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**Educational inequality after high school graduation
– there is a way to change that.**

An inquiry into the effectiveness of an intensive
counseling program 1.5 years after high school graduation

Discussion Paper

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Educational inequality after high school graduation – there is a way to change that. An inquiry into the effectiveness of an intensive counseling program 1.5 years after high school graduation

Melinda Erdmann, Irena Pietrzyk, Juliana Schneider, Marcel Helbig, Marita Jacob, and Jutta Allmendinger

The German education system is characterized by strong social inequalities in university access. These may be reduced by offering individual counseling sessions to students in their final two years of high school. The study “Zukunfts- und Berufspläne nach dem Abitur” (ZuBAb)¹ examines how such intensive and individual guidance counseling affects participants’ educational trajectories using an experimental design that allows for making internally valid inferences regarding the program’s causal effects. Based on data ($N = 1,064$) collected about 1.5 years after participants earned their university entrance diploma (*Abitur*), we looked at whether the program promotes university enrollment among persons of low educational origin, whether it reduces educational inequalities at the transition from school to higher education, and how educational trajectories change in the period between 0.5 years and 1.5 years after graduation, depending on whether students received counseling or not. The results show a strong program effect of 8 percentage points on university enrollment rates among persons of low educational origin and a strong inequality-reducing effect of the counseling program (15 percentage points or 71 percent in relative terms). The program’s positive impact stems from the fact that participation tends to improve fit between a student’s academic performance and the educational pathway chosen after graduation. Moreover, the results show that positive program effects begin to emerge only after 1.5 years post-graduation (whereas no positive effect was found 0.5 years after graduation) because persons who start a gap year experience (e.g., voluntary community service year) right after earning their *Abitur* are especially likely to benefit from program participation. Additionally, a detailed breakdown of educational trajectories over time shows that the program not only promotes university enrollment among persons of low educational origin and enrollment in vocational training schemes among persons of high educational origin but also,

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in descriptive terms, helps graduates start any kind of post-school educational pathway. The findings make clear that studies designed to make comprehensive inferences about the effects of educational programs should also consider persons of high educational origin and should look not only at university enrollment but also at the smooth transition to any kind of postsecondary educational pathway. They also show that researchers and practitioners need to be patient because there may be some delay until measurable positive effects of individual counseling sessions begin to unfold.

Keywords: educational inequality, university enrollment, intervention

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1. Introduction

Although both the proportion of students earning a university entrance qualification and the proportion of students enrolled in university have increased for years, enrollment in higher education in Germany continues to be marked by strong social inequality (Autorengruppe Bildungsberichterstattung, 2020: 190). Parental educational attainment is a major factor in whether individuals with a university entrance qualification actually pursue a university degree (Becker & Hecken, 2008; Hillmert & Jacob, 2010; Lörz, 2012; Reimer & Schindler, 2013; Helbig et al., 2015). Based on recent figures, the likelihood of eligible graduates with parents with a higher education degree to enroll in university is 86 percent, compared to only 76 percent among persons whose parents did not graduate from higher education. Even among students with excellent grades, the gap in university enrollment by educational origin is 7 percentage points (with parents with higher education degree: 96 %; without parents with higher education degree: 89 %; Autorengruppe Bildungsberichterstattung, 2020: 186). This not only contradicts the call for equal opportunities, it also keeps many young people from realizing their potential.

To reduce these strong social inequalities in university access and to promote equal opportunities, educational policy makers and civil society groups in Germany over the last decade have increasingly launched educational programs (BMBF, 2010: 51, 56). It is yet unclear, however, whether individual counseling in the German context in fact enhances educational outcomes. Whereas some experimental studies in North America have shown that such interventions do support sociostructurally disadvantaged persons with their transition to higher education (for an overview, see Herbaut & Geven, 2020), researchers in Germany so far have only performed (quasi-)experimental studies on the effects of short information workshops offered in group settings. The findings from these studies have led to rather pessimistic assessments regarding the possibility to influence university enrollment rates. Information workshops were found not to enhance the enrollment intentions or enrollment rates of sociostructurally disadvantaged persons, or to do so only for highly specific subgroups (Daniel et al., 2018; Ehlert et al., 2017; Peter et al., 2021). However, as international research has found evidence that personalized one-on-one counseling sessions have a higher effect than short information workshops (Herbaut & Geven, 2020), individual counseling may also prove more effective in Germany than the short

presentation of information and may thus have a positive effect on participants' educational trajectories.

Against this background, the ZuBAb study ("Zukunfts- und Berufspläne vor dem Abitur")² examines the effect of individual counseling in Germany. The key goal of the counseling program evaluated in ZuBAb is to encourage young adults from sociostructurally disadvantaged backgrounds to enroll in university. The program is currently run at 17 universities and universities of applied sciences in the state of North Rhine-Westphalia. At about 400 high schools, students enrolled in the academic track of upper secondary schools³ are supported prior to graduation and beyond by counselors sent by the universities and trained specifically for this purpose.

The ZuBAb study examines whether this counseling program promotes university enrollment among eligible students of low educational origin and whether it serves to reduce educational inequality at the transition to higher education. The study is funded by the North Rhine-Westphalia State Ministry of Culture and Science and is hosted at the WZB Berlin Social Science Center (Prof. Dr. h.c. Jutta Allmendinger, PhD, Prof. Dr. Marcel Helbig, Melinda Erdmann) and the University of Cologne (Prof. Dr. Marita Jacob, Irena Pietrzyk, Juliana Schneider). Key features of the study include an experimental research design, which for the first time in the German context allows for internally valid conclusions regarding the causal effects of individual counseling, and multi-year observation, enabling researchers to evaluate long-term program effects. So far, the study has produced findings on program effects occurring half a year after graduation (Erdmann et al., 2022). For this period, no evidence of a positive effect of guidance counseling on participants' educational trajectories was found. In this paper, we now address counseling effects one year later, that is, 1.5 years after graduation. In contrast to the earlier findings, we see strong program effects on university enrollment among individuals of low educational origin and a pronounced inequality-reducing effect one and a half years after graduation. To determine how the change in measurable program effects over

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³ Secondary schools are highly stratified in Germany. Whereas vocational tracks (i.e., *Realschule*, *Hauptschule*) end before upper secondary school and therefore do not lead to the *Abitur*, the academic track at *Gymnasium* and at comprehensive schools (i.e., *Gesamtschule*) continue through upper secondary education, with most students enrolled in these tracks acquiring the *Abitur*. Furthermore, students enrolled at *Berufskollegs*, which prepare students for vocational training, can also acquire the *Abitur* under certain conditions.

time comes about, we perform an additional analysis of how the program influences educational trajectories in this period between 0.5 years and 1.5 years after graduation.

The paper is structured as follows: In the next section (2), we introduce the research design, focusing on the counseling program studied (2.1), the design of the ZuBAb study (2.2), and the analytical strategy (2.3). Subsequently, we report the results (3), namely on the program's *effects on university enrollment among persons of low educational origin* (3.1), regarding the *inequality-reducing effect of the counseling program* (3.2), and the *effects of counseling over time* (3.3). We conclude with a discussion of the results (4).

2. Research design

2.1 The counseling program

The intervention studied in ZuBAb is an individual and comprehensive guidance counseling program designed for high school students during upper secondary school. It offers advice on post-school educational options and career training opportunities and supports students with implementing their decisions. One goal is to encourage students to enroll in university and to help them pursue this goal. Another goal is to support the postsecondary educational process overall and to help students develop key psychosocial skills. Given the sharp social inequalities at the transition to higher education, the focus of the program is on young adults whose parents do not hold a higher education degree.

Participants are guided by specifically trained counselors sent to their respective schools from nearby universities. Counseling sessions are usually held on school premises, with the frequency and contents depending on students' counseling needs. Individual program participation is voluntary and open to all interested students. In addition, teachers at the schools target suitable students and invite them to participate to ensure a good fit between participants and program goals.

Participation in the program begins with an individual counseling session between the student and the professional counselor. That meeting primarily

covers the student's wishes for the future, their interests, and problems with respect to educational choices after graduation; initial concrete concerns may also be addressed as needed. The further course of the program is tailored to each student's individual needs, questions, and insecurities. Topics in subsequent one-on-one meetings include specific questions (e.g., choosing a specific university major or choosing an apprenticeship program) and how to follow through with the envisaged goal (e.g., funding, application requirements for admission to university or an apprenticeship position). Furthermore, the program offers various additional support services for participants. These include networking meetings with other participating students, connections to professionals working in the careers pursued by students, campus visits, participation in placement tests, and referrals to other advising services.

Aside from the extensive and highly personalized information provided by the counselors, one focus of the program is on building a reliable basis of trust between the counselors and the participating students. The counselors think of themselves as points of contact for all questions concerning educational pathways after graduation, which may also include personal insecurities. To ensure low-threshold accessibility and regular interactions, counselors also use communication channels outside the counseling sessions in their daily practice, such as communicating via text messages. These kinds of interaction, as well as the one-on-one counseling meetings, remain available to the young adults even after they have started a postsecondary educational program. In this way, insecurities that may arise during their university studies or vocational training may be buffered and processed.

2.2 The ZuBAb study (“Zukunfts- und Berufspläne vor dem Abitur”)

The ZuBAb study is a randomized controlled trial (RCT) with a longitudinal design.⁴ It is based in the state of North Rhine-Westphalia, where a total of 42 schools have agreed to participate in the study. In line with the program's objectives, the study gives special consideration to schools that enroll a higher proportion of sociostructurally disadvantaged students (Isaac, 2011).

The study was implemented in the following steps: Prior to launching the counseling activities at the schools, a standardized survey was conducted in early 2018 as a baseline measurement. It was targeted at all students who at the time of the survey were enrolled in the first year of the so-called “qualification phase” at the participating schools (academic track in comprehensive schools: grade 12; Gymnasium: grade 11). Using a standardized paper-and-pencil interview, students were surveyed in the school context about their career and post-school plans, their social environment, their interests, and various psychosocial skills. Moreover, students’ cognitive skills were measured with the help of a test (for an overview of the survey schedule, see Fig. 1). In total, the first survey (baseline measurement) produced data of 1,766 students ($n = 1,356$ at Gymnasium and $n = 410$ students at academic track in comprehensive schools).

ZuBAb study survey schedule

| Time | Feb. 2018 | May 2018 | Feb. 2019 | Nov. 2019 | Nov. 2020 | Nov. 2021 |
|-------------------|--|---------------|---------------------|------------------|-----------------|-----------------|
| Educational phase | prior to graduation | | | after graduation | | |
| | 1.5 years prior | 1 years prior | Abitur exams | 0.5 years after | 1.5 years after | 2.5 years after |
| Program | Launch of counseling program | | | | | |
| | Wave 1 | | Wave 2 | Wave 3 | Wave 4 | Wave 5 |
| | Baseline measurement PAPI in the school context | | CAWI | CAWI | CAWI | CAWI |

PAPI: Paper And Pencil Interview; CAWI: Computer Assisted Web Interview

Fig. 1: Survey schedule of the ZuBAb study

Abitur = university entrance qualification in Germany

Given the limited capacity of program delivery, 31 schools out of the 42 schools in the total sample were selected randomly for participation in the RCT. From within these schools, $N = 1,344$ students who participated in the baseline measurement were included in the RCT, again by random selection and stratified by educational origin.⁵ In line with the target group definition of the program studied, priority consideration was given to students of low educational origin, i.e. to students whose parents do not hold a higher education degree. As this

⁴ For an overview of the study, see Pietrzyk et al., 2019. The study is registered at the Social Science Registry under ID 2738: <https://www.socialscienceregistry.org/trials/2738/>.

⁵ This and all subsequent data do not include students of one high school ($n = 60$) where school leadership decided against further participation in the ZuBAb study right before the program was launched.

group of students is underrepresented in upper secondary schools due to the highly stratified secondary school system in Germany and accompanying social inequality in the transition from primary to secondary school, the effect of this approach is that the number of individuals of low educational origin in the RCT is only slightly higher than that of individuals of high educational origin (low edu. origin: $n = 703$; high edu. origin: $n = 615$).

This group of RCT participants was then randomly assigned in a 50/50 allocation ratio to a treatment condition with program participation (TC) and a control condition without program participation (CC) (see Tab. 1).

Tab. 1: Distribution of educational origin across the experimental conditions

| | Treatment condition | Control condition |
|-------------------------------|---------------------|-------------------|
| Low educational origin | 352 | 351 |
| High educational origin | 307 | 308 |
| Total | 659 | 659 |
| No information on edu. origin | 13 | 13 |

Operationalization: low educational origin = no parents with higher education degree, high educational origin = parents with higher education degree; *Source:* ZuBAb, Wave 1

This random assignment maximizes comparability across experimental conditions and thus increases the internal validity of conclusions about the program's causal effects on educational trajectories and outcomes. School affiliation and educational origin served as a blocking variable in the randomization.⁶ In the case of the ZuBAb study, randomization indeed resulted in relevant predictors of university enrollment collected in the baseline measurement being equally distributed between the TC and the CC. This includes students' initial intention to enroll in higher education, their initial level of academic performance, and their educational origin (see Tab. 2).

⁶ In line with scientific standards, the random assignment was performed by a person outside the ZuBAb team, namely an employee of GESIS (Leibniz Institute for Social Sciences).

Tab. 2: Distribution of predictors of university enrollment across the experimental conditions

| Student characteristics in wave 1 | Control condition | Treatment condition | Diff. |
|---|-------------------|---------------------|-------|
| <i>Initial academic performance</i> | 8.87 | 9.07 | -0.20 |
| <i>N</i> | 634 | 625 | |
| <i>Initial intention to enroll in univ.</i> | 3.61 | 3.63 | -0.02 |
| <i>N</i> | 658 | 646 | |
| <i>Educational origin</i> | | | |
| low | 0.53 | 0.53 | 0.00 |
| high | 0.47 | 0.47 | 0.00 |
| <i>N</i> | 659 | 659 | |

Operationalization: initial academic performance on 15-point grading scale; initial intention to enroll in university on 5-point Likert scale; low educational origin = no parents with higher education degree, high educational origin = parents with higher education degree. Differences are given on the original scale of the measured construct or as differences in percentage points. *Source:* ZuBAb, Wave 1, authors' calculations.

Immediately after the baseline measurement and the subsequent random assignment of students to the treatment and control condition, the program was implemented in the participating schools so that counseling for program participants could begin approximately one year before their high school graduation. In the further course of the study, the young adults were asked about their educational trajectories and plans as well as other characteristics in several additional online surveys (see Fig. 1).

The following analyses of the impact of counseling on postsecondary educational outcomes are based on data from wave 4, collected about one and a half years after high school graduation. These are the most recent data at the time of publication of this paper. Due to individual dropouts in the course of the repeated survey and due to missing information (item non-response), the following analyses include information from $N = 1,056$ respondents (for TC, low edu. origin: $n = 283$, high edu. origin: $n = 244$; for CC, low edu. origin: $n = 280$, high edu. origin: $n = 249$).⁷

⁷ Between wave 1 and wave 4, there was no systematically unequal panel attrition between the TC and the CC on key predictors of university enrollment, namely with respect to initial intention to enroll in university, initial level of performance, and educational origin (see Appendix for detailed information: Tab. A.1).

2.3 Analytical strategy

In the following, we examine the program's effect centrally by comparing the educational trajectories between the experimental conditions (TC v. CC). Thus, we apply intention-to-treat analysis, which considers participants' random assignment to the experimental conditions and not their actual program participation. Given the random assignment to the experimental conditions and the resulting maximized comparability between the TC and the CC, differences in educational trajectories between the TC and the CC can be causally attributed to program effects. This strategy is a conservative estimate. The program effect estimated using this method is highly relevant for educational policy decisions because the estimate should be close to the program's actual average effect under real-world implementation conditions (e.g., Hollis & Campbell, 1999).⁸

The results of our analysis reported in the following section are percentage point differences in university enrollment rates between the TC and the CC. The percentage point differences we report result from linear probability models.⁹ To examine the first research question regarding the program's effect on individuals of low educational origin, we restrict the analysis sample to individuals whose parents do not hold a higher education degree. In this case, the linear probability model includes only participants' assignment to the experimental conditions as the key independent variable, and we control for school affiliation with school-fixed effects (and with robust standard errors). To study the second research question regarding the program's inequality-reducing effect, we expand the analysis sample by also including individuals of high educational origin and by supplementing the key independent variable of

⁸ This is the case because under real-world implementation conditions, there will also be some students eligible for program participation who choose not to participate. These students who choose not to participate in the program should be comparable to those who decided against participation in the context of the study even though they were assigned to the TC.

In the present case, as expected, the intention-to-treat procedure yields a slightly lower estimate of the program effect on the enrollment of individuals of low educational origin than the alternative estimation procedure using a so-called instrumental variable (IV) (see Appendix, Tab. A.2). This alternative procedure takes into account both random assignment and students' actual participation in the program. The procedure provides information on the size of the program effect for those individuals who were induced to participate by being randomly assigned to the TC (e.g., Sagarin et al., 2014). Because the intention-to-treat procedure provides more reliable information than the IV procedure for estimating program effects under real-world conditions, we report the results of this estimation in the results section.

⁹ The results of logistic regression analyses do not differ from the results of the linear probability models presented in the following sections (see Appendix, Tab. A.3)

assignment to the experimental conditions with an interaction term between the experimental conditions and educational origin (controlling for school affiliation and calculating robust standard errors).

3. Results

3.1 University enrollment of individuals of low educational origin

In the following, we first consider whether counseling has increased university enrollment among individuals of low educational origin at the time of the survey one and a half years after high school graduation. The result of the linear probability model is illustrated in Figure 2. The height of the bar indicates the group difference between the TC and the CC in estimated university enrollment rates in percentage points, whereas the interval around the highest point of the bar indicates whether the difference is statistically significantly different from zero (confidence interval).

The graph shows that individuals who were assigned to the TC were 8 percentage points more likely to have entered university than respondents from the CC. Moreover, this difference is statistically significant ($p < 0.05$, one-tailed test). Based on this result, we can conclude that counseling significantly increases university enrollment among young adults of low educational origin and thus achieves a key program objective.

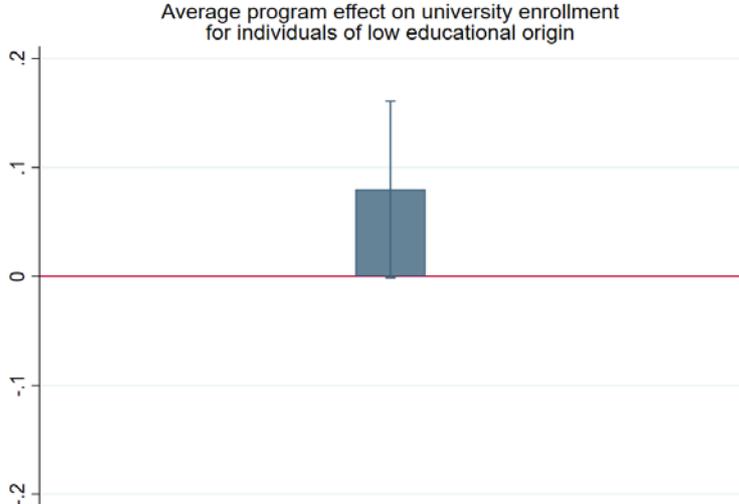


Fig. 2: Program effect on university enrollment one and a half years after high school graduation for individuals of low educational origin

Results from a linear probability model using assignment to the experimental conditions as independent variable (intention-to-treat analysis) controlling for school affiliation and with robust standard errors; $N = 563$; for detailed values: see Appendix, Tab. A.4. Source: ZuBAb, authors' calculations.

3.2 Effect on educational inequality

In the next step, we consider whether counseling reduces inequality in higher education enrollment across educational origin groups. Since educational inequality is defined by the relationship of social groups (e.g., Pietrzyk & Erdmann, 2020), we analyze the program effect for individuals of low and high educational origin.

The result of the linear probability model is presented in the graph below (see Fig. 3). The plot is based on estimated enrollment rates for the different groups. Because our focus is on educational inequality, we look at the difference in the estimated enrollment probabilities between the educational origin groups. We examine whether this difference, as a measure of educational inequality, is smaller in the TC than in the CC. A decrease in educational inequality in the TC relative to the CC can be interpreted as an inequality-reducing effect of counseling.

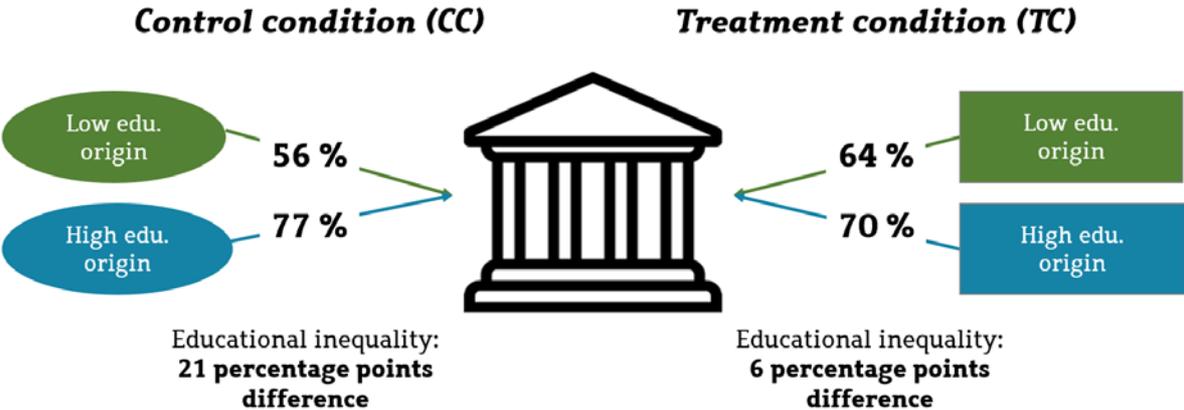


Fig. 3: Predicted enrollment rates one and a half years after high school graduation for different groups

Result of a linear probability model with experimental conditions as independent variable (intention-to-treat analysis) and an interaction term between experimental conditions and educational origin; predicted university enrollment rates controlled for school affiliation and with robust standard error; $N = 1,056$; for detailed values; see Appendix Tab. A.5 Source: ZuBAb, authors' calculations.

The results show that educational inequality in the CC is 21 percentage points – a remarkable figure (see Fig. 3, left side). Here, the estimated university enrollment rate for individuals of low educational origin is 56 percent, compared to 77 percent for individuals of high educational origin.

Furthermore, the results show that educational inequality in the TC is only 6 percentage points (see Fig. 3, right side). In this group, the estimated enrollment rate for individuals of low educational origin is 64 percent. For individuals of high educational origin, it is 70 percent and hence only slightly higher. The inequality score of 6 percentage points in the TC is clearly below the inequality score of 21 percentage points in the CC.

The results thus show that counseling leads to a sharp reduction of educational inequality in university access. Whereas inequality is a substantial 21 percentage points in the CC, it is down to 6 percentage points in the TC—a reduction of 15 percentage points. In other words, the program reduces the level of educational inequality in university enrollment that exists without the intervention by an estimated 15 percentage points. And there is another way to quantify the size of the inequality-reducing effect: If we look at the inequality-reducing effect of 15 percentage points in relation to the level of inequality that exists without the intervention, we can say that inequality is reduced by a substantial 71 percent (as 15 percentage points are equivalent to 71 percent of 21 percentage points).

What drives this strong inequality-reducing effect of counseling is not only the fact that the program increases university enrollment among individuals of low educational origin by 8 percentage points, as reported above (cf. Section 3.1). The program also reduces university enrollment among respondents of high educational origin. Specifically, the enrollment rate in this group of individuals is reduced by an estimated 7 percentage points (see Fig. 3, difference in estimated university enrollment rates of individuals of high educational origin in the TC and those of the same group in the CC).

Additional analyses show that the reduction in social inequality in university enrollment is due to the fact that the program improves fit between academic performance and the educational pathways chosen. If we consider the program effect separately by educational origin groups and Abitur grades (see Fig. 4), the following pattern emerges: Individuals of low educational origin and with

above-average Abitur grades are more likely to enroll in university after participating in the program (see Fig. 4, left green bar). In contrast, individuals of high educational origin and below-average Abitur grades are less likely to enroll in university after participating in the program (and more likely to pursue vocational training; see Fig. 4, right-hand blue bar). Although the results are not statistically significant, the consistent pattern suggests that counseling helps students translate their academic achievement potential into appropriate educational pathways.¹⁰

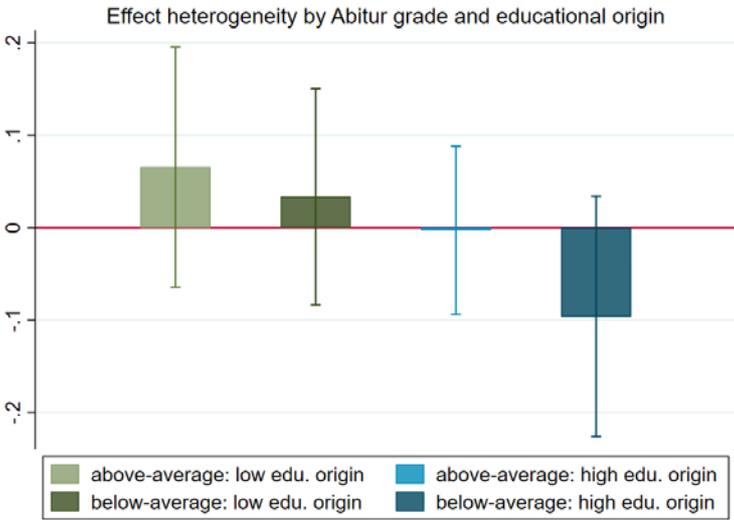


Fig. 4: Program effect on university enrollment one and a half years after graduation, effect heterogeneity by Abitur grade and educational origin

Result of linear probability models using assignment to the experimental conditions as independent variable (intention-to-treat analysis) controlling for school affiliation and with robust standard errors; separate models for four groups of persons, defined by educational origin and dichotomized Abitur grade (good = above-average Abitur grade; low = below-average Abitur grade); case numbers in the order of the models presented: $n = 196$, $n = 304$, $n = 248$; $n = 221$ Source: ZuBAb, authors' calculations.

In summary, the significant reduction in educational inequality in university enrollment and the trend toward improved fit between school performance and university enrollment are strong indications that counseling is clearly meeting the goal of reducing educational disparities.

¹⁰ The pattern outlined above indicating an increase in fit between academic performance and educational pathway chosen tends to emerge even if the average grade from seven subjects in qualification phase 1 (survey in the baseline measurement) is chosen instead of the Abitur grade to operationalize academic performance (see Appendix, Fig. A.1).

3.3 Educational trajectories 0.5 years and 1.5 years after graduation

In the following, we take a descriptive look at the influence of guidance counseling on respondent's educational trajectories in the period between 0.5 years and 1.5 years after they earned their Abitur diploma.

The first reason why these detailed educational trajectories are of interest is that no evidence of a measurable effect of the program on educational trajectories was found six months after graduation (cf. Erdmann et al., 2020), whereas a strong inequality-reducing effect emerged one and a half years after graduation (cf. Section 3.2). Second, the following analysis considers not only university enrollment but also enrollment in vocational training schemes to get a more nuanced idea of the program's effect on educational trajectories.

To determine how educational trajectories evolved in the period under investigation based on the program effect, we carry out a descriptive analysis of the differences in the trajectories between the TC and the CC. For this purpose, we divide respondents' educational trajectories into four categories: 1) university, 2) vocational training, 3) no post-school educational pathway started (with Abitur at the time of the survey), 4) no post-school educational pathway started (no Abitur at the time of the survey). The analysis is performed separately for each educational origin group because the focus is on how the inequality-reducing effect changes over time. Given the small number of cases in some categories, we limit ourselves to a descriptive analysis. Even if the number of cases is rather small for some pathways, we do observe a consistent pattern overall.

We begin our discussion with a focus on individuals of low educational origin (see Fig. 5). The display of educational trajectories of this group shows that there were hardly any differences in the frequency of chosen educational pathways between the TC and the CC at the time of the third wave 0.5 years after high school graduation. For all educational pathways shown, the differences range from 0.5 to 2.4 percentage points (e.g., vocational training: 15.3 % vs. 17.6 %). One year later, by contrast, clear differences emerge in the course of the different pathways between the TC and the CC, which now range from 2.5 to 8.7 percentage points (e.g., university: 64.4 % vs. 55.8 %).

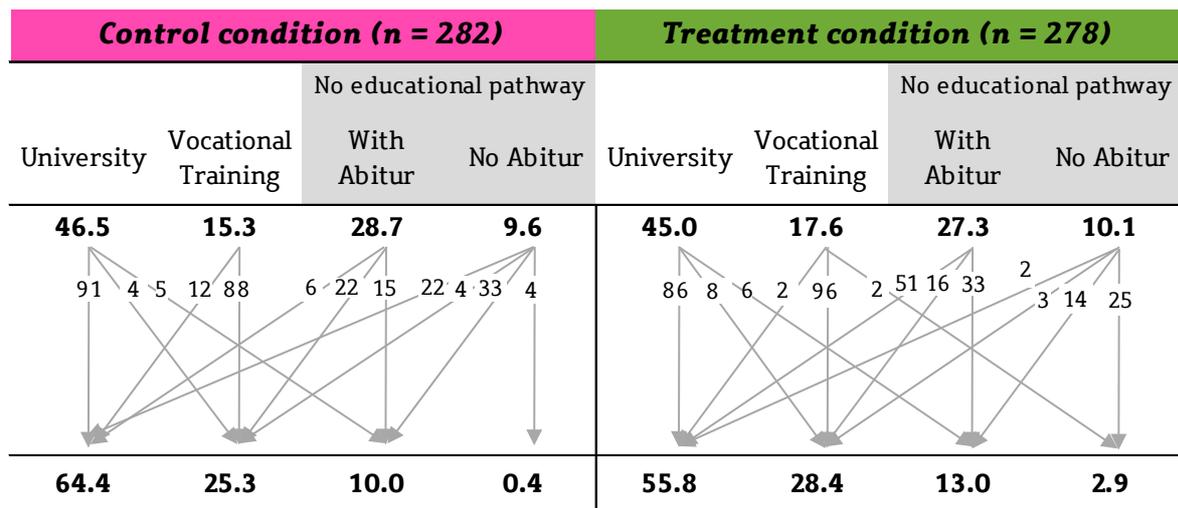


Fig. 5: Educational trajectories in the treatment condition and the control condition, individuals of low educational origin

The chart shows the paths that respondents were pursuing at the time of wave 3 (0.5 years after graduation) and at the time of wave 4 (1.5 years after graduation). The figures in bold indicate the percentage of respondents in the treatment condition and control condition, respectively (e.g., 46.5 % of respondents in the treatment condition were enrolled in university at the time of wave 3). The numbers next to the paths indicate percentages within individual educational paths (e.g., 91 % of respondents in the treatment condition who were enrolled in university at the time of wave 3 were also enrolled in university at the time of wave 4). *Source:* ZuBAb, authors' calculations with $N = 560$; three cases could not be considered because of missing information.

One notable aspect is the large percentage of individuals who in wave 3 have not yet started an educational pathway, meaning they were in the so-called gap year at this point (total of the fields highlighted in grey for the TC: 38.4 %; for the CC: 37.4 %). The percentage of this group is markedly reduced one year later (for the TC: 10.4 %; for the CC: 15.9 %). This change in percentages over time already suggests that it is primarily individuals in this group who may have chosen different educational pathways depending on their assignment to the experimental conditions and that it is their educational choices that contribute to the difference in program effects half a year and one and a half years after graduation.

A detailed presentation of the educational pathways for this group of respondents (no educational pathway in wave 3) indeed shows that individuals in the TC enrolled in university much more frequently one and a half years after graduation than individuals in the CC. This higher proportion of enrollment in university or vocational training in the TC translates into the fact that individuals in this group of respondents were less frequently found in the "no educational pathway" path one and a half years after graduation than individuals in the CC.

A condensed presentation of the differences between the experimental conditions in percentage points (see Tab. 3)¹¹ shows that the positive program effect on university enrollment one and a half years after graduation is not only caused by the fact that individuals with a preference for vocational training are motivated by the program to pursue a university degree. This is because the difference between the experimental conditions in university enrollment (8.7 percentage points) is significantly higher than the difference for vocational training enrollment (3.2 percentage points). Rather, some of the positive program effect on university enrollment is attributable to the fact that counseling, in descriptive terms, helps students get enrolled in whatever educational pathway a year and a half after graduation (-5.5 percentage points difference for “no educational pathway”). This observation is a noteworthy finding when assessing program effects.

Tab. 3: Difference in the frequency of chosen educational pathway between treatment and control condition by time of survey for individuals of low educational origin

| | University | Vocational training | No educational pathway |
|----------------------|------------|---------------------|------------------------|
| Difference in wave 3 | 1.5 | -2.4 | 0.9 |
| Difference in wave 4 | 8.7 | -3.2 | -5.5 |

Source: ZuBAb, authors’ calculations

To supplement this presentation of educational trajectories for individuals of low educational origin background, we also consider the educational trajectories of individuals of *high educational origin* (see Fig. 6). As with the former group, only minor differences between the chosen educational pathways emerge for individuals with high educational origin at the time of wave 3, ranging from 0.4 to 3.1 percentage points. Again, this picture changes substantially one year later, with differences in educational trajectories increasing to up to 7.3 percentage points.

¹¹ The slight discrepancy between the 8.7 percentage point difference in university enrollment reported here and the 8 percentage point program effect on university enrollment for those of low educational origin reported in Section 3.1 can be explained by slight differences in methodology. While descriptive differences between the TC and CC are reported here, the value reported in Section 3.1 is an estimate based on a regression model controlling for school affiliation.

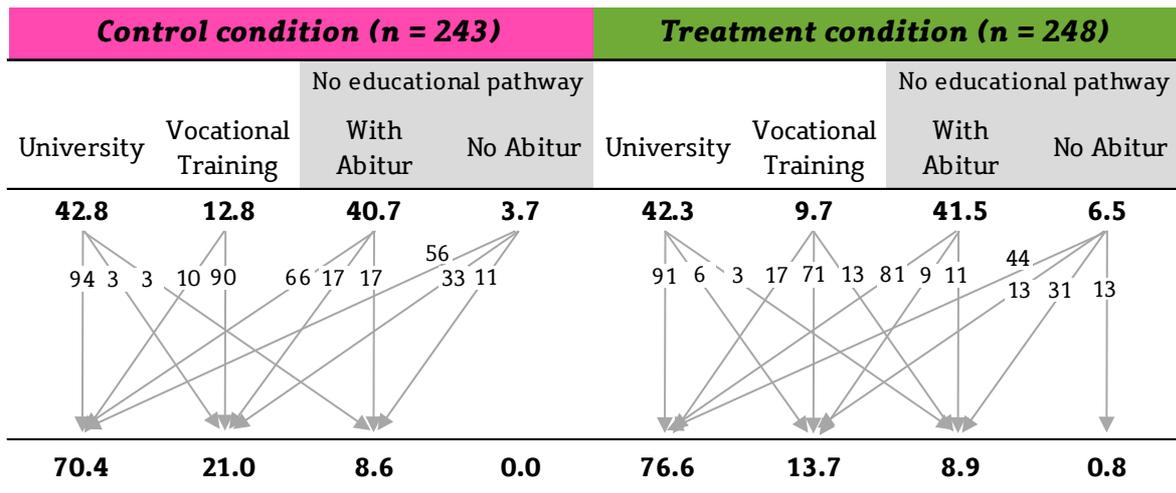


Fig. 6: Educational trajectories in the treatment condition and the control condition, individuals of high educational origin

The chart shows the paths that respondents were pursuing at the time of wave 3 (0.5 years after graduation) and at the time of wave 4 (1.5 years after graduation). The figures in bold indicate the percentage of respondents in the treatment condition and control condition, respectively (e.g., 42.8 % of respondents in the treatment condition were enrolled in university at the time of wave 3). The numbers next to the paths indicate percentages within individual educational paths (e.g., 94 % of respondents in the treatment condition who were enrolled in university at the time of wave 3 were also enrolled in university at the time of wave 4). *Source:* ZuBAb, authors' calculations with $N = 491$; two cases could not be considered because of missing information.

The group of respondents of high educational origin also features a very large proportion of individuals who were in a gap year at the time of the third survey—the proportion is even higher than that observed for individuals of low educational origin. More than 40 percent of respondents in the TC and in the CC (with and without an Abitur diploma) have not started a postsecondary educational path six months after graduating from high school. Again, differences in the decision-making behavior of this group depending on the treatment assignment can also be assumed as the cause for the program effect found one and a half years after graduation.

A detailed breakdown of educational pathways indeed shows that respondents in this group (no educational pathway in wave 3) in the TC much less frequently enrolled in university than respondents in the CC. Another notable finding is that the proportion of respondents remaining in the vocational training pathway from wave 3 to wave 4 is much higher in the TC than that in the CC.

Tab. 4: Difference in the frequency of chosen educational pathways between treatment and control condition by time of survey for individuals of high educational origin

| | University | Vocational training | No educational pathway |
|----------------------|------------|---------------------|------------------------|
| Difference in wave 3 | 0.5 | 3.1 | -3.5 |
| Difference in wave 4 | -6.2 | 7.3 | -1.1 |

Source: ZuBAb, authors' calculations

The condensed presentation of differences between the TC and the CC reveals a different picture for individuals of high educational origin than for individuals of low educational origin (see Tab. 4)¹². One and a half years after graduation, respondents of high educational origin in the TC much more frequently opt for vocational training than individuals in the CC (7.3 percentage points difference). This higher rate of enrollment in vocational training is accompanied primarily by less frequent enrollment in university (-6.2 percentage points difference). Enrollment in any kind of postsecondary educational pathway is not supported to the same extent for this group of respondents as it is for individuals of low educational origin (-1.1 percentage points difference).

In summary, the main reason for the change in measurable program effects on educational trajectories over time (in the period 0.5 years and 1.5 years after high school graduation) is that individuals who were in a gap year at the time of the first survey decided to pursue different educational pathways—depending on whether they participated in the counseling program or not. Whereas individuals of low educational origin in the TC were more likely to enroll in university than respondents in the CC, individuals of high educational origin in the TC were more likely to enroll in vocational training than their peers in the CC. Moreover, we see that guidance counseling not only promotes university enrollment, especially among individuals whose parents do not have a higher

¹² The slight discrepancy between the -6.2 percentage point difference in university enrollment reported here and the -7 percentage point program effect on university enrollment of individuals of high educational origin reported in Section 3.2 can be explained by slight differences in methodology. While descriptive differences between the TC and CC are reported here, the value reported in Section 3.2 is an estimate based on a regression model controlling for school affiliation and an interaction term between educational origin and experimental conditions.

education degree; it also facilitates quick entry into any kind of postsecondary educational pathway.

4. Summary and discussion

In the present paper, we investigated whether intensive and individual guidance counseling influences the post-school educational pathways of upper secondary students Germany one and a half years after they attained their university entrance diploma (Abitur). The experimental design of the ZuBAb study is especially well suited for making inferences about the causal effects of the program.

The results of our analysis show that counseling substantially increases university enrollment among individuals of low educational origin (estimated 8 percentage point difference between treatment and control condition). From a practical perspective, this 8 percentage point increase can be considered a strong program effect because counseling successfully motivated many students of low educational origin, who otherwise would not have enrolled in university, to pursue this educational pathway or supported them in following through with this plan.

However, counseling not only promotes university enrollment among individuals whose parents did not attend higher education, it also encourages individuals of high educational origin to pursue vocational training. This pattern of differential effects on educational pathways for different educational origin groups leads to a substantial reduction of social inequality in university access—by an estimated 15 percentage points or 71 percent—as a result of the program. The program's positive impact stems from the fact that participation tends to improve fit between a student's academic performance and the chosen academic or non-academic educational pathway.

It is only one and a half years after graduation that the program's effect on educational trajectories becomes measurable, whereas no such effect was found six months after graduation. The main reason why program effects emerge only after some delay is the fact that many individuals started a so-called gap year experience (e.g., voluntary community service year) immediately after receiving their Abitur diploma. It is the educational trajectories of these persons in particular that show marked differences over time depending on whether they

participated in the counseling program or not. Individuals of low educational origin are more likely to enroll in university at the end of their gap year if they were assigned to the treatment condition, whereas individuals of high educational origin are more likely to enroll in vocational training as a result of their program participation. Furthermore, a detailed breakdown of educational trajectories over time reveals that counseling not only promotes university enrollment among individuals of low educational origin and vocational training enrollment among individuals of high educational origin; it also helps high school graduates—and especially those of low educational origin—to actually start any kind of postsecondary educational pathway one and a half years after graduation. It can be assumed that a phase of deferred educational choices that lasts longer than one year after graduation does not offer any further beneficial orientation for most individuals. Thus, the finding that the program also helps participants implement a post-school educational decision relatively quickly is to be considered a positive effect.

The program's inequality-reducing effect of 71 percent must be considered a very strong effect from a practical perspective. Comparing this finding with the results of international research is difficult because international studies frequently do not consider a program's effect on individuals of high social origin. Among other things, this is due to the fact that the US does not have a strong (dual) vocational training system as an attractive alternative to university for eligible high school graduates. For the US context, in which the majority of existing studies were carried out, it is therefore unlikely for (low-achieving) high school graduates of high social origin to decide against higher education in favor of an alternative educational pathway as a result of guidance counseling.

What matters for practice is how the observed strong inequality-reducing effect in the analysis sample would translate to educational inequality in a specific population, such as the total group of high school graduates with a university entrance qualification in North Rhine-Westphalia or in Germany. Generally, this translation not only depends on the size of the estimated effect on students of different educational origin groups who have access to counseling (as in the present study) but also on how many students from different educational origin groups have access to counseling. A key consideration here is whether students of low or high educational origin are over- or underrepresented in the counseling program (cf. Pietrzyk & Erdmann, 2020). As the estimated effect for

individuals of low educational origin (+8 percentage points in university enrollment) is roughly the same as the estimated effect for individuals of high educational origin in the reverse direction (-7 percentage points in university enrollment) in the counseling program studied in ZuBAb, we might expect a strong inequality-reducing effect to show for the total population even if certain educational origin groups are over- or underrepresented in the counseling program. The strongest inequality-reducing effect of the program at macro level might generally be expected if as many students as possible had access to the program and if students of both low and high educational origin were to participate in it.

Overall, our findings highlight the following three relevant aspects when it comes to studying the effects of educational programs to reduce educational inequality: First, our results support the theoretical assumption that it is essential for any inquiry into the inequality-reducing effects of counseling programs in many contexts to not only consider the program's effects on individuals of low educational origin but also for individuals of high educational origin (cf. Pietrzyk & Erdmann, 2020). Second, a key theoretical and practical concern in the transition of eligible high school graduates to postsecondary educational pathways is not only whether they enroll in university (versus vocational training) but also whether they choose any kind of postsecondary educational pathway at all in a somewhat timely manner. The pressure of having to make a post-school educational decision that will have a major impact on one's future life and career might cause some graduates to postpone that decision for as long as possible out of insecurity. Guidance counseling may evidently reduce such insecurities and motivate students to enter a postsecondary educational pathway relatively quickly. Third, the program's positive effect could only be measured because of the long-term project design of the counseling program studied and the long-term design of the accompanying scientific evaluation. This should be considered an important indication that policy makers and researchers need patience, as the measurable effect of educational and support programs might only unfold in a long-term perspective.

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Appendix

Tab. A.1: Panel attrition by experimental conditions

| Characteristics studied | No further participation in W4 | | | Participation in W4 | | |
|---|--------------------------------|------|-------|---------------------|------|-------|
| | CC | TC | Diff. | CC | TC | Diff. |
| <i>Initial academic performance W1</i> | 8.54 | 8.84 | -0.29 | 8.97 | 9.14 | -0.16 |
| | 116 | 121 | | 507 | 497 | |
| <i>Initial intention to enroll in university W1</i> | 3.46 | 3.45 | 0.01 | 3.66 | 3.68 | -0.03 |
| | 125 | 128 | | 522 | 508 | |
| <i>Educational origin</i> | 0.55 | 0.52 | 0.02 | 0.53 | 0.54 | -0.01 |
| low | 0.45 | 0.48 | -0.02 | 0.47 | 0.46 | 0.01 |
| high | 130 | 132 | | 529 | 527 | |
| <i>N</i> | 8.54 | 8.84 | -0.29 | 8.97 | 9.14 | -0.16 |

CC: control condition; TC: treatment condition; Diff.: CC-TC; operationalization: initial academic performance on 15-point grading scale; initial intention to enroll in university on 5-point Likert scale; low educational origin = no parents with higher education degree, high educational origin = parents with higher education degree. Differences are provided on the original scale of the measured construct or as differences in percentage points; the table only includes information from persons with valid scores for educational origin. Source: ZuBAb, authors' calculations.

Tab. A.2: Results of the linear probability models using an **instrumental variable** for the effect of the program studied on university enrollment by educational origin

| | Educational origin | |
|--|--------------------|---------|
| | low | high |
| <i>Program participation</i> (Reference: no program participation) | 0.124** | -0.080 |
| | (0.062) | (0.060) |
| Program participation | | |
| Constant | 0.678*** | 0.367** |
| | (0.101) | (0.144) |
| Observations | 563 | 493 |
| Adj. R ² | 0.049 | 0.027 |

Standard errors in parentheses; *** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$; calculated using robust standard errors and controlling for school affiliation (school fixed effects) Source: ZuBAb, authors' calculations.

Tab. A.3: Results of the **logistic regression analysis** for the effect of the program studied on university enrollment of individuals of low educational origin

| | β | AME |
|--|----------|---------|
| <i>Experimental condition</i> (Reference: control condition) | 0.362** | 0.081** |
| Treatment condition | (0.183) | (0.041) |
| Constant | 0.885*** | |
| | (0.535) | |
| Observations | 557 | |
| Pseudo R ² | 0.060 | |

Use of intention-to-treat analysis; standard error in parentheses; *** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$; calculated using robust standard errors and controlling for school affiliation (school fixed effects) Source: ZuBAb, authors' calculations.

Tab. A.4: Result of the **linear probability model** for the effect of the program studied on university enrollment by educational origin

| | Educational origin | |
|--|---------------------------|---------|
| | low | high |
| <i>Experimental condition</i> (Reference: control condition) | 0.080* | -0.051 |
| | (0.041) | (0.039) |
| Constant | 0.703*** | 0.367** |
| | (0.107) | (0.144) |
| Observations | 563 | 493 |
| Adj. R ² | 0.060 | 0.038 |

Use of intention-to-treat analysis; standard error in parentheses; *** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$; calculated using robust standard errors and controlling for school affiliation (school fixed effects) Source: ZuBAb, authors' calculations.

Tab. A.5a: Results of the **linear probability model** for the effect of the program studied on university enrollment **with an interaction effect** between educational origin and experimental conditions

| | |
|---|----------|
| <i>Experimental condition</i> (Reference: control condition) | 0.075* |
| | (0.041) |
| Educational origin (Ref. low) | 0.175*** |
| | (0.041) |
| Interaction between educational origin and experimental condition | -0.131** |
| | (0.057) |
| Constant | 0.508*** |
| | (0.098) |
| Observations | 1,056 |
| Adj. R ² | 0.042 |

Use of intention-to-treat analysis; standard error in parentheses; *** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$; calculated using robust standard errors and controlling for school affiliation (school fixed effects) *Source:* ZuBAb, authors' calculations.

Tab. A.5b: Estimated university enrollment rate by educational origin and experimental conditions

| <i>Group of individuals</i> | <i>Average</i> | <i>Standard deviation</i> | <i>n</i> |
|---------------------------------------|----------------|---------------------------|----------|
| Control condition: low edu. origin | 0.561 | 0.106 | 280 |
| Control condition: high edu. origin | 0.767 | 0.099 | 249 |
| Treatment condition: low edu. origin | 0.643 | 0.100 | 283 |
| Treatment condition: high edu. origin | 0.701 | 0.096 | 244 |

Predicted values of university enrollment rate calculated based on the results in Tab. A.5a. *Source:* ZuBAb, authors' calculations.

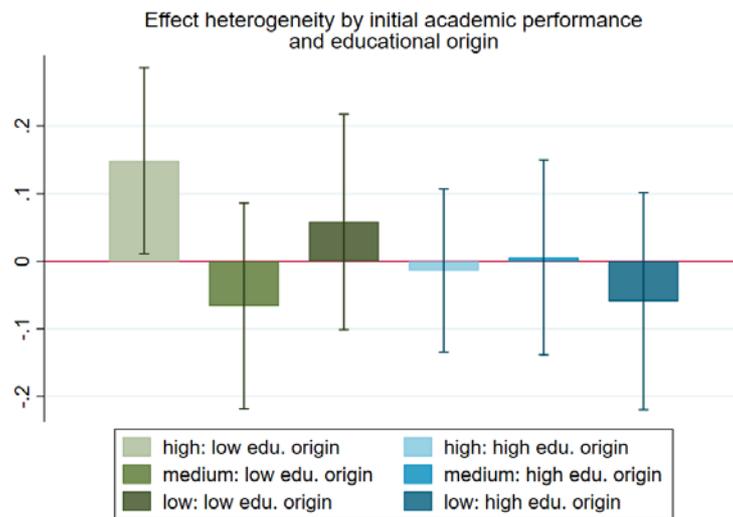


Fig. A.1: Effect heterogeneity by initial academic performance and educational origin

Results of linear probability models using assignment to the experimental conditions as independent variable (intention-to-treat analysis) controlling for school affiliation and with robust standard errors; separate models for six groups of persons, defined by educational origin and three categories of the average grade, z-standardized within the educational origin groups (low, medium, high; calculated based on the grades in the subjects German, Mathematics, English, Biology, Physics, History, Social Sciences) at the time of the first survey; case numbers in the order of the models presented: $n = 177$, $n = 184$, $n = 175$, $n = 158$, $n = 160$, $n = 150$ Source: ZuBAb, authors' calculations.

Discussion Paper of the President's Research Group 2022

Melinda Erdmann, Irena Pietrzyk, Marcel Helbig, Marita Jacob and Stefan Stuth

P 2022-001

Do intensive guidance programs reduce social inequality in the transition to higher education in Germany?
Experimental evidence from the ZuBAb study 0.5 years after high school graduation

Melinda Erdmann, Irena Pietrzyk, Juliana Schneider, Marcel Helbig, Marita Jacob und Jutta Allmendinger

P 2022-002

Bildungsungleichheit nach der Hochschulreife – das lässt sich ändern.
Eine Untersuchung der Wirksamkeit eines intensiven Beratungsprogramms 1,5 Jahre nach dem Abitur