any of the above categories. In that case use *no fit*	
Restate (no difference)	Use this code when the respondent states that a certain demographic trait (gender, SES) does not make a difference for academic performance.	- "There is no reason why parents' education should matter." - "I can't see why they wouldn't do just as well."
Restate (general)	Use this code whenever the respondent restates the quantitative belief reported before and does NOT mention any additional (underlying) considerations. In other words, do not use restate for every half-sentence where the respondent repeats the statement made by her quantitative belief. Use this code when the respondent states that one group (or themselves) perform better than others without specifying a reason.	- "Girls do better than boys." - "Girls/boys are generally better." - "I just think so."
Misunderstood context	Use this code whenever the respondent clarifies that he/she misunderstood the previous question (about their quantitative beliefs).	

Notes: This table provides an overview of the different codes in our coding scheme, an explanation for each code, and example responses from each of our different surveys.

Table continued on next page.

Coding rules:

- Each response can receive multiple codes (one or more). However, we aim for one code per "statement"/"idea", i.e. try and not use two different codes just because it is hard to decide.
- Rather do not assign a specific code – or even rather code a response as *no fit* – than assigning a code that is a real stretch given the response. Most responses should be classifiable with our coding scheme though.
- If some factor is mentioned in an "offsetting" way even, do not code. If a factor is mentioned in a neutral way even though the quantitative beliefs for the two groups differ, do not code. Examples:
  - Someone sees a girl advantage and says: "Boys are smarter but girls work so hard that they make up for it." or "It is not that girls are smarter, but they work hard."
    → Do **not code** *intelligence*, only code *effort*.
  - Someone sees a girl bonus and says: "I don't think there is a difference in gender and intelligence within the mentioned subjects. Instead, it's about motivation, and I assume it's equally high for both boys and girls in high school. Therefore, I don't see any difference immediately. If girls still manage better, it's because of motivation, whereas boys have a more relaxed approach to homework."
    → Do **not code** *intelligence*.
- If some factor is mentioned in a negative or neutral way and the quantitative belief is the same for both groups, do code all factors. Examples:
  - Someone sees neither a girl nor a boy advantage and says: "Boys are smarter but girls work so hard that they make up for it." or "It is not that girls are smarter, but they work hard."
    → **Do** code *intelligence*, and also code *effort*.
  - Another example for this rule:
    Text response: "Because group 1 can get help from their parents, while group 2 works harder to achieve the same result."
    - if group 1 expected to perform better: *general support*
    - if group 2 expected to perform better: *effort*
    - if both groups the same: *effort* & *general support*
- If there is a part of a response that does relate to the question at hand, and another part that does not, then code only the part that relates to the question.

D Survey Instructions: Main Survey

D.1 Survey of Students

Screen 1: Welcome Page

Thank you very much for participating in this survey about education - we really appreciate it!

As a thank you for your time, we draw a total of **50 GoGift gift cards** among those who complete the survey. These gift cards are good for many things and are very easy to use in stores and online. Each gift card is worth **1,000kr**.

10 of the gift cards are reserved for those who complete the entire questionnaire (it takes about **15 minutes**).

The remaining 40 gift cards will be randomly assigned to those who complete small tasks during the survey. For example, you might guess some facts correctly or write a few words and share your thoughts with us.

Look out for questions marked with an emoji - in those questions you can win extra gift cards!

[pagebreak]

Screen 2: Demographics

2a [gender]
Which gender do you most identify with?
• Male • Female

{(2a) determines {$custom1} used below:
if (2a) = “Male”: {$custom1} = “boys”; if (2a)= “Female”: {$custom1} = “girls”}

2b [birthyear]
When were you born?
• Before 2007 • 2007 • 2008 • 2009 or later

2c [educ_curre]
What describes your current situation best?

- I am in 9th grade

- I am in 10th grade
- Other

[pagebreak]

{If (2c) = “Other”, move directly to screen 20}

Screen 3: Family Type

3a [type_home]
What type of home are you from? Select the option that best suits your situation.

- I live with both my mother and father and/or I see both my mother and father regularly. [1]
- I only live with my father and do not have regular contact with my mother. [2]
- I only live with my mother and do not have regular contact with my father. [3]
- I have no parents or no contact with my parents. [4]

[pagebreak]

Screen 4: Parental Education

{Show (4a) if (3a) = [1] or [2]}

4a [dad_educ]
Does your dad have a high school diploma? If you’re not sure, just give us your best guess.

Note: Studentereksamen means that he has completed an upper secondary education (STX, HTX or HHX) or a higher examination (HF).
• Yes • No

[pagebreak]

{Show (4b) if (3a) = [1] or [3]}

4b [mum_educ]
Does your mom have a high school diploma? If you’re not sure, just give us your best guess.

Note: Studentereksamen means that she has completed an upper secondary education (STX, HTX or HHX) or a higher examination (HF).
• Yes • No

{(3a), (4a), and (4b) determine {$custom2} used below:

- If ((4a) = “No” or (3a) = [3] or [4]) and ((4b) = “No” or (3a) = [2] or [4]): {$custom2} = “they do not have a parent with a high school diploma”
- If (4a) = “Yes” and ((4b) = “No” or (3a) = [2] or [4]): {$custom2} = “they have a parent with a high school diploma”
- If ((4a) = “No” or (3a) = [3] or [4]) and (4b) = “Yes”: {$custom2} = “they have a parent with a high school diploma”
- If (4a) = “Yes” and (4b) = “Yes”: {$custom2} = “their parents both have a high school diploma”

}

{(3a), (4a), and (4b) determine {$custom3} used below:

- If ((4a) = “No” or (3a) = [3] or [4]) and ((4b) = “No” or (3a) = [2] or [4]): {$custom3} = “who do not have a parent with a high school diploma”
- If (4a) = “Yes” and ((4b) = “No” or (3a) = [2] or [4]): {$custom3} = “who have a parent with a high school diploma”
- If ((4a) = “No” or (3a) = [3] or [4]) and (4b) = “Yes”: {$custom3} = “who has a parent with a high school diploma”
- If (4a) = “Yes” and (4b) = “Yes”: {$custom3} = “who have two parents with a high school diploma”

}

[pagebreak]

Screen 5: Grade Report

5a [math_grade9]
{Show if (2c) = “I am in 9th grade”}
In December of 9th grade, you received **grades** in school.
Please tell us, based on your memory, what grade you received **in math without help/computational skills** in December of **9th grade**.

{Show if (2c) = “I am in 10th grade”}
In June at the end of 9th grade, you received **grades** in school.
Please tell us, based on your memory, what grade you received **in math without help/computational skills** in June of **9th grade**.

If you are unsure, just report your best estimate based on your memory.
• -3 • 0 • 2 • 4 • 7 • 10 • 12

{{$custom4} = response to (5a)}

5b [danish_grade9]
{Show if (2c) = “I am in 9th grade”}
Please tell us, based on your memory, what grade you received in **Danish, writing/**

presentation in December in **9th grade**.

{Show if (2c) = "I am in 10th grade"}
Please tell us, based on your memory, what grade you received in **Danish, writing/ presentation** in June in **9th grade**.

If you are unsure, just report your best estimate based on your memory.
• -3 • 0 • 2 • 4 • 7 • 10 • 12

{{$custom5} = response to (5b)}

Note: Throughout the rest of this questionnaire, when we refer to a person's math grade, we mean math (without aids/proficiency calculation), and when we refer to a person's Danish grade, we mean Danish (written/presentation).

[pagebreak]

Screen 6: Intro Guessing Questions

{Randomly draw 1 out of the 5 following combinations of 2 variables grade1 and grade2, each with same probability of 20%: grade1= 2 and grade2=7, grade1=2 and grade2=10, grade1=4 and grade2=10, grade1=4 and grade2=12, grade1=7 and grade2=12}

In the next questions, we will ask how you think previous cohorts of Danish young people have performed in their upper secondary education. We know the true answers, based on official figures, and we'll ask you to **guess the true answer** as best you can.

Each time, we will ask **how many out of 100** young people with certain characteristics who started upper secondary education graduated with a grade point average of at least 7.

For every question where your answer differs by less than 5 from the **true answer**, you will be entered into a raffle for one of **40 gift cards** worth 1,000 kr. If you win, you will receive your gift card in your e-Boks.

[pagebreak]

{Participants are randomly assigned with equal probability to either the Gender arm (screen 7-9) or the SES arm (screen 10-12)}

Screen 7: Gender Guess

{Show for *Gender arm*}

Now, we're going to ask you to think about a group of young people who are slightly older than you (born in 2000) and who chose upper secondary education a few years ago.

For each of the following groups, **how many out of 100 young people who started upper secondary education** (STX, HHX or HTX) **completed it within 3 years** with a **GPA of at least 7**?

Note: You answer by writing a number in the blank. For every guess that is close to the correct value, you can win a gift card worth 1,000 kroner!

{Randomize order of (7a) and (7b)}

7a [gender_guess_boys_1]

- Consider 100 **boys** who at the end of 9th grade received a **[grade 1] in math and Danish** and who started upper secondary education after 9th or 10th grade. Out of the 100 boys, _____ completed upper secondary education with a GPA of **at least 7**.

7b [gender_guess_girls_1]

- Consider 100 **girls** who at the end of 9th grade received a **[grade1] in math and Danish** and who started upper secondary education after 9th or 10th grade. Out of the 100 girls, _____ completed upper secondary education with a GPA of **at least 7**.

{Order items (7c) and (7d) in the same way as above, i.e. if "boys" comes first above, "boys" should also come first in these items}

7c [gender_guess_boys_2]

- Consider 100 **boys** who at the end of 9th grade received a **[grade 2] in math and Danish** and who started upper secondary education after 9th or 10th grade. Out of the 100 boys, _____ completed upper secondary education with a GPA of **at least 7**.

7d [gender_guess_girls_2]

- Consider 100 **girls** who at the end of 9th grade received a **[grade 2] in math and Danish** and started upper secondary education after 9th or 10th grade. Out of those 100 girls, _____ completed upper secondary education with a GPA of **at least 7**.

[pagebreak]

{Among the participants in this Gender arm, randomize with equal probability the order of screen 8 (gender considerations) and 9 (considerations grade gender)}

Screen 8: Gender Considerations

{Show for *Gender arm*}

{Draw a random number that takes value [grade1] or [grade2] with 50:50 probability and call that number RANDOM}

We are interested in your thoughts on how boys and girls perform in high school. In a previous question, you answered that:

- You believe that among **100 boys** with a 9th grade math and Danish grade of [RANDOM] who entered high school, **[xxx]** graduated with a GPA of 7 or better.
- Among **100 girls** with a 9th grade math and Danish grade of [RANDOM] who started upper secondary education, you think that **[xxx]** graduated with a GPA of 7 or better

8a [gender_considerations]
{Show if ([RANDOM] = [grade1] and (7a) $>$ (7b)) or ([RANDOM] = [grade2] and (7c) $>$ (7d))}
Why do you think **boys do better in high school than girls**, even when both groups scored [RANDOM] in math and Danish in 9th grade?

{Show if ([RANDOM] = [grade1] and (7a) $<$ (7b)) or ([RANDOM] = [grade2] and (7c) $<$ (7d))}
Why do you think **girl do better in high school than boys**, even when both groups scored [RANDOM] in math and Danish in 9th grade?

{Show if ([RANDOM] = [grade1] and (7a) $=$ (7b)) or ([RANDOM] = [grade2] and (7c) $=$ (7d))}
Why do you think **boys and girls do equally well in high school** when both groups scored [RANDOM] in math and Danish in 9th grade?

There are no right or wrong answers here, we're just interested in **your thoughts**.

[Text entry field]

[pagebreak]

Screen 9: Considerations Grade Gender

{Show for *Gender arm*}

{Create a random variable [RANDGEND] that takes the value "boys" or "girls" with 50:50 probability
If the variable is "boys" then compare (7a) and (7c) and use "boys" rather than "girls" in the below wording}

We are now interested in your thoughts on how young people with **different grades** from primary school perform in high school. In a previous question, you answered that:

- You think that among 100 [RANDGEND] with a **9th grade math and Danish grade of [grade1]** who started upper secondary school, **[xxx]** graduated with a GPA of at least 7.
- Among 100 [RANDGEND] with a **9th grade math and Danish grade of [grade2]** who started upper secondary education, you think **[xxx]** graduated with a GPA of at least 7.

9a [considerations_grade_gender]
{Show if ([RANDGEND] = "boys" and (7a) $>$ (7c)) or ([RANDGEND] = "girls" and (7b) $>$ (7d))}
Why do you think that [RANDGEND] who got the **grade [grade1] in math and Danish** in 9th grade do **better in high school** than those who got the **grade [grade2] in math and Danish** in 9th grade?

{Show if ([RANDGEND] = "boys" and (7a) $<$ (7c)) or ([RANDGEND] = "girls" and (7b) $<$ (7d))}
Why do you think that [RANDGEND] who got the **grade [grade2] in math and Danish** in 9th grade do **better in high school** than those who got the **grade [grade1] in math and Danish** in 9th grade?

{Show if ([RANDGEND] = "boys" and (7a) $=$ (7c)) or ([RANDGEND] = "girls" and (7b) $=$ (7d))}
Why do you think that [RANDGEND] **who got [grade1] in math and Danish** in 9th grade **do just as well** in high school as those who got **[grade2] in math and Danish** in 9th grade?

There are no right or wrong answers here, we're just interested in **your thoughts**.

[Text entry field]

[pagebreak]

Screen 10: SES Guess

{Show for *SES arm*}

Now, we're going to ask you to think about a group of young people who are slightly older than you (born in 2000) and who chose upper secondary education a few years ago.

For each of the following groups, **how many out of 100 young people who started upper secondary education** (STX, HHX or HTX) **completed it within 3 years** with a **GPA of at least 7**?

Note: You answer by writing a number in the blank. For every guess that is close to the correct value, you can win a gift card worth 1,000 kroner!

{Randomize order of (10a) and (10b)}

10a [SES_guess_high_1]

- Consider 100 young people who at the end of 9th grade received a **[grade 1] in math and Danish**, whose parents **both have a high school diploma**, and who started upper secondary education after 9th or 10th grade. Out of the 100 young people, _____ completed upper secondary education with a GPA of **at least 7**.

10b [SES_guess_low_1]

- Consider 100 young people who at the end of 9th grade received a **[grade 1] in math and Danish, who do not have a parent with a high school diploma**, and who started upper secondary education after 9th or 10th grade. Out of the 100 young people, _____ completed upper secondary education with a GPA of **at least 7**.

{Order items (10c) and (10d) in the same way as above, i.e. if "parents both have a high school diploma" comes first above, it should also come first in these items}

10c [SES_guess_high_2]

- Consider 100 young people who at the end of 9th grade received a **[grade 2] in math and Danish**, whose parents **both have a high school diploma**, and who started upper secondary education after 9th or 10th grade. Out of the 100 young people, _____ completed upper secondary education with a GPA of **at least 7**.

10d [SES_guess_low_2]

- Consider 100 young people who at the end of 9th grade received a **[grade 2] in math and Danish, who do not have a parent with a high school diploma**, and who started upper secondary education after 9th or 10th grade. Out of the 100 young people, _____ completed upper secondary education with a GPA of **at least 7**.

[pagebreak]

{Among the participants in this SES arm, randomize with equal probability the order of screen 11 (SES considerations) and 12 (considerations grade SES)}

Screen 11: SES Considerations

{Show for *SES arm*}

{Draw a random number that takes value [grade1] or [grade2] with 50:50 probability and call that number RANDOM}

In this question, we are interested in your thoughts on the role parents' education plays in how their children perform in high school. In a previous question you answered that:

- You think that among 100 young people who in 9th grade got the grade [RANDOM] in math and Danish, **whose parents both have a high school diploma**, and who started upper secondary school, **[xxx]** graduated with a GPA of 7 or better.
- Among 100 young people who in 9th grade got the grade [RANDOM] in math and in Danish, **who do not have a parent with a high school diploma**, and who started upper secondary education, you think **[xxx]** graduated with a GPA of 7 or better.

11a [SES_considerations]
{Show if ([RANDOM] = [grade1] and (10a) $>$ (10b)) or ([RANDOM] = [grade2] and (10c) $>$ (10d))}
Why do you think that young people **whose parents both have a high school diploma** do better in high school than young people **who do not have a parent with a high school diploma**, even when both groups scored [RANDOM] in math and Danish in 9th grade?

{Show if ([RANDOM] = [grade1] and (10a) $<$ (10b)) or ([RANDOM] = [grade2] and (10c) $<$ (10d))}
Why do you think that young people **who do not have a parent with a high school diploma** do better in high school than young people **whose parents both have a high school diploma**, even when both groups scored [RANDOM] in math and Danish in 9th grade?

{Show if ([RANDOM] = [grade1] and (10a) $=$ (10b)) or ([RANDOM] = [grade2] and (10c) $=$ (10d))}
Why do you think that young people **who do not have a parent with a high school diploma** do **as well in high school** as young people **whose parents both have a high school diploma**, when both groups scored [RANDOM] in math and Danish in 9th grade?

There are no right or wrong answers here, we are just interested in **your thoughts**.

[Text entry field]

[pagebreak]

Screen 12: Considerations Grade SES

{Show for *SES arm*}

{Create a random variable [RANDSES] that takes the value "who do not have a parent with a high school diploma" or "whose parents both have a high school diploma" with 50:50 probability
If the variable is "whose parents both have a high school diploma" then compare (10a) and (10c) and use "whose parents both have a high school diploma" rather than "who do not have a parent with a high school diploma" in the below wording}

We are now interested in your thoughts on how young people with **different grades** from primary school perform in high school. In a previous question, you answered that:

- You think that among 100 young people who in **9th grade got the grade [grade1]** in math and in Danish, [RANDSES], and who started upper secondary education, **[xxx]** graduated with a GPA of 7 or better.
- Among 100 young people who in **9th grade got the grade [grade2]** in math and in Danish, [RANDSES], and who started upper secondary education, you think that **[xxx]** graduated with a GPA of 7 or better.

12a [considerations_grade_SES]
{Show if ([RANDSES] = "whose parents both have a high school diploma" and (10a) $>$ (10c)) or ([RANDSES] = "who do not have a parent with a high school diploma" and (10b) $>$ (10d))}
Why do you think that young people, [RANDSES], who got the **grade [grade1] in math and Danish** in 9th grade do **better in high school** than those who got the **grade [grade2] in math and Danish** in 9th grade?

{Show if ([RANDSES] = "whose parents both have a high school diploma" and (10a) $<$ (10c)) or ([RANDSES] = "who do not have a parent with a high school diploma" and (10b) $<$ (10d))}
Why do you think that young people who, [RANDSES], got the **grade [grade2] in math and Danish** in 9th grade do **better in high school** than those who got the **grade [grade1] in math and Danish** in 9th grade?

{Show if ([RANDSES] = "whose parents both have a high school diploma" and (10a) $=$ (10c)) or ([RANDSES] = "who do not have a parent with a high school diploma" and (10b) $=$ (10d))}
Why do you think that young people, [RANDSES], **who got [grade1] in math and Danish** in 9th grade **do just as well** in high school as those who got **[grade2] in math and Danish** in 9th grade?

There are no right or wrong answers here, we're just interested in **your thoughts**.

[Text entry field]

[pagebreak]

Screen 13: Belief About Population and Oneself

13a [belief_pop]
We will now ask you to think of people who are just like you in relation to:

- They got the **grade {$custom4} in math and the grade {$custom5} in Danish** at the end of 9th grade.
- They are **{$custom1}**, and **{$custom2}**.

Now consider all people with these characteristics who are about 8 years older than you (born in 2000) and who started upper secondary education (STX, HHX, HTX) after 9th or 10th grade.

What do you think: For every 100 of the young people in this group, **how many** completed upper secondary education within 3 years with a GPA of at least 7?

[numerical entry] out of 100.

{{$custom6} = response to (13a)}

13b [belief_self]
In this question, **think about YOURSELF**. What do you think: What are the chances (out of 100) that **YOU** will graduate from high school with a grade point average of 7 or better if you transfer to high school in the upcoming school year?

Please answer the question on a scale between 0 and 100, where 0 means“impossible” and 100 means “definitely”.

[numerical entry] out of 100

{{$custom7} = response to (13b)}

[pagebreak]

Screen 14: Considerations Self vs. Population

14a [considerations_self]
The following questions are about how YOU are different from others with the same background.

In a previous question you answered that:

You think that out of all young people with the same background as you ({$custom1} with a 9th grade grade of {$custom4} in math and {$custom5} in Danish, and

{$custom3}), **{$custom6} out of 100** have completed high school with an average of 7 or better.

For yourself, you guessed that your chance is **{$custom7} out of 100** of completing high school with a GPA of 7 or better.

{Insert "higher than" if {$custom7} > {$custom6}; insert "lower than" if {$custom7} < {$custom6}; insert "the same as" if {$custom7} = {$custom6}}

Why do you think your own chances of doing well in high school are **[higher than/lower than/the same as]** the chances of other young people from the same background?

There are no right or wrong answers here, we're just interested in **your thoughts**.

[Text entry field]

[pagebreak]

Screen 15: Perceived Distribution of Past Grades

15a [dist_math9]
Think of **100 randomly selected Danish** people who were born in 2000. How many, do you think, got the **following math grades at the end of 9th grade**?

- 02 or lower _____
- 4 _____
- 7 _____
- 10 _____
- 12 _____

Note: Numbers must add up to 100

[pagebreak]

Screen 16: Track Choice

16a [track_choice]
{Show if (2c) = "I am in 9th grade"}
By March 1, 2024, you need to decide on the next big step in your education. As you probably know, you have several options for continuing your education in the coming year. For example, you can start a vocational education or an upper secondary education

(STX, HHX or HTX).

What are your plans for your education after this school year? If you're not sure, choose the option you think is most likely right now.

- Start STX, HTX or HHX after 9th grade
- Go to 10th grade and then start STX, HTX or HHX
- Start HF after 9th grade
- Go to 10th grade and then start HF
- Start vocational training after 9th grade
- Go to 10th grade and then start vocational training
- Start EUX after 9th grade
- Go to 10th grade and then start EUX
- Leave primary school after 9th grade with no plans for further education
- Go to 10th grade and then leave school with no plans for further education
- Take a gap year and then look for a youth education
- Other

{Show if (2c) = "I am in 10th grade"}
By March 1, 2024, you need to decide on the next big step in your education. As you probably know, you have several options for continuing your education in the coming year. For example, you can start a vocational education or an upper secondary education (STX, HHX or HTX).

What are your plans for your education after this school year? If you're not sure, choose the option you think is most likely right now.

- Start STX, HTX or HHX
- Start HF
- Start vocational training
- Start EUX
- Leave school after 10th grade with no plans for further education
- Take a gap year and then look for a youth education
- Other

[pagebreak]

Screen 17: Beliefs About Selection into Upper Secondary Education

We would like to ask you again to think about the different groups of young people born in the year 2000. For each of the following groups, **how many out of 100 young people do you think started upper secondary education** (STX, HHX or HTX) after primary school?

17a [enrollment_1]
{Show for *Gender arm*}
Think of 100 [RANDGEND] who got the grade [grade1] in math and Danish at the end of 9th grade. Out of the 100 [RANDGEND], _____ started upper secondary education.

{Show for *SES arm*}
Think of 100 young people, [RANDSES], who got the grade [grade1] in math and Danish at the end of 9th grade. Out of the 100 young people, _____ started upper secondary education.

17b [enrollment_2]
{Show for *Gender arm*}
Think of 100 [RANDGEND] who got the grade [grade2] in math and Danish at the end of 9th grade. Out of the 100 [RANDGEND], _____ started upper secondary education.

{Show for *SES arm*}
Think of 100 young people, [RANDSES], who got the grade [grade2] in math and Danish at the end of 9th grade. Out of the 100 young people, _____ started upper secondary education.

[pagebreak]

Screen 18: Expected Grades

18a [expected_danishgrade]
Please tell us what grade you expect to get in Danish, written presentation **at the end of this school year**?
• -3 • 0 • 2 • 4 • 7 • 10 • 12

18b [expected_gpa]
Imagine again that you are starting high school in the **upcoming school year**.

What grade point average do you expect at the end of high school? (Please enter a number between -3 and 12, decimals are possible). _____

[pagebreak]

Screen 19: Effort, Ability, etc.

19a [expected_effort]
Almost done!

Imagine again that you are starting high school in the upcoming school year.

How many hours do you think you will spend on homework and studying in an average week, in addition to the time you spend in school? _____ hours.

19b [importance_HS]
How important do you think it is for your life that you complete high school with a good grade?

Please use a scale from 0 to 10, where 0 means **"Not at all important"** and 10 means **"Extremely important"**.

[Scale 0, 1, 2, 3, 4, 5, 6, 7, 8, 9, 10]

19c [role_luck]
To what extent do you agree with the following statement?

"What a person achieves in life is primarily a matter of **fate and luck**."

Please use a scale from 0 to 10, where 0 means **"Strongly disagree"** and 10 means **"Strongly agree"**. You can also use any number between 0 and 10 to indicate where you are on the scale.

[Scale 0, 1, 2, 3, 4, 5, 6, 7, 8, 9, 10]

[pagebreak]

Screen 20: Last Screen

{Show if (2c) $\neq$ "Other"}
That's it - thank you so much for your time and comments!

{Show if (2c) = "Other"}
Unfortunately, you do not meet the requirements to participate in the survey. We sincerely thank you and appreciate your time and participation.

20a [survey_feedback]
Do you have any thoughts or feedback you'd like to share with us? If there's something you'd like to share with us, please let us know in the text box below.

[Text box]

END OF SURVEY

D.2 Survey of Parents

Screen 1: Welcome Page

Thank you for participating in this survey about young people's education choices - we really appreciate it!

We are currently running two surveys: one targeting young people born in 2008 and one targeting their parents.

We have already invited your child born in 2008 to participate in the youth survey. We would be very happy if you could remind your child (or children) to check their e-Boks and find that invitation.

Of course, it's a good idea to talk about the survey and your child's educational choices. However, it's important that your child answers all the questions in their questionnaire on their own without help. It is also essential that you answer the questions without the help of your child.

Let's get started with your questionnaire. It takes about **10-15 minutes** and includes questions about your views on your child's choice of education.

As a thank you for your time, we're giving away a total of **50 GoGift gift cards** to those who complete the questionnaire. These gift cards are good for many things and are very easy to use in stores and online. Each gift card is worth **1,000 kr**.

10 of the gift cards are reserved for those who complete the full questionnaire. The remaining 40 gift cards will be awarded randomly to those who complete small tasks during the survey. For example, you might guess some facts correctly.

Look out for questions marked with an emoji - in those questions you can win extra gift cards!

[pagebreak]

Screen 2: Demographics

2a [gender]
Which gender do you most identify with?
• Male • Female

{(2a) determines {$custom1} and {$custom2} used below:
if (2a) = "Male": {$custom1} = "mother" and {$custom2} = "she";

if (2a) = “Female”: {$custom1} = “father” and {$custom2} = “he”}

2b [birthyear]
When were you born?
• Before 1960 • 1960-1969 • 1970-1979 • 1980-1989 • 1990 or later

2c [educ]
Do you have a high school diploma?
• Yes • No

Note: High school diploma means that you have completed an upper secondary education (STX, HTX, HHX) or a higher examination (HF).

[pagebreak]

Screen 3: Child

3a [child]
Do you have at least one child born in 2008?

- No
- Yes, I have exactly one child born in 2008.
- Yes, several of my children were born in 2008.

[pagebreak]

{If (3a) = “No”, move directly to screen 21}

Screen 4: Child Gender

4a [gender_child]
{Show if (3a) = “Yes, I have exactly one child born in 2008.”}
In the following questions, we ask you to think about your child born in 2008.

{Show if child (3a) = “Yes, several of my children were born in 2008.”}
You have answered that you have several children born in 2008. In the following questions, we ask you to think of the oldest of your children born in 2008 (if you have twins or triplets, think of the first born).

Which gender does your child identify with the most?
• Male • Female

{(4a) determines the following custom-values used below:

- if (4a) = “Male”:
  {$custom3} = “son”

{$custom4} = “he”
{$custom5} = “his”
{$custom6} = “boys”

- if (4a) = “Female”:
  {$custom3} = “daughter”
  {$custom4} = “she”
  {$custom5} = “her”
  {$custom6} = “girls”

}

[pagebreak]

Screen 5: Current Education

5a [educ_curre]
What best describes your {$custom3}’s current situation?

- {$custom4} is in 9th grade.
- {$custom4} is in 10th grade.
- Other

{If (5a) = “Other”, move directly to screen 21}

[pagebreak]

Screen 6: Family Type

6a [type_home]
What type of home is your {$custom3} from?

Select the option that best suits your situation.

- My {$custom3} lives with both mom and dad and/or {$custom3} sees both mom and dad regularly. [1]
- My {$custom3} lives only with his father and does not have regular contact with his mother. [2]
- My {$custom3} lives only with her mother and does not have regular contact with her father. [3]

[pagebreak]

Screen 7: Education Other Parent

{Show (7a) if (6a) = [1]}

7a [educ_other_parent]
Does your {$custom3}'s {$custom1} have a high school diploma?
• Yes • No

Note: Studentereksamen means that {$custom2} has completed an upper secondary education (STX, HTX, HHX) or a higher examination (HF).

[pagebreak]

{(2c), (6a), and (7a) determine {$custom7} used below:

- If (2c) = "No" and ((7a) = "No" or (6a) = [2] or [3]): {$custom7} = "they do not have a parent with a high school diploma"
- If (2c) = "Yes" and ((7a) = "No" or (6a) = [2] or [3]): {$custom7} = "they have one parent with a high school diploma"
- If (2c) = "No" and (7a) = "Yes": {$custom7} = "they have one parent with a high school diploma"
- If (2c) = "Yes" and (7a) = "Yes": {$custom7} = "their parents both have a high school diploma"

}

{(2c), (6a), and (7a) determine {$custom8} used below:

- If (2c) = "No" and ((7a) = "No" or (6a) = [2] or [3]): {$custom8} = "who does not have a parent with a high school diploma"
- If (2c) = "Yes" and ((7a) = "No" or (6a) = [2] or [3]): {$custom8} = "who has one parent with a high school diploma"
- If (2c) = "No" and (7a) = "Yes": {$custom8} = "who has one parent with a high school diploma"
- If (2c) = "Yes" and (7a) = "Yes": {$custom8} = "who has two parents with a high school diploma"

}

Screen 8: Grade Report

8a [math_grade9]
{Show if (5a) = "{$custom4} is in 9th grade."}
In december of 9th grade, your {$custom3} received performance **grades** in school.
Please tell us, based on your memory, what grade your {$custom3} received in **math unaided/skills math** in december in **9th grade**.

{Show if (5a) = "{$custom4} is in 10th grade."}
In June at the end of 9th grade, your {$custom3} received performance **grades** in school.
Please tell us, based on your memory, what grade your {$custom3} received in **math**

without aids/skills math in June of **9th grade**.

If you're unsure, just report your best estimate based on your memory.
• -3 • 0 • 2 • 4 • 7 • 10 • 12

{{$custom9} = response to (8a)}

8b [danish_grade9]
{Show if (5a) = "{$custom4} is in 9th grade."}
Please tell us, based on your memory, what grade your {$custom3} received in **Danish, written presentation**, in December in **9th grade**.

{Show if (5a) = "{$custom4} is in 10th grade."}
Please tell us, based on your memory, what grade your {$custom3} received in **Danish, written presentation**, in June in **9th grade**.

If you are unsure, just report your best estimate based on your memory.
• -3 • 0 • 2 • 4 • 7 • 10 • 12

{{$custom10} = response to (8b)}

Note: Throughout the rest of this questionnaire, when we refer to a person's math grade, we mean math (without aids/proficiency calculation), and when we refer to a person's Danish grade, we mean Danish (written/presentation).

[pagebreak]

Screen 9: Intro Guessing Questions

{Randomly draw 1 out of the 5 following combinations of 2 variables grade1 and grade2, each with same probability of 20%: grade1= 2 and grade2=7, grade1=2 and grade2=10, grade1=4 and grade2=10, grade1=4 and grade2=12, grade1=7 and grade2=12}

In the next questions, we will ask how you think previous cohorts of Danish young people have performed in their upper secondary education. We know the true answers, based on official figures, and we will ask you to **guess the true answer** as best you can.

Each time, we will ask how many out of 100 young people with certain characteristics who started upper secondary education graduated with a grade point average of at least 7.

For every question where your answer differs by less than 5 from the **true answer**, you will be entered into a raffle for one of **40 gift cards** worth **1,000 kr.** If you win, you will receive your gift card in your e-Boks.

Look out for questions marked with an emoji - in those questions you can win gift cards!

[pagebreak]

{Participants are randomly assigned with equal probability to either the Gender arm (screen 10-12) or the SES arm (screen 13-15)}

Screen 10: Gender Guess

{Show for *Gender arm*}

Now we're going to ask you to think about a group of people in Denmark who are a little bit older than your {$custom3} (namely children born in 2000) and who chose their secondary education a few years ago.

For each of the following groups, **how many out of 100 young people who started an upper secondary education** (STX, HHX or HTX) **completed it within years** with a **GPA of at least 7**?

Note: You answer by typing a number in the empty field. For every guess that is close to the correct value, you can win a gift card worth 1,000 kroner!

{Randomize order of (10a) and (10b)}

10a [gender_guess_boys_1]

- Consider 100 **boys** who at the end of 9th grade received a **[grade 1] in math and Danish** and who started upper secondary education after 9th or 10th grade. Out of the 100 boys, _____ completed upper secondary education with a GPA of **at least 7**.

10b [gender_guess_girls_1]

- Consider 100 **girls** who at the end of 9th grade received a **[grade1] in math and Danish** and who started upper secondary education after 9th or 10th grade. Out of the 100 girls, _____ completed upper secondary education with a GPA of **at least 7**.

{Order items (10c) and (10d) in the same way as above, i.e. if "boys" comes first above, "boys" should also come first in these items}

10c [gender_guess_boys_2]

- Consider 100 **boys** who at the end of 9th grade received a **[grade 2] in math and Danish** and who started upper secondary education after 9th or 10th grade. Out of the 100 boys, _____ completed upper secondary education with a GPA of **at least 7**.

10c [gender_guess_girls_2]

- Consider 100 **girls** who at the end of 9th grade received a **[grade 2] in math and Danish** and started upper secondary education after 9th or 10th grade. Out of those 100 girls, _____ completed upper secondary education with a GPA of **at least 7**.

[pagebreak]

{Among the participants in this Gender arm, randomize with equal probability the order of screen 11 (gender considerations) and 12 (considerations grade gender)}

Screen 11: Gender Considerations

{Show for *Gender arm*}

{Draw a random number that takes value [grade1] or [grade2] with 50:50 probability and call that number RANDOM}

We are interested in your thoughts on how boys and girls perform in high school. In a previous question, you answered that:

- You believe that among **100 boys** with a 9th grade math and Danish grade of [RANDOM] who entered high school, **[xxx]** graduated **with a GPA of 7 or better**.
- Among **100 girls** with a 9th grade math and Danish grade of [RANDOM] who started upper secondary education, you think that **[xxx]** graduated **with a GPA of 7 or better**.

11a [gender_considerations]
{Show if ([RANDOM] = [grade1] and (10a) $>$ (10b)) or ([RANDOM] = [grade2] and (10c) $>$ (10d))}
Why do you think **boys do better in high school than girls**, even when both groups scored [RANDOM] in math and Danish in 9th grade?

{Show if ([RANDOM] = [grade1] and (10a) $<$ (10b)) or ([RANDOM] = [grade2] and (10c) $<$ (10d))}
Why do you think **girls do better in high school than boys**, even when both groups scored [RANDOM] in math and Danish in 9th grade?

{Show if ([RANDOM] = [grade1] and (10a) $=$ (10b)) or ([RANDOM] = [grade2] and (10c) $=$ (10d))}
Why do you think **boys and girls do equally well in high school** when both groups scored [RANDOM] in math and Danish in 9th grade?

There are no right or wrong answers here, we're just interested in **your thoughts**.

[Text entry field]

[pagebreak]

Screen 12: Considerations Grade Gender

{Show for *Gender arm*}

{Create a random variable [RANDGEND] that takes the value "boys" or "girls" with 50:50 probability
If the variable is "boys" then compare (10a) and (10c) and use "boys" rather than "girls" in the below wording}

We are now interested in your thoughts on how young people with **different grades** from primary school perform in high school. In a previous question, you answered that:

- You think that among 100 [RANDGEND] with a **9th grade math and Danish grade of [grade1]** who started upper secondary school, **[xxx]** graduated with a GPA of at least 7.
- Among 100 [RANDGEND] with a **9th grade math and Danish grade of [grade2]** who started upper secondary education, you think **[xxx]** graduated with a GPA of at least 7.

12a [considerations_grade_gender]
{Show if ([RANDGEND] = "boys" and (10a) $>$ (10c)) or ([RANDGEND] = "girls" and (10b) $>$ (10d))}
Why do you think that [RANDGEND] who got the **grade [grade1] in math and Danish** in 9th grade do **better in high school** than those who got the **grade [grade2] in math and Danish** in 9th grade?

{Show if ([RANDGEND] = "boys" and (10a) $<$ (10c)) or ([RANDGEND] = "girls" and (10b) $<$ (10d))}
Why do you think that [RANDGEND] who got the **grade [grade2] in math and Danish** in 9th grade do **better in high school** than those who got the **grade [grade1] in math and Danish** in 9th grade?

{Show if ([RANDGEND] = "boys" and (10a) $=$ (10c)) or ([RANDGEND] = "girls" and (10b) $=$ (10d))}
Why do you think that [RANDGEND] **who got [grade1] in math and Danish** in 9th grade **do just as well** in high school as those who got **[grade2] in math and Danish** in 9th grade?

There are no right or wrong answers here, we're just interested in **your thoughts**.

[Text entry field]

[pagebreak]

Screen 13: SES Guess

{Show for *SES arm*}

Now, we're going to ask you to think about a group of young people who are slightly older than your {$custom3} (namely children born in 2000) and who chose secondary education a few years ago.

For each of the following groups, **how many out of 100 young people who started an upper secondary education** (STX, HHX or HTX) **completed it within 3 years** with a **GPA of at least 7**?

Note: You answer by typing a number in the empty field. For every guess that is close to the correct value, you can win a gift card worth 1,000 kroner!

{Randomize order of (13a) and (13b)}

13a [SES_guess_high_1]

- Consider 100 young people who at the end of 9th grade received a **[grade 1] in math and Danish**, whose parents **both have a high school diploma**, and who started upper secondary education after 9th or 10th grade. Out of the 100 young people, _____ completed upper secondary education with a GPA of **at least 7**.

13b [SES_guess_low_1]

- Think of 100 young people who at the end of 9th grade received a **[grade1] in math and Danish, who do not have a parent with a high school diploma**, and who started upper secondary education after 9th or 10th grade. Out of the 100 young people, _____ completed upper secondary education with a GPA of **at least 7**.

{Order items (13c) and (13d) in the same way as above, i.e. if "parents both have a high school diploma" comes first above, it should also come first in these items}

13c [SES_guess_high_2]

- Consider 100 young people who at the end of 9th grade received a **[grade 2] in math and Danish**, whose parents **both have a high school diploma**, and who started upper secondary education after 9th or 10th grade. Out of the 100 young people, _____ completed upper secondary education with a GPA of **at least 7**.

13d [SES_guess_low_2]

- Consider 100 young people who at the end of 9th grade received a **[grade 2] in math and Danish, who do not have a parent with a high school diploma**, and who started upper secondary education after 9th or 10th grade. Out of the 100 young people, _____ completed upper secondary education with a GPA of **at least 7**.

[pagebreak]

{Among the participants in this SES arm, randomize with equal probability the order of screen 14 (SES considerations) and 15 (considerations grade SES)}

Screen 14: SES Considerations

{Show for *SES arm*}

{Draw a random number that takes value [grade1] or [grade2] with 50:50 probability and call that number RANDOM}

In this question, we are interested in your thoughts on the role parents' education plays in how their children perform in high school. In a previous question you answered that:

- You think that among 100 young people who in 9th grade got the grade [RANDOM] in math and Danish, **whose parents both have a high school diploma**, and who started upper secondary school, **[xxx]** graduated with a GPA of 7 or better.
- Among 100 young people who in 9th grade got the grade [RANDOM] in math and in Danish, **who do not have a parent with a high school diploma**, and who started upper secondary education, you think **[xxx]** graduated with a GPA of 7 or better.

14a [SES_considerations]
{Show if ([RANDOM] = [grade1] and (13a) $>$ (13b)) or ([RANDOM] = [grade2] and (13c) $>$ (13d))}
Why do you think that young people **whose parents both have a high school diploma** do better in high school than young people **who do not have a parent with a high school diploma**, even when both groups scored [RANDOM] in math and Danish in 9th grade?

{Show if ([RANDOM] = [grade1] and (13a) $<$ (13b)) or ([RANDOM] = [grade2] and (13c) $<$ (13d))}
Why do you think that young people **who do not have a parent with a high school diploma** do better in high school than young people **whose parents both have a high school diploma**, even when both groups scored [RANDOM] in math and Danish in 9th grade?

{Show if ([RANDOM] = [grade1] and (13a) $=$ (13b)) or ([RANDOM] = [grade2] and (13c) $=$ (13d))}
Why do you think that young people **who do not have a parent with a high school diploma** do **as well in high school** as young people **whose parents both have a high**

school diploma, when both groups scored [RANDOM] in math and Danish in 9th grade?

There are no right or wrong answers here, we are just interested in **your thoughts**.

[Text entry field]

[pagebreak]

Screen 15: Considerations Grade SES

{Show for *SES arm*}

{Create a random variable [RANDSES] that takes the value "who do not have a parent with a high school diploma" or "whose parents both have a high school diploma" with 50:50 probability
If the variable is "whose parents both have a high school diploma" then compare (13a) and (13c) and use "whose parents both have a high school diploma" rather than "who do not have a parent with a high school diploma" in the below wording}

We are now interested in your thoughts on how young people with **different grades** from primary school perform in high school. In a previous question, you answered that:

- You think that among 100 young people who in **9th grade got the grade [grade1]** in math and in Danish, [RANDSES], and who started upper secondary education, **[xxx]** graduated with a GPA of 7 or better.
- Among 100 young people who in **9th grade got the grade [grade2]** in math and in Danish, [RANDSES], and who started upper secondary education, you think that **[xxx]** graduated with a GPA of 7 or better.

15a [considerations_grade_SES]
{Show if ([RANDSES] = "whose parents both have a high school diploma" and (13a) $>$ (13c)) or ([RANDSES] = "who do not have a parent with a high school diploma" and (13b) $>$ (13d))}
Why do you think that young people, [RANDSES], who got the **grade [grade1] in math and Danish** in 9th grade do **better in high school** than those who got the **grade [grade2] in math and Danish** in 9th grade?

{Show if ([RANDSES] = "whose parents both have a high school diploma" and (13a) $<$ (13c)) or if ([RANDSES] = "who do not have a parent with a high school diploma" and (13b) $<$ (13d))}
Why do you think that young people, [RANDSES], who got the **grade [grade2] in math and Danish** in 9th grade do **better in high school** than those who got the **grade [grade2] in math and Danish** in 9th grade?

{Show if ([RANDSES] = "whose parents both have a high school diploma" and (13a) $=$ (13c)) or ([RANDSES] = "who do not have a parent with a high school diploma" and (13b) $=$ (13d))}
Why do you think that young people, [RANDSES], **who got [grade1] in math and**

Danish in 9th grade **do just as well** in high school as those who got **[grade2] in math and Danish** in 9th grade?

There are no right or wrong answers here, we're just interested in **your thoughts**.

[Text entry field]

[pagebreak]

Screen 16: Belief About Population and Child

16a [belief_pop]
We will now ask you to think of people who are similar to your {$custom3} in relation to:

- They got the **grade {$custom9} in math and the grade {$custom10} in Danish** at the end of 9th grade.
- They are **{$custom6}**, and **{$custom7}**.

Now consider all people with these characteristics who were born in 2000 and who started upper secondary education (STX, HHX, HTX) after 9th or 10th grade.

What do you think: For every 100 of the young people in this group, **how many** completed upper secondary education within 3 years with an average grade point of at least 7?

[numerical entry] out of 100.

{{$custom11} = response to (16a)}

16b [belief_child]
In this question, think about your {$custom3}. What do you think: What is the chance (out of 100) that your {$custom3} will graduate from high school within three years with a grade point average of 7 or better, in case {$custom4} enrolls in high school in the coming school year?

Please answer the question on a scale between 0 and 100, where 0 means "impossible" and 100 means "definitely".

[numerical entry] out of 100

{{$custom12} = response to (16b)}

[pagebreak]

Screen 17: Considerations Child vs. Population

17a [considerations_child]
The following questions are about how your {$custom3} is different from others with the same background as your {$custom3}.

In a previous question you answered that:

You believe that out of **all young people with the same background as your** {$custom3} ({$custom6} with a 9th grade grade grade of {$custom9} in math and {$custom10} in Danish, and {$custom8}), **{$custom11} out of 100** have completed high school with an average of 7 or better.

For your {$custom3}, you guessed that {$custom5}'s chance is {$custom12} out of 100 of graduating high school with a GPA of 7 or better.

{Insert "higher than" if {$custom12} > {$custom11}; insert "lower than" if {$custom12} < {$custom11}; insert "the same as" if {$custom12} = {$custom11}}

Why do you think your {$custom3}'s chances of doing well in high school are **[higher than/lower than/the same as]** the chances of other kids from the same background?

There are no right or wrong answers here, we're just interested in **your thoughts**.

[Text entry field]

[pagebreak]

Screen 18: Perceived Distribution of Past Grades

18a [dist_math9]
Consider 100 randomly selected young people born in 2000. How many, do you think got the **following math grades at the end of 9th grade**?

- 02 or lower _____
- 4 _____
- 7 _____
- 10 _____
- 12 _____

Note: Numbers must add up to 100

[pagebreak]

Screen 19: Track Choice

19a [track_choice]
{Show if (5a) = "{$custom4} is in 9th grade."}
By March 1, 2024, your {$custom3} must decide on the next big step in his or her education. As you probably know, {$custom4} has several options for continuing his or her education in the coming year. For example, {$custom4} can start a vocational education or an upper secondary education (STX, HHX, or HTX).

Now imagine you had to choose an education on behalf of your {$custom3}. Which educational path would you choose for your {$custom3}?

- Start STX, HTX or HHX after 9th grade
- Go to 10th grade and then start STX, HTX or HHX
- Start HF after 9th grade
- Go to 10th grade and then start HF
- Starting vocational training after 9th grade
- Go to 10th grade and then start vocational training
- Start EUX after 9th grade
- Go to 10th grade and then start EUX
- Leaving school after 9th grade with no plans for further education
- Go to 10th grade and then leave school with no plans for further education
- Take a gap year and then look for a youth education
- Other

{Show if (5a) = "{$custom4} is in 10th grade."}
By March 1, 2024, your {$custom3} must decide on the next big step in his or her education. As you probably know, {$custom4} has several options for continuing his or her education in the coming year. For example, {$custom4} can start a vocational education or an upper secondary education (STX, HHX, or HTX).

Now imagine you had to choose an education on behalf of your {$custom3}. Which educational path would you choose for your {$custom3}?

- Start STX, HTX or HHX
- Start HF
- Start vocational training
- Start EUX
- Leave school after 10th grade with no plans for further education

- Take a gap year and then look for a youth education
- Other

[pagebreak]

Screen 20: Beliefs About Selection into Upper Secondary Education

We would like to ask you again to think about the different groups of young people born in the year 2000. For each of the following groups, **how many out of 100 young people do you think started upper secondary education** (STX, HHX or HTX) after primary school?

20a [enrollment_1]
{Show for *Gender arm*}
Think of 100 [RANDGEND] who got the grade [grade1] in math and Danish at the end of 9th grade. Out of the 100 [RANDGEND], _____ started upper secondary education.

{Show for *SES arm*}
Think of 100 young people, [RANDSES], who got the grade [grade1] in math and Danish at the end of 9th grade. Out of the 100 young people, _____ started upper secondary education.

20b [enrollment_2]
{Show for *Gender arm*}
Think of 100 [RANDGEND] who got the grade [grade2] in math and Danish at the end of 9th grade. Out of the 100 [RANDGEND], _____ started upper secondary education.

{Show for *SES arm*}
Think of 100 young people, [RANDSES], who got the grade [grade2] in math and Danish at the end of 9th grade. Out of the 100 young people, _____ started upper secondary education.

[pagebreak]

Screen 21: Last Screen

{Show if (5a) $\neq$ "Other"}
That's it - thank you so much for your time and comments!

{Show if (5a) = "Other"}
Unfortunately, you do not meet the requirements to participate in the survey. We sincerely thank you and appreciate your time and participation.

21a [survey_feedback]
Do you have any thoughts or feedback you'd like to share with us? In the text box below, you can let us know if there's something you'd like to share with us.

[Text box]

END OF SURVEY

E Survey Instructions: Causal Survey

E.1 Initial Survey of Female Students (with Treatment)

Screen 1: Welcome Page

Thank you very much for participating in this survey about education - we really appreciate it!

As a thank you for your time, we draw a total of **60 GoGift gift cards** among those who complete the survey. These gift cards are good for many things and are very easy to use in stores and online. Each gift card is worth **1,000kr**.

30 of the gift cards are reserved for those who complete the entire questionnaire (it takes about **10 minutes**).

The remaining 30 gift cards will be randomly assigned to those who complete small tasks during the survey. For example, you might guess some facts correctly.

Look out for questions marked with an emoji - in those questions you can win extra gift cards!

[pagebreak]

Screen 2: Demographics

2a [gender]
Which gender do you most identify with?
• Male • Female

{If (2a) = "Male", move directly to screen 14}

2b [birthyear]

When were you born?
• Before 2008 • 2008 • 2009 • 2010 or later

2c [educ_curre]
What describes your current situation best?

- I am in 8th grade
- I am in 9th grade
- I am in 10th grade
- I am doing a vocational training or working in a job
- I am enrolled in STX, HHX or HTX
- I am enrolled in HF
- I am enrolled in EUX
- Other/none of the above: _____

[pagebreak]

Screen 3: Family Type

3a [type_home]
What type of home are you from? Select the option that best suits your situation.

- I live with both my mother and father and/or I see both my mother and father regularly. [1]
- I only live with my father and do not have regular contact with my mother. [2]
- I only live with my mother and do not have regular contact with my father. [3]
- I have no parents or no contact with my parents. [4]

[pagebreak]

Screen 4: Parental Education

{Show (4a) if (3a) = [1] or [2]}

4a [dad_educ]
Does your dad have a high school diploma? If you're not sure, just give us your best guess.

Note: High school diploma means that he has completed an upper secondary education (STX, HTX or HHX) or a higher examination (HF).
• Yes • No

[pagebreak]

{Show (4b) if (3a) = [1] or [3]}

4b [mum_educ]
Does your mom have a high school diploma? If you're not sure, just give us your best guess.

Note: High school diploma means that she has completed an upper secondary education (STX, HTX or HHX) or a higher examination (HF)
• Yes • No

[pagebreak]

Screen 5: Grade Report

5a [math_grade]
{Show if (2c) = "I am in 8th grade"}
In December of 8th grade, you received **grades** in school.
Please tell us, based on your memory, what grade you received **in math without help/computational skills** in December of **8th grade**.

{Show if (2c) = "I am in 9th grade" or "Other/none of the above"}
In December of 9th grade, you received **grades** in school.
Please tell us, based on your memory, what grade you received **in math without help/computational skills** in December of **9th grade**.

{Show if (2c) = "I am in 10th grade", "I am doing a vocational training or working in a job", "I am enrolled in STX, HHX or HTX", "I am enrolled in HF" or "I am enrolled in EUX"}
In June at the end of 9th grade, you received **grades** in school.
Please tell us, based on your memory, what grade you received **in math without help/computational skills** in June of **9th grade**.

If you are unsure, just report your best estimate based on your memory.
• -3 • 0 • 2 • 4 • 7 • 10 • 12

5b [danish_grade]
{Show if (2c) = "I am in 8th grade"}
Please tell us, based on your memory, what grade you received in **Danish, writing/ presentation** in December in **8th grade**.

{Show if (2c) = "I am in 9th grade" or "Other/none of the above"}
In December of 9th grade, you received **grades** in school.
Please tell us, based on your memory, what grade you received **in Danish, writing/presentation** in December of **9th grade**.

{Show if (2c) = “I am in 10th grade”, “I am doing a vocational training or working in a job”, “I am enrolled in STX, HHX or HTX”, “I am enrolled in HF” or “I am enrolled in EUX”}
In June at the end of 9th grade, you received **grades** in school.
Please tell us, based on your memory, what grade you received **in Danish, writing/presentation** in June of **9th grade**.

If you are unsure, just report your best estimate based on your memory.
• -3 • 0 • 2 • 4 • 7 • 10 • 12

Note: Throughout the rest of this questionnaire, when we refer to a person’s math grade, we mean math (without aids/proficiency calculation), and when we refer to a person’s Danish grade, we mean Danish (written/presentation).

{(5a) and (5b) determine {$custom1} used below:
{$custom1} = integer from {4, 7, 10, 12} closest to the average of (5a) and (5b);
if average is exactly between two values, {$custom1} = value closer to 7}

{Generate variables {$custom2} and {$custom3}:

- if {$custom1} = 4: {$custom2} = 6; {$custom3} = 9
- if {$custom1} = 7: {$custom2} = 25; {$custom3} = 37
- if {$custom1} = 10: {$custom2} = 67; {$custom3} = 76
- if {$custom1} = 12: {$custom2} = 90; {$custom3} = 92

}

[pagebreak]

Screen 6: Track Choice

6a [track_choice]
{Show if (2c) = “I am in 8th grade”}
In less than a year, you’ll have to decide what the next step in your education will be. Which of the following would be your first choice after 9th grade? If you’re not sure, choose the option you think is most likely right now.

- Start STX, HTX or HHX after 9th grade [1]
- Go to 10th grade and then start STX, HTX or HHX [1]
- Start HF after 9th grade [2]
- Go to 10th grade and then start HF [2]
- Start vocational training after 9th grade [3]
- Go to 10th grade and then start vocational training [3]
- Start EUX after 9th grade [4]
- Go to 10th grade and then start EUX [4]
- Leave primary school after 9th grade with no plans for further education [5]

- Go to 10th grade and then leave school with no plans for further education [5]
- Take a gap year and then look for a youth education [6]
- Other/none of the above [7]

{Show if (2c) = "I am in 9th grade"}
You probably decided recently what will be the next step in your educational career. Which of the following was your top choice for the coming school year?

- Start STX, HTX or HHX after 9th grade [1]
- Go to 10th grade and then start STX, HTX or HHX [1]
- Start HF after 9th grade [2]
- Go to 10th grade and then start HF [2]
- Start vocational training after 9th grade [3]
- Go to 10th grade and then start vocational training [3]
- Start EUX after 9th grade [4]
- Go to 10th grade and then start EUX [4]
- Leave primary school after 9th grade with no plans for further education [5]
- Go to 10th grade and then leave school with no plans for further education [5]
- Take a gap year and then look for a youth education [6]
- Other/none of the above [7]

{Show if (2c) = "I am in 10th grade"}
You probably decided recently what will be the next step in your educational career. Which of the following was your top choice for the coming school year?

- Start STX, HTX or HHX [1]
- Start HF [2]
- Start vocational training [3]
- Start EUX [4]
- Leave school after 10th grade with no plans for further education [5]
- Take a gap year and then look for a youth education [6]
- Other/none of the above [7]

{Generate a variable {$Phrasing}:

- if (2c) = "I am enrolled in STX/HHX or HTX" or "I am enrolled in HF" or ((2c) = "I am in 9th grade" or "I am in 10th grade") and ((6a) = [1] or [2]): {$Phrasing} = HSactual
- if ((2c) = "I am in 9th grade" or "I am in 10th grade") and ((6a) $\neq$ [1] and [2]): {$Phrasing} = HShypotheticalfuture
- if (2c) = "I am doing a vocational training or working in a job" or "I am enrolled in EUX" or "Other/none of the above": {$Phrasing} = HShypotheticalpast
- if (2c) = "I am in 8th grade": {$Phrasing} = HSfuturefuture

}

[pagebreak]

Screen 7: Intro Guessing Questions

In the following question, we will ask how you think previous cohorts of Danish young people have performed in their upper secondary education. We know the true answer, based on official figures, and we'll ask you to **guess the true answer** as best you can.

In each of the following questions where you see this emoji

, you can win a gift card worth 1,000 kr, if your answer is close to the truth. If you win, you will receive your gift card in your e-Boks.

[pagebreak]

Screen 8: Gender Guess

8a [gender_guess]
Please think about a group of young people who are slightly older than you (born in 2002) and who chose upper secondary education a few years ago.

- Think of **100 boys** in this cohort who at the end of 9th grade received a grade of **{$custom1} in math and Danish** and who started upper secondary education (STX, HHX or HTX). Out of these 100 boys, **{$custom2}** completed upper secondary education within 3 years with a GPA **of 7 or better.**

Note: You answer by writing a number in the blank. If your estimate is close to the true value, you can win a gift card worth 1,000 kroner!

- Now consider **100 girls** in this cohort who at the end of 9th grade also received a grade of **{$custom1} in math and Danish** and who also started upper secondary education (STX, HHX or HTX). Out of these 100 girls, how many do you think completed upper secondary education within 3 years with a GPA of **7 or better?**
- _____ out of 100 [numerical entry restricted to 0-100]

[pagebreak]

Screen 9: Info Treatment

{Show to a random 50% of respondents}

We have analyzed the school careers of all adolescents in Denmark born in 2002 with a 9th grade math and danish grade of {$custom1} who started upper secondary education (STX, HHX or HTX).

We found out that {$custom3} out of 100 girls in this group completed high school with a GPA of 7 or better! (Remember: Only {$custom2} out of 100 boys with the same 9th grade grades completed high school with a GPA of 7 or better.)

This means that girls in this group have **a higher likelihood than boys** of finishing high school with a GPA of at least 7.

[Interactive bar chart with 2 bars.
Heading above bar chart: Probability of graduating from HS with a GPA of 7 or better.
Heading over left bar: Boys, Heading over right bar: Girls.
Labeling of left bar: **{$custom2} out of 100**, labeling of right bar: {$custom3} out of 100.
Size of left bar: {$custom2}, size of right bar: {$custom3}]

[pagebreak]

Screen 10: Own Expected Success

10a [belief_self]
{Show if {$Phrasing} = HSfuturefuture}
In this question, think about YOURSELF and imagine you will start high school after 9th grade. What do you think would be the chances (out of 100) that **YOU** would graduate from high school within three years with a **grade point average of 7 or better**?

{Show if {$Phrasing} = HSactual}
In this question, think about YOURSELF. What do you think: What are the chances (out of 100) that **YOU** will graduate from high school within three years with a **grade point average of 7 or better**?

{Show if {$Phrasing} = HShypotheticalpast}
In this question, think about YOURSELF and imagine you started high school in the coming school year. What do you think would be the chances (out of 100) that **YOU** would graduate from high school within three years with a **grade point average of 7 or better**?

{Show if {$Phrasing} = HShypotheticalfuture}
In this question, think about YOURSELF and imagine you will start high school in the coming school year. What do you think would be the chances (out of 100) that **YOU** would graduate from high school within three years with a **grade point average of 7 or better**?

Please answer the question on a scale between 0 and 100, where 0 means “impossible” and 100 means “definitely”.

[numerical entry] out of 100

10b [expected_gpa]

{Show if {$Phrasing} = HSfuturefuture}
Think again about YOURSELF and imagine again that you will start high school **after 9th grade**.
What grade point average would you expect at the end of high school?

{Show if {$Phrasing} = HSactual}
Think again about YOURSELF.
What grade point average do you expect at the end of high school?

{Show if {$Phrasing} = HShypotheticalpast}
Think again about YOURSELF and imagine again that you started high school in the **upcoming school year**.
What grade point average would you expect at the end of high school?

{Show if {$Phrasing} = HShypotheticalfuture}
Think again about YOURSELF and imagine again that you will start high school in the **upcoming school year**.
What grade point average would you expect at the end of high school?

[numerical entry between -3 and 12, decimals are possible]

[pagebreak]

Screen 11: Posterior Beliefs

We are again interested in your beliefs about boys and girls.

But this time we are interested in people born in the same year as YOU.

Note: You answer by writing a number in the blank.

11a [posterior_boys]

- Consider **100 boys** born in the same year as you who in 9th grade receive a grade of **{$custom1}** in **math and Danish** and who enroll in upper secondary education (STX, HHX or HTX). Out of these 100 boys, how many do you think will complete upper secondary education within 3 years with a GPA of **7 or better**?

  [numerical entry] out of 100

11b [posterior_girls]

- Consider **100 girls** born in the same year as you who in 9th grade receive a grade of **{$custom1}** in **math and Danish** and who enroll in upper secondary education (STX, HHX or HTX). Out of these 100 girls, how many do you think will complete upper secondary education within 3 years with a GPA of **7 or better**?

  [numerical entry] out of 100

[pagebreak]

Screen 12: Enrollment

We would like to ask you again to think about different groups of young people born in the year 2002. For each of the following groups, **how many out of 100 young people do you think started upper secondary education** (STX, HHX or HTX) after primary school?

12a [enrollment_boys]

- Think of **100 boys who got the grade {$custom1} in math and Danish** at the end of 9th grade. Out of the 100 **boys**, _____ started upper secondary education

12b [enrollment_girls]

- Think of **100 girls who got the grade {$custom1} in math and Danish** at the end of 9th grade. Out of the 100 **girls**, _____ started upper secondary education

Imagine, two of your friends who have the grade {$custom1} in math and Danish in 9th grade consider starting upper secondary education (STX, HHX or HTX) after primary school. They ask you for advice on whether this is the right choice.

Please use a scale from 0 to 10, where 0 means **"Strongly discourage"** and 10 means **"Strongly recommend"**.

12c [recommend_boy]

- One friend is a boy. How much would you recommend for him to start upper secondary education?

  [scale 0,1,2,3,4,5,6,7,8,9,10]

12d [recommend_girl]

- Your other friend is a girl. How much would you recommend for her to start upper secondary education?

  [scale 0,1,2,3,4,5,6,7,8,9,10]

[pagebreak]

Screen 13: Effort, Ability, etc.

Almost done!

13a [expected_effort]
{Show if {$Phrasing} = HSfuturefuture}
Think again about YOURSELF and imagine again that you will start high school after 9th grade.

{Show if (2c) = "I am enrolled in STX, HHX or HTX" or "I am enrolled in HF"}
Think about the coming school year.

{Show if (2c) ≠ "I am enrolled in STX, HHX or HTX" and (2c) ≠ "I am enrolled in HF" and {$Phrasing} ≠ HSfuturefuture}
Imagine again that you are starting high school in the **upcoming school year**.

How many hours do you think you will spend on homework and studying in an average week, in addition to the time you spend in school? _____ hours

13b [consumption_value]
{Show if (2c) = "I am enrolled in STX, HHX or HTX" or "I am enrolled in HF"}
To what extent do you agree with the following statement?
"Going to high school is and will be an **enjoyable experience for me**."

{Show if (2c) = "I am in 9th grade" and (6a) = "Start STX, HTX or HHX after 9th grade" OR (2c) = "I am in 10th grade" and (6b) = "Start STX, HTX or HHX"}
To what extent do you agree with the following statement?
"Going to high school will be an **enjoyable experience for me**."

{Show if {$Phrasing} = HShypotheticalpast OR {$Phrasing} = HShypotheticalfuture OR {$Phrasing} = HSfuturefuture}
To what extent do you agree with the following statement?
"Going to high school would be an **enjoyable experience for me**."

Please use a scale from 0 to 10, where 0 means **"Strongly disagree"** and 10 means **"Strongly agree"**.

[scale 0,1,2,3,4,5,6,7,8,9,10]

[pagebreak]

13c [aspiration]

In this question, think again about YOURSELF. What do you think are the chances (out of 100) that **YOU** will ever (at any time in your life) attend university?

Please answer the question on a scale between 0 and 100, where 0 means "impossible" and 100 means "definitely".

[numerical entry] out of 100

[pagebreak]

Screen 14: Last Screen

{Show if (2a) = "Male"}
Unfortunately, you do not meet the requirements to participate in the survey. We sincerely thank you and appreciate your time and participation.

{Show if (2a) = "Female"}
That's it - thank you so much for your time and comments!

14a [survey_feedback]
Do you have any thoughts or feedback you'd like to share with us? If there's something you'd like to share with us, please let us know in the text box below.

[Text box]

END OF SURVEY

E.2 Follow-up Survey of Female Students (without Treatment)

Screen 1: Welcome Page

Thank you very much for participating in this survey! This is a follow-up survey to a survey you answered last week. (Again, thank you for sharing your valuable opinions and thoughts with us last week!)

It consists of only three questions and takes about 3 minutes!

Once again, as a token of our appreciation for your time, we are giving away a total of **15 GoGift gift cards** among those who complete the questionnaire. Each gift card is worth **1,000 kr**.

Screen 2: Own Expected Success

2a [belief_self]

{Show if {$Phrasing} = HSfuturefuture}
In this question, think about YOURSELF and imagine you will start high school after 9th grade. What do you think would be the chances (out of 100) that **YOU** would graduate from high school within three years with a **grade point average of 7 or better**?

{Show if {$Phrasing} = HSactual}
In this question, think about YOURSELF. What do you think: What are the chances (out of 100) that **YOU** will graduate from high school within three years with a **grade point average of 7 or better**?

{Show if {$Phrasing} = HShypotheticalpast}
In this question, think about YOURSELF and imagine you started high school in the coming school year. What do you think would be the chances (out of 100) that **YOU** would graduate from high school within three years with a **grade point average of 7 or better**?

{Show if {$Phrasing} = HShypotheticalfuture}
In this question, think about YOURSELF and imagine you will start high school in the coming school year. What do you think would be the chances (out of 100) that **YOU** would graduate from high school within three years with a **grade point average of 7 or better**?

Please answer the question on a scale between 0 and 100, where 0 means "impossible" and 100 means "definitely".

[numerical entry] out of 100

2b [expected_gpa]
{Show if {$Phrasing} = HSfuturefuture}
Think again about YOURSELF and imagine again that you will start high school **after 9th grade**.
What grade point average would you expect at the end of high school?

{Show if {$Phrasing} = HSactual}
Think again about YOURSELF.
What grade point average do you expect at the end of high school?

{Show if {$Phrasing} = HShypotheticalpast}
Think again about YOURSELF and imagine again that you started high school in the **upcoming school year**.
What grade point average would you expect at the end of high school?

{Show if {$Phrasing} = HShypotheticalfuture}
Think again about YOURSELF and imagine again that you will start high school in the **upcoming school year**.
What grade point average would you expect at the end of high school?

[numerical entry between -3 and 12, decimals are possible]

[pagebreak]

Screen 3: Posterior Beliefs

Almost done!

Now, we are interested in your beliefs about boys and girls born in the same year as YOU.

Note: You answer by writing a number in the blank.

3a [posterior_boys]

- Consider **100 boys** born in the same year as you who in 9th grade receive a grade of **{$custom1}** in **math and Danish** and who enroll in upper secondary education (STX, HHX or HTX). Out of these 100 boys, how many do you think will complete upper secondary education within 3 years with a GPA of **7 or better**?

  [numerical entry] out of 100

3b [posterior_girls]

- Consider **100 girls** born in the same year as you who in 9th grade receive a grade of **{$custom1}** in **math and Danish** and who enroll in upper secondary education (STX, HHX or HTX). Out of these 100 girls, how many do you think will complete upper secondary education within 3 years with a GPA of **7 or better**?

  [numerical entry] out of 100

[pagebreak]

Screen 4: Last Screen

That's it - thank you so much for your time and comments!

4a [survey_feedback]
Do you have any thoughts or feedback you'd like to share with us? If there's something you'd like to share with us, please let us know in the text box below.

[Text box]

F Survey Instructions: Mechanism Survey (Students)

Screen 1: Welcome Page

Thank you very much for participating in this survey about education - we really appreciate it!

As a thank you for your time, we draw a total of **40 GoGift gift cards** among those who complete the entire survey. These gift cards are good for many things and are very easy to use in stores and online. Each gift card is worth **1,000 kr**.

[pagebreak]

Screen 2: Demographics

2a [gender]
Which gender do you most identify with?
• Male • Female

{(2a) determines the following custom-values used below:

- if (2a) = "Male":
  {$custom1} = "boys"
  {$custom2} = "boy"
  {$custom3} = "him"
  {$custom4} = "he"
- if (2a) = "Female":
  {$custom1} = "girls"
  {$custom2} = "girl"
  {$custom3} = "her"
  {$custom4} = "she"

}

2b [birthyear]
When were you born?
• Before 2008 • 2008 • 2009 • 2010 or later

2c [educ_curre]
What describes your current situation best?

- I am in 8th grade
- I am in 9th grade
- I am in 10th grade
- I am doing a vocational training or working in a job
- I am enrolled in STX, HHX or HTX
- I am enrolled in HF
- I am enrolled in EUX
- Other/none of the above: _____

[pagebreak]

Screen 3: Hypothetical Block Info

In the following, we will present you with two different hypothetical scenarios about school, and in particular about exam grades and what matters for them. Please read the two scenarios carefully and take your time in responding to them. There are no right or wrong answers, we are just interested in your thoughts.

{Show if (2c) = "I am doing a vocational training or working in a job" or (2c) = "Other/none of the above"}
Please note: Even though the context of the scenarios is high school, we particularly care about the views of those of you who did not choose a high school path.

{Create random variable [GIRLSFIRST] $\in$ 0,1 with 50:50 probability:
if [GIRLSFIRST] = 1: screens 4–7 are shown in order (4,5,6,7);
If [GIRLSFIRST] = 0: screens 4–7 are shown in order (6,7,4,5)}

Screen 4: Hypothetical Block - Girls I

{Show if [GIRLSFIRST] = 1}
Scenario 1:

Imagine a Danish school class in the first year of high school. Everyone in the class takes an exam in a given subject.

Consider the students in this class who, in 9th grade, had a grade of 7 in the exam subject.

Now imagine that in this exam in high school, the **girls on average scored a 10** and the **boys on average scored a 7**. Remember that these are boys and girls who in the past school year had the same grade in this subject.

{Show if [GIRLSFIRST] = 0}
Scenario 2:

Now imagine a different school class and a different exam in the first year of high school. In this scenario, the girls on average scored a 10 and the boys on average scored a 7, even though all the students we look at had a 7 in the exam subject in 9th grade.

{Show always}
4a [returns_effort_g]
Now think about this exam and what made the girls do so much better than the boys. For each of the following two factors, use the sliders to tell us how important you think it was for getting a 10 instead of a 7.

1) Study effort: Do you think the exam was such that it paid off to work hard and study in preparation? (I.e. if a student put in a lot of effort and studied for 10 hours instead of

only 1 hour, would that student obtain a better grade?)

[slider range [0, 100]]
0 effort did not pay off
100 effort paid off a lot

4b [returns_intelligence_g]
2) Intelligence: Do you think the exam was such that it paid off to be naturally smart? (I.e., would a clever student with a natural talent for the subject obtain a better grade than a less gifted student?)

[slider range [0, 100]]
0 cleverness did not pay off
100 cleverness paid off a lot

{next button, above answers locked in and new questions below are added; only reveal new questions if previous sliders have been clicked}

Now think about the {$custom1} in this class in particular. Remember, the girls on average scored a 10 and the boys a 7. For each of the following two factors, use the sliders to tell us how important you think it was for {$custom1}] for getting a better grade in the exam.

4c [returns_effort_gender_g]
1) Study effort: Do you think the exam was such that it paid off for {$custom1} to work hard and study in preparation? (I.e. if a {$custom2} put in a lot of effort and studied for 10 hours instead of only 1 hour, would that {$custom2} obtain a better grade?)

[slider range [0, 100]]
0 effort did not pay off
100 effort paid off a lot

4d [returns_intelligence_gender_g]
2) Intelligence: Do you think the exam was such that it paid off for {$custom1} to be naturally smart? (I.e., would a clever {$custom2} with a natural talent for the subject obtain a better grade than a less gifted one?)

[slider range [0, 100]]
0 cleverness did not pay off
100 cleverness paid off a lot

[pagebreak]

Screen 5: Hypothetical Block - Girls II

Think about the same exam again, in which girls on average scored a 10 and boys a 7.

5a [effort_cost_acceptability_g]
Now we would like to understand what you think classmates in this class expect from {$custom1} when it comes to working for school.

What do you think: How socially acceptable is it among classmates if {$custom1} worked hard and prepared for the exam?

[slider range [-100, 100]: show default position at 0]
-100 Totally not acceptable for {$custom1} to work hard for school
0 Makes no difference for social status
100 Totally cool for {$custom1} to work hard for school

5b [effort_cost_enjoyment_g]
Now we would like to understand what you think about how much the {$custom1} in this class enjoy or dislike studying for school. For example, some students might enjoy studying because they find the materials interesting while others might dislike it because it takes away time from other activities.

If a {$custom2} studied for 10 hours in the week before the exam rather than for just 1 hour, how much more unpleasant or pleasant do you think that week would have been for {$custom3}?

[slider range [-100, 100]: show default position at 0]
-100 Much more unpleasant
0 No difference
100 Much more pleasant

[pagebreak]

Screen 6: Hypothetical Block - Boys I

{Show if [GIRLSFIRST] = 1}
Scenario 2:

Now imagine a different school class and a different exam in the first year of high school. In this scenario, the boys on average scored a 10 and the girls on average scored a 7, even though all the students we look at had a 7 in the exam subject in 9th grade.

{Show if [GIRLSFIRST] = 0}
Scenario 1:

Imagine a Danish school class in the first year of high school. Everyone in the class takes an exam in a given subject.

Consider the students in this class who, in 9th grade, had a grade of 7 in the exam subject.

Now imagine that in this exam in high school, the **boys on average scored a 10** and the **girls on average scored a 7**. Remember that these are boys and girls who in the past school year had the same grade in this subject.

{Show always}
6a [returns_effort_b]
Now think about this exam and what made the boys do so much better than the girls. For each of the following two factors, use the sliders to tell us how important you think it was for getting a 10 instead of a 7.

1) Study effort: Do you think the exam was such that it paid off to work hard and study in preparation? (I.e. if a student put in a lot of effort and studied for 10 hours instead of only 1 hour, would that student obtain a better grade?)

[slider range [0, 100]]
0 effort did not pay off
100 effort paid off a lot

6b [returns_intelligence_b]
2) Intelligence: Do you think the exam was such that it paid off to be naturally smart? (I.e., would a clever student with a natural talent for the subject obtain a better grade than a less gifted student?)

[slider range [0, 100]]
0 cleverness did not pay off
100 cleverness paid off a lot

{next button, above answers locked in and new questions below are added; only reveal new questions if previous sliders have been clicked}

Now think about the {$custom1} in this class in particular. Remember, the boys on average scored a 10 and the girls a 7. For each of the following two factors, use the sliders to tell us how important you think it was for {$custom1} for getting a better grade in the exam.

6c [returns_effort_gender_b]
1) Study effort: Do you think the exam was such that it paid off for {$custom1} to work hard and study in preparation? (I.e. if a {$custom2} put in a lot of effort and studied for 10 hours instead of only 1 hour, would that {$custom2} obtain a better grade?)

[slider range [0, 100]]
0 effort did not pay off
100 effort paid off a lot

6d [returns_intelligence_gender_b]
2) Intelligence: Do you think the exam was such that it paid off for {$custom1} to be naturally smart? (I.e., would a clever {$custom2} with a natural talent for the subject

obtain a better grade than a less gifted one?)

[slider range [0, 100]]
0 cleverness did not pay off
100 cleverness paid off a lot

[pagebreak]

Screen 7: Hypothetical Block - Boys II

Think about the same exam again, in which boys on average scored a 10 and girls a 7.

7a [effort_cost_acceptability_b]
Now we would like to understand what you think classmates in this class expect from {$custom1} when it comes to working for school.

What do you think: How socially acceptable is it among classmates if {$custom1} worked hard and prepared for the exam?

[slider range [-100, 100]: show default position at 0]
-100 Totally not acceptable for {$custom1} to work hard for school
0 Makes no difference for social status
100 Totally cool for {$custom1} to work hard for school

7a [effort_cost_enjoyment_b]
Now we would like to understand what you think about how much the {$custom1} in this class enjoy or dislike studying for school. For example, some students might enjoy studying because they find the materials interesting while others might dislike it because it takes away time from other activities.

If a {$custom2} studied for 10 hours in the week before the exam rather than for just 1 hour, how much more unpleasant or pleasant do you think that week would have been for {$custom3}?

[slider range [-100, 100]: show default position at 0]
-100 Much more unpleasant
0 No difference
100 Much more pleasant

[pagebreak]

Screen 8: Additional Beliefs

8a [rel_grading]
We usually say that there are two different ways in which teachers can evaluate exams. We are interested in which form of grading, you believe, happens in reality in Danish

upper secondary schools.

1) Absolute grading: The better your performance in a test, the higher your grade will be, regardless of how your classmates perform. I.e., when deciding on what grade to assign to you, the teacher will be completely "blind" to the performance of your classmates.

2) Relative grading: Teachers compare the test performance of everyone in the class. The highest-performing student(s) will receive a high grade, others will receive lower grades. This means that the lower the performance of your classmates, the better your own grade will be.

Please use the slider to tell us where you think the truth about grading lies.

[slider range [-100, 100] default position at 0]
-100 Absolute grading
100 Relative grading

[pagebreak]

Screen 9: Additional Questions about the Respondent

{Show if (2c) = "I am doing a vocational training or working in a job" or "Other/none of the above"}
Please note: The following questions are about your time at school (incl. high school). If you are no longer attending school or high school, please just think back to your past experiences at school and answer accordingly.

9a [belief_in_own_return_to_effort]
Think about yourself in school. Do you think it pays off for you personally to work hard and study in preparation for exams? In particular, if you study for 10 hours instead of only 1 hour, how likely is it that you would obtain a better grade?

[slider range [0, 100]]
0 effort does not pay off
100 effort pays off a lot

9b [own_study_cost]
Imagine a typical school week. How much would you enjoy that week if you studied for 10 hours rather than for only one hour in total during that week?

[sliders range [0, 100]]
0 I would enjoy it much less
50 no difference
100 I would enjoy it much more

9c [study_cost_group]
Imagine a typical school week. How much, do you think, would the average {$custom2}

in Denmark enjoy that week if {$custom4} studied for 10 hours rather than for only one hour in total during that week?

[sliders range [0, 100]]
0 {$custom4} would enjoy it much less
50 No difference
100 {$custom4} would enjoy it much more

9d [overall_utility_high_school]
How much do you care overall about finishing high school with a good grade?

Note: You might care because of the career options you gain through a good high school degree, or you might care because you gain personal satisfaction and pride. Please take into account all factors you personally care about.

[sliders range [0, 100]]
0 I do not care at all
100 I care a great deal

9e [group_identification]
To what extent do you think of yourself as similar to other {$custom1}s?

[sliders range [0, 100]]
0 Not at all
100 Completely

9f [social_norm]
To what extent, would you say, is your own behavior in the context of school influenced by what others consider acceptable behavior? For instance, if you realize that your classmates find it cool to do well in school and to make an effort for that, would that nudge you to put more effort into studying for school?

[sliders range [0, 100]]
0 Not at all
100 Completely

[pagebreak]

Screen 10: Family Type

10a [type_home]
What type of home are you from? Select the option that best suits your situation.

- I live with both my mother and father and/or I see both my mother and father regularly. [1]
- I only live with my father and do not have regular contact with my mother. [2]
- I only live with my mother and do not have regular contact with my father. [3]

- I have no parents or no contact with my parents. [4]

[pagebreak]

Screen 11: Parental Education

{Show (11a) if (10a)= [1] or [2]}

11a [dad_educ]
Does your dad have a high school diploma? If you're not sure, just give us your best guess.

Note: High school diploma means that he has completed an upper secondary education (STX, HTX or HHX) or a higher examination (HF).
• Yes • No

[pagebreak]

{Show (11b) if (10a) = [1] or [3]}

11b [mum_educ] Does your mom have a high school diploma? If you're not sure, just give us your best guess.

Note: High school diploma means that she has completed an upper secondary education (STX, HTX or HHX) or a higher examination (HF)
• Yes • No

[pagebreak]

Screen 12: Grade Report

12a [math_grade]
{Show if (2c) = "I am in 8th grade"}
In December of 8th grade, you received **grades** in school.
Please tell us, based on your memory, what grade you received **in math without help/computational skills** in December of **8th grade**.

{Show if (2c) = "I am in 9th grade" or "Other/none of the above"}
In December of 9th grade, you received **grades** in school.
Please tell us, based on your memory, what grade you received **in math without help/computational skills** in December of **9th grade**.

{Show if (2c) = "I am in 10th grade", "I am doing a vocational training or working in a job", "I am enrolled in STX, HHX or HTX", "I am enrolled in HF" or "I am enrolled in EUX"}
In June at the end of 9th grade, you received **grades** in school.
Please tell us, based on your memory, what grade you received **in math without**

help/computational skills in June of **9th grade**.

If you are unsure, just report your best estimate based on your memory.
• -3 • 0 • 2 • 4 • 7 • 10 • 12

12b [danish_grade]
{Show if (2c) = "I am in 8th grade"}
Please tell us, based on your memory, what grade you received in **Danish, writing/ presentation** in December in **8th grade**.

{Show if (2c) = "I am in 9th grade" or "Other/none of the above"}
In December of 9th grade, you received **grades** in school.
Please tell us, based on your memory, what grade you received **in Danish, writing/presentation** in December of **9th grade**.

{Show if (2c) = "I am in 10th grade", "I am doing a vocational training or working in a job", "I am enrolled in STX, HHX or HTX", "I am enrolled in HF" or "I am enrolled in EUX"}
In June at the end of 9th grade, you received **grades** in school.
Please tell us, based on your memory, what grade you received **in Danish, writing/presentation** in June of **9th grade**.

If you are unsure, just report your best estimate based on your memory.
• -3 • 0 • 2 • 4 • 7 • 10 • 12

[pagebreak]

Screen 13: Track Choice

13a [track_choice]
{Show if (2c) = "I am in 8th grade"}
In less than a year, you'll have to decide what the next step in your education will be. Which of the following would be your first choice after 9th grade? If you're not sure, choose the option you think is most likely right now.

- Start STX, HTX or HHX after 9th grade
- Go to 10th grade and then start STX, HTX or HHX
- Start HF after 9th grade
- Go to 10th grade and then start HF
- Start vocational training after 9th grade
- Go to 10th grade and then start vocational training
- Start EUX after 9th grade
- Go to 10th grade and then start EUX
- Leave primary school after 9th grade with no plans for further education
- Go to 10th grade and then leave school with no plans for further education

- Take a gap year and then look for a youth education
- Other/none of the above

{Show if (2c) = “I am in 9th grade”}
You probably decided recently what will be the next step in your educational career. Which of the following was your top choice for the coming school year?

- Start STX, HTX or HHX after 9th grade
- Go to 10th grade and then start STX, HTX or HHX
- Start HF after 9th grade
- Go to 10th grade and then start HF
- Start vocational training after 9th grade
- Go to 10th grade and then start vocational training
- Start EUX after 9th grade
- Go to 10th grade and then start EUX
- Leave primary school after 9th grade with no plans for further education
- Go to 10th grade and then leave school with no plans for further education
- Take a gap year and then look for a youth education
- Other/none of the above

{Show if (2c) = “I am in 10th grade”}
You probably decided recently what will be the next step in your educational career. Which of the following was your top choice for the coming school year?

- Start STX, HTX or HHX
- Start HF
- Start vocational training
- Start EUX
- Leave school after 10th grade with no plans for further education
- Take a gap year and then look for a youth education
- Other/none of the above

[pagebreak]

Screen 14: Effort, Ability, etc.

Almost done!

14a [expected_effort]
{Show if (2c) = “I am in 8th grade”}
Imagine you will start high school after 9th grade.

{Show if (2c) = “I am enrolled in STX, HHX or HTX” or (2c) = “I am enrolled in HF”}
Think about the coming school year.

{Show if (2c) ≠ “I am enrolled in STX, HHX or HTX” and (2c) ≠ “I am enrolled in HF” and (2c) ≠ “I am in 8th grade”}
Imagine that you are starting high school in the upcoming school year.

How many hours do you think you will spend on homework and studying in an average week, in addition to the time you spend in class? _____ hours

[pagebreak]

Screen 15: Last Screen

That’s it - thank you so much for your time!

15a [survey_feedback]
Do you have any thoughts or feedback you’d like to share with us? If there’s something you’d like to share with us, please let us know in the text box below.

[textbox]

END OF SURVEY