Disability Discrimination in Higher Education: Analyzing the Quality of Counseling Services

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April 28, 2017

Abstract

We conduct a field experiment to analyze barriers disabled students face when entering higher education institutions. Fictitious high-school graduates request information regarding the admission process and special accommodations to ease studying. Potential applicants randomly reveal one of four impairment types. Response rates are similar for all four conditions. Evaluating response contents reveals differential treatment by impairment type. Students with depression or dyslexia are provided less information and services compared to students with physical impairments or students with no disability. Our results suggest that general information deficits about health conditions exist. Psychological and learning impairments are less often recognized as disabilities.

Keywords: Higher education, disability discrimination, correspondence experiment

JEL classification: I14, I23

Acknowledgements: We thank Reto Föllmi, Per Johannson, Michael Lechner and seminar participants at the University of St. Gallen, the University of Passau, the 2014 Society of Labor Economics Conference, the 2014 Meeting of the Economics of Education Association and the 2014 Workshop on Applied Economics of Education for helpful comments.

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1 Introduction

People with disabilities are on average considerably less well educated than their non-disabled peers (OECD 2010). Since education serves as an important buffer to protect against the negative labor market effects of a disability, access to education is an issue of crucial policy relevance (Dean and Dolan 1992, Ravaud et al. 1992, Hollenbeck and Kimmel 2008). To ensure that people with disabilities are not excluded from education, the UN Convention on the Rights of Persons with Disabilities obliges governments to provide access to the general education system, including higher education, vocational training and continuing education (Article 24).

However, little is known about the obstacles disabled students face when entering education, particularly regarding higher education.[1] To understand whether policy reforms are needed to improve access to education, it is important to analyze the inclusiveness of the education system. Previous studies in education and disability research typically analyze obstacles faced by disabled students by questioning students or university staff directly (e.g. Vickerman and Blundell 2010, Zhang et al. 2010, Lombardi and Murray 2011). Although these studies consistently report severe barriers of access, they suffer from various limitations: Results are based on subjective assessments, focus on a small number of individuals or institutions and are particularly prone to social desirability bias.

We use a field experiment to analyze barriers disabled students face when entering higher education institutions (HEIs). We send randomly manipulated emails from prospective first-year students containing inquiries about special accommodations for students with disabilities to student counseling offices of all German HEIs. Emails vary by the type of disability of the student. Since administrative staff is unaware of being observed, our experiment constitutes an objective test and is not affected by social desirability bias. The research design is related to correspondence experiments often used to detect discrimination against minority groups (e.g. Bertrand and Mullainathan 2004, Oreopoulos 2011, Jacquemet and Yannelis 2012).

Our analysis also extends the traditional correspondence test framework. In contrast to standard application, we do not focus on response rates alone, but

[1] The economic literature typically focuses on primary or secondary education, e.g. by considering the effects of providing financial incentives to schools and placing disabled students in special education (e.g. Kwak 2010, Dhuey and Lipscomb 2011, Battisti et al. 2012). Other studies evaluate interventions for children with special needs or peer effects among disabled and non-disabled students in inclusive school systems (e.g. Hanushek et al. 2002, Fletcher 2009, Friesen et al. 2010, Heckman et al. 2010, McGee 2011, Andrews et al. 2012, Keslair et al. 2012, Iversen et al. 2013). Less is known about post-secondary education. Notable exceptions are Jolls (2004) and Polidano and Mavromaras (2011), who study access to vocational education, or Cheatham and Elliott (2013) who look at individual incentives for disabled students to enroll in college.

analyze the contents of written replies (e.g. Giulietti et al. 2015, White et al. 2015). Response rates are a useful measure to study discrimination when the implied costs (for example opportunity costs of inviting candidates for job interviews) are sufficiently high. In our application, however, this may not be the case. The costs of answering an email is relatively low and we therefore do not expect much variation in response rates. Nevertheless, this does not mean that all students are treated alike. Students may receive very different answers, and we aim to measure these different contents objectively by capturing the information content of the emails.

Response rates in our experiment are consistently very high. We do not find any evidence of discrimination regarding the response probability. Counselors are equally likely to reply to all students, irrespective of their disability status or type. However, when investigating response contents we find significant differences. Students with some of the most prevalent disabilities, i.e. psychological and learning impairments, receive less information about special provisions and are granted access to disability counseling services at lower rates compared to students with chronic somatic diseases. We observe that student counselors are less likely to recognize these conditions as a disability, suggesting that misconceptions about the limitations entailed by impairments are widespread. Differential treatment is most likely driven by a lack of awareness whether psychological and neuro-behavioral disabilities qualify as a protected disability.

Our results suggest there is no discrimination in basic response behavior. The differences in information provided to students are most likely non-purposeful and can potentially be addressed by providing better information about health conditions to counselors.

The remainder of the paper is structured as follows: Section 2 discusses on the experimental design; section 3 introduces the data used in the empirical analysis. Results are presented in section 4. Section 5 concludes.

2 Experimental design

In Germany, higher education is the responsibility of the federal states. National law obliges German higher education institutions to ensure that disabled students do not suffer any disadvantage in their studies. Similar rules can be found in state legislation governing higher education (applies to private and public universities). However, formal rules regarding appropriate accommodations and services for disabled students are vague and substantial autonomy in interpretation regarding both the eligibility and the scope of concessions remains with higher education institutions. As a

consequence, there are no common procedures how to accommodate students with special needs. Prospective students with disabilities are therefore advised to get information about study opportunities and conditions directly from the institution they want to apply to.[2]

In this paper we analyze barriers for disabled students when entering higher education institutions (HEIs). Universities' student counseling offices are the first point of contact and the main source of information. We send randomly manipulated emails to student counseling offices to evaluate whether students with different impairments are treated alike and whether they receive the same access to information and services. Each HEI receives four different emails. Emails vary by the health condition and describe how the condition hampers academic performance. The sender requests information about special eligibility rules for the admission process (reductions in GPA requirements), special accommodations during studies (exemption from compulsory attendance and time extensions during exams), and whether the HEI provides additional support to students with disabilities.

The different disability types are selected such that they are relatively common in the student population and comparable with respect to the special accommodations needed.[3] We choose the following health conditions for our study: (1) Chronic kidney failure represents a physical disease, requiring regular renal dialysis. This student misses classes for two days a week due to dialysis sessions. (2) Clinical depression represents a mental illness. This student misses two days of classes per week due to therapy. (3) Dyslexia represents a learning impairment that requires special accommodations for exams. (4) An additional profile for a non-disabled student was added. This student misses classes for two days a week because he has to care for a sick family member. This situation does not entail any entitlement to compensatory measures. All other included impairments are officially recognized to constitute a disability according to international standards (World Health Organization 2001) and German law (§2 SGB IX).

Each email sends a strong signal that the student suffers from a disability which counselors should react upon. In the text, students reveal that they suffer from one of the listed conditions, that the condition is permanent (by signalling that they

[2] See e.g. the recommendation from the German National Association for Student Affairs at `http://www.studentenwerke.de`.

[3] A representative survey of students at German universities revealed that 45% of students with a disability have a mental illness (most often depression), 20% have a chronic somatic illness, 6% have a learning impairment (most often dyslexia), 5% have a visual impairment, and 4% have a mobility impairment (Unger et al. 2012). Despite the low prevalence, a physical handicap requiring a wheelchair remains the stereotype for a disability in society (Sapey et al. 2004). We refrained from including mobility or visual impairments in our study because they require very different accommodations mostly with respect to infrastructure.

have been seeing a doctor regularly for several years, that they missed classes in high school and that their high school grades have suffered as a result). This makes them eligible for disadvantage compensation and study accommodations by universities' regulations, given official medical records are provided with the formal application. It is explicitly asked whether special regulation exists, whether leniency can be granted regarding admission requirements and what other kinds of accommodation are possible. Sample email texts are provided in the online appendix.

Each university receives one email per disability type to increase sample size. Note that due to the specific contents, it is infeasible to vary only a single word/attribute in each email. This is why we use different descriptions for each condition. To detect causal effects with respect to the disability type, emails need to be on the one hand as similar as possible to ensure that differences in the responses do not stem from different writing styles or from other characteristics of the email. On the other hand, they should be different enough to protect the experiment from detection. This is ensured by using randomized profiles across four additional dimensions: (1) Each email is sent from a different email account. The names and email accounts are random combinations of the most prevalent first names of the birth cohort graduating from high school in Germany in 2012 and the most prevalent last names (Lukas Fischer, Julia Müller, Laura Schmidt, and Jan Schneider). (2) The emails are sent in four waves between March and May 2012 with approximately four weeks between each wave. (3) Each of the four emails was written by a different author. The requests and stated limitations are the same for each type, but wording varies across authors. Each author writes one mail per type. (4) The student expresses interest in different study subjects (i.e. economics/management, technical subjects such as engineering or computer science, medicine, and teaching with a focus on Math and German). If the HEI does not offer all study subjects, it still receives four emails where remaining subjects are randomly selected from those offered. All factors, i.e. both the email characteristics and the timing are randomized. Details about the joint block randomization design are provided in the appendix.

3 Data

In total, we sent 856 emails to 214 different higher education institutions (HEI). This is the universe of public universities, universities of applied sciences, education colleges and all publicly registered private higher education institutions. Legal requirements are the same for public and private colleges. We do not include very specialized institutions such as schools of arts or music or theological colleges in our

study because they do not offer academic programs in any of the subjects included (i.e. economics/management, technical subjects, medicine or teaching) and tend to use very different recruitment procedures. We base our sample on the list of universities provided by the association of German higher education institutions.[4] Ten HEIs (36 email responses) are dropped from the sample because they share student counseling offices as parts of a regional cluster. The final sample comprises 816 emails to 204 different HEIs. The majority of institutions are universities of applied sciences (59%) and public (80%) (see Table A2 in the appendix). The distribution of students is right-skewed; the average university lists 10,073 students while the median university only has 5913.

The primary outcome variable in typical correspondence tests is whether an inquiry is responded to. Response rates allow the investigation of discrimination both between disabled and non-disabled individuals and between persons with different disabilities. Emails are sent to the universities' general student counseling office. Typically multiple persons are responsible for answering requests, and replying to requests from future students is the main job of a student counselor. As a consequence, response rates are high (85% of emails are answered) and may not fully capture discriminatory behavior. Response rates also do not differ by institutional characteristics, e.g. private institutions reply to inquiries at the same rate as public schools. For these reasons, we analyze the content of the emails. This allows us to determine whether some disabled students receive systematically different responses.

A qualitative look at the responses reveals that counselors are often very helpful. Official university regulations are pointed out frequently. Many show empathy with the situation of the inquirer and signal that accommodations may be possible, even if this means pursuing individual solutions and establishing precedence. People also often ask more experienced colleagues or specialists for help and offer personal contact. Blunt dismissals are rare. However, there are also imprudent responses lacking a proper understanding of the limitations of a disability and how to cope with them. Students with permanent clinical depression are regularly told to "finish therapy first and get well" before they should consider studying. Depression often appears to be perceived as a temporary and self-inflicted phenomenon which can be overcome by summoning sufficient will power. In one case, a student was told that chances for accommodations are very small, and the only case in which they were previously considered was an impaired, but exceptionally gifted student. The next sentence notes that the student died soon after and the situation never realized. Providing

[4] The list can be found at `https://www.hrk.de/mitglieder/mitgliedshochschulen/` [last accessed April 2017].

such information is neither helpful nor necessary. However, from a qualitative reading it remains unclear whether systematic discrimination by impairment type exists. We proceed with a quantitative analysis of response behavior.

Finding quantitative indicators for unequal treatment is complicated by the fact that people with disabilities are a very heterogeneous group with different needs. However, in all cases the student signals that he suffers from a condition which constitutes an officially recognized disability, and all emails include questions regarding the admissions process and potential disadvantage compensation. Using this information, we construct proxy variables to ascertain and categorize the helpfulness and information content of the email responses.

One major outcome we consider is access to specialized disability counseling. In Germany, higher education institutions have a designated spokesperson for disability-related issues, and large universities often also have specialized counseling services. The association of German state and state-recognised universities recommends that study counselors cooperate with special needs counseling services (Hochschulrektorenkonferenz 2009). We measure access to special services for students with disabilities by a dummy variable which indicates whether the email was forwarded to a counseling office for disabled students (20% of responses). Another outcome considers the information provided to the student. All students should be provided with similar information regarding specific admission regulation for students with disabilities. We measure access to basic information by an indicator whether the response email includes a link or attachment which points out university regulation (39%).

To further gauge the helpfulness of the response, we code more outcomes based on the email contents. We consider whether the counselor offered further personal contact (42% of all cases). In addition, we analyze whether the counselor questions the degree choice or suggests a different subject. Finally, we look at whether the health condition is recognized as a disability based on a simple keyword search, i.e. whether certain keywords like health, disability or similar were explicitly used in the reply. These outcomes can also provide more insights into the counselors decision process, e.g. whether the counselor makes assumptions about the students' abilities or whether he recognized the primary concern of the email.

In supplementary analyses, we consider the occurrence of other keywords which are likely to capture additional relevant information: special requests, hardship, disadvantage compensation, admission, certificate, exam, attendance, study fees and study contents (and synonyms). However, these results should be interpreted with caution, as simple word counts obscure the content in which the words are used.

The occurrence of a word does not necessarily imply approval, as it can also be used in negation. Still, word counts serve well as an approximate measure of the emails' information content.

Details and descriptive statistics for all outcome variables can be found in Table A3 (appendix).

4 Results

4.1 Access to information and services

To analyze whether access to information and services is associated with impairment type we regress impairment indicators on variables indicating whether the email was responded to, whether the initial email is forwarded to disability counseling services or whether it includes links/attachments providing further information about university regulations. The regression includes all other main effects from the treatment arms (results are not reported and available upon request). Since our key interest is to study if counselors treat different disability types in a different way and most people perceive disability to be a physical handicap (Sapey et al. 2004), we select chronic kidney failure as the reference category. This constitutes a strong benchmark as kidney failure is a non-treatable physical handicap which is hard to fake, involves clear limitations, is readily acknowledged as a handicap and evidently implies eligibility for disability concessions. The results are presented in Table 1. Since all variables are randomized, coefficients can be interpreted as average effects.

The results in column (1), Table 1 document that response rates are consistently very high and do not significantly vary with respect to disability type. Response behavior does not suggest discrimination – neither in comparison to a non-disabled student nor in comparison to different disability types. However, marginal costs of answering our emails are very low (email responses contain 115 words on average) and answering students' questions is the counselors' main job. Counselors may still treat different disability types in a different way which is not visible from looking at response rates only.

In columns (2) and (3) we analyze the content of the emails. The analysis is conditional on receiving a response, thus the smaller sample size. Since there is no discrimination based on response, conditioning on response does not induce sample selection bias (see Table A1 in the appendix). The analysis includes the no disability category for consistency.

Response contents document behaviour of student counseling offices which is con-

Table 1: Access to information and services

	(1)	(2)	(3)
Dependent variable	Email response	Email forwarded to disability counseling	Answer contains link or attachment
Disability type (omitted category: chronic kidney failure)			
Depression	-0.022	-0.102***	-0.045
	(0.030)	(0.036)	(0.043)
Dyslexia	-0.031	-0.119***	-0.110***
	(0.032)	(0.038)	(0.042)
No disability	-0.033	-0.243***	-0.013
	(0.033)	(0.035)	(0.041)
Constant	0.823***	0.373***	0.332***
	(0.050)	(0.057)	(0.067)
R^2	0.022	0.06	0.04
N	816	692	692

Note: Results are based on linear regressions. Additional controls include indicators for the name of the student, author of the email, wave, and study subject. Standard errors are clustered by the Higher Education Institution. *** denotes significance at the 1% level.

sistent with discrimination by impairment. Column (2) analyzes access to specialized disability counseling services. Requests from students with depression or dyslexia are consistently less often forwarded to specialized counseling services (10 and 12 percentage points less, respectively). Unsurprisingly, emails from students without disability are less often forwarded to a disability counselors as well – indicating that these services are truly designed to assist students with disabilities and do not provide general counseling services. Specialized disability counselors have the best knowledge about the situation of handicapped students at the university and which types of help can be provided. Failing to point out to disadvantaged students the existence of these services constitutes negligence.

Analyzing response contents and the provision of legislative information reveals a similar pattern. Especially students with dyslexia receive information about university regulation via links and attachments less often compared to students with the chronic disease. The difference amounts to 11 percentage points and is significant at the 1% level. Students without a disability receive links and attachments as often as physically impaired student, confirming that the links or attachments contain general information on the admission procedure and are unlikely to be specifically targeted to different disability types. We test for the possibility that student counseling offices substitute one transmission mode of information (links/attachments) with another (e.g. providing the same information in the text of the response). As the results in Table A4 in the appendix indicate, this is not the case. If anything, responses to

emails from students with a physical impairment include even more information in the text as indicated by the negative and significant coefficients in many specifications. The notable exceptions are that students with depression are more likely to receive information on disadvantage compensation and students with dyslexia are more likely to receive information on special accommodations during exams compared to students with chronic diseases, aspects which are of particular relevance for these conditions.[5]

4.2 Potential mechanisms

In the previous section we demonstrate that student counselors discriminate students according to impairment type by not providing comparable access to information and services. This differential treatment does not help to facilitate equal opportunities for all students. However, to propose effective policies to resolve this problem, the mechanisms leading to discriminatory behavior need to be better understood.

Economic theory treats unequal treatment of people based on membership to certain groups as the result of an individual utility or profit maximization process: Student counselors may have prejudices against certain types of disabilities, such that utility depends negatively on the number of disabled students (i.e. taste-based discrimination, see Becker 1957). Discrimination may also be grounded in information asymmetries regarding intellectual capacity and can arise even if student counselors have no particular preference regarding different groups, but try to maximize the university's performance by selecting students with the greatest potential (i.e. statistical discrimination, see Phelps 1972, Arrow 1973). A potential policy to overcome this kind of discriminatory behavior is to price it. This could be achieved by quota systems coupled with penalties (similar to quota systems in the labor market, e.g. Lalive et al. 2013), public inclusiveness rankings of institutions or subsidies per disabled student. However, such a solution may well be infeasible due to prohibitive monitoring costs.

The data provide very little empirical evidence in support of these common theories for discrimination: With preference-based discrimination, we would expect that emails from students with certain types of impairments receive less replies and that personal contact is offered less often. This is not the case: neither response

[5] Table A4 also shows a positive depression coefficient for disadvantage compensation. Looking at the email contents, we find that the keyword is often used in negation. Counselors are more likely to signal a refusal of disadvantage compensation when the student suffers from a psychological disease compared to a physical sickness. In some cases, counselors even mention that disadvantage compensations are only granted for students suffering from physical sickness or that depression is not recognized as a disability (even though this is in violation of official legislation).

(see previous section) nor the variable indicating that the counselor offered contact are significantly associated to the impairment type (see Table 2, column 1). With statistical discrimination one would expect that student counselors question the study choice or suggest other fields of studies based on their subjective inference about student quality and student-subject match quality. However, counselors directly question the study choice of the student only in about 5% of all emails. Study choice is somewhat more often questioned for students with depression (counselors often recommend to complete therapy before beginning to study) but the absolute size of the effect is not very large (see Table 2, column 2). Furthermore, effect heterogeneities do not suggest statistical discrimination (cf. online appendix section B.1). Since different study subjects require different skills, we would expect discriminatory behavior to be associated with the study subject.[6] Stratifying the analysis with respect to study type reveals little evidence for effect heterogeneities, most coefficients have the same sign and are similar in magnitude. Formal joint F-tests for disability-course match are always insignificant. We only detect heterogeneity in two dimensions (cf. online appendix, detailed results available on request). Dyslexic students are more often discouraged from entering teaching degrees, i.e. their degree choice is questioned more frequently, most likely because the counselor perceives the student-degree match to be poor. Additionally, when inquiring about management studies, dyslexia is more often recognized as a disability, i.e. explicitly labelled as such. This is most likely because management studies and dyslexia are among the most common combinations occurring in the population.

Unequal treatment can also be unrelated to prejudices or performance maximization, and may be a consequence of simple information deficits. Counselors may have incomplete information about what constitutes a disability, who is eligible for accommodation and how much or which kind is appropriate. Misconceptions or a lack of awareness may lead to a situation where certain impairments are not considered a disability deserving special assistance. From a policy perspective, misconceptions are the easiest to remedy. Relatively inexpensive information and awareness campaigns as well as targeted education measures to student counselors are potential policies.

The last column of Table 2 provides some evidence that lack of awareness is one driver of unequal provision of access to basic information and services. Responses to students with depression, and even more to students with dyslexia, are less likely to include keywords indicating that the counselor recognizes the condition as a disability (e.g. keywords like disability, sickness or health). These differences are systematic.

[6] For example, language skills have been shown to be strongly associated with academic success (Zeegers 2004).

Table 2: Discrimination mechanisms

	(1)	(2)	(3)
Dependent variable	Offered contact	Questions degree choice	Recognized disability
Disability type (omitted category: chronic kidney failure)			
Depression	-0.066	0.033*	-0.128***
	(0.044)	(0.020)	(0.046)
Dyslexia	-0.081	0.005	-0.299***
	(0.049)	(0.020)	(0.046)
No disability	-0.133***	0.038*	-0.445***
	(0.046)	(0.022)	(0.042)
Constant	0.539***	0.049	0.590***
	(0.071)	(0.030)	(0.064)
R^2	0.026	0.009	0.143
# of HEIs	201	201	201
# of obs.	692	692	692

Note: Results are based on linear regressions. Additional controls include indicators for the name of the student, author of the email, wave, and study subject. Standard errors are clustered by the Higher Education Institution. ***,* denote significance at the 1% and 10% level.

Some HEIs sent almost identical responses to all students (showing that answers are very often based on text modules), but deleted all keywords related to disability in responses to students with dyslexia or depression. It appears that counselors' impressions of a disability relate to physical handicaps and many fail to recognize mental or learning impairments as a disability.

Finally, counselors may also hesitate to point students towards 'disability services' due to stigma. Disability counseling services are always explicitly named. By suggesting students (who may not necessarily consider themselves disabled) to contact them, counselors risk labeling students as disabled, possibly insulting them. Similarly, students might hesitate to contact disability services due to stigma, even though it would be helpful for them. Changing to a more inclusive institution that is explicitly named, e.g. a general help desk for students in need, may reduce issues of stigma.

4.3 Limitations

The key advantage of our approach is that all parameters of our experiment are randomized, and study counselors were not aware of our study and thus did not adjust their behavior in a socially desirable way. Consequently, any difference in responses to requests from students with different disabilities can be attributed to

the type of disability and our results are internally valid. However, the key question in an experimental study is the extent to which results are also externally valid.

Our first concern regarding external validity of our experiment relates to the fact that four different emails were sent to each HEI. This is typically considered an unnecessary procedure, given that our profiles are entirely randomized (Newman 1980). Identification of our main effects also does not rely on a within-comparison. The reason for sending multiple emails is a simple power argument: There are not sufficiently many HEIs in Germany and sending more than one email to each institution increases the number of observations. This procedure, however, bears the risk of arousing suspicion, leading to a detection of the experiment (Riach and Rich 2004a). This can happen if the emails do not differ enough or if HEIs do not often receive requests from students with disabilities. If this were the case, we could expect a dynamic effect due to recognition. Email responses to requests in later waves would then differ systematically from those sent in earlier waves as counselors reactions converge to the socially desirable behavior. However, the effects are mostly similar in sign and magnitude (see Figure B2, online appendix). Some results for the third wave, however, go in the opposite direction. This could be a day of the week effect. Emails were sent on a Monday as opposed to later weekdays for other waves. Nevertheless, since the results of the last wave are qualitatively similar to the earlier waves, the results do not indicate a consistent time pattern which would suggest a dynamic effect.

Another threat to the external validity of our results are framing effects. Student counselors may not only react to the disability but also to other differences, such as the gender of the requesting person. If effect heterogeneities exist with respect to these differences (if for example emails by Lukas Fischer are assessed in a different way than the ones by Julia Müller), our results are internally valid but not representative of other students with disabilities. We test whether the name of the sender as well as the author are significantly associated with our main outcome variables and whether the effect of different disability types is affected by these factors (see Figures B3 and B4 in the online appendix). We do not find strong evidence for effect heterogeneities with respect to the author of the emails or the name of the sender. In most cases, coefficients are similar in sign and magnitude.

Another limitation is that our test provides evidence for unequal treatment of different disability types when students ask for information, but cannot provide empirical evidence for unequal treatment during the admission process or even during studies. However, if similar attitudes prevail throughout universities' administration, discrimination extends to other areas as well. This may result in further barriers

during the time at university and higher drop-out rates among disabled students.

Finally, we are aware that correspondence tests are often criticized because they impose substantial costs on recipients (e.g. Riach and Rich 2004b). However, we do believe that our application merits the use of this design. In our setting, costs are minimal. We only send 856 emails in total, 4 to each German university. Requests are brief and can be processed quickly, unlike the costly screening of job applications. Responses are short and often standardized. We do not send any follow-up emails to avoid increasing counselors' workload further. Furthermore, our approach is a non-standard application of the classical correspondence test framework. An experiment is the only valid possibility to obtain results that are unaffected by social desirability bias.

5 Conclusion

This study uses a randomized experiment to detect whether student counseling offices grant students with different impairments systematically different access to information and services. We send randomly manipulated emails from fictitious students to student counseling offices of higher education institutions to ask for information on the admission process as well as for special accommodations to ease studying. We do not find evidence of discrimination regarding response rates. The likelihood of an inquiry being answered does not differ between the experimental impairment profiles. Considering this objective measure, our analysis shows that counselors do not discriminate between students.

In a next step, we evaluate the responses and classify them by content. We observe substantial differences in the way student counselors reply to our fictitious students: Students with dyslexia or depression receive systematically less information on special accommodations, and are provided reference to disability counseling less frequently compared to students with a chronic somatic disease.

We also find that dyslexia and depression are systematically less likely to be categorized as a disability. This suggests the mechanism driving counselors' discriminatory behavior are most likely information deficiencies, although we chose impairments which are relatively common among college students. Student counselors have incomplete or biased information which impairments qualify as a disability, about the limitations entailed by these impairments and which kind of special accommodations can be arranged.

Of course, there are other channels through which students can receive relevant information about accommodations for students with special needs. Nevertheless,

students are typically encouraged to contact universities before enrollment to discuss which kind of accommodations are provided and how students can apply for these accommodations. Providing incomplete or false information or not fostering contact with special disability counseling services can lead to a situation where the student does not receive necessary accommodation or even discourage enrollment.

These information deficiencies among student counselors are relatively easy to overcome by targeted policies such as awareness building campaigns and special training measures for academic and administrative staff. To this end, it is necessary that educational policy makers and university management recognize the need to create equal opportunities for disabled students and active measures to resolve discrimination are taken. However, our results suggest that quota measures or other pricing mechanisms which are both difficult and expensive to implement do not seem to be necessary.

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A Appendix

A.1 Randomization design

Each Higher Education Institution (HEI) received in total four emails. Each email is a random combination of the disability type (chronic kidney failure, depression, dyslexia and no disability), the field of study (economics/management, engineering/computer science, medicine, and teaching), the student's name (Jan Schneider, Julia Müller, Laura Schmidt, and Lukas Fischer) and the base text written by one of the four authors. The order in which the four emails are sent to the HEI is randomized as well. If the HEI does not offer all considered academic programs, the field of study was randomly chosen out of those considered fields that are offered. Randomization was based on a simultaneous random draw without replacement to ensure that each HEI receives every characteristic exactly once. The randomization design is visualized in Figure A1. Each side of the matrix represents a specific characteristic, while the order of the characteristics is randomized for each HEI. The combination of characteristics represented by the diagonal is chosen to construct the emails for each HEI.

The randomization was generally successful. The null hypothesis that the randomization characteristics are independent (based on Pearson's chi-squared test for independence) cannot be rejected in almost all cases (see Table A1). Only illness and wave are loosely related. Conditional on response, none of the factors are significantly associated.

A.2 Figures and Tables

Figure A1: Visualization of the randomization design

Author of the email

Disability type	Author 1	Author 4	Author 2	Author 3	Name
Dyslexia	x				Name 3
Kidney		x			Name 1
Depression			x		Name 4
No disability				x	Name 2
	Subject 4	Subject 2	Subject 1	Subject 3	

Field of study

Table A1: Pearson's chi-squared test for independence

Full sample, N=816				
	Illness	Sender	Author	Subject
Sender	3.61			
Author	10.05	5.22		
Subject	4.13	5.16	3.89	
Wave	16.86*	9.29	12.43	5.13
Conditional on response, N=692				
	Illness	Sender	Author	Subject
Sender	2.27			
Author	8.67	8.03		
Subject	5.75	6.07	6.66	
Wave	13.81	13.61	13.05	10.34

Note: Degrees of freedom: 9. * denotes significance at the 10% level.

Table A2: Descriptive statistics: Higher education institutions

	Sum	Mean
Total number of institutions: 204		
Type: University of applied sciences	120	.588
Type: University (PhD granting)	84	.412
State-owned	164	.804
Federal state: Baden-Wurttemberg	32	.157
Federal state: Bavaria	29	.142
Federal state: Berlin	12	.059
Federal state: Brandenburg	6	.030
Federal state: Bremen	4	.020
Federal state: Hamburg	5	.025
Federal state: Hesse	16	.078
Federal state: Mecklenburg-Western Pomerania	4	.020
Federal state: Lower Saxony	17	.083
Federal state: North Rhine-Westphalia	38	.186
Federal state: Rhineland-Palatinate	8	.039
Federal state: Saarland	2	.010
Federal state: Saxony	9	.044
Federal state: Saxony-Anhalt	6	.029
Federal state: Schleswig-Holstein	9	.044
Federal state: Thuringia	7	.034
Number of students	2,054,860	10,073

Table A3: Descriptive statistics: Outcome variables

Variable	Mean
Access to information and services	
Response (N=816)	0.85
Forwarded to disability counseling	0.20
Email includes links/attachments	0.39
Proxies for discrimination mechanism	
Offered contact	0.42
Questions decision	0.05
Recognized disability, keywords: disabled, sick, health (synonyms)	0.39
Content measures	
Keyword: special request	0.04
Keyword: hardship application	0.18
Keyword: disadvantage compensation	0.47
Keyword: admission (synonyms)	0.45
Keyword: certificate (synonyms)	0.25
Keyword: exam (synonyms)	0.51
Keyword: attendance (synonyms)	0.18
Keyword: study fee (synonyms)	0.04
Keyword: study contents (synonyms)	0.26

Note: Number of observations/responses: 692.

Table A4: Content measures

Keywords/ synonyms	Special request	Hardship application	Disadvantage compensation	Admission (synonyms)	Certificate (synonyms)	Exam (synonyms)	Attendance (synonyms)	Study fee (synonyms)	Study contents (synonyms)
Disability type (omitted category: chronic kidney failure)									
Depression	0.027	-0.107**	0.120***	-0.063	0.019	-0.137***	-0.092**	-0.010	-0.074*
	(0.017)	(0.042)	(0.046)	(0.048)	(0.044)	(0.048)	(0.040)	(0.020)	(0.041)
Dyslexia	-0.021	-0.123***	0.047	0.049	0.048	0.159***	-0.266***	-0.019	-0.138***
	(0.016)	(0.039)	(0.047)	(0.049)	(0.046)	(0.044)	(0.032)	(0.017)	(0.041)
No disability	0.009	-0.149***	0.030	-0.019	-0.072*	-0.181***	0.001	0.005	-0.072*
	(0.021)	(0.040)	(0.048)	(0.049)	(0.043)	(0.050)	(0.044)	(0.020)	(0.043)
Constant	0.006	0.247***	0.457***	0.595***	0.237***	0.578***	0.333***	0.049*	0.348***
	(0.022)	(0.059)	(0.072)	(0.072)	(0.065)	(0.073)	(0.054)	(0.027)	(0.059)
R^2	0.036	0.039	0.050	0.058	0.021	0.089	0.138	0.019	0.088
# of HEIs	201	201	201	201	201	201	201	201	201
# of obs.	692	692	692	692	692	692	692	692	692

Note: Results are based on linear regressions. Additional controls include indicators for the name of the student, author of the email, wave, and study subject. Standard errors are clustered by the Higher Education Institution. *, **, *** denote significance at the 10%, 5% and 1% level, respectively.