



## Bias in education disability accommodations

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### ARTICLE INFO

#### JEL Classification:

I24

Z18

#### Keywords:

Disability services  
Higher education  
Racial bias  
Disability bias  
Race bias training

### ABSTRACT

For students with disabilities, educational success often depends on accommodations. We study accommodation decision-making by implementing a large-scale survey experiment with staff who work in disability services at U.S. colleges. We find evidence of disability specific bias – against those with attention-deficit/hyperactivity disorder (ADHD) as opposed to a vision impairment. This bias appears in respondents' attitudes toward students and their expectations about which students will receive accommodations. We offer evidence that perceptions of work ethic underlie the disability bias. Our exploration into racial bias arrives at a nuanced picture – we find evidence of racial bias, but it is concentrated only among staff who report not having taken a racial bias training course. This could reflect an impact of such courses or differences between those who do and do not choose to take a course. We conclude with a discussion of possible steps to minimize bias and move towards a more equitable allocation of disability services.

### 1. Introduction

Americans with disabilities are one of the largest minority groups in the United States. Numbering more than 55 million people, they make up nearly 19% of the population (Brault, 2012) and 19% of post-secondary students (U.S. Department of Education, 2019). Education can be vital for anyone, but this is particularly true for individuals with disabilities. While those with disabilities have been treated as abnormal for much of American history, a series of laws in the 20<sup>th</sup> century greatly increased their access to education (Pettinicchio, 2019).<sup>2</sup> Moreover, evidence indicates that obtaining higher education dramatically improves the employment outcomes and corresponding salaries for people with disabilities (Cheatham & Elliott, 2012; Winsor et al., 2018). The success of students with disabilities depends in part on the accommodations they receive. The bulk of students with disabilities participate in general education classroom environments (Pettinicchio, 2019, p. 155), and thus, often rely on supports provided by the institution to bolster their educational experiences and success.

Despite the size of the population with disabilities and the importance of education, surprisingly little work explores disability biases in educational settings. We do so, with an empirical focus on higher

education. While current law requires most colleges to provide reasonable accommodations to students with disabilities, existing research in other domains (e.g., Druckman & Shafranek, 2020) suggests that the staff administering such policies have leeway to make biased decisions. Does such bias impact disability attitudes and recommendations in educational environments? We address this question with a focus on student disability type and race. We hypothesize students with non-physical disabilities – specifically attention-deficit/hyperactivity disorder (ADHD) – and racial minorities face negative biases with respect to attitudes and recommendations. We further suggest that perceptions of low work ethic underlie both biases. We test our predictions with a large survey experiment of individuals who work in disability offices in American colleges. Although this method precludes observing actual accommodation decisions, it nonetheless allows us to offer initial tests of our hypotheses regarding attitudes, recommendations, and service provision. We find evidence for bias against those with ADHD, likely stemming from stereotypic perceptions of work ethic. The results suggest much less racial bias, although some exists among disability staff who have not previously taken a course on implicit racial bias (which could reflect the impact of such courses or differences between those who do and do not choose to take a course). Our findings

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<sup>2</sup> This includes the Rehabilitation Act of 1973 (e.g., Section 504), the Education for Handicapped Children's Act (1975), the Individuals with Disabilities Education Act (1990), and the Americans with Disabilities Act (1990).

provide guidance to minimize biases going forward.

## 2. Education and Disabilities

### 2.1. Opportunities for Bias

Discrimination or unequal treatment based on disability status has long been a source of public concern, and in this regard, few policy domains are as crucial as education. Ensuring a successful education for individuals with disabilities often requires accommodations – that is, “modifications or adjustments to the tasks, environment or to the way things are usually done that enable individuals with disabilities to have an equal opportunity to participate in an academic program...” (American Psychological Association, 2012). One landmark law concerning disabilities in education is Section 504 of the Rehabilitation Act of 1973. The law states: “No otherwise qualified individual with a disability in the United States... shall, solely by reason of her or his disability, be excluded from the participation in, be denied the benefits of, or be subjected to discrimination under any program or activity receiving Federal financial assistance...” (29 U.S. Code § 794(a)). This implies that schools receiving any federal funding must provide reasonable accommodations for all students with disabilities.

In spite of such an ideal, however, there are reasons to believe that the process by which students receive accommodations creates opportunities for biased decision-making on the part of school administrators. This is particularly true in higher education settings. Unlike in high school, the onus for receiving accommodations in college falls on students with disabilities themselves. In other words, students “must inform the [higher education institution] that you have a disability and need an academic adjustment... your postsecondary school is not required to identify you as having a disability or to assess your needs” (U.S. Department of Education, 2011). Consequently, to obtain accommodations in higher education, a student with a disability must typically make a request, offer documentation, and then work with school administrators to identify the appropriate accommodations. In a sense, these administrators act as street-level bureaucrats, or public “service workers who interact directly with citizens in the course of their jobs, and who have substantial discretion in the execution of their work” (Lipsky, 1980, p. 3-4). The outcome of the accommodations process depends on school administrators’ decisions about what the student deserves and should receive.

The discretion afforded to street-level bureaucrats often leads to biased decisions in policy implementation. Discrimination by other types of street-level bureaucrats is well documented (e.g., White et al., 2015; Slough, 2018; Neggers, 2018; Raaphorst & Groeneveld, 2019) including in school settings (Druckman & Shafraneck, 2020; Pfaff, Crabtree, Kern, & Holbein, 2021). This likely reflects a mix of unconscious discrimination, and coping with requests given limited resources (e.g., Lipsky, 1980; Tummers et al., 2015; Andersen & Guul, 2019). Despite the best intentions, administrators are likely subject to the same types of biased decision-making that pervades human reasoning (e.g., Gilovich et al., 2002), and may unknowingly discriminate. Discrimination, in turn, can occur both through decisions about the provision of services and through unequal application of administrative burdens (where certain individuals must take more steps to obtain and/or use services) (Herd & Moynihan 2018; Christensen et al. 2020; Olsen et al. 2020).

When it comes specifically to disability accommodations, the process requires self-advocacy on the part of the student (e.g., Cameto et al., 2004; Aron & Loprest, 2012), and involves many steps, with prior work suggesting wide variance in student experiences (Claiborne et al., 2011; Kimbell et al., 2016, p. 106-107). We follow previous work that investigates citizens’ initial inquires to street-level bureaucrats, as this initial contact can play a determinative role in the ultimate outcome. Other such work focuses on policy domains such as college admission inquiries (e.g., Thornhill, 2019; Druckman & Shafraneck, 2020; Brown &

Hilbig, 2021), religious accommodation inquires (Pfaff, Crabtree, Kern, & Holbein, 2021), inquiries about state benefits (e.g., Slough, 2018), and inquiries about housing programs (Einstein & Glick, 2017).

In the following section, we motivate our hypotheses that administrators will exhibit bias based on the disability type and the race of the inquiring student. Per the above excerpt from Section 504 of the Rehabilitation Act, responses to accommodation inquiries from those who work in disability offices should be based on objective information. Were decisions to vary based on the hypothesized, orthogonal factors, this would undermine the ideal that any “qualified individual with a disability” must receive the appropriate accommodations. As we discuss, we analyze several outcome measures such as counselors’ perceptions that a student is deserving of accommodations, a student’s traits like warmth and competence, a student’s likelihood of receiving accommodations, likelihood of complying, and the specific accommodations that would be provided. While it is reasonable for disability type and severity to affect the specific accommodations provided, these factors should not influence attitudes towards the student or the student’s likelihood of receiving accommodations at all. We are unaware of any other work that directly explores this decision-making process on the part of administrators in college disability offices.

### 2.2. Disability Type

Sizeable literatures exist exploring the nature of disability discrimination (e.g., Dirth & Branscombe, 2017; Kruse et al., 2018). While less work explores variations in discrimination between distinct disabilities, the work that does exist suggests that actors’ perceptions of “deservingness” play an important role.<sup>3</sup> The public is generally willing to allocate more resources to individuals they view as “deserving” (e.g., Will, 1993; Oorschot, 2000; Jilke & Tummers, 2018). Moreover, deservingness correlates with a lack of control over one’s situation (Oorschot, 2000; Jeene et al., 2013; Jensen & Petersen, 2017), and people tend to view those with physical disabilities as having less control over their situations compared with individuals with non-physical disabilities (regardless of the accuracy of these perceptions). Blum et al. (2019) report that individuals view those with addiction disabilities, autism, or attention-deficit/hyperactivity disorder (ADHD) as less deserving than those people who are deaf, blind, or quadriplegic. While this work focuses on the general population with disabilities rather than students specifically, it seems probable the same perceptions apply, particularly since they often occur beyond one’s conscious awareness (de Vries, 2017). If so, then disability administrators will view those with a non-physical disability as less deserving than those with a physical disability. This will lead staff to assess those with non-physical disabilities more negatively in terms of personal traits – those perceived as more (less) deserving will be seen as more (less) competent or warm (Fiske et al., 2002; Blum et al., 2019). These negative trait perceptions can influence the quality of accommodations and the amount of support a student receives, and potentially add administrative burden (see Herd & Moynihan 2018). Finally, lower perceived deservingness will also lead counselors to be less likely to favor granting accommodations at all. Indeed, Bell and Smith (2021) find evidence that administrators’ attitudes impact students’ access to programs.

*Non-Physical Disability Hypothesis: Relative to those with physical disabilities, those with non-physical disabilities will be viewed as less deserving, viewed more negatively, and less likely to be favored to receive accommodations, all else constant.*

<sup>3</sup> Other work focuses on disability stereotypes, finding that people feel warm towards those with disabilities (Gervais, 2011; Dovidio et al., 1997; Will, 1993) but also often view them as incompetent (Fiske et al., 2002), and lacking power (Kreitzer & Smith, 2018).

### 2.3. Race

Race plays a significant role when it comes to disabilities. African Americans have the highest disability rate among any racial group or ethnic group in the United States (Brault, 2012, p. 8), yet they also experience a host of disparities in terms of diagnosis and achievement. For example, while African American youth exhibit more ADHD symptoms, their diagnosis rate is two-thirds that of Whites (Miller, Nigg, & Miller, 2009). Health care providers are less likely to ask African American parents, compared to White parents, if they have any developmental concerns related to the learning and behavior of their child (Guerrero, Rodriguez, & Flores, 2011). Providers are also less likely to prescribe stimulants to African American children with ADHD (Stevens et al., 2005). Moreover, African American youth with disabilities have a substantially lower employment rate compared to White youth with disabilities (Wagner et al., 2005, p. ES-10), and are underrepresented in college (National Center for Education Statistics, 2015).<sup>4</sup>

These disparities may stem, in part, from implicit racial stereotypes that providers hold. That is, attitudes largely beyond conscious awareness cohere with socialized stereotypes of African Americans (e.g., Fazio, et al. 1995; Dovidio et al., 1997; Payne et al., 2005; Payne et al., 2010). Even those who report that they are racially liberal hold dehumanizing stereotypes depicting African Americans as violating the Protestant work ethic and being lazier than Whites (e.g., Brown-Iannuzzi et al., 2017; Jardina & Piston, 2019). This, in turn, leads individuals to view African Americans as less deserving, given the perception that they have a poorer work ethic (e.g., Jeene et al., 2013). This has straightforward, downstream implications for disability accommodations – perceptions that a student holds a poor work ethic also leads to more negative perceptions and reduces the likelihood the student is seen as deserving of accommodations.

*Race Hypothesis: Relative to Whites, African Americans will be viewed as less deserving, viewed more negatively, and less likely to be favored to receive accommodations, all else constant.*

It follows from the Non-Physical Disability Hypothesis and the Race Hypothesis that African Americans with a non-physical disability will be doubly disadvantaged when it comes to deservingness, perceptions, and receipt of accommodations. This stems from the additive effects of bias against non-physical disabilities and against African Americans. As a corollary, it is possible that the intersection of being African American and having a non-physical disability will have a multiplicative effect, such that the stereotypes exacerbate one another beyond the independent disability and race effects.<sup>5</sup>

### 2.4. Work Ethic as Mechanism

Both the disability and racial bias hypotheses partially rest on the mechanism of work ethic. In the former case, many individuals conflate behavioral disabilities with laziness. This is particularly true with certain non-physical disabilities such as ADHD, where executive functioning challenges can be misinterpreted or stereotyped as indicating low motivation (Ingersoll & Goldstein, 1993; Harmun et al., 2007; Daley & Rappolt-Schlichtmann, 2018). As discussed, beliefs about work ethic also manifest in racial stereotypes (Jardina & Piston, 2019). Put another way, biases against those with non-physical disabilities and African Americans are mediated by perceptions of low work ethic.

Perceptions of work ethic are also theorized to be a key correlate of deservingness (Will, 1993; Petersen, 2012). In Blum et al. (2019, p. 5), a

“key finding is that deservingness rests in part on perceptions of effort... that is, support is given to those who are making an effort to rectify their situation compared to those who are not.” Petersen et al. (2012) show that those who exert more effort, as opposed to cheating, are judged as more deserving across a number of domains. Moreover, these judgments are made without conscious awareness (also see Petersen et al., 2011). Consequently, a signal that an individual possesses a strong work ethic should reduce biases by individuating the student, therefore preventing administrators from applying the stereotypes that may unconsciously come to mind. The implication is that if an individual with a non-physical disability (particularly ADHD) or an African American signals higher effort, it will counter the stereotype and minimize the biases predicted in the earlier hypotheses.<sup>6</sup>

*Work Ethic Hypothesis: The disability-based and race-based biases (in the prior hypotheses) will be smaller for individuals who signal a strong work ethic relative to those who do not signal a strong work ethic, all else constant.*

To be clear, we are not suggesting that students should possess above-average work habits to counteract stereotypes. Instead, we are interested in whether perceived work ethic acts as a mechanism underlying the biases we might observe.

## 3. Methods

### 3.1. Experiment

We test our pre-registered hypotheses with a vignette-based survey experiment.<sup>7</sup> This widely-used approach facilitates causal inference, as we randomly vary the factors posited by our hypotheses – disability, race, and work ethic (Mutz, 2011). The approach should also minimize (but not completely eliminate) social desirability biases that occur when studying discrimination, since respondents remain unaware of variations across conditions and our analyses involve cross-condition assessments. That said, one potential downside of this approach concerns whether the hypothetical vignette emulates scenarios encountered by disability administration staff. To address this concern, we constructed the vignette after extensive consultation with college disability staff and counselors who work with prospective college applicants with disabilities. This ensures that the vignette matches typical inquiries received by disability staff.

A related concern, relevant to any survey of practitioners, is whether the survey responses in the experiment map onto actual decisions counselors make in their day-to-day practices. Our response is three-fold. First, due to ethical and practical constraints, it would be nearly impossible to conduct causal tests of our hypotheses with real-world decision-making. For example, we considered conducting a correspondence study where administrators are sent ostensibly real, but actually fictitious, e-mail requests about accommodation services. Aside from the ethical questions involved in such studies (e.g., Nathan & White, 2021), this approach would not allow us to measure the detailed evaluations that interest us (e.g., assessments of deservingness). The key outcome in a correspondence study is response or non-response to the request, and further coding the content of the responses introduces methodological limitations (see Coppock, 2019). Second, evidence from other fields suggests that survey vignettes cohere with real-world decisions (e.g., Trawalter et al., 2012). Finally, given that prior work has not yet assessed our hypotheses, our experiment represents a useful first

<sup>4</sup> These gaps echo general health disparities that show African Americans experience discrimination when it comes to diagnosis, pain perceptions, expectation of compliance, and other measures. (e.g., van Ryn & Burke, 2000; Burgess et al., 2007; Green et al., 2007; Trawalter et al., 2012).

<sup>5</sup> We thank an anonymous reviewer for pointing out this possibility.

<sup>6</sup> To be clear, we do not expect work ethic to directly impact the applicant with a physical disability or the White applicant. Instead, it will close the gap with those groups because it counters the stereotype only of the applicant with a non-physical disability and the African American applicant.

<sup>7</sup> Our pre-registered hypothesis can be found at: <https://aspredicted.org/mi6k8.pdf>.

**Table 1**  
Institutional Features of the Sample.

Institutional Feature	Percentage (N) / Average (Std. Dev; N)
Private school	44% (616)
Associate's degree highest degree	25% (616)
Bachelor's degree highest degree	15% (616)
Advanced degree (MA/PhD) highest degree	60% (616)
Specialized school	11% (611)
For-profit school	12% (610)
Average enrollment	7,851 (10,735; 581)

**Table 2**  
Individual Features of the Sample.

Variable	Percentage (N) / Average (Std. Dev; N) / Distribution (N)
Interact with students to determine if they receive accommodations	94% (616)
Director of student disability services (or equivalent)	76% (615)
Time worked in the field	14 years (13; 611)
Hours work with students in a typical academic year week	23 h (11; 600)
Age	18–24: 1.5%; 25–34: 14.5%; 35–50: 42%; 51–65: 36.5%; over 65: 5.5% (616)
Income	<\$30K: 1%; \$30K–\$69,999: 24%; \$70K–\$99,999: 31%; \$100K–\$200K: 37%; > \$200K: 7% (551)
Gender	Female: 80%; Male: 20% <sup>A</sup> (610)
Race	White: 81.5%; African Americans: 7%; Asian American: 2%; Hispanic: 4.5%; Native American: 2%; Other: 5% <sup>B</sup> (618)
Average ideology score (1–7 scale with higher scores = more conservative)	2.99 (1.58; 585)
Education (highest degree)	Some college: 1%; 4 year college degree: 9%; Master's degree: 74%; PhD: 16% (615)
Took course on minimizing racial bias in job	65% (617)
Average racial resentment attitude (0 to 1 scale with higher scores = more resentment)	.21 (0.19; 577)
Average disability social distance score (1–4 scale with higher scores = less prejudice)	3.80 (0.34; 601)
Average proportion of time spent interacting with African American students	20% (21%; 616)

<sup>A</sup> One participant chose "other".

<sup>B</sup> Sums to greater than 100% since respondents could check multiple categories.

approach despite practical limitations. In this sense, we follow many others who use survey experiments to study distinct aspects of disability attitudes (Peyton et al., 1980; Thurman et al., 1988; Will, 1993; Morin et al., 2013; Proctor & Azar, 2013; Retzer et al., 2020). To be clear, we recognize the limitations but view our study as an initial step to exploring biases in this domain. Such an approach provides useful insights into how disability staff evaluate students, on which others can build.

Our design specifically allows us to study experimental mediation. That is, we manipulate perceived work ethic because we expect that negative perceptions of work ethic will mediate disability bias and/or racial bias. Furthermore, we expect that high levels of perceived work ethic will cause the other biases to dissipate (Gerber & Green, 2012, p. 333-336); such a result would constitute plausible, but not definitive, evidence of mediation (Pirlott & MacKinnon, 2016; Glynn, 2021).

Finally, in our experiment, for the physical disability, we used a visual impairment (Stargardt disease) that results in legal blindness (20/

200 vision). While this is not a prevalent disability, it allows for a straightforward comparison without introducing complications of physical disabilities that require residential accommodations (which are distinct from academic accommodations). For the non-physical disability, we use ADHD, for two reasons. First, there are a sizeable number of students entering college with ADHD (e.g., Wagner et al., 2005, p. ES-3). Second, as mentioned, ADHD stereotypes invoke laziness, a stereotype that is integral to each of our hypotheses. We leave it to future work to study other disabilities including those less related to perceptions of work ethic. Another concern could be whether the decision-making discretion granted to staff is different for these two types of disabilities. On this point, the staff and counselors we spoke with were unaware of differential policies.

### 3.2. Sample

We opted to focus on higher education settings; as explained, this is a particularly crucial context given the amount of discretion staff have at colleges. Our population thus includes those who work in disability service offices at all accredited two-year and four-year general education institutions in the United States. We identified the list of schools from the Integrated Postsecondary Education Data System (IPEDS), leading to a total of 3,020 schools. We then developed a protocol to identify a contact in disability services at each of these schools (see Appendix A). We identified a contact at 2,380 schools (78.81%).<sup>8</sup>

We sent personalized e-mails to each contact in February 2020, with one follow-up reminder e-mail. The e-mail invited the individual to participate in an anonymized study on "accommodation decisions when it comes to students with disabilities." We offered participants \$5 gift cards for their time. One hundred and twenty-five of our invitations bounced back, leading to a sampling frame of 2,255. A total of 618 individuals completed the study, resulting in a response rate of 27%. This response rate exceeds that typically found in online surveys (e.g., Couper, 2008; Shih & Fan, 2008), and a comparison of our sampling frame to our final sample suggests that the sample nicely represents the population. The survey included a number of variables to measure school characteristics where respondents work, as well as respondents' demographics and attitudes. We present a sample overview in Table 1 (institutional variables) and Table 2 (individual variables).

Ninety-four percent of respondents report that they interact with students to make determinations about disability accommodations, confirming that we reached the desired sample. On average, respondents possess significant experience, having worked an average 14 years in the field. Women are vastly over-represented in these jobs, composing 80% of the sample (which reflects the population).<sup>9</sup> Respondents also display extremely liberal racial attitudes. Measured on three-item racial

<sup>8</sup> When we could not find an e-mail contact for a particular school, it was either because the school no longer existed (as the list we used was last updated in 2017) or because the school did not identify a disability services contact on its website. That said, we do find some patterns insofar as we were more likely to find contact information from schools that offer four-year degrees, are public, are land-grant, or are HBCUs. Also, we were more likely to find contact information for schools in New England, the Mideast, the Plains, and the Far West, and less likely in the Southwest and outside of the continental U.S. We do not anticipate that any of these variables impact our treatment effects, since respondents were randomly assigned to experimental conditions after opening the survey. It is plausible that staff at smaller schools (i.e., those with two-year degrees) where we could not find email addresses experience greater administrative burdens, and therefore our treatment effects would serve as conservative estimates for these schools.

<sup>9</sup> When collecting the contact information for the sampling frame, we recorded (when possible) the person's position, gender, and perceived race. We find 81% are directors, 79% are women, and 86% are White. This matches our sample percentages – respectively 76%, 80%, and 81.5% – remarkably well. Our sample thus nicely represents the population.



**Table 3**

Experimental Conditions.

	White Vision	White ADHD	African American Vision	African American ADHD
No Hard Work	1	2	3	4
Hard Work	5	6	7	8

resentment scale that runs from 0 to 1, with higher scores indicating more racial animus, we find an average of .21. This result suggests virtually no explicit racial prejudice in our sample. Finally, we measured discrimination against those with disabilities using social distance measures, asking people their comfort level having friends with disabilities and having their child marry someone with a disability (scale 1-4, with higher scores indicating less prejudice). Given the population, it is not surprising that the average score of 3.80 nearly reaches the scale maximum of 4.<sup>10</sup> The results for both the racial resentment scale and the social distance measures suggest scant explicit desire to discriminate – by race or disability type – among our sample. Even though our sample self-selected into the disability services profession, this is a fairly remarkable result that should be kept in mind in conjunction with our findings concerning biases.

### 3.3. Design and Procedure

We informed respondents that they would read a hypothetical e-mail request from a prospective accepted student who is deciding whether to enroll at their school. We opted to use an admitted student to avoid conflating admission likelihood with accommodation requests.<sup>11</sup> We explained that while the scenario was hypothetical, it reflects a common situation for incoming students and that respondents should imagine the specific case (on imaging cases in experimental contexts, see, e.g., Crisp et al., 2009). The student in the e-mail explained that he is inquiring about academic accommodations, had accommodations in high school, has been accepted and is considering enrollment, and has a few questions about how to apply for accommodations. We successfully piloted this text for realism with a small sample of individuals who work in disability services.

We randomly assigned respondents to one of eight experimental vignettes that varied: (1) race (African American/White), (2) disability (ADHD/vision), and (3) work ethic (no mention/high). We signaled race by using names that strongly correlate with being an African American or White individual: Jabari Washington for African American conditions and Dalton Wood for White conditions (e.g., Butler & Homola, 2017). We opted for these names based on objective birth certificate data that showed they are strong signals of race and have equivalent parental education. We also used a pilot survey to test perceptions of the names and found they clearly signal race (and gender) and do not differ in perceptions of social class, parental birth (being in America) or familiarity (for details, see Druckman et al., 2018). We made the name clear in the e-mail address, the signature to the e-mail, and referred to the name throughout the survey questions in an effort to have a strong prime. We recognize that using only males precludes identifying gender biases, but this decision was necessitated by statistical power concerns. We opted for males because males are diagnosed with ADHD at higher

rates than females.

As noted, we use a visual impairment (Stargardt disease) for the physical disability and ADHD for the non-physical disability. A sentence in the e-mail indicates the hypothetical student's diagnosis. Finally, to operationalize work ethic, we included a statement (for the relevant "hard work" conditions) in the e-mail vignette that "While I work very hard – I was just voted "most driven" by my high school class –..." This makes for a realistic and clear operationalization of the way a student might signal their work ethic. We detail the eight conditions in Table 3 and provide an example of an e-mail in Figure 1.<sup>12</sup>

Following the vignette, respondents answered our main outcome variables. First, to measure deservingness, we asked whether Jabari/Dalton would be deserving of accommodations for his visual impairment/ADHD, on a 5-point scale with higher scores indicating more deservingness (see Meuleman et al., 2020). As detailed previously, perceptions of deservingness are integral to perceptions of individuals with disabilities, and we expect that this outcome underlies many of our expectations. (We do not, in this study, operationalize distinct types of deservingness a la Gilke & Tummers, 2018.) Next, we measure perceptions of student traits. We created a single aggregate measure based on the Stereotype Content Model that accentuates the traits of warmth and competence (e.g., Fiske et al., 2002); we included two measures of warmth (asking about warmth and sincerity) and two measures of competence (asking about competence and confidence) (Cuddy et al., 2008; also see Blum et al., 2019). The traits were all measured on 5-point scales with higher scores indicating more positivity. The items scaled strongly ( $\alpha = .87$ ) and thus we merged them into one measure.<sup>13</sup> Such trait perceptions can greatly impact the quality of services students receive from accommodations offices, and plausibly the administrative burdens they encounter (see Herd & Moynihan, 2018). Closely related to the traits, we additionally ask about the student's likelihood of using accommodation if they were provided, on a 5-point scale. This measure of perceived compliance is another way to gauge positive (or negative) perceptions toward the student (van Ryn & Burke, 2000).<sup>14</sup> Perhaps most importantly in practice, we asked how likely it would be that the individual would receive accommodations on a 5-point scale.

We also included two measures that specifically ask about the accommodations process. With these outcomes, disability counselors may have less flexibility due to institutional mandates.<sup>15</sup> One of these measures asks whether it would suffice for the applicant to provide self-documentation to obtain accommodations, as opposed to medical documentation. This measure is intended to gauge trust in the student. Another measure indicates the specific accommodations the student would likely receive, if provided. For example, we ask whether the student would receive regular appointments with a counselor, as well as various adjustments such as extra time on tests or priority registration. We discuss the results regarding these variables but leave the formal analyses for the appendix. Finally, the survey included manipulation checks concerning the applicant's disability, his identity, his work ethic, and his race. The entire survey is available in Appendix B.

<sup>12</sup> In analyses available from the authors, we find balance across experimental conditions, based on the variables reported in Tables 1 and 2.

<sup>13</sup> We also measured "comfort" in interacting with the applicant, on a 5-point scale. The average score is 4.80 (sd = .70; n = 574) and thus nearly everyone is at the top of the scale. This suggests that virtually no one reports and/or consciously is aware of inter-personal aversion.

<sup>14</sup> Perceived compliance is a common measure in studies of health care provision.

<sup>15</sup> We also measured likelihood of responding to the e-mail and virtually everyone reported the highest score of 5 (average = 4.82 (sd = .75; n = 616)). We measured whether there would be additional steps to the process beyond the e-mail (e.g., in-person interview) and 94% responded affirmatively, and whether there would be additional cost for accommodations and 96% said no.

<sup>10</sup> The social distance measures asked separately about ADHD and a vision impairment, with the respective means being 3.88 and 3.71. We also asked about the percentage of time spent working with students with different disabilities. We find psychological disabilities receives the highest score with about 30.5%. ADHD is tied for second at 24% (with learning disabilities). Vision is predictably lower at just 3.6%. (All physical disabilities including hearing and mobility are under 5%.)

<sup>11</sup> Further, our conversations with those who work in this area lead us to believe that most requests come after a student is admitted.

Jabari Washington is graduating from high school this spring and has been admitted to your college. Imagine he wrote you the following e-mail and think about how you would respond.

Hi,

I am writing to inquire about academic accommodations for my disability. I am graduating from high school this spring, have been accepted there, and am considering enrolling next fall. I have been diagnosed with ADHD. While I work very hard – I was just voted “most driven” by my high school class – I have received and used accommodations from my high school (throughout my high school career).

I have a few questions about how accommodations for ADHD would work in college. First, how do I apply for accommodations? Second, can I have regular appointments with someone in your office? Third, if so, how often could I have these appointments? Finally, is there an added cost for the support program?

Thank you,  
Jabari Washington

Fig. 1. Example E-mail (from condition 8).

Table 4  
Outcome Variables.

Variable	Scale	Average (Std. Dev; N)
Deservingness	1–5 scale with higher scores = more deserving	4.21 (0.95; 614)
Traits	1–5 scale with higher scores = more favorable traits	3.73 (0.61; 602)
Use Accommodation	1–5 scale with higher scores = more use	3.64 (0.81; 607)
Receive Accommodation	1–5 scale with higher scores = more likely to receive	4.23 (0.81; 615)

4. Results

4.1. Bias in Staff Evaluations

We begin with our manipulation checks that confirm respondents attended to the vignettes: 99% correctly identified the applicant’s disability, and 97% correctly identified the name of the applicant. When asked about whether the applicant had worked hard, those in the work ethic conditions reported a significantly higher score, compared to those in the non-work ethic conditions.<sup>16</sup> We also asked respondents to assess the race of the applicant but 69% opted for the “prefer not to guess” option. Of those who did guess, 95% were correct (N = 191). This suggests the names sent a clear signal but also that this population is averse to explicit racial labeling.

In Table 4, we present mean values for the main outcome variables. It shows, across the board, that respondents had positive evaluations. For instance, an average of 4.21 out of 5.0 for deservingness makes clear that

<sup>16</sup> Specifically, on a 5 point-scale with higher scores indicating hard work, those in the work ethic condition scored 4.10 (sd = .83; n = 309) while those in the non-work ethic condition scored 3.44 (sd = .69; n = 306) ( $t_{613} = 10.74; p < .01$ ).

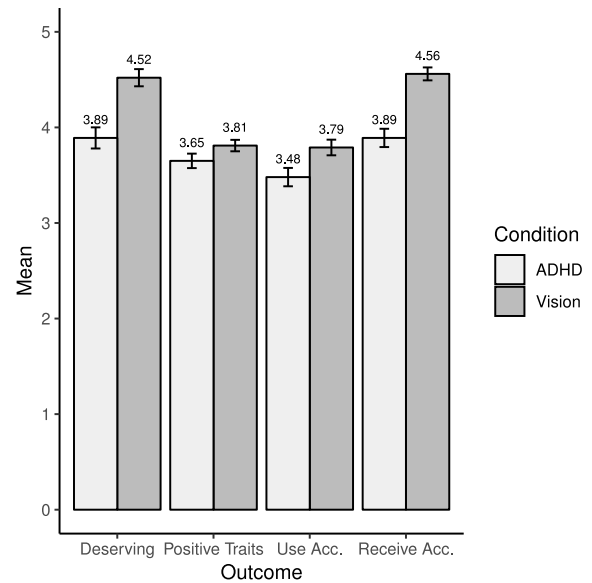


Fig. 2. The effect of the student’s disability on respondents’ assessments of four outcome variables. Means and 95% confidence intervals provided for the ADHD condition and the visual impairment condition.

this population viewed the applicants as appropriate for accommodations. Even though the compliance (likelihood to use accommodations) and trait evaluations are a bit lower, we see a very high average score in terms of favoring granting accommodations. That said, the table reveals non-trivial variation in each outcome, and our interest lies in exploring whether disability and race – as shaped by work ethic perceptions – influence responses.

We present the main results with figures of the mean scores for relevant conditions to test each hypothesis. Figure 2 presents the mean scores (with 95% confidence intervals) for each outcome, testing

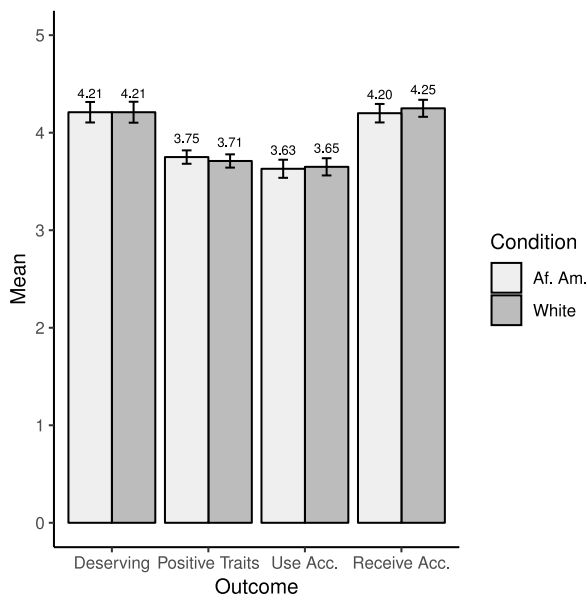


Fig. 3. The effect of the student’s race on respondents’ assessments of four outcome variables. Means and 95% confidence intervals provided for the African American student condition and the White student condition.

and substantively meaningful. This suggests staff enter into interactions with more favorable impressions of students with a vision impairment, relative to students with ADHD.

For the Race Hypothesis, Figure 3 displays the average score for those assigned to a White applicant condition (Dalton) as opposed to those assigned to an African American applicant condition (Jabari). It shows no evidence of racial bias and thus we do not find evidence for the Race Hypothesis.<sup>17</sup> This may reflect the sample’s extremely liberal racial attitudes mentioned earlier, although we will later unpack this null result to see if it masks individual heterogeneity.

The Work Ethic Hypothesis posits that the biases stem from perceptions of work ethic. We focus on the disability bias since there is no racial bias to explain. Figure 4 presents, for each outcome variable, comparisons of the no hard work condition and the hard work condition, separately for each disability. There are two key points. First, it shows that in every case (with the exception of a student with a vision disability receiving accommodations), the hard work condition increased the average score. This indicates that perceived hard work has an effect on its own, regardless of disability. Second, one can see that the impact of the hard work treatment is substantially larger for the ADHD conditions than the vision conditions; the gaps are .64 (4.21 minus 3.57), .5, .62, and .3 for the ADHD conditions for each respective outcome variable, compared to .21 (4.62 minus 4.41), .25, .18, and -.02 for the vision conditions. Or put another way, the hard work ADHD condition leads to scores that rival the vision condition scores. This is consistent with the

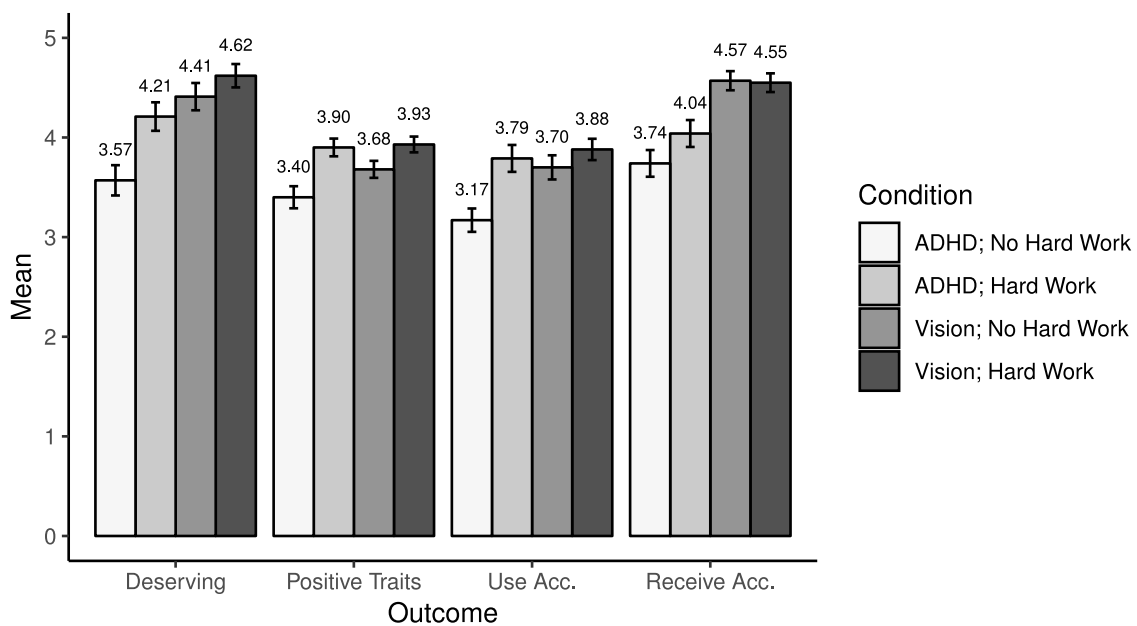


Fig. 4. The effect of the hard work condition on respondents’ assessments of four outcome variables, by disability type. Means and 95% confidence intervals provided.

differences based on the type of disability. Here we see clear support for the Non-Physical Disability Hypothesis. For every outcome variable, disability staff responded more favorably for applicants with a vision impairment as opposed to ADHD ( $p < .01$  for all, correcting for multiple comparisons). For example, an ADHD applicant received a score of 3.89 for deserving accommodations while a vision applicant has a mean of 4.52, an increase of 15.75% on the scale. These echo the large difference when it comes to the likelihood of the applicant receiving accommodations – an ADHD applicant likely will receive them with a score of 3.89 but an applicant with a vision disability is nearly certain to receive them with a 4.56, or an increase of nearly 17% of the scale. While the differences regarding positive traits and perceived compliance (i.e., using the accommodations) are not as large, they remain highly significant

Work Ethic Hypothesis when it comes to the disability bias. Students who signal a strong work ethic face less relative bias. Overall, moving from the no hard work ADHD condition to the hard work vision condition, we see respective non-trivial percentage increases of 26.25% (on

<sup>17</sup> We find the same null results if we restrict analyses only to non-African American respondents. Also, we are confident that the null results do not stem from the lack of statistical power. The largest Cohen’s  $d$  is .06 which is well under the typical .2 small effect; indeed, the graphs show that the means across race conditions are nearly identical in every case. More generally, we are not concerned about statistical power as many of our hypotheses merge design cells, increasing the relevant sample sizes; otherwise, even for our least powered hypotheses we calculated nearly an 80% chance of detecting a small effect.

**Table 5**  
Bias in Accommodation Perceptions.

	(1) Deserving	(2) Traits	(3) Use Acc.	(4) Receive Acc.
ADHD	-0.833*** (0.100)	-0.282*** (0.066)	-0.527*** (0.088)	-0.833*** (0.084)
African American	-0.015 (0.100)	0.033 (0.066)	-0.035 (0.088)	-0.045 (0.084)
Hard Work	0.206* (0.121)	0.250*** (0.081)	0.170 (0.107)	-0.008 (0.102)
Hard Work * ADHD	0.420*** (0.140)	0.254*** (0.093)	0.433*** (0.123)	0.324*** (0.118)
Hard Work * African American	0.024 (0.140)	0.002 (0.093)	0.037 (0.123)	-0.024 (0.118)
Constant	4.414*** (0.086)	3.663*** (0.057)	3.713*** (0.076)	4.590*** (0.072)
Observations	614	602	607	615
R-squared	0.169	0.125	0.118	0.189

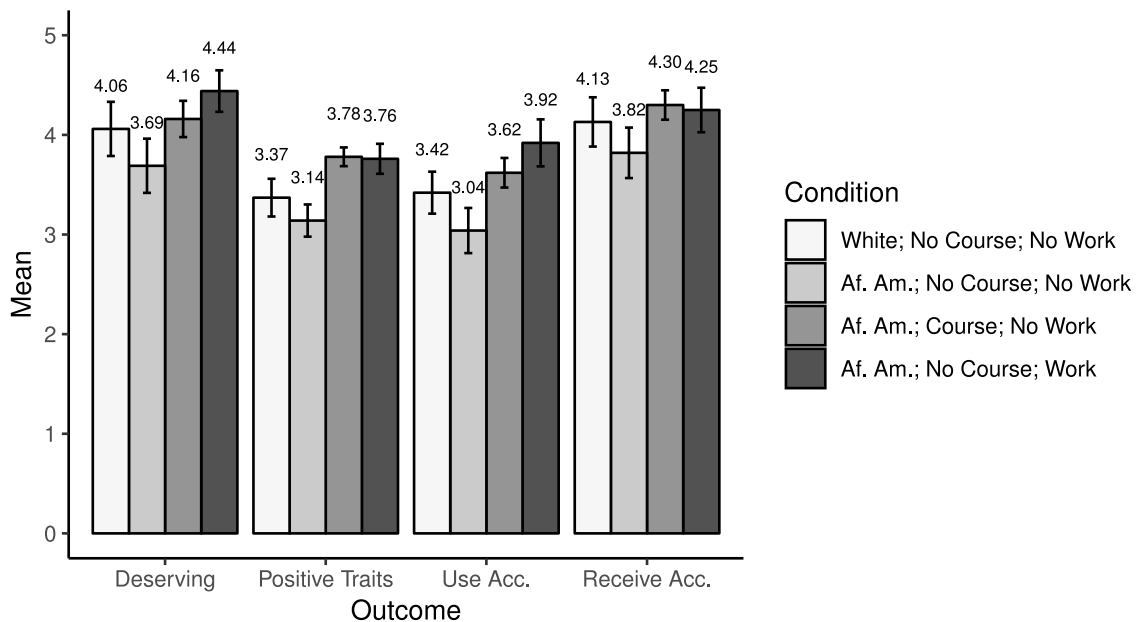
All models are OLS. Standard errors in parentheses. \*\*\*  $p < 0.01$ , \*\*  $p < 0.05$ , \*  $p < 0.1$  for two-tailed tests.

coefficient reflects the null race bias result, and the insignificance of the interaction between African American and hard work suggests the absence of racial stereotypes. Given the lack of support for the Race Hypothesis, perhaps it is not surprising that we also do not find support for the aforementioned corollary of added negative effects from the intersection of being African American and having a non-physical disability. Indeed, when we add an interaction between African American and ADHD to the regressions in Table 5, none are significant.

In sum, we have clear evidence of a disability bias in accommodation requests by which ADHD applicants are perceived as less deserving, as having less favorable traits, as being less likely to use the accommodations, and being less likely to receive them in the first place. Moreover, the evidence suggests that the bias partially stems from disability staff viewing those with ADHD as lacking a strong work ethic; when that perception is corrected, the bias partially disappears. All results reported here (and in the appendix) are robust to the inclusion of institutional- and individual-level control variables.<sup>18</sup>

#### 4.2. Racial Bias and Training Courses

We find no evidence of a main effect for racial bias (i.e., for the Race



**Fig. 5.** Heterogeneity in racial bias, based on hard work condition and bias training course. Means and 95% confidence intervals provided for four outcome variables.

the five-point scale) for deservingness, 13.25% for positive traits, 17.75% for use accommodations, and 20.25% for receive accommodations.

To confirm that our evidence for the Work Ethic Hypothesis is statistically significant, we regress each outcome variable on dummy variables for race (African American), disability (ADHD), work ethic (high), and interactions of work ethic with race and disability. The results, presented in Table 5, confirm the significance of the work ethic by ADHD interaction, showing that work ethic has a particularly notable effect for ADHD and partially closes the gap in the disability bias.

These results suggest that perceptions of work ethic partially mediate the ADHD bias. The coefficient on the ADHD coefficient dwarfs the ADHD-work ethic interaction for two outcomes, suggesting that perception of hard work does not fully mediate or eliminate the ADHD bias. The results also show that work ethic has a direct effect on deservingness and traits, but not on compliance or receiving accommodations. Finally, the insignificance of the African American

Hypothesis), but there may be a racial bias among subgroups of respondents. Here, we investigate such a possibility, looking at subgroups based on whether they received a vignette with a hard work signal, and whether the respondent indicated taking an implicit bias training course in the past. Our survey included an item that asked respondents whether they had taken a course focused on minimizing implicit racial bias in their job or more generally. Studies find that these interventions can work among people who are concerned about societal discrimination and who become aware of their own biases through the intervention (e.g., Devine & Monteith, 1993; Plant & Devine, 2009; Devine et al., 2012).<sup>19</sup> Given the racial liberalism we found in measures mentioned

<sup>18</sup> That said, we find smaller treatment effects overall and particularly regarding the impact of work ethic when we look at specialized (e.g., trade) schools, for-profit schools, and schools with fewer degree offerings.

<sup>19</sup> Devine et al. (2012) show that interventions can indeed lead to a dramatic reduction in implicit racial bias that endure (also see Lai et al. 2016).



**Table 6**  
Effect of Racial Bias Training Course.

	(1) Deserving	(2) Traits	(3) Use Acc.	(4) Receive Acc.
ADHD	-0.826*** (0.099)	-0.264*** (0.064)	-0.514*** (0.086)	-0.825*** (0.083)
African American	-0.362** (0.154)	-0.340*** (0.098)	-0.458*** (0.134)	-0.345*** (0.129)
Hard Work	0.212* (0.121)	0.259*** (0.077)	0.177* (0.105)	-0.003 (0.101)
Hard Work * ADHD	0.416*** (0.140)	0.230** (0.089)	0.425*** (0.122)	0.317*** (0.118)
Hard Work * African American	0.312 (0.190)	0.235* (0.121)	0.470*** (0.164)	0.229 (0.159)
Training Course	-0.099 (0.106)	0.051 (0.068)	-0.097 (0.093)	-0.030 (0.089)
Training Course * African American	0.536*** (0.181)	0.579*** (0.116)	0.653*** (0.157)	0.464*** (0.152)
Training Course * African American * Hard Work	-0.455** (0.204)	-0.339*** (0.130)	-0.684*** (0.177)	-0.390** (0.172)
Constant	4.476*** (0.112)	3.621*** (0.071)	3.771*** (0.097)	4.606*** (0.094)
Observations	614	602	607	615
R-squared	0.182	0.200	0.149	0.206

All models are OLS. Standard errors in parentheses. \*\*\*  $p < 0.01$ , \*\*  $p < 0.05$ , \*  $p < 0.1$  for two-tailed tests.

earlier, we infer that our sample meets the former condition. Taking a course can satisfy the second condition, and we find that 65% of respondents report having taken a course. This variable was not experimentally varied, so we cannot give a causal interpretation to any relationship involving the course. For instance, those who took the course were more likely to hold racially liberal attitudes, and more likely to identify that African Americans have been underdiagnosed for ADHD (see Coker et al., 2016).<sup>20</sup> This may indicate learning effects, or may stem from selection into the class based on liberal attitudes. Still, the bias course provides a useful variable for assessing heterogeneity.

Figure 5 presents mean values on our outcome variables for selected subgroups. For every outcome – deservingness assessments, positive trait assessments, and assessments of whether the student will use and receive accommodations – the same general pattern emerges. Among respondents who did not receive a vignette with a hard work signal, and did not take a bias course, there is at least a trend towards racial bias. For instance, mean deservingness dropped from 4.06 in the White student condition to 3.69 in the African American student condition (p-value = 0.06 for a two tailed test). This bias then disappears if the respondent took a course or received a vignette with a work signal. For all variables, these later values even exceed the original baseline value for the White student – for instance, mean deservingness is 4.16 for the African American student when the course is added, and is 4.44 if the work signal is added instead. The former is not significantly greater than 4.06

<sup>20</sup> Specifically, those who took the course report more racially liberal attitudes – .20 (sd = .19; n = 374) versus .23 (sd = .19; n = 203) ( $t_{575} = 1.91$ ;  $p < .05$  for a one-tailed test). Also, 44.91% of those who took the class correctly identified African Americans as being more underdiagnosed versus 32.24% for those who did not take a class ( $z = 3.05$ ;  $p < .01$ ). We further asked about the percentage of time spent working with students from different demographic backgrounds. Here we find no difference based on the class between those who took and did not take the class – respectively, 20.39% (sd = 19.33; n = 402) of their time working with African American students versus 20.30% (sd = 22.85; n = 213) ( $t_{613} = .05$ ;  $p < .50$  for a one-tailed test).

(p-value = .52) but the latter is (p-value = .03).

In Table 6, we use a regression to assess statistical significance controlling for all experimental conditions. The regression is the same as in Table 5, but adds a dummy variable for taking a bias course, an interaction of that dummy and the African American condition, and a three-way interaction with the hard work condition. This allows us to assess a racial bias in cases where there is no bias course and no hard work signal, and then see what happens to the bias in the presence of either the course or the hard work signal. The results show a clear racial bias, as the African American coefficient is significant and negative for all variables. The African American interaction with the course is then positive and significant for all outcomes, and the African American interaction with the hard work signal is positive and significant for two of the four outcomes (and approaches significance with deservingness;  $p = .10$ ). While we have to be cautious in interpreting the bias course causally (given self-selection possibilities), the implication is that the course and the work signal are substitutes for one another – there is no bias in the presence of either one. A causal interpretation of the bias course would be consistent with past findings (Pope et al., 2018), but we leave more concrete evidence to future work.

### 4.3. Accommodations Provided

As mentioned, we measured aspects of the accommodation process and accommodations likely provided. We present the analysis in Appendix C, here summarizing the main results. First, we analyzed whether the respondent would trust self-documentation in granting accommodations; this captures trust in the applicant as it removes the burden of more official documentation from a medical provider. Forty-three percent of the disability staff reported accepting self-documentation. Here we find results very similar to those reported above – a disability bias that disappears in the presence of a work ethic signal, and racial bias that disappears for respondents who took a course. This finding is consistent with the results in the above sections, and likely taps positive perceptions connected to deservingness and positive traits.

Second, we assessed, if granted accommodations, whether the applicant would have regular appointments with a disability counselor. We find some evidence of an ADHD bias, but it is somewhat difficult to interpret this result since those with vision impairments may medically require more appointments. Otherwise, we see no racial or work effect (or training course effect). Third, we analyzed the number of specific accommodations granted for each disability. Here we cannot compare across disabilities because of the incomparability of particular accommodations.<sup>21</sup> We find no evidence of racial biases. Thus, in contrast to attitudinal perceptions (deservingness, traits, compliance) and the granting of accommodations, specific arrangements exhibit fewer clear biases. This may reflect institutions standardizing specific accommodations. That is, once an office determines that a student will receive accommodations, institutional factors minimize opportunities for a bias in the accommodations provided.

## 5. Conclusion

Students with disabilities constitute a non-trivial number of U.S. students. Obtaining an education can be particularly vital in terms of long-term success for people with disabilities, but doing so often depends on the accommodations provided. Our study constitutes an initial investigation of this process with college-level counselors and staff who interact with students and make accommodation decisions. Overall, our results offer a mixed portrait. On the one hand, differential treatment

<sup>21</sup> Looking at specific accommodations provided for different disabilities would be a worthwhile area for future work, but there is a challenge in doing so given students with different disabilities have distinct needs.

based on disability contradicts the ideal set forth in Section 504 of the Rehabilitation Act that no student with a disability should be excluded from receiving needed assistance and accommodations. These biases affect perceptions of deservingness, trait evaluations, and perceptions of likely compliance, which could all correspond with the quality of services students receive. We also find evidence that biases impact counselors' expectations about which students will receive accommodations. On the other hand, we find that racial biases are not as severe as one may have anticipated, and the results point toward likely mechanisms and antidotes for racial-and disability-based biases.

Our study offers several contributions to the existing literature on biases toward individuals with disabilities. Existing work has not focused on the attitudes of disability services counselors, despite findings in other domains that the decision making of "street-level bureaucrats" can be affected by implicit biases (White et al., 2015; Slough, 2018; Neggors, 2018; Raaphorst & Groeneveld, 2019; Druckman & Shafraneck, 2020; Pfaff, Crabtree, Kern, & Holbein, 2021). Additionally, existing work tends to focus on bias toward individuals with disabilities, writ-large, more so than heterogeneity between different types of disabilities. Our findings concerning disability-specific bias complement and expand upon existing survey data concerning disability accommodations in higher education. For instance, in the National Longitudinal Transition Study (Newman et al., 2011), 62.5% of higher education students with vision impairments said they were definitely getting enough help with their schoolwork, compared to 42.8% with a learning disability. We similarly find evidence that individuals with a vision impairment are more likely to receive accommodations than those with ADHD. Our method furthermore finds causal evidence that perceptions of work ethic partially underlie this disparity.

While we find evidence of biases, it is certainly worth noting that the averages on all outcome variables across conditions are above the midpoints of the scales. Even so, to be consistent with the mandate of Section 504 of the Rehabilitation Act, counselors should have not differed across experimental conditions. Even disability severity should not affect the probability an individual receives accommodations. Whether these biases emerge from individuals solely or reflect office practices, it is problematic for the students with disabilities who may be disadvantaged. As for the role of hard work, we recognize our mediational claims are not definitive (see Bullock, Green, & Ha, 2010; Glynn 2021). We cannot rule out spurious mediation, since we do not look at whether disability or race affect work ethic. We also cannot rule out partial mediation, in which there are other mediators, or work ethic as a moderator rather than a mediator (Pirlott & MacKinnon, 2016). Still, our evidence suggests that work ethic serves as at least a partial mediator of disability-based biases, which we consider to be a meaningful finding.

It is perhaps surprising that we did not find any main effects for racial bias, considering the disparity in ADHD diagnosis (Miller, Nigg, & Miller, 2009). Existing research also suggests that African Americans experience discrimination when it comes to diagnosis, pain perceptions, expectation of compliance, and other measures (e.g., van Ryn & Burke, 2000; Burgess et al., 2007; Green et al., 2007; Trawalter et al., 2012). Our null finding likely stems from the racial liberalism of the sample. Still, further analysis showed heterogeneity, as those who had not reported taking an implicit bias course display race-based biases. At minimum, such a finding suggests there is racial bias in parts of this population. Of course, the finding of heterogeneity based on taking a course is exploratory at best. The bias course measure was self-reported. On the one hand, we have little *a priori* reason to expect misreporting. We find no significant difference in the proportion of individuals across experimental conditions who reported taking a course. It seems, then, that respondents who were assigned to the African American student condition were not primed to report taking a class. On the other hand, it is entirely possible that individuals self-select into the course and our findings reflect unmeasured individual differences, for which the bias course variable is a proxy. As mentioned, we find those who report

taking a course are racially more liberal and more knowledgeable about race and disabilities – this could reflect such people being more likely to seek out a course or it could reflect learning from the course. Future work is needed and crucially important to uncover the sources of racial bias – whatever they may be – that our results suggest.

We have emphasized that our method provides a helpful first approximation of disability counselors' attitudes. Several avenues for future work could explore the reach of our findings. Although we note that the biases appear substantively meaningful – for instance, the gap between the no hard work ADHD group and hard work vision group for receiving accommodations is 20% of the scale – future work is needed to determine the extent to which biases result in real differences in the provision of accommodations. Some social desirability bias may be a factor in our results, particularly for the null effect of race – recall 69% preferred to not guess the race of the applicant in the vignette. Institutional factors may also affect the provision of services in practice. For instance, organizational safeguards may prevent staff from acting on biases; however, on the flip side, high workloads could incentivize biased service provision (e.g., Tummers et al., 2015; Andersen & Guul, 2019). All of these considerations underscore the need for research that employs behavioral data.<sup>22</sup> Our study also applies to a particular educational setting with particular operationalizations of physical and non-physical disabilities. It is possible that our null results for racial bias are attributable to the liberal sample of disability staff, and that multiplicative biases for race and disability (which we did not find) would be found in other populations.<sup>23</sup> Additionally, while we use ADHD and Stargardt disease as examples of a non-physical and physical disability, other disabilities could show distinct dynamics.<sup>24</sup> Studying other non-physical disabilities is also essential due to increases in diagnoses of such disabilities in educational settings.

Our study offers practical implications for bias reduction. If perceptions of deservingness and work ethic mediate biases, the implication is not that students need to work hard to receive equal treatment, but that awareness among counselors can help them avoid this bias. That said, future work could test other versions of the work ethic treatment that do not imply above-average work ethic from the student. Our study also adds to other work suggesting that recognition of implicit racial bias can be effective (Pope et al., 2018). The population of disability counselors is clearly one that is motivated to reduce their biases and help their students, so it is a population for which these training initiatives should help. We furthermore recognize that disability counselors, like other social workers, experience high workloads and stress levels (Tummers et al., 2015), but they also appear highly motivated to learn about and address their own biases. Given the role of accommodations in shaping the success of students with disabilities, we look forward to further investigation into biases and ways to counter any biases among providers who work to improve the lives of these students.

#### Author Statement

James N. Druckman, Jeremy Levy, and Natalie Sands were involved in all aspects of the paper.

<sup>22</sup> We did not find any moderating effects of the respondent's reported number of hours working with students or for respondents who were office directors. However, these may be imperfect indicators of administrative workload, so future work could test other factors.

<sup>23</sup> We do not find a multiplicative effect even when we look only at those who did not take a course.

<sup>24</sup> Along similar lines, we cannot rule out the possibility that our non-physical disability effect may stem partially from more familiarity with ADHD than with Stargardt disease, and/or the greater frequency of ADHD requests. That said, such an explanation would clash with our result that the hard work condition reduces bias.

### Acknowledgements

We thank the Northwestern Political Science Department and Northwestern Office of Undergraduate Research for financial support. We also thank Nicolette Alayon, Jordan Burstein, David Figlio, Joe

Horner, Stephen Monteiro, Lauren Pourian, and Richard Shafranek for their assistance with the research. We thank Charles Crabtree and Monica Schneider for helpful suggestions, and Elizabeth Bell for sharing her work.

### Appendix A: Sample Protocol

As explained in the text, we identified our sample by first obtaining the list of all accredited two-year and four-year general education institutions in the United States (from the Integrated Postsecondary Education Data System). We then identified the disability services website for each school – that is, the office that made decisions about academic accommodations. This typically was a distinct page, although in some cases it was nested within another department of the school. If we were unable to locate such a webpage, we searched in the school directory for staff who work in disability services.

We then had a team of research assistants access the webpages and record contacts. Specifically, we had them identify the head/director of the department. When this was not clear from the webpage, we followed the following hierarchy of positions: Director of Student Disability Services; Director of Learning and Accessibility Services; Academic Service and Accommodations Advisor; Special Populations Coordinator; Accessibility Services Coordinator; Accommodation Coordinator; Disability Access Services Coordinator; Learning Specialist; Other. For this person, we recorded the name, title, and e-mail address. We also asked the research assistant to assess whether the person appeared to indeed be the head of the department, their gender, and their race. In cases where no individual person was listed but a general e-mail was provided (e.g., accessible@xxx.edu), we used the general e-mail. The precise detailed protocol is available from the authors.

**Appendix B: Survey**

How unlikely or likely would you be to respond to this e-mail from **NAME**?

<u>Definitely Would</u> Not Respond	<u>Probably Would</u> Not Respond	<u>Not Sure</u>	<u>Probably Would</u> Respond	<u>Definitely Would</u> Respond
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Do you disagree or agree that **NAME** would be deserving of accommodations for **[Disability]**?

<u>Disagree</u> Completely	<u>Disagree</u> Somewhat	<u>Neither</u> Disagree nor Agree	<u>Agree</u> Somewhat	<u>Agree</u> Completely
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How likely do you think **NAME** is to receive at least some accommodations for **[Disability]**?

<u>Not At All</u> Likely	<u>A Little</u> Likely	<u>Somewhat</u> Likely	<u>Very</u> Likely	<u>Extremely</u> Likely
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**For ADHD conditions 2, 6, 4, 8:**

What would be acceptable for documentation of **[NAME]**'s **ADHD diagnosis**? Check all that apply.

- Student's self-report\_\_\_\_\_
- Neuropsychological evaluation\_\_\_\_\_
- Letter from a physician\_\_\_\_\_
- Letter from a mental health professional\_\_\_\_\_
- Documentation of prior accommodations\_\_\_\_\_
- Documentation of medications\_\_\_\_\_

**For Vision conditions 1, 3, 5, 7:**

What would be acceptable for documentation of **[NAME]**'s **diagnosis of visual impairment**? Check all that apply.

- Student's self-report\_\_\_\_\_
- Vision evaluation\_\_\_\_\_
- Letter from a physician\_\_\_\_\_
- Letter from a vision specialist (non-physician)\_\_\_\_\_
- Documentation of prior accommodations\_\_\_\_\_
- Documentation of medications\_\_\_\_\_



Would there be additional applications and/or processes for [NAME] to obtain accommodations for [Disability] (other than documentation)? Check all that apply.

No                       A Written Application                       An interview via phone or e-mail                       An in-person interview                       An appointment with university medical services                       Other

If NAME received accommodations for [Disability], how unlikely or likely would it be that he would be able to have regular appointments with a disability counselor when he first enrolled?

Not At All Likely                       A Little Likely                       Somewhat Likely                       Very Likely                       Extremely Likely

If NAME received accommodations for [Disability], would there be an added cost for him to receive disability supports?

No                       Yes                       Not Sure/Maybe

**For ADHD Conditions 2,4,6,8:**

If NAME were to receive academic accommodations for [Disability], what accommodations do you think he would receive? Check all that apply.

Priority Registration \_\_\_\_\_

Additional time for assignments \_\_\_\_\_

Additional time for exams \_\_\_\_\_

Scheduled meeting with specialized counselors \_\_\_\_\_

Alternative testing location \_\_\_\_\_

Preferred seat location \_\_\_\_\_

Special allowances for absences \_\_\_\_\_

Appointed note taker (reader/scribe) \_\_\_\_\_

Assisted technology (of any type including adaptive software, etc.) \_\_\_\_\_

Alternative formats for exams \_\_\_\_\_

Segment test to be taken over several days \_\_\_\_\_

Segment assignments over several days \_\_\_\_\_

Other \_\_\_\_\_

**For Vision Conditions 1,3,5,7:**

If **NAME** were to receive academic accommodations for [**Disability**], what accommodations do you think he would receive? Check all that apply.

Priority Registration\_\_\_\_\_

Additional time for assignments\_\_\_\_\_

Additional time for exams\_\_\_\_\_

Scheduled meeting with specialized counselors \_\_\_\_\_

Alternative testing location \_\_\_\_\_

Preferred seat location\_\_\_\_\_

Special allowances for absences\_\_\_\_\_

Appointed note taker (reader/scribe)\_\_\_\_\_

Assisted technology (of any type including adaptive software, screen magnifier, adaptive keyboard, etc.)\_\_\_\_\_

Alternative texts for readings\_\_\_\_\_

Alternative texts for lectures\_\_\_\_\_

Alternative texts for exams\_\_\_\_\_

Other alternative formats for exams\_\_\_\_\_

Segment test to be taken over several days \_\_\_\_\_

Segment assignments over several days\_\_\_\_\_

Other \_\_\_\_\_

**All Conditions; If Other:**

What other accommodations for [**Disability**] would **NAME** receive?\_\_\_\_\_

Do you think **NAME** has worked hard?

Definitely Not      Probably Not      Not Sure      Probably      Definitely  
*Worked Hard*      *Worked Hard*           *Worked Hard*      *Worked Hard*

If **NAME** were to receive accommodations for **[Disability]**, how likely do you think he would be to use them all?

Not At All      A Little      Somewhat      Very      Extremely  
*Likely*      *Likely*      *Likely*      *Likely*      *Likely*

Do you think you would be very uncomfortable or very comfortable interacting with **NAME**?

Very      Somewhat      Neither      Somewhat      Very  
*uncomfortable*      *uncomfortable*      *uncomfortable nor*      *comfortable*      *comfortable*

How confident is **[NAME]**?

Not at all confident      Slightly confident      Somewhat confident      Very Confident      Extremely confident

How competent is **[NAME]**?

Not at all competent      Slightly competent      Somewhat competent      Very competent      Extremely competent

How sincere is **[NAME]**?

Not at all sincere      Slightly sincere      Somewhat sincere      Very sincere      Extremely sincere

How warm is **[NAME]**?

Not at all warm      Slightly warm      Somewhat warm      Very warm      Extremely warm

In the last five years, have you taken a course focused on minimizing (implicit) racial bias in your job or more generally?

No      Yes      Maybe      Not Sure

When it comes to ADHD, have you heard of any evidence that some racial or ethnic groups are underdiagnosed? If so, which groups? Check all that apply. If you are unaware of clear evidence, check “don’t know.”

White      African American      Asian American      Hispanic      Native American      Other      Don't Know

If you had to guess, what racial or ethnic group do you think **NAME** identifies himself as being from? (If you would prefer to not make such a guess, feel free to check that answer or skip the question.)

White      African American      Asian American      Hispanic      Native American      Other      Prefer not to guess

What condition was mentioned in the e-mail?

Vision Impairment     ADHD     Anxiety     Don't Recall

**FOR JABARI (Conditions 3, 4, 7, 8):** What was the full name of the person who wrote the e-mail?

Jabari Washington     John Walton     Josh Wood     Don't Recall

**FOR DALTON (Conditions 1, 2, 5, 6):** What was the full name of the person who wrote the e-mail?

Dalton Wood     David Washington     Donald Williams     Don't Recall

***The next set of questions are about yourself. (As you know, you can choose not to answer any particular question. Also recall that no one beyond us will ever have access to any identifying demographic information.)***

Do you interact (in person or over e-mail) with students with disabilities in order to determine whether they should receive accommodations?

No     Yes

Is your school public or private?

Public     Private

Of the following, which is the highest degree offered by your school?

Associate     Bachelor's     Master's and/or PhD

Is your school a specialized training (e.g., trade) school?

No     Yes

Is your school a for-profit?

No     Yes

What is roughly the undergraduate enrollment at your school? \_\_\_\_\_

What is your age?

under 18     18-24     25-34     35-50     51-65     over 65



What condition was mentioned in the e-mail?

Vision Impairment     ADHD     Anxiety     Don't Recall

**FOR JABARI (Conditions 3, 4, 7, 8):** What was the full name of the person who wrote the e-mail?

Jabari Washington     John Walton     Josh Wood     Don't Recall

**FOR DALTON (Conditions 1, 2, 5, 6):** What was the full name of the person who wrote the e-mail?

Dalton Wood     David Washington     Donald Williams     Don't Recall

***The next set of questions are about yourself. (As you know, you can choose not to answer any particular question. Also recall that no one beyond us will ever have access to any identifying demographic information.)***

Do you interact (in person or over e-mail) with students with disabilities in order to determine whether they should receive accommodations?

No     Yes

Is your school public or private?

Public     Private

Of the following, which is the highest degree offered by your school?

Associate     Bachelor's     Master's and/or PhD

Is your school a specialized training (e.g., trade) school?

No     Yes

Is your school a for-profit?

No     Yes

What is roughly the undergraduate enrollment at your school? \_\_\_\_\_

What is your age?

under 18     18-24     25-34     35-50     51-65     over 65

What is your estimate of your family's annual household income (before taxes)?

                                                                                                                                                                                              
 < \$30,000                      \$30,000 - \$69,999                      \$70,000-\$99,999                      \$100,000-\$200,000                      >\$200,000

Do you identify as male, female, or another gender?

                                                                                                          
*male*                      *female*                      *other*

Which of the following do you consider to be your primary racial or ethnic group (*you may check more than one*)?

                                                                                                                                                                                                                                                                                  
*White*                      *African American*                      *Asian American*                      *Hispanic*                      *Native American*                      *Other*                      *Prefer not to guess*

Are you the director/head of Student Disability Services (or its equivalent) at your school?

                                                                
*No*                      *Yes*

What is the title of your current position? \_\_\_\_\_

For how long have you worked in the field (e.g. working with students with disabilities)? (This includes your time in your current position; in years and months)?

\_\_\_\_\_ Years                      \_\_\_\_\_ Months

Which point on this scale best describes your political views?

                                                                                                                                                                                                                                                                                  
*very liberal*                      *moderately liberal*                      *somewhat liberal*                      *moderate*                      *somewhat conservative*                      *moderately conservative*                      *very conservative*

What is your highest level of education?

                                                                                                                                                                                                                                                                                  
*Less than high school*                      *High school*                      *Some college*                      *4 year college degree*                      *Master's degree*                      *PhD*                      *MD*                      *PhD and MD*

In a typical week during the academic year, how many hours a week do you spend working directly with students? \_\_\_\_\_

We are interested in the frequency with which students who report having different disabilities work with your staff. Of the total time you spend working with students via your office, what percentage involves working with individuals who report having each of the below types of disabilities? This likely will not sum to 100% since we do not list an exhaustive set of

disabilities. We realize these percentages are not in your control as they reflect the student body, and that they will be inexact so make your best guess.

ADHD \_\_\_\_\_

Learning Disabilities Other than ADHD (Dyslexia, Auditory Processing Disorder etc.) \_\_\_\_\_

Psychologic disabilities (Depression, Bipolar Disorder, Generalized Anxiety & Panic Disorder, Obsessive Compulsive Disorder, Schizophrenia, Eating Disorder) \_\_\_\_\_

Visual Impairment or Blindness \_\_\_\_\_

Hearing Loss \_\_\_\_\_

Mobility Related disabilities \_\_\_\_\_

We are interested in the frequency with which students of different demographic backgrounds work with your staff. Of the total time you spend working with students, what percentage involves working with individuals from each of the below demographic groups. This likely will not sum to 100% since we do not list an exhaustive set of demographic descriptions. We realize these percentages are not in your control as they reflect the student body, and that they will be inexact so make your best guess.

White men \_\_\_\_\_

Black men \_\_\_\_\_

White women \_\_\_\_\_

Black women \_\_\_\_\_

Now we'll present you with a few more statements. We realize some of these statements – although very common on surveys – may make you uncomfortable and we are not endorsing any particular view. We are asking you to gauge different opinions. If you prefer to not answer any, leave it blank.

After each statement, we would like you to tell us how strongly you agree or disagree. The first statement is:

“Generations of slavery and discrimination have created conditions that make it difficult for blacks to work their way out of the lower class.”

Do you...

_____	_____	_____	_____	_____
<i>Disagree Strongly</i>	<i>Disagree Somewhat</i>	<i>Neither Disagree Nor Agree</i>	<i>Agree Somewhat</i>	<i>Agree Strongly</i>

“Over the past few years, blacks have gotten less than they deserve.”

Do you...

Disagree  
Strongly
Disagree  
Somewhat
Neither Disagree  
Nor Agree
Agree  
Somewhat
Agree  
Strongly

“It’s really a matter of some people not trying hard enough; if Blacks would only try harder they could be just as well off as Whites.”  
Do you...

Disagree  
Strongly
Disagree  
Somewhat
Neither Disagree  
Nor Agree
Agree  
Somewhat
Agree  
Strongly

How comfortable are you having close personal friends who have ADHD?

Not at all  
comfortable
Not too  
comfortable
Somewhat  
comfortable
Extremely  
comfortable

Suppose a son or daughter of yours was getting married. How would you feel if he or she married someone with ADHD?

Not at all  
upset
Not too  
upset
Somewhat  
upset
Extremely  
upset

How comfortable are you having close personal friends who have a severe visual impairment?

Not at all  
comfortable
Not too  
comfortable
Somewhat  
comfortable
Extremely  
comfortable

Suppose a son or daughter of yours was getting married. How would you feel if he or she married someone with a severe visual impairment?

Not at all  
upset
Not too  
upset
Somewhat  
upset
Extremely  
upset

**Appendix C: Results for Documentation and Accommodations**

Table C.1

**Table C.1**  
Documentation and Accommodations.

	(1) Doc. Self-Report	(2) Regular Apt.	(3) ADHD Num. Acc.	(5) Vision Num. Acc.
ADHD	-1.408*** (0.265)	-0.321** (0.127)	N/A	N/A
African American	-1.666*** (0.464)	-0.140 (0.197)	-0.024 (0.119)	-0.031 (0.091)
Hard Work	-0.045 (0.288)	-0.084 (0.155)	-0.103 (0.078)	0.057 (0.057)
Hard Work * ADHD	0.934*** (0.353)	0.143 (0.180)	N/A	N/A
Hard Work * African American	0.963* (0.532)	0.313 (0.243)	0.158 (0.148)	0.038 (0.109)
Race Bias Training	-0.264 (0.256)	0.029 (0.137)	0.084 (0.085)	-0.034 (0.060)

(continued on next page)



Table C.1 (continued)

	(1) Doc. Self-Report	(2) Regular Apt.	(3) ADHD Num. Acc.	(5) Vision Num. Acc.
Race Bias Training * African American	1.551*** (0.519)	0.047 (0.232)	0.024 (0.141)	0.113 (0.104)
Race Training* Hard Work * Af. Am.	-0.190 (0.567)	-0.167 (0.262)	0.018 (0.157)	-0.065 (0.116)
Constant	0.464* (0.271)	3.964*** (0.144)	1.469*** (0.077)	2.076*** (0.058)
Observations	617	616	305	312
R-squared	N/A	0.018	N/A	N/A
Log-likelihood	-383.25	N/A	-604.39	-714.99
Ln-Alpha	N/A	N/A	-21.173	-29.270

Model 1 is logit; Model 2 is OLS; Models 3 and 4 are Negative binomial regressions. Standard errors in parentheses. \*\*\*  $p < 0.01$ , \*\*  $p < 0.05$ , \*  $p < 0.1$  for two-tailed tests.

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