The Role of Information in the Application for Merit-Based Scholarships: Evidence from a Randomized Field Experiment*

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This paper analyzes whether information asymmetries prevent high-achieving students from non-academic families where nobody attained a university degree from applying for merit-based aid. I randomly assigned German higher education students to receive either general information on federally funded scholarships or additionally personalized information on details of the application process, conveyed by a similar role model. The role model treatment did significantly increase non-academic and male students' application probabilities for federally funded merit-based scholarships. Providing only general information on the scholarship system triggered participants' own information search for alternative funding sources and increased application rates for other, not federally funded scholarships. *JEL:* I22, I24, D83

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1 Introduction

Student financial aid aims both at providing equal educational opportunities and at promoting the most talented students in higher education. While federal need-based aid emphasizes the goal to equate chances, federal merit-based aid focuses on promoting talents. Both forms of financial aid share the common feature that they are only effective if eligible students are aware of their existence and both willing and able to complete the complex paperwork involved when filing the application.

Regarding need-based financial aid, previous literature has built a case for information asymmetries and different levels of (parental) assistance between students of different socio-economic backgrounds (Scott-Clayton 2013). A lack of information and assistance helps to explain why many eligible students of low socio-economic backgrounds do not file the complex application for need-based student aid (Dynarski and Scott-Clayton 2006; King 2006). Therefore, providing information and assistance can help diminishing this problem (e.g., Bettinger et al. 2012).

This chapter investigates whether information asymmetries are also relevant with respect to merit-based aid in Germany, where scholarship holders of non-academic backgrounds are considerably underrepresented (Middendorff et al. 2009).

In contrast to the US, where state scholarship programs are simpler, more transparent, and easier to apply to than need-based aid (Dynarski 2004), or the UK, where the Higher Education Bursary and Scholarship Scheme assesses automatically whether the student qualifies for scholarships (Callender 2009), the German system is much less transparent. Scholarships in Germany are tax-funded, but awarded by privately-owned providers in a highly competitive selection process to high-achieving applicants. The government only sets formal eligibility requirements, but leaves it to the 13 providers to define their own eligibility criteria. Consequently, the criteria vary extensively and are often not clear-cut. For example, most providers define no stringent grade point average needed to apply. For other selection criteria, such as certain personality traits, specifying cut-offs is impossible. This lack in transparency leaves room for information asymmetries, risks inefficient talent loss of high-achieving low socio-economic status students, and reinforces social inequalities. The latter is further accelerated by numerous non-monetary benefits from scholarships such as courses, personal support, and access to a social network of many high-profile alumni, which boost scholarship holders' careers after graduation.

In a randomized field experiment with over 5,000 German students, I study whether information asymmetries deter qualified students from applying for merit-based scholarships and whether mitigating these information asymmetries increases students' application rates. I randomly allocated participants to either the control or one of two treatment groups. In the first treatment group, participants received general, publicly available information on scholarships only. In the second treatment group, participants additionally

received tailored information on the application process and probabilities of success, provided by a real, current scholarship holder. To ease identification, the scholarship holder resembled the participant in several characteristics, acting as a role model.

I consider two manifestations of information asymmetries that find expression in the design of the treatments.

First, prospective applicants must know the scholarship providers and their respective application requirements. As currently only 1% of all German higher education students are funded by these merit-based scholarships, compiling the distinctive details of the respective application procedures is challenging. This is especially true for students whose parents (and social surroundings) have not studied and cannot contribute their own experiences with student financial aid applications. The general information treatment addresses mainly this information asymmetry.

Second, potential applicants have to rate their own performance against that of their competitors in the selection process. Although all students face uncertainty about the sufficiency of their own qualification, non-academic students are disadvantaged in various ways. On the one hand, they can rarely benchmark their own performance against acquaintances who were successfully awarded a scholarship. On the other hand, the "cultural centeredness" (Steele et al. 2002, p. 420) of the German scholarship body reinforces the scholarship providers' rather elitist appeal.[1] Consequently, high-achieving students of low socio-economic status might be afraid that stereotypes about "the educationally deprived" affect their chances to succeed (Steele et al. 2002, p. 422). The feeling not to fit into the scholarship system might put the applicants' performance in the selection process under a stereotype thread or put students off applying entirely. A lack in role models of similar background to convey the credible assurance that students, who did not grow up in a family of academics, can be equally successful is then both cause and effect of a social selective scholarship system. The role model treatment considered here aims, first, at breaking this cycle to increase non-academic students' sense of belonging to scholarship providers. Second, the role model treatment intends to provide insider information similar to that shared by parents or peers experienced with the German scholarship system.

My results provide evidence of information asymmetries and differences in previous applications between academic and non-academic students. Both treatments increased non-academic students' poor baseline-knowledge about scholarships. Moreover, non-academic students in the role model treatment group doubled their applications for merit aid. Restricting the sample to the most eligible students increases role model treatment effects substantially. The general information treatment did, however, not affect application rates for merit-based scholarships—potentially because it triggered the students' own in-

[1] Translated literally, German scholarship foundations are promoting endowment, rather than providing aid on grounds of performance. Another example is that the Bavarian scholarship programs are regulated in the "Bavarian Elite Aid Act".

formation search for other, less selective, aid programs, and increased applications there. Furthermore, the treatments were ineffective for high-achieving female students who judge their own overall academic performance significantly less favorably than equally qualified men do.

This chapter adds to the existing literature in several ways. Up to now, little is known about whether information asymmetries between students of different socio-economic backgrounds matter also for high performing students in higher education. To the best of my knowledge, this chapter is the first field experiment analyzing the effect of information provision with respect to merit-based scholarships and contributes to the sparse literature on information interventions in competitive settings. Furthermore, previous studies report mixed results as to whether the provision of information can indeed trigger behavioral changes and how interventions should be designed to do so. I shed further light on the design of interventions by testing whether participants lack information per se or tailored information provided by a similar role model. Finally, drawing on data on students' decision to apply, I can disentangle students' self-selection into the pool of potential scholarship holders from many other factors influencing whether they are indeed awarded the scholarship. I focus on students' applications because the scholarship providers' choice is limited to the pool of applicants. Therefore, from a policy perspective, equal opportunities at the stage of applications are the basis to secure an efficient and equitable allocation of funds.

The rest of this chapter proceeds as follows. After a review of the relevant literature in the next section, section 3 provides a short overview of the institutional background of merit-based student aid in Germany. Section 4 details the experimental set-up. Section 5 describes the data and gives brief descriptive analyses on heterogeneous information asymmetries and application experiences at baseline. Section 6 reports results of the experiment, and section 7 concludes. Supplemental tables, further details, and robustness checks can be found in the appendix.

2 Previous literature

Although I am unaware of experimental studies about merit-based student financial aid, numerous papers employ experimental set-ups to assess the behavioral impacts of information provision on costs and returns of going to college, or the availability of need-based student financial aid. Taken as a whole, evidence on the effectiveness of information interventions is mixed and depends both on the institutional context and the design of the intervention.

More specifically, a first strand of the literature intends to close information asymmetries by providing general information not customized to the recipient (e.g., statistics or leaflets on the returns to education). When official statistics are unavailable, not reliable,

or poorly understood, a general information treatment can effectively increase years of schooling (Jensen 2010), grades, and perceived returns to education (Nguyen 2008) in developing countries or rural areas. In contrast to that, providing general information in industrialized countries cannot effectively increase take-up of student financial aid (Booij et al. 2012; Bettinger et al. 2012), college enrollments (Carrell and Sacerdote 2013), or channel enrollment to degrees with higher educational returns (Kerr et al. 2014).

In industrialized countries with a broad coverage of publicly available information, customized information or personal assistance has a higher potential to affect behavior. Bettinger et al. (2012) study students' completion of the highly complex free application for federal student aid (FAFSA), which is central to access funds from most student aid programs in the US. The authors explicitly tested the advantages of providing personalized information and counseling over providing general information on student financial aid. They treated low-income students in all experimental groups with a brochure containing general information on costs and benefits of studying and need-based financial aid. The authors additionally provided one treatment group with individual aid estimates and encouraged them to file the FAFSA. Over and above both receiving general and personalized aid information, the third group was also offered personal assistance in completing the FAFSA. Only students in the personally assisted group were significantly more likely to receive aid, enroll, and persist in college.

Contrary to that, recent studies show that customizing information *can* positively affect low socio-economic status students' choice of more promising institutions or degrees (Hastings and Weinstein 2008; Hoxby and Turner 2013; Hastings et al. 2015).

With respect to coaching and counseling, Bettinger and Baker (2011) found that college students who received assistance in organizing their day and planning their studies were significantly more likely to persist and graduate. Likewise, Castleman et al. (2014) demonstrated in a recent study that counseling recent high school graduates on financial aid matters, reminding them of important deadlines, and assisting them with the paperwork increased their retention at and completion of college significantly.

Many other studies provide evidence that coaching or counseling increases the quality of educational choices and later labor market outcomes (e.g., Carrell and Sacerdote 2013; Borghan et al. 2013; Saniter and Siedler 2014), and might be even more cost-effective than increasing student financial aid (Bettinger and Baker 2011).

Other studies maximize the targeting of the information by sending role models (or: peer counselors) with similar characteristics to students. Role models enhance the credibility of the information provided, increase the sense of belonging, and can induce participants to emulate them.

Nguyen (2008), for example, treated poor fourth-graders in Madagascar with three different interventions: A random group of students and their parents saw statistics on average educational returns to school only. The second treatment group met a person

who shared his or her story of success with the children. Within this group, students were additionally randomly sampled to listening to the success story of a role model of high socio-economic background, or to a role model of shared, i.e., low socio-economic background. The third treatment group received both treatments. The author shows that both statistics and meeting a role model with shared characteristics can have large effects on perceived educational returns, attendance, and achievement of students of low socio-economic background. Combining both treatments increases, however, also awareness of the heterogeneity in educational returns and, therefore, reduces the positive effects of the statistics.

Dinkelman and Martínez A. (2014) take the same line with their intervention on low-income eighth-graders in Chile. They let students watch a 15-minute film where role models of similar socio-economic status describe financial aid possibilities. In consequence, the treatment increased students' high school enrollments and reduced school absenteeism.

Moreover, role models can be effective in stereotyped contexts such as math tests where women's ability (e.g., Marx and Roman 2002) or at universities where non-academic students' performance is negatively stereotyped (e.g., Stephens et al. 2014). In these contexts, role models need not even share the stereotyped social identity (Steele et al. 2002, p. 428), though shared characteristics can increase the role models' effectiveness (Behncke et al. 2010; Marx and Ko 2012).

In contrast to all that, the evidence on information asymmetries in competitive contexts such as applications for merit aid or at highly selective institutions is sparse. Yet, one study investigates talented low-income students' application behavior at selective US-colleges. Hoxby and Turner (2013) provided high-achieving students from low-income families with partly individualized, written information on the application process and personal expected net college costs at selective institutions. Furthermore, the intervention reimbursed treated students' application costs at up to eight colleges and also offered information for students' parents. Hoxby and Turner (2013) find economically and statistically significantly higher application and admittance rates to highly selective colleges. The mix of financial and informational incentives makes it, however, impossible to evaluate whether a gap in information or rather credit constraints were the decisive hurdle in students' access to selective higher education. Furthermore, Wiswall and Zafar (2013a;b) show that even high-ability students at an elite university are not perfectly informed about returns from specific majors and that providing this information affects their choices. Unfortunately, the authors do not comment on heterogeneous effects by socio-economic background.

In sum, especially students of non-academic backgrounds should be more likely to show positive treatment effects if information is tailored and they can easily identify with a role model of similar socio-economic background. On the contrary, general information seems to be rather ineffective in impacting behavior. Up to now, we do, however, not know

whether information asymmetries matter also for students who are of low socio-economic background, but score high in the achievement-distribution.

3 Institutional background

3.1 The German student aid system

As German colleges do not charge tuition, studying in Germany is relatively cheap in international comparison. Financial student assistance is, likewise, less pronounced when compared to countries charging high fees such as the US or the UK. Nevertheless, this means at the same time that German high schools usually lack a study adviser for student financial aid matters. Consequently, gaps in knowledge about how to finance studying persist.

Need-based income-contingent aid as of the Federal Training Assistance Act, short "BAföG", is the most common form of financial support in Germany, claimed by 17% of all enrolled German students in 2012 (German Bundestag 2014). The state usually grants half of the BAföG amount as a subsidy, the other half as an interest-free loan. The loan-component must be repaid within 20 years after a grace period of five years. On average, funded students draw on a monthly funding amount of EUR 448 (Federal Statistical Office 2015a, p. 32), which is equal to about 60% of the minimum subsistence level of a single person (German Bundestag 2015, p. 8).[2]

The departments of the student services are responsible for counseling, processing of the students' applications, and calculating the respective funding amounts. These departments are closely associated with the respective higher education institutions, making BAföG a well-known funding source that students come across latest when they look for a room in one of the departments' student dormitories or charge their service cards for the canteens also operated by the student services.

In contrast to that, the scholarship culture is still rather underdeveloped with currently not even 2% of all higher education students funded by some form of merit-based aid.[3] 13 privately-owned foundations for the promotion of young talent, called "Begabtenförderungswerke" (BFW), provide the most common form of merit-based aid in higher education. The foundations are privately owned and most of them pursue other goals over and above providing money for talented students, for example, political education, teaching of values in Germany and abroad, or development assistance. Therefore, and because the BFW are mainly funded by the German state, the merit-based aid system

[2] Therefore, most students have to rely on several financial resources. Therein, financial support by parents and own income from working besides the studies or in the semester break are most important (Middendorff et al. 2013, p. 593).

[3] Own calculation based on Federal Statistical Office (2014b); Federal Ministry of Education and Research (2014a) and Federal Ministry of Education and Research (2015a) for 2013.

as a whole is obligated to reflect the plurality of society. Accordingly, each foundation is associated with a different facet of society: Several political foundations provide scholarships. Each of these foundations is affiliated with one of the parties in the German Federal Parliament. Moreover, there are religiously associated foundations and those affiliated with companies or trade-unions. Lastly, the ideologically neutral German National Scholarship Foundation is the oldest and largest BFW, promoting more than 40% of all funded scholars (German National Scholarship Foundation 2014, p. 210).

The Federal Ministry of Education and Research is continuously extending funding amounts to increase the amount of scholarship holders. In 2014, EUR 232.6 million were provided to support 26,900 students enrolled in bachelor's or master's programs and 4,100 PhD students, summing up to about 1% of the overall student body (Federal Statistical Office 2015b; Federal Ministry of Education and Research 2015b). After the report of Middendorff et al. (2009) on the social selectivity in the German scholarship system spurred notable political and media attention (e.g. Kerbusk 2009), special funds of EUR 8.2 million were placed at the BFWs' disposal to increase the share of scholarship holders from "underrepresented groups".

Unlike BAföG, both the BFW and the merit-based scholarships they award are completely separate of any (higher) education institution. This has two important implications. First, neither the amount nor the receipt of the scholarship is tied to visiting a certain university or being enrolled in a certain program. Second, the German merit-based aid scheme requires a high degree of the students' own responsibility to get informed and to apply of their own accord to each BFW separately in order to participate in the respective selection processes.

Students usually apply for funding when they are enrolled in their first or second semesters of higher education, though some BFW allow applications for funding at the undergraduate level even before students officially enroll at university (tables 15 to 17 in the appendix give an overview). If the BFW also offers scholarships for Master's studies, students are usually required to apply before they start the program. From the respective pool of applicants, each BFW selects then its own future scholars (see the next section). When asked about acceptance rates, the BFW argue not to stick to a fixed rate but to admit all promising applicants.

Different to the US where students can claim both need- and merit-based aid simultaneously, German students have to decide between claiming need-based and merit-based aid. The latter is, however, clearly more favorable: Not only carry scholarships the advantage that they need not be repaid, they pay also higher aid amounts. Accordingly, the basic monthly scholarship awards are geared to the income-contingent BAföG amounts but supplemented by a monthly lump-sum amount of EUR 300. The resultant maximum award of EUR 970 is enough to concentrate fully on studying.

Beyond its financial advantages, a BFW scholarship signals high motivation and

achievement of those who succeeded in the highly competitive selection process. A BFW scholarship is, therefore, considered a distinction worth being included in the curriculum vitae. Because the BFW aim at promoting and developing highly skilled young academics who are willing to take over social responsibility, funded scholars profit from many opportunities: The BFW provide conceptual support, such as interdisciplinary seminars, study trips, summer academies, personal support, and mentoring. With respect to their later career, funded scholars profit, moreover, from a rich alumni network which meets regularly and includes many high-profile politicians, researchers, and managers. Given that students of non-academic homes can draw on less financial resources and lack both counseling by college-experienced parents and a highly qualified network, they should benefit most from merit-based scholarships.

Apart from the most prominent form of merit-based aid provided by the BFW, a plethora of small private or institutional providers award scholarships to a small number of students. For example, some universities, companies, and cities provide merit-based scholarships to students born in the region or enrolled in a certain subject of studies. In comparison to the BFW, these scholarships are generally less focused on academic merit and impose more specific and more transparent criteria. As these scholarship providers are small and often only operating in a specific area, they are largely unknown and face far less competition. These scholarships are, therefore, potentially easier to win than the BFW scholarships (Pabst 05.04.2015). Nevertheless, they do also usually pay less lucrative amounts than the BFW scholarships.

3.2 The application process for merit-based aid

The federal law only regulates that students are eligible to receive funding of the BFW "if their talent and personality promise outstanding performance during their studies and in working life" (Federal Ministry of Education and Research 2014b, p. 3, own translation). They must furthermore meet some formal requirements, e.g., having a permanent residence permit and being enrolled full-time at a state-approved higher education institution. The further refinement of the aptitude criteria and the selection process is left to the discretion of each BFW.

Most BFW establish the following criteria to assess applicants' aptitude: First, applicants have to demonstrate "high performance" in high school or college. Second, applicants have to play an active part in society, politics, or culture, i.e., must be socially engaged, preferably compatible with the mission of the respective institution. Third, qualifying students must show responsibility, motivation, and dependability. Fourth, they should identify with the provider's alignment and goals, e.g., applicants at a Catholic BFW should identify with Catholic values. However, providers may put different emphases on the relative importance of these components and may also judge the "total

package". Most BFW establish application thresholds with respect to acceptable age and semester ranges. Some BFW apply additional criteria, such as explicitly considering the applicant's socio-economic background. All in all, regulations and thresholds differ strongly between providers (tables 15 to 17 in the appendix give an overview).

Whether students meet the requirements to be funded during their studies is usually assessed in a very competitive procedure of several stages. For example, the German National Scholarship Foundation requires applicants to take an extensive test on their chances of academic success. After passing the aptitude test, they are invited to a selection seminar involving two interviews and a group discussion on short papers presented by the candidates. In 2013, 28.2% of the participants in the selection process were awarded a scholarship (German National Scholarship Foundation 2014, p. 211).

The federal government explicitly supports the high heterogeneity in the application requirements and the selection processes to secure plurality in the scholarship body. Nevertheless, the resultant complexity increases the applicants' transaction costs to find an appropriate BFW. Because friends or parents with scholarships are much more common sources of information and motivation to apply than the high school or university,[4] non-academic students are more likely to lack important insights into the merit-based aid system. Accordingly, heterogeneous application requirements might equally well rather be detrimental to plurality.

Moreover, personality traits and volunteer work being core qualification requirements, it is impossible to define standardized eligibility cut-offs for sufficient qualification. Although academic merit should be easily quantified and compared, only a minority of BFW define a grade point average candidates must meet to successfully apply (grade point average (GPA) better than 2.0 on a five-point scale, 1.0 representing the best possible grade). In contrast to the transparent criteria underlying the provision of BAföG, students are highly dependent on forming expectations about their chances to succeed when applying for a scholarship.

4 The scholarship information experiment

The scholarship experiment was framed as a two-wave online survey on study finances with special focus on scholarships. I conducted the first survey between late October

[4] A subsample of 376 participants in the experiment was funded by a BFW scholarship at wave 2. I exploited this coincidence by asking them additional questions after the general part of the second survey, containing items on the sources that had informed them about the existence of BFW scholarships and the people who made them applying (multiple selections were possible). 36% were informed by friends and 22% by their parents, while 18% mentioned to have participated in an information program at their high schools or universities. Only 4% reported that an instructor at university or school had provided information on scholarships. More than half indicated that their parents had brought them to apply, 46% state that friends were the motivating factor. School teachers were named in 35% of cases and university lecturers in only 19%.

and early December 2013, and the second survey around half a year later (April/May 2014), i.e., in the first weeks of the winter and summer lecture periods, respectively.[5] To incentivize participation, students had the possibility to participate in a lottery which was tied to completing both waves.

4.1 Wave 1

For wave 1, I recruited participants via universities' official mailing lists where possible but also by means of printed posters and online study groups. The goal of the first survey was to gather information on the respondents' socio-economic and study background, to assess their knowledge of the German scholarship system and to proxy their eligibility for a scholarship. Furthermore, I questioned participants on previous applications for scholarships.

After completing the questionnaire, respondents were randomly assigned to the control group or one of the two treatment groups. It is unsettled whether German students, especially freshmen, know of the rarely awarded scholarships at all and whether confronting them with potentially publicly available information on scholarships does already exert an effect. Therefore, I did not provide the control group with any general information. Along the same line of reasoning, I provided both treatment groups with a general information text to ensure their basic scholarship knowledge and the second treatment group's understanding of the role model interview.

More specifically, I randomly allocated participants to one of the following groups:

Control group: The control group was directly filtered to the last page where official university e-mail addresses were collected to invite participants for the second survey. As the universities' computing centers provide each student with a single university e-mail address once enrolled, I am able to restrict the sample to enrolled students and detect duplicates in my data.

General information treatment group: Participants were exposed to a text containing general information about merit-based scholarships, the amount of monthly funding, and formal application requirements. Text and graphics intended to offer objective information without explicitly encouraging students to apply. The wording was similar to an official website of the BFW Working Group (2013), especially when describing the respective application requirements. The text stressed, however, that students should gather more detailed information from the BFW directly.

[5] A third wave was conducted in May 2015, i.e., one year after the second wave, to give insights into whether students' scholarship applications were successful or not. Unfortunately, the response rate of students who applied after wave 1 was too small to conduct reliable analyses. Nevertheless, the data could be exploited to fill about 100 missings of time-invariant variables from wave 1, e.g., with respect to parental academic background.

Role model treatment group: The role model treatment group also received the general information text the information treatment group read, but was additionally provided with "custom-fit" insights through a written, personal testimony of a (real) student funded by one of the BFW.[6] I asked role models to answer a set of questions concerning personal benefits from scholarship and application requirements with a focus on the importance of academic achievement and social engagement. Role models should further detail the application and admission procedure, and estimate the chances to win a scholarship if belonging to a group currently underrepresented in the scholarship body. Although answers to these questions were tailored to the requirements of the specific BFW, all interviews shared a motivating tenor and stressed that an application, although strenuous, is worth the trouble. As the treatment focused non-academic students, role models also emphasized that students of non-academic backgrounds have equal chances to succeed and should not shy away from applying.

To avoid bad fit between role model and participant, e.g., a participant identifying with a left-wing party being matched with a scholar from a BFW associated with a conservative party, students were allocated to a role model based on their political and/or religious association. In order to achieve good matches, an algorithm (see appendix 8.1 for details) selected the interview which had the highest accuracy of fit with respect to field of studies and gender between the interviewed scholarship holder and the respondent. In other words, I established similarity on observed and controlled characteristics rather than additionally randomizing the degree of similarity.[7]

All interviews were headed with a warrant of apprehension (name, subject of studies, educational institution, semester, educational path to university) and showed the scholar on a casual photograph, so that participants could easily learn about the role model's characteristics.

4.2 Wave 2

Six months after the first survey, I invited approving students to access the second questionnaire via a personal link in their e-mail. The second survey aimed at updating information from the first survey, observing whether students' knowledge on scholarships changed, and refining judgment about their possible eligibility for a scholarship. Most importantly, I asked respondents whether they applied for a scholarship between both waves. As both personality traits and cognitive abilities are selection criteria for scholarships, the second survey included a short measurement of the Big Five Inventory BFI-S

[6] For the sake of credibility of and identifiability with the information and the scholarship holder, I decided to actually conduct interviews with 34 real scholars rather than confronting the participant with artificial vignettes. As I show later in the appendix, results are insensitive to potential slight variations between texts.

[7] Slight differences in the quality of matching did not affect participants' application rates significantly (see tables 11 and 12 in the appendix).

(Gerlitz and Schupp 2005) and an untimed 12-item short-form of Raven's Advanced Progressive Matrices APM test (Raven et al. 1988), developed by Bors and Stokes (1998) and administered online.[8]

5 Data

5.1 Descriptives

As students potentially eligible to receive a scholarship are the target group of this study, I restrict the sample to students enrolled in both waves. After removing 574 cases, including PhD students, recent graduates, and college drop-outs, 8,817 students who completed the first survey remained. Of these, 64.3% also finished the second interview.[9] Response rates for the second survey are also very similar between groups (controls: 65.0 %, info treatment: 64.2 %, role model treatment: 63.6 %) with differences between groups not being statistically significant (chi-squared test: $\chi^2 = 1.29$, $p = 0.53$). Moreover, using the wave 1 data set and regressing participation in wave 2 on the treatment dummies, the later baseline controls, and the interaction of both does not raise differential attrition concerns. Listwise deletion of participants with non-response on at least one of the items used as control variables (1.6% of the sample) results in a final analytic sample of 5,531 participants equally spread over groups.

In the final sample, participants study at about 180 different colleges (universities and universities of applied sciences), so that more than 40% of all German colleges are represented. I emphasize here, though, that the sample was not drawn on a representative basis as the population of students formally eligible to apply for a scholarship was unknown. The results and conclusions are, therefore, only internally valid.[10]

The following paragraphs describe the analytic sample and draw comparisons to the general student body, where possible. I focus on discussing means for the control group if not indicated otherwise.

Table 1 displays descriptive statistics within and between the three experimental groups. As shown in the last two columns, characteristics are balanced over groups,

[8] In order to prevent attrition caused by an excessively long first wave, I decided to shift data collection of the BFI-S and the APM to wave 2. As the treatments are unlikely to affect measurement of personality and cognitive test scores and because both BFI-S and APM can be considered as relatively stable over time as indicated by acceptable test-retest stabilities (Hahn et al. 2012; Bors and Stokes 1998), this should not affect the results.

[9] More than one third of wave 2 non-respondents (12.2% of those who finished wave 1) could not be contacted due to typos in the e-mail addresses collected. The high share of mistakes in e-mail addresses is probably due to the fact that most universities provide their students with randomly created, and hence hard to remember, addresses to prevent spam for and identification of the respective students.

[10] Nevertheless, a self-selected sample, which is likely to represent the more committed students, is an appropriate potential target group for information campaigns of the BFW.

indicating that randomization was successful.[11] As is often the case in survey-based studies, female respondents are largely overrepresented, compared to official register data amounting to 48% female students (Federal Statistical Office 2014c). More importantly, however, the representation by educational background is in range with recent representative student-level data reporting that 50% (*20. Sozialerhebung 2012* by Middendorff et al. (2013)) of the surveyed students are of non-academic background: Here, 52% of the participants are of non-academic background, meaning they descend from families where no parent achieved a college degree.

Compared to official register data for the sampling period (Federal Statistical Office 2014a), students in my sample are more than 2 years younger (23 years, not reported) and have completed less semesters. I intended to sample students at an early stage of their studies as the BFW target students in their first semesters. Moreover, the students here are far more likely to be enrolled at a university (87% here vs. 58% in the register data). The overrepresentation of university students is a common phenomenon in survey data, even if drawn on a representative basis (and amounting to 74% in the *20. Sozialerhebung 2012*, for example).

Turning to key controls for the following analyses reveals that current holders of BFW scholarships (6%) are overrepresented as their share in the general student population amounts to only 1%. 16% of the students had already applied for a scholarship at a BFW, and 14% had applied elsewhere for a scholarship. Strikingly, the application rates by educational background differ only with respect to the BFW scholarships but not with respect to scholarships of other providers: While 14% of the non-academic students had applied at a BFW, the respective percentage of the academic students is more than one third higher (19%). At the same time, a similar proportion of academic and non-academic students had applied elsewhere (15% and 14%, $\chi^2 = 0.04$, $p = 0.84$). In contrast to the BFW, the non-BFW providers sometimes address students in financial hardship or of low socio-economic background directly, thereby likely to reduce information asymmetries by educational background. At the same time, however, many non-BFW providers also impose less challenging eligibility criteria, so that more non-academic students might qualify for other scholarships but not for the more selective BFW scholarships. In sum, this pattern already suggests that either a larger proportion of academic students is qualified to apply at a BFW or that non-academic students lack awareness of the profitable opportunities only BFW scholarships open up.

To proxy students' eligibility to receive a scholarship, the further analyses control for the fit of application requirements. As described above, dual degree students (12%), those studying in their second course of studies (4%), or part time (1%) are mostly

[11] Members of the first treatment group were, however, marginally less likely to have applied for other scholarships ($p<0.1$). Applying procedures correcting for alpha inflation, e.g., Bonferroni-Holm, no statistically significant differences were found on an overall significance level of 1%. Figure 2 in the appendix shows that kernel density plots for the Big Five Inventory between groups are very similar.

ineligible to receive scholarships. Most providers require applicants to be at least younger than 35 years—which nearly all students in the sample are. Qualified applicants should officiate volunteer work (which half of the sample does) and show above-average academic performance. Because one third of all students in the sample were college freshmen in wave 1, they were not able to report grades of their studies yet.[12] Therefore, I used the study grades at baseline, where available, and substituted these by high school GPA if missing (2,010 cases).[13]

Representative data on students' average academic performance during their studies is unavailable in Germany. Taking information on high school GPA from the "mostly representative" (Ramm 2014, p.10) *Studierendensurvey 2013* by Simeaner et al. (2014) as a benchmark suggests that high school GPAs in the sample here are overall similar but slightly better—which is reasonable because students in my sample are younger and average high school GPAs ameliorate continuously over cohorts.[14] About 45% of the sample here falls into the "high performance" group which is, according to the BFW that impose explicit study GPA-cutoffs, defined as a GPA better than 2.0 on the German five-point grading scale. 46% of the sample scores between GPA 2.0 and 2.9 (medium performance), only 9% scores lower than that. Despite the potential slight overrepresentation in study entrance grades, average cognitive test scores of 7.21 (S.D. = 2.70) are very close to results of the original offline version (mean = 7.15, S.D. = 2.34) used by Bors and Stokes (1998, p. 393).

As discussed earlier, delimiting the subsample with a viable chance to apply is difficult. Defining eligible students as students with high academic performance, who are younger than 35 years, neither dual degree students nor studying in their second course of studies, and have officiated volunteer work within the past 12 months, a share of 21.4% of this sample can be considered as potentially eligible. This fraction reduces to 19% when I subtract current scholars. All these shares are equally spread over groups.

If not indicated otherwise, all analyses control for socio-economic and study-related characteristics, fulfillment of application requirements, the respective baseline levels of the dependent variable (applied at a BFW or applied at other non-BFW providers), and baseline scholarship receipt. Cognitive test scores and personality traits are added as indicated.

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[12] There are also subjects of studies, e.g., Law, where the first semesters are not graded at all and grades are, naturally, missing.

[13] This strategy should be unproblematic as students have to demonstrate their academic ability when applying for scholarships and will also have to use their high school diploma if they did not receive any college grades yet. Furthermore, if I used achievements as reported in the second semester, I would be unable to rule out bias introduced by potential treatment-related changes in achievement.

[14] Data from the German Kultusministerkonferenz shows that high school GPAs ameliorated by roughly 2% between 2009 and 2013 over all German states. Grade inflation was most pronounced in North Rhine-Westphalia and Thuringia, where GPAs ameliorated by more than 5% (see figure 3 in the appendix).

Table 1:
Pre-treatment descriptive statistics

	(1) Controls		(2) General info		(3) Role model		(1) - (2)		(1) - (3)	
	Mean	(S.D.)	Mean	(S.D.)	Mean	(S.D.)	Diff.	(P-value)	Diff.	(P-value)
Female	0.68	(0.47)	0.68	(0.47)	0.67	(0.47)	0.00	(0.96)	0.00	(0.84)
Non-academic background	0.52	(0.50)	0.50	(0.50)	0.53	(0.50)	0.03	(0.12)	–0.01	(0.71)
Semester	4.43	(3.50)	4.39	(3.34)	4.53	(3.48)	0.04	(0.73)	–0.09	(0.42)
Type of institution										
University	0.87	(0.33)	0.87	(0.34)	0.86	(0.35)	0.00	(0.72)	0.02	(0.16)
Applied sciences	0.11	(0.31)	0.11	(0.31)	0.12	(0.33)	–0.00	(0.91)	–0.01	(0.22)
Other educational institution	0.02	(0.14)	0.02	(0.15)	0.02	(0.15)	–0.00	(0.55)	–0.00	(0.55)
Former receipt										
BFW scholarship wave 1	0.06	(0.24)	0.06	(0.23)	0.06	(0.24)	0.01	(0.52)	0.00	(0.76)
Other scholarship wave 1	0.04	(0.20)	0.03	(0.18)	0.03	(0.17)	0.01	(0.27)	0.01	(0.08)
Former application										
Applied at BFW	0.16	(0.37)	0.17	(0.37)	0.16	(0.37)	–0.01	(0.48)	–0.00	(0.71)
if non-academic	0.14	(0.34)	0.13	(0.34)	0.14	(0.34)	0.00	(0.80)	–0.00	(0.99)
if academic	0.19	(0.39)	0.20	(0.40)	0.20	(0.40)	–0.02	(0.32)	–0.01	(0.59)
Applied for other scholarship	0.14	(0.35)	0.12	(0.33)	0.13	(0.34)	0.02	(0.04)	0.01	(0.30)
if non-academic	0.14	(0.12)	0.13	(0.33)	0.13	(0.34)	0.02	(0.29)	0.01	(0.56)
if academic	0.15	(0.35)	0.12	(0.32)	0.13	(0.34)	0.03	(0.08)	0.01	(0.37)
Observations	1850		1839		1842		3689		3692	

Table 1:
Continued

	(1) Controls		(2) General info		(3) Role model		(1) - (2)		(1) - (3)	
	Mean	(S.D.)	Mean	(S.D.)	Mean	(S.D.)	Diff.	(P-value)	Diff.	(P-value)
Application requirements										
Dual studies	0.12	(0.32)	0.11	(0.32)	0.10	(0.30)	0.00	(0.77)	0.01	(0.21)
Second degree	0.04	(0.19)	0.04	(0.19)	0.03	(0.18)	–0.00	(0.70)	0.00	(0.67)
Other non-eligible studies	0.01	(0.08)	0.01	(0.08)	0.00	(0.07)	–0.00	(0.83)	0.00	(0.37)
Older than 34 years	0.01	(0.10)	0.01	(0.08)	0.01	(0.11)	0.00	(0.23)	–0.00	(0.64)
Volunteer work	0.50	(0.50)	0.52	(0.50)	0.52	(0.50)	–0.02	(0.31)	–0.02	(0.36)
High performance	0.45	(0.50)	0.47	(0.50)	0.44	(0.50)	–0.02	(0.18)	0.00	(0.78)
Medium performance	0.46	(0.50)	0.44	(0.50)	0.46	(0.50)	0.02	(0.20)	–0.00	(0.90)
Low performance	0.09	(0.29)	0.09	(0.29)	0.09	(0.29)	0.00	(0.91)	–0.00	(0.79)
Cognitive abilities										
Cognitive test score	–0.01	(1.02)	0.02	(0.99)	0.01	(0.98)	–0.03	(0.40)	–0.02	(0.50)
Observations	1850		1839		1842		3689		3692	

Notes: The last two columns report p-values of independent samples t-tests. "Other educational institutions" include, e.g., teacher training colleges. Dual studies combine academic and practical phases financed by companies. Students in their second degree enrolled for a second undergraduate education after finishing their first undergraduate degree. Students in dual studies or their second degree are ineligible for most BFW scholarships. "Other non-eligible studies" include, e.g., part-time students. "Former application" indicates all applications up to wave 1 or current scholarship receipt in wave 1. "Other scholarships" includes scholarships such as the "Deutschlandstipendium" or company-provided scholarships. Cognitive test scores are standardized.

5.2 Application determinants

There are, of course, several reasons why students of non-academic backgrounds are underrepresented in the scholarship body. For example, a lower share of qualified students of non-academic backgrounds must translate into an equally reduced share in the overall scholarship body. Nevertheless, recent evidence suggests that differences in college grades between academic and non-academic students are very small (Delaney et al. 2011; Aspelmeier et al. 2012).[15] Even if the probability to meet the requirements was, however, unrelated to socio-economic characteristics, the selection process could introduce selectivity. College-experienced parents might, for example, coach their children to perform better, or students of non-academic background might perform worse when in a situation of stereotype threat.

Providing information can only exert an effect on a more equitable social composition if equally talented students of non-academic backgrounds are already underrepresented at the stage of applications. To explore whether this is indeed the case, I specify a logit model where I regress applications for a BFW scholarship up to the first survey on a set of socio-economic, college, and eligibility controls (table 2).

As expected, the application requirements are highly relevant determinants of the application decision with academic performance, volunteer work, and meeting the age requirement being most important.[16] Keeping all these factors at their observed values, students at universities of applied sciences are predicted to be about four percentage points less likely to report a previous application than students enrolled at universities. As the share of students who work besides their studies is higher in the applied sciences group, this effect is likely to capture more time constraints and a smaller financial need to apply for a scholarship.[17]

Furthermore, the results in column 1 suggest that respondents' socio-economic background influences application behavior. All else equal, the predicted probability to report an application was 2.5 percentage points (=18%) lower for students of families without academic experience than for students from academic homes. High achieving university students with an average number of semesters (4.4), meeting all application requirements and reporting a party identification, had a 5.2 percentage points (=12.4%) lower predicted probability to have applied if of non-academic background ($p < 0.01$).

Omitted variable bias can, however, explain differences in applications if personality or cognitive abilities drive both application behavior and are correlated with socio-economic

[15] To the best of my knowledge, evidence for Germany is not available so far.

[16] Of course, students in their second course of studies and students who are too old to be eligible may have applied earlier. The dummy flagging respondents older than 34 years does therefore also capture a time trend of scholarships being less frequent and known at the time they would have been eligible to apply.

[17] Students' or parents' financial resources might be simultaneously affected by scholarship receipt (high income reduces the scholarship amount; scholarship funding increases financial resources). Lacking appropriate data, I cannot address this issue, unfortunately.

Table 2:
Determinants of the application for a merit scholarship: Logit model

	(1)	(2)	(3)	(4)
Female	–0.016	–0.012	–0.023**	–0.021**
	(0.010)	(0.010)	(0.011)	(0.011)
Semester	0.004***	0.004***	0.003**	0.003**
	(0.001)	(0.001)	(0.001)	(0.001)
Non-academic background	–0.025***	–0.023**	–0.026***	–0.024**
	(0.009)	(0.009)	(0.009)	(0.009)
Applied sciences	–0.040**	–0.038**	–0.046***	–0.044***
	(0.014)	(0.014)	(0.014)	(0.014)
Other educational institution	–0.030	–0.032	–0.024	–0.026
	(0.030)	(0.029)	(0.030)	(0.030)
Medium performance	–0.157***	–0.152***	–0.143***	–0.137***
	(0.009)	(0.009)	(0.009)	(0.009)
Low performance	–0.162***	–0.160***	–0.155***	–0.153***
	(0.008)	(0.008)	(0.008)	(0.009)
Older than 34 years	–0.121**	–0.121**	–0.120**	–0.121**
	(0.030)	(0.030)	(0.030)	(0.030)
Dual studies	–0.036**	–0.033**	–0.033**	–0.030*
	(0.015)	(0.015)	(0.015)	(0.015)
Second degree	–0.028	–0.026	–0.032	–0.030
	(0.023)	(0.023)	(0.023)	(0.023)
Other non-eligible studies	–0.016	–0.013	–0.022	–0.017
	(0.064)	(0.065)	(0.061)	(0.062)
Volunteer work	0.166***	0.166***	0.162***	0.160***
	(0.009)	(0.009)	(0.009)	(0.009)
Party identification	0.028***	0.029***	0.023**	0.024**
	(0.010)	(0.010)	(0.010)	(0.010)
Cognitive test score		0.022***		0.025***
		(0.005)		(0.005)
Openness			–0.002	–0.003
			(0.005)	(0.005)
Conscientiousness			0.039***	0.040***
			(0.005)	(0.005)
Extraversion			0.007	0.011**
			(0.005)	(0.005)
Agreeableness			–0.012***	–0.013***
			(0.005)	(0.005)
Neuroticism			–0.005	–0.003
			(0.005)	(0.005)
Observations	5531	5531	5531	5531
McFadden's Pseudo-R^2	0.158	0.162	0.171	0.176

* $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$. Standard errors in parentheses.

Notes: Each column reports average marginal effects from a separate logistic regression on the probability that the participant had applied for a BFW scholarship at baseline. I conduct a principal component analysis and orthogonal varimax rotation (total explained variance = 65.28%) on the Big Five Inventory before extracting the five factors by regression scoring.

background. Therefore, I include covariates for cognitive test scores (col. 2) and personality traits (col. 3). It is well established that conscientious students who are likely to be motivated and to behave achievement-oriented perform better in college (e.g., O'Connor and Paunonen 2007). Accordingly, I find that conscientious participants are predicted to be about four percentage points more likely to have applied (col. 3), over and above controlling for cognitive test scores (col. 4). Participants with high levels of agreeableness, being less assertive in their behavior, are predicted to be less likely, while extroverted individuals more likely to have applied when cognitive test scores are added. Nevertheless, none of the controls can close the application gap between students of different socio-economic backgrounds (col. 4).

What is striking, once personality traits are added, is that women are less likely to have applied. In the full specification, their predicted probability is 4.3 percentage points (10.9%) lower ($p = 0.05$) when considering eligible university students with average values on personality, test scores, and number of semesters.

Although I am not claiming causality here, the results provide some evidence that not only students of non-academic backgrounds but also women are already underrepresented when applying for scholarships, keeping eligibility constant. The lower application probability of women confirms the significantly smaller share of female scholarship holders in the German National Scholarship Foundation detected by Kuhlmann et al. (2012).

5.3 Information asymmetries

Is the decision to abstain from applying related to a lack in knowledge about scholarships? When asked about reasons for not applying, participants attach most importance to insufficient knowledge on application requirements, followed by insufficient volunteer work, and grades (table 14 in the appendix). Table 3 shows that students who had never applied at a BFW up to wave 1 were indeed poorly informed about scholarships. More than half of the participants indicated to be very or rather uninformed about scholarships, while only 9% stated to be informed or very informed.

This pattern is also found in participants' abilities to answer questions about scholarships correctly. Only 10% of the non-applicants were able to provide an estimate of the scholarship amount within an interval of EUR 50 around the true value of EUR 800.[18] Apart from that, more than one third could not name a single scholarship provider.

Several yes-no items tried to further assess students' perceptions of scholarships. Nearly half of the students knew that an application is possible without top margin grades. Most participants were informed about the possibility to apply at the BFW directly and knew that a scholarship need not be repaid. Yet, about 80% thought that a

[18] Respondents were asked to name the scholarship amount equivalent to EUR 500 of BAföG. Respondents therefore needed to know that the scholarship amount equals BAföG, but that scholarship holders receive a lump-sum payment of EUR 300 on top.

Table 3:
Knowledge level of non-applicants at baseline (wave 1)

	Mean	(S.D.)
Subjective knowledge level		
(Very) informed	0.09	(0.29)
Partly informed	0.36	(0.48)
(Very) uninformed	0.55	(0.50)
Knowledge on characteristics		
Amount correctly estimated	0.10	(0.30)
No provider known	0.36	(0.48)
Correct answer with respect to:		
Eligible even if not in upper half of very good grades	0.46	(0.50)
Own application without proposal possible	0.80	(0.40)
Amount need not be repaid	0.71	(0.46)
No strict grade requirements for prolongation	0.22	(0.42)
Knowledge indicator		
Sum of correctly answered	2.92	(1.35)
Observations	4622	

Notes: Participants who indicated not to know the answer to the question and those who failed to provide the correct answer were coded as 0, participants who came up with the correct answer were coded as 1. The "Knowledge indicator" sums participants' correct answers from all six objective knowledge items in the table.

strict grade point average existed, which, if not met, led to a loss of funding.

In a nutshell, participants were inadequately informed and especially lacked knowledge on the flexibility of requirements. Summing up correct answers, respondents answered, on average, slightly less than half of the six items correctly. Less than 1% of the respondents answered all items correctly (not reported).

To explore information asymmetries, I regress the number of correctly answered questions on a set of controls, including eligibility requirements. To prevent reverse causality, I restrict the sample to those who had not applied at a BFW up to the first wave. The sample includes, therefore, both respondents totally unaware of scholarships and those who might have considered applying but decided against it. I run an ordered logistic regression, and, to facilitate interpretation, evaluate the results at the probability to answer five of the six questions correctly.[19] Table 4 reports average semi-elasticities. The average semi-elasticity indicates the average percentage change in the probability to answer five out of six questions correctly when the respective covariate increases by one unit, keeping all other variables at their observed values.

Unsurprisingly, academic achievement is, again, associated strongest with a high predicted probability of above-average knowledge: The predicted probability to answer five questions correctly is about 66 (116) percent lower for participants with moderate (low) instead of high academic achievements, ceteris paribus. Dual study students usually ineligible to receive scholarships are predicted to be 21 percent less likely to provide five correct answers. Older students tend to be better informed, possibly because they had more opportunities to meet scholarship holders during their studies in comparison to young students. The socially engaged who are more likely to meet funded scholars during volunteer work, are predicted to be about 14 percent more likely to answer five questions correctly.

The predicted probability of above-average knowledge for a non-academic at university with an average number of semesters, meeting all eligibility requirements is about 16% ($p < 0.01$) lower than that of a comparable student with college-educated parents. Calculating the same average semi-elasticity with respect to gender, women's predicted probability is about 26% ($p < 0.01$) percent lower than that of similar men. These results are only slightly affected when controlling for potential differences in cognitive abilities in column 3.

To explore in how far this effect is mitigated by informal knowledge within the social network, I add a dummy for acquaintances with a scholarship holder (col. 2). People who indicated to know a (former) scholarship holder had substantially higher predicted probabilities to be informed. As significantly less non-academic students were acquainted

[19] Estimates across all other cut-offs are shown in the appendix exemplary for the specification of column 1 in table 4 (see figures 4 and 5 in the appendix). Patterns for the other specifications are similar.

Table 4:
Ordered logit model for scholarship knowledge: average semi-elasticities

	(1)	(2)	(3)	(4)	(5)
Female	–0.289***	–0.290***	–0.260***	–0.263***	–0.324***
	(0.048)	(0.049)	(0.049)	(0.049)	(0.070)
Semester	0.031***	0.021***	0.029***	0.020***	0.017*
	(0.007)	(0.007)	(0.007)	(0.007)	(0.010)
Non-academic background	–0.177***	–0.138***	–0.165***	–0.127***	–0.287***
	(0.046)	(0.046)	(0.046)	(0.046)	(0.066)
Applied sciences	–0.051	–0.046	–0.032	–0.029	–0.188*
	(0.073)	(0.073)	(0.073)	(0.073)	(0.102)
Other educational institution	–0.038	–0.018	–0.064	–0.042	–0.185
	(0.166)	(0.167)	(0.168)	(0.168)	(0.243)
Medium performance	–0.657***	–0.643***	–0.629***	–0.617***	–0.346***
	(0.050)	(0.050)	(0.050)	(0.050)	(0.076)
Low performance	–1.155***	–1.089***	–1.116***	–1.054***	–0.666***
	(0.084)	(0.085)	(0.085)	(0.085)	(0.108)
Older than 34 years	0.471**	0.474**	0.470**	0.472**	0.290
	(0.185)	(0.185)	(0.185)	(0.185)	(0.298)
Dual studies	–0.209***	–0.202***	–0.199***	–0.192***	–0.126
	(0.072)	(0.072)	(0.073)	(0.072)	(0.101)
Other non-eligible studies	0.330	0.408	0.379	0.450	0.686
	(0.363)	(0.370)	(0.357)	(0.363)	(0.502)
Volunteer work	0.141***	0.096**	0.140***	0.096**	–0.007
	(0.045)	(0.046)	(0.045)	(0.046)	(0.066)
At least one acquaintance		0.449***		0.439***	0.301***
		(0.050)		(0.050)	(0.068)
Cognitive test score			0.125***	0.117***	0.134***
			(0.024)	(0.024)	(0.034)
Actively looked for information					1.086***
					(0.076)
Observations	4622	4622	4622	4622	2671
Baseline predicted probability	0.039	0.039	0.039	0.039	0.057
P-value overall Brant test	0.775	0.688	0.624	0.530	†

* $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$. Robust standard errors in parentheses.

Notes: The table shows average semi-elasticities from an ordered logit model. Average semi-elasticities are calculated for the probability to answer five of the six items correctly. Figures 4 and 5 in the appendix show how average semi-elasticities vary over cut-offs. The sample is restricted to those who had not applied for a scholarship up to wave 1. †=Too few observations in some sub-groups to compute the Brant test.

with a scholar than their counterparts from academic homes ($\chi^2 = 59.16$, $p = 0.00$), the difference in knowledge between academic and non-academic students drops by about one quarter but is not completely offset. Note that the inclusion of the informal knowledge dummy does not affect the gender gap. As I cannot reject the hypothesis that men and women differ in their probabilities to know a scholar ($\chi^2 = 0.86$, $p = 0.35$), the results suggest that information asymmetries might be a relevant obstacle for non-academic students but probably not for women. The same holds for including cognitive test scores in column 4.

In column 5, I isolate the effect for those who had actively looked for information but then decided against applying by adding a dummy on own information search.[20] The influence of grades, volunteer work, and dual studies is reduced, indicating that the most eligible did indeed inform themselves and were thus better prepared to answer the questions. Strikingly, gaps with respect to academic background and gender increase, emphasizing that non-academic and female were also less likely to have looked for information.

6 The effects of information provision

6.1 Method

In the following, I analyze intent-to-treat (ITT) effects for five dependent variables, all of them measured at the time of the second survey: the number of correctly answered knowledge items, whether participants applied for a merit-based scholarship at a BFW or at other providers, whether they thought about applying, and, finally, whether they actively engaged in gathering more information about scholarships.

I estimate all ITT effects by specifying the following model:

$$y_i = \beta_0 + \beta_1 \cdot \textit{INFORMATION} + \beta_2 \cdot \textit{ROLE MODEL} + \boldsymbol{x}_i^{'} \cdot \boldsymbol{\beta}_3 + \epsilon_i, \tag{1}$$

where y_i is the respective outcome variable for student i at the time of the second survey. The treatment dummies *INFORMATION* and *ROLE MODEL* indicate whether students received only general information, or whether they received the role model treatment. β_1 and β_2 represent the intent-to-treat effects of the information and role model treatment, respectively. As previously mentioned, the role model treatment also included the information treatment. Therefore, β_2 represents the composite effect of both treatments with respect to no treatment. $\boldsymbol{x}_i$ is a vector of baseline controls. ϵ_i represents the error term, estimated using robust standard errors.

[20] As only respondents who had not applied for scholarships and were not planning to do so at baseline received this question, the sample size reduces to 2,681 students.

When the dependent variable is the number of correctly answered knowledge items, I omit the constant from equation 1 and estimate an ordered logit model. y_i becomes a latent variable of the students' scholarship knowledge, observed in one of the seven categories from zero items to six items answered correctly. For the ease of interpretation and similar to the previous analyses of students' information asymmetries (table 4), I report average semi-elasticities for the probability to answer five of the six knowledge items correctly.

For all other binary dependent variables, I run simple linear probability models with ordinary least squares (OLS); non-linear specifications yield, however, similar results.

Being interested in non-academic students' application probabilities mainly, I investigate heterogeneous ITT effects by adding interactions between the treatment dummies and the students' educational background in most of the analyses.

6.2 Results

Treatment effects on scholarship knowledge

Table 5 shows whether the treatments increased scholarship knowledge at the time of the second survey for the whole sample (col. 1–2) and by educational background (col. 3–6). Columns 1 and 2 indicate that both treatments increased the knowledge about scholarships significantly.[21] The average predicted probability to answer five of the six knowledge questions correctly increased by about 12 percent in both the information and the role model treatment group (col. 1). Adding personality traits and cognitive test scores slightly decreases the estimates. Decomposing the sample by educational background reveals that the effects are twice as large and only statistically significantly different from zero for non-academic students for whom the information was designed and who were worse informed at baseline.

Treatment effects on applications for scholarships

This section investigates whether the better knowledge about scholarships carried over to students' higher application rates at wave 2. Table 6 presents the impact of both treatments on applications at a BFW (col. 1–3) and at other scholarship providers (col. 4–6). As a reference point, the bottom of the table contains the predicted probabilities to apply for a scholarship at wave 2 for the control group. I start with discussing the treatment effects for applications at a BFW.

Considering the whole sample, column 1 reveals that less than three percent of the students applied for a BFW scholarship between wave one and wave two. Moreover,

[21] Results without covariates for this and all following specifications are very similar. I report covariates-adjusted results only as these are more efficient and take care of potential remaining differences between groups. Unadjusted results are available upon request.

Table 5:
ITT effects on knowledge: Ordered logit model

	All		Non-academic		Academic	
	(1)	(2)	(3)	(4)	(5)	(6)
Information treatment	0.120**	0.111**	0.146**	0.142**	0.089	0.073
	(0.047)	(0.047)	(0.067)	(0.067)	(0.066)	(0.067)
Role model treatment	0.119**	0.113**	0.159**	0.157**	0.072	0.060
	(0.048)	(0.048)	(0.067)	(0.068)	(0.068)	(0.068)
Big5 Controls		✓		✓		✓
Cognitive test scores		✓		✓		✓
Observations	5195	5195	2726	2726	2469	2469

* $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$. Robust standard errors in parentheses.

Notes: ITT effects reported as average semi-elasticities from an ordered logit model (cut-off at 5 correctly answered items) with respect to the control group. Each estimation controls for all covariates of table 1, including the baseline level of the respective dependent variable.

neither of the two treatments had a statistically significant effect on applications.

Decomposing the sample again by educational background shows that the role model treatment increased non-academic students' application rates by highly statistically significant 2 percentage points (col. 2–3), though. In other words, in comparison to the respective control group, where only 1.9% of the students with non-academic background applied for a BFW-scholarship, the role model treatment more than doubled non-academics' application probabilities. In contrast to that, the respective treatment effect is not statistically significant for students of college-educated families ($p > 0.1$). Although non-academic students in the general information treatment group are equally likely to answer objective knowledge questions on scholarships, their probability to have applied for a BFW scholarship is not significantly affected (col. 2–3) and marginally significantly smaller than the ITT of the role-model treatment ($p < 0.1$). Therefore, only the role model treatment increased a sense of belonging, allowed students to look behind the scenes, and to accumulate insider information relevant to decide in favor for applying themselves. As a consequence, ITT effects found in the second treatment group can be considered as stemming from the interview text and not from the general information text which was also provided to the general information group.

Turning to students' application probabilities for other scholarship opportunities not provided by the BFW (col. 4–6 in table 6) shows that the effect pattern between both treatment groups reverses. Participants in the general information group were 1.5 points more likely to report applications for non-BFW scholarships, though the effect is only marginally statistically significant. At the same time, the coefficient for members of the other treatment group is negligibly small and insignificant, though not significantly smaller ($p > 0.1$, col. 4). The negative signs of the interactions with educational background point

Table 6:
ITT effects for full sample and heterogeneous effects: OLS

	Application at a BFW			Application elsewhere		
	(1)	(2)	(3)	(4)	(5)	(6)
Information treatment	0.001	0.007	0.007	0.015*	0.019*	0.019*
	(0.005)	(0.007)	(0.007)	(0.008)	(0.011)	(0.011)
Role model treatment	0.005	0.020***	0.020***	0.002	0.002	0.003
	(0.006)	(0.008)	(0.008)	(0.008)	(0.010)	(0.010)
Academic background	–0.004	0.010	0.010	0.004	0.006	0.007
	(0.005)	(0.008)	(0.008)	(0.007)	(0.011)	(0.011)
Interaction effects						
Info × Academic		–0.012	–0.012		–0.007	–0.007
		(0.011)	(0.011)		(0.016)	(0.016)
Role model × Academic		–0.032***	–0.032***		0.000	–0.001
		(0.011)	(0.011)		(0.015)	(0.015)
Big5 Controls			✓			✓
Cognitive test scores			✓			✓
Observations	5195	5195	5195	5195	5195	5195
Pred. probability to apply between W1 and W2 (control group)						
All	0.026	0.026	0.026	0.055	0.055	0.055
Non-academic		0.019	0.019		0.050	0.050
Academic		0.034	0.034		0.060	0.060

* $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$. Robust standard errors in parentheses.

Notes: ITT effects reported with respect to the control group. Each estimation controls for the covariates of table 1, application at baseline and the receipt of other scholarships at baseline. Additional covariates or interactions with both treatment groups are added as indicated. 334 participants were dropped because they were already funded by a scholarship (parallel funding not possible).

to a smaller effect for academic students, yet, the interactions are not significantly different from zero (col. 5-6). This is in line with the observation that baseline application rates for non-BFW scholarships were already very similar for academic and non-academic students (see table 1).

Treatment effects on short-run behavior

To better understand why the general information treatment increased participants' applications for non-BFW scholarships but did not affect applications for BFW scholarships, I investigate whether the treatments had similar effects on intentions to apply and own information search.[22] Table 7 contains regression results for the dependent variables having thought about applying for any scholarship (col. 1–2) and having actively looked for more information after the treatment (col. 3–4).

In the control group, about 42% of the students had thought about applying at the time of the second survey. Both treatments increased the share of those who had thought about an application by a small but significant amount. Although both treatments had an equally large impact on whether participants considered applying ($p > 0.1$, col. 1–2), only the general information treatment triggered own active information search between wave 1 and wave 2. The effect for participants in the role model treatment group who were provided with extensive information is significantly smaller ($p < 0.1$, col. 3) and not statistically significant overall. That the treatment effect in the information treatment group is not statistically significantly different from zero is not surprising as the general text provided only basic information about scholarships and urged participants to go online to look for more extensive information. In this vein, students in the information treatment group might have come across other, probably more suitable or less challenging, scholarship opportunities and applied there, while those treated more extensively restricted their attention to applying at a BFW. As outlined previously, the selection criteria of other, smaller scholarship programs are often more transparent and have less competitive and complex selection processes. Publicly available information is, therefore, more helpful when gathering information on non-BFW scholarships than when cutting one's way through the more complex information on scholarships provided by one of the BFW.

Treatment effects on applications of the most eligible students

Because the majority of the students in my sample are not eligible to receive scholarships, the treatment effects presented so far are only a lower bound of the true effects. To

[22] Unfortunately, only those who had never applied for any scholarship at baseline and did not intend to do so before the treatment were asked whether they had actively looked for information or thought about applying.

Table 7:
ITT effects on pre-application outcomes: OLS

	Thought about applying†		Active information search†	
	(1)	(2)	(3)	(4)
Information treatment	0.059***	0.057***	0.036**	0.034*
	(0.020)	(0.020)	(0.018)	(0.018)
Role model treatment	0.044**	0.044**	0.004	0.006
	(0.020)	(0.020)	(0.018)	(0.018)
Big5 Controls		✓		✓
Cognitive test scores		✓		✓
Observations	2670	2670	2670	2670
Pr(y=1) at W2 (control group)				
All	0.419	0.419	0.233	0.233

* $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$. Robust standard errors in parentheses.

Notes: ITT effects reported with respect to the control group. Each estimation controls for all covariates of table 1, including the baseline level of the respective dependent variable. † These items were only given to respondents who had not applied for scholarships and were not planning to do so at baseline.

purge the sample of mostly ineligible students, table 8 restricts the sample to an approximation of the target population. I start by dropping all students likely to be ineligible to apply at most BFW because they are too old or study in ineligible programs (col. 1–2). Then, I also drop students beyond the most favored range of semesters (col. 3). In column 4, I exclude moderately and low performing students and in column 5 also those who exert no volunteer work. Columns 6 and 7 keep, in addition to column 3, only the high performing students. I depict results without educational background interactions for the first sample reduction (col. 1) and the most restrictive sample (col. 6).

Columns 1 and 6 without interactions reveal that both treatments remain insignificant in the sample of most eligible students. As students in the general information group applied at higher rates elsewhere, irrespective of their factual eligibility to receive BFW scholarships,[23] ITT effects in the general information group do not increase between columns 1 and 6 and stay negligible in size and statistical significance. Although the ITT effects in the role model group increase up to 2.2 points in column 6, the effect is still not statistically significant.

Contrary to that, heterogeneous ITT effects for non-academic students are statistically significant in all specifications (col. 2–6, col. 7) and rise steadily up to 6.6 percentage

[23] Students ineligible for BFW scholarships have *not* applied less often for other alternatives when I repeat the analysis from table 8 but restrict the sample up to the least eligible participants. ITT estimates are similar to the unrestricted sample and larger in the info treatment group.

Table 8:
ITT effects of application for a BFW-scholarship, approximation of the relevant sample: OLS

	Formal criteria		Formal crit. +Semester	Performance	Volunteer	Performance +Semester	
	(1)	(2)	(3)	(4)	(5)	(6)	(7)
Information treatment	–0.004	0.004	0.019	0.013	0.005	0.005	0.057*
	(0.006)	(0.007)	(0.016)	(0.016)	(0.024)	(0.024)	(0.031)
Role model treatment	0.002	0.019**	0.027*	0.034*	0.065**	0.022	0.066*
	(0.006)	(0.008)	(0.016)	(0.018)	(0.030)	(0.026)	(0.034)
Academic background	–0.005	0.013	0.026	0.038**	0.048*	0.011	0.071**
	(0.005)	(0.008)	(0.018)	(0.018)	(0.028)	(0.020)	(0.032)
Interaction effects							
Info × Academic		–0.017	–0.033	–0.044*	–0.056		–0.095**
		(0.012)	(0.025)	(0.024)	(0.036)		(0.046)
Role model × Academic		–0.037***	–0.032	–0.066**	–0.102**		–0.081
		(0.012)	(0.027)	(0.026)	(0.041)		(0.052)
Observations	4232	4232	1182	1781	896	550	550
Pred. probability to apply between W1 and W2 (control group)							
(a) All	0.026	0.026	0.030	0.052	0.065	0.051	0.051
(b) Non-academic		0.018	0.014	0.030	0.036		0.012
(c) Academic		0.036	0.047	0.071	0.090		0.086
P-value (c)=(b)		0.036	0.060	0.026	0.055		0.020

* $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$. Robust standard errors in parentheses.

Notes: ITT effects reported with respect to the control group. Each estimation controls for socio-economic characteristics, application requirements, former applications, and current receipt of other scholarships than BFW scholarships. Starting from the full sample and excluding current scholarship holders of wave 1, the sample is further restricted as follows: "Formal" = drop dual degree, part-time, students in their second course of studies, students older than 34 years in wave 1, and current scholarship holders; "Formal+Semester" = additionally drop students in their Bachelor's but higher than in second semester at baseline or in their Master's and higher than first semester in wave 2; "Performance" = in addition to "Formal", keep only high performing students; "Volunteer" = in addition to "Performance", keep only socially engaged students; "Performance+Semester" = in addition to "Formal+Semester", keep only high performing students.

points (col. 7). In the specification including only students with volunteer work and high academic performance (col. 5), application rates for non-academic students in the role model group are about twice as large as the respective control group benchmark. In the most restrictive specification for formally eligible, high-achieving students in the eligible semester range (col. 7), application rates in the role model treatment group exceed the respective control group benchmark by more than factor 5. As can be seen from the bottom of the table, the predicted probabilities for the control group to have applied for a BFW-scholarship differ significantly between non-academic (row b) and academic students in all specifications (row c): While academic students in the control group were increasingly more likely to have applied for a scholarship if they are highly eligible, even highly eligible non-academic students in the control group were up to 7 percentage points less likely to have applied. The role model treatment closed the gaps in application probabilities between students of different educational backgrounds almost completely.

Success of applications

How likely is it that the non-academic students who applied after the treatment are indeed awarded the scholarship? Unfortunately, I cannot assess this question directly because the response rate of applicants assessed in a third wave 1.5 years after the first was too low to conduct meaningful analyses.

Nevertheless, I can investigate whether the success probabilities of students who had applied before wave 1 differed by educational background. Table 9 reports OLS-estimates for the subsample of those who reported a BFW-application at baseline. More specifically, I regress an indicator of having applied (un-)successfully on several covariates. The estimates show that non-academic students were not statistically significantly less successful than comparable academic students.

These results are confirmed when I broaden the focus to applications up to wave 3. I do not find evidence that students of non-academic background who applied for the scholarship after wave 1 have a different likelihood to be awarded the scholarship ($\chi^2 = 0.43$, $p = 0.51$).[24]

Furthermore, I asked students who were already financed by a BFW-scholarship at wave 1 to assess, in how far the probability to be awarded a scholarship is affected if applicants are of low socio-economic background (but, other than that, similar to all other applicants). Respondents could choose between the categories "very negatively", "rather negatively", "no influence", "rather positively", and "very positively". 76% assumed that the probability to be awarded the scholarship is rather or very positively affected if applicants are of low socio-economic background, ceteris paribus. Answers to this question

[24] The likelihood to participate in the third wave differed not significantly between students of non-academic and academic background ($\chi^2 = 0.12$, $p = 0.72$), and both groups were equally likely to participate in wave 3 if successfully awarded a scholarship ($\chi^2 = 0.67$, $p = 0.41$).

differed not significantly by respondents' own socio-economic backgrounds ($\chi^2 = 3.37$, $p = 0.50$). This assessment is also in line with the stated goal of the BFW to increase the share of underrepresented students.

All these results confirm the descriptive findings of Kuhlmann et al. (2012) who report no statistically significant differences in general acceptance rates by (non-)academic background for the German National Scholarship Foundation and even higher acceptance rates for first-semester students without parental college degree. Taken together and against the background that additional funds to increase the percentage of underrepresented groups in the merit-based aid system are available, a higher number of qualified applicants of non-academic background should most likely also translate into a higher number of scholarships awarded to them.

Table 9:
Success probabilities for applications at baseline: OLS

	(1)		(2)		(3)	
Socioeconomic background						
Female	–0.034	(0.031)	–0.031	(0.031)	–0.009	(0.031)
Semester	0.074***	(0.013)	0.067***	(0.012)	0.066***	(0.012)
Semester^2	–0.003***	(0.001)	–0.003***	(0.001)	–0.003***	(0.001)
Non-academic background	–0.035	(0.030)	–0.029	(0.029)	–0.023	(0.029)
Type of institution						
Applied sciences	0.044	(0.059)	0.030	(0.058)	0.042	(0.056)
Other educational institution	0.110	(0.117)	0.084	(0.110)	0.100	(0.112)
Academic performance						
Medium performance	–0.065*	(0.036)	–0.073**	(0.035)	–0.074**	(0.036)
Low performance	–0.159	(0.104)	–0.220**	(0.099)	–0.231**	(0.095)
Volunteer work			0.268***	(0.027)	0.248***	(0.027)
Personality traits						
Openness					0.012	(0.014)
Neuroticism					–0.062***	(0.015)
Agreeableness					0.020	(0.014)
Extraversion					0.029*	(0.015)
Conscientiousness					0.012	(0.015)
Cognitive abilities						
Cognitive test score					0.014	(0.015)
Observations	897		897		897	
McFadden's Pseudo-R^2	0.048		0.095		0.107	
Predicted probability of success			0.299		0.299	

* $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$. Robust standard errors in parentheses.

Notes: The sample is restricted to students who mentioned to have applied at a BFW at baseline. The dependent variable equals 1 if the student received the scholarship as reported at baseline and equals 0 if the student did not receive the scholarship.

Differences between men and women

To follow up briefly on the gender effects I found with respect to information levels and former applications, I investigate in table 10 whether these effects carry over to gender-differences in treatment effects.[25] Surprisingly, the role model treatment did not affects women's application probabilities for merit-based scholarships significantly, whereas the effects are statistically significantly different from zero for men. This finding corroborates once more that information asymmetries are not key to explain why female students apply less often (see section 5.2) and are less likely to persist in the selection process of the German National Scholarship Foundation, although equally eligible (Kuhlmann et al. 2012).

Table 10:
ITT effects of application for a BFW-scholarship, by gender: OLS

	(1)		(2)		(3)	
Information treatment	0.001	(0.005)	–0.000	(0.007)	0.000	(0.007)
Role model treatment	0.005	(0.006)	–0.003	(0.007)	–0.003	(0.007)
Male			–0.006	(0.008)	–0.004	(0.008)
Interaction effects						
Info × Male			0.003	(0.011)	0.003	(0.011)
Role model × Male			0.026**	(0.013)	0.026**	(0.013)
Observations	5195		5195		5195	
Pred. probability to apply between W1 and W2 (control group)						
(a) All	0.026		0.026		0.026	
(b) Female			0.027		0.027	
(c) Male			0.023		0.023	
P-value (c)=(b)			0.618		0.617	

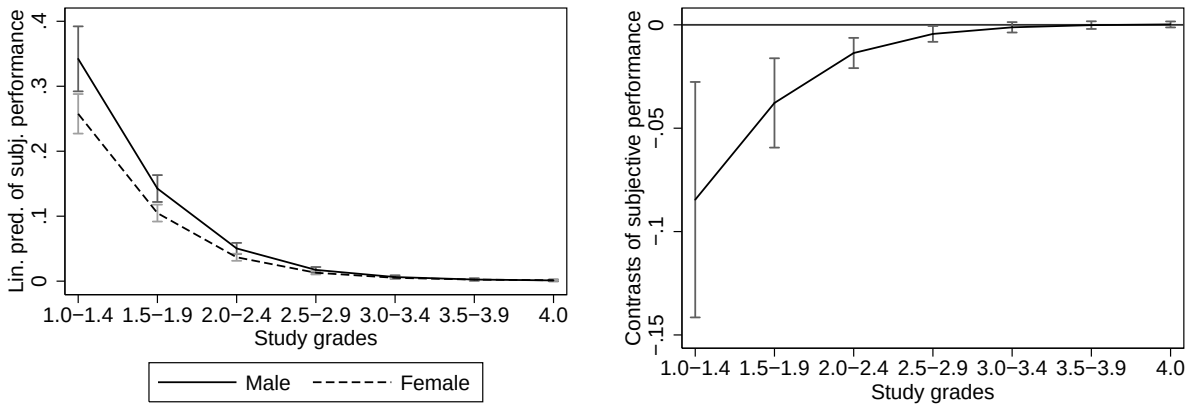
* $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$. Robust standard errors in parentheses.

Notes: ITT effects reported with respect to the control group. Each estimation controls for the covariates of table 1, application at baseline and the receipt of non-BFW scholarships at baseline. Additional covariates or interactions with both treatment groups are added as indicated.

One possible explanation for the finding that equally qualified women abstain from applying might be the underestimation of their own abilities and the lower level of confidence about their own performance (e.g., Deaux and Farris 1977; Chevalier et al. 2009). Another explanation is women's generally higher average performance in college (Vincent-Lancrin 2009). If women compare their own achievement to that of their peer group, their self-assessment might be lower just because the average level of performance in a female-dominated peer group is higher.

[25] The results for a sample restriction similar to table 8 are even more pronounced and yield zero effects for women but larger effects for men. Because sample sizes for men become relatively small when cutting down the sample, the results (available on request) have to be interpreted with caution, though, and are therefore not reported here.

To investigate these channels, I run an ordered logistic regression of participants' self-assessed academic performance with respect to their peers on several convariates: gender, study grades, field of studies, a three-way-interaction of gender, study grades, and field of studies plus their composite terms, cognitive test scores, high school GPA, type of institution, semester, and personality traits. I cluster the standard errors at the respective higher education institution to account for differences in grading and quality between universities. Keeping the factual study grades constant, I find that men are significantly more likely than women to evaluate themselves as "much better" than their peers if their study GPA is better than 3.0 (see figure 1). While the average predicted probability of men with top grades to evaluate their own performance as "much better" amounts to 32%, the respective average probability of women is about one third lower. Lacking objective measures for the peer groups' performance, I cannot assess, however, whether it is women's lower self-consciousness or their different reference point that drives their worse self-assessment.



(a) Linear predictions

(b) Contrasts of linear predictions

Figure 1:
Linear predictions of students' subjective performance, evaluated against their peers

Notes: Results from an ordered logit regression. Dependent variable: own study GPA is much worse (1), worse (2), the same (3), better (4) or much better (5) than the study GPA of peers at the same higher education institution in the same subject of studies and semester. Independent variables: see text.

7 Conclusion

Two thirds of all German merit-based aid holders come from families where at least one parent achieved a college degree, whereas students of academic background only make up half of the overall student population (Middendorff et al. 2009, p. 24). Middendorff et al. (2009) argue that the likelihood to encounter students of non-academic backgrounds in the group of qualified students is lower than the likelihood to come across students whose

parents have studied. Studies on differences in academic abilities between students who have already made their way to higher education are, however, not available for Germany. Yet, international evidence suggests that gaps in college grades are very small (Delaney et al. 2011; Aspelmeier et al. 2012) and not comparable to socio-economic differences in grades at earlier stages.

As the German merit-based aid system is very intransparent and the selection process of new scholarship holders is complex, it seems more reasonable that information asymmetries contribute to explaining the underrepresentation of non-academic students. This chapter is the first to investigate whether non-academic students qualified to receive merit-based scholarships apply indeed as frequently and are equally well informed about scholarship opportunities as are similar students of academic homes. If qualified students of college inexperienced families apply less often, although they might profit most from the scholarships' advantages, the merit-based system cannot unfold non-academic students' talent, thereby allocating funds inefficiently, and undermining its social mandate.

The findings from this chapter provide first evidence that participants in a field experiment were indeed significantly less informed at baseline if descending from families without academic experience. Keeping educational achievements, cognitive test scores, important application requirements, and a range of other covariates constant, students of non-academic backgrounds were also significantly less likely to report former applications for merit-based aid. Therefore, even if students of all socio-economic groups are equally likely to succeed in the application process for scholarships, the smaller share of non-academic students' applications will carry over to their underrepresentation in the scholarship body.

Nevertheless, if lower application rates are mainly resulting from information asymmetries, providing information about scholarship opportunities is a very inexpensive instrument to influence students' choice sets after leaving high school. The findings here suggest that providing information on scholarships increased non-academic students' knowledge on scholarships and led them to consider applying. Moreover, factual application rates of non-academic students six months later doubled with respect to the control group when a scholar with similar characteristics shared custom-fit information. As not all scholarship providers' application deadlines fell into the time span of six months, it is very likely that the treatment effects would be even larger if applications were questioned 9 or 12 months later. Moreover, these results represent a lower-bound estimate of the effect as the sample contained a majority of students formally ineligible to apply for funding. Restricting the sample to the highly eligible students increases the intent-to-treat effects for non-academic students in the role model treatment group substantially.

At the same time, providing publicly available information alone increased the awareness of scholarships in general and triggered applications for other, less selective ones. Yet, general information was not suitable to affect applications for highly selective merit-based

aid. This finding is in line with previous evidence from the information interventions literature, suggesting that providing general information exerts no behavioral outcomes in industrialized countries (Booij et al. 2012; Carrell and Sacerdote 2013; Kerr et al. 2014). Therefore, the decisive information asymmetry is not the ignorance of mere facts about scholarships, but rather the information that a similar person made it.

I find no differences in the baseline probabilities to succeed between applicants of different socio-economic backgrounds. As it is a declared goal to increase the number of scholars from underrepresented groups, the higher number of qualified students' applications is very likely to translates into a higher number of scholarship winners.

My results do, however, also suggest that female participants' applications were unaffected after offered detailed information, while men seem to have embraced the opportunity to apply. The findings from this chapter provide evidence that women underestimate their own abilities with respect to their peers—may it be because they are generally less confident about their own performances or because the average level of performance in a female-dominated peer group is higher. As merit-based scholarships are awarded in a highly demanding selection process and the role model treatment provided detailed information on its competitiveness, gender differences in competitiveness might also explain why women in the second treatment group did not apply more often. A wide range of studies provide evidence that women shy away from competition, while men embrace it and even perform better when competing (Gneezy et al. 2003; Gneezy and Rustichini 2004; Niederle and Vesterlund 2007; Morin 2015). With respect to merit-based aid, Kuhlmann et al. (2012) provide evidence that women having been recommended to the largest German scholarship providing institution are less successful in the assessment centers than their male counterparts, although equally well qualified. Learning about details of the later selection process might, therefore, shift women's lower odds to succeed in the process to an earlier stage: Anticipating the challenge to compete and potential problems to prevail in the process, women might abstain from applying in the first place. More evidence is, however, needed to investigate reasons for the gender gap and assess whether the findings from this non-representative sample can be generalized to the full student population. Accordingly, prospective studies should include a direct measure of participants' tastes for competition and level of self-confidence to set limits to possible reasons of the gender gap.

Some BFW have already established small mentoring programs where current scholarship holders get in touch with students from underrepresented groups and share information on scholarships. These programs are highly cost-effective as scholarship holders act on a volunteer work basis. The results from this chapter suggest that these programs can indeed be a fruitful and inexpensive endeavor to promote nonacademic students.

References

Aspelmeier, Jeffery E., Ann N. Elliott, Michael M. Love, Lauren A. McGill, and Thomas W. Pierce, "Self-Esteem, Locus of Control, College Adjustment, and GPA Among First- and Continuing-Generation Students: A Moderator Model of Generational Status," *Research in Higher Education* 53 (2012), 755–781.

Behncke, Stefanie, Markus Frölich, and Michael Lechner, "A Caseworker Like Me: Does The Similarity Between The Unemployed and Their Caseworkers Increase Job Placements?" *The Economic Journal* 120 (2010), 1430–1459.

Bettinger, Eric P. and Rachel Baker, "The Effects of Student Coaching in College: An Evaluation of a Randomized Experiment in Student Mentoring," *NBER Working Paper*.

Bettinger, Eric P., Bridget Terry Long, Philip Oreopoulos, and Lisa Sanbonmatsu, "The Role of Application Assistance and Information in College Decisions: Results from the H&R Block FAFSA Experiment," *The Quarterly Journal of Economics* 127 (2012), 1205–1242.

BFW Working Group, "Stipendiumplus: Begabtenförderung im Hochschulbereich," (2013), URL: http://www.stipendiumplus.de, accessed on 10.10.2013.

Booij, Adam S., Edwin Leuven, and Hessel Oosterbeek, "The Role of Information in the Take-Up of Student Loans," *Economics of Education Review* 31 (2012), 33–44.

Borghan, Lex, Bart H. H. Golsteyn, and Anders Stenberg, "Does Expert Advice Improve Educational Choice?" *IZA Discussion Paper*.

Bors, D. A. and T. L. Stokes, "Raven's Advanced Progressive Matrices: Norms for First-Year University Students and the Development of a Short Form," *Educational and Psychological Measurement* 58 (1998), 382–398.

Callender, Claire *Awareness, Take-up and Impact of Institutional Bursaries and Scholarships in England: Summary and Recommendations*, Bristol: Office for Fair Access (2009), URL: http://tinyurl.com/Office4FairAccess, accessed on 13.10.2014.

Carrell, Scott E. and Bruce Sacerdote, "Late Interventions Matter Too: The Case of College Coaching New Hampshire," *NBER Working Paper*.

Castleman, Benjamin L., Lindsay C. Page, and Korynn Schooley, "The Forgotten Summer: Does the Offer of College Counseling After High School Mitigate Summer Melt Among College-Intending, Low-Income High School Graduates?" *Journal of Policy Analysis and Management* 33 (2014), 320–344.

Chevalier, Arnaud, Steve Gibbons, Andy Thorpe, Martin Snell, and Sherria Hoskins, "Students' Academic Self-Perception," *Economics of Education Review* 28 (2009), 716–727.

Deaux, Kay and Elizabeth Farris, "Attributing Causes for One's Own Performance: The Effects of Sex, Norms, and Outcome," *Journal of Research in Personality* 11 (1977), 59–72.

Delaney, Liam, Colm Harmon, and Cathy Redmond, "Parental Education, Grade Attainment and Earnings Expectations Among University Students," *Economics of Education Review* 30 (2011), 1136–1152.

Dinkelman, Taryn and Claudia Martínez A. "Investing in Schooling in Chile: The Role of Information About Financial Aid for Higher Education," *The Review of Economics and Statistics* 96 (2014), 244–257.

Dynarski, Susan, "The New Merit Aid," in Caroline M. Hoxby (Ed.) *College Choices*, Chicago: Univ. of Chicago Press, 63–100 (2004), URL: http://www.nber.org/chapters/c10098.

Dynarski, Susan M. and Judith E. Scott-Clayton, "The Cost of Complexity in Federal Student Aid: Lessons from Optimal Tax Theory and Behavioral Economics," *National Tax Journal* 59 (2006), 319–356.

Federal Ministry of Education and Research, "Impulse für die Gesellschaft: Die Begabtenförderungswerke.," (2014a), URL: http://www.bmbf.de/de/294.php, accessed on 04.08.2014.

——— *Zusätzliche Nebenbestimmungen zur Förderung begabter Studierender sowie begabter Nachwuchswissenschaftlerinnen und -wissenschaftler* (2014b), URL: http://tinyurl.com/Stipendienrichtlinien, accessed on 29.03.2016.

——— , "Stipendienentwicklung für Studierende in den Jahren 2005 bis 2014," (2015a), URL: http://tinyurl.com/Stipendientrends, accessed on 29.03.2016.

——— , "Übersicht über die Zuwendungen des BMBF an die Begabtenförderungswerke und die Zahl der Geförderten nach Jahren," (2015b), URL: http://tinyurl.com/Stipendienbetrag, accessed on 29.03.2016.

Federal Statistical Office (Ed.) *Bildung und Kultur: Studierende an Hochschulen Wintersemester 2013/2014*, Wiesbaden (2014a).

Federal Statistical Office, "Long Term Series of Student Numbers from 1975," (2014b), URL: http://tinyurl.com/studnumb, accessed on 29.03.2016.

Federal Statistical Office (Ed.) *Studierende an Hochschulen Vorbericht - Fachserie 11 Reihe 4.1 - Wintersemester 2013/2014*, Wiesbaden (2014c).

——— (Ed.) *Ausbildungsförderung nach dem Bundesausbildungsförderungsgesetz (BAföG) 2014*, Fachserie 11 Reihe 7, Wiesbaden (2015a).

Federal Statistical Office, "Long Term Series of Student Numbers from 1975," (2015b), URL: http://tinyurl.com/studnumb75, accessed on 29.03.2016.

Gerlitz, Jean-Yves and Jürgen Schupp, "Zur Erhebung der Big-Five-basierten Persönlichkeitsmerkmale im SOEP: Dokumentation der Instrumententwicklung BFI-S auf Basis des SOEP-Pretests 2005," *DIW Berlin Research Notes*.

German Bundestag, "Unterrichtung durch die Bundesregierung: Zwanzigster Bericht nach § 35 des Bundesausbildungsförderungsgesetzes zur Überprüfung der Bedarfssätze, Freibeträge sowie Vomhundertsätze und Höchstbeträge nach § 21 Absatz 2," *German Bundestag Printed Matter*.

——— , "Unterrichtung durch die Bundesregierung: Bericht über die Höhe des steuerfrei zu stellenden Existenzminimums von Erwachsenen und Kindern für das Jahr 2016 (10. Existenzminimumbericht)," *German Bundestag Printed Matter*.

German National Scholarship Foundation, "Jahresbericht 2013," (2014), URL: http://tinyurl.com/scholfound, accessed on 29.03.2016.

Gneezy, U., M. Niederle, and A. Rustichini, "Performance in Competitive Environments: Gender Differences," *The Quarterly Journal of Economics* 118 (2003), 1049–1074.

Gneezy, Uri and Aldo Rustichini, "Gender and Competition at a Young Age," *The American Economic Review* 94 (2004), 377–381.

Hahn, Elisabeth, Juliana Gottschling, and Frank M. Spinath, "Short Measurements of Personality: Validity and Reliability of the GSOEP Big Five Inventory (BFI-S)," *Journal of Research in Personality* 46 (2012), 355–359.

Hastings, Justine, Christopher Neilson, and Seth Zimmerman, "The Effects of Earnings Disclosure on College Enrollment Decisions," *NBER Working Paper*.

Hastings, Justine S. and Jeffrey M. Weinstein, "Information, School Choice, and Academic Achievement: Evidence from Two Experiments," *The Quarterly Journal of Economics* 123 (2008), 1373–1414.

Hoxby, Caroline M. and Sarah Turner, "Informing Students about Their College Options: A Proposal for Broadening the Expanding College Opportunities Project," *The Hamilton Project Discussion Paper*.

Jensen, Robert, "The (Perceived) Returns to Education and the Demand for Schooling," *The Quarterly Journal of Economics* 125 (2010), 515–548.

Kerbusk, Simon, "Wer hat, dem wird gegeben: Studie zur Begabtenförderung," *DIE ZEIT*, URL: http://www.zeit.de/2009/40/C-Begabtenfoerderung, accessed on 18.11.2014.

Kerr, Sari Pekkala, Tuomas Pekkarinen, Matti Sarvimäki, and Roope Uusitalo, "Educational Choice and Information on Labor Market Prospects: A Randomized Field Experiment," *Working Paper*.

King, Jacqueline E. "Missed Opportunities Revisited: New Information on Students Who Do Not Apply for Financial Aid," *American Council on Education Issue Brief*.

Kuhlmann, Kerstin, Svenja Kremer, Jahid Hassan, and Georg Rudinger, "Evaluierung des Auswahlverfahrens der Studienstiftung des deutschen Volkes für die Studienstiftung des deutschen Volkes e. V.," (2012), URL: http://www.studienstiftung.de/publikationen/abschlussbericht-zur-evaluierung-der-auswahlverfahren.html, accessed on 13.08.2014.

Marx, D. M. and J. S. Roman, "Female Role Models: Protecting Women's Math Test Performance," *Personality and Social Psychology Bulletin* 28 (2002), 1183–1193.

Marx, David M. and Sei Jin Ko, "Superstars "Like" Me: The Effect of Role Model Similarity on Performance Under Threat," *European Journal of Social Psychology* 42 (2012), 807–812.

Middendorff, Elke, Beate Apolinarski, Jonas Poskowsky, Maren Kandulla, and Nicolai Netz *Die Wirtschaftliche und Soziale Lage der Studierenden in der Bundesrepublik Deutschland 2012: 20. Sozialerhebung des Deutschen Studentenwerks; Durchgeführt durch das HIS-Institut für Hochschulforschung*, Bonn u.a: Bundesministerium für Bildung und Forschung (2013).

Middendorff, Elke, Wolfgang Isserstedt, and Maren Kandulla *Das soziale Profil in der Begabtenförderung: Ergebnisse einer Online-Befragung unter allen Geförderten der elf Begabtenförderungswerke im Oktober 2008*, HIS:Projektbericht, Hannover: HIS Hochschul-Informations-System GmbH (2009).

Morin, Louis-Philippe, "Do Men and Women Respond Differently to Competition? Evidence from a Major Education Reform," *The Journal of Labor Economics* 33 (2015), 443–491.

Nguyen, Trang, "Information, Role Models and Perceived Returns to Education: Experimental Evidence from Madagascar," *MIT working paper, Cambridge: Massachusetts Institute of Technology*.

Niederle, Muriel and Lise Vesterlund, "Do Women Shy Away From Competition? Do Men Compete Too Much?" *The Quarterly Journal of Economics* 122 (2007), 1067–1101.

O'Connor, Melissa C. and Sampo V. Paunonen, "Big Five Personality Predictors of Post-Secondary Academic Performance," *Personality and Individual Differences* 43 (2007), 971–990.

Pabst, Josephine, "Stipendiaten auf Schatzsuche: Unbekannte Förderprogramme," URL: http://www.faz.net/-gyl-81j2f, accessed on 09.03.2016.

Ramm, Michael, "Studierendensurvey und Repräsentativität: Dokumentation II," *Hefte zur Bildungs- und Hochschulforschung.*

Raven, John C., J. H. Court, and J. Raven *Manual for Raven's Progressive Matrices and Vocabulary Scales (Section 4)*, London: H.K. Lewis (1988).

Saniter, Nils and Thomas Siedler, "The Effects of Occupational Knowledge: Job Information Centers, Educational Choices, and Labor Market Outcomes," *IZA Discussion Paper.*

Scott-Clayton, Judith, "Information Constraints and Financial Aid Policy," in Donald E. Heller (Ed.) *Student Financing of Higher Education*, London: Routledge, 75–97 (2013).

Sekretariat der Ständigen Konferenz der Kultusminister der Länder in der Bundesrepublik Deutschland IVC/Statistik, "Abiturnoten im Ländervergleich: Übersichten 2006 bis 2013," (2015), URL: http://tinyurl.com/kmkabinoten.

Simeaner, Hans, Michael Ramm, and Christa Kolbert-Ramm, "Datenalmanach Studierendensurvey 1993 - 2013: Studiensituation und Studierende an Universitäten und Fachhochschulen," *Hefte zur Bildungs- und Hochschulforschung.*

Steele, Claude M., Steven J. Spencer, and Joshua Aronson, "Contending with Group Image: The Psychology of Stereotype and Social Identity Threat," *Advances in Experimental Social Psychology* 34 (2002), 379–440.

Stephens, N. M., M. G. Hamedani, and M. Destin, "Closing the Social-Class Achievement Gap: A Difference-Education Intervention Improves First-Generation Students' Academic Performance and All Students' College Transition," *Psychological Science* 25 (2014), 943–953.

Vincent-Lancrin, Stéphan, "The Reversal of Gender Inequalities in Higher Education: An On-going Trend," in OECD (Ed.) *Higher Education to 2030* 1, Demography, Washington: OECD Publishing, 266–298 (2009).

Wiswall, Matthew and Basit Zafar, "Belief Updating Among College Students: Evidence from Experimental Variation in Information," *SSRN Electronic Journal*.

——— , "Determinants of College Major Choice: Identification Using an Information Experiment," *Federal Reserve Bank of New York Staff Report*.

8 Appendix

8.1 Robustness to matching quality

A matching algorithm allocated each member of the role model treatment group to the most similar role model. To draw from the pool of available role models, the algorithm matched political party identification and religious denomination in a first step. If several role models were available on that basis, a role model of the same field of studies and/or gender was randomly selected. For 1% of participants, the algorithm could not select a matching role model in the first step, e.g., if the participant indicated to be socially engaged in a religious denomination not covered by the German BFWs. In that case, only field of studies and/or gender were matched. If there was more than one most similar role model, the algorithm randomly allocated the participant to one role model. Due to this procedure, the level of similarity to the role model differed slightly between participants and might have introduced bias.

If a higher quality of matching positively impacted participants' application behavior, controls accounting for similarity to the role model should be significantly positive. Adding controls for all matching dimensions (dummy = 1 if characteristics coincide, 0 otherwise) in column 1 of table 11, I do not find any of the dummies statistically significantly different from zero. To explore whether matching quality might have been more important for students of non-academic backgrounds or women and could therefore account for significant treatment effects found, I interact these variables with similarity controls in columns 2 and 3. I do again not find statistically significant effects. I rerun these analyses in table 12 but sum up the total number of similarities. Taking participants who were matched on half of the matching criteria as a reference group, those matched worse should have been less and those matched better should have been more likely to apply if similarity had a positive and relevant impact. Again, no clear pattern with respect to signs of coefficients evolves and none of the dummies is statistically significantly different from zero. Additionally, both the differential effect for students of non-academic backgrounds and women are robust to the inclusion of similarity indicators. Potentially different matching qualities between different student groups can, therefore, not explain different application rates.

It is luring but false to conclude from this analysis that similarity to the role model did not matter at all. As I had to maximize similarity in order to secure the relevance of the provided information for the treated, the variation in matching quality between participants is rather small, thereby impeding the probability to detect significant effects. Moreover, not all information to assess the overall degree of similarity was collected for all participants. For example, participants were only asked about their religious denomination if socially engaged in church. Attachment to church might be most relevant for participants with volunteer work in church. Nevertheless, religious but socially not

Table 11:
Influence of similarity on applications in the role model treatment group

	(1)	(2)	(3)
Non-academic background	0.024***	–0.037	0.022***
	(0.008)	(0.069)	(0.008)
Female	–0.019*	–0.018*	–0.110
	(0.010)	(0.010)	(0.073)
Matching criteria			
Same party	–0.015	0.002	–0.045
	(0.016)	(0.019)	(0.035)
Same religious denomination	–0.033	–0.082	–0.047
	(0.034)	(0.052)	(0.055)
Same field of studies	0.006	0.014	0.020
	(0.009)	(0.012)	(0.017)
Same gender	–0.002	0.004	–0.021
	(0.010)	(0.011)	(0.028)
Interactions with matching criteria			
Same party × Non-academic		–0.031	
		(0.031)	
Same religious denom. × Non-academic		0.103	
		(0.065)	
Same field × Non-academic		–0.014	
		(0.017)	
Same gender × Non-academic		–0.010	
		(0.019)	
Same Party × Female			0.055
			(0.039)
Same religious denom. × Female			0.031
			(0.066)
Same field × Female			–0.024
			(0.020)
Same gender × Female			0.034
			(0.029)
Observations	1730	1730	1730

* $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$. Robust standard errors in parentheses.

Notes: The table contains results of OLS regressions of the application in wave 2 for the second treatment group only. Results from non-linear models are similar. Each estimation controls for the covariates of table 1, including former applications at a BFW and the former receipt of other scholarships at baseline. All similarity dummies are equal to 1 if the characteristics of the participant and the role model coincide and 0 otherwise.

Table 12:
Influence of similarity on applications in the role model treatment group by number of similarities

	(1)	(2)	(3)
Non-academic background	0.023***	0.028*	0.022***
	(0.008)	(0.017)	(0.008)
Female	–0.019*	–0.018*	–0.048
	(0.010)	(0.010)	(0.032)
Number of similarities			
One of Four	0.012	0.025	0.004
	(0.033)	(0.037)	(0.058)
Three of four	0.015	0.011	–0.013
	(0.011)	(0.013)	(0.034)
Four of four	–0.003	0.012	–0.035
	(0.010)	(0.014)	(0.033)
Interactions with no. of similarities			
One × Non-academic		–0.025	
		(0.068)	
Three × Non-academic		0.005	
		(0.021)	
Four × Non-academic		–0.027	
		(0.020)	
One × Female			–0.018
			(0.060)
Three × Female			0.034
			(0.036)
Four × Female			0.039
			(0.035)
Observations	1730	1730	1730

* $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$. Robust standard errors in parentheses.
Notes: See notes of table 11.

engaged participants could also feel close to a matched role model of a religious BFW, although I cannot control for this match.[26]

To explore whether overall fit between participant and matched BFW mattered, I regress participants' scholarship applications on a self-reported evaluation of personal fit with the BFW they were matched to.[27] Note that the self-assessed fit item asked respondents to evaluate the similarity to the BFW funding the role model rather than to the role model. Therefore, I cannot separate the effect of similarity between participant and the BFW's association from the effect of similarity between the participant and the specific role model. Table 13 reveals that a good or very good self-assessed fit increases the probability to have applied by highly statistically significant 3.6 and 3.7 percentage points.

A last issue addressed here is whether slight differences in content or writing style between interview texts might have influenced application rates significantly—apart from similarity to the role model. I regress application behavior on dummies for all 34 interview texts, taking the text which was most frequently drawn by the algorithm as the reference category, and controlling for the quality of matching (not reported, results available on request). I find only one of the 33 interview dummies statistically significantly different from zero on the 5%-level—which is in line with a usual rate of false discoveries in multiple testing. Moreover, this text was shown to less than 10% of participants in the role model treatment group and should, therefore, not affect the results.

[26] Religious denomination was coded to be similar (=1) if participants reporting volunteer work within church were matched with a BFW of equal religious denomination. Religious denomination was coded to be dissimilar (=0) if matched with a BFW of other religious denomination. Participants without religious volunteer work were coded as 1 if matched with a non-religious BFW. This coding takes into account that religious BFWs favor applicants socially engaged in church and with the same religious denomination. I also tested an alternative coding setting the similarity dummy only for those participants to 1 who were matched according to their religious engagement, considering all others as unmatched. Although this coding introduces an imbalance between religious and not religious participants—the latter always considered to be matched worse even if they might perfectly identify with the matched non-religious role model—the similarity dummy stays statistically insignificant.

[27] The self-assessed fit question in wave 2 was worded as follows: "Please think back to the last survey. You have read an interview with a < male/female > scholar of < name of the BFW >. If you wanted to apply for a scholarship, how good would this BFW fit your personal political, religious, and ideological attitude?"

Table 13:
Influence of self-assessed fit on applications in the role model treatment group

	(1)	(2)	(3)
Non-academic background	0.031**	0.030**	0.030**
	(0.012)	(0.012)	(0.012)
Female	–0.023*	–0.020	–0.021
	(0.013)	(0.013)	(0.014)
Self-assessed personal fit with BFW			
(Very) good fit	0.036***	0.037***	0.037***
	(0.013)	(0.013)	(0.013)
(Very) bad fit	0.009	0.008	0.010
	(0.014)	(0.014)	(0.014)
Matching criteria			
Same party		–0.012	
		(0.020)	
Same religious denomination		–0.040	
		(0.049)	
Same field of studies		0.013	
		(0.012)	
Same gender		0.007	
		(0.013)	
Number of similarities			
One of four			–0.009
			(0.040)
Three of four			0.020
			(0.016)
Four of four			0.003
			(0.016)
Observations	1110	1110	1110

* $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$. Robust standard errors in parentheses.

Notes: The table contains results of OLS regressions of the application in wave 2 on a set of covariates for the second treatment group only. Results from non-linear models are similar. Each estimation controls for the covariates of table 1, including former applications at a BFW and the former receipt of other scholarships at baseline. Reference category of the self-assessed fit variable is "partly, partly" fit between the respondent and the matched BFW. I dropped those who answered "don't know" (approximately 12% of cases) and for whom self-assessed fit is, accordingly, missing.

8.2 Additional figures

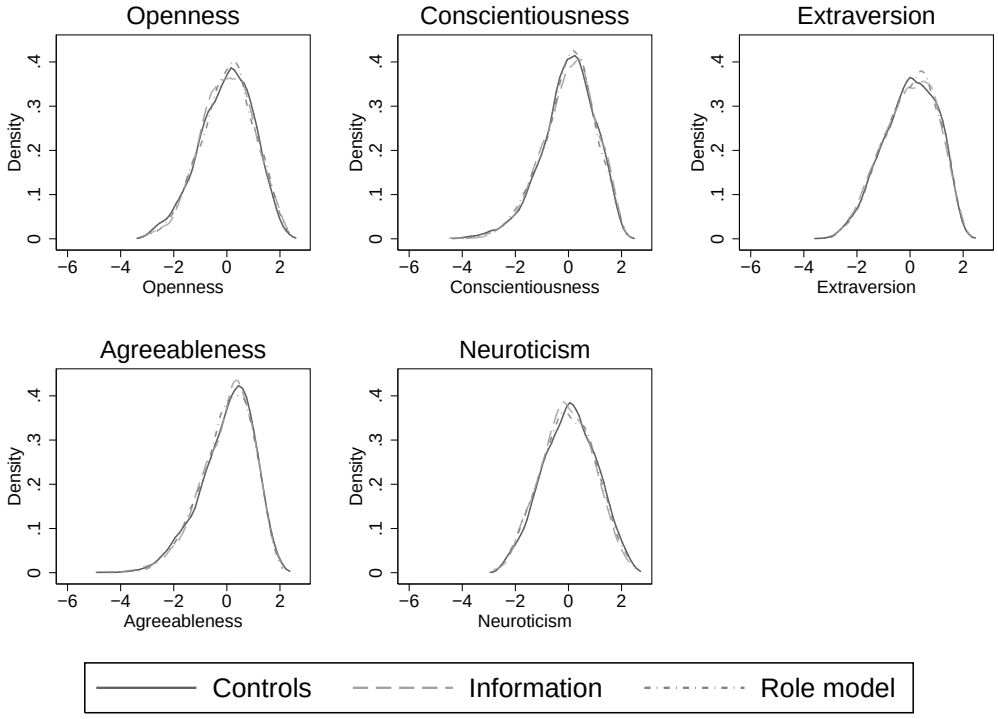


Figure 2:
Differences in the Big Five Inventory between experimental groups

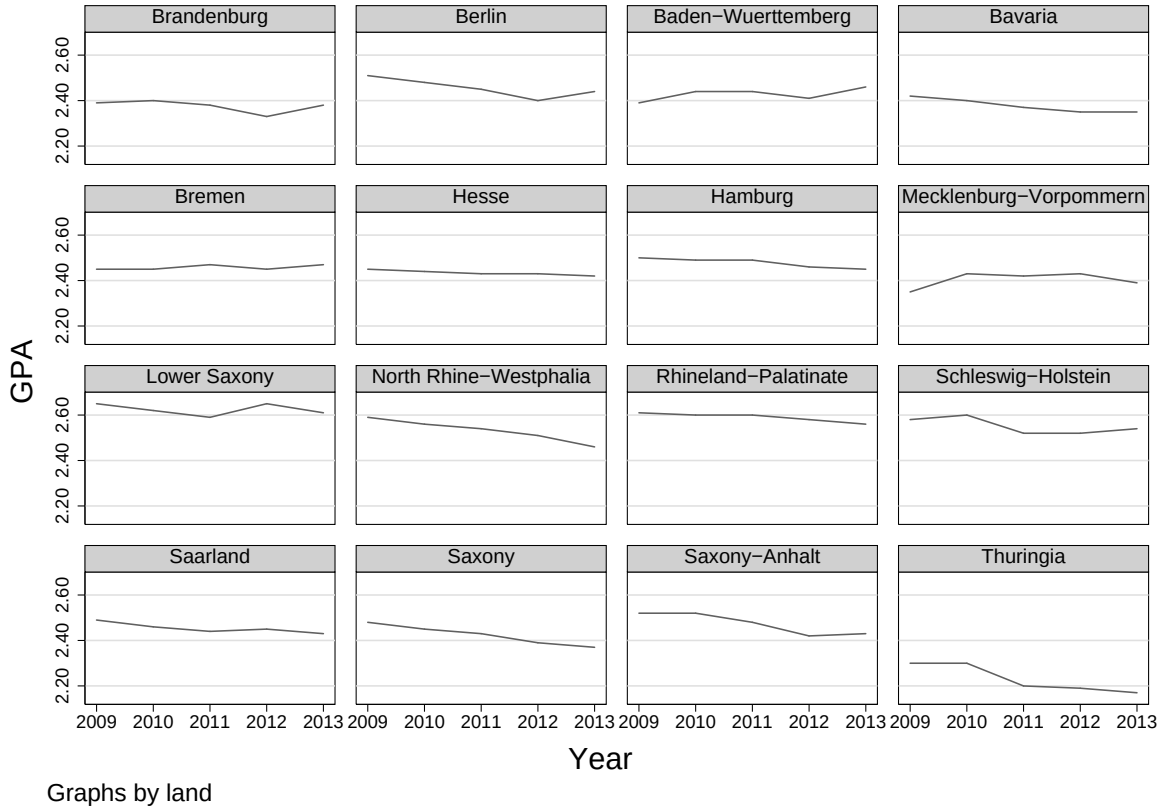


Figure 3:
Grade inflation in German high school leaving certificates

Notes: Average GPAs of high school certificates in all 16 German states over time. Data source: Sekretariat der Ständigen Konferenz der Kultusminister der Länder in der Bundesrepublik Deutschland IVC/Statistik (2015).

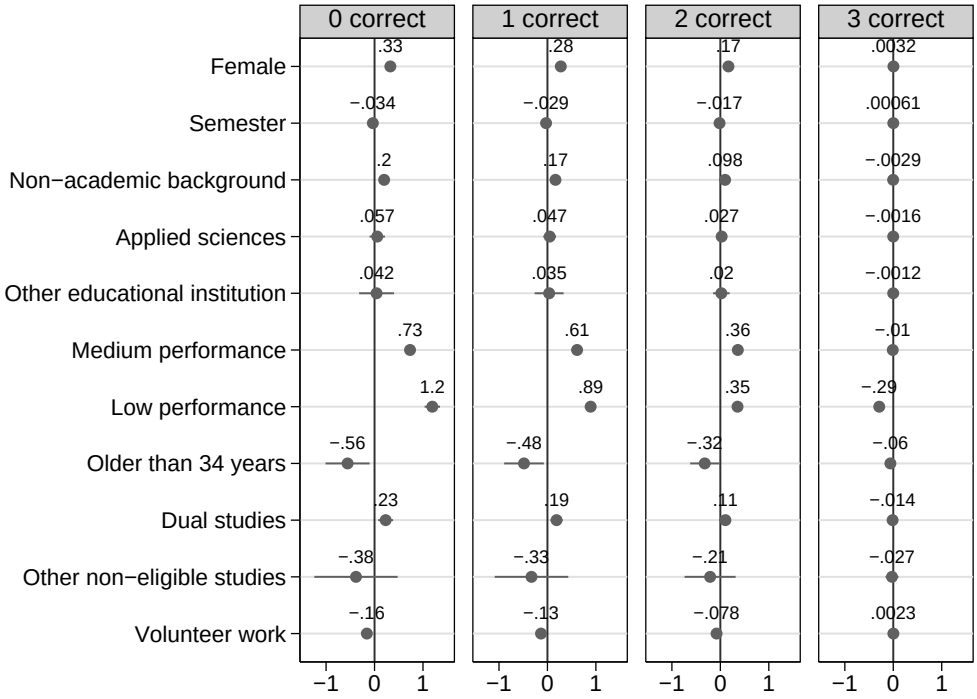


Figure 4:
Information asymmetries over cut-offs (1/2)

Notes: Average semi-elasticities from an ordered logit model using 95%-confidence intervals. Positive (negative) values indicate a higher (lower) likelihood to answer the respective number of items correctly.

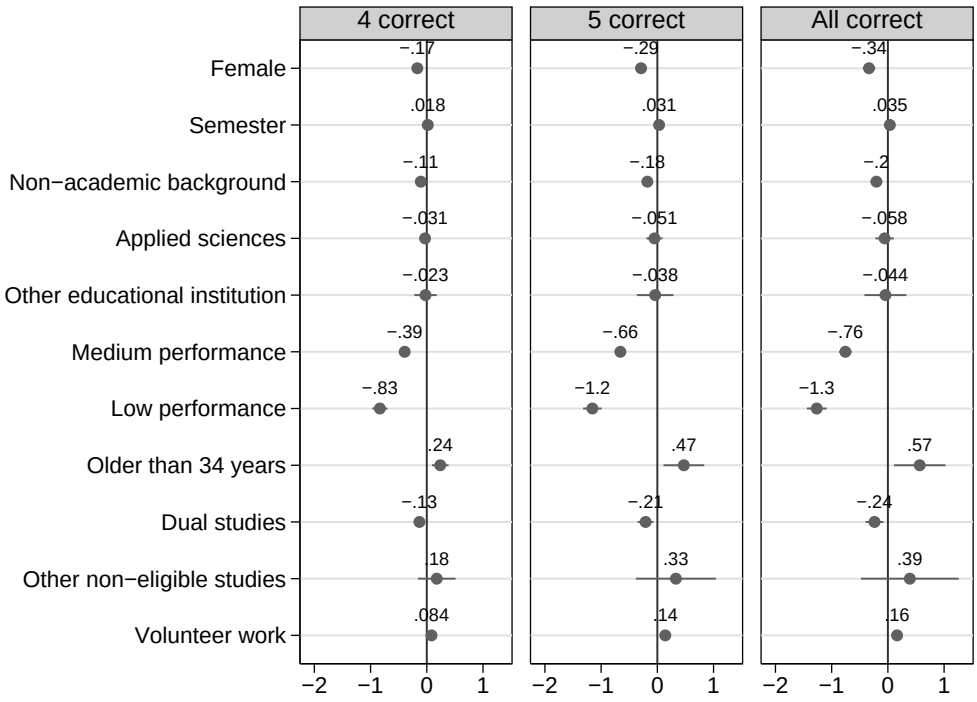


Figure 5:
Information asymmetries over cut-offs (2/2)

Notes: See figure 4.

8.3 Additional tables

Table 14:
Pre-treatment reasons for not applying

	Mean	(S.D.)
My grades are not good enough.	3.03	(0.90)
My voluntary work is not sufficient.	3.05	(0.91)
The funding amount I would receive is too small to be worth the application.	1.62	(0.76)
I know too little about the application requirements.	3.18	(0.86)
I received too little support by my college lecturers.	2.47	(1.03)
I do not need a scholarship as I can draw on other financial sources.	2.49	(0.94)
The application process is too complicated.	2.58	(0.90)
I do not want to incur liabilities tied to funding, e.g., seminar participation.	2.30	(0.97)
Observations	2670	

Notes: The sample size is smaller as only participants who mentioned to never have applied for a scholarship at wave 1 were questioned. The exact wording of the question was: "The following list contains reasons for why some students do not apply for a scholarship. In how far do these reasons also apply to you?" Participants rated each answer on a 4-point scale from "1 – Does not apply at all" to "4 – Applies fully". The order of the items in the table equals the order in which they were asked in the survey.

Table 15:
Application requirements of the German Begabtenförderungswerke with religious association

Association	Name	Eligible semesters	Eligibility criteria	Formal requirements	Application deadline
Muslim	Avicenna-Studienwerk	BA: 1-2; MA: before start	High performance; social engagement; confession to Islam; interest in intercultural dialogue	No part-time studies; Muslim confession—exceptions possible on rare occasions	01.04.; 01.10. (still unknown at the time of the experiment because newly established)
Catholic	Cusanuswerk	BA: 1-2; MA: before start	High performance; interdisciplinary focus; personality; social engagement; attachment to church	Catholic confession	01.07.
Jewish	Ernst-Ludwig-Ehrlich Studienwerk	BA: 1; MA: before start	High performance; social engagement in Jewish community or other areas	Attachment to Jewish community	01.07.; 01.01.
Protestant	Evangelisches Studienwerk Villigst	BA: 1-2; no MA	Social engagement; enthusiasm in own studies; good performance; interest in interdisciplinary topics	Attachment to protestant church favored; exceptions for students > 35 or in second degrees possible; no part-time, distance, or dual studies	01.03.; 01.09.

Notes: Wording and order of different eligibility criteria and formal requirements follow the current information provided on the respective BFWs' websites. Applicants' number of semesters may not exceed the number of maximal semesters (see "Eligible semesters") when applying—calculations were based on a prescribed period of study of 6 semesters in the Bachelor's (BA) and 4 semesters in the Master's (MA) degree. Programs for PhDs and special programs for certain fields of studies etc. are not contained. Abbreviations: STEM = science, technology, engineering, and mathematics; uni AS = university of applied sciences.

Table 16:
Application requirements of the German Begabtenförderungswerke with political association

Association	Name	Eligible semesters	Eligibility criteria	Formal requirements	Application deadline
Social Democracy	Friedrich Ebert Foundation	BA: 1-3; MA: before start	Political and/or social engagement in cohesion with social democracy; talent; personality	Depends*; no part-time or second degrees	30.11., 30.4.
Liberal	Friedrich Naumann Foundation	BA: 1-4; MA: 1-2	High or outstanding performance; interdisciplinary interest; personality; liberal political and/or social engagement	No part-time, dual degree, or second degree studies; no age restriction	15.11.
Christian, conservative	Hanns Seidel Foundation	Uni: BA: 1-2; Uni AS: BA: 1-3; MA: before start	High performance; social engagement; Christian social values; personal qualification	No second degree students; $<$ 32 years	15.01.; 15.07.
Green	Heinrich Boell Foundation	BA: 1-3; no MA	Outstanding performance; interest in social/political issues; personality; supports the foundation's goals; focus on non-traditional, female, STEM-, and uni AS students	No part-time, dual degree, or second degree studies; no age restriction	Uni: 15.1., 15.7.; uni AS: 31.05., 30.11.
Christian, liberally conservative	Konrad Adenauer Foundation	BA: 1-2 if no MA intended; otherwise: 1-6; MA: before start	Cognitive abilities; high performance; interdisciplinary interest; supports the foundation's values; social engagement; personality	Dual studies possible if not part-time; no second degrees; distance studies possible; $<$ 36 years	15.01.; 01.07.
Democratic socialism	Rosa Luxemburg Foundation	BA: 2-3; MA: 1	High performance; social engagement in cohesion with socialist/foundation's values; female, needy, and non-academic students favored	Dual studies possible if not part-time; no second degrees	15.10.; 15.04.

Notes: See table 15. * Special requirements with respect to financial need, subject, and high school GPA for freshmen.

Table 17:
Application requirements of the German Begabtenförderungswerke with other association

Association	Name	Eligible semesters	Eligibility criteria	Formal Requirements	Application deadline
Company-close	Foundation of German Business	BA: 1-2 if no MA intended; otherwise: BA: 1-6; MA: before start	High performance; social engagement; single-mindedness; social competence; general knowledge; joined-up thinking; ability to communicate	No second degree students; < 33 years	Flexible, depends on location
Ideologically neutral	German National Scholarship Foundation	Proposal: BA: 2-4, MA: 1-2; application: BA: 1-2, no MA	"Performance, initiative, responsibility"	No second degree students; no part-time students; dual studies possible; < 35 years	18.02.
Close to trade unions	Hans Boeckler Foundation	Flexible	Financial need; high achieving; social engagement	Special requirements for different programs, e.g., membership in a trade union	Depends on type of program

Notes: See table 15.