

**Discrimination in the Credential Society:  
An Audit Study of Race and College Selectivity in the Labor Market**

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**ABSTRACT**

Racial inequality in economic outcomes, particularly among the college educated, persists throughout U.S. society. Scholars debate whether this inequality stems from racial differences in human capital (e.g. college selectivity, GPA, college major) or employer discrimination against black job candidates. However, limited measures of human capital and the inherent difficulties in measuring discrimination using observational data make determining the cause of racial differences in labor market outcomes a difficult endeavor. In this research, I examine employment opportunities for white and black graduates of elite top-ranked universities versus less selective institutions. Using an audit design, I create matched candidate pairs and apply for 1,008 jobs on a national job search website. I also exploit existing birth record data in selecting names to control for differences across social class within racialized names. The results show that although a credential from an elite university results in more employer responses for all candidates, black candidates from elite universities only do as well as white candidates from less selective universities. Moreover, race results in a double penalty: when employers respond to black candidates it is for jobs with lower starting salaries and lower prestige than those of white peers. These racial differences suggest that a bachelor's degree, even one from an elite institution, cannot fully counteract the importance of race in U.S. society. Thus, both discrimination and differences in human capital contribute to racial economic inequality.

## INTRODUCTION

“Education is the most important determinant yet discovered of how far one will go in today's world.” (1979:3)

--Randall Collins, *The Credential Society*

The popular notion in U.S. society is that education is the great equalizer. From a young age, children learn that education helps individuals overcome social disadvantage and opens many doors of opportunity. But not everyone can go to college and those who do enter into a tiered system of schools and exit into a labor market that values more than educational credentials. Although education scholars consistently document the ways that institutions at the primary and secondary levels reinforce a stratified system with particularly deep racial divides in outcomes, scholars have devoted less attention to differences among college graduates.

Some research highlights the particularly discouraging finding that racial economic inequality is greatest among the college educated (Cancio, Evans, and Maume 1996; Zhang 2008). This finding perhaps is explained by racial differences in the types of institutions from which students graduate. Competition to gain admission to the best universities is intense; institutions that accept fewer than half of all applicants make up only 18% of the total institutions in the U.S. but receive 31% of all college applications (National Association for College Admission Counseling, 2010). The race for the coveted spots in these institutions translates into a stratified higher education system as blacks, Hispanics, and low-income students are much less likely to attend highly selective institutions than whites, Asians, and high-income students (Alon and Tienda 2007; Bowen and Bok 1998; Carnevale and Rose 2003). However, it is unclear how much employers value degrees from elite universities and if there are racial differences in the returns to these degrees (Brewer and Ehrenberg 1996; Dale and Krueger 2002, 2011; Zhang 2008).

Rather than serve as the great equalizer, a higher education credential, even one from a highly prestigious institution, may not fully erase any negative attitudes employers have about blacks. Since the passage of the Civil Rights Act researchers have consistently found evidence of racial discrimination in the labor market using a variety of methods (Bendick, Jackson, and Reinoso 1994; Bertrand and Mullainathan 2004; Kirschenman and Neckerman 1991; Pager 2007a). No research, however, has explored whether employers engage in racial discrimination against applicants with a degree from an elite institution. Such research would increase our understanding of the possibilities and limits of education in reducing social inequality.

In this article, I examine the employment opportunities for white and black graduates of elite versus less selective institutions to determine if racial economic inequality among the college educated is explained by racial differences in human capital, racial discrimination in the labor market, or both. Unfortunately, large scale nationally representative data have fallen short in fully addressing these issues. Some potentially important human capital measures, such as college selectivity, GPA, and major, are often not available. Moreover, while researchers in the 1980s and even early 1990s were able to assess employers' overt thoughts on discrimination through surveys and interviews, fear of lawsuits and social desirability bias have reduced the viability of these research methods in assessing discrimination today. Using a field experiment, researchers can control for human capital and race and more closely examine the employer decision process. Thus, I argue that an audit study is well-suited to examine racial economic inequality among the college educated.

I conduct an audit study by matching candidate pairs and applying for jobs listed on a national job search website. In total, I apply for 1,008 jobs in three geographic regions in the U.S. to examine how race and college selectivity affect the likelihood of receiving an employer request via e-mail or phone for a job interview. Then, among those job candidates receiving

responses I analyze how race and college selectivity influence candidates' potential salary range and occupational type. The results suggest that higher education credentials do not equalize employment opportunities for blacks compared to whites, even among elite university graduates. Credentials from an elite university result in more call-backs for all candidates, but black candidates from an elite university only do as well as white candidates from a less selective university. Moreover, race results in a double penalty: when employers respond to black candidates it is for jobs with lower starting salaries and lower prestige than those of white peers. These racial differences suggest that a bachelor's degree, even one from an elite institution, cannot fully counteract the importance of race in U.S. society. Thus, both discrimination and differences in human capital contribute to racial economic inequality among the college educated.

## **BACKGROUND AND THEORY**

There is no denying that simply obtaining a college degree is beneficial. Individuals with a bachelor's degree earn nearly \$22,000 more per year and are less than half as likely to be unemployed than individuals with just a high school diploma (Baum, Ma, and Payea 2010). Moreover, expected lifetime earnings for bachelor's degree holders are 66% higher than for high school graduates (ibid). Racial inequality is prevalent for college graduates, as black men make approximately 75% of the wages of white men and black women make approximately 90% of the wages of white women (Bradbury 2002). In fact, racial differences in earnings (Cancio, Evans, and Maume 1996; Zhang 2008) and unemployment (Wilson, Tienda, and Wu 1995) are highest among bachelor's degree holders. This racial inequality incites a rich debate over whether the source is human capital differences (Farkas and Vicknair 1996; Heckman 1998; Neal and Johnson 1996) or employer biases and discrimination (Lucas 2008; Pager 2003, 2007a).

*Racial Inequality due to Differences in Human Capital*

Scholars in the human capital tradition argue that employers look to make the best possible investments when hiring employees. Among high school graduates, employers choose white over black candidates at higher rates due to differences in high school quality, curriculum, and other characteristics that are indicators of human capital (Farkas and Vicknair 1996; Heckman 1998; Neal and Johnson 1996; O'Neill 1990). These scholars often downplay the importance of racial discrimination; Nobel Prize-winning economist James Heckman has even called racial discrimination “the problem of an earlier era” (1998:102).

At the heart of this research is an effort to explain differences in outcomes based on a number of variables such as knowledge, IQ, effort, selection of major, and experience. Critics point out that these models fail to explain how employers determine applicants' abilities apart from their educational achievement and attainment or control for too many correlated variables without understanding how these characteristics shape each other (Tomaskovic-Devey, Thomas, and Johnson 2005). Recent research that attempts to more accurately model these processes finds racial differences in the return to education even after accounting for human capital (Alon and Haberfeld 2007; Tomaskovic-Devey, Thomas, and Johnson 2005).

College selectivity is one potential human capital explanation for racial inequality. If blacks have low attendance rates at the most selective colleges and employers value degrees from these colleges at high rates then inequality might reflect racial differences in educational credentials more than discrimination. The most selective colleges admit smaller percentages of black students than less selective colleges (Soares 2007:174-5) and black students are also much less likely than white students to attend and graduate from highly selective institutions (Alon and Tienda 2007; Bowen and Bok 1998; Carnevale and Rose 2003).

However, employers must place a higher value on educational credentials from selective institutions for this racial difference to manifest as economic inequality. Research on the aggregate effects of college selectivity is somewhat mixed. Comparisons of broad categorical classifications show some positive effects of college type on occupational status and income (Brewer, Eide, and Ehrenberg 1999; Monks 2000), while other results show that students at more selective colleges are more likely to graduate, more likely to attend graduate or professional programs, and earn higher wages (Alon and Tienda 2005; Bowen and Bok 1998; Brand and Halaby 2006; Brewer and Ehrenberg 1996). Social capital and institutional networks at elite schools also yield benefits to graduates (Mullen 2010; Rivera 2011).

Non-experimental data, though, is subject to potential bias due to the correlation between unobserved factors, such as student ability and motivation, that may influence both admission to selective colleges and outcomes such as graduation and wages (Dale and Krueger 2002, 2011; Gerber and Cheung 2008). Scholars using more sophisticated methodological techniques to address selection bias find mixed results about the effect of college selectivity. Black and Smith (2004) match similar individuals from different institutions using test scores and find that college selectivity has a positive effect on wages. Using a regression discontinuity design, Hoekstra (2009) finds that white men who barely made the admissions cut-off at a flagship state university experience 20% higher wages than white men who barely missed the admissions cut-off. Dale and Krueger (2002) use the College and Beyond Survey (C&B) to examine wage returns 15 years after graduation and find no effect of college selectivity when matching students based on institutions they were admitted to but did not attend. In a follow-up Dale and Krueger (2011) include an additional cohort and again find no effect of college selectivity on earnings after adjusting for selection. Additional research presents mixed conclusions on the existence and size of selection bias (Behrman et al. 1996; Brand and Halaby 2006; Long 2008).

Thus, it is somewhat unclear whether college selectivity has a causal effect on labor market outcomes. If racial differences in the *qualitative* aspect of educational credentials, i.e. college selectivity, explain racial economic inequality then establishing the effects of college selectivity are paramount. This leads to my first research question: (1) Does college selectivity affect labor market outcomes?

### *Racial Inequality due to Discrimination*

Research using a variety of methods has found evidence of racial discrimination at various stages of the labor market, particularly for low-wage job seekers. These studies have documented extensively the role of employer attitudes toward and opinions of blacks in reference to other racial groups (Kirschenman and Neckerman 1991; Moss and Tilly 2001; Waldinger 1997), the role of racially-targeted recruitment (Braddock and McPartland 1987; Moss and Tilly 2001; Kirschenman and Neckerman 1991), and racial differences in employment outcomes using experimental methods (Bertrand and Mullainathan 2004; Pager 2003, 2007a; Pager, Western, and Bonikowski 2009). Unfortunately, these studies do not reveal whether higher education credentials might reduce or enhance racial discrimination.

Explicit examination of labor market discrimination is an important but difficult endeavor for social science research. Although no one can argue against the merit of Title VII of the Civil Rights Act of 1968, which gives individuals the right to sue discriminatory employers, it appears to have made identifying discrimination more difficult while not eliminating it entirely. As Doug Massey states, “when pushed by the federal government to end overt discriminatory practices, [whites] are likely to innovate new and more subtle ways to maintain their privileged position in society.” (2007:54). Researchers are left with the methodological puzzle of adopting new ways to measure something that is no longer directly observed.

Pointed questions about discriminatory attitudes and beliefs are less valuable today than



they were decades ago. Research finds increasingly lower affirmative response rates to such questions (Bobo 2001; Schuman et al. 2001; also see discussion in Blank et al. 2004; Moss and Tilly 2001). One reason is the development of a social consciousness regarding such attitudes and beliefs, or social desirability bias (Pager and Quillian 2005). Instead of professing discriminatory beliefs, individuals today engage in “smiling” discrimination by presenting a public facade about non-whites and keeping their true opinions to themselves (Bonilla-Silva 2010). Additionally, although information collected from surveys on beliefs and attitudes can be important it says nothing of discriminatory actions (see Pager and Quillian 2005).

Thus, many scholars have relied on statistical residuals to examine discrimination. Discrimination is assumed when there is an otherwise unexplainable difference in outcomes between whites and non-whites on a dependent variable (Lucas 2008). Often, scholars must account for as many important variables as possible and defend the residual as an estimated effect of discrimination based on observables. This method is hindered by a number of serious problems including omitted variable bias, sample selection bias, and inadequate measurement of cumulative discrimination effects, among others (Blank et al. 2004; Farkas and Vicknair 1996; Jones and Kelley 1984; Lucas 2008; Quillian 2006). Omitted variable bias can lead to improper attribution of the residual to the effect of discrimination. For example, if human capital is not adequately measured and there are mean differences in human capital between whites and blacks, the effect of the omitted variable (human capital) is incorrectly attributed to discrimination. Residual attribution presents uncertainty, so some researchers have turned to field experiments, particularly audit studies, arguing that these methods represent a vast improvement over standard observational models in examining discrimination.

Racial differences in economic outcomes may manifest among bachelor’s degree holders even with credentials from the same university. Research finds a mix of larger positive effects

(Dale and Krueger 2011; Loury and Garman 1995), no differential effects (Long 2010; Monks 2000), or smaller positive effects (Cooper and Cohn 1997) of college selectivity on wages for blacks compared to whites. Other scholars have found that those who are least likely to attend college receive the largest economic benefits from college (Brand and Halaby 2006; Brand and Xie 2010). This observational research makes it unclear if racial discrimination occurs among bachelor's degree holders and whether college selectivity affects any potential racial discrimination. These issues lead to my next two research questions: (2) Does race affect labor market success among bachelor's degree holders? and (3) Do race and college selectivity have an interactive effect on labor market success?

#### *Using Audit Studies to Examine Labor Market Outcomes*

An audit study is a field experiment that matches two individuals with nearly identical characteristics to participate in a test of some outcome. Audit research began with in-person examinations of housing discrimination in the 1970s (see Yinger 1995) but audits have evolved to include correspondence by mail and computerized (online correspondence) versions. In each variation of the audit method, careful sampling and randomization of certain components along with matching on all important criteria between auditors allows researchers to properly attribute differences in outcomes. The audit method has grown in popularity, particularly to examine racial discrimination, with the rise of online applications for housing and employment. In recent years, sociologists, economists, and political scientists have implemented creative and influential computerized audit studies (e.g. Ahmed and Hammarstedt 2008; Butler and Broockman 2011; Hogan and Berry 2011; Lauster and Easterbrook 2011; Tilcsik 2011).

In-person audits require human assistants, known as auditors or testers, to drop off resumes, talk to other individuals, or otherwise participate in the process. Although some scholars praise the in-person technique, it is not without its critics (Heckman 1998; Heckman and

Siegelman 1993). Topping the list of critiques is that researchers are unable to control for important characteristics that may differ between individuals, such as delays in speech, differences in poise, etc.; in other words, differences in characteristics that employers can witness but the researcher cannot. By removing the human element of the audit, researchers alleviate many of these problems.

Although in-person audits use personal appearance to convey race, correspondence and computerized audits must rely on written information to convey race. Research often uses racialized names, but scholars have raised concerns that these names may conflate race and social class and bias the results (Fryer and Levitt 2004; Pager 2007b). Despite some ex post facto examination, no research has incorporated race and social class of names directly into the design stage of the study.

It is also important to note that the choice of audit method type must align with standard practices in the real world. For instance, audits of the low-wage labor market require an in-person method because these jobs are not traditionally listed online. By contrast, a broad range of jobs targeted toward the college-educated often require candidates to apply online. A computerized audit study closely mimics the real experiences of college-educated job seekers today as employers are increasingly less likely to accept job applications in-person or by mail.

## **DATA AND METHODS**

Between March and August of 2011, I conducted a computerized audit study following four general steps (detailed below): I (1) created a series of candidate profiles varying race, gender, social class, college selectivity, and college major, (2) carefully matched candidate profiles, (3) selected and applied to jobs in three geographic regions in the U.S., and (4) recorded employer responses. In total, I applied to 1,008 jobs (2,016 data points) through a major national job search website.

*Creating Candidate Profiles – College Selectivity, Race, and Social Class*

To examine college selectivity, I selected elite universities that ranked highly in both the U.S. News and World Report and Baron's rankings and paired them with a nationally ranked but less selective university ranked below the elite university (U.S. News and World Report 2011). The pairs I used were: (1) Harvard and University of Massachusetts – Amherst, (2) Stanford and University of California – Riverside, and (3) Duke and University of North Carolina – Greensboro.<sup>1</sup>

To select names I obtained data from the New York State Department of Health on births during the early 2000s that list the total number of births by (1) name and race and (2) name and mother's education. I searched for first names with at least 50 births per year in the state and at least 75% born to mothers of one particular race (black or white). I then chose names from this list that were similar on mother's education to select three names for each race and gender combination representing three tiers of education levels (upper, middle, and lower). In total, I used 12 different names: Jalen, Lamar, DaQuan (black/male), Nia, Ebony, Shanice (black/female), Caleb, Charlie, Ronny (white/male), Aubrey, Erica, and Lesly (white/female). I then selected last names using frequently occurring surnames from the 2000 Census which were approximately race neutral (U.S. Census Bureau 2008) (see Appendix Tables A1 and A2 for more information on first and last names respectively).

There are still potential shortcomings from using these names. First, names in New York may not be representative of the U.S. population. To limit the impact of differences between New York and national naming patterns, I chose to reject any obvious immigrant or black Muslim names. Second, the timing of the names data is not perfectly aligned as individuals graduating from college in 2011 were born around 1989. Although the social class or racial

naming patterns with these 12 names may have changed over a decade, data limitations prevent me from exploring this issue.<sup>2</sup>

*Creating Candidate Profiles – Resumes, Cover Letters, and Other Information*

To create candidate resumes, I combined elements of actual resumes used by job seekers prior to data collection. I used two style templates to create resumes (each candidate could be assigned either template but each job had two applicants with different templates), entered the candidate information, and instituted random assignment across pertinent variables.

I created two basic resumes each with a short objective statement, 4-5 activities in student organizations with two leadership roles, a list of skills, and an employment history. Each list of activities comes from real organizations on each campus and was matched as closely as possible across campuses. The skills come from those frequently listed on other resumes and match with skills used or reasonably attained in the specified employment history. Finally, each candidate's employment history included work in one typical part-time student job (e.g. salesperson, wait staff) and one internship position using real employers with offices in every region. The total time of employment across candidates is the same.

To examine additional human capital differences<sup>3</sup> that may contribute to differences across race and gender in observational studies, I used two possible college majors for each resume: economics and psychology. Each of these majors is one of the top choices by gender for men and women respectively (Altonji, Blom, and Meghir 2012; Carnevale, Strohl, and Melton 2011). Furthermore, these majors provide general knowledge and skills that can be used to apply for a broad range of jobs.

I then created two different cover letters for assignment to each candidate. The overall content of each cover letter was the same, but I altered the specific words, phrases, and order. Each cover letter contained information on college courses, leadership experience, skills, and an

explanation that the candidate had recently relocated from their college town to a residence local to the employer. Finally, I randomly assigned cover letters prior to the job application process so that a matched pair never used the same cover letter.

For each candidate/school combination, I obtained a unique telephone number with a local area code and a voice mailbox using Google Voice, a Google e-mail account, and a mailing address. Individuals matching the race and gender of the candidate recorded identical outgoing voicemail messages apart from the candidate's name. Because employers might be aware of differences in rental prices in local areas, I used Google to investigate apartments and select an address for each candidate (also adjusted for cost of living across regions).

### *The Matching Procedure*

An advantage of the audit method is that a researcher is able to isolate the difference on a single characteristic between testers in a matched pair to examine the effect of that characteristic on an outcome. Critics are skeptical and suggest that a variety of unmeasured differences may exist between testers and matches between testers with only one single difference may inflate the importance of that difference on the outcome (Heckman and Siegelman 1993). Although it is impossible to know with absolute certainty that there are no *unmeasured* differences between testers, prior audit studies have both intentionally and unintentionally examined two *measured* differences between testers in a matched pair (e.g. Ahmed and Hammarstedt 2008; Bertrand and Mullainathan 2004).

In this study, a number of conditions led me to simultaneously vary two characteristics while matching within pairs. To examine differences in college selectivity as the singular difference, I would need to simultaneously hold race, gender, and social class constant within pairs. However, the nature of the measurement of these variables would require that candidates have the same first name. Employers likely would be more suspicious of two applications

received within days of each other with the same distinctive names, possibly eliminating both candidates from consideration. To examine differences in race as the singular difference, I would need to simultaneously hold college selectivity, gender, and social class constant within pairs. This also creates a problem because employers likely would be more suspicious of two applications received within days of each other from candidates with the same degree from the same college (particularly the elite schools). Results from a pilot study confirm that these options increase the likelihood of experiment discovery and bias the results by reducing the overall sample size in an unmeasurable way.<sup>4</sup> Because race and college selectivity were my leading variables of interest in this research and I wanted to examine differences within pairs for at least one of these variables, I chose to simultaneously vary *both* characteristics within pairs. Within pairs, I made matches on the basis of gender, social class, major, and region. Comparisons on race and college selectivity match black candidates with an elite degree against white candidates with a less selective degree and black candidates with a less selective degree against white candidates with an elite degree. Table 1 shows the basic pairs.<sup>5</sup>

This design is very similar to the traditional design of a factorial experiment as all two-by-two combinations are represented in the data (Gonzalez 2009). However, unlike the traditional experimental design, audit studies derive overall effects from a combination of within-pair and between-pair effects.<sup>6</sup> Traditional experiments randomly assign individuals to either a treatment or control condition and examine all individuals on the same outcome measure. Audit studies take a similar form but often include random assignment of pairs to social actors or situations which then form the basis of the outcome measure. For example, housing audits randomly assign pairs to real estate agents and employment audits randomly assign pairs to employers. No single real estate agent or employer creates the outcome measure for more than one pair. Thus, between-pair effects can be properly estimated only when the researcher

randomly selects pair assignment during the outcome phase and require that no significant differences across these social actors or situations exist (also see Pager 2003, p 957). Although the estimates obtained from between-pair comparisons are less efficient than within-pair comparisons, the results are unbiased if random assignment occurs in the outcome phase.

Thus, by examining a combination of within-pair and between-pair effects with random assignment of employers to matched pairs, this research closely approximates a similar design to using four candidates per job (black/elite degree, black/less selective degree, white/elite degree, white/less selective degree) but without the limitations and ethical concerns discussed above and in footnote 4 respectively. An additional advantage of this design is that employers do not have to focus on a single small difference between two candidates (a critique of audit studies from Heckman and Siegelman 1993). It is highly unlikely that employers in real world scenarios ever have to make the unrealistic choices that the typical matched pair process requires of them, potentially inflating the estimates of characteristics such as race in prior audit studies.

#### *Selecting and Applying to Jobs*

For two separate weeks during May and June 2011, I used a programming script that I created in Ruby on Rails to query the employment website and download all posted jobs in the cities in my three selected regions that fit the following search criteria: college degree (BA) required, listed as “entry level” or “student”, posted in the past 30 days, and located in a 50 mile radius of the cities. I then eliminated any jobs that required the applicant to leave the website and apply at an external site and those that required specialized degrees or training (e.g. nursing, engineering, etc.). The script saved the data into a text file and the HTML file for each job listing. This became the sampling frame for each region. In each sampling frame I generated a random number for each job, ordered them, and kept the first 336 jobs to create my three



samples across regions. With the jobs randomly ordered on the basis of any pertinent variables, I assigned pair IDs (see Table 1) to each job and split the application order across pairs.

Once I matched jobs and candidates for a particular geographic region, I applied for 240 jobs (2 candidates per job) in each home region (e.g. Boston and New York City for Harvard and UMass graduates) and 96 jobs in one of the two outside regions (e.g. Los Angeles and San Francisco). I implemented a 24 hour delay between the first and second applications to reduce the chance of employer discovery. In total I applied for 1,008 jobs (2,016 data points). I then waited for ten weeks after the submission of each application for employers to make decisions and respond to candidates before concluding the data collection phase.

### *Descriptive Results*

Table 2 shows descriptive statistics for the candidates by order of application. There is an attrition rate of 5.6% due to employers removing a job advertisement before one or both candidates could apply for the job. Of the 952 successful candidate pairs submitted, there are equal numbers of white and black candidates and of those with a degree from an elite college and those with a degree from a less selective college. The remaining variables differ between pairs so some characteristics are not evenly divided due to attrition.

Employers responded to job applications from candidates in one of three ways: email, phone, or both.<sup>7</sup> Employers used email to solicit additional information or setup a time for a phone or in-person interview. When employers called candidates, they almost always requested an interview. Generally, emails were less urgent and represented an additional interim stage before a phone call (e.g. “Please fill out this questionnaire if you wish to still be considered for this position.”) while phone calls were more urgent and represented a more advanced stage in the process than emails (e.g. “We would love to hear back from you as soon as possible with a time that works best for you.”). Occasionally, employers responded to all candidates via an

automated generic email that did not indicate a definitive interest in that particular candidate.<sup>8</sup>

As Table 2 shows, the average response rates were 7.4% by email, 8.2% by phone, 3.5% by both, and 12.1% total. There are no significant differences in the response rates between first and second application submissions.

Table 3 shows descriptive statistics for the job advertisements by application set. Set 1 refers to a black candidate with an elite degree and a white candidate with a less selective degree (Pair IDs 1-12 from Table 1); set 2 refers to a white candidate with an elite degree and a black candidate with a less selective degree (Pair IDs 13-24 from Table 1). Each job advertisement or employer received applications from only one pair, creating a different sample of jobs for each set. However, as the table shows, the different sets did not apply for significantly different types of jobs in respect to occupational category, listed salary ranges, or by rate of attrition. The sample of jobs each set applied to are approximately 23% sales, 17-19% customer service, 15% administrative assistant, 9-10% analyst, 8-9% clerical, 5-6% human resources, 5% managerial, and 13-16% other categories. Set 1 applied for jobs with listed starting salary ranges averaging between \$31,000 and \$37,600 and set 2 applied for jobs with listed starting salary ranges averaging between \$31,800 and \$37,900. Finally, the attrition rates are similar; 6.2% of job advertisements for set 1 and 5.0% for set 2.

### *Methods of Analysis*

For simple bivariate analyses, I use a two-tailed paired t-test to test for significant differences within pairs from the same sample (Kutner, Neter, Nachtsheim, and Li 2004). However, to examine between-pair effects I use a less efficient estimator because the sample and sample size varies between the two groups. The Welch's t-test is appropriate with two independent samples of unequal sample size and unequal variance (ibid):

$$t = \bar{x}_1 - \bar{x}_2 / (\sqrt{(s_1^2/n_1 + s_2^2/n_2)}) \quad (1)$$

Although these basic significance tests are appropriate for measuring the differences across characteristics both within and between pairs, a logistic regression equation predicting odds-ratios provides more intuitive results. Additionally, a logistic regression controls for all observed characteristics, returns estimates that are weighted based on the small differences due to attrition, and allows for cluster-corrected standard errors at the employer level:

$$\text{logit}(p_i) = \alpha_i + \beta_1 CS_i + \beta_2 R_i + \beta_3 SC_i + \beta_4 G_i + \beta_5 M_i + \beta_6 RE_i + \beta_7 X_i + u_i + e_{ij} \quad (2)$$

In the equation above,  $\alpha_i$  is the individual-level intercept, the  $\beta$  coefficients 1-6 represent the coefficients for college selectivity, race, social class, gender, college major, and region, respectively,  $X_i$  represents a vector of control variables,  $u_i$  is the individual-level error term, and  $e_{ij}$  is the employer-level error term.

Among only those candidates who receive responses for jobs that include a listed salary range, I run OLS regression models to examine differences in these listed salaries:

$$Y_i = \alpha_i + \beta_1 CS_i + \beta_2 R_i + \beta_3 SC_i + \beta_4 G_i + \beta_5 M_i + \beta_6 RE_i + \beta_7 X_i + u_i + e_{ij} \quad (3)$$

In the equation above,  $Y_i$  is one of three possible variables that captures information about the salary range: the lowest listed value in the range, the mean of the range, or the highest listed value in the range. I run three separate regressions, one for each possible listed salary outcome variable.

Finally, among only those candidates who receive an employer response, I run logistic regression models predicting whether the response is for an analyst or managerial job versus all other jobs:

$$\text{logit}(p_i) = \alpha_i + \beta_1 \text{CS}_i + \beta_2 \text{R}_i + \beta_3 \text{SC}_i + \beta_4 \text{G}_i + \beta_5 \text{M}_i + \beta_6 \text{RE}_i + \beta_7 \text{X}_i + u_i + e_{ij} \quad (4)$$

## RESULTS<sup>9</sup>

### *Employer Responses by College Selectivity and Race*

Figures 1 and 2 show the bivariate results of employer responses by the two main characteristics of interest: college selectivity and race. Each figure shows three sets of bars: the response percentage separately by email and phone and the total response percentage.<sup>10</sup>

First, Figure 1 shows that candidates with a degree from an elite college receive more email responses than candidates with a degree from a less selective college at a rate of approximately 1.4 to 1 (8.7% vs. 6.1%). This difference is larger when examining phone responses from employers: 1.9 to 1 (10.7% vs. 5.7%). The results examining either an email or phone response (total response) from employers show that candidates with a degree from an elite college are 1.7 times as likely to get any response as candidates with a degree from a less selective college (15.2% vs. 8.9%). In all cases, a two-tailed Welch's t-test shows that the differences in means are statistically significant ( $p < 0.05$  for email;  $p < 0.001$  for phone and total responses).

Figure 2 reports employer responses for white versus black candidates. White candidates receive more email responses than black candidates at a rate of approximately 1.4 to 1 (8.7% vs. 6.1%) and more phone responses at a rate of approximately 1.6 to 1 (10.0% vs. 6.4%). For total responses from an employer, white candidates are 1.5 times as likely to get a response as black

candidates (14.5% vs. 9.7%). These results are significantly different between the two racial categories ( $p < 0.05$  for email;  $p < 0.01$  for phone and total responses).

These results tentatively suggest that both educational credentials and race are important; both have strong relationships with the rate of employer responses. Due to the small differences in attrition across the two samples of job advertisements, it is important to examine logistic regressions predicting employer responses. The results of these models, shown in Table 4, closely match those of the bivariate figures and suggest that race and college selectivity are statistically significant. Compared to whites, blacks are 62.8% as likely to receive any type of employer response. Candidates with a degree from an elite college are 184.1% as likely as candidates with a degree from a less selective college to receive any type of employer response.

Overall, these results suggest that employers strongly value a degree from an elite college but also discriminate against candidates with black names. An additional area of inquiry is how these variables work together. For instance, can black candidates close the gap in employer responses with white candidates when they have a degree from an elite college over a degree from a less selective college?

In Figure 3 I examine total employer responses across race and college selectivity.<sup>11</sup> These results suggest a tiered pattern of responses: white candidates with a degree from an elite college have the highest response rate (17.5%), followed by black candidates with a degree from an elite college (12.9%) and white candidates with a degree from a less selective college (11.4%)<sup>12</sup>, and finally black candidates with a degree from a less selective college have the lowest response rate (6.5%).<sup>13</sup> In other words, a white candidate with a degree from an elite college can expect an employer response for every 6 resumes submitted, while an equally qualified black candidate must submit 8 resumes to receive a response; white candidates with a

degree from a less selective college need to submit 9 resumes to expect a response, while a similar black candidate needs to submit 15 resumes to receive a response.

In other logistic regression models (available upon request), I explore potential interaction effects of race and educational credentials. Although the interaction effect of black candidate and degree from an elite college is positive in multiple model specifications, it is never statistically significant. Thus, compared to white candidates, black candidates do not gain more or less from a degree from an elite college over a degree from a less selective college. In other words, the effects of race and college selectivity are additive but not interactive.

*Listed Salary Range of Jobs by College Selectivity and Race*

In the previous section I examined the effects of educational credentials and race on employer response rates. But, as this section will show, the effects extend to more than just how many responses a candidate receives. Candidates are sorted through a system that restricts their opportunities in multiple ways. Two additional pieces of information in the job advertisements are the dependent variables of interest in the following sections: the listed salary range and the occupational category of each job.

When employers post a job advertisement on the website, they include a variety of information to attract job candidates. In 289 cases in my completed sample (30.4% of the job advertisements), employers included some information about the salary range. As previously mentioned, I created three variables for listed salary: low, mean, and high values from each job advertisement with means of approximately \$31,400, \$34,600, and \$37,800 respectively (see Table 3). Among those candidates who receive any type of response from an employer, 93 cases come from a job advertisement with a listed salary range (40.4% of the responses).<sup>14</sup>

Table 5 reports the effects of candidate and application characteristics on these salary ranges from three OLS regressions.<sup>15</sup> Using the low salary variable (model 1) I find that black

candidates receive responses for jobs that have a listed salary \$3,071 lower than white candidates. Candidates with a degree from an elite college receive responses for jobs that have a listed salary \$2,601 higher than candidates with a degree from a less selective college. In models 2 and 3, I find similar results when the outcome is mean or high salary but the coefficient for black candidate is no longer significant in model 3.

The results from Table 5 suggest that black candidates face a double penalty of discrimination in the labor market. Not only are they less likely to receive a response than white candidates, but the jobs that are potentially available to them are listed with ~10% lower starting salary ranges. Conversely, candidates with a degree from an elite college get a double bonus from their educational credentials in the labor market in the forms of more responses and 8-13% higher listed salary ranges.

#### *Occupation Type by College Selectivity and Race*

The previous sections suggest that the inequality of opportunities in the labor market is a layered process. One final way to analyze this process is by examining the differences in occupational categories of job advertisements for which candidates receive employer responses. Although there are a number of ways to quantify the “best” occupational categories from among those in the sample, I use three criteria: educational credential requirements, listed salary range, and occupational prestige. All of the job advertisements in my sample require a college degree but two occupational categories more consistently list this requirement than others: analyst and managerial. Moreover, these two occupational categories have higher average listed salary ranges and occupational prestige than other categories.<sup>16</sup> I deem these two occupational categories “high value” and compare responses against all other categories. 142 of the 952 job advertisements (14.9%) are for high value occupations.

To examine any differences in responses for high value occupations due to educational credentials or discrimination, I run logistic regressions predicting whether an employer response is for a high value occupation or not. This sample only includes candidates who receive any type of employer response. Table 6 shows the results from these regressions. In the first model, I find that black candidates are only 56.1% as likely as white candidates to receive a response for a high value occupation vs. other occupations. No other variables of note are statistically significant, including the coefficient for a degree from an elite college. Similar to prior analyses, in model 2 I control for both applicants received a response and find no significant changes in the effects across models. In other words, one out of every four responses for a white candidate was for a high value occupation while one out of every six responses for a black candidate was for a high value occupation. These results confirm an additional layer of inequality of opportunities for black candidates in the labor market.

#### *Employer Sentiment about Elite Schools*

Beyond employer contact with candidates, employers also exchanged internal emails amongst themselves. In thirteen cases, employers accidentally included candidates on correspondence that was intended for other employees of the company, presumably in the human resources department. Most of these emails were forwarded versions of the brief email with limited candidate information that is sent to employers notifying them of a new application. Typically, the sender included a sentence indicating that the intended recipient should examine a particular candidate. In five cases these messages, in an excited or urgent tone, explicitly mentioned the institution from which a candidate held a degree:

“ok, she had me at Stanford. Eat our dust [competitor].”

“forget the others: HARVARD GRAD”



“Kids coming out of Duke are by far the most capable. Push this one to the top of the list.”

“Harvard guy wants to work for us!”

“We had a real bright app pop up this morning – Stanford grad with great credentials.”

These accidental emails provide some limited qualitative insight into the importance employers place on a degree from an elite college. In zero of the thirteen cases did an employer explicitly mention one of the less selective college, race, gender, or any other characteristics. Thus, it is likely that the signal of an elite credential is at the forefront of employers’ minds.

## **DISCUSSION**

With higher education credentials becoming more common in the labor market, examining labor market outcomes among individuals with a college degree is critical to understanding education's role in reducing or exacerbating inequalities. Yet prior research has failed to adequately address how much the qualitative differences in educational credentials affect success in the labor market, particularly early in an individual’s career when employers have limited information about applicants other than their educational credentials. Additionally, although research indicates that there are racial differences in the qualitative aspects of educational credentials and these differences likely have important implications in the labor market, researchers often are unable to capture these variables in models of economic inequality. Human capital theory suggests that college selectivity is a major reason for racial differences in employment outcomes while other scholars cite continued racial discrimination as an independent cause.

One of the primary goals of this study was to examine the effects of college selectivity on early stage job market outcomes for recent college graduates to add clarity to the debate on the importance of human capital among the college educated. The results suggest that a degree from an elite college increases the likelihood that an employer will respond to a job application with an offer for an interview and those responses are for jobs with higher listed salaries. Human capital, operationalized as college selectivity, clearly matters in the job market. Since whites are more likely than blacks to have a degree from an elite university (Alon and Tienda 2007; Carnevale and Rose 2003), at least part of the economic inequality based on race can be attributed to differences in human capital or qualitative differences in educational credentials.

The other side of this debate about inequality, the side that suggests discrimination still plays a large role, also is not wrong. The findings from this audit study show that black candidates have a much lower likelihood of an employer responding to a job application. Additionally, when black candidates receive responses, they are for jobs with lower listed salaries and less often for managerial or analyst jobs. Just as employment audit studies have uncovered racial discrimination in the low-wage labor market (Pager 2003; Pager, Western, and Bonikowski 2009), I find significant evidence of racial discrimination in a section of the labor market that demands highly educated employees.

The opportunities that arise upon graduation from an elite college are not equal between whites and blacks. Although there is clearly a premium to a degree from an elite university over a less selective university for both white and black candidates, black candidates still lag behind white candidates in employer responses. Surprisingly, there is no interaction effect between race and college selectivity; the black-white gap in employment outcomes is similar between candidates with a degree from an elite college and candidates with a degree from a less selective college. The results presented here suggest a different picture than the romanticized idea of the

U.S. as a post-racial society as well as the notion that education is the great equalizer. On a number of quantitative and qualitative aspects, blacks are at a disadvantage compared to their white peers. While both whites and blacks can alter their educational trajectories to improve the name of the institution on their college degree, blacks can never shed the penalty of race and catch up to whites.

This research has important implications for the current debate regarding affirmative action in higher education. Using data prior to statewide bans on affirmative action, researchers have estimated that minority enrollment at highly selective public universities nationwide would drop without affirmative action policies (Bowen and Bok 1998; Espenshade and Chung 2005). Other studies have found that after California, Texas, and Washington implemented bans on affirmative action, state universities systems began to look even more like a racially stratified system with whites and Asians at the highly selective flagship universities and blacks and Hispanics at less selective universities (Brown and Hirschman 2006; Card and Krueger 2005; Long 2007). Thus, eliminating affirmative action in higher education would likely guarantee that fewer black students would attend and graduate from highly selective public universities and also lead to increased racial inequality in employment and wages between whites and blacks.

Unfortunately, one significant shortcoming of audits is the inability to follow through with the entire employment process. In this case, I do not follow-up with employers after their initial contact and cannot see how the sorting process would play out to the job offer stage. It is unclear once employers meet a candidate face-to-face how they might respond to the race of a candidate with both actual offers of employment and salary. Likely, some employers do not pick up on the racial cues from an individual's name and the levels of discrimination reported here might be underestimated. This study, however, presents a clear picture of the opportunity structure for candidates up until the final sort. Educational credentials play a large role, as

candidates with a degree from an elite college secure additional opportunities through interviews for jobs that have higher listed salary ranges even after controlling for the types of jobs for which they receive responses. Racial discrimination is also vastly important in the labor market, as black candidates face diminished opportunities beyond their lower response rates in the form of lower potential salaries and lower value jobs. Thus, even if we assume that black candidates and candidates with a degree from a less selective college simply worked harder and applied to many more jobs than their counterparts, inequality would still pervade the labor market.

It is unclear how much the computerized audit method and using only an online national job search board to apply for jobs affect the results. The overall effects of college selectivity estimated here are likely conservative. Previous research finds that some benefits of attending a highly selective institution come through the social capital and networks made available from those institutions (Rivera 2011). These effects are likely not captured through an audit as applicants apply with no prior contact with employers through such networks. Social capital may not only increase any main effects of college selectivity but also potentially exacerbate any racial differences. However, Dale and Krueger (2011) suggest that social capital might be the reason why they find positive effects of college selectivity for minorities and low-income origin students in their observational data. Future research should further explore these possibilities.

Alternatively, if employers using the website do not often see candidates with a degree from an elite college in their applicant pool, these results may be overstated compared to the effect of college selectivity across all hiring processes. Two studies suggest this may be an undue concern. First, a recent survey of companies found that 25% of new hires came from national job search boards and nearly all surveyed companies attributed at least one hire in 2010 to the website used in this audit (Crispin and Mehler 2011). Additionally, data from 2006 found that 62% of individuals between 18-28 years old used the internet for job searches, a figure that

had almost certainly increased by the time of this data collection (Brown 2008). Although the likelihood of using the internet for a job search is positively correlated with education, there is no significant relationship with race (ibid).

Another limitation of this study is that I cannot attribute the effect of educational credentials to a specific mechanism, whether human or cultural capital. As stated above, social capital as a mechanism has been effectively ruled out. Employers privilege candidates with a degree from an elite college, as evidenced by the quantitative results and other qualitative email responses, but it is unclear if employers do so because they believe these candidates have obtained adequate knowledge and skills or because they believe these candidates come from the proper social background. Future research could gain traction on these mechanisms with more in-depth qualitative analysis (see Rivera 2012 for one such recent study in the context of elite firms).

A final point is that this study is somewhat circumscribed by time, location, and the chosen set of universities, so it is difficult to compare this study with prior work on educational credentials in the labor market. Although the results differ from some of the most recent and methodologically advanced survey research on college selectivity, prior research has focused on the employment outcomes of older cohorts of college graduates later in their careers. Both of these time variables may play a role in the differences in findings but we cannot be certain whether differences in qualitative aspects of educational credentials matter more now than in previous years because of quantitative changes in educational credentials, or if qualitative aspects of educational credentials simply matter less later in an individual's career. Moreover, differences in the outcomes measured could be to blame, because research on how job interviews translate to actual job offers and wages is limited (although see Petersen, Saporta, and Seidel 2000; Barron, Bishop, and Dunkelberg 1985). Finally, during the data collection labor market

conditions were tight and unemployment was still somewhat high nationwide, potentially giving employers more power and thus providing a high-end estimation of effects.

This research addresses a number of gaps in our knowledge concerning horizontal stratification and racial inequality and raises a number of important issues. The results suggest that other scholars should be more cautious when measuring college education as one category of a variable. Although this research only tests employment outcomes at the entry-level stage, college selectivity may be important at other stages of employment and for other outcomes. Furthermore, education, even an elite education, does not erase racial inequality during the preliminary stages of the employment process. Other research finds that overall racial inequality in the labor market increases over the career and is typically lowest at the point of entry into the labor market, suggesting that future research should examine whether graduating from an elite university may help to attenuate or exacerbate inequalities over time (Tomaskovic-Devey, Thomas, and Johnson 2005). The present findings stand to potentially improve racial economic inequality by drawing media and employer attention to the stark racial differences in employment prospects among individuals with the same college degree. Overall, this research contributes to our theoretical and empirical understanding of the possibilities and limits of education in reducing social inequality.

## NOTES

1. The exact National University Rankings from the U.S. News and World Report are: (1) Harvard, (5) Stanford, (10) Duke, (94) UMass-Amherst, (97) UC-Riverside, and (190) UNC-Greensboro.
2. However, in other work I conduct survey experiments and find that individuals are consistently accurate in classifying race for these particular names (see *Author-redacted* 2014).
3. One additional potential human capital difference is GPA. Each resume includes a GPA based on the requirements listed for graduation with honors (cum laude) for each school. Thus, GPA does not vary within school.
4. Additionally, simply sending more than two applications to a single employer compounds this problem and increases the amount of time a single employer must spend reviewing applications, raising additional ethical concerns. Experiment discovery by employers introduces other ethical concerns such as termination or other economic harm of individual employees involved in the audit (see *Author-redacted* 2013 for more).
5. Additional variables that were important in the design process but not of interest in this analysis include cover letter type, resume template, employment history, and application order. I varied these equally across pairs.
6. Audit studies often do not include clear language on the differences in these effects. Within-pair effects are directly observed because the characteristic differs within matched pairs of two or more testers. Between-pair effects are indirectly observed because the characteristic differs between pairs of two or more testers.
7. Additionally, I calculate total response rates (either email OR phone).
8. I verified these by sending a third test application with credentials that indicated they were not qualified for the posted job. When the third candidate received the same response, I did not count any of these as a “true” employer response in the data.
9. Although response rates vary somewhat by social class, gender, college major, and region, detailed examination of those results is beyond the scope of this article. Both the design of the audit method and the logistic regression models control for these characteristics to avoid biased coefficients.
10. The total response percentage does not equal email plus phone because some employers responded by both email and phone.
11. In two cases (i.e. white candidates with a degree from an elite college vs. black candidates with a degree from a less selective college and black candidates with a degree from an elite college vs. white candidates with a degree from a less selective college) I use a two-tailed paired t-test because it is a direct comparison of matched pairs. In the other two cases I use a two-tailed Welch’s t-test because it compares cases across different job samples.
12. These two categories are never statistically different across any employer response type.
13. The differences between white candidates with a degree from an elite college and all other candidates are statistically significant ( $p < 0.05$  for black candidates with a degree from an elite college;  $p < 0.01$  for white candidates with a degree from a less selective college;  $p < 0.001$  for black candidates with a degree from a less selective college). The differences between black candidates with a degree from a less selective college and all other candidates are statistically significant ( $p < 0.01$  for white candidates with a degree from a less selective college;  $p < 0.001$  for white candidates with a degree from an elite college and black candidates with a degree from an elite college).

**14.** I test for differences across job advertisements that include salary information and those that do not. There are no significant differences between these types of job advertisements in terms of region or occupation type (results available from author upon request).

**15.** The models presented here include dummy variables for the occupational categories of each job because both salaries and responses for different categories are correlated with occupational categories. Without this control, the coefficients for a black candidate are larger in size and the coefficients for a candidate with a degree from an elite college remain largely unchanged (results available from author upon request). This suggests that the type of job for which black candidates receive responses accounts for some of the difference in listed salaries. However, candidates with a degree from an elite college appear to receive responses for higher salary jobs regardless of what type of job it is.

**16.** From the National Opinion Research Center's 1989 Occupational Prestige Scores. Although sales also has a higher than average listed salary range the range has significant variation and sales jobs generally have low occupational prestige.



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**Table 1. Basic Matching Procedure**

ID	A1 Race	A1 College	A1 Gender	A1 Social Class	A1 Major	A2 Race	A2 College	A2 Gender	A2 Social Class	A2 Major
01	White	LS	Male	Upper	Econ	Black	Elite	Male	Upper	Econ
02	White	LS	Male	Upper	Psych	Black	Elite	Male	Upper	Psych
03	White	LS	Male	Mid	Econ	Black	Elite	Male	Mid	Econ
04	White	LS	Male	Mid	Psych	Black	Elite	Male	Mid	Psych
05	White	LS	Male	Low	Econ	Black	Elite	Male	Low	Econ
06	White	LS	Male	Low	Psych	Black	Elite	Male	Low	Psych
07	White	LS	Female	Upper	Econ	Black	Elite	Female	Upper	Econ
08	White	LS	Female	Upper	Psych	Black	Elite	Female	Upper	Psych
09	White	LS	Female	Mid	Econ	Black	Elite	Female	Mid	Econ
10	White	LS	Female	Mid	Psych	Black	Elite	Female	Mid	Psych
11	White	LS	Female	Low	Econ	Black	Elite	Female	Low	Econ
12	White	LS	Female	Low	Psych	Black	Elite	Female	Low	Psych
13	White	Elite	Male	Upper	Econ	Black	LS	Male	Upper	Econ
14	White	Elite	Male	Upper	Psych	Black	LS	Male	Upper	Psych
15	White	Elite	Male	Mid	Econ	Black	LS	Male	Mid	Econ
16	White	Elite	Male	Mid	Psych	Black	LS	Male	Mid	Psych
17	White	Elite	Male	Low	Econ	Black	LS	Male	Low	Econ
18	White	Elite	Male	Low	Psych	Black	LS	Male	Low	Psych
19	White	Elite	Female	Upper	Econ	Black	LS	Female	Upper	Econ
20	White	Elite	Female	Upper	Psych	Black	LS	Female	Upper	Psych
21	White	Elite	Female	Mid	Econ	Black	LS	Female	Mid	Econ
22	White	Elite	Female	Mid	Psych	Black	LS	Female	Mid	Psych
23	White	Elite	Female	Low	Econ	Black	LS	Female	Low	Econ
24	White	Elite	Female	Low	Psych	Black	LS	Female	Low	Psych

Note: A1 = applicant 1, A 2= applicant 2, LS= less selective. These 24 pairs represent the total set of candidate pairs that applied to jobs across the three regions.

**Table 2. Applicant Descriptive Statistics**

	Applicant 1		Applicant 2		Total	
	N	% (mean)	N	% (mean)	N	% (mean)
White	469	49.3%	483	50.7%	952	50.0%
Black	483	50.7%	469	49.3%	952	50.0%
Elite College	482	50.6%	470	49.4%	952	50.0%
Less Selective College	470	49.4%	482	50.6%	952	50.0%
Male	475	49.9%	475	49.9%	950	49.9%
Female	477	50.1%	477	50.1%	954	50.1%
Upper Class	322	33.8%	322	33.8%	644	33.8%
Middle Class	309	32.5%	309	32.5%	618	32.5%
Lower Class	321	33.7%	321	33.7%	642	33.7%
Region - Southeast	318	33.4%	318	33.4%	636	33.4%
Region - Northeast	320	33.6%	320	33.6%	640	33.6%
Region - West	314	33.0%	314	33.0%	628	33.0%
Home Region	673	70.7%	673	70.7%	1346	70.7%
Out of Home Region	279	29.3%	279	29.3%	558	29.3%
Major - Economics	479	50.3%	479	50.3%	958	50.3%
Major - Psychology	473	49.7%	473	49.7%	946	49.7%
Response - Email	74	7.8%	67	7.0%	141	7.4%
Response - Phone	76	8.0%	80	8.4%	156	8.2%
Response - Both	32	3.4%	35	3.7%	67	3.5%
Response - Total (either email or phone)	118	12.4%	112	11.8%	230	12.1%
Removed	56	5.6%	56	5.6%	112	5.6%
N	952	94.4%	952	94.4%	1904	94.4%

Note: Applicant 1 and 2 refers to the order of application to a job within a pair. Removed indicates attrition from the sample – an employer removed a job advertisement before one or both applicants could apply for the job.

**Table 3. Job Advertisement Descriptive Statistics**

	Set 1		Set 2		Difference	Total	
	N	% (mean)	N	% (mean)	p-value	N	% (mean)
<b>Occupational Category</b>							
Administrative Assistant	73	15.4%	72	15.0%	0.8631	145	15.2%
Analyst	48	10.2%	45	9.4%	0.6958	93	9.8%
Clerical	39	8.3%	43	9.0%	0.6878	82	8.6%
Customer Service	82	17.3%	91	19.0%	0.5067	173	18.2%
Human Resources	26	5.5%	31	6.5%	0.5266	57	6.0%
Managerial	25	5.3%	24	5.0%	0.8480	49	5.1%
Other – Kids	27	5.7%	21	4.4%	0.3511	48	5.0%
Other – Physical	12	2.5%	13	2.7%	0.8646	25	2.6%
Other	29	6.1%	28	5.9%	0.8529	57	6.0%
Sales	112	23.7%	111	23.2%	0.8541	223	23.4%
Listed Salary - Low	141	\$30,977.22	148	\$31,789.65	0.4376	289	\$31,393.27
Listed Salary - Mean	141	\$34,305.89	148	\$34,834.23	0.6396	289	\$34,576.46
Listed Salary - High	141	\$37,634.56	148	\$37,878.83	0.8546	289	\$37,759.65
Removed	31	6.2%	25	5.0%	0.4099	56	5.6%
N	473	93.9%	479	95.0%		952	94.4%

Note: Set 1 refers to black applicants with an elite degree and white applicants with a less selective degree (Pair IDs 1-12 in Table 1); set 2 refers to white applicants with an elite degree and black applicants with a less selective degree (Pair IDs 13-24 in Table 1). Difference indicates the p-value of a two-tailed t-test examining the difference in values between Sets 1 and 2. Removed indicates attrition from the sample – an employer removed a job advertisement before one or both applicants could apply for the job.

**Table 4. Logistic Regressions Predicting Employer Response**

	Email	Phone	Total
Black (ref: White)	0.677** (0.086)	0.616*** (0.090)	0.628*** (0.071)
Elite (ref: Less Selective)	1.472** (0.188)	2.007*** (0.300)	1.841*** (0.211)
Female (ref: Male)	0.923 (0.200)	0.864 (0.166)	0.956 (0.161)
Lower-class (ref: Upper/Middle)	0.599* (0.150)	0.560* (0.132)	0.607* (0.120)
Major – Psychology (ref: Economics)	0.853 (0.185)	0.825 (0.159)	0.860 (0.145)
Region – Northeast (ref: Southeast)	1.606+ (0.414)	1.412 (0.326)	1.475+ (0.298)
Region – West	0.989 (0.278)	1.044 (0.257)	1.052 (0.226)
Out of Home Region	0.881 (0.211)	1.045 (0.221)	1.015 (0.186)
Application submission (2 <sup>nd</sup> )	0.897 (0.114)	1.062 (0.152)	0.943 (0.105)
Constant	0.093***	0.086***	0.135***
N	1904	1904	1904

Note: All completed cases are included. Regressions also control for resume type, cover letter type, and employment history type. Odds ratios shown. Cluster-corrected (job advertisement level) standard errors in parenthesis.

+ =  $p < 0.10$ , \* =  $p < 0.05$ , \*\* =  $p < 0.01$ , \*\*\* =  $p < 0.001$



**Table 5. OLS Regressions Predicting Listed Salary Range of Job Advertisements**

	Low	Mean	High
Black (ref: White)	-3071.13** (1125.15)	-2922.83* (1432.55)	-2774.53 (1887.71)
Elite (ref: Less Selective)	2601.45* (1291.51)	3240.31* (1407.58)	3879.17* (1627.26)
Female (ref: Male)	-1405.89 (1730.20)	-1302.45 (1956.30)	-1199.01 (2393.46)
Lower-class (ref: Upper/Middle)	-30.75 (1833.06)	-234.40 (1882.52)	-438.06 (2206.54)
Major – Psychology (ref: Economics)	-2851.72 (1935.13)	-3173.60 (2095.53)	-3495.48 (2471.90)
Region – Northeast (ref: Southeast)	4759.56* (2199.89)	6711.64** (2207.62)	8663.72** (2600.56)
Region – West	5469.73* (2447.56)	6971.03* (2728.59)	8472.33* (3231.61)
Out of Home Region	998.76 (2128.87)	540.12 (2134.94)	81.48 (2422.91)
Application submission (2 <sup>nd</sup> )	75.66 (1183.06)	931.68 (1274.26)	1787.70 (1482.12)
Both applicants received response	-1535.42 (2210.75)	-820.04 (2335.30)	-104.66 (2756.79)
Constant	28994.00***	29741.61***	30489.22***
N	93	93	93

Note: Cases with no listed salary range or no employer response are dropped. Regressions also control for occupation type, resume type, cover letter type, and employment history type. Cluster-corrected (job advertisement level) standard errors in parenthesis.

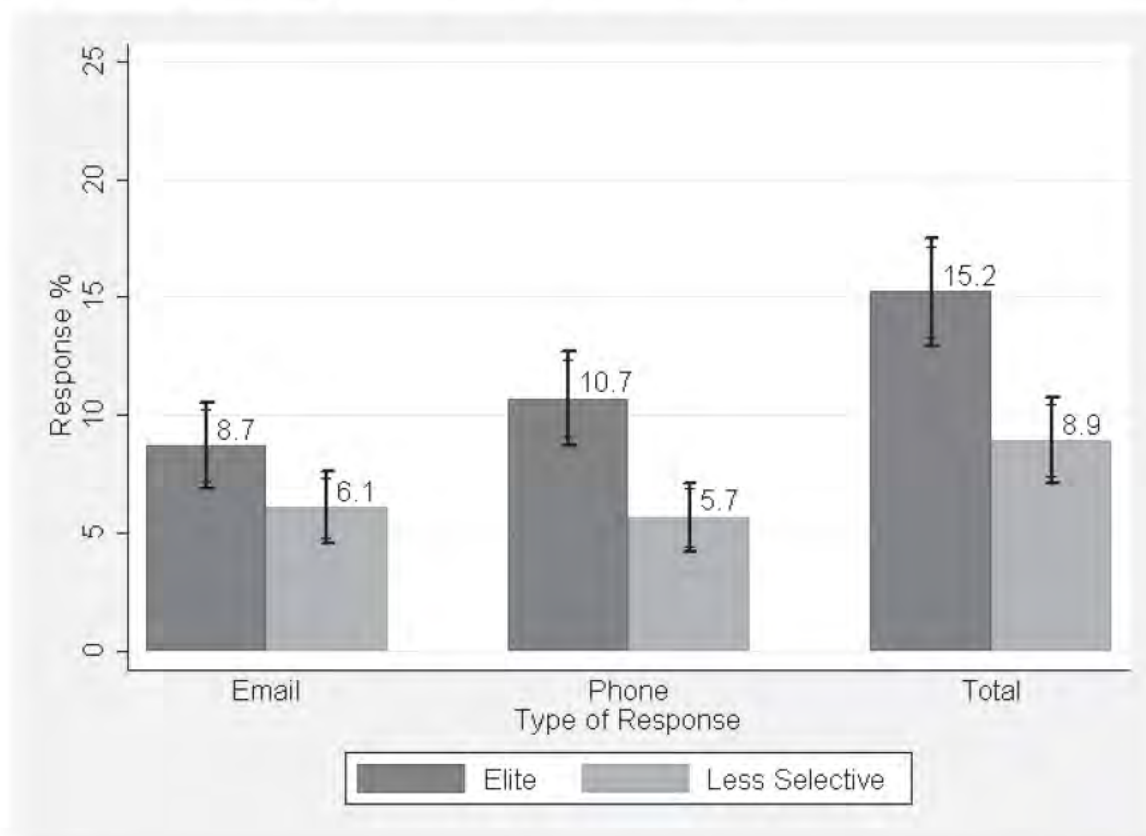
+ =  $p < 0.10$ , \* =  $p < 0.05$ , \*\* =  $p < 0.01$ , \*\*\* =  $p < 0.001$

**Table 6. Logistic Regressions Predicting Response of High Value Occupations (Managerial or Analyst vs. All Others)**

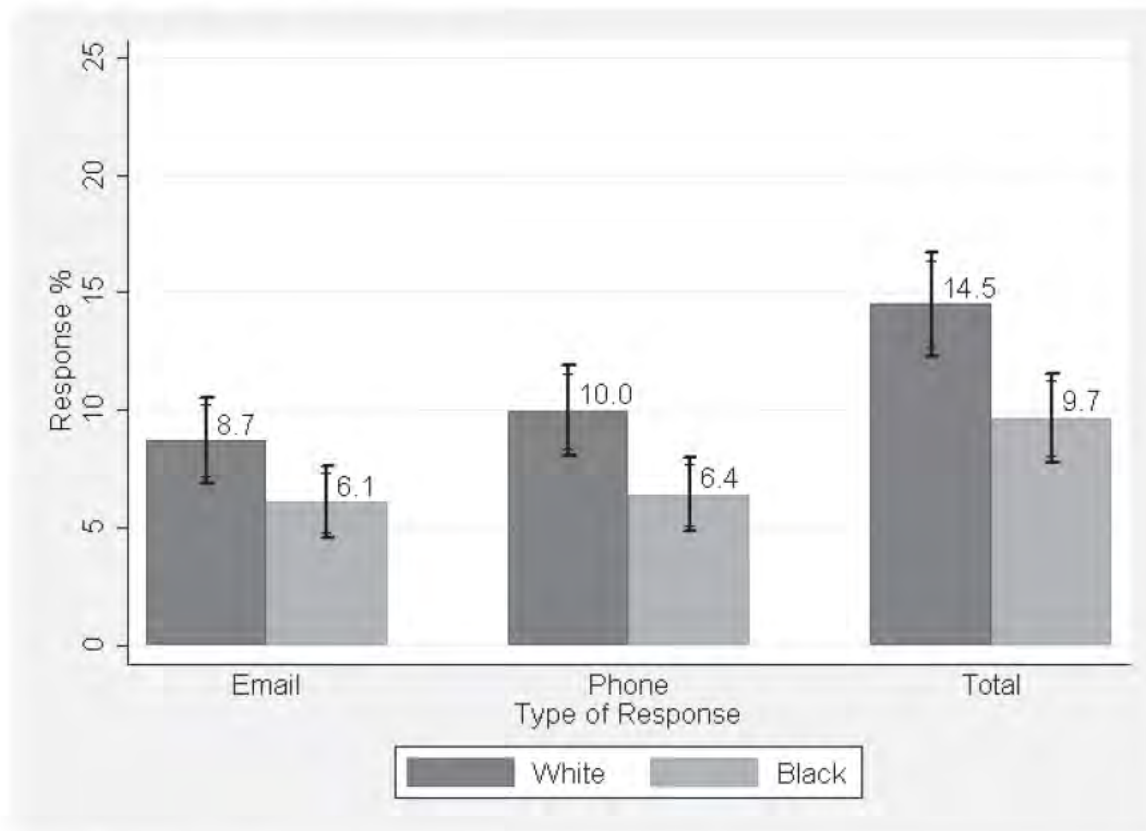
	1	2
Black (ref: White)	0.561* (0.147)	0.528** (0.130)
Elite (ref: Less Selective)	1.194 (0.319)	1.311 (0.333)
Female (ref: Male)	1.263 (0.492)	1.259 (0.489)
Lower-class (ref: Upper/Middle)	0.989 (0.458)	0.960 (0.445)
Major – Psychology (ref: Economics)	0.610 (0.264)	0.588 (0.257)
Region – Northeast (ref: Southeast)	1.635 (0.746)	1.583 (0.717)
Region – West	0.536 (0.304)	0.525 (0.300)
Out of Home Region	0.384+ (0.188)	0.380+ (0.189)
Application submission (2 <sup>nd</sup> )	0.852 (0.222)	0.835 (0.218)
Both applicants received response		1.356 (0.566)
Constant	0.439+	0.386+
N	230	230

Note: Cases with no employer response are dropped. Regressions also control for resume type, cover letter type, and employment history type. Odds ratios shown. Cluster-corrected (job advertisement level) standard errors in parenthesis.

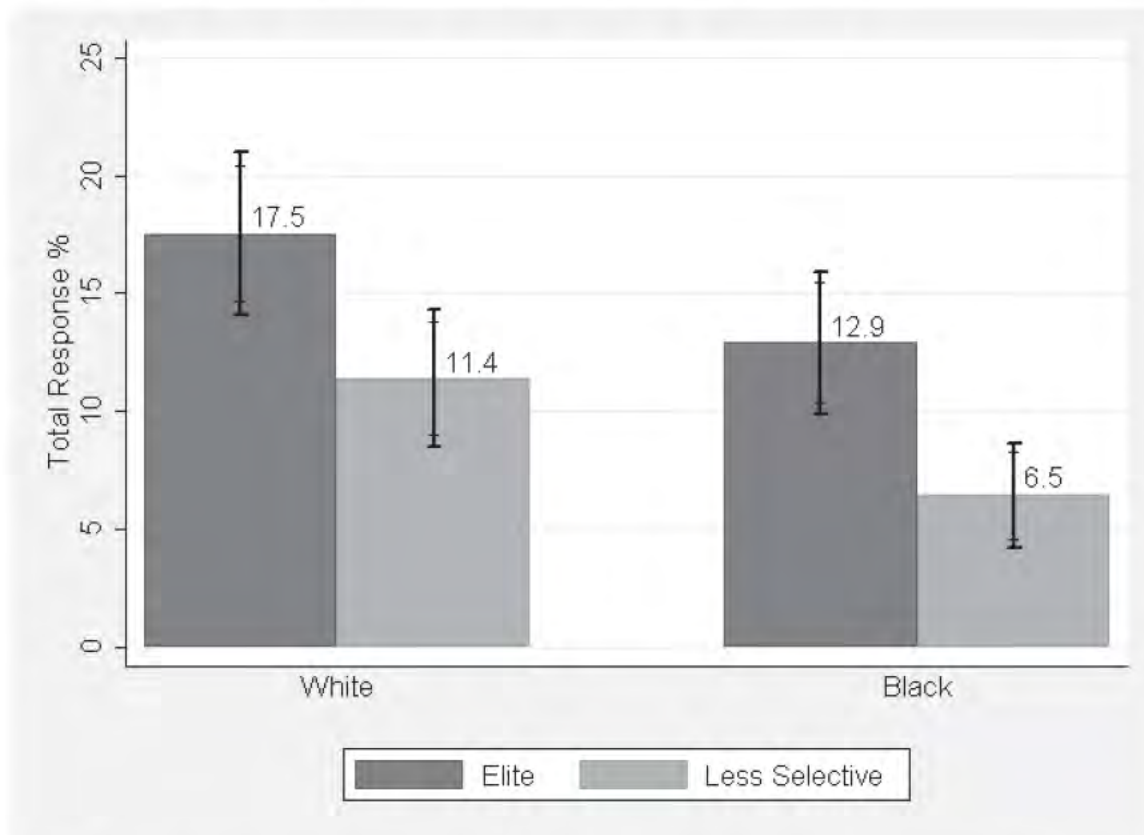
+ =  $p < 0.10$ , \* =  $p < 0.05$ , \*\* =  $p < 0.01$ , \*\*\* =  $p < 0.001$

**Figure 1. Employer Responses by College Selectivity**

Note: The outer lines represent the 95% confidence interval and the inner lines represent the 90% confidence interval, both using a two-tailed Welch's t-test.

**Figure 2. Employer Responses by Race**

Note: The outer lines represent the 95% confidence interval and the inner lines represent the 90% confidence interval, both using a two-tailed Welch's t-test.

**Figure 3. Employer Responses by Race and College Selectivity**

Note: The outer lines represent the 95% confidence interval and the inner lines represent the 90% confidence interval, both using a two-tailed paired t-test. The differences between white candidates with a degree from an elite college and all other candidates are statistically significant ( $p < 0.05$  for black candidates with a degree from an elite college;  $p < 0.01$  for white candidates with a degree from a less selective college;  $p < 0.001$  for black candidates with a degree from a less selective college). The differences between black candidates with a degree from a less selective college and all other candidates are statistically significant ( $p < 0.01$  for white candidates with a degree from a less selective college;  $p < 0.001$  for white candidates with a degree from an elite college and black candidates with a degree from an elite college).

**Appendix****Table A1. First Names by Mother's Race and Mother's Education**

	% Black	% White	% =< HS	% >= Some College
Jalen	78.7%	18.7%	41.1%	58.9%
Lamar	86.1%	12.7%	69.2%	30.8%
DaQuan	87.3%	12.7%	90.1%	9.9%
Nia	84.4%	14.3%	38.8%	61.2%
Ebony	75.1%	24.9%	62.5%	37.5%
Shanice	92.9%	7.1%	82.1%	17.9%
Caleb	10.6%	84.0%	39.0%	61.0%
Charlie	10.2%	85.4%	64.2%	35.8%
Ronny	2.8%	91.7%	85.8%	14.2%
Aubrey	12.7%	83.6%	41.6%	58.4%
Erica	13.6%	76.7%	56.7%	43.3%
Lesly	7.7%	91.5%	87.1%	12.9%

**Table A2. Last Names by Frequency and Racial Composition**

	Rank	Frequency per 100k	% White
Thompson	19	238.9	72.5%
Clark	25	203.3	76.8%
Hall	30	175.6	75.1%
Allen	32	171.8	70.2%
Adams	39	153.1	76.2%
Campbell	43	137.9	76.5%
Evans	48	126.9	70.7%
Parker	51	120.2	71.5%
Collins	52	117.8	73.9%
Stewart	54	116.0	71.8%
Morris	56	115.6	75.9%
Price	84	84.8	76.1%