Intergenerational Transmission of Education: Internalized Aspirations versus Parent Pressure

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Abstract

High school graduates in Germany who lack parents with college experience are 40 percentage points less likely to attend college than those with college-educated parents, despite the fact that in Germany college is free. This study provides evidence that parental influence explains a significant portion of this socio-economic gap through at least two channels: one, parental pressure and two, the intergenerational transmission of beliefs and preferences. To understand parental influence, I conduct a field experiment with 1,195 students and 819 parents in Germany. Importantly, I experimentally make students' stated college plans visible to parents. In the first finding, visibility to parents doubles the socio-economic gap in college plans to 27 percentage points. This is mainly driven by a large increase in college plans among students with college-educated parents. To disentangle mechanisms, I collect detailed survey data on students' and parents' subjective expectations for various career tracks and estimate a structural model of career choice under uncertainty. Model simulations indicate that 40% of the socio-economic gap in college plans is explained by parental pressure and 44% by students internalizing family-specific beliefs. (JEL C93,D91,I21,I23,I24,J62,Z13)

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1 Introduction

In many countries, people's career paths are strongly associated with their parental background (Black and Devereux, 2011; Chetty et al., 2014; Schnitzlein, 2016; Long and Ferrie, 2013). For example, in Germany high school graduates whose parents did not attend college themselves are 40 percentage points less likely to attend college than children with college-educated parents. Differences in financial constraints or expected earnings cannot fully explain the observed socio-economic gaps (Heckman, Lochner and Todd, 2006).

A recent and rapidly growing literature has thus examined alternative explanations. Studies have focused on the role of informational constraints (Dynarski et al., 2021; Gurantz et al., 2021), neighborhoods or schools (Chetty and Hendren, 2018; Rothstein, 2019; Biasi, 2019) and students' preferences and beliefs regarding career tracks (Boneva and Rauh, 2017). This paper focuses on a novel mechanism: parental pressure. While there is correlational evidence that parental approval matters for gaps in career choices (Boneva and Rauh, 2017; Zafar, 2013), causal evidence for the impact of parental pressure is lacking.

This paper studies how high school students in Germany adjust career choices beyond their own preferences and beliefs to more closely match their parents' preferences and how this impacts the socio-economic gap in college plans. To study this question, I designed a field experiment in which I varied whether students' stated career plans for potential advising sessions were shared with their parents or not. This experimental variation identifies the causal effect of increasing parental pressure on students' career plans. To put this adjustment into context, I estimate a structural model that also accounts for students' beliefs and preferences. This allows me to quantify the predicted contribution of parental pressure to the socio-economic gap in college plans relative to these internalized components.

Germany is a well-suited context in which to study the influence of parents' preferences on students' career choices. Primary, secondary, and tertiary education is free, and college attendance strongly depends on parental background. Of children with at least one college-educated parent 79% enroll in college, but only 27% of those without a college-educated parent do so. Among high school graduates, the gap stands at 87% vs. 47% – this gap is the focus of this paper.

I begin with documenting a strong association between parents' preferences and students' career choices, using the National Educational Panel Survey (NEPS) that tracks German students from high school to postsecondary education. The data shows that among the 18% of students who initially disagreed with their parents on attending college or not, 51% choose to follow their parents' aspirations rather than their own. Since this could be due to a number of other factors such as students becoming more informed over time, it does not

imply that students adjust their choices to accommodate their parents' preferences, however.

To study the causal impact of parent pressure, I designed a field experiment about career planning in which 1,195 students and 819 parents participate. I developed an extensive career planning module of up to 150 minutes that embedded standardized career advising tests and career planning surveys into students' career planning curriculum. I then invited students and parents at 47 high schools to participate. To make the elicitation of career plans incentive-compatible, I coupled the elicitation with a lottery of expensive career advising sessions and informed students that their stated plans determine what type of advising session they get. I experimentally varied parent pressure by randomizing the instructions to students between a *private* and a *public* condition. While I informed all students that I would send them a copy of their answers for their further preparation, I randomized whether I would also send a copy to their parents at the individual level.

I find that students' adjustment to parental pressure and their subjective expectations regarding different career tracks explain most of the observed socio-economic gap in college plans. Following convention, I define students with at least one college-educated parent as "high socio-economic status" students (henceforth "high SES"). Students without any college-educated parent are defined as "low SES" students. Students adjust their college aspirations when those aspirations are observable by parents, which widens the socio-economic gap significantly. In the *private* condition, there is a socio-economic gap of 12 percentage points in college aspirations; 68% of high SES and 56% of low SES students aspire to attend college. In the *public* condition, high SES students are 10 percentage points more likely, but low SES students 5 percentage points less likely to aspire to college. Consequently, the socio-economic gap in college aspirations more than doubles to 27 percentage points in the *public* condition.

Among the high SES students, there is a larger effect for those with one rather than two college-educated parents. Students with one college-educated parent are 15 percentage points more likely to aspire to college in the *public* than the *private* condition. In *private*, these students' college aspirations are in line with their parent without college education, whereas in *public*, they align with their college-educated parent. Some of these students therefore plan to attend college only due to perceived expectations to do so by their college-educated parent. In contrast, among those with two college-educated parents, 80% already aspire to college in the *private* condition. They appear to have mostly internalized college as the preferred option. This could explain why for them there is no significant difference in college plans between the *private* and the *public* condition.

Students' adjustment to parents' preferences is not limited to college aspirations. When aspirations are shared with parents, students also adjust their preferred fields towards those

preferred by parents: they become more likely to aspire to high-earning fields such as business and economics and less likely to aspire to low-earning fields such as arts, music, and design. This is again most pronounced for students with college-educated parents.

To decompose the socio-economic gap of 27 percentage points in observable college aspirations, I estimate a structural choice model of career plans building on Boneva and Rauh (2017), Zafar (2013), and Giustinelli (2016). For this purpose, I also elicited students' subjective expectations ("beliefs") with respect to undergraduate studies, dual study programs, and vocational training. The model can explain 89% of the observed socio-economic gap. In the model, 44% of the predicted gap is due to students' adjustment to parental pressure and 56% due to differences in students' beliefs and preferences. I find a strong association between parents' and children's beliefs, which is consistent with a possible intergenerational transmission of these beliefs.

These results imply that parents' preferences and beliefs shape students' educational choices in two major ways. First, students may adopt their parents' beliefs and preferences. Second, they adjust their educational choices to their parents' preferences beyond any internalized aspects. Since parents' own beliefs and preferences are favorable to careers similar to their own, both channels of transmission reduce intergenerational mobility.

The impact of parental pressure relative to students' own preferences and beliefs is heterogeneous. While internalized beliefs and preferences predict 78% of the gap between low SES students and those with two college-educated parents, differential parental pressure predicts 78% of the gap between low SES students and those with one college-educated parent. At the individual level, students who do not have positive expectations for college appear to adjust the most to parental pressure. These are predominantly students who have low grades. I also find suggestive evidence that girls and agreeable students[1] appear especially likely to adjust their aspirations in the *public* condition. Both perceiving a reason to adjust, such as potential disagreement with parents, and being willing to adjust thus seem to be crucial factors behind heterogeneities in reacting to increased pressure in the *public* condition.

I contribute to several literatures by testing and empirically quantifying the role of parent pressure as a mechanism behind intergenerational mobility. First, my paper contributes to the literature on reasons behind socio-economic gaps in career outcomes and ways to address these gaps. Many papers document intergenerational correlations in education, earnings, and occupations[2] and examine the reasons behind this strong relationship. I find that students' adjustment to parental pressure widens the socio-economic gap in college plans. Importantly,

[1] Agreeableness is one of the five personality traits measured in the Big Five Inventory (Soto and John, 2017) and associated with a heightened desire for harmony and social approval. I classify students as "agreeable" if they score above the median for agreeableness on the Big Five Inventory.

[2] See Black and Devereux (2011); Chetty et al. (2014); Schnitzlein (2016); Findeisen et al. (2021).

the gap widens within schools, on top of differences in students' preferences and beliefs, and while holding informational, financial, and eligibility constraints fixed. The mechanism is thus different from financial or informational constraints,[3] differences in schools or neighborhoods,[4] or students' internal preferences and beliefs with respect to career tracks.[5]

My paper also relates to the literature on the drivers of career and educational choices, in particular to two separate branches on social influences and the role of subjective beliefs. I make a methodological contribution by showing how to study these two jointly rather than in separation. Studying both aspects in a unified framework, I can quantify their relative importance and how they interact. In addition, I contribute to each of the two literatures separately. I add to the literature on social influence by showing that educational choices also serve as signals to parents, not just to peers, (potential) partners, or prospective employers.[6] I contribute to the literature on subjective beliefs in educational choices by confirming the importance of beliefs in a new context and by demonstrating a strong correlation between students' and parents' beliefs.[7] Previous papers in this literature assumed that students' and parents' beliefs are closely linked. The evidence for family-specific beliefs in this paper is consistent with beliefs having been transmitted from parents to children, and thus also adds to research on intergenerational transmission within families more broadly.[8]

Students' reactions to disagreements with their parents illustrates that intergenerational transmission involves two active parties, parents and children. This complements a growing literature on intergenerational intra-household decision-making by showing how parents shape their children's choices when parents are not the sole decision-maker.[9] The paper demonstrates that parents' preferences continue to matter for students' choices beyond high

[3]On the role of credit constraints, see for example Heckman, Lochner and Todd (2006); Keane and Wolpin (2001); Carneiro and Heckman (2002); Cunha et al. (2006); Belley and Lochner (2007); Lochner and Monge-Naranjo (2012). For papers exploring informational constraints, refer to Dynarski et al. (2021); Peter, Spiess and Zambre (2021); Lergetporer, Werner and Woessmann (2021); Bleemer and Zafar (2018); Gurantz et al. (2021); Hoxby and Turner (2013).

[4]See Chetty, Hendren and Katz (2016); Chetty and Hendren (2018); Rothstein (2019); Biasi (2019).

[5]See for example Boneva and Rauh (2017); Belfield et al. (2020); Boneva, Golin and Rauh (2021); Ehrmantraut, Pinger and Stans (2020).

[6]For signalling to peers, refer to Bursztyn and Jensen (2015), Bursztyn, Egorov and Jensen (2017), and Fryer Jr and Torelli (2010); for signalling to (potential) partners to Bursztyn, Fujiwara and Pallais (2017) and Spence et al. (1973) for the seminal paper on signalling (to employers).

[7]Among others, see Jensen (2010), Attanasio and Kaufmann (2017), Zafar (2013), Boneva and Rauh (2017), Stinebrickner and Stinebrickner (2013), Wiswall and Zafar (2015), Delavande and Zafar (2019), Cortés et al. (2021), Arcidiacono, Hotz and Kang (2012); Arcidiacono et al. (2020), Hastings, Neilson and Zimmerman (2015); Hastings et al. (2016), Giustinelli and Manski (2018).

[8]Papers in this literature include, among others: Bisin and Verdier (2001, 2011), Dohmen et al. (2011), Doepke and Zilibotti (2017), Fernández and Fogli (2006, 2009).

[9]See Bursztyn and Coffman (2012); Dizon-Ross (2018); Ashraf et al. (2018); Boneva and Rauh (2017); Bergman (2015); Giustinelli (2016); Giustinelli and Manski (2018); Jensen and Miller (2017).

school. The transition from parents as sole decision-maker, as in childhood,[10] to students deciding by themselves may thus be much more gradual than often implicitly assumed by treating students as sole decision-makers of postsecondary choices.

The remainder of the paper is structured as follows: I start with an introduction to the setting of choosing tracks after high school in Germany. Using NEPS data, I next show that students often follow their parents' aspirations. Third, I present my field experiment and its findings. Fourth, I introduce detailed data on students' beliefs and estimate a choice model to benchmark students' adjustment to parents against the predictive power of students' preferences and beliefs. I close with heterogeneities in adjusting to parents and conclude.

2 Postsecondary Career Choices in Germany

Germany offers a well-suited context to examine the importance of students' and parents' preferences behind the socio-economic gap in college attendance and career choices more generally. This is for two main reasons. First, college attendance in Germany strongly depends on students' socio-economic background. Among those who obtained an university entry qualification (the *Abitur*), 87% of children with at least one college-educated parent choose to attend college, but only 47% of those without any college-educated parent do.[11] This is a large gap considering that students with the university entry qualification present a selected sample. Second, education is tuition-free from primary school to university and the entry to many (university) programs is not very competitive. Preferences should thus be important drivers of whether and what to study. Following, I present more details on the relevant aspects of the German education system and the transition from high school to postsecondary careers.

2.1 Socio-economic gaps in educational transitions

While 79% of high SES students eventually attend college, only 27% of low SES students do so. Among those graduating from high school, the shares are 87% vs. 47%. This socio-economic gap of 40 percentage points is the one I examine in this paper.

The sample of high school graduates already is a selective sample itself, because selection in Germany starts much earlier with the transition from elementary to secondary schools. One of the available secondary tracks leads to the upper classes and the *Abitur*. It is available at two types of schools, the *Gymnasium* and the *Gesamtschule*. In North Rhine-Westphalia,

[10] See Currie and Almond (2011) or Cunha et al. (2006) for example.
[11] See Federal Ministry of Education and Research (2016)

and most of Germany, this early tracking happens after 4 years of primary school. A proxy for the social selectivity of this transition is the share of students from different parental background that makes it to the upper classes in high school. While it is 83% among high SES families, it is only 46% for low SES families. This selection is strongly driven by tracking after 4 years of primary school, where parents have been found to play an important role.[12]

There is an equivalently pronounced socio-economic gap among high school graduates. This gap is not exclusively driven by differences in students' grade averages or cognitive scores, as the gap is similarly pronounced when controlling for students' grade average or cognitive score.[13] What alternative explanations may account for the pronounced gap? And what exact role do parents play at this stage given that most students are adults when they get to choose postsecondary careers?

Understanding the reasons behind the socio-economic gap in the transition from high school to university is relevant for understanding the reasons behind the overall gap in university attendance. If low SES high school graduates were to enrol at university at the same rate as their high SES peers, the overall gap in university attendance would close by 19 percentage points or 36.5% of the gap. Vice versa it would close by 33 percentage points, or 64.7% of the gap.[14] These gaps are all conditional on parents' educational background, which raises the question what role parents play in their children's complex career choices at this point in their lives. Financial resources are a natural starting point.

2.2 Paying for education in Germany

Education from primary school to university is state-financed in Germany and free for individual students. The exception are university fees of between $100 and $400 per semester. This can be higher for private universities, but less than 10% of students attend private universities.[15] Similarly, for elementary school and high school, 92% of all students attend publicly-funded schools (Statistisches Bundesamt, 2020). One of the motivations for the publicly-funded education system is that children from all backgrounds should have the same opportunities and should not be held back by a lack of personal financial resources.

[12] Falk, Kosse and Pinger (2020) examine the effect of mentoring on the gap in early tracking.

[13] Using the NEPS, the socio-economic gap does not close when controlling for grade average- or cognitive score-fixed effects. Results are presented in tables A2 and A4.

[14] The statistics are from 2016 data provided by the Federal Ministry of Education and Research (2016). 83% of high SES students make it to upper classes at high school and 87% of these go on to college. These shares are 46% and 47% for low SES students, resulting in 72% vs. 21% enrolling in university via high school. Students can also make it to university via professional schools. These are attended by 17% of high SES and 54% of low SES children, among whom 40% and 10% go on to university. This brings the overall gap in college enrollment to 79% vs. 27%. The calculations above are based on the path via high school.

[15] Among 2.9 million students in Germany in 2019/20 (Statistisches Bundesamt, 2021*b*), 269,000 attended private institutions (Statistisches Bundesamt, 2021*a*).

This is also the rationale for financial support through the *German Federal Training Assistance Act* (or BAföG) which was designed to enable "young men and women to choose the training that suits their personal interests, irrespective of their families' financial means".[16] It is available to students from 10th grade on. Most recipients use it for their living expenses during vocational training or college. Almost 20% of students receive some monthly payment through *BAföG*, with the exact amount depending on parents' financial means among others. The maximum monthly payment is €861 and the average monthly payment €500. Half of the payments are given as a grant and half of them as an interest-free loan. The maximum amount that needs to be repaid is €10,010.

Despite the low costs of most paths and additional government-provided financial support there remains a strong relationship between students' educational careers and parental background. How do students' choices come about if financial resources alone cannot explain the persisting gaps?

2.3 Choosing a postsecondary educational career

In order to obtain a university qualification, students have to attend 3 years of upper classes at high school.[17] After graduating from high school, they can choose from many options. Their decision can be broken down into three major components: broad tracks, fields/occupations and universities/employers. They can choose between 4 broad tracks: attend university, sign up for a dual study program, pursue vocational training or start to work without further education.[18] Most graduates choose one of the first three options, with studying at a university being most popular. Around 63% of graduates attend college, another 5% take up a dual study program and 30% opt for vocational training.[19] At a more detailed level, graduates have to decide in which area to specialize: picking a major when planning to study or an occupation when planning to pursue vocational training. Finally, students have to choose a university or an employer. Preferences for locations or one's general willingness to move thus play an important role in determining one's choice set of universities and employers. While for dual study programs and vocational training students usually have to apply during their last year at school, for most college programs they can wait until after graduation (typical application deadlines are provided in figure 3).

[16] More information is provided by the Federal Ministry of Education and Research (2021).

[17] Their performance during their last two years determines 50% of their final grade average, with the remaining half determined by one oral examination and three state-wide written exams.

[18] Dual study programs combine elements of practical training in a specific firm with college-level courses.

[19] These numbers are based on decisions and concrete plans by graduates in North Rhine-Westphalia half a year after graduation in 2012, available in Appendix tables by Schneider and Franke (2014), Deutsches Zentrum für Hochschul- und Wissenschaftsforschung (DZHW), and Kracke, Buck and Middendorff (2018).

The exact application process depends on the preferred major and university. As long as demand does not outstrip supply of places for this major at the preferred university, students can simply enrol with their college entry qualification. Entry to about 60% of programs is unrestricted in this way. For other programs, students have to apply in July, to a specific field at a specific university.[20] Next, students pick the program they prefer among those that admitted them. For majors with competitive entry at a specific university there are often less competitive alternatives, which increases students' chance to pursue a major close to their interest. Substitutes for a specific program in Business Administration would for example be a program in Business Administration at another university or Economics at the same university. Once students are enrolled, switching majors requires to re-apply to an alternative program, drop out and then start from scratch. Choosing a postsecondary career path among the many available options is thus both consequential and complex.

3 Motivating Descriptive Evidence

Using a panel study that tracks German high school students from high school to the 3 years after graduation, I provide three empirical findings suggesting that parents' preferences play a big role in students' career choices. First, both students and parents show an increased tendency to prefer college the more college-educated parents are in the family, a relationship even more pronounced for parents than for students. Second, when regressing students' actual college attendance within 2.5 years of graduating on students' and parents' aspirations, both are important inputs for predicting students' attendance. Third, when students and parents disagree about whether to attend college or not, more than 50% of students follow their parents' aspiration rather than their own.

3.1 Data

The German National Educational Panel Survey (NEPS) tracks students from high school grade 9 through to almost 3 years after graduation. It combines surveys of students and parents and contains detailed information on the educational career of students, including data on aspirations for the future. In grades 11 and 12, for almost 3,000 students, students and parents were asked whether they aspire to attend college after high school. I combine these aspirations with data on actual college enrolment.

[20]The application process for fields like medical studies and psychology is more restricted and centralized since demand for places is generally higher than supply.

3.2 Findings

Almost 82% of students hold aspirations in line with their parents' aspirations and ca. 80% end up following these aspirations. But even among students disagreeing with their parents' aspirations, around 50% follow their parents' aspiration rather than their own. When a parent prefers college but the child does not, almost 60% of students end up attending college (see figure 1). A similar share eventually attends college if the child does aspire to college but the surveyed parent does not, although the non-surveyed parent might do so. These patterns imply that parents' college aspiration is a significant predictor of students' college attendance. In a linear probability model, reported in table A1, a parent preferring college for their child is associated with a 35 percentage point increase in the student's probability to attend college, similar to the 34 percentage point association with students' aspiration.

3.3 Interpretation

The evidence from the NEPS shows that parents' career preferences are predictive of students' college attendance, beyond students' own aspirations. Even when students and parents disagree about going to college or not, many students follow their parents' aspirations rather than their own. Why is that? One possibility is that students become more informed over time and realize they prefer the same tracks as their parents. Or students could adjust their choices to their parents' preferences because they want to please them. Students could for example fear disagreement or perceive their parents' love and support as conditional (Assor, Roth and Deci, 2004) and thus use their career choice to signal to their parents.

The second channel would imply a direct link from parents' preferences (and beliefs) to children's career choices that does not operate through students' own preferences and beliefs. The patterns observed in the NEPS data are consistent with several explanations since the causes for the difference between students' aspirations and eventual choices remain unidentified. Students' stated aspirations and their actual decisions differ in several ways. First, aspirations were elicited when students were ca. 16 years old, 2 to 3 years before their actual choice. Students could become more informed over two years, make up their mind about what to do and consequently move towards their parents' aspirations. Second, while aspirations are hypothetical, students' chosen career tracks are actual, consequential choices. In contrast to aspirations, actual choices are therefore subject to potential financial constraints and eligibility requirements. Finally, aspirations were stated in private and confidential, but career choices publicly observable. Isolating the impact of this difference would help identify the causal impact of increased parental pressure. However, given all other differences this

is not possible with NEPS data alone. Observational data thus does not suffice to identify how students adjust their career choices to their parents' preferences.

The challenge is to examine whether students make different career choices because they are publicly observable by their parents. Actual career choices cannot be kept secret from parents while holding everything else constant. Students' stated plans, however, can temporarily be kept secret from parents. This makes it possible to vary whether students' stated plans are observable by parents or not. Making students' stated plans incentive-compatible would further help making them more consequential and not purely hypothetical. I designed the field experiment to address these challenges: I invited students and parents to state their career aspirations and made students' stated career plans experimentally visible to parents or not. To incentivize stated career plans, I instructed participants that stated plans determine what type of expensive, private career advising session students would get if they won one of ten sessions in a lottery. Moreover, students' and parents' preferences and beliefs should be important drivers of students' postsecondary career choices in this context, because financial constraints and eligibility requirements should be less important than in other contexts.

4 Field Experiment

I conducted the experiment in collaboration with 47 high schools from North Rhine-Westphalia. School visits constituted the core part of these collaborations and were conducted between July 2019 and March 2021. These visits were in person until February 2020 and mostly virtual afterwards.

4.1 Design

The goal of the field experiment was to examine whether students adjust their postsecondary career plans to their parents' preferences. For this purpose, I experimentally varied whether students have to make (educational) choices in private or when they can be observed by parents.

In order to work with students on their current career plans in a realistic environment, I designed a 150 minute-session on planning for the time after high school. The main purpose of these sessions was for students to think more carefully about their plans for the time after high school and to learn more about their own interests and aptitudes. With these goals in mind, I was able to offer these sessions to students in collaboration with high schools. The sessions have two main components. Each session first starts with 30 to 40 minutes of survey questions around students' career aspirations, subjective beliefs for different career

tracks and further background questions. Students then take 100 to 110 minutes of tests typically employed in expensive private career advising sessions. The details of the procedure for career planning sessions are also shown in Figure 5.

The tests included standardized personality, interest and cognitive tests that are not freely available to students. Similar tests are often used in assessment centers and in typical private career advising sessions that cost up to $1,400 in this region. The tests usually take up 40 to 50% of the time of such an advising session. Buying these tests in bulk as a researcher from an external provider, I was able to lower the variable costs per student to less than $5 and to offer them to students for free. Each participating student thus directly benefited from participating by learning more about themselves and practicing the tests for eventual assessment centers in the future.

For the purpose of incentivizing students' stated career plans, I combined the career planning module with the chance to win one of ten expensive private career advising sessions. This allowed me to truthfully instruct students that their stated career plans would determine what type of advising session they could get. In these sessions, students for example received help with how to prepare for their preferred career track or how to find out which of their preferred options suits them best. Different advisors specialize in different areas, so once I drew the winning students, I found advising sessions that were a good fit to the students' stated career aspirations. If a student was drawn in the lottery who answered "college" to the question about his plans for the time after high school for example, I booked an advising session on preparing for college, or a specific major, for this student. By incentivizing students' stated aspirations in this way, I make their answers consequential, intermediate choices on their way of preparing for the time after high school.

Students therefore directly benefited from participating in several ways. First, from taking the standardized tests, receiving their results and learning more about their interests and aptitudes. Second, by spending time thinking about their plans. And third, by potentially winning a private advising session that would further help them prepare for the time after high school. These benefits for students ensured that the school visits would be mostly about the students and their plans rather than about my research. They also helped with making the participation attractive for students and for schools.

When eliciting students' career plans that would form the basis of a potential advising session, I varied whether students' statements would be shared with their parents or not. In randomizing instructions, I followed the design by Bursztyn and Jensen (2015), but varied confidentiality with respect to parents rather than peers. To credibly do so, parents had to be involved in the study and registered with some contact details such as an email-address. I achieved this by inviting parents to participate as well, following a similar design

to Tungodden (2018). Surveying parents has additional advantages as parents' preferences do not remain a black box. I can use detailed data on parents' aspirations to identify points of disagreement between children and parents and in which directions parents might push or pull their children's choices.

4.2 Visibility Experiment

In order to test whether students make different choices compared to their privately held preferences because their parents can observe their statements, I varied whether students were told that their plans would be shared with their parents or not. I randomized instructions for all students who had at least one parent register to participate and indicate some contact details before my school visit. Most participating students were minors and therefore required parental consent to participate. I used this to invite the parents to participate in the study and share their view on career planning. Students were then given one of the following two instructions as part of the *private* [*public*] condition:

As starting point for your further planning we will send a copy of your answers on this page ***to you*** *[and your parents]. Your statements won't be shared with anyone else,* ***also not with your parents*** *[except for your parents].*[21]

The only difference between these two statements are the words in the brackets that are added to or substituted for the words in bold. Both statements mentioned parents to make sure that the only difference is the visibility to parents, not the mentioning of parents. Most students understood whom their answers would be shared with as figure 4 shows. Going from the *private* to the *public* condition, the share of students believing that their answers will be shared with their parents increases from 19% to 88%. In contrast, the share believing their answers will be shared with nobody falls from 75% to 10%.[22] These patterns show that the instructions were well understood and achieved what they were set up to do.

I conducted the randomization at the individual level once the registration deadline had passed for an individual school and before the implementation of the career planning module at this particular school. Controlling for school fixed-effects, most differences between stu-

[21]The exact German wording was the following in the *private* condition: "Für Deine weitere Planung werden wir eine Kopie Deiner Antworten auf dieser Seite an Dich schicken. Deine Angaben werden mit niemandem ausser Dir geteilt, auch nicht mit Deinen Eltern." The instructions in the *public* condition instead read: "Für Deine weitere Planung werden wir eine Kopie Deiner Antworten auf dieser Seite an Dich und Deine Eltern schicken. Deine Angaben werden mit niemandem ausser Deinen Eltern geteilt."

[22]Ineligible students in the non-experimental group, e.g., because their parent(s) did not register, give similar answers to the students in the *private* group. Importantly, a negligible share of students believed their answers would be shared with the school (2% in the *private* and 4% in the *public* condition). These patterns further validate the effectiveness of the instructions.

dents in the two groups should thus be insignificant. Balance tests for relevant covariates are reported in Panel B of table 1, confirming that the randomization was successful. Students in the *private* and the *public* condition do not significantly differ with respect to their gender, their socio-economic status or their grade average for example.

4.3 Timing and protocol of school visit

Participation was confined to students of upper classes. At schools of the type *Gymnasium*, these are grades 10 through 12. At schools of the type *Gesamtschule*, these are grades 11 through 13. In Figure 3, I present an overview of students' transition from upper classes to postsecondary tracks, including students' usual age in different grades and the timing of typical application deadlines. I also include the timing of most school visits and the steps in preparing for them and following up after these visits.

The majority of participating students, 71%, were in their penultimate year of high school because this is the year I mostly targeted. Grades 11 (at *Gymnasium*) and 12 (at *Gesamtschule*) present the right time to ask students about their plans. They should have started to think about what they want to do, but should not have committed to a particular track yet. They usually take the first steps towards preparing applications during the last year of school. As explained in section 2, students usually do not have to take concrete steps until after graduation if they want to go to university. For those planning to take up a dual study program or to pursue vocational training, the typical application deadline is between 9 to 12 months before the start of the program. This implies that they would have to apply during the first half of their last year if they want to start their program in the same year as graduating from high school. When I invited students outside their penultimate year to participate, they were either in the first half of their last year or the second half of grade 10 (*Gymnasium*) or 11 (*Gesamtschule*).

A lot of the relevant fieldwork happened before and after my school visits. First, I contacted schools by emailing the principal and the team responsible for students' career planning curriculum. In this email, I introduced my research project, the career planning module and its advantages to students and schools, and asked for a meeting. If the school expressed interest, I arranged a meeting to discuss all further details so that the school could decide whether to participate or not. If the school decided to participate, we agreed on all organizational details and initiated the next stage. I invited all students in a given grade by giving them a short presentation of 7 minutes and handing out consent and registration forms for students and parents in envelopes. Interested students and parents had 10 to 14 days to register and consent to participation. After the registration deadline I collected all

returned consent forms, registered participants, and prepared all materials for the school visit, including personal envelopes containing survey forms with personalized instructions and test forms. At the day of the school visit, students participated in the career planning module which took the following form, also displayed in figure 5.

I begin by reminding students of the purpose of my visit, explain that they can win one of ten private career advising sessions that will be based on their answers in the first survey form, and then hand out the first survey form. Students start with the first survey, the "Career Survey". Once they are done with this survey, they exchange it against a second survey with questions about their family background, their parents' preferences and their subjective expectations for different career tracks (termed "Background Survey"). Once students have completed these surveys, students continue with the personality test and, as long as they are proceeding at normal speed, also the interest test. After a break, I led students through a cognitive test that amounts to another 95 minutes.[23]

Once students have started the tests, I invited registered parents via email and/or SMS to complete a 15-20 minute survey. The questions to parents mirrored those to their children: I asked parents about their preferred careers for their child, their own careers and their subjective expectations for different career tracks. I reminded parents up to six times for the next two weeks such that 85% of registered parents answered the parent survey. Next, I evaluated students' personality, interest and cognitive tests and sent them their personal results within a few weeks of the school visit. In a separate message, I shared a copy of their stated career plans with them and for those in the *public* condition, also with their parents.

4.4 Sample

I collaborated with 47 high schools in Germany's most populous state of North Rhine-Westphalia, 35 schools of the type "*Gymnasium*" and 12 schools of the type "*Gesamtschule*". The schools are scattered across the state, with most schools located in the urban centers along the river Rhine, but some in more rural parts of the state. Figure 2 shows the geographic distribution of participating schools and of localities where I contacted schools but no school participated. At these 47 schools, 1,195 students and 819 parents participated, leading to a tally of 2,014 conducted surveys. 549 students were eligible for the experimental variation of instructions. For these students, I randomized instructions at the individual level within a given school. In Panels A, B and C of table 1, I present descriptive statistics for participating schools, students and parents.

The distribution of students across the two types of schools in my sample is representative

[23]Schools had the option to opt for a short, 35-minute version of the cognitive test if their schedule did not allow for the long test.

of the overall population. While 70% of participating students are at a *Gymnasium*, this share is 76% across the state. Panel A of table 1 shows some key difference between the two school types. These illustrate why it is more challenging to reach parents at *Gesamtschulen* and why fewer students at a *Gesamtschule* are part of the visibility experiment than their counterparts at a *Gymnasium*. Among participating students at a *Gymnasium* 65% have at least one parent registered to participate. This share is 39% at a *Gesamtschule*. This translates into different shares of participating students that are part of the visibility experiment: it is 51% at *Gymnasien* and 33% at *Gesamtschulen*.[24] This is due to several reasons. First, at *Gesamtschulen*, more students are already of legal age since they had one extra year of schooling. They can consent to participating without asking their parents and their parents are thus less likely to register. Second, students at *Gesamtschulen* are less likely to have a college-educated parent and more likely to have at least one parent who immigrated to Germany. These two factors further lead to lower shares of participating parents at *Gesamtschulen*.

Overall, 52% of students in the sample have at least one college-educated parent, 64% at *Gymnasien* and 26% at *Gesamtschulen*, and 37% at least one parent who was not born in Germany. This share is 28% at *Gymnasien* and 55% at *Gesamtschulen*. The share of students at *Gymnasien* with migration background is representative of a 30% share at *Gymnasien* in Germany. The over-representation of students with college-educated parents at *Gymnasien* matches the general pattern, but is even more pronounced in this sample. Students' self-reported grade average of 2.21 is slightly better than average grades of 2.44 in North Rhine-Westphalia.[25] The sample is 61% girls, which is slightly higher than their state-wide share of 55.2% among high school graduates in North Rhine-Westphalia.[26]

Students' parental backgrounds are reflected in the descriptive statistics for participating parents in Panel C of table 1. Among 819 participating parents, 52% are college-educated. Among them, 39% come from families with two college-educated parents, 29% from households with one college-educated parent, and 31% from households without a college-educated parent. Among all participating parents, 13% were born outside of Germany. This is lower than the share of 37% of students with at least one parent not born in Germany, illustrating the challenge of recruiting them to participate. While mothers were more likely to participate, 36% of participating parents are fathers.

Overall, the sample of participating students reflects the majority of students at the two

[24]Not every student with a participating parent is eligible for the visibility experiment. Some parents register too late and others have the same contact details as their child.

[25]See Sekretariat der Ständigen Konferenz der Kultusminister der Länder in der Bundesrepublik Deutschland (2020) for average grades by state.

[26]Recent data for 2019 is provided by Information und Technik Nordrhein-Westfalen (2020).

types of schools well, but is not perfectly representative. Some students were more likely to participate than others, in particular girls and students with college-educated parents who were born in Germany. Similarly, those whose parents were unlikely to participate are under-represented in the visibility experiment. The characteristics of the sample may lead to an under-representation of potential downward pressure in the visibility experiment. This sample might thus not be the right one to capture this type of parental influence, although I should be well-positioned to capture representative pressure in high SES families. The sample also limits which type of heterogeneous treatment effects I can analyze. There are for example not enough children with migration background to get precise estimates of differences across the *private* and *public* conditions. Finally, I do not find significant differences in the reported relationship quality to parents between those with or without participating parents such that selection based on having more or less harmonious parent-child relationships is not likely to bias the estimates.

5 Results

5.1 College Aspirations

The majority of students in the *private* condition, 64%, considers going to university when they are asked what they would like to do after high school. Since 71% of these students have a participating parent that considers university for them, it is more common for parents to consider college for their child than for the child to consider college for itself. This pattern is particularly pronounced for high SES students as figure 6 shows. While 68% of these students plan to attend college in the *private* condition, 80% of them have a participating parent who considers college for them. For low SES students, there is no such difference as 57% of students aspire to college and 56% of them have a parent doing so.

Although students' and parents' college aspirations in aggregate are more aligned for low SES households, this does not mean that these students and parents more often agree with each other. As illustrated in figure 6, they actually disagree more often, but the direction of disagreement is more balanced than for high SES households. While 14% of low SES students do not aspire to college but have a parent who does, 15% of them aspire to college but have no parent who does. This is different for high SES students and parents. Among them, 18% of students do not aspire to college but have at least one participating parent who does. However, only 7% among them aspire to college when none of their participating parents does.[27] These patterns show that the socio-economic gap of 24 percentage points

[27]Not all parents are aware of these cases of disagreement with their children. For example, 19% of parents

in college aspirations among parents (with children in the *private* condition) is much more pronounced than the gap of 11 percentage points for their children in the *private* condition.

If students adjust to their parents' preferences, I would thus expect the share of high SES students aspiring to college to increase and the socio-economic gap to widen under increased parental pressure (as in the *public* condition or for actual choices). This is exactly what figure 7 shows. The share of high SES students aspiring to college is 9.6 percentage points higher in the *public* than in the *private* condition (p-value of 0.04). The share of low SES students aspiring to college is 4.7 percentage points lower in the *public* than in the *private* condition (not significant).[28] As a result, the socio-economic gap increases from 12 percentage points to 27 percentage points, with 78% of high SES students aspiring to university, but only 51% of low SES students doing so. This suggests that students' willingness to adjust their plans to their parents' preferences exacerbates socio-economic differences in college plans. Taking this reduced-form evidence to decompose the gap of 27 percentage points in college plans in the *public* condition implies that more than half of the gap may be due to students' adjustment to their parents rather than due to students' own private preferences and beliefs.

In column (3) of Table 2, I present the same results reported in figure 7 for a linear probability model in regression format. In columns (2), (4) and (5) I include school fixed effects since treatment was assigned at the individual level within schools. The coefficient on the difference in socio-economic gaps is stable and slightly higher at 16 percentage points. This coefficient represents the effect of the *public* condition on the socio-economic gap in college aspirations within schools and thus is not driven by differences across schools. The socio-economic gap in *private* aspirations falls to 1 percentage point when controlling for school fixed effects, compared to 13 percentage points without school fixed effects. This suggests that in my data, the socio-economic gap in *private* aspirations is mostly driven by students from different socio-economic backgrounds attending different schools with differing levels of (*private*) college aspirations. Hence, students of different backgrounds at the same school appear to aspire to college at similar rates in *private*. In presence of this result, it is even more illuminating that within schools, the socio-economic gap in college plans only emerges when making students' college aspirations visible to parents.

What makes students adjust their stated aspirations in line with their socio-economic background and thus causes the socio-economic gap to increase under the heightened in-

whose child does not aspire to college wrongly believe it does. This misconception is particularly pronounced among college-educated parents whose child does not aspire to college. Almost 31% of them believe that their child aspires to college, whereas this share is 13% among parents without college education.

[28]The overall effect is an increase in college aspirations of 5 percentage points (not significant), as shown in columns (1) and (2) of table 2. This effect is in line with the overall differences between students and parents as found in figure 6.

fluence of parents? To answer this question, it is useful to distinguish students' parental background in more detail than the binary label "low" vs. "high" socio-economic status does. Students from so-called "high" socio-economic background fall into two groups: those with 2 college-educated parents and those with one college-educated parent and another parent without college education. As figure 8 shows, these two groups of students behave quite differently across the *private* and *public* condition. Among students with two college-educated parents, ca. 80% aspire to college, regardless of the experimental condition. For students with only one college-educated parent, however, the visibility of aspirations makes a big difference: whereas 60% of them aspire to college in the private condition, this share increases to 75% in the public condition (the p-value of this difference is 0.05).[29]

The socio-economic gap therefore mainly increases from the private to the public condition, because those with one college-educated parent more often state an aspiration to attend college. This behavior seems to be driven by these students adjusting to their college-educated parent's preference. Their college-educated parent aspires to college more often than they do in the *private* condition: compared to 60% among the students, 75% of the college-educated parents in these families state a preference for college attendance. As a consequence, students with one college-educated parent resemble their parent without college education (and like students without college-educated parents) in the *private* condition and their parent with college education in the *public* condition. In contrast, students with zero or two college-educated parents report college aspirations at rates very similar to their parents in both the *private* and the *public* condition.

This interpretation of students following their more educated parent when it comes to making an observable career choice – even if in private they might hold different aspirations – is supported by suggestive evidence from variation in which of the two parents registers to participate and is reported in Appendix Table A5. Among students with 1 college-educated parent, observable aspirations increase the share of students aspiring to college by 17 percentage points if their college-educated parent registered to participate in the study (significant at the 5-percent-level). If only the parent without college education registered to participate, the estimated coefficient is just 6.8 percentage points.

The observed differences across students from "high" socio-economic backgrounds with either 1 or 2 college-educated parents point to different channels of parental influence on

[29]Students were also asked a continuous version about their preference for college vs. vocational training. The results in Figure A3 are similar to the discrete version: students with 1 college-educated parent state an increased desire for college in the public condition and again seem to adjust to their college-educated parent. Moreover, among these students it appears to affect those at the margin, moving their preference closer to college when it otherwise would have been closer to vocational training or at the point of indifference. There is no significant difference for students with either zero or two college-educated parents.

their children's college attendance that I examine in more detail in section 6. Children with 2 college-educated parents might have already internalized their parents' preferences and beliefs, such that it is clear to almost all of them that they want or should want to attend college. As a result there is a ceiling effect for them. To the extent that this internalization has at least partly happened because of parents' expectations for their children, the difference between the private and public conditions presents a lower bound for the extent to which children adjust to their parents' college aspirations. Children of 1 college-educated parent, on the other hand, do not appear to have fully internalized yet that going to college is what they should want to do, potentially because they are exposed to both of their parents' preferences and beliefs that do not uniformly pull their own preferences and beliefs into the direction of attending college. When making decisions, however, these students seem to know that their college-educated parent would like them to go to college and find this expectation important enough to adjust to it.

5.2 Preferred Fields

Parents' influence does not end at going to college or not. Students are also willing to adjust their preferred field to their parents' preferences. When sharing aspirations with parents, students tend to shy away from fields such as "Arts, Music, Design" and instead become more likely to state an aspiration for fields with higher earnings, such as "Business and Economics". Students' adjustments are once more in line with parents' preferences for fields and overall lead students to switch from fields in the lower half of earnings – Arts, Music, Design; Linguistics and Cultural Studies; Agriculture and Forestry; Education; Social Sciences – to fields in the upper half of earnings – Business and Economics; Engineering; Maths and Natural Sciences; Law; Medical Studies. Similar as for college aspirations, this effect is particularly pronounced for students with 1 college-educated parent, complementing the effect on college aspirations.

After being asked whether they would like to go to college after high school or had alternative plans, students were asked which fields of study they aspired to. For this purpose, students were asked to rate 10 different fields in terms of their attractiveness to them, on a scale of 0 ("completely unattractive") to 100 points ("extremely attractive").[30] Based on students' rankings for each field, I code a binary variable for each field, indicating whether it received the student's highest rating and is thus top-ranked by this individual student.

[30]The translation of the exact question students were asked, is the following: "Which fields of study do you find the most attractive? *Please state how attractive you find the following fields of study, on a scale of 0 points ("completely unattractive") to 100 points ("extremely attractive").*" The question then listed the following 10 fields: Agriculture and Forestry; Arts, Music, Design; Education; Linguistics and Culture; Social Sciences; Business and Economics; Engineering; Maths, Natural Sciences; Law; Medical Studies.

I repeat the same procedure for parents who answered an equivalent question. Using students' and parents' top-ranked fields (in the private condition), I can compare the relative attractiveness of fields among students and parents by calculating the difference between the share of parents ranking a given field top and the share among students giving this field their highest rating.[31] The differences indicate which fields are relatively more favored by parents than children and are portrayed on the x-axis of figure 10.

In comparison to students, parents find fields such as "Maths, Natural Sciences", "Business and Economics" and "Engineering" attractive, but especially dislike "Arts, Music, Design". When making their aspirations observable by parents, students react in ways that align with parents' preferences: they shy away from "Arts, Music, Design" and become more likely to aspire to "Business and Economics". As shown in figure 10, the difference between the public and the private condition (represented on the y-axis) is higher for fields that are relatively more preferred by parents. The exception to this pattern is "Engineering", which students are less likely to state when aspirations are observable even though parents find it relatively attractive in comparison to their children. The result for Engineering is driven by students without any college-educated parents who are 12 percentage points less likely to aspire to engineering in the public condition (more detailed results are shown in Figure A6).

Next, I collapse fields into two categories by their graduates' average earnings and find that students become more likely to aspire to fields with higher earnings when their aspirations are shared with their parents (see figure A4). This effect is again most pronounced for students with one college-educated parent, for whom the share aspiring to a field with higher earnings increases by 17 percentage points (p-value of 0.03). These students resemble students without any college-educated parents in private, but those with 2 college-educated parents in public. Together with the effect on students' college aspiration, this tendency also leads to a doubling of the socio-economic gap in students aspiring to enroll in a field with relatively high earnings at college. While in private 35% (47%) of students from low (high) socio-economic backgrounds aspire to college and a high earning field, these shares are 32% and 58% in the public condition (displayed in figure A5).

Hence, students are willing to adjust not only their college aspirations to their parents' preferences, but also what field to study at college. As a consequence, both the socio-economic gap in overall college aspirations and in the shares of students aspiring to studying high-earning fields at university increase significantly.

[31] Compared to students, parents are more likely to rank more than one field top, which is why most differences are non-negative.

6 Decomposing the socio-economic gap in (observable) college aspirations

The reduced-form evidence shows that students are willing to adjust their aspirations to their parents and suggests that the adjustment is sizable. How important is this adjustment to parents relative to the contribution of students' private beliefs and preferences in explaining the socio-economic gap in college aspirations?

To decompose the socio-economic gap in college aspirations, I elicited detailed subjective beliefs for the career tracks undergraduate studies, dual study programs and vocational training, and develop a model of career choice. The model embeds both students' preferences and beliefs and their potential adjustment to parents when choices are observable. After estimating the unobserved components of this model, the utility weights, I can decompose the socio-economic gap in college aspirations into the three components utility weights, beliefs and adjustment to parents.[32] These three components represent two potential avenues of intergenerational transmission: the joint influence of preferences and beliefs possibly represent a transmission via internalization of parents' beliefs and preferences and I hence term the contribution of these factors "internalized components". Transmission via students' adjustment to parents, on the other hand, represents a direct impact of parents that cannot be explained by students' own preferences and beliefs regarding different career tracks.

I use the experimental variation of visibility to parents and detailed data on students' subjective expectations (beliefs) regarding the available career tracks to estimate the unobserved components of the model. The choice model and elicited beliefs data build on similar approaches to decompose socio-economic or gender gaps in career choices by Zafar (2013), Boneva and Rauh (2017), and Giustinelli (2016). One caveat of this approach is that utility weights for different choice aspects are estimated using non-exogenous variation in subjective beliefs across individuals and career tracks. This can lead to biased estimates if unobserved beliefs and preferences relevant to one's subjective expected utility from different career tracks are correlated with observed beliefs (Wiswall and Zafar, 2015).

[32]Note that I use the term utility weights and not preferences when writing about decomposing the gap into three components because beliefs may be tainted by preferences. This means that students' internalized concerns cannot be cleanly separated into preferences and beliefs. Together, students' beliefs and preferences make up their internalized concerns, which is why I use the term preferences and beliefs when distinguishing internalized aspects from students' adjustment to pressure.

6.1 Beliefs and Preferences

When students are deciding which career track they prefer, they have to form subjective expectations for several aspects of the different alternatives and then figure out which option compares most favorably to all others. While students could care about a multitude of aspects, the relevant aspects typically belong to a handful of categories such as social, material/financial or individual performance concerns, as well as concerns around enjoyment, interest and challenge involved in the various career tracks. Among these relevant aspects, some concern the immediate future, i.e. the 3 to 4 years after high school, whereas others concern long-term outcomes such as having an enjoyable job in one's thirties.

I elicited students' (and parents') subjective beliefs with respect to 15 relevant scenarios covering the aspects introduced above for the three most common career tracks undergraduate studies, dual study program and vocational training. The selection of scenarios is inspired by Zafar (2013) and Boneva and Rauh (2017). All of these 15 scenarios are displayed in table A8, of which 10 relate to immediate characteristics in the first 3 to 4 years after high school and 5 scenarios apply to the more distant future at age 30 to 35. I elicited students' beliefs by asking them to rate the likelihood of a certain binary aspect – such as graduating or not – materializing for each of the three career tracks on a scale from 0 to 100.[33] Each student thus compares all three alternatives for 15 different scenarios, resulting in 45 career track-scenario-specific expectations that are informative about students' different expectations for the three career tracks across various relevant aspects.

Students hold quite different expectations for the different scenarios and career tracks and their expectations clearly vary by their family background, as portrayed in figure A8. Compared to students from low SES backgrounds, students from high SES families have more optimistic beliefs about college when it comes to positive aspects such as enjoying one's social life or finding the covered material interesting. They are less pessimistic when it comes to negative aspects such as expecting to struggle financially. When comparing students' beliefs for vocational training, on the other hand, high SES students are less optimistic than low SES students in terms of finding the relevant tasks interesting, expecting to finish the

[33] More specifically, they are elicited in the following way: *"Try to imagine your life during the 3 to 4 years after high school (and a potential gap year) for the cases that you pursue vocational training, a dual study program or undergraduate studies. How would you imagine your life to be during those 3-4 years in these scenarios? Please estimate for all three scenarios (undergraduate studies, dual study programs, vocational training), how certain you are on a scale of 0 (extremely unlikely) to 100 (absolutely certain) that you will..."* Students read this introduction and then the relevant scenario for each of the 10 immediate scenarios such as: "*finish the respective program and graduate?*" They then state a value between 0 and 100 for all three alternatives and move on to the second scenario that concludes with "*enjoy your social life and social activities?*" Before they reach the 5 scenarios for the more distant future, students are asked to "*now please imagine again for all three scenarios (...) that at the age of 30 to 35 you will...*" and proceed in the same way as before.

program ("graduating") or achieving a job of desirable status. Overall, high SES students thus perceive higher returns to college than low SES. This is both because they perceive college more positively and vocational training more negatively than low SES students.

Students from high SES families also expect higher pecuniary returns of going to college or pursuing dual study programs than students from low SES families (see figure A7). This is mainly due to higher expected earnings conditional on going to college (€5,129 vs. €4,600) or pursuing a dual study program (€4,556 vs. €4,167), as students from either background have comparable expectations upon pursuing vocational training (€3,247 vs. €3,158).

6.2 Choice Model

How do these beliefs matter for students' career plans? The model and its estimation embody the intuition that students prefer a career track they expect to outperform alternative tracks regarding aspects they care about.

6.2.1 Baseline Model

Suppose a student s has expected utility SEU_{sj} from choosing a career track j between college ($j = 1$), dual study programs ($j = 2$) or vocational training ($j = 3$). Students' subjective utility for this static choice problem depends on a vector of k binary outcomes b with $b_1, b_2, ...b_k \in \{0, 1\}$ and subjective likelihoods $\pi_{sj}(b_k = 1) \equiv \pi_{sjk}$ of each outcome k materializing conditional on choosing career track j. Assuming additive separability for the 15 binary outcomes I introduced above, these can be interpreted in the following way: students expect to derive a certain utility from the positive outcome of graduating $u(b_{\text{Graduating}} = 1)$ and a different level of utility from the negative outcome of not graduating $u(b_{\text{Graduating}} = 0)$. The difference between these two levels $u(b_k = 1) - u(b_k = 0)$, denoted by Δu_k, e.g. $\Delta u_{\text{Graduating}}$, indicates how much students care about an aspect such as graduating or not. Students may also care about the expected earnings for the different career tracks. Assuming risk neutrality, it is sufficient to include the mean expected earnings rather than the full distribution of expected earnings. Students' expected gross monthly earnings for career j are captured by $E_s(c_j)$, with γ governing how strongly earning expectations affect students' expected utility. Finally, I allow the preference parameters, i.e. the $u(b_k = 1), u(b_k = 0), \gamma$ to vary by socio-economic background $X_s = \{L, H\}$, indicating low and high socio-economic background:

$$SEU_{sj} = \sum_{k=1}^{K} [\pi_{sjk} u(b_k = 1, X_s) + (1 - \pi_{sjk}) u(b_k = 0, X_s)] + \gamma(X_s) E_s(c_j) + \epsilon_{sj} \quad (1)$$

Students may care about other factors unobserved to the researcher, which is reflected by ϵ_{sj}. Using $\Delta u_k \equiv u_k(b_k = 1) - u_k(b_k = 0)$, I can re-write students' expected utility as:

$$SEU_{sj} = \sum_{k=1}^{K} \pi_{sjk} \Delta u_k(X_s) + \sum_{k=1}^{K} u(b_k = 0)(X_s) + \gamma(X_s) E_s(c_j) + \epsilon_{sj} \quad (2)$$

Before estimating the unobserved utility weights $\Delta u_k(X_s)$ and $\gamma(X_s)$ with the help of the observed expectations π_{sjk} and $E_s(c_j)$, I enrich the model by acknowledging students' desire to potentially adjust to parents when their choices are observable by parents.[34]

6.2.2 Enriched Model

For that purpose, assume that students gain subjective expected utility λ_j when their stated aspiration is observable by parents, which may vary by socio-economic background X_s. This wedge could reflect students' reluctance to publicly go against what they believe their parents think is best for them or increased/decreased approval by their parents depending on their plans (as in parents' conditional regard theory, e.g. Assor, Roth and Deci (2004)).[35]

Defining d_s as students' stated plan, itself the result of subjective expected utility maximization, i.e. $d_s \equiv arg \max_{j \in J} SEU_{sj}$, parents' p information set can be expressed as $Info_p = \{\emptyset, d_s\}$ and students' subjective expected utility as follows:

$$SEU_{sj} = \sum_{k=1}^{K} \pi_{sjk} \Delta u_k(X_s) + \sum_{k=1}^{K} u(b_k = 0)(X_s) + \gamma(X_s) E_s(c_j) + \lambda_j(X_s) 1_{(Info_p = d_s)} + \epsilon_{sj} \quad (3)$$

I identify $\lambda_j(X_s)$ by experimentally varying the visibility of students' aspirations to parents $1_{(Info_p = d_s)}$ and analyzing the resulting differences in stated aspirations. The unobserved components $\Delta u_k(X_s)$ and $\gamma(X_s)$ are identified from cross-sectional variation in students' beliefs for different career tracks and their association with students' stated aspirations.

[34] $u(b_k = 0)$ is unobserved, but not critical for identification. It does not affect the ordering of tracks.

[35] Students may have internalized some desire to gain approval in their private aspirations, but could overestimate their willingness/ability to choose a path independent of their parents' approval. Bringing this concern to the present may thus lead to behavior that reflects the strength of these concerns more accurately.

6.3 Estimation Approach

Comparing two options, for example $j = 1$ (College) and $j = 3$ (Vocational Training), a student aspires to college if the subjective expected utility of college is higher than for vocational training, $SEU_{ij=1} \geq SEU_{ij=3}$, or if:

$$\epsilon_{sj=3} - \epsilon_{sj=1} \leq \sum_{k=1}^{K} [\pi_{sj=1k} - \pi_{sj=3k}] \Delta u_k(X_s) + \gamma(X_s)(E_s(c_1) - E_s(c_3)) + (\lambda_1(X_s) - \lambda_3(X_s)) 1_{(Info_p = d_s)}$$

This illustrates that opting for college rather than vocational training can be driven by the perceived returns to college in terms of the likelihood of outcomes k, $\pi_{sj=1k} - \pi_{sj=3k}$, weighted by their importance $\Delta u_k(X_s)$, by the expected monetary returns to college $E_s(c_1 - c_3)$ weighted by the relevance of earnings, $\gamma(X_s)$, and by the expected utility difference from parents observing one's plans: $\lambda_1 - \lambda_3$. I normalize $\lambda_3 = 0$, such that the estimated λ_j indicate the change in expected utility relative to stating a preference for vocational training. This introduces a wedge between alternatives that is not present when options are considered in private. Assuming that the errors ϵ_{sj} are of type I-extreme value and i.i.d., the probability of a student stating an aspiration for career track j can be expressed as:

$$Pr(d_s = j) = \frac{\exp\left(\sum_{k=1}^{K} \pi_{sjk} \Delta u_k(X_s) + \gamma(X_s) E_s(c_j) + \lambda_j(X_s) 1_{(Info_p = d_s)}\right)}{\sum_{j=1}^{J} \exp\left(\sum_{k=1}^{K} \pi_{sjk} \Delta u_k(X_s) + \gamma(X_s) E_s(c_j) + \lambda_j(X_s) 1_{(Info_p = d_s)}\right)} \quad (4)$$

I estimate this conditional logit via maximum likelihood. Students' stated career plans are the dependent variable, explanatory variables are students' alternative- and individual-specific subjective beliefs π_{sjk}, $E_s(c_j)$ and the individual-specific visibility to parents $1_{(Info_p = d_s)}$.

6.4 Estimation Results

I estimate the model components using those students who have data on all components of the model and present the results in table 3.[36] For high SES students, observability introduces a pronounced utility premium of attending college that is not present for low SES students. The coefficient of .98 is large compared to those for other career aspects. For example, students' expectations to find the material and tasks in college enjoyable would have to increase by 26.3 percentage points to reach an equivalent impact. In terms of expected monthly earnings, it would even require an increase of €4,321, illustrating both

[36] This includes students who were not part of the visibility experiment. They contribute to more precise estimates of Δu_k and γ. Students who did not manage to fill out the subjective expectations module are dropped. This includes students at one school where time did not suffice to administer this module.

the importance of parent pressure and that expected earnings are not the primary concern behind students' plans. This is true for low and high SES students: expected earnings matter, but various non-pecuniary career aspects are more important. The most important aspects for students from both backgrounds are expecting to finish a career track (or graduate), as well as enjoying both the covered material/tasks and an eventual job. These results are in line with findings by Zafar (2013) and Boneva and Rauh (2017). They found that non-pecuniary factors matter more than pecuniary factors for college plans and major choices and that students particularly care about enjoying a particular path and parental approval.

While low and high SES students care about many pecuniary and non-pecuniary aspects in similar ways, there is evidence that they weigh certain aspects differently. High SES students care much more about achieving a job of desirable status, and potentially also about parental and family support in the short term, whereas low SES students may care more about an eventual work-life-balance and social aspects of different career aspects.

Using the point estimates of the unobserved components together with the observed components of the model I next turn to examining which components may explain the socio-economic gap in college aspirations. For this purpose, I use a non-linear equivalent of the Oaxaca-decomposition to analyze to what extent the gap can be explained by the model and its components of utility weights, beliefs and adjustment to parents.

6.5 Decomposing the socio-economic gap: channels of intergenerational transmission

Three separate sources can contribute to the socio-economic gap in college aspirations when they are observable by parents: different beliefs (subjective expectations π_{sjk} and $E_s(c_j)$), differences in utility weights (Δu_k and γ in the model) and third, differences in the extent to which low and high SES students adjust their stated aspirations when they are visible to parents. As both, beliefs and utility weights are held internally by students and have possibly been internalized by them as a result of their family upbringing, these two components reflect the importance of "internalized components".[37]

To what extent can these three components explain the socio-economic gap of 27.6 percentage points in college aspirations (when these are observable) and how important is the adjustment to parents relative to the internalized components? For this purpose, I combine the estimated and observed components of the model, assume that aspirations are observable by parents (such that $\lambda_j(X_s)$ is active for every student) and calculate the predicted socio-

[37]Note that some of the belief components – e.g. expectations to enjoy the material or tasks – are probably tainted by students' preferences and thus do not allow a clear-cut separation of the importance of preferences and beliefs. This is why I speak of "utility weights" rather than preferences.

economic gap in college plans as shown in equation 5. I denote the probability of aspiring to college when aspirations are visible, $Pr(d_s = \text{College}|\text{Info}_p = d_s)$, by $Pr_{\text{College}}(\pi_s\beta_{X_s}, \lambda_{X_s})$, where $\beta_{X_s} \equiv (\Delta u_1(X_s), ..., \Delta u_{15}(X_s), \gamma_X(s))'$ and $\pi_{sj} \equiv (\pi_{sj1}, ..., \pi_{sj15}, E_s(c_j)))$.[38]

$$\Delta^{SES} = \underbrace{E[Pr_{\text{College}}(\pi_s\beta_H, \lambda_H)|X_s = H] - E[Pr_{\text{College}}(\pi_s\beta_L, \lambda_L)|X_s = L]}_{\text{Predicted Gap}} \tag{5}$$

The predicted gap Δ^{SES} is 24.4 percentage points. The model thus predicts 89% of the actual, observed gap (see figure 11a). I next decompose the gap into its three components:

$$\begin{aligned}\Delta^{SES} = &\underbrace{E[Pr_{\text{College}}(\pi_s\beta_H, \boldsymbol{\lambda_H})|X_s = H] - E[Pr_{\text{College}}(\pi_s\beta_H, \boldsymbol{\lambda_L})|X_s = H]}_{\Delta^{\lambda}\text{(Adjustment to Parents)}} \\ &+ \underbrace{E[Pr_{\text{College}}(\pi_s\boldsymbol{\beta_H}, \lambda_L)|X_s = H] - E[Pr_{\text{College}}(\pi_s\boldsymbol{\beta_L}, \lambda_L)|X_s = H]}_{\Delta^{\beta}\text{(Utility Weights)}} \\ &+ \underbrace{E[Pr_{\text{College}}(\boldsymbol{\pi_s}\beta_L, \lambda_L)|\boldsymbol{X_s = H}] - E[Pr_{\text{College}}(\boldsymbol{\pi_s}\beta_L, \lambda_L)|\boldsymbol{X_s = L}]}_{\Delta^{\pi}\text{(Beliefs)}}\end{aligned}$$

The results are presented in figure 11a: adjustments to parents accounts for 10.8 percentage points or 44% of the predicted gap, whereas internalized aspects account for 13.6 percentage points or 56% of the predicted gap. Interestingly, beliefs account for 89% of the internalized components suggesting that different utility weights are not the primary driver behind the socio-economic gap in college aspirations.

According to the decomposition, the two main drivers behind the pronounced socio-economic gaps in college aspirations are therefore students' beliefs and their adjustment to their parents. This suggests two key channels of intergenerational transmission that could explain intergenerational immobility in this context. The transmission of family-specific subjective beliefs to children and the direct impact of parents' preferences and beliefs as students are willing to adjust to their parents.

This is corroborated by conducting the same decomposition exercise for the comparison of those without any college-educated parent against those with one college-educated parent and then separately against those with two college-educated parents. The results underline the varying importance of these two separate channels for different types of families: while 78% of the gap between low SES students and those with one college-educated parent is

[38] $Pr_{\text{College}}(\pi_s\beta_{X_s}, \lambda_{X_s})|X_s]$ is thus a simplified version of the general probability to aspire to career track j: $Pr(d_s = j) = \frac{\exp(\pi_{sj}\beta_{X_s} + 1_{Info_p = d_s}\lambda_{j,X_s})}{\sum_{j\in\{College,Dual,VocEd\}}\exp(\pi_{sj}\beta_{X_s} + 1_{Info_p = d_s}\lambda_{j,X_s})}$.

attributed to the adjustment to parents, the majority of the gap – 78% – between low SES students and those with two college-educated parents is assigned to internalized components rather than the adjustment to parents.

Importantly, these two channels – parents' direct influence and the transmission of beliefs – can apparently act as substitutes in making sure children attend college. One of them – perceived parental expectations to attend college or beliefs clearly favoring college – can suffice to lead to high rates of college aspirations, but the absence of both will likely lead to much lower rates of college attendance.

The reduced-form evidence in figure 8 gave a first hint at this: while most students with two college-educated parents aspire to college even in the private condition, students with one college-educated parent only reach comparable levels in the public condition. In the private condition, on the other side, they are not much more likely to aspire to college than those without any college-educated parents. Combining this with data on students' beliefs (in form of their perceived returns of going to college, e.g. as compared to vocational training in figure A9) suggests that the observed differences in college aspirations across these three groups in the private condition may be due to differences in their beliefs: while students with two college-educated parents have the highest and students without any college-educated parents have the lowest (for some scenarios even negative) perceived returns of going to college, those with one college-educated parent hold intermediate beliefs between these two extremes, which in some aspects are closer to those by low SES students than those by the other group of high SES students (e.g. with respect to scenarios "Social", "Support", "Graduating" or "Status").

This intuition is visualized in figure A10, in which I plot the estimated kernel density of students' predicted likelihood to aspire to college based on their subjective beliefs only. Those with 2 college-educated parents are the clear outliers with most of them predicted to be almost certain to aspire to college. Their overall beliefs therefore set them apart from the two other groups of students and are consistent with them having internalized college as the appropriate path for them. High SES students with only one college-educated parent, on the other hand, do not appear too different from those without any college-educated parents.[39]

For students with two college-educated parents it thus seems their internalized pro-college beliefs that makes the majority of them clearly favor college over alternative tracks, whereas for students with only one college-educated parent it is not so much their own beliefs, but

[39]Students' predicted likelihoods based on their beliefs are obtained in two steps: first, I estimate the baseline choice model for students in the private condition only (via maximum likelihood estimation of the conditional logit model), separately by low and high SES background. Using the estimated utility weights, for each individual with stated subjective beliefs, I can then calculate the predicted likelihood of aspiring to college by plugging in the beliefs into the estimated subjective expected utility model.

their adjustment to parents that ensures comparably high rates of college aspirations. The key difference between students with one or no college-educated parent therefore seems to lie not in their beliefs, but their perception of parental expectations: the presence of at least one college-educated parent, many of whom would like their child to attend college, appears to go hand in hand with some perceived pressure to adjust in this direction. This perceived pressure is absent for most students without any college-educated parents (see figure 8).

The importance of beliefs in explaining the socio-economic gap in college aspirations and the differences in beliefs across family backgrounds – especially between families with one and two college-educated parents – raise two follow-up questions: one, which beliefs matter most? Second, where do these beliefs come from, especially those that matter most?

6.6 Decomposition: Contribution of Individual Belief Components

I find that much of the gap originating from beliefs can be explained by differences in beliefs with respect to only 4 scenarios around one's expected enjoyment of different career paths and eventual jobs, one's social life and graduation prospects (see figure 11b). To compare counterfactuals, I simulate replacing low SES students' belief distribution for each of the 15 scenarios by the respective belief distribution of high SES students.[40]

The biggest contribution to the gap comes from students' subjective beliefs about their personal interests: if students from low socio-economic backgrounds were given the same beliefs for the three career tracks about finding the covered material or the tasks at work exciting and expecting to enjoy them as high SES students, the predicted gap closes by more than 5 percentage points. Equipping them with high SES students' beliefs of whether they would enjoy their eventual job given a particular career track closes the gap by almost 3 percentage points. This illustrates the importance of one's personal interests and expectations of what one will find interesting not only for students' individual plans, but also for explaining the socio-economic gap in aspirations. Students from all backgrounds care about finding something they would enjoy doing, but students with college-educated parents are more confident in college's ability and less confident in vocational training's ability to deliver in this regard than students without college-educated parents.

The second biggest contribution comes from differences in expecting to graduate and

[40]The exact procedure I use follows similar approaches by Zafar (2013), Giustinelli (2016) and Boneva and Rauh (2017). Since there are fewer students of low than high socio-economic background in my sample, I draw a random sub-sample of high SES students that equals the number of low SES students. Next, I separately rank students in both groups by their predicted probability of aspiring to college. Students of low socio-economic background are then given the beliefs (for college, dual studies and vocational training) of the student with the same rank in the group of students from high socio-economic background. For each student (and individual belief category), I can now calculate the difference in the predicted probability of aspiring to college and then repeat this 100 times.

to finish a certain career track, closing the gap by 4 percentage points. While high SES students are more confident than low SES students about graduating if they were to embark on an undergraduate degree, they are less confident about finishing their vocational training were they to start one. The last sizable factor are students' expectations about enjoying their social life: making low SES students as confident about enjoying their social life under different scenarios as high SES students would close the gap by almost 3 percentage points.

All these factors have two things in common: students of low socio-economic background care about them and they perceive much lower "returns" to college compared to alternatives than students of high socio-economic backgrounds (because they are less optimistic for college, more optimistic for the alternatives, or both). This also explains why some aspects do not seem to matter for the socio-economic gap in aspirations. While low SES students are much more pessimistic about struggling financially in college than high SES students, potential financial struggles do not seem to matter too much in deciding for or against college and thus, expecting less financial struggles would not make them more likely to aspire to college. An eventual work-life-balance, on the other hand, appears to matter to low SES students, but students of both backgrounds have very similar beliefs with respect to work-life-balance in different career tracks such that swapping their belief distributions does not make a difference.

6.7 Origin of Beliefs

Given that students' beliefs differ markedly by parental background, it is natural to suspect that these beliefs might have been transmitted by parents (or families and social networks more generally). Is there correlational evidence for a link between students' and parents' beliefs and could it explain why students hold such different beliefs depending on whether they have zero, one or two college-educated parents?

Using data on students' and parents' subjective beliefs, I find that there is a strong link between parents' and students' perceived returns to college. Moreover, students' beliefs are related to both their mothers' and fathers' beliefs (see table 4).[41] This provides correlational evidence for family-specific beliefs. I cannot establish this link as causal from parents' to students' beliefs since reverse causality and unobserved influences on students' and parents' beliefs might matter, too.

In table 4, I present a strong relationship with a coefficient of .45 when regressing stu-

[41] Parents' beliefs are elicited in a way parallel to the procedure for students. They are instructed to imagine their child were to take up undergraduate studies, a dual study program or vocational training. For each scenario, they are asked for their probabilistic beliefs that this aspect will materialize under the three alternatives.

dents' perceived returns to college over vocational training ($\pi_{sj=college} - \pi_{sj=VocEd}$) on their parent's perceived returns. This result is based on pooling data for all 14 career aspects for which I have data from both students and parents. The relationship between students' and parents' beliefs remain almost unchanged when controlling for families' socio-economic background or school fixed effects. This suggests that family-specific characteristics rather than socio-economic background or the school environment drive the strong correlation between students' and parents' beliefs.

Two further results highlight the importance of family when it comes to career-specific beliefs. First, the relationship between students' and parents' beliefs is the strongest for those aspects that matter the most for the socio-economic gap. In particular for expecting to enjoy the tasks and material in different career tracks (see table A6 for separate regressions for each scenario). Each percentage point increase in parents' perceived returns to college in this domain is associated with a 0.61 percentage point increase in the child's perceived returns. The next strongest relationship, expecting to enjoy one's eventual job, shows a coefficient of 0.4.

Second, for those families with data on the student's, the mother's and the father's beliefs, the association between students' and each parent's beliefs is significant and sizable for both parents (see table 4). If part of the relationship captures a causal link from parents' to students' beliefs, this finding suggests that both parents exert some independent influence on their child. This would help explain why students with zero, one or two college-educated parents have different beliefs. In particular, it could explain why those with one college-educated parent have less positive views of college than those with two college-educated parents. Being exposed to parents with and without college experience could lead to more moderate beliefs than exposure to two parents with college experience. On top of that, college-educated parents in these "mixed" families have more moderate views themselves. This might reflect a different disposition and openness to a partner without college education, or the moderating influence of the partner.

Finally, both students and parents were asked what factors are important for choosing between careers.[42] These answers can be transformed into relative weights on the various

[42]Students were asked the following question: "When choosing an occupation or a major, many factors play a role. How important are the following aspects for your decision? *Try to indicate the relative importance of the different aspects by assigning every aspect a value between 0 and 100 (the higher, the more important). If an aspect is twice as important to you than another aspect, assign this aspect a value that is twice as high as the value for the other aspect.*" Following 16 aspects were listed: earning opportunities; status and prestige; working conditions; personal interests; personal talents; personal satisfaction; self-realization; approval parents; approval friends and peers; financial security and independence; costs educational path; earning money soon; proximity family; proximity friends; duration educational path; personal satisfaction; common good.

factors such that they can be compared to the utility weights estimated in the structural model. Interestingly, these decision weights elicited in the survey show a weaker correlation between students and parents than the beliefs (with a coefficient of .27 when pooling all weights). This could either reflect increased noise in these measures or a weaker relationship. What broad aspects students care about may thus be less family- or background-specific than the elicited beliefs. This could also explain why utility weights seem to play a subdued role in explaining the socio-economic gap in college plans in this context.

Following the results in this section, parents have two main avenues of shaping their children's college aspirations. Indirectly via students' beliefs about what different careers will be like and directly via children's adjustment to parental expectations. Why do students adjust to their parents' preferences beyond their own preferences and beliefs?

7 Who adjusts and why? Heterogeneities in Adjusting to one's Parents

Why are students adjusting to their parents, i.e. which psychological or social motivations are behind it? This project was not designed to distinguish between different theories. Examining who adjusts to parents might yield suggestive insights into the motivations behind this adjustment, however. There are two crucial elements to observing students adjusting to parents. First, students have to perceive a reason why falsifying their aspirations may be desirable when they are observed by parents (such as fearing disagreement). Second, after perceiving a reason to adjust their aspirations, students have to be willing to actually do so.

In this section I therefore examine how students' adjustment to parents varies by groups of students. I focus on potential differences by students' beliefs, grades, gender, agreeableness or migration background. These groups might differ in one or both of these aspects. Since my statistical power to analyze these heterogeneities is limited, I report the results with the caveat that they can only be suggestive. Nevertheless, I hope that a more careful analysis of these and other dimensions of heterogeneity will prove fruitful in future.

7.1 Subjective Beliefs

Using students' subjective beliefs, I employ the estimation approach as above to obtain a predicted likelihood to aspire to college for every individual. Figure 12 displays the actual shares of students aspiring to college in the *public* condition against the predicted probability of doing so. The figure illustrates potential heterogeneous effects of parental pressure depending on how positive students' expectations are regarding college. Those whose beliefs

are not in line with going to college show the biggest reaction to the *public* condition. Students from high SES backgrounds become more likely to aspire to college than predicted, whereas those from low SES families might become less likely to aspire to college than predicted. Absent beliefs favoring college, parent pressure may thus act as a substitute for such beliefs. This raises the question which group privately holds unfavorable views of college.

7.2 Grade Average

One such group comprises students with low grades who are much more pessimistic about college. They are more pessimistic about enjoying college, finding an enjoyable job afterwards and graduating, that is about the most relevant aspects when considering alternative career tracks. In line with this, I find that low-performing high SES students seem to increase their college aspirations the most as a reaction to increased parental pressure (see figure 12). For high SES students, the relationship between grades and college aspirations thus becomes weaker in the *public* condition. For low SES students, on the other hand, this relationship becomes slightly stronger.

As a result, the *public* condition particularly widens the socio-economic gap for low-grade students. The same pattern can be observed in the NEPS data for actual college attendance (see Appendix figure A1 and table A2), implying that students' adjustment to parents might drive the pronounced socio-economic gap for students with low grades. A possible interpretation of this pattern is that low-performing students from high SES families are not excited about going to college, but their college-educated parents steer them towards college nevertheless. Figure 12 is consistent with this interpretation. High SES parents are much more likely to state college as aspiration for their children with low grades than the children themselves or parents in low SES families. High SES students with mediocre grades thus appear both likely to hold different aspirations than their parents and willing to adjust when aspirations are made visible to parents.

7.3 Gender and Agreeableness

The longitudinal data from the NEPS (see table A1) suggests that daughters might put a higher weight on parents' aspirations relative to their own aspirations than sons. The patterns in my field experiment are in line with this interpretation, as the *public* condition increases the socio-economic gap more for participating girls than it does for boys (see figure A11). Consistent with these findings, daughters also put a higher weight on their parents' opinion when it comes to making a career choice. As part of the background survey, I asked participants how many points (out of 100) they would put on their parents' opinion

when they could allocate 100 points between their own opinion and their parents' opinion. While sons allocated an average 34 points to their parents' opinion, girls chose 42 points, a significant difference of 0.32 standard deviations. Moreover, 28% of girls put a higher weight on their parents' opinion than on their own, but only 16% of sons do so.

Girls may thus adjust more often to their parents because they are more willing to adjust or because they are more perceptive of their parents' preferences than boys, or both. Students' answers on the background survey provide evidence that both might matter. Girls more often indicate that their parents are considering a career option for them they do not like themselves (26% vs. 18%). Girls also score much higher than boys on agreeableness in the personality test – by 46.7% of a standard deviation. Maybe the desire to avoid conflict matters in adjusting to one's parents and offers an explanation for the observed gender differences. Breaking up the adjustment by agreeableness shows similar heterogeneous effects as when comparing girls and boys (see panel b) of figure A11).[43]

7.4 Migration Background

A group that perceives more disagreement with their parents are students with two parents of migration background. They are more likely to report that parents have other preferred majors or occupations for them in mind that they do not like themselves (32% among them compared to a baseline of 20%). They also more often say they would like to do something their parents do not approve of (27% among them vs. 17% among students with both parents born in Germany). Alone 12% among them state that their parents would like them to pursue medical studies although they are not interested in doing so. In addition, these students also put significantly higher weights on parents' opinion than others. While others would put an average weight of 38% on their parents' opinion, they state an average of 51% (a difference of half a standard deviation). A share of 40% puts more weight on their parents' opinion than on their own, compared to 20% among all others.

Unfortunately, I do not have enough participating parents from families where both parents migrated to Germany to analyze differences in plans between the *private* and *public* condition for their children. The patterns above suggest, however, that parent-child-dynamics might be of tremendous importance for the career trajectories of these students.

[43] Agreeableness is one of the five personality traits measured in the Big Five Inventory (Soto and John (2017)) and associated with a heightened desire for harmony and social approval. I classify students as "agreeable" if they score above the median for agreeableness on the Big Five Inventory.

8 Conclusion

While there has been extensive research into the reasons behind intergenerational mobility, there is still considerable uncertainty about its underlying causes. This paper tests for parent pressure as a mechanism behind socio-economic gaps in college attendance by eliciting high school students' career plans under experimentally varied degrees of parental pressure. I find that students' adjustment to parental pressure more than doubles the socio-economic gap in college plans to 27 percentage points. Estimating a structural model of career choice, I find that parental pressure and students' beliefs and preferences together explain 89% of the observed gap in college plans, in almost equal parts. Moreover, students' and parents' beliefs are strongly correlated, suggesting that parents' preferences and beliefs shape students' choices in at least two ways, both indirectly via the transmission of preferences and beliefs, and directly through students' adjustment to parents' preferences.

These results have several implications. They suggest that narrowing socio-economic gaps might require addressing parents' beliefs and preferences (List, Pernaudet and Suskind, 2021; Dizon-Ross, 2018) or creating additional support networks such as mentoring programs (Falk, Kosse and Pinger, 2020; Resnjanskij et al., 2021). Moreover, they also imply that leveling the playing field in terms of available resources and possibilities does not guarantee students from different backgrounds will make the same decisions (Heckman and Landersø, 2021).

A crucial question for future research is, when is parental influence on career choices good and when is it bad? The answer depends on how informed parents' preferences and beliefs are relative to those by their children. This might differ widely across households. The framework in this paper provides a starting point to analyze such nuanced differences of parental influence in the future and shows that parental pressure across many families has the power to shape society-wide outcomes like intergenerational mobility.

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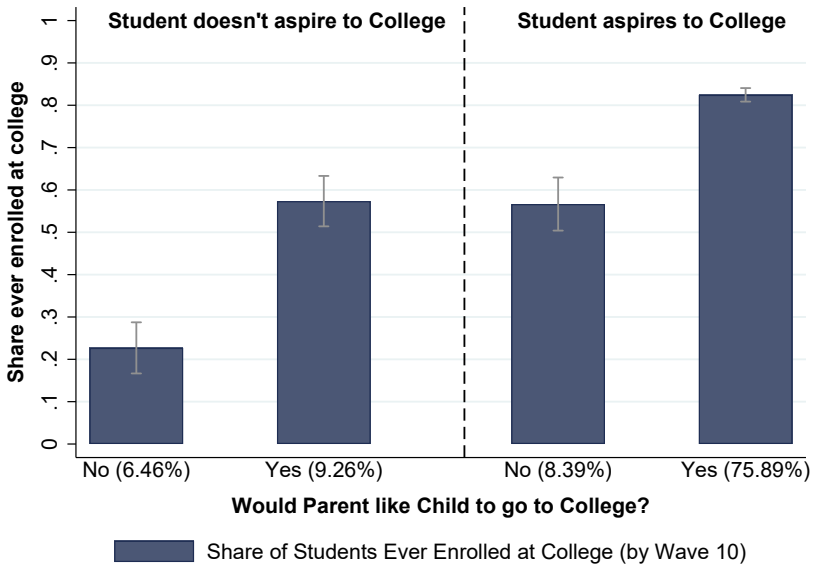
Figures and Tables

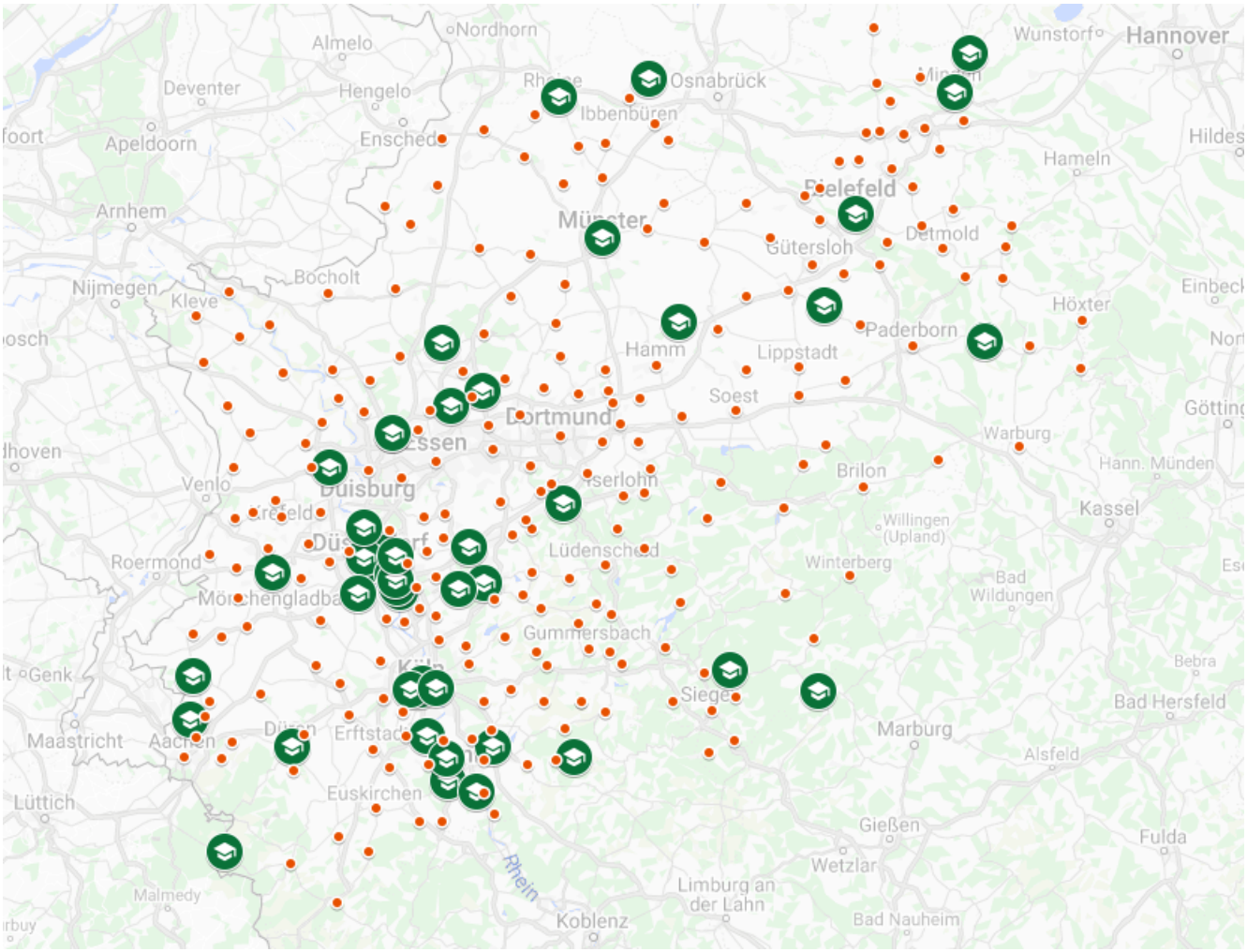
Figures

Figure 1: Students' actual college attendance conditional on students' and parents' college aspirations



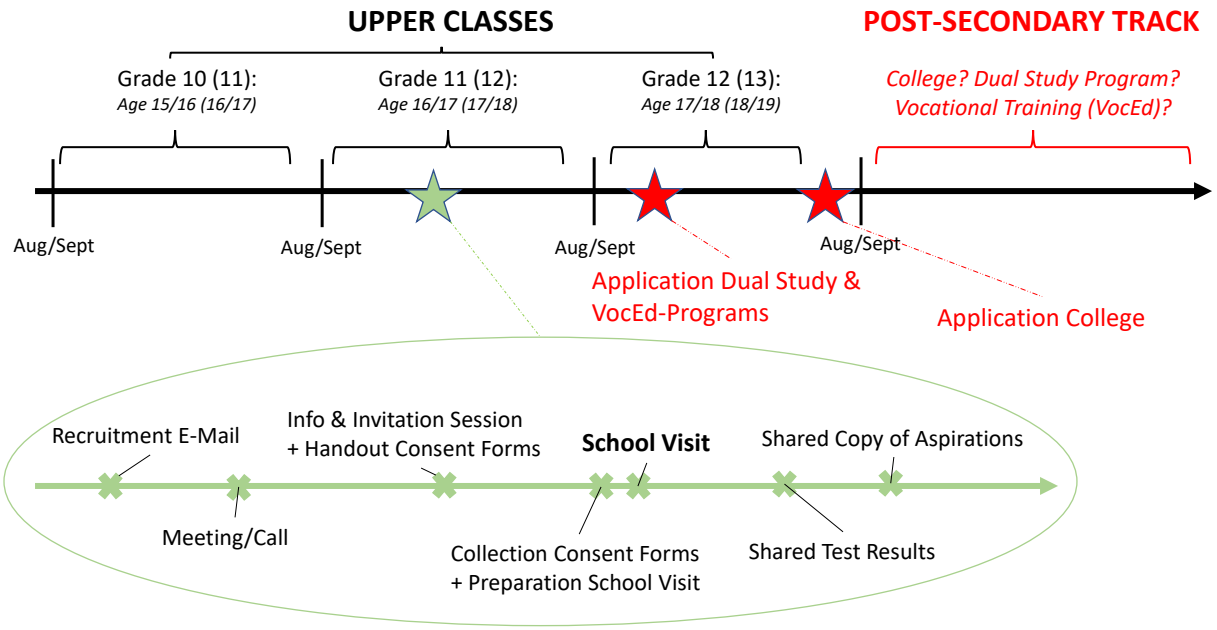
Notes: This graph is based on 2,862 observations from the NEPS. The y-axis reports the share (and the 95 percentconfidence intervals) of students ever attending college after having finished high school in waves 9 and 10 of cohort 4 of the NEPS dataset. A student (parent) is coded as aspiring to college if (s)he indicates such an aspiration in either wave 5 or 7 while being in the upper classes at high school.

Figure 2: Location of Participating Schools



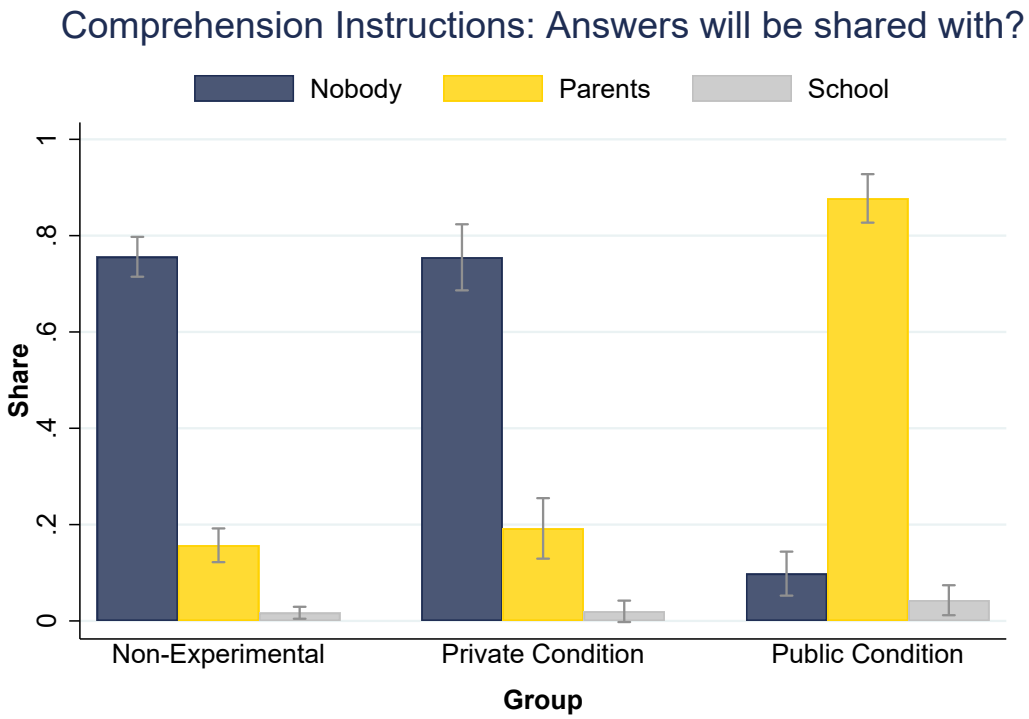
Notes: The map shows the state of North Rhine-Westphalia and the location of the 47 participating schools (green symbols) as well as localities where no school participated (red dots), but where there was at least 1 eligible school that was contacted. North Rhine-Westphalia is Germany's most populated state with a population of almost 18 million inhabitants, hosting 30 of the 81 biggest German cities. The metropolitan area "Rhine-Ruhr" along the two rivers of the same name is one of the World's largest metropolitan areas, where 10.5 million inhabitants and thus the majority of North Rhine-Westphalia's inhabitants lives. While participating schools span the whole area of North Rhine-Westphalia from south to north and east to west, most participating schools are from the "Rhine-Ruhr" area as can be seen from the cluster of schools stretching from Bonn over Cologne, Düsseldorf and Duisburg to Essen.

Figure 3: Timeline of Upper Classes, Postsecondary Career Choices and School Visits



Notes: This figure shows the timing of most school visits against high schools' upper classes with grades and typical ages of students for Gymnasien (and Gesamtschulen in brackets) and the start of most postsecondary career tracks. While students at Gymnasien currently finish after 12 years and upper classes are thus from grade 10 through grade 12, at Gesamtschulen you graduate after 13 years of schooling with upper classes comprising grades 11 through 12. Graduates at Gesamtschulen therefore tend to be one year older than their counterparts at Gymnasien, turning 18 already in their penultimate year of high school rather than in their last year of high school.
August/September of a year typically marks the start of a school year, with most vocational programs after high school also starting around this time and most university programs starting in September or October of the same year. Typical application deadlines for dual study and vocational training programs are between August of the year before starting the program and January/February of the same year. Applications for most college programs are not due until mid-July, and for some programs applications are not necessary at all and enrolling until sometime in October/November is sufficient.
Most of the students participated when they were in their penultimate year of high school (represented by the green star. The figure also zooms into steps in preparation and when following up with the school visits, from the recruitment e-mail to the principal and teachers responsible for the career planning curriculum at the beginning to sharing students' stated aspirations with them several weeks after the school visit.

Figure 4: Understanding of Experimental Instructions



Notes: The data shown here comes from a sub-sample of 741 students participating in the field experiment who were asked the following comprehension question after having seen the instructions: "who except you will we share your answer with?" Available options to check were "Nobody", "Parents" and "School". Students were not required to answer this question and as such, the shares for each group do not have to add up to 100%. On the x-axis, I distinguish between three groups: "non-experimental" are all those students for whom I do not randomize the instructions (e.g. because none of their parents is participating or they did not indicate contact details separate from their parents. "Control" are those who received the private instruction at random and "Treatment" are all those in the public condition.

Figure 5: School Visits: Format of the Career Planning Module (components & procedure)

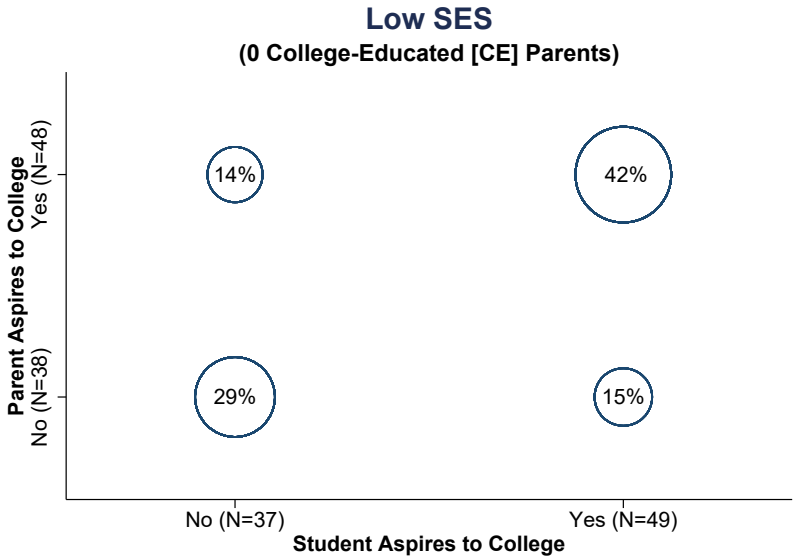
- The first block takes ca. 40 – 55 minutes to complete
- Block 1 starts with an **introduction** that serves several purposes:
  - Remind students of the reason for our school visit
  - Provide overview of school visit and instruct students on how to proceed in the next 90 – 150 minutes
  - Remind students that they can win expensive, private career advising sessions and that their session would be based on their statements in the "career survey"
- The **career survey** elicits students' aspirations for career tracks, fields/occupations and locations. It contains detailed instructions and informs students whether a copy of the questions and answers will only be shared with them or also with their parents
- The **background survey** asks students about their family background (such as parents' education), their beliefs about their parents' career preferences and for three scenarios "college", "dual study program" and "vocational training"
- As **personality test**, I use the Big Five Inventory (BFI-2) developed by Soto and John (2017)
- Most students (except the slower ones) also fill out an **interest test** (AIST-3)

- All students are given test materials and detailed instructions for the upcoming test
- Participants fill out the test modules at the same time and are given the same time constraints to standardize test supervision
- Depending on time allotted by the school, participants take one of two versions that both offer an estimate of overall reasoning:
  - A long version (the I-S-T 2000R) with 9 modules and separate scores for the three dimensions Verbal, Spatial and Numeric Reasoning. Students have 77 minutes to complete 9 modules, in total the test takes ca. 95 minutes
  - A short version (IST-Screening) with 3 modules. Students have 27 minutes to complete the 3 modules, the whole test takes ca. 35 minutes

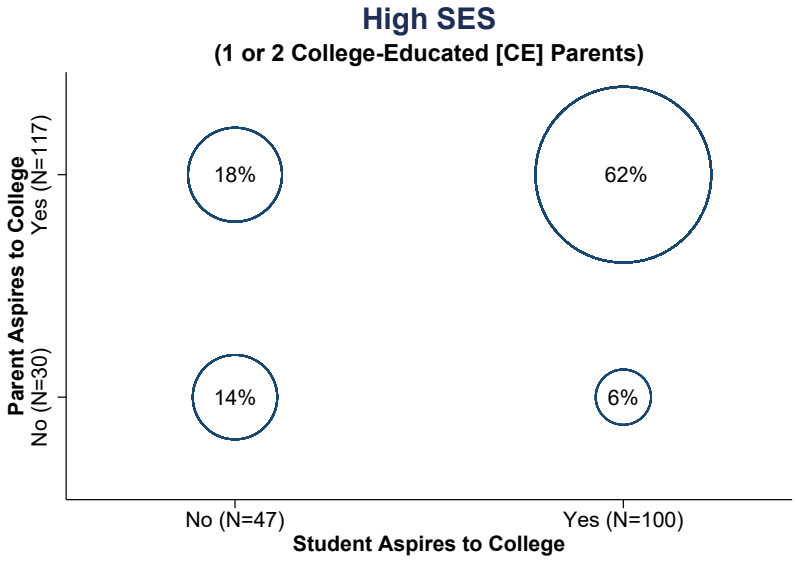
Notes: I developed both the career survey and background survey. The personality test is adopted from the German version of the Big Five Inventory (BFI-2) developed by Soto and John (2017). Licenses for both versions of the cognitive test (I-S-T 2000R and IST-Screening) as well as the interest test (AIST-3) were purchased in bulk from the Hogrefe Testzentrale. Schools were free to choose between the long format and the short format of the cognitive test, which mostly depended on how much time they were willing to grant me in total (and whether they wanted their students to get a brief glimpse in this type of test or a more detailed and more challenging version of such tests, as often encountered in assessment centers or career advising sessions). Registered parents received the invitation to fill out their survey while their children were working on block 1. They receive up to 6 reminders within the next 2 weeks to take the survey.
For the shift to the online format, I kept the overall structure of two blocks and made the following adjustments: students would start with the interest test and then complete the remaining surveys and tests in the same remaining order. After finishing block 1, students could choose between the short and long version of the test. If they chose the short version, they could choose when to take the test (including immediately after completing block 1). If they chose the long version, they had to book an appointment to take the test with remote instruction and supervision. In the online format, parents were only invited to fill out their survey after their children had completed block 1.

Figure 6: Students' vs. Parents' *Private* College Aspirations: Shares of Agreement & Disagreement

(a) Low SES

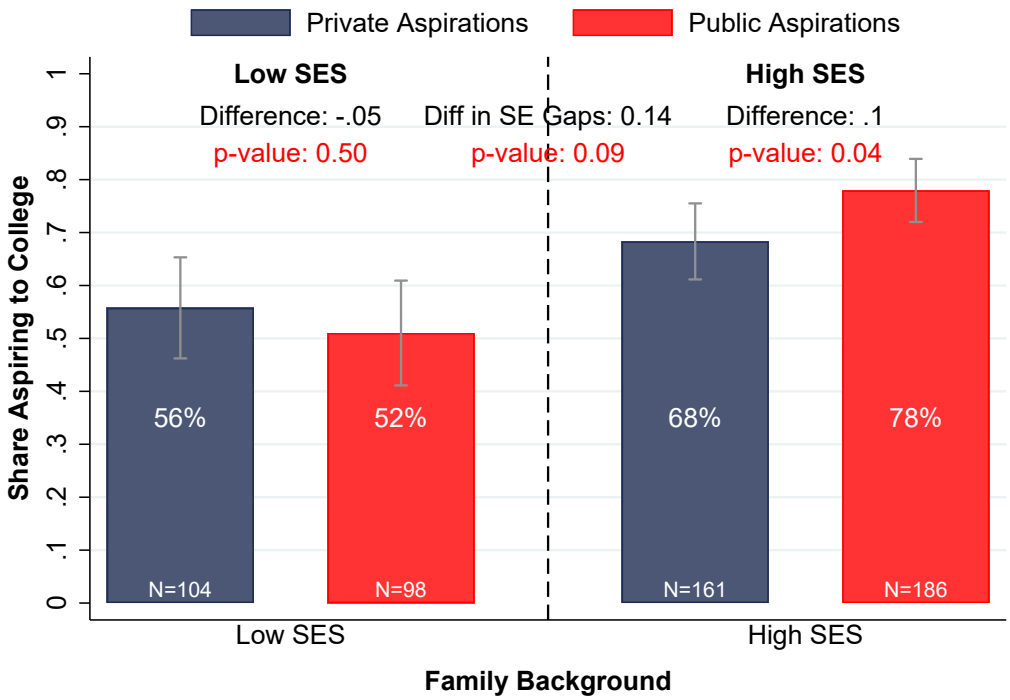


(b) High SES



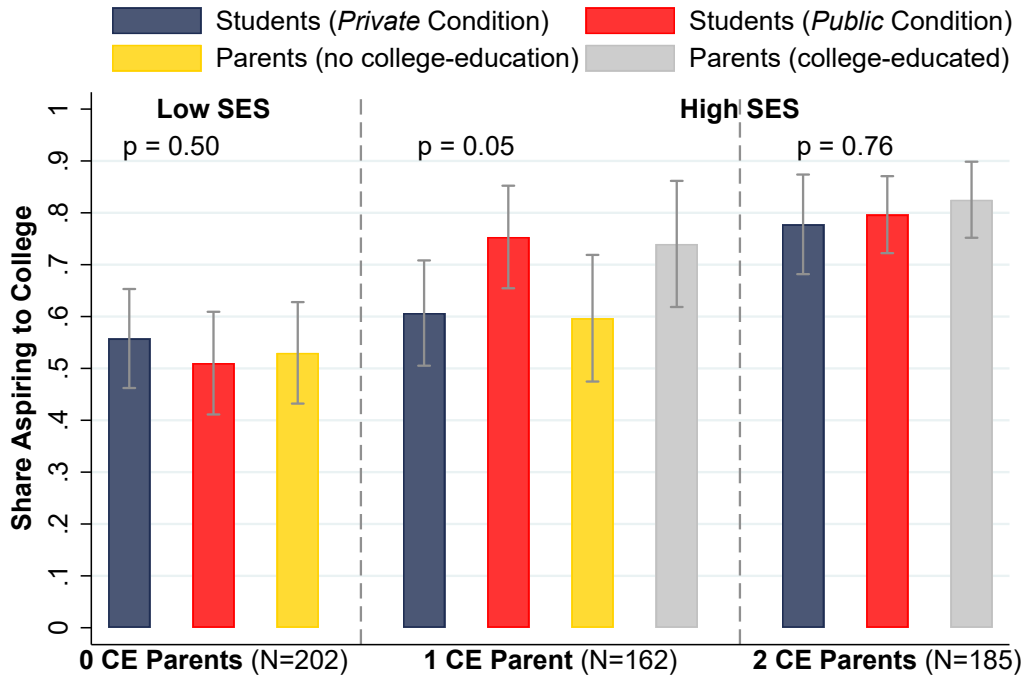
Notes: This figure shows the share of observations in agreement and disagreement with their parent(s) with respect to aspiring to college or not. It is is based on 233 students in the *private* condition of the visibility experiment who had at least one parent participate and fill out their aspirations for their children. The x-axis indicates whether students stated an aspiration to attend college or not, the y-axis indicates the equivalent for their parents. If two parents participated and one of them stated an aspiration for their child to attend college, this would take the value "yes". It is based on asking parents about their preferred option(s) for their child, without offering them the option of leaving it to the child. Panel a) and b) distinguish between children without any college-educated parent ("low SES") and children with at least one college-educated parent ("high SES"). These are 86 students from low socio-economic background and 147 from high socio-economic background.

Figure 7: Private and Public College Aspirations by SES



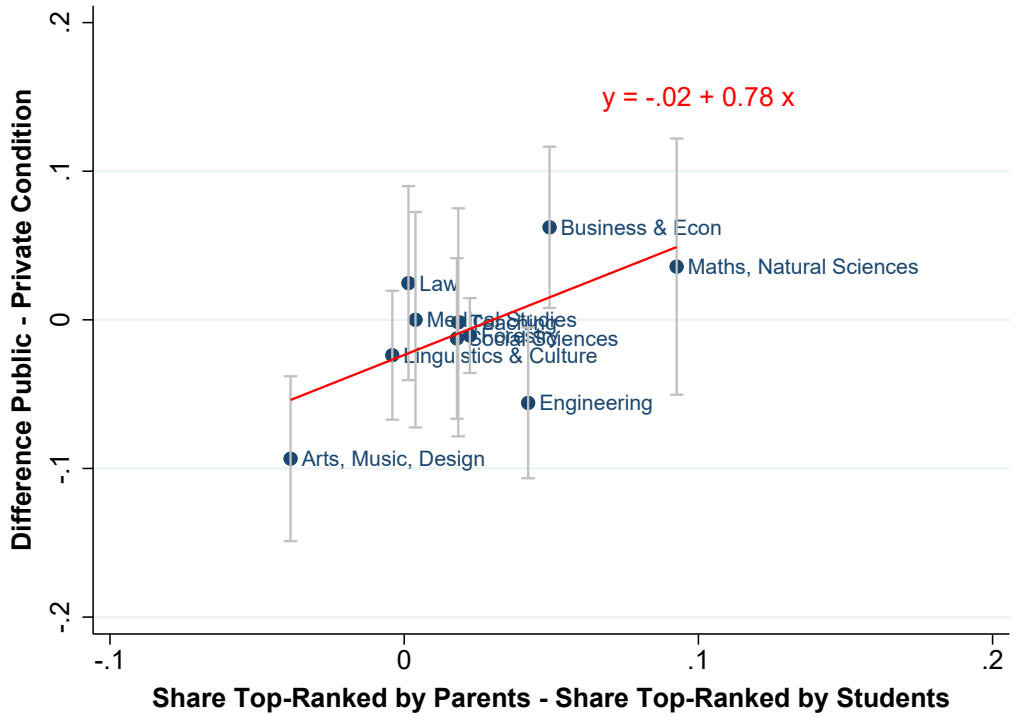
Notes: This figure presents the means and the 95 percent confidence intervals of the share of students aspiring to university in the private and the public condition, separately for students without any college-educated parent on the left side (termed "low SES (0 CE Parents)") and students with at least one college-educated parent on the right side (termed "high SES ($\geq$ 1 CE Parents)"). The graph is based on 549 students in the visibility experiment, of which 202 do not have any college-educated parent and 347 have at least one college-educated parent. The graph reports the p-value of the pairwise difference between the shares in the private and the public condition for low and high SES students as well as the p-value of the difference in the socio-economic gaps. The reported p-value corresponds to the p-value for the coefficient of β_3 as obtained from the following regression: College Aspiration$_i = \beta_0 + \beta_1$High SES$_i + \beta_2$Public$_i + \beta_3$High SES x Public$_i + \epsilon_i$. The estimation uses robust standard errors. More detailed results are reported in Table 2.

Figure 8: Student and Parent Aspirations by Number of College-Educated Parents



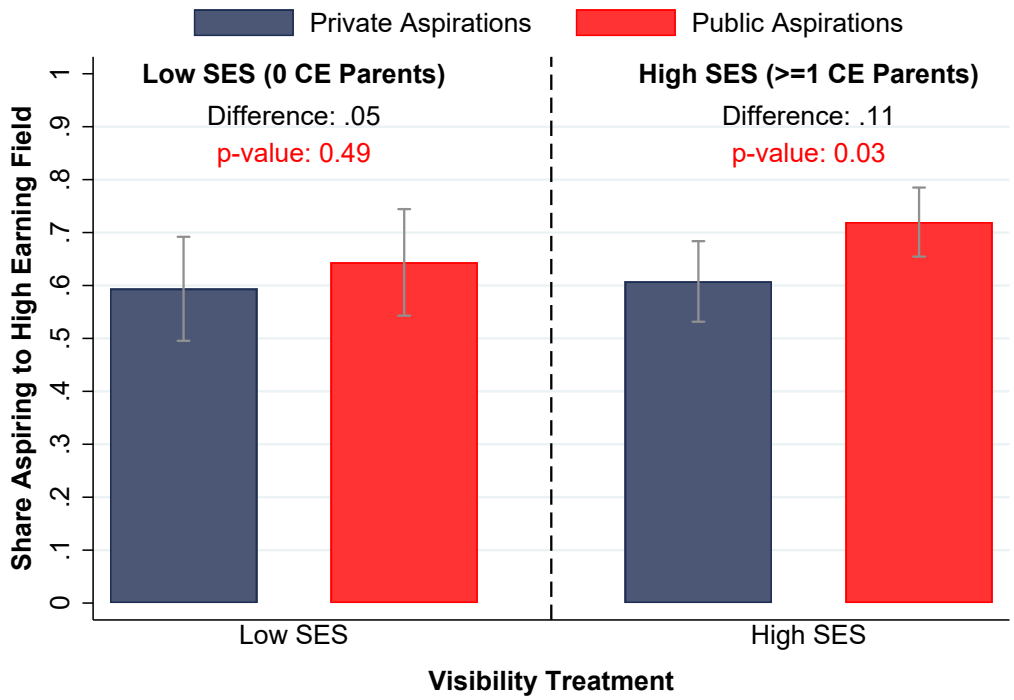
Notes: This figure presents the means and the 95 percent confidence intervals of the share of students aspiring to university in the private and the public condition, separately for students by the number of their college-educated parents (none, one or two). The figure also presents the means and the 95 percent confidence intervals of the share of parents aspiring to university in the private condition (when leaving it to one's child was not an option), distinguishing between parents without and with college education. The graph is based on 549 students part of the visibility experiment and 314 parents with a child part of the visibility experiment and in the private condition. 202 students have zero college-educated parents, 162 have one college-educated parent and 185 have two college-educated parents. These numbers are 100, 111 and 103 for the participating parents in the private condition, with those in the "1 CE Parent" households being 62 without college education and 49 with college education. The p-values reported stem from pairwise comparisons between students in the private and public condition for the different family backgrounds.

Figure 9: Visibility Experiment: Preferred Fields



Notes: This figure presents the relative disagreement between parents and students about different fields in the private condition (on the x-axis) and the difference between students' preferences for these fields in the public vs. the private condition (on the y-axis). The values on the x-axis display the difference between the share among parents in the private condition who rank a certain field top and the share among students in the private condition who rank the same field top. Students statements are more often single-peaked than parents such that most fields show a positive number. Nevertheless, the ordering is informative about the relative ranking of fields among parents vs. students. The y-axis displays the coefficient of regressing a dummy for ranking a given field top on a dummy for being in the public condition and the 95 percent confidence interval (based on robust standard errors). The regression line reports the results from regressing the coefficient on public on the difference in shares among parents minus students ranking a certain field top. The positive relationship indicates that an increased (lower) share of students report aspirations for those fields that parents find relatively more (less) attractive than students.
The data is based on asking students and parents to rate the attractiveness of ten fields on a scale from 0 points ("completely unattractive") to 100 points ("extremely attractive") and then assigning the dummy of being top-ranked to all fields receiving the student's or parent's highest rating. The ten fields are the following: "Agriculture and Forestry"; "Arts, Music, Design"; "Education"; "Linguistics and Culture"; "Social Sciences"; "Business and Economics"; "Engineering"; "Maths, Natural Sciences"; "Law"; "Medical Studies". 254 Students part of the visibility experiment gave their ratings for different fields in the private condition and 289 Parents with a child part of the visibility experiment and in the private condition did so. The coefficients for the difference between the public and private conditions is based on 523 students part of the visibility experiment who rated the fields in terms of their attractiveness.

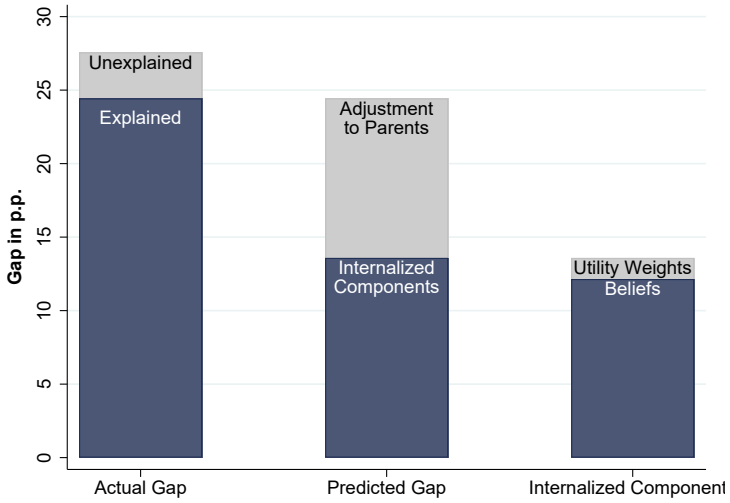
Figure 10: Visibility Treatment: Preferences for high earning fields by family background



Notes: This figure presents the means and the 95 percent confidence intervals of the share of students aspiring to a high earning field in the private and the public condition, separately for students without any college-educated parent on the left side (termed "low SES (0 CE Parents)") and students with at least one college-educated parent on the right side (termed "high SES ($\geq$ 1 CE Parents)"). The graph is based on 523 students in the visibility experiment who did rate the attractiveness of different fields. 183 students in this group do not have any college-educated parent and 340 have at least one college-educated parent. The graph reports the p-value of the pairwise difference between the shares in the private and the public condition for low and high SES students.
The dummy for aspiring to a high earning fields takes the value of 1 if a student aspires to one of the five fields with the highest average earnings among graduates of the respective field. The five fields with the highest average earnings among graduates are the following: "Business and Economics"; "Engineering"; "Maths, Natural Sciences"; "Law"; "Medical Studies". Accordingly, the five fields with relatively lower earnings are: "Agriculture and Forestry"; "Arts, Music, Design"; "Education"; "Linguistics and Culture"; "Social Sciences".

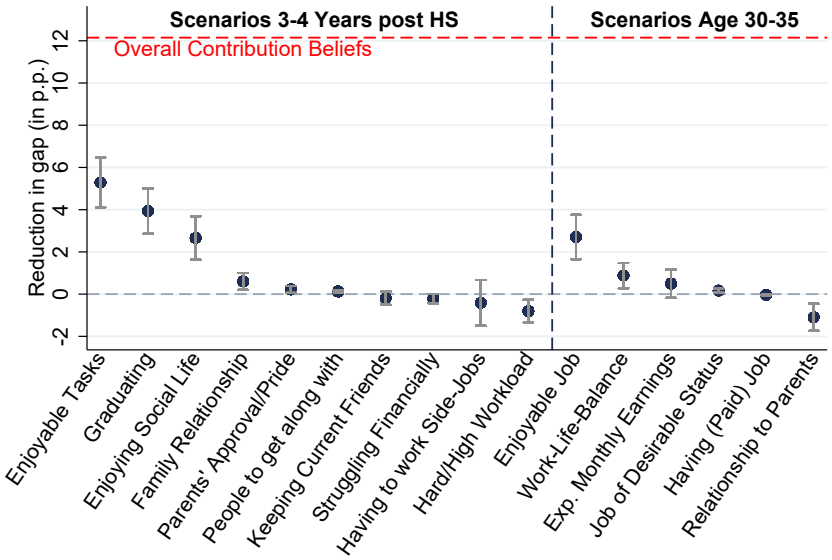
Figure 11: Structural Estimation: Core Results

(a) Decomposition of the socio-economic gap in (public) college aspirations



Notes: This figure reports the decomposition of the socio-economic gap in college aspirations, comparing first the overall gap to the explained gap by the model, decomposing the explained gap into the components direct transmission (adjustment to parents) and indirect transmission (utility differentials and beliefs) and finally decomposing the indirection transmission component into its constituent forces utility differentials and beliefs. The y-axis represents the size of the gap and each component's contribution to the gap.

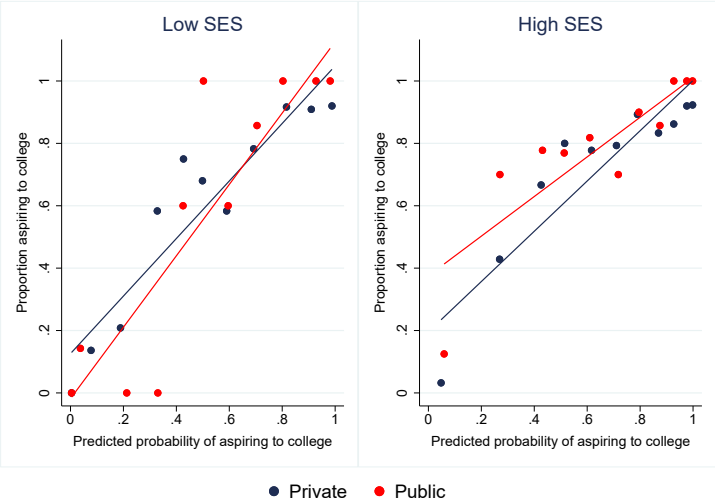
(b) Equipping low SES students with beliefs of high SES: Simulations



Notes: This figure reports the contributions of individual beliefs to closing the socio-economic gap. Positive (negative) values indicate a closing (widening) of the socio-economic gap by the respective amount. The individual contributions are estimated by replacing low SES students' distribution of subjective beliefs with respect to a specific scenario such as "parental support" (for undergraduate studies, dual studies and vocational training) with the respective distribution of beliefs among high SES students. Since there are fewer low SES students (N_L) than high SES students (N_H), I draw 100 random samples of N_L students from the pool of high SES students. Each individual simulation then sorts low and high SES students by their predicted probabilities of aspiring to college and replaces the n^{th} ranked low SES student's subjective beliefs by the n^{th} ranked high SES student's subjective beliefs. The confidence intervals are based on bootstrapped standard errors from 100 repetitions.

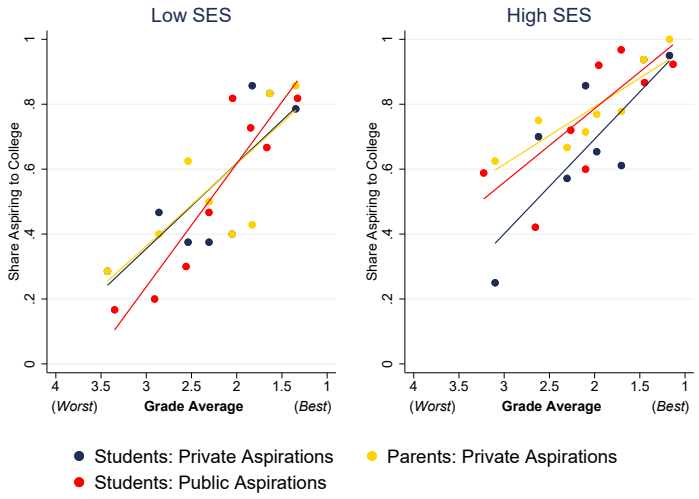
Figure 12: Heterogeneities in Adjusting to one's Parents

(a) Subjective Beliefs: College Aspirations in the Public Condition against Predicted Probability to aspire to college



Notes: This figure shows bin-scatterplots of the share of students aspiring to college as a function of students' predicted probability of aspiring to college. The predicted probability is obtained by first estimating the baseline model that only incorporates students' subjective expectations and then calculating the predicted probability based on each individual's beliefs.

(b) Grades: Students' Private & Public vs. Parents' Private Aspirations against students' grade average



Notes: This figure shows bin-scatterplots of the share of students and parents aspiring to college as a function of students' reported grade average, for both students without any college-educated parents on the left side and students with at least one college-educated parent on the right side. Passing grade averages in Germany range from 4.0 to 1.0, with lower grades representing better grades. The median grade average in my overall sample is 2.2. 524 students in the visibility experiment reported their own grade average such that the left graph is based on 185 students and the right graph on 339 students.

Tables

Table 1: Descriptive Statistics for Schools, Students and Parents

Panel A: Schools

	All	Gymnasien	Gesamtschulen
N	47	35	12
Urban	33	25	8
Participants	1,195	836	359
Part of Experiment	549	430	119
Grade Average	2.21	2.12	2.45
% Participants High SES	0.52	0.64	0.26
% Migration Background	0.37	0.28	0.55
% at least 1 Parent Registered	0.57	0.65	0.39

Panel B: Students

	All	Part of Experiment?		Treatment Group?		Balance
		No	Yes	Private	Public	p-value
N	1,195	646	549	265	284	
Male	0.39	0.38	0.39	0.41	0.38	0.43
Penultimate Year	0.71	0.74	0.68	0.67	0.69	0.52
Ultimate Year	0.16	0.18	0.14	0.13	0.14	0.79
Grade Average	2.21	2.33	2.09	2.12	2.06	0.25
$\geq$ 1 Registered Parent	0.57	0.22	1	1	1	-
# Registered Parents	0.81	0.30	1.40	1.40	1.40	0.91
Registered Mom	0.52	0.19	0.88	0.89	0.88	0.70
Registered Dad	0.33	0.13	0.56	0.55	0.57	0.47
High SES	0.52	0.43	0.63	0.61	0.65	0.27
$\geq$ 1 Immigrant Parent	0.37	0.49	0.22	0.20	0.24	0.18
2 Immigrant Parents	0.23	0.34	0.11	0.10	0.11	0.62

Panel C: Parents

	All
N	819
Female	0.64
College-Educated	0.52
0 CE-Parent HH	0.31
Non-CE in 1 CE HH	0.16
CE in 1 CE HH	0.13
2 CE Parents	0.39
Immigrated	0.13

Notes: Panels A to C report key variables for participating schools, students and parents. Panel A breaks down information by the two type of schools *Gymnasien* and *Gesamtschulen*. Panel B provides information on all students as well as by their status of being part of the experiment or not and by being in the private or the public condition in the visibility experiment. The right column under "Balance" reports the p-value for the difference between the private and the public condition. The p-value (under robust standard errors) is obtained by regressing the respective variable on a dummy for being in the public condition while controlling for school fixed effects (as randomization happened at the individual level within schools). Panel C provides some key statistics on participating parents.

Table 2: The Visibility Experiment: The Effect on College Aspirations

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
	Dependent Variable: Indicator for Aspiring to College									
Public Condition	.05	.06	−.05	−.05	−.05	−.05	−.1	.11**	.15*	.04
	(.04)	(.04)	(.07)	(.07)	(.07)	(.07)	(.08)	(.05)	(.08)	(.06)
High SES			.13**	.01						
			(.06)	(.07)						
Public Condition x High SES			.14*	.16*						
			(.09)	(.09)						
1 College-Educated (CE) Parent					.05	−.03				
					(.07)	(.08)				
2 CE Parents					.22***	.07				
					(.07)	(.08)				
Public Condition x 1 CE Parent					.19*	.2*				
					(.1)	(.1)				
Public Condition x 2 CE Parents					.07	.12				
					(.09)	(.09)				
Mean in *Private*	.63	.63					.56	.68	.61	.78
Mean Low SES (0 CE) in *Private*			.56	.56	.56	.56				
Sample	All						Low SES	High SES	1 CE	2 CE
N	549	549	549	549	549	549	202	347	162	185
R^2	0	.13	.05	.14	.06	.15	.18	.15	.22	.24
School-FE	NO	YES	NO	YES	NO	YES	YES	YES	YES	YES

Notes: This table presents the results of OLS regressions of a dummy variable for students' stated college aspirations on being part of the *public* condition (for all columns), and on being from a high SES family and the interaction term of the two (for columns (3) and (4)). Columns (5) and (6) instead include indicators for having 1 or 2 College-Educated Parents and interaction terms of these with being in the *public* condition. Finally, columns (7)-(10) report the effect of being in the *public* condition for the 4 groups of low SES students (those with 0 College-Educated Parents), high SES students, students with 1 College-Educated Parent and students with 2 College-Educated Parents. Columns (2), (4), (6) and (7) to (10) include school fixed effects. Robust standard errors are reported in brackets below coefficients, $^{***}p < .01$, $^{**}p < .05$, $^{*}p < .1$.

Table 3: Maximum Likelihood Conditional Logit Estimates for Dependent Variable Aspiring to College, Dual Study Program or Vocational Training

	Low SES		High SES		High - Low SES
	Choice Model	WTP (€)	Choice Model	WTP (€)	Choice Model
Exp. Monthly Earnings (in '000s €)	.21*** (.08)	-	.23**(.1)	-	.02(.13)
Adjustment Utility College (λ_{College})	.06 (.51)	263 (2421)	.98** (.49)	4321 (3024)	.93 (.71)
Adjustment Utility Dual ($\lambda_{\text{Dual Study}}$)	−.46 (.54)	−2186 (2669)	−.44 (.58)	−1949 (2649)	.02 (.79)
Enjoying Social Life	2.4** (.94)	113* (60)	1.37 (.96)	60 (50)	−1.03 (1.35)
Meeting People Gets Along With	.14 (1.11)	6 (52)	.8 (1.08)	35 (50)	.66 (1.55)
Maintaining Good Relationship w/ Family	1.79 (1.69)	84 (91)	5.24* (2.71)	230 (155)	3.45 (3.2)
Having Parents' Approval & Pride	.56 (1.22)	26 (59)	2.63* (1.39)	115 (85)	2.07 (1.85)
Maintaining Good Relationship w/ Friends	−.52 (.93)	−25 (44)	−1.2 (1.39)	−53 (65)	−.68 (1.68)
Finding Material/Tasks Exciting & Enjoyable	4.06*** (1.03)	191** (86)	3.72*** (1.18)	163* (90)	−.34 (1.56)
Finding " Too Hard/ Workload Too High	1.34 (.89)	63 (51)	.94 (.99)	41 (49)	−.4 (1.33)
Struggling Financially	.46 (.73)	22 (36)	−.84 (.87)	−37 (40)	−1.3 (1.13)
Having to Work Besides Main Responsibilities	1.47*** (.47)	69** (35)	1.48*** (.45)	65* (35)	.01 (.65)
Finishing Program and Graduating	3*** (.88)	141* (66)	4.15*** (.92)	182** (90)	1.15 (1.27)
Having a (Paid) Job	−.07 (1.25)	−3 (59)	.4 (1.4)	18 (63)	.47 (1.88)
Enjoying Job (Conditional On Having Paid Job)	3.74*** (1.25)	176* (94)	2.69* (1.4)	118 (80)	−1.05 (1.88)
Having Good Relationship to Parents in 30s	−2.95 (3.2)	−139 (161)	−3.24 (3.54)	−143 (168)	−.29 (4.77)
Combining Work and Social Life/ Family	2.23* (1.28)	105 (74)	−.12 (1.45)	−5 (64)	−2.35 (1.93)
Achieving Job of Desirable Status	.23 (1.04)	11 (49)	4.02*** (1.31)	177 (111)	3.79** (1.67)
Observations	323		423		746

Notes: This table represents the estimated conditional logit results (via Maximum Likelihood) - coefficients and standard errors in brackets – for both students from low and high SES families and the difference between the two. The table also contains conversions of these estimates into a willingness to pay (WTP) for a 1 percentage point increase in the underlying belief (or for λ_j switching off visibility completely). The rows indicate the estimated component (λ_j, expected earnings or the respective scenario title). Note that the estimated coefficients for the 15 scenarios represent the estimates of the utility differentials in the model: $\Delta u_k(X_s)$. For all scenarios, WTP is calculated as $WTP_k = 1,000\frac{0.01\times\Delta u_k}{\gamma}$. For λ_j however, it is calculated as $WTP_j = \frac{\lambda_j}{\gamma}$ Standard errors for the willingness to pay calculations are calculated using the delta method.

Table 4: Intergenerational Transmission of Beliefs: Perceived Returns to College vs. Vocational Training (Pooled Scenarios)

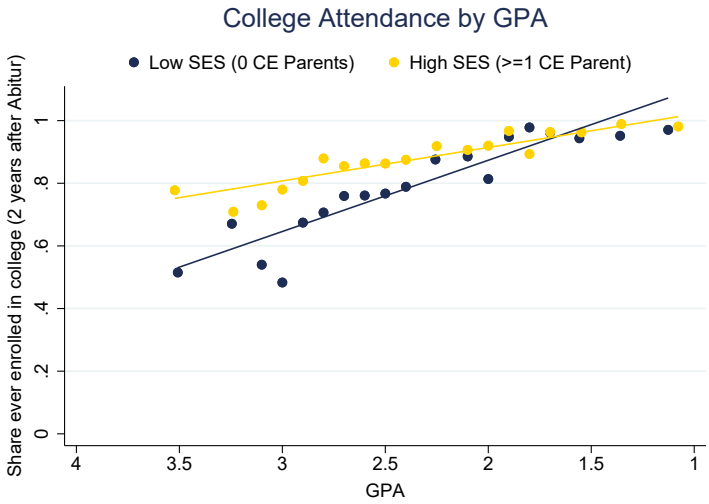
	Dep. Variable: Students' Beliefs ($\pi_{s,\mathbf{college},k} - \pi_{s,\mathbf{VocEd},k}$)			
	All Parents	Mothers	Fathers	Mothers vs. Fathers
Parent's Beliefs ($\pi_{p,\text{college},k} - \pi_{p,\text{VocEd},k}$)	.45***			
	(.03)			
Mother's Beliefs ($\pi_{m,\text{college},k} - \pi_{m,\text{VocEd},k}$)		.44***		.32***
		(.03)		(.05)
Father's Beliefs ($\pi_{f,\text{college},k} - \pi_{f,\text{VocEd},k}$)			.48***	.31***
			(.04)	(.04)
High SES	.04***	.03**	.04**	.05*
	(.01)	(.02)	(.02)	.03
Constant	-.01	-.01	-.02	-.03
	(.01)	(.01)	(.02)	(.03)
N	7,526	4,627	2,809	1,470
R^2	.16	.16	.16	.23

Notes: Each column presents the results of a separate regression of students' perceived returns to college over vocational training $\pi_{s,\text{college},k} - \pi_{s,\text{VocEd},k}$) on the perceived returns by their parents (column 1), their mothers (column 2), their fathers (column 3), or on both, their mothers and fathers (column 4) for those with both parents participating. For the purpose of these regressions, beliefs for all scenarios are pooled.

A Appendix

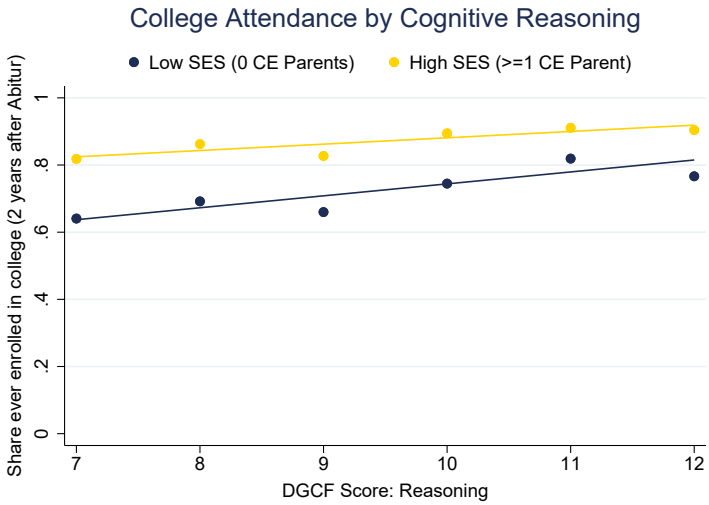
A.1 Figures

Figure A1: Socio-Economic Gap by Grade Average



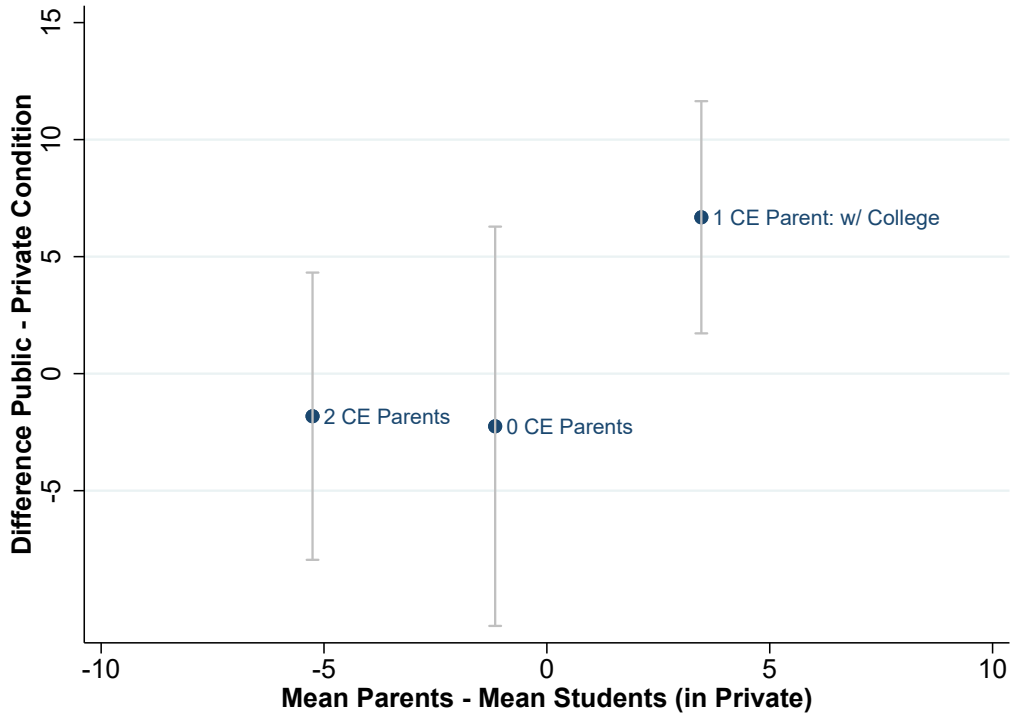
Notes: This figure presents the share of students in the German National Educational Panel Study (NEPS) ever having attended college by ca. 2.5 years after high school (by wave 10) conditional on the GPA for their *Abitur* (their university entry qualification) in a bin-scatter-plot. The shares are presented separately for students without any college-educated parent in blue (termed "low SES (0 CE Parents)") and students with at least one college-educated parent in yellow (termed "high SES ($\geq$ 1 CE Parents)"). The data is based on 2,714 students with available GPAs. Note that in Germany, the lower the GPA the better.

Figure A2: Socio-Economic Gap by Cognitive Scores



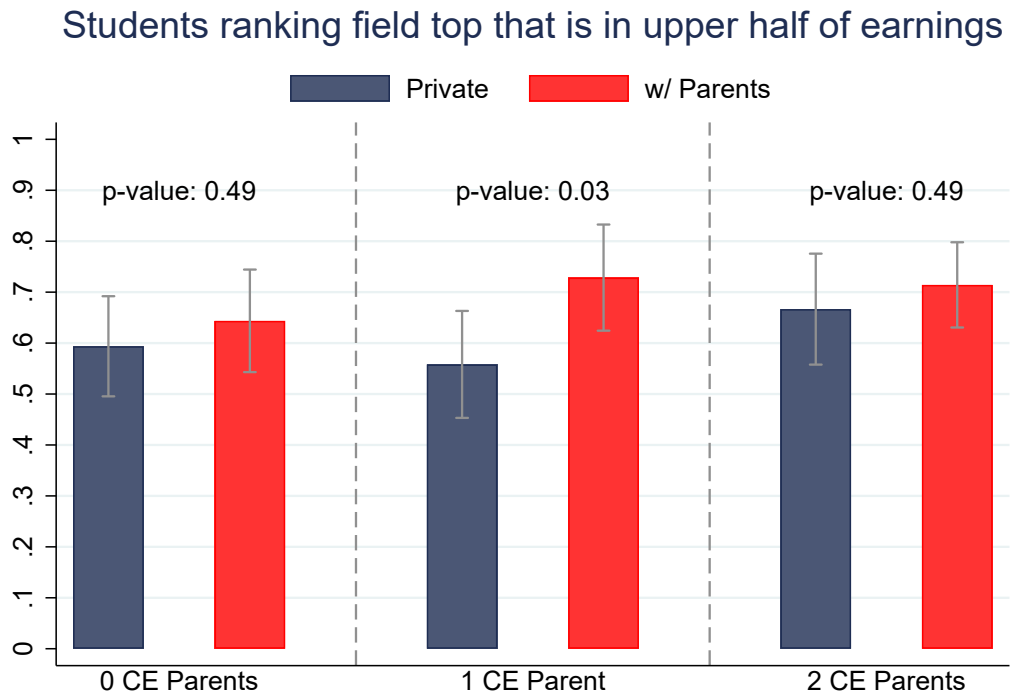
Notes: This figure presents the share of students in the German National Educational Panel Study (NEPS) ever having attended college by ca. 2.5 years after high school (by wave 10) conditional on their performance on a cognitive test during high school in a bin-scatter-plot. The shares are presented separately for students without any college-educated parent in blue (termed "low SES (0 CE Parents)") and students with at least one college-educated parent in yellow (termed "high SES ($\geq$ 1 CE Parents)"). The data is based on 2,717 students with cognitive scores available. The higher the score, the better.

Figure A3: Visibility Experiment: Continuous Preference for College vs. VocEd



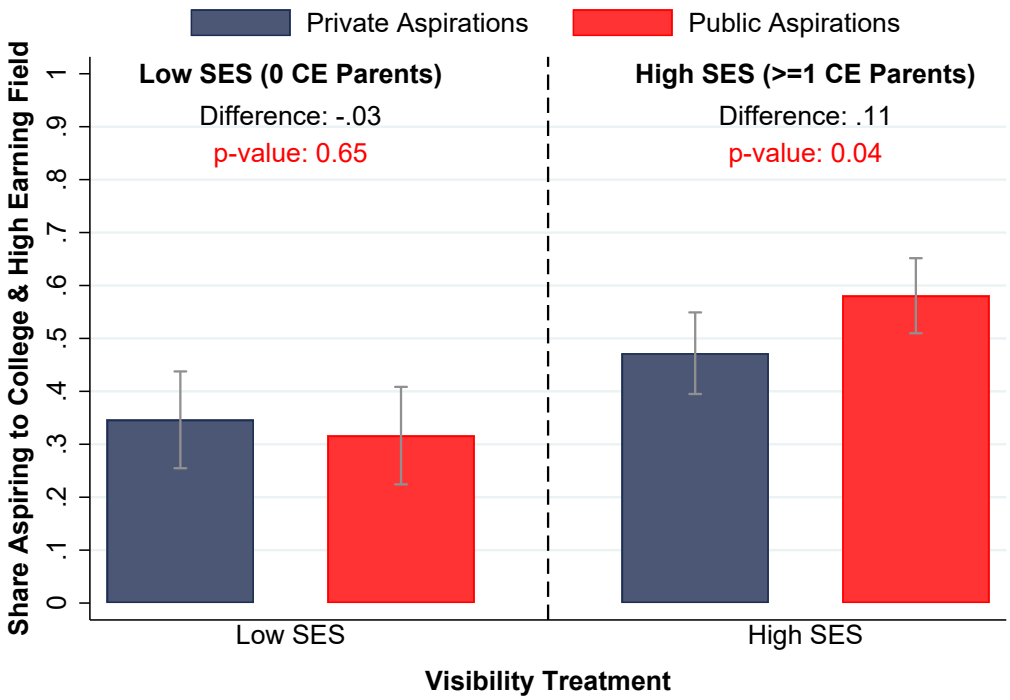
Notes: This figure presents the relative disagreement between parents and students about the intensity of their preference for going to college or vocational training (on the x-axis) and the difference between students' continuous in the public vs. the private condition (on the y-axis). Students and parents were asked how much they prefer to pursue vocational training vs. going to college on a scale of 0 to 100, where 0 stands for "vocational training for sure" and 100 represents "college for sure". The values on the x-axis display the difference between the mean value among parents in the private condition and the mean value among students in the private condition. The y-axis displays the coefficient of regressing students' stated values on a dummy for being in the public condition and the 95 percent confidence interval (based on robust standard errors). 259 Students part of the visibility experiment gave their rating in the private condition and 305 Parents with a child part of the visibility experiment and in the private condition did so. The coefficients for the difference between the public and private conditions is based on 542 students part of the visibility experiment who stated a continuous preference for the two alternatives.

Figure A4: Visibility Treatment: Preferences for high earning fields by family background



Notes: This figure presents the means and the 95 percent confidence intervals of the share of students aspiring to a high earning field in the private and the public condition, separately for students without any college-educated parent ("0 CE Parents"), with one college-educated parent ("1 CE Parent") or two college-educated parents ("2 CE Parents"). The graph is based on 523 students in the visibility experiment who did rate the attractiveness of different fields. 183 students in this group do not have any college-educated parent, 156 have one college-educated parent and 184 have two college-educated parents. The graph reports the p-value of the pairwise difference between the shares in the private and the public condition for these three groups of students.
The dummy for aspiring to a high earning fields takes the value of 1 if a student aspires to one of the five fields with the highest average earnings among graduates of the respective field. The five fields with the highest average earnings among graduates are the following: "Business and Economics"; "Engineering"; "Maths, Natural Sciences"; "Law"; "Medical Studies". Accordingly, the five fields with relatively lower earnings are: "Agriculture and Forestry"; "Arts, Music, Design"; "Education"; "Linguistics and Culture"; "Social Sciences".

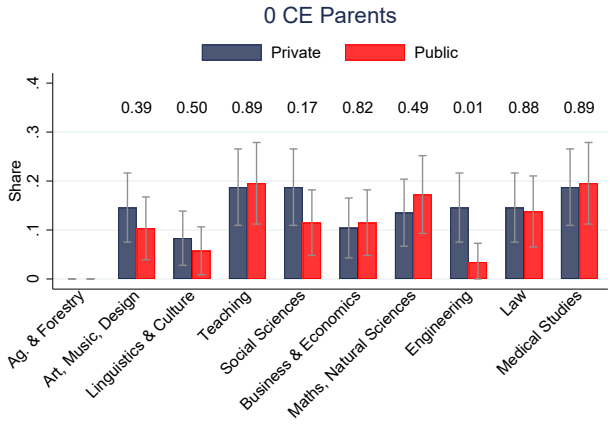
Figure A5: Private and Public Aspirations for High Earning Field at College by SES



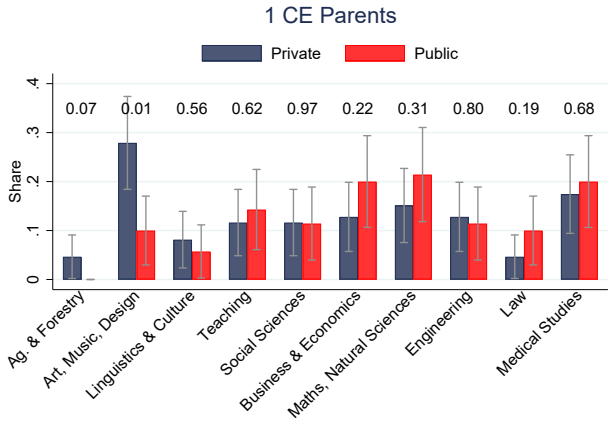
Notes: This figure presents the means and the 95 percent confidence intervals of the share of students who aspire to university AND to a high earning field at university in the private and the public condition, separately for students without any college-educated parent on the left side (termed "low SES (0 CE Parents)") and students with at least one college-educated parent on the right side (termed "high SES ($\geq$ 1 CE Parents)"). The graph is based on 523 students in the visibility experiment who did rate the attractiveness of different fields. 183 students in this group do not have any college-educated parent and 340 have at least one college-educated parent. The graph reports the p-value of the pairwise difference between the shares in the private and the public condition for low and high SES students.
The dummy for aspiring to a high earning fields takes the value of 1 if a student aspires to one of the five fields with the highest average earnings among graduates of the respective field. The five fields with the highest average earnings among graduates are the following: "Business and Economics"; "Engineering"; "Maths, Natural Sciences"; "Law"; "Medical Studies". Accordingly, the five fields with relatively lower earnings are: "Agriculture and Forestry"; "Arts, Music, Design"; "Education"; "Linguistics and Culture"; "Social Sciences".

Figure A6: Visibility Experiment: Effects by Parental Background

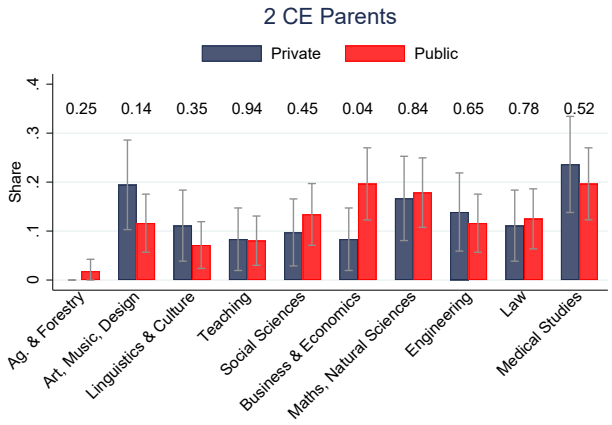
(a) 0 College-Educated Parents



(b) 1 College-Educated Parents

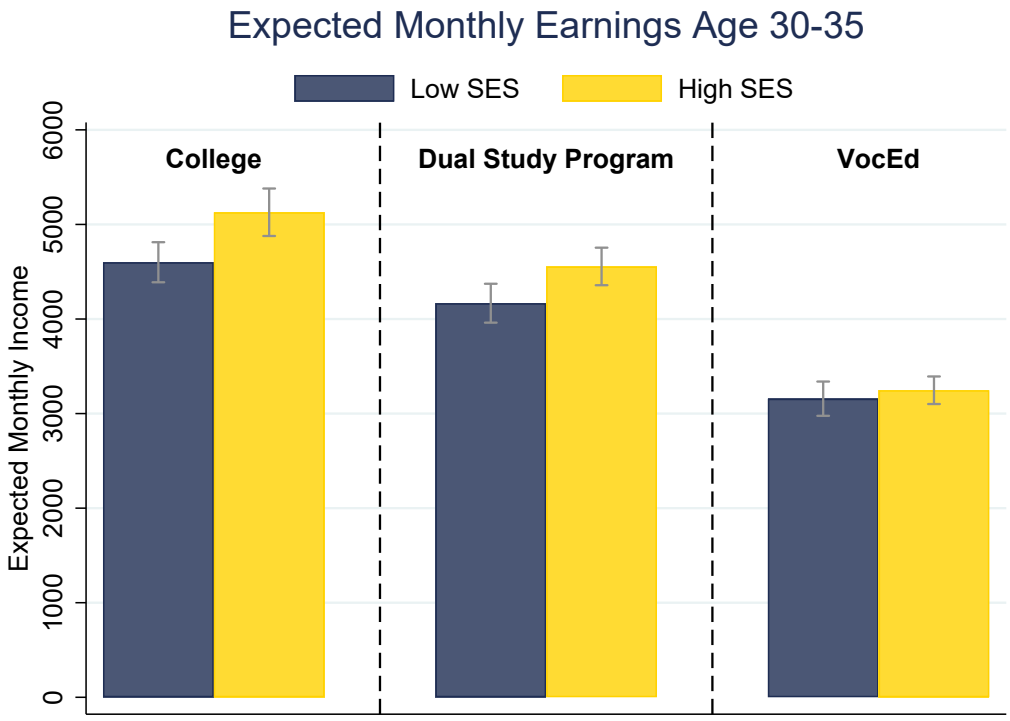


(c) 2 College-Educated Parents



Notes: This graph reports the share (and 95% CI) of 523 students aspiring to the different fields of study in the *private* and the *public* condition, separately for those with 0, 1 and 2 college-educated parents. The p-values reported indicate a simple comparison between these groups.

Figure A7: Expected Monthly Earnings (Gross) at an age of 30-35

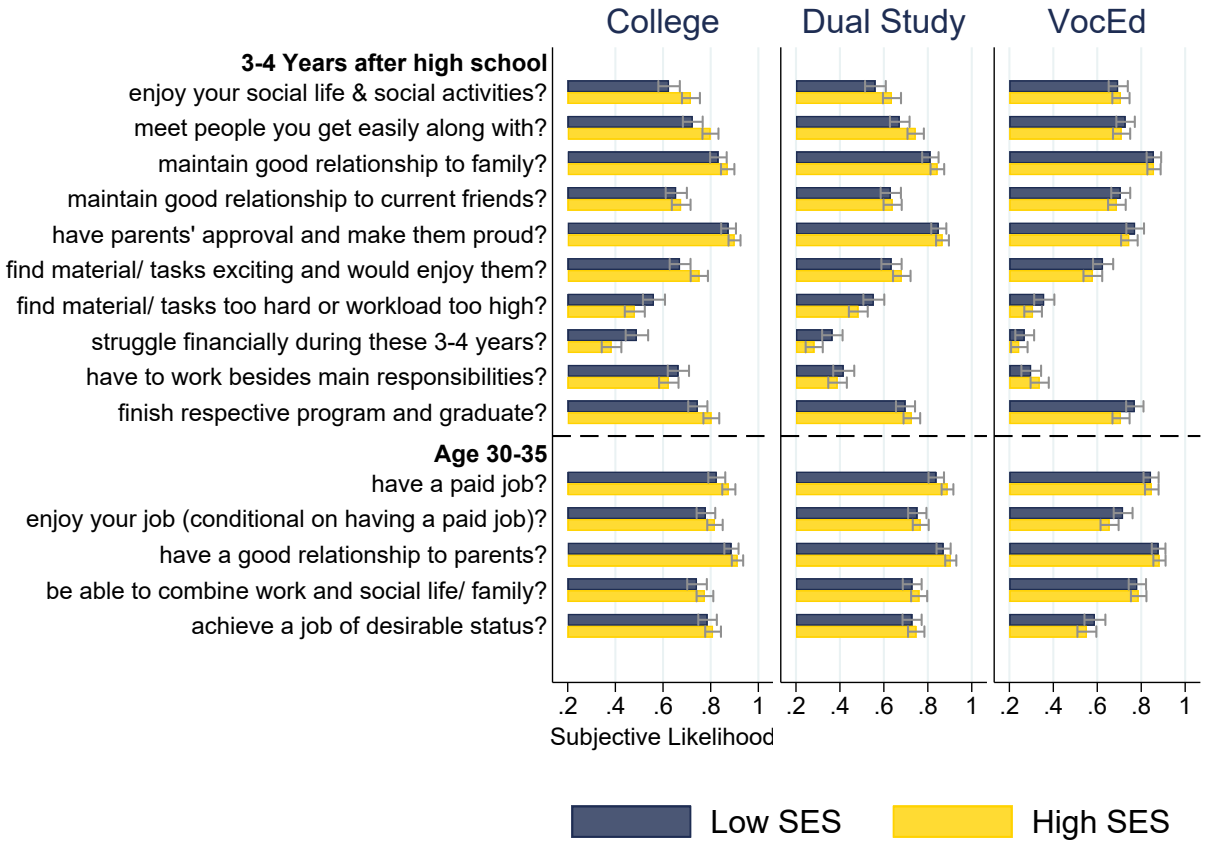


Notes: This graph portrays the mean (and 95% confidence interval) of students' answer to following question about their likely gross income at an age of 30 to 35: "Assuming you work full-time and there is no inflation, which monthly gross income (before taxes) in € do you consider likely for yourself at an age of 30 to 35 in each scenario (college, dual study program, vocational training)?" Expectations are reported separately for students from low and high SES families.

Figure A8: Subjective Beliefs for immediate and future scenarios

Scenarios 3-4 Years after High School: Try to imagine your life during the 3 to 4 years after high school (and a potential gap year) for the cases that you pursue vocational training, a dual study program or undergraduate studies. How would you imagine your life to be during those 3-4 years in these scenarios? Please estimate for all three scenarios (undergraduate studies, dual study programs, vocational training), how certain you are on a scale of 0 (extremely unlikely) to 100 (absolutely certain) that you will...

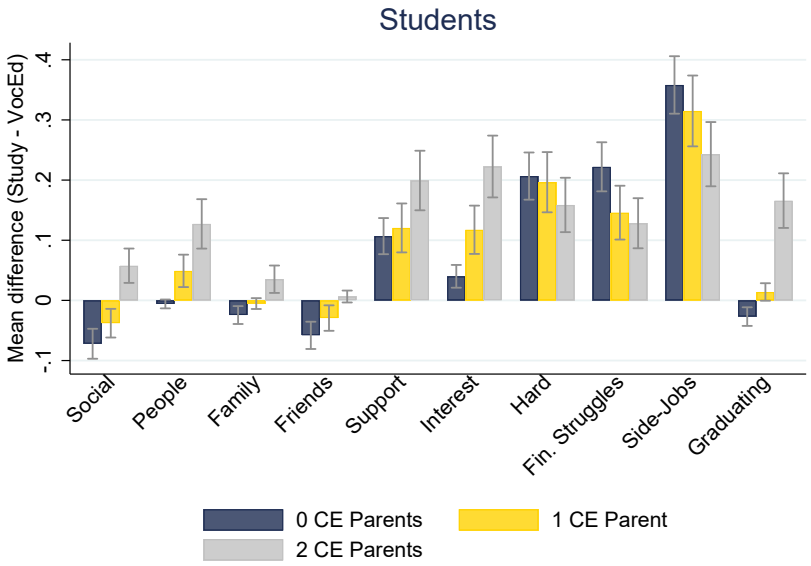
Scenarios Age 30-35: Now please imagine again for all three scenarios (...) that at the age of 30 to 35 you will...



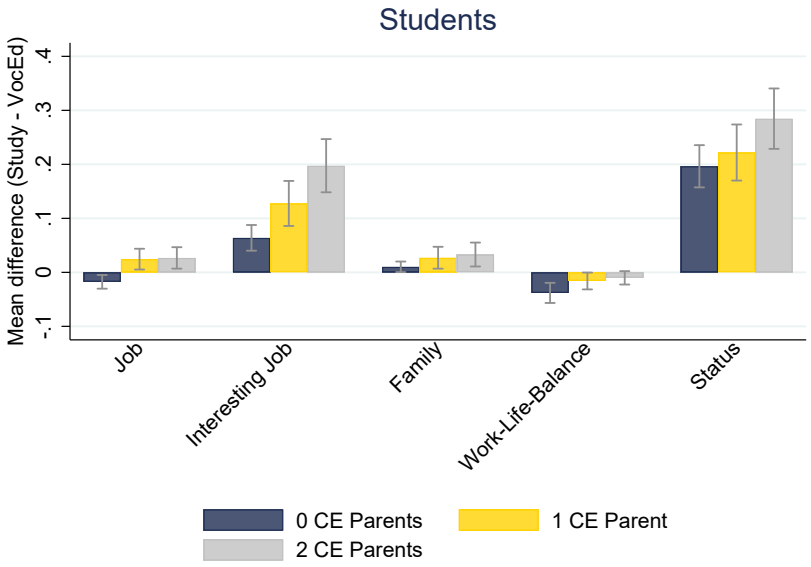
Notes: This figure presents the mean (and 95% confidence interval) of students' (likelihood) beliefs for the 15 scenarios detailed presented to students. Beliefs are reported for both students from low and high SES families and presented for college, dual study programs and vocational training. Parents were asked equivalent questions for their children's future (with the exception of the question about friends).

Figure A9: Perceived Returns of Going to College (rather than pursuing Vocational Training)

(a) Immediate Returns

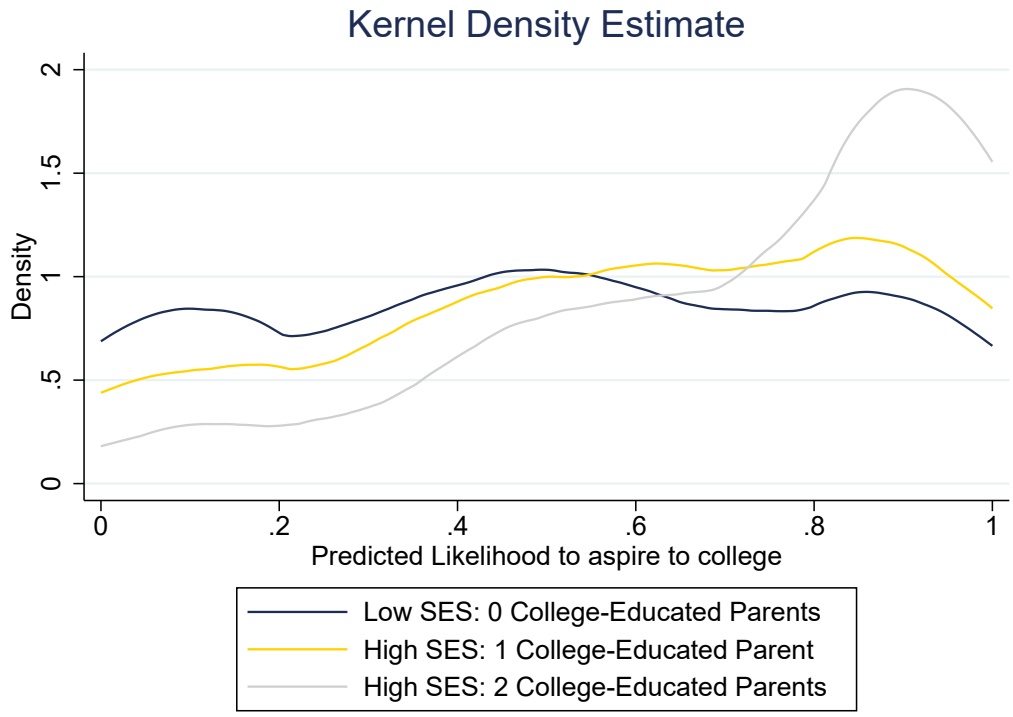


(b) Future Returns



Notes: Displayed here are the perceived returns (and 95%-confidence intervals) to going to college rather than vocational training, obtained by subtracting the subjective beliefs for vocational training from those for college for each specific scenario. Positive Numbers indicate that students judge the relevant aspect to be more likely to materialize in case of going to college than when pursuing vocational training. The returns are split by the number of college-educated parents (0, 1 or 2).

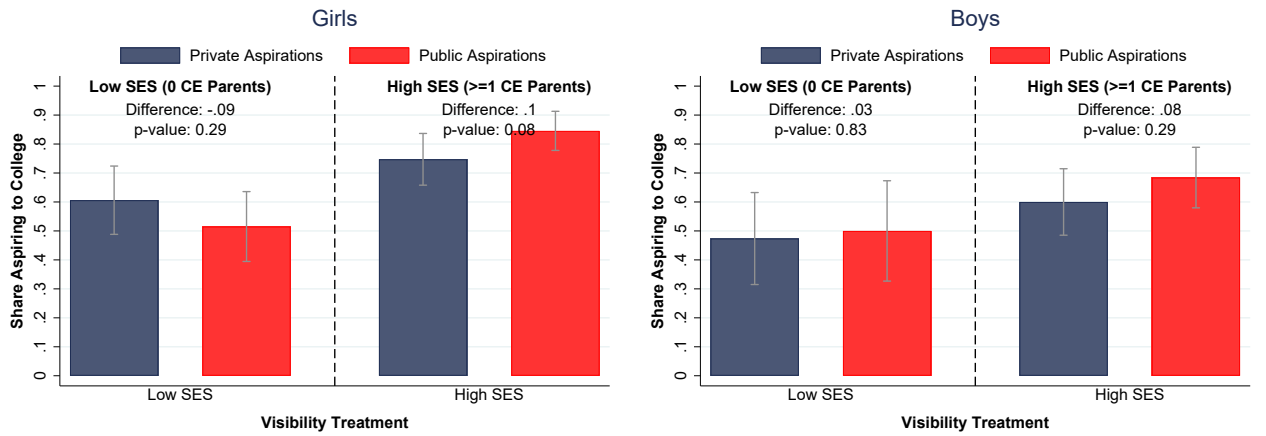
Figure A10: Predicted Probability of Aspiring to College based on Students' Beliefs, by Parental Background



Notes: This figure visualizes the estimated kernel density of students' predicted likelihood to aspire to college based on their stated subjective beliefs, separately for those with 0, 1, and 2 college-educated parents. For each individual, a likelihood is predicted in the following way: first, I estimate the choice model for students in the private condition only (via maximum likelihood estimation of the conditional logit), separately by low and high SES background. Using these estimated utility weights, for each individual with stated subjective beliefs, I can then calculate the predicted likelihood of aspiring to college by plugging in the beliefs into the estimated subjective expected utility model.

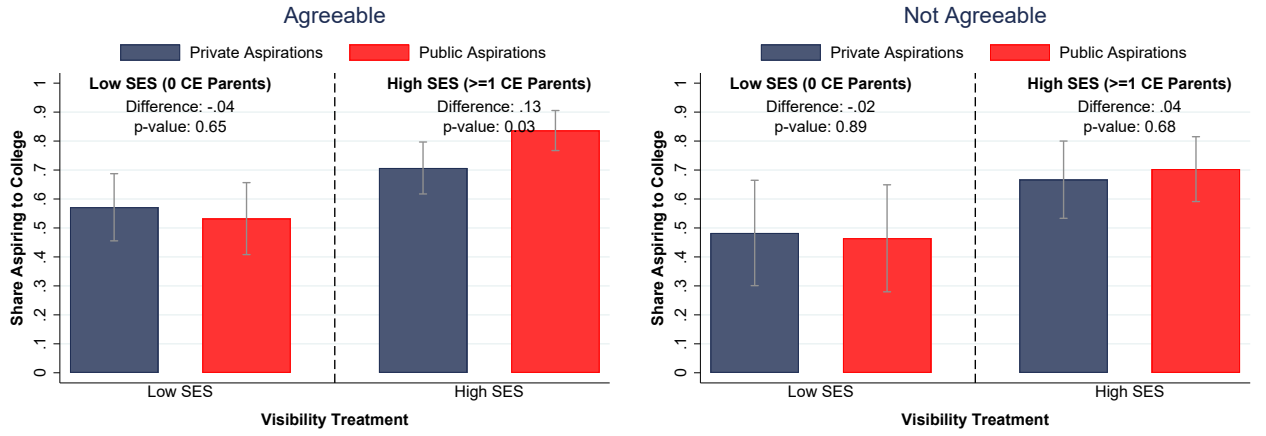
Figure A11: Visibility Experiment and Socio-Economic Gaps

(a) By Gender



Notes: Subfigure a) splits students into girls on the left side and boys on the right side. Each of the two graphs presents the means and the 95 percent confidence intervals of the share of students aspiring to university in the private and the public condition, separately for students without any college-educated parent on the left side (termed "low SES (0 CE Parents)") and students with at least one college-educated parent on the right side (termed "high SES ($\geq$ 1 CE Parents)"). Students' gender is available for all 549 students in the visibility experiment, with 333 girls and 216 boys being part of the visibility experiment. The graphs report the p-value of the pairwise difference between the shares in the private and the public condition for low and high SES students.

(b) By Agreeableness



Notes: Subfigure b) splits students into "agreeable" (on the left) and "not agreeable" (on the right) students. Agreeable students are all those who scored above the 50th percentile on agreeableness on the Big Five test (BFI-2). Each of the two graphs presents the means and the 95 percent confidence intervals of the share of students aspiring to university in the private and the public condition. The graphs report the p-value of the pairwise difference between the shares in the private and the public condition for low and high SES students.

A.2 Tables

Table A1: **(NEPS Data)** Regression of Having Enrolled in College at some point by 2.5 years after finishing high school (Dependent Variable) on Students' and Parents' *Private* College Aspirations during High School (Independent Variables)

	All	0 CE Parents	≥ 1 CE Parents	Boys	Girls
Student Aspiration to Study	0.34	0.36	0.18	0.35	0.33
	(0.04)	(0.05)	(0.1)	(0.07)	(0.06)
Parent Aspiration to Study	0.35	0.36	0.19	0.3	0.39
	(0.04)	(0.05)	(0.09)	(0.06)	(0.06)
Interaction Term	−0.09	−0.1	0.05	−0.07	−0.11
	(0.05)	(0.07)	(0.11)	(0.08)	(0.07)
Constant	0.23	0.18	0.43	0.24	0.22
	(0.03)	(0.03)	(0.08)	(0.05)	(0.04)
N	2862	1465	1397	1299	1563
R-squared	0.14	0.18	0.07	0.14	0.15

Notes: Each column in this table shows a separate regression of an indicator for a student being enrolled in college either during wave 9 (1.5 years after graduating from high school) OR wave 10 (2.5 years after high school) on students' and parents' aspiration for the student to enroll. The aspiration indicators for students and parents take the value of 1 if they stated an aspiration to enroll in college in either wave 5 (grade 11) OR wave 7 (grade 12). The rows show the coefficients and in brackets below the standard errors. CE parents means "college-educated" parents. The data for this analysis is taken from the NEPS.

Table A2: Socio-Economic Gap by GPA, Regressions for DV: Ever Enrolled in College by Wave 11

	Unconditional	Conditional
High SES	.11	.08
	(.01)	(.01)
Dummies for grade average	No	Yes
Mean Low SES	.78	
N	2714	

Notes: When conditioning on grade average, the regression includes dummies for each possible grade average. Robust standard errors are reported. The sample includes all those graduating from high school in 2014 (excluding those who graduated in 2015 for now).

Table A3: Socio-Economic Gap by GPA, Median Split; Regressions for DV: Ever Enrolled in College by Wave 11

	Above Median (2.4)		**Below Median (2.4)**	
	Unconditional	Conditional	Unconditional	Conditional
High SES	.03	.02	.15	.14
	(.01)	(.01)	(.02)	(.02)
Dummies for GPA average	No	Yes	No	Yes
Mean Low SES	.91		.67	
N	1365		1349	

Notes: When conditioning on GPA, the regression includes dummies for each possible GPA. Robust standard errors are reported. The sample includes all those graduating from high school in 2014 (excluding those who graduated in 2015 for now). The sample is divided across the median grade of 2.4.

Table A4: Socio-Economic Gap by Cognitive Scores, Regressions for DV: Ever Enrolled in College by Wave 11

	Unconditional	Conditional
High SES	.13	.13
	(.01)	(.01)
Dummies for cognitive scores	No	Yes
Mean Low SES	.74	
N	2717	

Notes: When conditioning on cognitive scores, the regression includes dummies for each cognitive score. Robust standard errors are reported. The sample includes all those graduating from high school in 2014 (excluding those who graduated in 2015 for now).

Table A5: Visibility Treatment for Students with 1 CE-Parent: Parents' Registration Status

	DV: **College Aspiration**			
	(1)	(2)	(3)	(4)
	Non-CE Parent only	CE-Parent only	Both Parents	CE Parent
Public	.068	.110	.108	.170**
	(.20)	(.09)	(.12)	(.08)
N	40	50	70	120
R^2	.44	.46	.42	.28
School-FE	YES	YES	YES	YES
Clustered SE	School	School	School	School

Notes: Each column reports the result of regressing students' college aspiration on a dummy for being in the public condition for students with 1 college-educated parent. The column labels describe whether only the parent without college education was registered (column 1), only the college-educated parent was registered (2), both parents were registered (3) or whether the college-educated parent registered at all or not. Robust standard errors are reported in brackets below coefficients, $^{***}p < .01$, $^{**}p < .05$, $^{*}p < .1$

Table A6: Intergenerational Transmission of Beliefs: Perceived Returns to College vs. Vocational Training

Dep. Variable	**Independent Variables**				
Students' Beliefs $(\pi_{s1k} - \pi_{s3k})$	Parents' Beliefs $(\pi_{p1k} - \pi_{p3k})$	High SES	Constant	N	R^2
Scenarios Next 3-4 Years					
Social	.26***	.05	−.06**	565	.07
	(.07)	(.03)	(.03)		
People	.35***	.07**	−.02	561	.11
	(.07)	(.03)	(.02)		
Family	.25**	.03*	−.03*	563	.05
	(.12)	(.02)	(.02)		
Support	.39***	.04*	.08***	549	.08
	(.07)	(.02)	(.02)		
Interest	.61***	.06**	.03	547	.3
	(.06)	(.03)	(.02)		
Hard	.13**	−.01	.16***	522	.02
	(.05)	(.03)	(.02)		
Financial	.07	−.07***	.22***	476	.03
	(.05)	(.03)	(.02)		
Side-Jobs	.18***	−.04	.29***	447	.03
	(.05)	(.04)	(.04)		
Graduating	.36***	.05*	.02	549	.13
	(.05)	(.03)	(.03)		
Scenarios Age 30-35					
(Paid) Job	.1**	.06***	−.03*	556	.03
	(.04)	(.02)	(.02)		
Interesting Job	.4***	.08***	.02	544	.15
	(.06)	(.03)	(.02)		
Work-Life-Balance	0	.02	−.04**	546	0
	(.05)	(.02)	(.02)		
Family	0	.01	.01	557	0
	(.02)	(.01)	(.01)		
Status	.31***	.02	.2***	509	.07
	(.06)	(.03)	(.03)		

Notes: The table presents regression of students' beliefs – their perceived returns to college vs. vocational training: $\pi_{s1k} - \pi_{s3k}$ – on parents' beliefs $(\pi_{p1k} - \pi_{p3k})$, a dummy indicating a high SES family and a constant. Each row represents an individual regression for the relevant scenario. Robust standard errors are included in brackets below the coefficients and significance levels indicated by $^{*}p < .1$,$^{**}p < .05$,$^{***}p < .01$. The number N indicates the number of student-parent-pairs with observations for each row.