Check for updates

Original Research Article

American Sociological Association

Sociology of Race and Ethnicity
1–17
© American Sociological Association 2021
DOI: 10.1177/23326492211029336
sre.sagepub.com
SAGE

Field Experiments and Job Posting Sources: The Consequences of Job Database Selection for Estimates of Racial Discrimination

David S. Pedulla[1], John Muñoz[2], Katherine E. Wullert[3], and Felipe A. Dias[4]

Abstract

Field experiments have proliferated throughout the social sciences and have become a mainstay for identifying racial discrimination during the hiring process. To date, field experiments of labor market discrimination have generally drawn their sample of job postings from limited sources, often from a single major online job posting website. While providing a large pool of job postings across labor markets, this narrow sampling procedure leaves open questions about the generalizability of the findings from field experiments of racial discrimination in the extant literature. In this paper, we present evidence from a field experiment examining racial discrimination in the hiring process that draws its sample from two sources: (1) a national online job posting website that aligns with previous research, and (2) a job aggregator service that scrapes the web daily in an effort to obtain all online job postings in the United States. While differing in the types of information they collect, we find the job postings drawn from the two sources result in similar estimates of discrimination against Black applicants. In other words, we do not find evidence that racial discrimination varies by the source of the job posting. We conclude by discussing the implications of these findings for studies of racial discrimination, discrimination along other axes of social difference, as well as field-experimental methods more broadly.

Keywords

discrimination, racial inequality, labor market, experimental methods, work and employment

Field experiments and audit studies have become a mainstay of research documenting and analyzing racial discrimination, as well as other forms of discrimination, in the hiring process. In one branch of field-experimental research in this area, researchers send applications, usually via online portals, to apply for real job openings, while experimentally manipulating key features of the applicant. For example, when examining racial discrimination, the race of the applicant may be manipulated on a resume by using names that are likely to lead employers to perceive the applicant as being from a particular racial group. All other features of the application are held constant. Researchers then track "callbacks," positive responses of interest and/or invitations for interviews, from employers for each applicant. Disparities in callback rates between groups are interpreted as evidence of discrimination, given that all other aspects of the

[1]Harvard University, Cambridge, MA, USA
[2]YouGov, San Francisco, CA, USA
[3]Stanford University, Stanford, CA, USA
[4]Tufts University, Medford, MA, USA

Corresponding Author:
David S. Pedulla, Harvard University, 430 William James Hall, 33 Kirkland Street, Cambridge, MA 02138, USA.
Email: dpedulla@fas.harvard.edu

applications were held constant besides the characteristics—such as race—that were experimentally manipulated.

Field experiments are a powerful tool for uncovering discrimination because they combine the internal validity of experiments with the external validity of evidence from "real world" hiring decisions. Years of field experiments—conducted by different researchers—on racial discrimination in the United States have consistently found that Black applicants face significant discrimination during the hiring process (Bertrand and Mullainathan 2004; Gaddis 2015; Pager 2003; Pager, Western, and Bonikowski 2009; Pedulla 2018; Quillian et al. 2017). While these findings have been robust and consistent, in recent years, significant methodological advances have been made in the design, implementation, and analysis of field experiments to better reflect what racial discrimination looks like in the labor market (see Gaddis 2018a, 2018b). For example, because names are often used to signal applicant social identities (e.g., race), scholars have considered the potential confounders that may come with different types of names (Crabtree and Chykina 2018; Gaddis 2017). Researchers have also written about whether it is better to send a single application or multiple applications to a given employer (Larsen 2020; Vuolo, Uggen, and Lageson 2018). Furthermore, scholars have examined how field-experimental findings may be shaped in important ways by the details of the resumes, cover letters, and other application materials that are used (Lahey and Beasley 2009).

In this article, we tackle a distinct methodological issue that has received less attention: the source from which job postings are drawn for a field experiment or audit study.[1] A substantial number of audit studies draw their sample of job postings from a single online job posting website, such as Monster.com, Careerbuilder.com, or Indeed.com. This sampling procedure offers researchers a robust pool of job postings across labor markets, making large-scale field-experimental studies feasible. Applying for jobs through these portals is also often quite efficient, given the simplified and consistent procedures on these sites. Additionally, pieces of the process can be automated, enabling researchers to scale their field experiments with limited labor and resources.

Questions remain, however, about the generalizability of findings from field experiments conducted through individual online platforms, given that these sources may be limited to a particular slice of the broader labor market. While there is evidence from the German housing market that ethnic discrimination does not vary by the source of the posting (Auspurg, Schneck, and Thiel 2020), to our knowledge similar work has not been conducted for the labor market or in the United States. Why might we expect to see variation in discrimination across job posting sources? Some companies may only post job openings on their own websites, companies hiring largely in specific occupations and industries may post on more targeted and smaller-scale job boards (such as Dice.com, which posts jobs in computer science), and companies seeking applicants from certain sociodemographics may post on websites that cater to those specific applicant characteristics (such as RecruitMilitary.com to select on veteran status). Though online platforms capture many jobs, they do not account for the full universe or even a true random sample of the full universe of postings. Importantly for estimates of racial discrimination, different types of companies may rely on different posting platforms and different posting platforms gather different types and amounts of information about candidates. To address questions of generalizability that may arise from these issues, we tackle the following question in this paper: Do findings about racial discrimination from field experiments conducted through single online job posting platforms extend to the labor market beyond that source of job openings? Answering this question is important for understanding if our current estimates of racial discrimination may be biased or limited due to the sampling procedures employed by researchers in this area.

While scholars have noted the need to attend to the representativeness of current field-experimental techniques (e.g., Lahey and Beasley 2018), addressing this issue empirically has proven challenging because it requires the implementation of a field experiment that uses the same application materials and manipulations to apply for jobs through a standard online platform (aligning with the predominant methodological approach in this area) as well as a broader source of job postings. In this paper, we present evidence from a field experiment where we collected such data and examine potential variation in racial discrimination across these two sources. To gain traction on these issues, we draw on data from 12,324 applications submitted to apply for 3,081 unique job postings across 20 Metropolitan Statistical Areas (MSAs) and 6 occupations in the United States. To obtain empirical estimates of racial discrimination, we manipulated the race of

the applicant using racialized names. Our sample for the field experiment came from two sources: (1) a standard online job posting platform and (2) novel data from a company that scrapes the internet daily for all new job postings across a broader variety of online sources in the United States. We refer to the former as an "online job board" or a "job posting website" and to the latter as a "job aggregator." The job aggregator source, while not representing the entire universe of online jobs, is a broader source of online job postings and arguably more representative of the online job search strategies utilized by actual job seekers (see Deming and Kahn 2018; Hershbein and Kahn 2018; Modestino, Shoag, and Ballance 2016).[2] By comparing callback rates for different groups across these two sources, we offer new insights about the generalizability of field-experimental results on racial discrimination in the existing literature.

The article proceeds as follows. We first discuss what is known about the types of companies that post jobs on online job posting websites as well as the different information collected across platforms and the potential implications of this for racial discrimination field-experimental findings. We then summarize the key findings from existing field experiments and audit studies on racial discrimination in the labor market. Next, we present our data and methods and then move on to our results. We conclude by discussing the implications of our findings for future research on racial discrimination and field experiments more generally.

ONLINE JOB POSTING WEBSITES

A variety of external job posting sources exist, catering to different company needs and with the potential to attract different types of companies looking to advertise their jobs. Companies can post on large online job boards, such as Indeed.com or Monster.com, send their postings to niche boards for specific occupations such as software development roles on Dice.com, advertise through social networking sites like LinkedIn, or post on their own websites, among other tools (Dickey-Chasins 2012). On the one hand, existing evidence suggests that while there is diversity in the online job posting sphere, the largest platforms—such as Indeed.com and Monster.com—dominate the industry, accounting for more than half of all external interviews (Maurer 2016). It is possible that, given this dominance, most companies are posting on large online job posting sites like those used in past field experiments. Therefore, we might not expect postings taken through these sites to be different from postings found in other places, but instead to have significant overlap in jobs being posted both on online job boards and other sources.

Additionally, recent work on sampling in a field experiment of housing discrimination in Germany found that ethnic discrimination was robust to sampling strategy (Auspurg et al. 2020), supporting the idea that there may be limited variation in discrimination by the source one uses for sampling purposes. And, while there are reasons to suspect that substantial differences in the degree of information and other aspects of the sources of job postings could impact the relative rate of discrimination across those sources, many methodological studies across the social sciences have shown just how stable results of studies are to "sample" effects (Coppock 2019; Grose, Malhotra, and Van Houweling 2015; Thomas and Clifford 2017; Weinberg, Freese, and McElhattan 2014). For example, researchers have demonstrated the ability of Amazon Mechanical Turk to replicate nationally representative samples in laboratory or field experiments (Coppock 2019; Crump, McDonnell, and Gureckis 2013; Grose et al. 2015; Thomas and Clifford 2017). Furthermore, in investigating "heterogeneous treatment effects" across subgroups within samples, scholars have shown that treatment effects are often remarkably consistent even when replicating dozens of experiments across these potential moderators (Coppock 2019; Coppock, Leeper, and Mullinix 2018). Thus, there is some methodological research suggesting that we may find similar rates of discrimination across sources of job postings.

While some prior scholarship suggests there might be no difference in discrimination across samples, there is also reason to believe that estimates of discrimination might vary depending on the platforms from which researchers draw postings for audit studies. One potential source of variation between job posting sources may be the type and quantity of information collected during the application process. Some job posting sources—such as Monster.com and Indeed.com—often require very limited information from an applicant beyond a cover letter and resume. By contrast, some companies collect detailed information from job applicants when they apply through the company's website. They may collect information about legal work authorization, criminal background, or even have applicants complete a personality test. The amount of information collected as

part of an application may produce variation in discrimination. Indeed, theories of statistical discrimination assert that certain groups of applicants, such as Black applicants, face discrimination because employers have limited information about them and, therefore, rely on biased group-level perceptions to make predictions about an individual applicant (see Aigner and Cain 1977; Phelps 1972). Once employers have more information about the individual applicant, they no longer need to rely on perceived group averages and discrimination may be reduced (Rissing and Castilla 2014). Thus, insofar as statistical discrimination is at work, job posting sources that have longer, more detailed applications—such as those that appear more commonly on company websites—may result in less discrimination (Kaas and Manger 2012).

Methods that draw on a single source of job postings with simplified and routinized application procedures would fail to capture these more detailed applications and could potentially overestimate discrimination in the market as a whole as a result. This is perhaps best illustrated in Eva Zschirnt and Didier Ruedin's (2016) meta-analysis of audit studies on hiring discrimination. Examining studies in Organisation for Economic Co-operation and Development (OECD) countries between 1990 and 2015, Eva Zschirnt and Didier Ruedin (2016) note that German-speaking countries are especially characterized by a job application process requiring extensive information about the applicants (Kaas and Manger 2012). Thus, if statistical discrimination is a large component to the documented gap between hiring decisions for white and nonwhite applicants, we ought to see reduced discrimination metrics in German-speaking countries relative to the other OECD countries where job application materials are comparatively lighter on applicant information. This is indeed what Eva Zschirnt and Didier Ruedin (2016) find, providing evidence that statistical discrimination occurs,[3] suggesting that we might expect a single major online job posting website to generate larger estimates of discrimination than sources of job postings that obtain more information on the applicant.

Along with potential differences in the amount and type of information collected, there are also differences in selection into posting on certain job sites. Some academic work has examined how companies utilize different outlets for posting open positions. A study of Fortune 100 companies found that companies fell into one of three clusters that varied in the frequency with which they used third-party job posting platforms and other job application tools. Companies with the lowest revenue among this set were least likely to utilize third-party sources, while companies in the middle were the most likely (Lee 2005). Similarly, work examining differences in recruitment practices by firm size has suggested that smaller firms are more likely to rely on single sources of recruitment, while larger firms may employ a broader range of sources (Marsden 1994). As such, there may be ways in which the sample of companies captured on online job posting websites is a skewed representation of the larger labor market. If the skew of these companies is also associated with discrimination, prior estimates of racial discrimination could be biased.

Additionally, a body of academic scholarship has shown that variation exists in the content of the branding companies use to attract prospective employees (Backhaus 2004), as employers actively use job postings to promote the company's brand and organizational image (Ewing et al. 2002). Companies in the tech and business sectors focus on their products, activities, and company size and growth, while companies in the service sector focus on the opportunities for advancement and career prospects (Backhaus 2004). Insofar as these different emphases lead employers to post their job openings in different locations, sampling job postings from only one source may bias the sample of companies that are represented, though the direction of this bias is unclear.

Our driving question in this article is whether estimates of discrimination by race differ between a single major online job posting website, as used in past research, and another source of postings that has much broader coverage. If differences in the information collected or the selection of companies into job posting sources impact discrimination, then estimates of discrimination may differ between the online posting board and a broader sample of job openings. In this case, existing methods may not adequately capture the reality of racial discrimination in the labor market.

EXISTING FIELD-EXPERIMENTAL RESEARCH ON RACIAL DISCRIMINATION

A significant body of scholarship has developed over the past decades that utilizes audit study and field-experimental techniques to study racial discrimination in hiring (Gaddis 2018a, 2018b; Pager and Shepherd 2008). In addition to the labor market, these techniques have been used to examine discrimination in housing markets (Hogan and Berry 2011; see review in Oh and Yinger 2018) as

well as markets for consumer goods (Doleac and Stein 2013). Researchers have also used these field experiments to examine racial discrimination in other settings, such as faculty responses to prospective students (Milkman, Akinola, and Chugh 2012) and access to night clubs (May and Goldsmith 2018). While not without its critics (see Heckman and Siegelman 1993), the audit method and field experiments in this area have produced a set of powerful findings on racial discrimination.

In the labor market, research on racial discrimination—drawing on both in-person audits and correspondence tests using written or on-line applications—consistently finds evidence that Black applicants receive significantly lower callback rates than white applicants (Bertrand and Mullainathan 2004; Gaddis 2015; Pager et al. 2009). The magnitude of racial discrimination is often quite large. For example, Devah Pager (2003) found that Black men with a clean criminal record received similar callback rates as white men with a criminal conviction. Similarly, David S. Pedulla (2018) found that Black job applicants with seamless, continuous employment trajectories received similar callback rates to white applicants (or applicants without a strong racial signal) who had experienced a year of unemployment. Racial discrimination also does not appear to be declining. Indeed, a meta-analysis of field experiments and audit studies conducted in the United States since 1989 showed no decline in discrimination against Black job applicants (Quillian et al. 2017; see also Zschirnt and Ruedin 2016). Beyond the United States, a growing body of research shows that there is consistent evidence of discrimination against non-white job applicants across countries (Di Stasio and Lancee 2020; Lancee 2021; Quillian et al. 2019; Zschirnt and Ruedin 2016). For example, in one of the most exhaustive meta-analyses of 738 correspondence tests across 43 separate studies in OECD countries between 1990 and 2015, Eva Zschirnt and Didier Ruedin (2016) find that racial and ethnic discrimination is detected across national contexts. And in an overview of nearly 100 audit studies on hiring discrimination in various countries conducted between 2005 and 2016, Stijn Baert (2018) found the overwhelming majority provided evidence of discrimination against racial and ethnic minorities. Although racial discrimination has persisted over time and exists across countries, we know very little about whether racial discrimination is also robust across job posting sources.

Given the large and robust literature in this area, we expect that our field-experimental data will show that Black applicants face discrimination during the hiring process. However, it is unclear whether this discriminatory pattern will vary with the source from which job postings are selected. As we discussed above, there may be differences in the types of companies that post openings on distinct job posting sources. Additionally, the information collected about applicants may vary between sources, which—as we noted above—could influence racial discrimination insofar as it is driven by a statistical discrimination mechanism. In turn, these types of variation between job posting sources could shape estimates of discrimination in multiple ways.

DATA AND METHODS

To examine the comparability of discrimination estimates across job posting sources, we sampled job postings in the 20 largest MSAs in the United States, with a maximum of one MSA per state between October of 2017 and September of 2018. To obtain the sample of job postings for each MSA and occupation, we drew from two sources: (1) an online job posting site that we have given the pseudonym Jobposting.com, and (2) job posting data from Burning Glass Technologies (henceforth "Burning Glass"), a company that scrapes the web for job postings across a variety of platforms. Our first source, Jobposting.com, is a major online job posting website. Our second source, Burning Glass, is a private company that collects job postings from a wide range of online sources, including large online job boards, niche job boards, company websites, and recruiter websites. As scholars have noted, "Thanks to the breadth of coverage, [Burning Glass] believes the resulting database captures a near-universe of jobs that were posted online" (Hershbein and Kahn 2018:1742). Additionally, Burning Glass data have been used in academic research on the labor market that has appeared in leading peer-reviewed journals (Deming and Kahn 2018; Hershbein and Kahn 2018; Modestino et al. 2016).

We sampled jobs in a total of six occupational categories with varying required education levels: administrative assistant, customer service, software developer, low-skilled sales, high-skilled sales, and cook. In order to better align our sample with the broader labor market, we obtained a larger number of postings in MSAs with larger populations and a smaller number of postings in MSAs with smaller populations.[4] Roughly 40 percent of our total sample came from Jobposting.com and roughly 60 percent came from Burning Glass.[5] Though we cannot feasibly capture all jobs across all labor markets in the United States, this sampling

strategy allows for a wide breadth of jobs across the country, thus reducing the impact of potential idiosyncrasies by occupation or labor market.

Experimental Manipulations

There were three key experimental manipulations in the field experiment: race, gender, and parental status. To signal applicant race, we used first and last name combinations that were consistently perceived as Black (Ebony Banks, Tyra Washington, Terrell Booker, and Darnell Jackson) and as white (Robert Andersen, Seth McGrath, Stephanie Walsh, and Allison Becker).[6] Gender and parental status were also manipulated on the resumes, variation that we will briefly exploit below to offer a point of comparison for our estimates of racial discrimination. The gender of the fictitious applicants was also signaled through first names that were consistently perceived as being men or women. For parental status, we used two experimental manipulations. For parent resumes, we either listed hobbies that the applicants do with their children (e.g., "In my free time, I enjoy going camping with my kids") or listed volunteer participation in a local Parent Teacher Association. For the non-parent resumes, we listed similar hobbies, but without "my kids" or volunteer participation in a neighborhood association that was not connected to being a parent. Thus, the non-parent manipulation did not explicitly signal that the applicant is childless, but was similar in content to the parent manipulation. Each posting was randomly assigned to include a parental status manipulation or not. If the parental status manipulation was included, two sets of applicants of the same race and gender who varied in parental status were submitted to the posting. Otherwise, all applicants were non-parents and the applicants covered the four possible race and gender combinations.

All other aspects of the resumes were kept consistent within occupations, however, there were differences between occupations in the employment and education histories of our applicants. For occupations often requiring more education (e.g., higher-skilled sales, administrative assistant, and software developer), all applicants had six years of prior work experience in the relevant field and held a bachelor's degree from a mid-tier, four-year public institution in the primary state associated with the MSA in which we were applying. For occupations often requiring less education (e.g., lower-skilled sales, customer service, and cook), all applicants had eight years of experience and held a high school diploma. Again, the specific high school was a real school in the given state. We selected public high schools that received mid-tier rankings on the website www.greatschools.org and where the name of the school did not signal a specialty (e.g., an arts-focused school). Years of experience differed between the two sets of occupations in order to keep age constant. We also drafted cover letters containing the work experience listed on the resumes. We assigned an email address and a regional phone number with a voicemail for each of our applicants (a total of 8 email accounts and 32 phone numbers). The phone numbers and email accounts were used during the application submission process and to record callbacks from employers.

Applying for Jobs

At the beginning of the study, we randomized the order in which we would submit applications to each of the different MSA-by-occupation groups. On Sunday morning of each week that we were conducting the field experiment, we began sampling jobs that were posted the previous week (Sunday-Saturday). We used a python script to collect postings from Jobposting.com and captured the first two pages of postings for a pre-defined set of occupation-specific search strings (e.g., "clerical assistant," "executive assistant," "receptionist," "secretary"). We cycled through this search for every zip code within the MSAs we were sampling that week and retained all postings that were no more than a week old. From the Burning Glass data, we selected the jobs for a given week that matched our location and occupation criteria from the daily files provided to us by the company. For both sources, we kept postings in our sample if the link to apply was live, it was a full-time job, and if we had not already applied to a job at the company. After selecting the jobs, postings were randomized among the set of researchers applying. Each week, the researchers would submit four resumes to every posting across two consecutive days, submitting two resumes on the first day and two on the second.

The actual process of applying to jobs varied by the source from which the posting was drawn. For Jobposting.com postings, many applications required only a name, phone number, email address, resume, and cover letter. In some instances, however, more information was requested, such as years of experience or legal authorization. For Burning Glass postings, applications were one of the following types: (1) direct applications through online job boards like Monster.com and Dice.com, (2) common application forms through tools like Taleo, and (3) company-specific applications on

the company's website. There was much greater heterogeneity in application procedures among the Burning Glass sample. The simplest applications required only uploading a resume, and commonly were direct apply links through other large online job posting sites. The most complex applications involved a series of additional questions followed by a skills and/or personality assessment, and were most frequently found on company websites.

While submitting applications, research assistants recorded relevant information from the job posting and from the application itself, such as whether the employer asked about race, Hispanic ethnicity, gender, disability, veteran status, criminal history, and legal authorization to work in the United States. Finally, we recorded whether employers required a resume, cover letter, and/or full application.[7]

Once the application was submitted, research assistants checked the appropriate voicemail and email accounts for employer responses. Responses were coded as callbacks if the applicant received a positive response from the employer. This included employers leaving a phone number and asking the applicant to call them back, stating that they wanted to speak with the applicant about the job or the applicant's background, or by requesting that the applicant respond with a time to interview. Automated responses from employers confirming receipt of the application were not coded as callbacks.

RESULTS

Information Collected Across Job Posting Sources

To examine potential differences between our two sources of job postings, we begin by presenting comparisons of callbacks and application information and procedures across the two sources in Table 1. First, we can see that there is no overall substantive or statistically significant difference in the callback rate between Jobposting.com and Burning Glass. Applications on both platforms, pooled across racial groups, resulted in callbacks between 15 and 16 percent of the time.[8] Next, we compare the information collected by the two job posting sources for applications. For all of the application dimensions in Table 1, there were statistically significant differences in the information collected on the two job posting sources. First, we note that nearly all applications submitted through either source required a resume. In the limited instances when a resume was not required on Jobposting.com, most companies asked that candidates come in person to hand in their materials. For job postings obtained from Burning Glass, when a resume was not required, there was simply no place to upload a resume or input work experience, but we did not encounter any walk-in requirements.[9] While the vast majority of applications required resumes on both platforms, cover letters and full applications were not equally common or as frequently required. Most Jobposting.com applications required the submission of a cover letter as part of the standardized form on this platform, but only around 63 percent of Burning Glass postings required a cover letter. In contrast, Burning Glass postings were far more likely to require a full application. A full application was required for around 41 percent of all postings sourced from Burning Glass, while less than 1 percent of cases on Jobposting.com required a full application. These full applications could entail the addition of short answer questions, skills, or personality assessments, or other information requested by the employer.

The other substantial difference in application procedures across the two platforms was the extent to which job postings contained a statement about Equal Employment Opportunity (EEO) or Affirmative Action and/or requested information on protected statuses like race, gender, disability, and veteran status. Overall, job postings sourced through Burning Glass were far more likely to contain some form of an EEO statement (42 percent compared to 9 percent) and were also much more likely to ask about protected statuses (approximately 32–45 percent compared to less than 1 percent).

Together, the evidence in Table 1 indicates that job postings on Burning Glass and Jobposting.com collected different levels and types of information. These differences in information could lead to differences in discrimination, as theories of statistical discrimination would predict. Although, we also note that it is not possible to know exactly how much, or which types, of information provided by applicants in response to the topics identified in Table 1 were also available to the screeners of job applications. We now turn to look at how findings for racial discrimination compare across the different sources of job postings. We then compare those findings to estimates of how gender and parental status discrimination vary across job posting sources.

Racial Discrimination

Table 2 presents estimates of racial discrimination and how they compare across job posting sources. Models 1 through 4 in Table 2 are the results from linear probability models with standard errors clustered by job posting and controls for state and

Table 1. Comparison of Application Characteristics Between Jobposting.com and Burning Glass.

	Jobposting.com	Burning Glass	Statistical Significance
Callback rate	15.2%	15.7%	n.s.
Application requirements			
Resume	97.6%	99.3%	***
Cover letter	99.1%	62.9%	***
Full application	0.8%	41.4%	***
EEOC information			
Ask about gender	0.6%	44.2%	***
Ask about race	0.4%	44.5%	***
Ask about ethnicity	0.2%	42.7%	***
Ask about disability	0.2%	31.7%	***
Ask about veteran status	0.2%	37.8%	***
EEO statement	9.4%	42.4%	***
Required checks			
Work authorization	20.6%	45.6%	***
Willing to do a background check	21.6%	18.0%	*
Asked about criminal record	0.6%	9.1%	***
Total job postings	1,311	1,770	
Total applications	5,244	7,080	

Note. We define a full application as additional questions beyond basic resume information requiring at least two minutes to complete. Statistical tests were conducted using linear probability models with robust standard errors. For the callback rate statistical test, standard errors were also clustered by job posting. In all other cases, only one observation per job posting was included in the analysis. EEO = equal employment opportunity. EEOC = Equal Employment Opportunity Commission.
Statistical significance (two-tailed tests): $^{\dagger}p < .10$. $^{*}p < .05$. $^{**}p < .01$. $^{***}p < .001$.

occupation in all models. Logit models produce similar results and are presented in Appendix Table A2. Model 1 pools data from Jobposting.com and Burning Glass. We evaluate our hypothesis of racial discrimination using both one-tailed and two-tailed statistical tests.[10] All other statistical tests are limited to two-tailed tests. The results from Model 1 provide clear evidence of racial discrimination. The callback rate for black job applicants is 1.6 percentage points lower than it is for white applicants, a statistically significant difference ($p < .01$, two-tailed test; $p < .01$, one-tailed test). The magnitude of the racial discrimination effect is somewhat smaller than might be anticipated from some prior scholarship (Bertrand and Mullainathan 2004; Gaddis 2015; Pager et al. 2009), although we note that it is consistent with some existing research on racial discrimination in hiring (Agan and Starr 2018). Additionally, in supplemental analyses (see Model 5 in Appendix Table A2), we estimated a logistic regression model with job posting fixed effects, which resulted in a coefficient (e.g., log odds) for being a Black applicant (compared to a white applicant) of -0.287 ($p < .01$, two-tailed test; $p < .01$, one-tailed test). This estimate is also in line with existing estimates of racial discrimination against Black applicants from a recent meta-analysis (Quillian et al. 2017).

Next, we examine racial differences in callbacks separately for each platform. In Model 2 of Table 2, which is limited to applications submitted to Jobposting.com, we see a statistically significant negative effect of being a Black applicant ($p < .01$, two-tailed test; $p < .01$, one-tailed test). In Model 3, which is limited to Burning Glass, we also see a negative coefficient, but with a slightly reduced magnitude. The negative effect in this model is not statistically significant at the .05 level with a two-tailed test (although, we note that it is statistically significant at the .10 level with a one-tailed test). Importantly, this does not mean that there is a significant *difference* in racial discrimination between Jobposting.com and Burning Glass. To formally test that possibility, Model 4 includes an interaction between being a Black applicant and whether the application was submitted on Jobposting.com. If there is a significant difference in racial discrimination between the platforms, we would expect the interaction term to be statistically significant. However, the interaction term is not statistically

Table 2. Linear Probability Models Examining Racial Differences in Callbacks, Comparing Jobposting.com and Burning Glass.

	No Job Posting Fixed Effects				With Job Posting Fixed Effects			
	Model 1	Model 2	Model 3	Model 4	Model 5	Model 6	Model 7	Model 8
	Full Sample, No Interaction	Jobposting.com Sample	Burning Glass Sample	Race and Posting Source Interaction	Full Sample, No Interaction	Jobposting.com Sample	Burning Glass Sample	Race and Posting Source Interaction
Race (ref. white)								
Black	–0.016**, a	–0.022**, a	–0.012 c	–0.011 c	–0.015**, a	–0.014*, b	–0.016**, a	–0.016**, a
	(0.005)	(0.008)	(0.007)	(0.007)	(0.004)	(0.007)	(0.006)	(0.006)
Job Source (ref. Burning Glass)								
Jobposting.com	–0.005	–	–	0.0002	–	–	–	–
	(0.011)	–	–	(0.012)	–	–	–	–
Jobposting.com × Black	–	–	–	–0.011	–	–	–	0.002
	–	–	–	(0.011)	–	–	–	(0.009)
Controls Included	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Constant	0.176***	0.154***	0.183***	0.173***	0.155***	0.153***	0.156***	0.155***
	(0.033)	(0.048)	(0.045)	(0.033)	(0.004)	(0.005)	(0.005)	(0.004)
Number of Applications	12,324	5,244	7,080	12,324	12,324	5,244	7,080	12,324
Number of Job Postings	3,081	1,311	1,770	3,081	3,081	1,311	1,770	3,081

Note. Standard errors clustered by job posting. Controls are for state, occupation, gender, parental status, and the gender-by-parental status interaction for the models without job posting fixed effects. Controls are gender, parental status, and the gender-by-parental status interaction for the models with job posting fixed effects.
Statistical significance (two-tailed tests): $^{\dagger}p < .10$. $^{*}p < .05$. $^{**}p < .01$. $^{***}p < .001$.
Statistical significance for "black" coefficient (one-tailed tests): a $p < .01$. b $p < .05$. c $p < .10$.

Table 3. Linear Probability Models Examining Gender and Parental Status Differences in Callbacks, Comparing Jobposting.com and Burning Glass.

	Model 1	Model 2	Model 3	Model 4
	Gender and Job Posting Interaction	Gender and Parent and Posting Source Interaction	Limited to Men: Parent and Posting Source Interaction	Limited to Women: Parent and Posting Source Interaction
Gender (ref. man)				
Woman	0.008	0.014*	–	–
	(0.007)	(0.007)	–	–
Parental status (ref. non-parent)				
Parent	0.008	0.049**	0.050**	0.012
	(0.010)	(0.017)	(0.017)	(0.017)
Job Source (ref. Burning Glass)				
Jobposting.com	–0.007	0.002	0.001	0.005
	(0.012)	(0.012)	(0.012)	(0.013)
Woman x Parent	–	–0.038†	–	–
	–	(0.020)	–	–
Jobposting.com × Woman	0.002	0.001	–	–
	(0.011)	(0.010)	–	–
Jobposting.com × Parent	–	–0.055*	–0.055*	–0.049*
	–	(0.025)	(0.025)	(0.025)
Jobposting.com × Woman × Parent	–	0.006	–	–
	–	(0.028)	–	–
Controls Included	Yes	Yes	Yes	Yes
Constant	0.179***	0.172***	0.185***	0.171***
	(0.033)	(0.033)	(0.038)	(0.036)
Number of Applications	12,324	12,324	6,110	6,214
Number of Job Postings	3,081	3,081	2,891	2,917

Note. Standard errors clustered by job posting. Controls are for state, occupation, and race.
Statistical significance (two-tailed tests): †$p < .10$. *$p < .05$. **$p < .01$. ***$p < .001$.

significant, meaning we are unable to reject the null hypothesis that the lower callback rate for Black applicants is in fact the same for both sources of data.

Models 5 through 8 in Table 2 are linear probability models with standard errors clustered by job posting and include fixed effects for each job posting. Thus, these models capture estimates of within-job posting racial discrimination. Here, we see similar findings to Models 1 through 4, although there appears to be a higher level of consistency across models. For the separate analyses of Jobposting.com and Burning Glass postings (Models 6 and 7), we see that there is a negative effect of being a Black applicant that is statistically significant at the .05 level or lower with a two-tailed test. Furthermore, the coefficient for the interaction between being a Black applicant and the posting coming from Jobposting.com is close to zero (0.002) and not statistically significant.

Together, the results in Table 2 provide compelling evidence that estimates of racial discrimination do not vary in a statistically significant way across job postings obtained from Jobposting.com and Burning Glass.

A Comparative View: Gender and Parental Status Discrimination

While our estimates of racial discrimination are quite consistent across platforms, is this a general finding that transcends different status characteristics? Or, is it something that might be specific to the way that race operates in the labor market? To gain traction on this issue, we turn to Table 3, which examines potential variation in the impact of gender and gender-by-parental status on callback rates by platform.

Table 3 presents linear probability models with standard errors clustered by job posting, controlling

for state, occupation, and the race of the applicant. Model 1 in Table 3 examines whether differences in callback rates exist by gender across platforms. The coefficient for the interaction between being a woman applicant and the job posting coming from Jobposting.com is small in magnitude and not statistically significant. Thus, there is no evidence that gender discrimination differs across job posting sources. Model 2 in Table 3 examines variation in parental status discrimination across platforms. The coefficient for the three-way interaction between being a woman, being a parent, and applying to a posting on Jobposting.com is small and not statistically significant. However, the other components of the model provide evidence that there may be some differences in the parental status effect between platforms, but that these are contingent on gender. Thus, in Model 3, we limit our analysis to men and examine whether the effect parental status for men differs across job posting sources. We see that it does: there is a negative and statistically significant coefficient for the interaction between being a parent and applying for a job on Jobposting.com for men. Similarly, in Model 4, which is limited to women applicants, we see a negative and statistically significant interaction between being a woman and applying for a job posted on Jobposting.com. Together, Models 3 and 4 offer some evidence that the effects of parental status—at least when examined within-gender—may differ across job posting sources.

This finding diverges from our main results presented above that racial discrimination does not vary in a significant way across job posting sources. At the same time, we note that these findings about within-gender interactions between parental status and job posting source are somewhat sensitive to model selection and specification. Using logit models and clustered standard errors, the interaction term between parental status and job posting source remains statistically significant for men at the .05 level, but is slightly above the .05 threshold ($p = .053$) for women. Additionally, when job posting fixed effects are added to the models—using both the linear probability and logit specifications—the interaction term between parental status and job posting source is not statistically significant ($p > .10$) for both men and women.

DISCUSSION AND CONCLUSION

Field experiments and audit studies are powerful tools utilized by social scientists to detect racial discrimination in the labor market. Yet, while major advances have been made in the design and implementation of these studies, questions remain about how common strategies used to select job postings shape the generalizability of the estimates of discrimination that are obtained. Existing research often relies on job postings from a limited number of large, online job posting websites, such as Monster.com and Careerbuilder.com. This could impact estimates of racial discrimination through at least two pathways. First, if the companies that post job openings on those sites differ in their discriminatory behavior from the broader set of job openings in the labor market, studies utilizing these sources may over- or underestimate the prevalence of discrimination. Second, if these job posting sources collect different levels and types of information about job applicants than other job posting sources, that may also shape estimates of racial discrimination.

Drawing on a large-scale field experiment of hiring discrimination in the United States, we directly examine whether rates of racial discrimination differ between a single online job posting website, as has been utilized in existing field-experimental research—what we call Jobposting.com—and a much broader source of job openings drawn from Burning Glass. First, consistent with existing research, we find evidence of racial discrimination against Black job applicants. Importantly, though, our results indicate that racial discrimination does *not* vary systematically between job posting sources. In other words, estimates of racial discrimination appear robust to the sources from which a researcher draws their job postings, even when the level of information collected about job applicants varies. This provides further evidence for the existence, persistence, and robustness of racial discrimination in the United States labor market. We also note that this finding aligns with recent evidence about ethnic discrimination in the German housing market where researchers explicitly drew samples from different sources and did not find variation in discrimination between those sources of postings (Auspurg et al. 2020). While more research is needed on this topic, the consistency of the findings between the German housing market and the United States labor market are compelling. Together, they indicate that audit studies of racial and ethnic discrimination may not be particularly sensitive to the source of postings to which the researchers apply. This finding is instructive for both researchers designing audit studies of racial discrimination as well as the interpretation of audit studies of racial discrimination that have already been completed.

Importantly, though, this lack of variation in racial discrimination begs the question: does this

finding translate to other social statuses? Our findings suggest that that is not necessarily the case. While we do not find any evidence that gender discrimination operates differently across job posting sources, the story is more complicated for parental status discrimination. We find evidence that, in subset analyses, the gender-specific consequences of parenthood differ between platforms. Thus, for scholars examining parental status discrimination, we suggest using caution when selecting the source from which they draw their job postings. We note, however, that additional scholarship is needed to determine if discrimination by other social statuses—such as LGBTQ status, social class, or immigration status—may be influenced by job posting sources.

While we are not able to empirically isolate the reasons that racial discrimination is consistent across job posting sources, there may be some hints in existing scholarship. In general, existing estimates of racial discrimination suggest that it is robust across higher-skilled and lower-skilled jobs (Bertrand and Mullainathan 2004; Pager 2003). Additionally, insofar as racial discrimination is driven by deep-seated stereotypes and implicit attitudes, it may not be particularly surprising that the additional information collected by Burning Glass does not produce a reduction in discrimination. Indeed, the diffuse nature of racial biases and beliefs may make its persistence relatively insensitive to variation in job posting sources. The consistency of racial discrimination across job posting sources also aligns with the broader set of research findings that there is consistent evidence of racial and ethnic discrimination against non-whites across national contexts (Di Stasio and Lancee 2020; Lancee 2021; Quillian et al. 2019; Zschirnt and Ruedin 2016) and over time (Quillian et al. 2017).

Our results offer new insights for scholars utilizing field experiments and audit studies to examine racial discrimination in the labor market. However, they are not without limitations. We are only able to compare one online job posting website with a broader pool of job postings, leaving questions about whether other online job boards perform similarly. Future work will be well served to examine other sources of job posting and, eventually, a meta-analysis on this topic would be valuable for scholars. Additionally, as with most field experiments in this area, we are limited to certain occupations and labor markets. While the current study included a large number of MSAs and six occupations, it is possible that our comparison of discrimination across platforms could also be shaped by the labor markets and occupations selected. We also only examined labor market discrimination. Yet, field experiments can be deployed across institutional contexts, including in housing and credit markets. Similar approaches to examining how the source of units selected for study shape discrimination estimates could be important in these other domains as well (for example, see Auspurg et al. 2020). Finally, we are unable to empirically identify the mechanisms behind our findings. Future work in this area would be useful for further developing field-experimental methods.

As social scientists continue to deploy field experiments to test for discrimination, it is important to consider the generalizability of the estimates that are recovered. In this article, we have offered one approach to advance scholarship in this area: comparing estimates of racial discrimination from a single online job posting site with those from a broader pool of postings. For racial discrimination, our results indicate that the source of the postings appears to matter little, providing reassurance that the sources utilized by scholars to study this topic are unlikely to yield wildly different results. Yet, more research is needed to identify how discrimination by other social statuses may vary across job posting sources. Together, our findings offer important leverage on interpreting results from existing field experiments and audit studies and pave the way for future scholarship on discrimination.

APPENDIX

Table A1. Distribution of Callbacks by Race, Gender, and Parental Status.

	Callback
Black Applicants	14.8% [912/6,180]
White Applicants	16.2% [997/6,144]
Men Applicants	15.0% [915/6,110]
Women Applicants	16.0% [994/6,214]
Mother Applicants	15.4% [158/1,023]
Father Applicants	17.1% [166/971]

Note. The "Callback" column reports the percent callback for applicants that were signaled as Black (row 1), White (row 2), men (row 3), women (row 4), mothers (row 5), and fathers (row 6). In brackets is the number of callbacks over the number of resumes sent for each race, gender, or parental status group.

Table A2. Logit Models Examining Racial Differences in Callbacks, Comparing Jobposting.com and Burning Glass.

	No Job Posting Fixed Effects				With Job Posting Fixed Effects			
	Model 1	Model 2	Model 3	Model 4	Model 5	Model 6	Model 7	Model 8
	Full Sample, No Interaction	Jobposting.com Sample	Burning Glass Sample	Race and Posting Source Interaction	Full Sample, No Interaction	Jobposting.com Sample	Burning Glass Sample	Race and Posting Source Interaction
Race (ref. white)								
Black	–0.128**, a	–0.177**, a	–0.094 c	–0.090 c	–0.287**, a	–0.256*, b	–0.310**, a	–0.310**, a
	(0.042)	(0.062)	(0.058)	(0.057)	(0.084)	(0.127)	(0.111)	(0.111)
Job Source (ref. Burning Glass)								
Jobposting.com	–0.037	–	–	0.007	–	–	–	–
	(0.086)	–	–	(0.095)	–	–	–	–
Jobposting.com × Black	–	–	–	–0.092	–	–	–	0.053
	–	–	–	(0.085)	–	–	–	(0.169)
Controls Included	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Number of Applications	12,324	5,240	7,036	12,324	2,360	1,020	1,340	2,360
Number of Job Postings	3,081	1,310	1,759	3,081	590	255	335	590

Note. Log-odds presented. Standard errors clustered by job posting in Models 1 through 4. Controls are for state, occupation, gender, parental status, and the gender-by-parental status interaction for the models without job posting fixed effects. Controls are gender, parental status, and the gender-by-parental status interaction for the models with job posting fixed effects. Some cases are dropped in Models 2 and 3 where a control perfectly predicts the outcome.

Statistical significance (two-tailed tests): $^{\dagger}p < .10$. $^{*}p < .05$. $^{**}p < .01$. $^{***}p < .001$.

Statistical significance for "black" coefficient (one-tailed tests): a $p < .01$. b $p < .05$. c $p < .10$.

ACKNOWLEDGMENTS

We thank Inyoung Choi, Obi Eboh, Saffron Huang, Chelsea King, Olivia Rambo, Cole Scanlon, Anthony Trinh, and Elizabeth Trinh for research assistance. We thank Alex Murphy and Mike Bader for useful comments on earlier versions of this manuscript. We also thank the editors and anonymous reviewers at *Sociology of Race and Ethnicity* for their thoughtful feedback. Much of the data collection for this project was conducted in collaboration with Devah Pager, who sadly passed away in 2018. We are grateful for her incredible and insightful guidance with this project.

AUTHOR CONTRIBUTIONS

The second, third, and fourth authors contributed equally to this article.

FUNDING

The author(s) disclosed receipt of the following financial support for research, authorship, and/or publication of this article: Generous funding and support for this project was provided by the W.K. Kellogg Foundation (P3033552), the Russell Sage Foundation (85-17-07), the Washington Center for Equitable Growth, the UPS Endowment Fund at Stanford University, the Sociology Department at Stanford University, IRiSS at Stanford University, and the Harvard Kennedy School's Women and Public Policy Program.

NOTES

1. We note that Joanna N. Lahey (2008), in her field experiment of age discrimination, addresses a distinct, but related, issue by comparing callbacks between job openings applied for through want-ads versus call-ins. We also see this work as in line with the suggestions of S. Michael Gaddis (2019) for moving forward the field of audit study research.
2. Additional information about the job aggregator source—Burning Glass Technologies—is provided below when we discuss our data and methods in more detail.
3. Eva Zschirnt and Didier Ruedin (2016) also note that *within* German-speaking countries, there exists different rates of hiring outcomes based on status characteristics, so statistical discrimination is not the sole determinant of hiring discrimination.
4. Our sample includes the MSAs that contain the following cities: New York, Los Angeles, Chicago, Washington, Boston, Philadelphia, Seattle, Detroit, Dallas, Atlanta, Phoenix, Denver, Baltimore, Miami, Minneapolis, Portland, Las Vegas, Charlotte, Cincinnati, and St. Louis. When identifying postings on Jobposting.com, we searched by each zip code in a given MSA. In a few cases, when no job postings were available in a given zip code that matched our criteria, openings slightly outside that zip code would be presented by Jobposting.com. These postings were included in our sample, which means a small number of job postings on Jobposting.com came from just outside the selected MSA. Our main results about racial discrimination are consistent when these postings are excluded from the analysis.
5. After months of sampling from both Jobposting.com and Burning Glass, we took a short break from sampling and then continued the field experiment by sampling from just Jobposting.com. That latter portion of the field experiment is excluded from these analyses for two reasons. First, the data would not provide a direct comparison between Jobposting.com and Burning Glass because our sample was only drawn from one source each time we sampled. Second, Jobposting.com blocked applications from three of our applicants after we transitioned to only sampling from Jobposting.com. Thus, the field experiment results from that point forward were compromised. We can see in the data the date at which Jobposting.com blocked certain accounts because the callback rates dropped to zero for the affected applicants for all jobs sampled after that date.
6. We conducted a survey experiment on Amazon.com's MTurk to test the perceptions of various names. All "Black" and "white" names used in the field experiment were perceived as black and white, respectively, more than 96 percent of the time. In the selection of names, we also attempted to limit the association between names and particular social classes to avoid the confounding of race and class (Gaddis 2017). Additionally, we note that while respondents in the survey experiment may have racialized conceptions of these "white" names when explicitly asked about the race they associate with the name, it is unclear whether real employers actively think of applicants with these names as white during the hiring process or whether these names default to assumptions of whiteness.
7. We defined a full application as additional questions beyond basic resume information such as name, email address, and past employment that required at least two minutes to complete. The majority of Jobposting.com postings were highly standardized in such a way that the processes tended to be shorter and did not amount to a full application. Though we did not gather data on time spent on each submission, the additional questions that were much more common through Burning Glass did result in substantially longer time spent completing each application than time spent on Jobposting.com.
8. Additional descriptive information about the number of callbacks for different groups is provided in Appendix Table A1.
9. Our main finding that racial discrimination does not vary in a statistically significant way across job posting sources holds when looking at only those applications where a resume was submitted.

10. We use both one- and two-tailed tests for racial discrimination given that our hypothesis about racial discrimination is directional due to existing theory and empirical research (for a discussion, see Murphy 2017; Tinkler et al. 2019).

REFERENCES

Agan, Amanda, and Sonja Starr. 2018. "Ban the Box, Criminal Records, and Racial Discrimination: A Field Experiment." *The Quarterly Journal of Economics* 133(1):191–235.

Aigner, Dennis J., and Glen G. Cain. 1977. "Statistical Theories of Discrimination in Labor Markets." *Industrial and Labor Relations Review* 30(2):175–87.

Auspurg, Katrin, Andreas Schneck, and Fabian Thiel. 2020. "Different Samples, Different Results? How Sampling Techniques Affect the Results of Field Experiments on Ethnic Discrimination." *Research in Social Stratification and Mobility* 65:100444.

Backhaus, Kristin B. 2004. "An Exploration of Corporate Recruitment Descriptions on Monster.com." *Journal of Business Communication* 41(2):115–36.

Baert, Stijn. 2018. "Hiring Discrimination: An Overview of (Almost) All Correspondence Experiments Since 2005." Pp. 63–77 in *Audit Studies: Behind the Scenes with Theory, Method, and Nuance*, edited by. S. M. Gaddis. Cham. Switzerland: Springer.

Bertrand, Marianne, and Sendhil Mullainathan. 2004. "Are Emily and Greg More Employable than Lakisha and Jamal? A Field Experiment on Labor Market Discrimination." *American Economic Review* 94:991–1013.

Coppock, Alexander. 2019. "Generalizing from Survey Experiments Conducted on Mechanical Turk: A Replication Approach." *Political Science Research and Methods* 73:613–28.

Coppock, Alexander, Thomas J. Leeper, and Kevin J. Mullinix. 2018. "Generalizability of heterogeneous treatment effect estimates across samples." *Proceedings of the National Academy of Sciences of the United States of America* 115(49):12441–46.

Crabtree, Charles, and Volha Chykina. 2018. "Last Name Selection in Audit Studies." *Sociological Science* 5:21–28.

Crump, Matthew J. C., John V. McDonnell, and Todd M. Gureckis. 2013. "Evaluating Amazon's Mechanical Turk as a Tool for Experimental Behavioral Research." *PLoS ONE* 8(3):e57410.

Deming, David, and Lisa B. Kahn. 2018. "Skill Requirements across Firms and Labor Markets: Evidence from Job Postings for Professionals." *Journal of Labor Economics* 36(S1):S337–69.

Dickey-Chasins, Jeff. 2012. "Job Board Evolution." *HR Examiner*, December 11. https://www.hrexaminer.com/job-board-evolutio/.

Di Stasio, Valentina, and Bram Lancee. 2020. "Understanding Why Employers Discrimination, Where and Against Whom: The Potential of Cross-national, Factorial and Multi-group Field Experiments." *Research in Social Stratification and Mobility* 65:100563.

Doleac, Jennifer L., and Luke C. D. Stein. 2013. "The Visible Hand: Race and Online Market Outcomes." *The Economic Journal* 123:469–92.

Ewing, Michael T., Leyland F. Pitt, Nigel M. De Bussy, and Pierre Berthon. 2002. "Employment Branding in the Knowledge Economy." *International Journal of Advertising* 21(1):3–22.

Gaddis, S. Michael. 2015. "Discrimination in a Credential Society: An Audit Study of Race and College Selectivity in the Labor Market." *Social Forces* 93(4):1451–79.

Gaddis, S. Michael. 2017. "How Black are Lakisha and Jamal? Racial Perceptions from Names Used in Correspondence Audit Studies." *Sociological Science* 4:469–89.

Gaddis, S. Michael. 2018a. "An Introduction to Audit Studies in the Social Science." Pp. 3–44 in *Audit Studies: Behind the Scenes with Theory, Method, and Nuance*, edited by S. M. Gaddis. New York: Springer.

Gaddis, S. Michael. 2018b. *Audit Studies: Behind the Scenes with Theory, Method, and Nuance*. Cham, Switzerland: Springer.

Gaddis, S. Michael. 2019. "Understanding the 'How' and 'Why' Aspects of Racial-ethnic Discrimination: A Multimethod Approach to Audit Studies." *Sociology of Race and Ethnicity* 5(4):443–55.

Grose, Christian R., Neil Malhotra, and Robert Parks Van Houweling. 2015. "Explaining Explanations: How Legislators Explain Their Policy Positions and How Citizens React." *American Journal of Political Science* 59(3):724–43.

Heckman, James, and Peter Siegelman. 1993. "The Urban Institute Audit Studies: Their Methods and Findings." Pp. 187–258 in *Clear and Convincing Evidence: Measurement of Discrimination in America*, edited by M. Fix and R. J. Struyk. Washington, DC: Urban Institute Press.

Hershbein, Brad, and Lisa B. Kahn. 2018. "Do Recessions Accelerate Routine-based Technological Change? Evidence from Vacancy Postings." *American Economic Review* 108(7):1737–72.

Hogan, Bernie, and Brent Berry. 2011. "Racial and Ethnic Biases in Rental Housing: An Audit Study of Online Apartment Listings." *City & Community* 10(4):351–72.

Kaas, Leo, and Christian Manger. 2012. "Ethnic Discrimination in Germany's Labour Market: A Field Experiment." *German Economic Review* 13(1):1–20.

Lahey, Joanna N. 2008. "Age, Women, and Hiring: An Experimental Study." *Journal of Human Resources* 43(1):30–56.

Lahey, Joanna N., and Ryan Beasley. 2009. "Computerizing Audit Studies." *Journal of Economic Behavior & Organization* 70(3):508–14.

Lahey, Joanna N., and Ryan Beasley. 2018. "Technical Aspects of Correspondence Studies." Pp. 81–101 in *Audit Studies: Behind the Scenes with Theory, Method, and Nuance*, edited by S. M. Gaddis. New York: Springer.

Lancee, Bram. 2021. "Ethnic Discrimination in Hiring: Comparing Groups Across Contexts. Results from a Cross-national Field Experiment." *Journal of Ethnic and Migration Studies* 47:1181–200.

Larsen, Edvard N. 2020. "Induced Competition in Matched Correspondence Tests: Conceptual and Methodological Considerations." *Research in Social Stratification and Mobility* 65:100475.

Lee, In. 2005. "The Evolution of E-recruiting: A Content Analysis of Fortune 100 Career Web Sites." *Journal of Electronic Commerce in Organizations* 3(3):57–68.

Marsden, Peter V. 1994. "The Hiring Process: Recruitment Methods." *American Behavioral Scientist* 37(7):979–91.

Maurer, Roy. 2016. "Indeed Dominates External Sources of Hire, Survey Finds." *SHRM*, May 2. https://www.shrm.org/resourcesandtools/hr-topics/talent-acquisition/pages/indeed-dominates-external-sources-of-hire-survey-finds.aspx.

May, Reuben A. Buford, and Pat Rubio Goldsmith. 2018. "Dress Codes and Racial Discrimination in Urban Nightclubs." *Sociology of Race and Ethnicity* 4(4):555–66.

Milkman, Katherine L., Modupe Akinola, and Dolly Chugh. 2012. "Temporal Distance and Discrimination: An Audit Study in Academia." *Psychological Science* 23(7):710–17.

Modestino, Alicia Sasser, Daniel Shoag, and Joshua Ballance. 2016. "Downskilling: Changes in Employer Skill Requirements Over the Business Cycle." *Labour Economics* 41:333–47.

Murphy, Ricardo. 2017. "On the Use of One-sided Statistical Tests in Biomedical Research." *Clinical and Experimental Pharmacology and Physiology* 45(1):109–14.

Oh, Sun Jung, and John Yinger. 2018. "What Have We Learned From Paired Testing in Housing Markets?" *Cityscape* 20(1):241–42.

Pager, Devah. 2003. "The Mark of a Criminal Record." *American Journal of Sociology* 108(5):937–75.

Pager, Devah, and Hana Shepherd. 2008. "The Sociology of Discrimination: Racial Discrimination in Employment, Housing, Credit, and Consumer Markets." *Annual Review of Sociology* 34:181–209.

Pager, Devah, Bruce Western, and Bart Bonikowski. 2009. "Discrimination in a Low-wage Labor Market: A Field Experiment." *American Sociological Review* 74:777–99.

Pedulla, David S. 2018. "How Race and Unemployment Shape Labor Market Opportunities: Additive, Amplified, or Muted Effects?" *Social Forces* 96(4):1477–1506.

Phelps, Edmund S. 1972. "The Statistical Theory of Racism and Sexism." *American Economic Review* 62(4):659–61.

Quillian, Lincoln, Anthony Heath, Devah Pager, Arnfinn H. Mitbøen, Fenella Fleischmann, and Ole Hexel. 2019. "Do Some Countries Discriminate More than Others? Evidence from 97 Field Experiments of Racial Discrimination in Hiring." *Sociological Science* 6:467–96.

Quillian, Lincoln, Devah Pager, Ole Hexel, and Arnfinn H. Mitbøen. 2017. "Meta-analysis of Field Experiments Shows No Chang in Racial Discrimination in Hiring Over Time." *Proceedings of the National Academy of Sciences of the United States of America* 114(41):10870–75.

Rissing, Ben A., and Emilio J. Castilla. 2014. "House of Green Cards: Statistical or Preference-based Inequality in the Employment of Foreign Nationals." *American Sociological Review* 79(6):1226–55.

Thomas, K. A., and S. Clifford. 2017. "Validity and Mechanical Turk: An Assessment of Exclusion Methods and Interactive Experiments." *Computers in Human Behavior* 77:184–97.

Tinkler, Justine, Jun Zhao, Yan Li, and Cecilia L. Ridgeway. 2019. "Honorary Whites? Asian American Women and the Dominance Penalty." *Socius: Sociological Research for a Dynamic World* 5:1–13.

Vuolo, Mike, Christopher Uggen, and Sarah Lageson. 2018. "To Match or Not To Match? Statistical and Substantive Considerations in Audit Design and Analysis." Pp. 119–40 in *Audit Studies: Behind the Scenes with Theory, Method, and Nuance*, edited by S. M. Gaddis. New York: Springer.

Weinberg, Jill D., Jeremy Freese, and David McElhattan. 2014. "Comparing Data Characteristics and Results of an Online Factorial Survey between a Population-based and a Crowdsource-recruited Sample." *Sociological Science* 1:292–310.

Zschirnt, Eva, and Didier Ruedin. 2016. "Ethnic Discrimination in Hiring Decisions: A Meta-analysis of Correspondence Tests 1990–2015." *Journal of Ethnic and Migration Studies* 42(7):1115–34.

AUTHOR BIOGRAPHIES

David S. Pedulla is Professor of Sociology at Harvard University. His research examines the consequences of nonstandard, contingent, and precarious employment for workers' social and economic outcomes as well as the processes leading to race and gender labor market stratification.

John Muñoz is a Scientific Research Manager at YouGov. He received his PhD in Sociology from Stanford University. His research examines race, the political and

public opinion impact of social movements, and statistics, while utilizing a range of methodological approaches from field and online experiments, to quantitative analysis, to computational simulations.

Katherine E. Wullert is a graduate student in Sociology at Stanford University. Her research examines the role of gendered, racialized, and classed stereotypes in crafting images of the ideal worker that serve as barriers to increasing diversity in the workplace.

Felipe A. Dias is Assistant Professor of Sociology at Tufts University. His research bridges insights from economic sociology, labor economics, race and ethnicity, gender, and immigration to understand the mechanisms associated with the reproduction of social inequality in the workplace.