Journal of Criminal Justice 43 (2015) 108–121

Contents lists available at ScienceDirect

Journal of Criminal Justice

Criminal stigma, race, and ethnicity: The consequences of imprisonment for employment

Scott H. Decker [a,*], Natalie Ortiz [c,**], Cassia Spohn [a], Eric Hedberg [b]

[a] School of Criminology and Criminal Justice, Arizona State University, 411 North Central Avenue, Phoenix AZ 85004, United States
[b] College of Public Programs, Arizona State University, 411 North Central Avenue, Phoenix AZ 85004, United States
[c] National Association of Counties, 25 Massachusetts Avenue, Washington, DC 20001, United States

ARTICLE INFO

Available online 23 February 2015

ABSTRACT

Purpose: The purpose of this paper is to assess the role of race/ethnicity and prior prison sentences on employment opportunities. Secondarily, we compare the impact of applying for jobs (in-person and online), and the role of education in securing employment. This work was conducted in a large southwestern city (Phoenix AZ) with high rates of imprisonment for blacks and Hispanics.
Methods: First, an audit test involving matched pairs of males within race/ethnicity categories (black, Hispanic, white) who applied for jobs in-person was conducted. More than 500 jobs were applied for by the audit testers. Second, a correspondence test was conducted using three pairs of résumés matched within race/ethnicity. In the correspondence test, over 3,000 jobs were applied for online. Each test used random assignment. Because of its importance for entry level employment, a separate analysis of food service jobs applied for online was conducted.
Results: Both sets of analyses were completed using cross-classified random effects (CCRE) models. Contrary to expectations, neither race/ethnicity nor prior prison record affected outcomes in the online application process. In contrast, both race/ethnicity and prison record had significant effects in the in-person audit analysis. The effect of a prison record was particularly strong for blacks.
Conclusions: Race/ethnicity and prior prison sentence remain important impediments to success in gaining employment. These results are particularly strong for in-person job applications and are somewhat smaller for online job applications.

> [The manager] pointed out my criminal record and right away told me that they couldn't go any further with the interview. I asked why and she just said that they couldn't hire me because of the criminal record. *Hispanic Male Ex-Prisoner.*

> [The manager] flipped over the résumé' and read the work experience and then said "I see you have been incarcerated let's first talk about that". He said unfortunately we are not looking to hire any parolees. The whole experience was less than 3 minutes. *Black Male Ex-Prisoner.*

> The interview was only 5 minutes long. [The manager] asked about my experience at [a restaurant] and then about the maintenance position at Arizona State Prison Complex - Winslow. It seemed like he started at the top of my résumé' and when he got to the Maintenance position at Winslow he stopped reading. *White Male Ex-Prisoner*

Introduction

Former prisoners face a variety of challenges upon their return to society. Securing adequate housing, mending weakened or broken family relationships and managing substance abuse and mental health issues all play pivotal roles in successful reintegration. But perhaps no challenge is greater or more important than finding employment. Prior research demonstrates that employment is a key – perhaps **the** key – factor affecting successful re-entry following imprisonment (Holzer, Raphael, & Stoll, 2002a; Waldfogel, 1994), largely because those who are unemployed are substantially more likely to return to crime than those who are employed (Burton, Cullen, & Travis, 1987; Clear, 2007; Freeman, 1994). Employment also integrates people into society, organizes their lives, and expands social capital. Although the benefits of employment may be more critical to the lives of returning prisoners, one of the collateral consequences of incarceration is the stigma that results from imprisonment, which negatively affects the likelihood of

* Corresponding author. Tel.: +1 602 496 2333.
** This research was not conducted in conjunction with the National Association of Counties (NACo) and the points of view expressed do not necessarily reflect the official position of NACo.
E-mail address: Scott.Decker@asu.edu (S.H. Decker).

http://dx.doi.org/10.1016/j.jcrimjus.2015.02.002
0047-2352/

securing employment (Albright & Denq, 1996; Giguere & Dundes, 2002; Hirschfield & Piquero, 2010; Pager, 2007; Uggen, 2000; Uggen, Vuolo, Lageson, Ruhland, & Whitham, 2014). These consequences of imprisonment may be particularly salient for racial/ethnic minorities, who historically have faced more barriers and stigma in attempting to gain work than have whites.

Evidence of the consequences of incarceration for employment comes from Pager's (2003; Pager, Western and Bonikowski, 2009; see also Galgano, 2009; Lalonde & Cho, 2008) important work on the relationship between race/ethnicity, criminal record, and employment prospects. Pager used an audit strategy in which matched pairs of black, white, and Hispanic job seekers with and without criminal records applied for the same jobs. She found that imprisonment had a negative effect on finding a job, but she also found that the effects of race/ethnicity trumped the effect of imprisonment, as whites who had served time in prison fared better in the job market than matched blacks and Hispanics who had not served time in prison. These findings led Pager (2003) to conclude that "The employment barriers of minority status and criminal record are compounded, intensifying the stigma toward this group" (p. 959), such that "previous estimates of the aggregate consequences of incarceration may therefore underestimate the impact on racial disparities "(p. 961).

The goal of this study is to understand how race/ethnicity interact with a criminal record to affect employment prospects. Using an experimental design modeled on the work of Pager (2003), Pager, Western and Bonikowski (2009) and Galgano (2009), we assess whether job applicants matched by race/ethnicity (black, Hispanic, white) and criminal record (prior prison term, no prior prison term) receive a callback from a potential employer. We extend this body of research by comparing both the in-person and online job application processes and highlighting the food service industry.

Review of relevant literature

The relationship between race/ethnicity and imprisonment is hardly new. In 1918, the Bureau of the Census published a report on the "Negro Population" (U.S. Department of Commerce, Bureau of the Census, 1918). The authors of the report noted that in 1910 blacks comprised 11 percent of the population but constituted 22 percent of the inmates of prisons, penitentiaries, jails, reform schools, and workhouses. The authors then posed a question that continues to generate controversy and stimulate research:

> While these figures . . . will probably be generally accepted as indicating that there is more criminality and lawbreaking among Negroes than among whites and while that conclusion is probably justified by the facts . . . it is a question whether the difference . . . may not be to some extent the result of discrimination in the treatment of white and Negro offenders on the part of the community and the courts (p. 438).

There is clear evidence that the racial disparities noted by the Census Bureau are worse today than they were a century ago (Carson & Sabol, 2012, Table 8). In 2011 the incarceration rate for black men (3,023/100,000) was six and a half times as high as the rate for white men (478/100,000); the rate for Hispanic men (1,238) was less than half the rate for black men but two and a half times as high as the rate for white men.

Prisoner reentry

More than 650,000 prisoners are released from U.S. correctional facilities each year[1] (Carson & Sabol, 2012). Individuals released from prison encounter a number of obstacles in their search for employment, including the reluctance of potential employers to hire ex-prisoners. Holzer et al. (2002a), for example, found that employers view ex-offenders as the least desirable applicants, in part because of concerns about the legal ramifications if ex-offenders deal inappropriately with the public or mishandle the public's property (Holzer & Stoll, 2001). Research also suggests that employers who do not conduct background checks are likely to avoid specific groups—namely, undereducated black men—because they stereotype them as ex-offenders without evidence to the contrary (Holzer, Raphael, & Stoll, 2002b; Holzer & Stoll, 2001; Pager, 2003). Visher and Kachnowski (2007) reported that although ex-offenders knew employment was important for their success and were optimistic about their prospects, their post-release employment rates remained low. Criminal convictions are inversely related to labor market success (Waldfogel, 1994) and ex-prisoners find fewer jobs and lower paying jobs (Western, 2006).

One approach to studying the factors that affect an individual's success in securing employment is an "audit strategy." In this design, the backgrounds and résumés of job applicants from different racial/ethnic groups are carefully constructed so as to be identical. The matched pairs (who differ only by race or ethnicity) present themselves to potential employers as legitimate job applicants. Differences in outcomes are attributed to differences in race or ethnicity. This work enjoys a long tradition in applied economics, where research consistently documents that blacks do worse than matched white job applicants (Bendick, Jackson, & Reinoso, 1994; Bertrand & Mullainathan, 2004) and Hispanics fare worse than matched white applicants (Bendick, Jackson, Reinoso, & Hodges, 1991). More specifically, Bendick and colleagues' research on employment discrimination in Washington D.C. found that black and Hispanic males and females were disadvantaged at each stage of the hiring process (offers to interview, job offers and starting wages) compared to their matched white counterparts.

The audit strategy also has been used to independently assess the impact of a criminal record by matching prospective job applicants on race and varying the presence or absence of a criminal background. In its classic formulation, this design uses matched pairs of black and white males, and presents one member of each pair as having a criminal background, either a conviction or prison sentence. Each member of these pairs applies for the same jobs and submits a résumé that is identical except for race/ethnicity and whether the individual has a criminal conviction. The outcome variable in such studies is typically a callback from an employer who expresses interest in hiring the prospective job candidate or arranging a second interview.

This methodology has been applied most persuasively by Pager (2003, Pager, Western, & Bonikowski, 2009). In a carefully controlled experiment first conducted in Milwaukee, Pager sent matched pairs of black and white males to apply for jobs in-person. The pairs had identical résumés with regard to length of time in the job market, types of previous jobs held, and education level. One résumé within each race-matched pair, however, indicated to the employer that the tester applying for the job had served time in prison. Using callbacks from employers as the dependent variable, she found that black men without a criminal record were nearly three times as likely to get a callback as black men with a criminal record (14 percent versus 5 percent). The effects of a criminal record were not quite as stark for whites, as white men without a criminal record were twice as likely to get a call back (34 percent versus 17 percent). However, the between-race results remain the major finding from Pager's research; she found that white men *with* a criminal record were more likely to receive callbacks than black men who did not have a criminal record.

Pager et al. (2009) replicated this experiment in New York City, adding Hispanics to the design and examining differences between pairs of black, Hispanic, and white testers. The Hispanic group her research examined was Puerto Ricans; the largest group of Hispanics in the state of New York, though not the largest group of Hispanics in the U.S. (Ennis, Rios-Vargas, & Albert, 2011).[2] Pager and her colleagues found that Hispanic men were less likely than white men but were more likely than black men to get a callback from an employer.

Consistent with her results from Milwaukee, white men with a criminal record were more likely to get a positive response from employers than Hispanic and black men without a felony record. These findings confirm not only that a criminal record affects job prospects, but that the effect of criminal record, which varies with race and ethnicity, is trumped by the effects of race and ethnicity.

We expand the research conducted by Pager and others in several important ways. First, much of the research has been conducted in the Northeast or Midwest, which ignores the patterns and trends in the fastest growing regions of the United States, particularly the Southwest. Second, with the exception of Pager et al. (2009), prior research on the influence of criminal history on re-entry in general and on employment prospects in particular has largely ignored Hispanics, the fastest growing segment of the prison population (Harrison & Beck, 2006). Hispanics' employment prospects are particularly important to assess, given the restrictions that many state and local jurisdictions place on hiring non-citizens. Finally, in recent years the online job application process has come to dominate how people find jobs, particularly entry level jobs. It is therefore important to determine whether the findings from research on the in-person application process are applicable to the online process.

Much has changed since Pager's work. One important difference is the significant growth in the number of employers who use the internet to advertise job openings (Nakamura, Shaw, Freeman, Nakamura, & Pyman, 2009). Concomitantly, there has been a marked increase in the number of jobseekers who use the internet to search and apply for employment opportunities (Kuhn & Skuterud, 2000; Stevenson, 2008). It is possible that the racial/ethnic disparities observed by Pager (2003, Pager et al., 2009) were the product of a very specific job application process (i.e., in-person applications) and could be minimized by online applications where race and ethnicity are less visible. Indeed, despite Pager's argument that evidence of discrimination might be greater in the absence of personal contact, Bendick et al. (1991) found no discrimination effect when matched résumés and job applications were mailed to employers. Similarly, Galgano (2009), replicating Pager's research using the online job application process and examining differences among women, found that white women were not more likely to be hired than black women. A second notable change since Pager's work is the growing importance of the Hispanic population. Hispanics are an increasing share of the prison population, and their post-release experiences are of growing importance. It may be that Hispanics face different kinds of employment discrimination, with such differences reflecting local differences in political and social contexts.

The current study

The current study replicates and extends Pager's (2003, Pager et al., 2009) work examining the effect of a criminal record on the employment outcomes of ex-prisoners. Using an experimental design similar to that used in earlier studies, we explore the direct and indirect effects of race/ethnicity and criminal history on employment outcomes for male job applicants. Our research is designed to answer three research questions.

1) Does an applicant's criminal record affect hiring decisions?
2) Does an applicant's race/ethnicity affect hiring decisions?
3) Does the effect of a criminal record vary depending on the applicant's race/ethnicity?

We extend Pager's work using two different field experiments (online and in-person job applications). We also use an analytic technique (the cross-classified random effects model) that takes into consideration the unique structure of our data. The cross classification of our experimental data for the online portion of the study is structured so that any one job type may have different résumés, but also that each résumé has different job types. In the in-person design, we had a set of testers, each of whom approached a set of employers, so that each employer encountered a plurality of testers and the testers encountered a variety of employers. For the in-person study, we focus on food service jobs, as they are a key sector for entry-level employment.

Research setting

The current research was conducted in Phoenix, Arizona, the sixth largest city in the United States, with a population of nearly 1.5 million residents. Phoenix is an especially appropriate site for a study of the employment consequences of a prison record because of the high incarceration rate for minorities, the large numbers of Hispanic residents within the metropolitan area, and the political tone surrounding immigration policy and enforcement. The state of Arizona requires that all employers, including private businesses, verify the citizenship status of potential employees at the time of the hire, and is one of just four states with such a law. The city of Phoenix is 41 percent Hispanic (Hispanics are 29.6 percent of Arizona's total population) and has the sixth largest number of Hispanics in a Census-designated place (Ennis et al., 2011). Blacks make up 6.5 percent of the city's population and 4.5 percent of the state population.

In 2011, Arizona had the sixth highest male incarceration rate in the U.S.: 1,084 per 100,000 U.S. residents (Carson & Sabol, 2012). Estimates for 2012 from the Arizona Department of Corrections indicated that Hispanics and blacks were 41 and 13 percent of the prisoner population, respectively. In 2005, Arizona had the seventh highest rate of incarceration (jail and prison) for blacks and the fifth highest rate for Hispanics among the fifty states (Mauer & King, 2007). These characteristics make Arizona an important site in which to study re-entry and employment.

Design of the experiments

Similar to Pager (2003, Pager et al., 2009) we conducted a field experiment. Whereas Pager used only in-person audit procedures, we use both the online correspondence and in-person audit methods. Research using the in-person audit method sends real people to apply for jobs, whereas online correspondence tests send résumés (or job applications) by email. In our work with the online correspondence method, we applied for jobs by emailing a résumé to employers. These same employers also used the Internet to advertise real job opportunities. Regardless of these methodological differences in procedures, each method calls for applying for jobs using résumés with fictional credentials (e.g., job skills, types of previous jobs held) that are matched across pairs of fictional job applicants. We used the same résumés for both the online and in-person experiments, making changes, as described below, when needed. For the sake of clarity, we refer to the "applicants" (i.e., the résumés) we created for the purposes of the online correspondence test as "online applicants" and to the real people who applied for jobs during the in-person audit as "testers."

For both the online correspondence test and in-person audit, we created three pairs of résumés to submit to employers, with one pair for black male applicants, another for Hispanic males, and the third for white males. All six résumés included a similarly worded objective statement, an identical set of skills and qualifications that made the applicant suitable for the position,[3] and previous employment in the same three job sectors—customer service, general/manual labor, and restaurant/food service—that we would target in the experiments.[4]

Detailing the temporal dimensions of employment histories proved to be challenging because of the prison test condition. The average length of stay for minimum security classification offenses in the Arizona Department of Corrections is 3.31 years and drug crimes account for the largest number of those convicted of such offenses. To increase the external validity of this measure, the prison condition applicants we created received a three-year prison term for possession of cocaine with intent to sell.[5] Three of the six résumés had 42 months (three and one-half years) of work experience; 36 months were in jobs in the sectors we would apply for during the experiment and 6 months which were in a prison job. This six-month prison job signaled a criminal record on the résumé

(Pager, 2003; Pager et al., 2009). The résumés without a criminal record also had 42 months of previous work experience, but included two six-month unemployment spells, one that was between the first and second and another that was between the second and third jobs specified on the résumé. For the online correspondence test, the prison record condition was randomly assigned to a résumé within each pair at the beginning of the online experiment and switched between the two résumés within the pair each week thereafter. For the in-person audit, prison record was randomly assigned to the tester's résumé for each job the tester would apply for, thus varying randomly within the pair over the course of the audit. For each pair, and regardless of method, employment history ends on the résumé without a prison record one month prior to the last month of prison work specified on the résumé with a prison record.

In addition to the criminal record test condition, we included a two-year community college degree as a test condition in both the in-person audit and online correspondence test.[6] We did not use block randomization when assigning this particular condition. Thus, it was possible that the résumé included both the prison and education test conditions.

Creating fake but realistic credentials was an important part of the research design (Bendick et al., 1991, 1994; Bertrand & Mullainathan, 2004; Pager, 2003; Pager et al., 2009). Cueing the online applicant's race/ethnicity to the employer was also an important part of the design because prior research indicates that race/ethnicity is a significant determinant of employment chances. Accordingly, it was critical that the résumés used to apply for jobs via the internet reliably indicated, or cued, the online applicant's race/ethnicity to the employer. We used the research of Bertrand and Mullainathan (2004) and Lavender (1988) to create a sampling frame of first names that are identifiable as black, white, and Hispanic. For last names, we turned to the research of the Census Bureau on the distribution of race/ethnicity within last names from the 2000 Census (Word, Coleman, Nunziata, & Kominski, 2010).[7] We randomly selected two first and last names that were racially/ethnically-identifiable for each pairing of résumés.[8] In addition to the name of the online job applicant, the résumés submitted to employers using the online correspondence method included an email address (that we monitored regularly),[9] a cell phone number (with a voicemail that was also checked daily), and a residential address. Addresses corresponded to an apartment complex in central Phoenix, and were randomly assigned to each résumé within a pair.[10]

For the online correspondence test, every résumé submitted to employers was completely fictitious; however, falsifying personal information for the in-person audit was not an option. Most employers in the in-person audit requested that a supplemental application be completed (in addition to the tester providing a résumé) that asked for a social security number (SSN). Because of Arizona's law requiring verification of employment eligibility, we risked biasing results if testers—particularly Hispanic testers–did not provide a SSN. Accordingly, testers used their real names and residential addresses on the résumés they submitted to employers and their actual SSNs on employers' supplemental applications. For each tester, we created an email address and set up a cell phone number with voicemail, both of which were monitored for responses from employers.

We targeted three job sectors during the online correspondence test—customer service, general/manual labor, and restaurant/food service. Across all three sectors, we applied for entry-level positions that did not require education beyond a high school diploma or more than three years of previous work experience. Furthermore, we did not apply for jobs which would exclude ex-offenders, including jobs working with children and the elderly or that required passing a criminal background check. To find available jobs that matched our criteria, we searched advertisements posted on Craigslist and CareerBuilder.[11] Local probation and parole officers in Maricopa County, where Phoenix is located, confirmed that web-based job search engines are the primary means used by their clients to find employment.

There were many similarities between the job search and application procedures used for both experiments; however, there also were some important differences. Whereas the in-person audit study was conducted only during the summer of 2012, the online correspondence study was conducted over two16-week periods during the summer of 2011 and during the same timeframe in 2012. Our original design called for submitting 1,800 applications during the summer of 2011; this was based on a power analysis that assumed that the positive response rate of employers would be roughly 24 percent, which is consistent with the callback rates reported by other researchers conducting employer audits (Bendick et al., 1994; Galgano, 2009; Pager, 2003). During the summer of 2011, the unemployment rate in the Phoenix metropolitan area hovered around nine percent, which is twice as high as the unemployment rates during the time of Pager's studies (2003, Pager et al., 2009). In response to these real-world economic circumstances and to give us sufficient statistical power, in the summer of 2012 we replicated the method we used in 2011 to search and apply for jobs.[12] The résumés submitted in 2012 were identical to those from 2011, except that all dates were increased by one year.

A second difference between the two experiments is that the online correspondence test targeted jobs in three sectors, whereas the in-person audit only targeted jobs in the food service/restaurant sector. Although the number of employers who advertise jobs on the internet is continually increasing (Nakamura et al., 2009), not all employers are interested in receiving résumés or applications only via the internet. During our search for jobs, we noticed a clear interest among employers in the food service/ restaurant sector for in-person applications. For this reason the in-person audit only targeted employers in the food service/ restaurant sector. Testers applied for jobs in-person during a 10-week period in 2012 that overlapped with the online correspondence test. We did not apply for jobs in-person that had been applied for using the online method and vice versa. We present a separate analysis of food service only jobs from the audit and correspondence methods in Appendix D.

Completing the in-person audit of employers required the additional steps of hiring and training testers to act as job applicants, a process that proved to be complex and time consuming. We screened hundreds of applicants for the six tester positions and conducted numerous interviews and meetings with potential candidates. Bringing in two applicants at a time allowed us to see how the applicants compared to each other, not just in terms of appearance, but also how their personalities matched up and how they presented themselves, including their mannerisms, ability to make and maintain eye contact, and overall language and interpersonal communication skills. Aside from matching pairs on race/ethnicity, testers within each pair were matched as closely as possible on physical appearance, including height, build, skin tone, hair and eye color, as well as demeanor.

Testers completed one week of training, for which we developed a comprehensive training manual with instructions on how to greet the employer, tone of voice to use, and body language to use and avoid. We provided testers with physical appearance and hygiene-related guidelines and standardized what they wore when applying for a position and during any subsequent interaction with the employer. Training also included mock interviews with questions (and appropriate answers) that were likely to be asked by employers during the application process and during the more formal hiring process (e.g., scheduled interviews), including how to respond to questions about their conviction and incarceration. Testers completed practice audits with real employers as the last step in the training process. Bi-weekly meetings were held with testers to review their experiences.

For both experiments, the dependent variable is a dichotomous measure that is coded 1 if the applicant received a favorable response and 0 otherwise. In the case of the online correspondence test, where résumés were emailed or electronically submitted to employers, callbacks and email responses from employers asking for an interview or for the applicant to return the call or reply to the email were coded as a favorable response. Favorable responses to applications submitted to employers during the in-person audit include callbacks for a second

interview or job offers made to testers where the employer conducted an on-the-spot interview.

Analysis plan

This section presents the analysis plan designed to measure the independent and interaction effects of race/ethnicity and prison record on employment chances. We also consider the effect of a community college degree on the likelihood that an employer will respond favorably to a job applicant. This section is divided into two parts: The results of the analysis of the experiment using the correspondence method, where résumés were electronically submitted to employers via the Internet, and the results of the audit study of employers, where testers submitted their résumés in-person to employers in the food service sector.

Both sets of analyses were completed using cross-classified random effects (CCRE) models to estimate more than one source of variation in the outcome (Raudenbush & Bryk, 2002). Cross-classified estimation procedures follow the logic of nested, or multi-level, data; they depart from traditional multi-level models, however, in that they allow for parallel sets of clusters (Rabe-Hesketh & Skrondal, 2008). A classic example uses children from schools and neighborhoods in Chicago where there is little correspondence between school and neighborhood (Raudenbush & Bryk, 2002). Put differently, the grouping variables do not neatly cluster hierarchically and, as a result, two or more different grouping variables occur at the same level. Thus, we can measure the effect of group set A over different values of group set B, and the effect of group set B over different values of group set A.

Fig. 1 illustrates how typical cross-classified data are structured versus the typical structure of hierarchical data. Both illustrations in the figure show the structure of 12 observations (A, B, C, D, E, F, G, H, I, J, K, and L). On the left side, the hierarchal structure has four "level-2" groups (I, II, III, and IV) nested within two "level-3" groups (1 and 2). This is in contrast to what is represented on the right side of the figure, where the cross-classified structure has two parallel groupings (1 and 2 and I and II), with each combination (e.g., 1 and I or 2 and I) having three observations.

For the correspondence test and audit data, race/ethnicity and experimental conditions are modeled as observation-level predictors. There is a difference between the analyses, however, in the grouping variables modeled at the group level. We describe how the data are clustered when discussing the results of each experiment. In both cases, we use cross-classified random effects models to estimate three sources of random variation in the observed outcome.

Results: Online correspondence test

Modeling strategy

In the case of the online correspondence test, *the set of* $i \in \{1, 2, 3 \ldots N\}$ observations are grouped together in two ways. One group consists of the $j \in \{1, 2, 3 \ldots J\}$ types of jobs that were applied for, and the second consists of the $k \in \{1, 2, 3..K\}$ résumés that were submitted online to employers. Applicants are nested within both résumés and job types, but résumés are not nested in jobs nor are jobs nested within résumés. The unconditional model for the likelihood of a favorable outcome is a generalized CCRE model where the log-odds of a positive outcome for observation i with job type j and résumé k is

$$\ln\left(\frac{\Pr\left(y_{ijk}=1\right)}{\Pr\left(y_{ijk}=0\right)}\right)=\theta+\phi_j+\kappa_k$$

where θ is the average of each cell's average log odds of a call back, ϕ_j is the random effect of job type and κ_k is the random effect of the résumé. The model produces estimates of two variance components for the job type and résumé effects, $\sigma^2_{JOB}=\mathrm{var}(\phi_j)$, and $\sigma^2_{RESUME}=\mathrm{var}(\kappa_k)$. The typical "level-1" variance is approximated with a linearization method where the intercept, θ, is transformed into a probability, p, and the variance is estimated with the reciprocal of $p^*(1\text{-}p)$ (Raudenbush & Bryk, 2002)

$$\sigma_c^2\approx\left(\frac{e^\theta}{1+e^\theta}\times\left(1-\frac{e^\theta}{1+e^\theta}\right)\right)^{-1}$$

Accordingly, the CCRE model we estimate separates the variation in the likelihood of a favorable response from an employer between online applicant-level characteristics, job type, and the effect of the résumé itself. Variation in the outcome has three sources, one source at level-1 and two sources at level-2. Within the group of job applicants, variation exists along the lines of race/ethnicity, prison record, and educational attainment. Within the group of jobs, variation can be attributed to differences between five job types, including office and administrative positions, food service and restaurant positions, general/manual labor jobs, jobs in sales, and customer service positions. Résumés, although designed to relay identical information to employers, could have unobserved effects due to addresses, email providers, high school attended, or other nuanced differences.

Including the résumé at level-2 in a CCRE model is motivated by concerns that unobserved differences in the content between each of the six résumés explains the observed distribution of the outcome across key predictors (see, for e.g., Heckman & Siegelman, 1993). Such unobserved differences can be compared to tester effects in audit studies (e.g., Ayres & Siegelman, 1995; Pager et al., 2009). Job type was specified as a level-2 variable because previous research indicated that the employment chances of racial/ethnic minorities and ex-prisoners depends on the occupation, broadly speaking, for which the tester is applying (Bendick et al., 1991, 1994; Galgano, 2009; Holzer et al., 2002a, 2002b; Pager, 2007; Pager et al., 2009).

Because the outcome is binary—whether a favorable response is received or not—we use a CCRE generalized linear model that estimates the random effect parameters for résumé and job type only, with

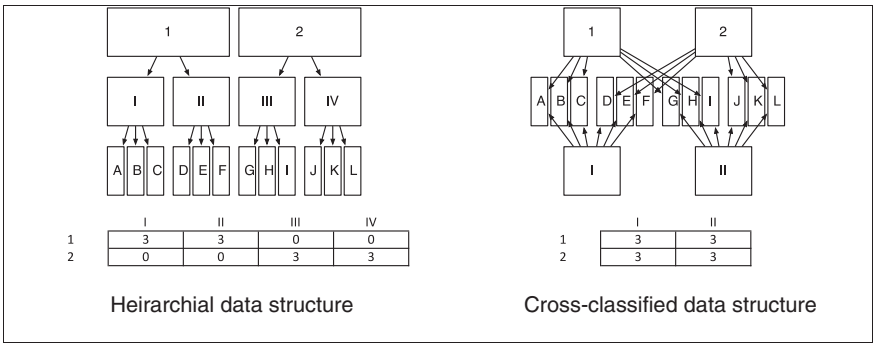


Fig. 1. Comparison of Data Structures.

the random variance component associated with the individual-level (level-1) predictors assumed to be a direct product of the probability of the outcome (Snijders & Bosker, 1999). Predictors were mean-centered, so that the intercept corresponds to the average applicant's probability of receiving a positive reply from employers.

We also estimate the effectiveness of our predictors in explaining variance using proportional reduction in variance (PRE) estimates, also conceptualized as R^2 scores which are equal to the proportion reduction in the variance components from the unconditional model to the conditional model:

$$PRE\left(\sigma^2\right) = \frac{\sigma^2 - \sigma_*^2}{\sigma^2}$$

where σ^2 is the variance component from the unconditional model and σ_*^2 is the variance component from the model with predictors. With these parameters we can also estimate the variance portioning coefficient (Goldstein, Browne, & Rasbash, 2002) to approximate the proportion of variance that originates for the three sources. For example, the formula for the amount of variance associated with job type is

$$VPC_{JOB} = \frac{\sigma_{JOB}^2}{\sigma_{JOB}^2 + \sigma_{RESUME}^2 + \sigma_C^2}$$

Findings

Because of the low callback rate in 2011, and the resulting effect it had on statistical power, we increased our sample size by repeating the test again in 2012. As shown in Table 1, in 2011, 996 résumés were submitted to 166 employers. In 2012, 2,112 résumés were submitted to 352 employers, illustrating the improvement in labor market opportunities during recovery from the Great Recession. The left column of Table 1 provides descriptive statistics for the online correspondence test. The data we analyze exclude incomplete tests where one or more résumés could not be submitted electronically to an employer.[13] After deleting incomplete tests from the dataset, we were left with 518 complete tests, representing the submission of 3,108 résumés to 518 different employers.

The data are balanced with regard to the prison condition (i.e., exactly one-half of all résumés submitted indicated the applicant had a criminal record) and race/ethnicity (e.g., because job applicants were from one of three race/ethnicity groups, one-third of résumés cued white as the applicant's race). The randomization procedures used to assign a community college degree to the résumé resulted in an even distribution of the education test condition—50.1 percent of résumés submitted to employers specified the applicant had a community college degree. There is no correlation between any of these three independent variables.

Our online applicants applied for a variety of positions in the three employment sectors we targeted, including clerical work in office settings, sales positions in the customer service sector, landscaping and painting jobs in the general labor sector, and wait service and dishwashing positions in the food service sector. The distribution of jobs applied for within each of the three sectors is not quite even, as opportunities in the customer service sector accounted for a larger share—38.4 percent—of the jobs that we found and applied for online. Job type overlapped with sector closely. Of the 518 jobs that were applied for, 52 were office/administrative type jobs, 172 were positions in restaurants and food service, 139 were manual labor jobs, 74 were jobs in sales, and 81 were categorized as customer service positions.

Of the 3,108 résumés that were submitted online, 231 (7.4 percent) received a favorable response from the employer. When examining the distribution of favorable responses by race/ethnicity, Hispanics were more likely to receive a favorable response to their résumés than were blacks ($p < .05$) or whites, though the Hispanic-white difference is not significant. Whites were more likely to hear back from employers than blacks ($p \leq .10$). A chi-square test of the distribution of responses between ex-prisoners and job applicants without a prison record indicated a non-significant difference in the likelihood of being contacted by employers. Likewise, no difference was found in the favorable response rates for high school graduates and community college degree holders.

The first cross-classified model we present (see the first column of Table 2) includes only the variance components of job type and résumé and no individual level predictors. The predicted probability of receiving a favorable response from an employer is 6.4 percent. The unconditional model also establishes variation in the outcome that depends on the type of job applied for and unobserved differences between the résumés used to apply. In CCRE models with discrete outcomes, a linearization approach is needed to estimate the variance partition coefficient (VPC) because the variance is measured differently within cells (i.e., in binomial units) than between cells (i.e., in logistic units, see Goldstein et al., 2002). The baseline VPC for job type is 0.029, which can be taken to mean that almost three percent of the variation in the likelihood of a positive response from employers is due to differences in

Table 1
A Comparison of Methods of Application

	Method	
	Correspondence (online)	Audit (in-person)
Number of employers receiving résumés	518	57
Number of résumés submitted	3,108	266
Résumés submitted by race/ethnicity		
Black	1,036 (33.3)	96 (36.1)
White	1,036 (33.3)	102 (38.4)
Hispanic	1,036 (33.3)	68 (25.6)
Résumés with prison condition	1,554 (50.0)	135 (50.8)
Résumés with college condition	1,558 (50.1)	145 (54.5)
Employment sector of position		
Customer service	1,194 (38.4)	
General/manual labor	858 (27.6)	
Food service/restaurant	1,056 (34.0)	266 (100)
Number of favorable responses to résumés submitted	231 (7.4)	38 (14.3)
By race/ethnicity		
Black	62 (26.8)	11 (28.9)
White	81 (35.1)	22 (57.9)
Hispanic	88 (38.1)	5 (13.2)

Table 2
CCRE estimates of Likelihood of Receiving a Favorable Response to Employment Application

	Online/Internet Applications $N = 3{,}108$				In-person Applications $N = 288$			
	Unconditional Model		Full Model		Unconditional Model		Full Model	
	b	*SE*	*b*	*SE*	*b*	*SE*	*b*	*SE*
Intercept	-2.68**	0.33	-2.62**	0.34	-2.44**	0.43	-2.82**	0.50
Black			-0.17	0.24			-1.32*	0.63
Hispanic			0.18	0.23			-1.74*	0.76
Prison Record			-0.02	0.23			-1.26*	0.60
Community College Degree			-0.07	0.14			0.22	0.44
Black*Prison Record			-0.26	0.36			0.87	0.94
Hispanic*Prison Record			-0.18	0.33			0.65	1.20
Random Effects								
Job type	0.49	0.35	0.49	0.35				
Résumé'	0.01	0.03	0.0	0.00				
Employer					1.62	0.92	1.99	1.10
Tester					0.19	0.26	0.0	0.00

**$p < .001$ *$p < .05$.
Note: Standard error of random effects is reported.

the type of job for which the tester applied. Less than one percent of the difference in the outcome is accounted for by the résumé submitted to the employer.

The second column of Table 2 provides the estimated effect of the level-1 predictors in addition to the random effects of job type and résumé. Adding the individual-level variables increased the probability of a favorable response slightly, to 0.068 for the average job applicant. Despite our expectation that race/ethnicity and criminal record would have negative effects on employment chances, being black or Hispanic or having a prison record did not significantly affect whether employers contacted a job applicant whose résumé cued those characteristics. Although not statistically significant, the effect of having a criminal record and the effect of being black (compared to an applicant who was white) were in the expected negative direction. Having a two-year college degree did not increase the probability of receiving a favorable response from employers, and the direction of the effect estimated (a negative effect) is opposite from expectations. In addition, the variables measuring the interaction between race/ethnicity and criminal record did not affect the probability of receiving a favorable response.

Once the level-1 predictors are added to the model, none of the variation in whether employers contacted a job applicant is located between résumés. Additionally, given the proportional reduction in the variance explained, it appears that individual characteristics conveyed through the résumés explain all, albeit a trivial amount, of variation in the outcome that was accounted for by résumés in the unconditional model. As the null model indicated, very little of the variation in the dependent variable is explained by the type of job for which the tester applied. The VPC for job type is three percent in the full model, changing little from the VPC calculated using the unconditional model estimates. In fact, adding individual-level predictors increased the proportion of the variation explained by job type, suggesting that the probability of advancing through the hiring process depends partly on not only the personal characteristics of a job applicant, but on the type of job for which they are applying.

At the theoretical level, a case can certainly be made that the online job application process is distinct from the process of applying for jobs in-person; we return to this in the discussion section of the paper. At the empirical level, the question remains if or how outcomes from the online process differ from the in-person results.

Results: In-person audit

Audit procedures were used in addition to the correspondence test to investigate differences in employers' hiring-related behavior toward black, white, and Hispanic testers posing as job applicants. Three pairs of testers applied for jobs with 57 employers in the food service sector over the course of eight weeks. Between the six testers, 266 résumés were submitted in-person to jobs that were advertised online. Most positions (92 percent) applied for involved direct interaction with customers, including server and wait staff, cashiers and other counter positions, and restaurant hosts. The remaining positions were in the kitchen.

Because of the randomization procedures used to assign the criminal record and education test conditions, the data are not balanced. Fifty-one percent of the applications were submitted by testers randomly assigned a prison record. Fifty-five percent of résumés submitted indicated that the tester had a community college degree. In 28.2 percent of job applications, testers submitted résumés that included both the criminal record and education test conditions.

As illustrated in column 2 of Table 1, the 14.3 percent favorable response rate is double that of the correspondence (online) test. Still, the response rate from employers to in-person applications is significantly smaller than rates reported in prior audits. Whites were more likely than blacks and Hispanics to receive a favorable response, and the differences between whites and blacks and between whites and Hispanics are significant. By contrast, the likelihood that the applicant would receive a callback for a second interview or a job offer did not differ significantly for black and Hispanic applicants. (Table 3 provides a more detailed breakdown of the responses received by testers according to their race/ethnicity and test conditions.)

Whereas we modeled job type and résumé at level-2 in the CCRE models using the online correspondence test data, the CCRE model estimated using the in-person audit data allows testers and employers to have random effects, thus accounting for unobserved differences between testers and employers that could explain variation in employment chances. The right side panel of Table 2 provides the CCRE estimates predicting employment chances when jobs are applied for in-person. The first model we estimate is an unconditional model that predicts the chance of a favorable response for the average job applicant and allows the employer and the tester to have random effects. A favorable response from employers can be expected by the average applicant in 8 percent of the job applications submitted. Without considering the characteristics of job applicants, 10.5 percent of the variation in the probability of an interview or job offer is accounted for by differences between employers. The baseline model also indicates that unobserved differences between testers explain 1.2 percent of the total variation in the likelihood of a favorable response from employers.

Once the individual applicant variables are added to the model, the evidence of a tester effect from the unconditional model disappears, indicating that differences between individual testers in the outcomes of the hiring process are accounted for by their race/ethnicity and the test conditions to which they were randomly assigned. Blacks and Hispanics are significantly less likely than whites to receive a favorable response from employers in the food service industry. More specifically, blacks' chances of being contacted for an interview or offered a job are 21 percent smaller than whites' chances, and Hispanics are almost 15 percent less likely to advance through the hiring process than are whites. As expected, employers also are less willing to interview or hire job applicants with a criminal record. On average, ex-prisoners seeking employment in-person are 22 percent less likely to receive a favorable response from employers than job applicants without a prison record. Having a degree from a two-year community college did not significantly increase the likelihood of an applicant landing an interview or a job.

In contrast to the findings from Pager's (2007, Pager et al., 2009) work, white ex-prisoners are not at an advantage over black or Hispanic job applicants without a prison record in all education/application method categories. Blacks without a prison record, however, have only a slight advantage at advancing through the hiring process; they have about a six percent better chance than whites with a criminal record. Consistent with the main effects of race/ethnicity and prison record, when ex-prisoners are compared along the lines of race/ethnicity, whites with a felony criminal record have better employment chances than minority job applicants with the same criminal background. Blacks with a prison record have the most difficulty moving through the hiring process—their odds of a getting a callback for an interview or being offered a job are 125 percent smaller than white ex-prisoners. The likelihood that Hispanics with a record will get another interview or will be offered a job is 18 percent smaller than the likelihood for whites with a record.

Despite the significance of race/ethnicity and a prison record to employment chances, the random effects portion of the full model indicates that employers who are in the process of hiring new employees continue to be an important source of variation in those chances. More specifically, employers account for 9.5 percent of the variation in whether applicants receive a callback for a second interview or an offer of employment. While the VPC for employers appears to decrease when individual-level predictors are added to the model, this is partly a function of the increase in the variation between employers and a decrease in the variation that was previously explained by between-tester differences. Indeed, the variance of the employer effect actually increases when individual-level predictors are added to the model. This suggests that the individual characteristics of applicants explain the differences between employers in their hiring preferences.

Table 3
Favorable Responses by Race/Ethnicity, Experimental Test conditions, and method

Prison record condition	No criminal record		No criminal record		Criminal record		Criminal record		Total	
Education condition	High school diploma		Community college degree		High school diploma		Community college degree			
Method	Online	In-Person	Online	In-Person	Online	In-Person	Online	In-Person	Online	In-Person
Race/ethnicity										
Black	17/262 (6.5%)	4/19 (21.1%)	18/256 (7.0%)	2/26 (7.7%)	16/260 (6.2%)	3/25 (12.0%)	11/258 (4.3%)	2/26 (7.7%)	62/1,036 (6.0%)	11/96 (11.5%)
Hispanic	21/249 (8.4%)	0/16 (0.0%)	27/269 (10.0%)	3/19 (15.8%)	22/268 (8.2%)	0/14 (0.0%)	18/250 (7.2%)	2/19 (10.5%)	88/1,036 (8.5%)	5/68 (7.4%)
White	22/263 (8.4%)	8/26 (30.8%)	19/255 (7.5%)	7/25 (28.0%)	21/248 (8.5%)	3/21 (14.3%)	19/270 (7.0%)	4/30 (13.3%)	81/1,036 (7.8%)	22/102 (21.6%)

Note: First row is the number of favorable responses/number of résumés submitted with those conditions. Number in parentheses in the second row is the favorable response rate.

More substantially, the few individual-level characteristics that we measure account for 23.2 percent of the *increase* in between-employer differences in the likelihood of whether a job applicant will be interviewed or offered a job. Given our finding that whites are the preferred job applicants in the food service sector among those with a criminal record, combined with Pager's (2003) conclusion that the food service and restaurant industry was more receptive to whites than blacks, this underscores the importance of organizational characteristics, even within a single low-wage employment sector, for understanding discrimination in hiring and its role in the persistence of racial inequality.[14] It may be that employers do not hire individuals whom they perceive are unwelcome by their customers because of the high visibility of employees and their interaction with customers in the food service sector.

Discussion

This study examined the effect of an applicant's criminal record and race/ethnicity on employment prospects in a large southwestern city. The study was designed to answer three research questions: (1) does an applicant's criminal record affect hiring decisions? (2) does an applicant's race/ethnicity affect hiring decisions? and (3) does the effect of an applicant's criminal record vary depending on the applicant's race/ethnicity? To answer these questions, we conducted a carefully designed field experiment modeled on the research of Pager (2007, Pager et al., 2009) that used both an online correspondence test and an in-person audit method.

The results of our analysis reveal that answers to the first two questions depend on the job application process. We found that neither the applicant's criminal record nor the applicant's race/ethnicity affected hiring decisions when applicants applied for jobs online, but that both factors influenced employers' decisions when applicants applied for jobs in-person. Although the effects of being a black applicant and having a criminal record on the online hiring process were in the expected (i.e., negative) direction, the effects were not statistically significant; moreover, the effect of being a Hispanic applicant, which also was not statistically significant, was in the opposite direction of what was expected. By contrast, we found that having a criminal record had a significant negative effect on the in-person job application process; ex-prisoners were 22 percent less likely than applicants without a prison record to receive a favorable response from employers. We also found that, compared to white applicants, blacks and Hispanics who applied for jobs in-person were significantly less likely to receive a request for a second interview or a job offer. The odds that black applicants would receive a favorable response were 21 percent smaller than the odds for white applicants and the probability that Hispanic applicants would receive a favorable response was 15 percent smaller than the probability for white applicants.

Our answer to the third research question is more complicated. On the one hand, there is no statistically significant effect of having a criminal record that varies depending on the online applicants' or in = person testers' race/ethnicity. On the other hand, employers who responded favorably, were more likely to prefer whites with a criminal record over blacks without a criminal record in three of the four comparisons across the online and in-person experiments. In addition, in the in-person audit of employers, more favorable responses from employers went to the applications of whites with a prison record over Hispanics without a criminal record. Only in the case of the online correspondence test did Hispanics without a criminal record receive a greater proportion of favorable responses from employers than whites without a criminal record. Whites and Hispanics with prison records received the same proportion of positive follow-ups from employers. It is important to note that résumés submitted online went to three different employment sectors, while all the in-person applications went to employers in the food service/restaurant sector. Being publicly visible to customers and being more likely to interact with customers, as is the case for many restaurant jobs, may have increased employer concerns about race/ethnicity and criminal record.

Our study has limitations, as it focused on the front end of the job application process. We did not examine what happens once applicants appear before a hiring officer. Suffice it to say, if an applicant does not make it past the screening process (in the case of online applications) or the initial interview (in the case of in-person applications), there will be no job. An additional limitation of the study is our measure of prior prison experience, which differentiates between applicants with and without a prison sentence for a drug offense. Ideally, one would test for the relative differences between applicants with and without prior arrests, and applicants with convictions for specific types of offenses (e.g., drugs, assault, robbery, burglary, and auto theft, which are the five most common conviction offenses among Arizona inmates), but every additional testing criterion doubles the number of categories (and thus the size of the sample) for dichotomous variables.[15] Future research should attempt to determine whether it is the prison experience *per se* that influences employment prospects, or whether having any type of criminal record disadvantages applicants. Future research also should determine whether conviction for other types of offenses have different effects on applicants' success or failure.

Despite these limitations, our results suggest that the online application process diminishes the effect of having a criminal record and being a racial/ethnic minority. This may be because the lack of a face-to-face interaction between employers and job applicants limits the effects of race/ethnicity and prison record. Put simply, race/ethnicity and a criminal record are less salient on a computer screen than they are in-person. As the job market is increasingly accessed online, this could be good news for returning prisoners. However, such a conclusion may be premature. Making it through the online selection process typically results in an in-person interview, we found negative experiences for ex-prisoners during the in- person stage of our experiment. In addition, an issue with statistical power arose early in the study. Although we attempted to increase the ability to detect differences between fictitious job applicants by applying for additional jobs during the summer of

2012, we nonetheless did not have the sample size needed to determine whether individual characteristics have an effect on employment chances in the context of the online application process (see Appendix A and Appendix B). Our power analysis calculated the sample size needed to detect an odds ratio of 0.8 as a function of number of jobs to which we would apply. Given that we had a call back rate of 7.4 percent, we would have needed to submit six résumés to 1,500 different job openings (i.e., employers) to achieve power of 0.8. Because the criteria we used to identify jobs was balanced against the work experience of real ex-prisoners and the employment history profiles created for the résumés used in this experiment, we did not have this number of opportunities available to us. The fact that the effects of having a criminal record and being a black applicant were in the predicted (i.e., negative) direction suggests that our lack of statistical power may well have precluded us from detecting significant effects.

The results from the in-person application process are less equivocal. Having a criminal record and being a black or Hispanic job applicant had the predicted negative effects on applicants' job prospects. We did not find an effect for having a community college degree in any of the analyses. This may be due to the fact that our testers applied for entry level jobs where a community college degree was not needed and may in fact have been viewed negatively as applicants with such a degree could have been viewed as "short-timers" who would be moving on to a better job at the first opportunity.

The transition from prison to society is not easy and employment is a key to this transition; ex-offenders who are unable to attain jobs will have a difficult time reintegrating and will have higher odds of recidivism. Our finding that individuals with a prison record had less success in the in-person application process than those without a record suggests that employers do have biases against those who have served time in prison, as the quotes from our in-person applicants at the start of the manuscript show. These biases may reflect stereotypes regarding the reliability and trustworthiness of ex-offenders, as well as concerns about dangerousness and liability to the establishment if someone with a record is hired. Whatever their source, these biases mean that ex-offenders face significant obstacles as they enter the job market. The fact that our applicants had been imprisoned for a drug offense, and that drug offenders make up large proportions of the state and federal prison populations, means that significant numbers of ex-offenders will be disadvantaged. Unless and until this changes, improving the prospects for successful re-integration of ex-offenders will be difficult and recidivism rates will remain high.

It also is clear that the challenges ex-offenders face in the job market may be particularly salient for racial minorities, given our finding that both having a criminal record and being a racial minority affected an applicant's employment prospects. This finding, which suggests that racial minorities who have been to prison face cumulative disadvantage in the job market, is consistent with a strong tradition of research in criminology. When coupled with the fact that the prison population is increasingly comprised of racial minorities, our finding that the employment chances of black and Hispanic ex-offenders are worse than those of white ex-offenders (at least in terms of the online application process) has important policy implications. Corrections officials and others who prepare offenders for reentry into society must be cognizant of the fact that blacks and Hispanics will encounter additional hurdles in navigating the job market as a result of their race/ethnicity. This suggests that providing additional job training and job preparedness, including training in interview skills, is important. In addition, a key part of any release plan must include being able to access the internet to be able to apply for jobs, something that does not happen uniformly across inmates.

Many of our auditors (none of whom had an actual conviction or had served prison time) reported that the interview process was "unfair." Returning prisoners should be prepared for rejection in the job application process and be ready to deal with it. This rejection includes the process of "steering," or applying for one job (typically a "front of the house" job such as a host/hostess or wait staff) and being considered by management for another (typically a "back of the house" job such as dishwasher).[16] Although whites did better in some contexts, the impact of a criminal record was strong in the on-line application process and across all three race/ethnic categories. This suggests that the disadvantages accumulated across the lives of ex-prisoners remain salient for re-entry, particularly for gaining employment. Our study did not examine whether these disadvantages can be seen in other areas important to successful re-entry (e.g., housing, access to education, family re-unification), but it would be reasonable to expect that they would, further complicating the re-entry process for the three quarters of a million prisoners who return to society each year. Although education may be thought to reduce the effect of a prison record, and make applicants more successful, we didn't find any evidence to support such an effect. This suggests that the "mark" of a criminal record trumps many other positive features of an ex-prisoner's record and continues to slow his/her successful re-entry to society.

Acknowledgements

This research was supported in part by grant 2010-MU-MU-0004 from the National Institute of Justice. The views expressed in this article are those of the authors and not the National Institute of Justice.

Appendix A. Power analysis

The power analysis for this study was based on two key pieces of information from previous employer audits. First, the literature suggested that the baseline rate of a favorable outcome was about 24 percent (Pager, 2003). Second, we reduced the 60 percent reduction in a favorable outcome observed for black males compared to white males (34 vs. 17 percent, or an odds ratio of about 0.4) to a smaller effect of a 35 percent reduction (or an odds ratio of 0.65).

Since the correspondence and audit data are nested, we needed to conduct a power analysis for person (i.e., job applicant) outcomes that are grouped by dimensions of the job seeking process (e.g., job type or employer) and by dimensions of the research methods used to conduct this study (i.e., résumés and testers). Based on the work of Spybrook, Raudenbush, Liu, Congdon, and Martínez (2006), we used an R program (with the code provided in Appendix B) to compute the power given alpha, the odds ratio, the number of jobs (J), the number of cases per job (n), the variance of the effect across jobs (nu2), and the baseline rate (pr).

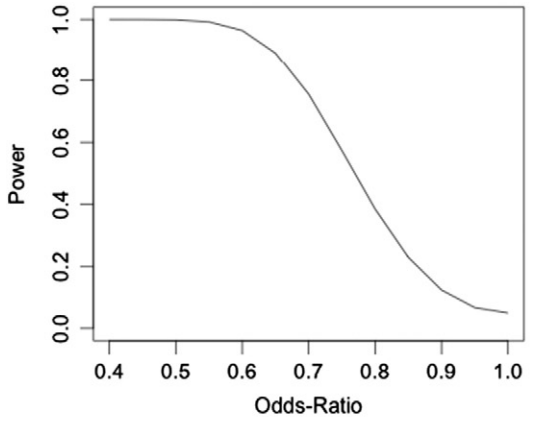
An important issue is that power not only depends on the size of the effect, but it also depends on the base response rate. As that rate moves towards 0 or 1, the variance inflates dramatically and reduces power to detect any effect. Given what we thought, we planned to send six résumés to 100 jobs. With an expected effect of 0.65 and a base rate of 24 percent, this design had adequate power.

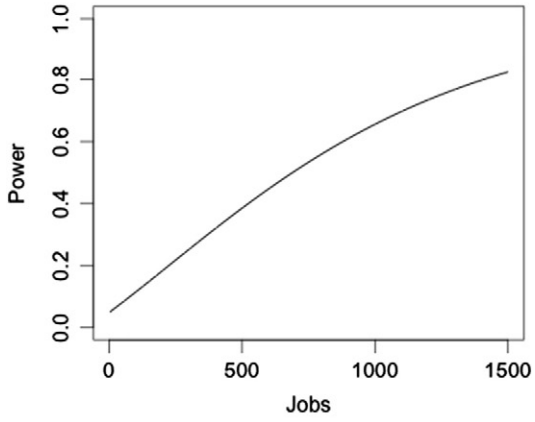
But, as we observed after completing the first correspondence test in summer 2011, our base rate was actually seven percent, so our power was actually 0.29.

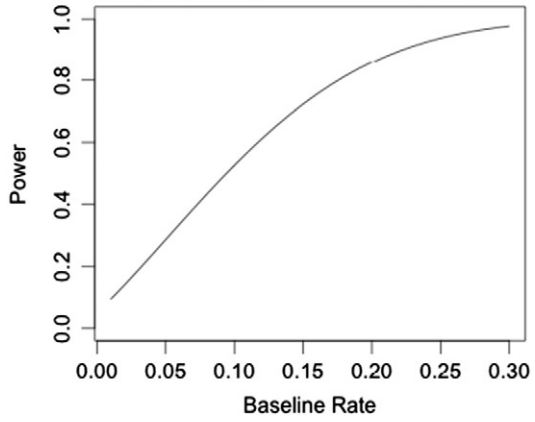
As a result to this reanalysis of our power, we increased the sample size to 500 jobs, assuming that would improve our ability to detect differences.

At the same time, the effect was smaller than we thought it would be and the odds ratio was closer to 0.80 and the power was insufficient given these observed parameters.

In sum, an observed odds ratio would need to be at least 0.68 (a 32 percent reduction in the odds of a favorable outcome) to get 0.8 power. The alternatives are a) we would have needed to apply to 1,400 jobs to detect an odds ratio of 0.80 (a 20 percent reduction in the odds of a favorable outcome) or b) the baseline rate of favorable responses would have needed to be 18 percent.

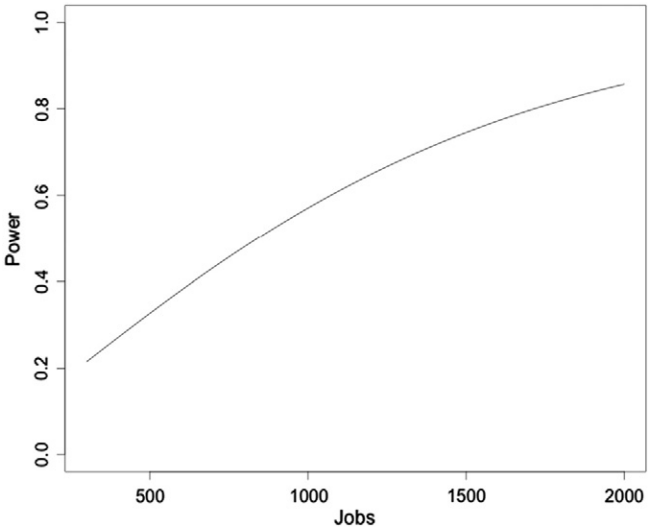






Appendix B. Full R code

```
blocked.power = function(alpha, OR, J, n, nu2, pr) {
    gamma1 <- abs(log(OR))
    prt <- (exp(log(pr/(1-pr)) + 0.5*gamma1))/(1 + (exp(log(pr/
(1-pr)) + 0.5*gamma1)))
    prc <- (exp(log(pr/(1-pr))-0.5*gamma1))/(1 + (exp(log(pr/
(1-pr))-0.5*gamma1)))
    sig2 <- 0.5*((1/prt*(1-prt)) + (1/prc*(1-prc)))
    ncp <- (J*gamma1^2)/(nu2 + (4*(((sig2/n)))))
    powercalc <- 1-pf(qf(alpha, 1, J-2, lower.tail = FALSE),1,J-2,ncp)
    return(powercalc)
}
##original power analysis
##Our original design of the correspondence test called for submit-
ting 100
##applications; this was based on a power analysis that assumed
that the
##positive response rate of employers would be roughly 24 percent,
##we assume there is no variance in treatment effect because it is
fixed
blocked.power(.05, .65, 100, 6, .01, 0.24)
#but, the rate was actually 7 percent, so our power really was
blocked.power(.05, .65, 100, 6, .01, 0.07)
#so, we increased it to 500 jobs
blocked.power(.05, .65, 500, 6, .01, 0.07)
#but our effect was smaller
blocked.power(.05, .8, 500, 6, .01, 0.07)
#our effect would need to be 0.68
blocked.power(.05, 0.68, 500, 6, .01, 0.07)
orlist <-seq(.4, 1, .05)
powerlist <- blocked.power(.05, orlist, 500, 6, .01, 0.07)
plot(orlist, powerlist, type = "n", xlab = "Odds-Ratio",
    ylab = "Power", ylim = c(0,1)) #plot the values
lines(orlist, powerlist, lty = 1)
#or have 1400 jobs
blocked.power(.05, 0.8, 1400, 6, .01, 0.07)
joblist <-seq(1, 1500)
powerlist <- blocked.power(.05, 0.8, joblist, 6, .01, 0.07)
plot(joblist, powerlist, type = "n", xlab = "Jobs",
    ylab = "Power", ylim = c(0,1)) #plot the values
lines(joblist, powerlist, lty = 1)
# or a baseline rate of 18 percent
blocked.power(.05, 0.8, 500, 6, .01, .18)
plist <-seq(.01, .3, .01)
powerlist <- blocked.power(.05, 0.8, 500, 6, .01, plist)
plot(plist, powerlist, type = "n", xlab = "Baseline Rate",
    ylab = "Power", ylim = c(0,1)) #plot the values
lines(plist, powerlist, lty = 1)
```



Appendix C. Sample résumés

Rasheed Dorsey
1645 E. Thomas Rd.
Phoenix, AZ 85016
(602) 541-7676
rasheed.dorsey@hotmail.com

Objective

To be offered a job that makes use of and improves the skills I have gained previously so that I can continue to develop my career in this field.

Summary of Qualifications and Skills

Customer Service

- Serves customers by learning about their needs and finding ways to meet those needs by being knowledgeable of services and products offered by the company.

Computer Literate

- Knows word and excel PC programs and can quickly learn new computer programs.

Communication Skills

- Can communicate effectively with customers and co-workers in writing, over the telephone, and face-to-face.

Team Oriented

- Works alongside co-workers to meet daily company goals and to provide better customer service.

Organized

- Adapts to changing work environment by being organized.

Experience

Marie Calendar's—May 2007 to July 2008
Team Member
Provided front-end customer service, including seating guests and taking, preparing, and packaging to-go orders.

Security Roofing and Construction Corporation—January 2009 to January 2010
General Construction
Provided general construction labor, including preparing and installing roofing materials.

AMC Theaters—July 2010 to November 2011
Cashier
Worked in ticket booth and assisted with ticket sales and general customer service. Tasks included selling movie tickets and informing guests about featured films, policies, and programs.

Education

High School Diploma—May 2006
Central High School

References Available Upon Request

JERMAINE BOOKER
901 E. Van Buren
Phoenix, AZ 85006
(602) 469-0348
Jermaine.Booker7@yahoo.com

Objective

To bring to your organization a valuable skill set that I obtained through previous work experience and that will meet your current employment needs.

Skills

Communication
Has in-person, telephone, and written communication skills
Computer
Has experience using computers and cash registers
Customer Service
Has interest in helping customers and meets customer's needs by learning about their needs and fitting services and products to their needs
Organization
Has multitasking and prioritizing skills
Team Player
Can adapt to changes in management needs and works with co-workers to meet daily goals

Employment History

Phoenix Painter, Inc. 6/2006 to
Labor Assistant 4/2007
Assisted in interior and exterior paint jobs for commercial and residential customers, including preparing job site and surfaces, applying primer and paint, touching-up surfaces, returning job to normal operations for customer, and performing related work.

Olive Garden 4/2007 to
Server 4/2008
Served customers, including taking their food and drink orders, ensured the diners' satisfaction with their experience, accurately handled cash and processed transactions, and provided related assistance when necessary.

Smart and Final 4/2008 to
Sales Associate 6/2009
Provided frontend service, including cashier duties, stocking sales floor, and maintaining a clean and welcoming environment for customers.

Arizona State Prison Complex, Tucson 6/2011 to
Laundry Crew 12/2011
Was responsible for washing, drying, folding, and sorting clothing and linens for a large number of people.

Education

Diploma 5/2006
Central High School
Associate of Applied Science in General Business 5/2009
Phoenix College

References Available Upon Request

Appendix D. Comparison of audit and correspondence applications to food service industry

The secondary analysis of male food service applicants followed two steps for online and in-person applications. First, a subset of observations was selected that could be matched on all experimental conditions

(i.e., race, gender, education, job) for McNemar tests. A McNemar test is a matched case test of a contingency table where dichotomous outcome frequencies are tabled by the case and control observations. A one degree of freedom χ^2 test is performed to determine whether the frequency of a positive outcome differs for the case and control cases. In our study, the case observations are those with a prison record, and those without a prison record are the control cases. These tests are designed to correspond to the analysis performed in Uggen et al. (2014). However, the power requirements of these test are difficult to achieve given low prevalence rates; as a consequence it was difficult to create several matched observations with the same race applying to the same job was difficult.

The second analysis, to allow for greater flexibility, was a test without direct case matches (namely, applications to different jobs). While this created an unmatched, unbalanced, set of data, we were able to again fit multilevel logistic regression models. Unlike the previous analyses, since we found no effect of the cross factors of résumé' or tester, these multilevel models are only nested within the job type (for online tests) or employer (for in-person tests). Also different from the previous analyses, we do not introduce prison to race moderation effects, as they proved to not be statistically significant.

Online tests

McNemar Test

Table A (Appendix) 1 presents the results of the matched McNemar test on the online food service data. Of all the in-person attempts, only 486 applications were to the same job type and matched on education and race. Of those with a prison record and those without a prison record, about 8 percent received a favorable response. The odds ratio was slightly positive, 1,11, indicating that the odds of a prison records receiving a favorable response are about 11 percent more those of the non-prison record attempt. However, test has a χ^2 value of 0.05 and a *p*-value of 0.82. Obviously, this effect is so small (and in the opposite direction than hypothesized) that additional matched observations would be required. However, with such a small test statistic, a post hoc power calculation would not be useful.

Multilevel model

The results of the online multilevel model are presented in Table A3. Aside from the intercept, we find that none of the predictor variables has an impact on the outcome of a favorable response. Moreover, the large random effect speaks to the extremely wide variability in responses by job type.

In-person tests

McNemar test

Table A2 presents the results of the matched McNemar test on the in-person food service data. Of all the in-person attempts, only 86 applications were to the same job and matched on education and race. Of those with a prison record, about 12 percent received a favorable response compared to the 19 percent of cases receiving a favorable response. This leads to an odds ratio of 0.5, indicating that the odds of a prison record receiving a favorable response are about 50 percent less those of an individual without a prison record. This test has a χ^2 value of 1.00 and a *p*-value of 0.32. Using conventional power calculations (Faul, Erdfelder, Lang, & Buchner, 2007; Lachin, 1992) we estimate that to achieve a statistically significant test with this odds ratio and with 0.8 power would require a sample size of 277[17] matched applications. In our test, we only achieved 43 matched observations, which resulted in 0.10 power.[18]

Multilevel model

The results of the multilevel model for the in-person applications are also presented in Table A3. In this model, we find that Hispanic applications are less likely to receive a favorable outcome (odds ratio = 0.26, $p < 0.05$). Also, those with a prison record are less likely to receive a favorable outcome (odds ratio = 0.42, $p < 0.05$).

Table A1
Results of Online Matched Tests

		Observations without a Prison Record		
		Favorable Outcome	Unfavorable Outcome	Total
Observations with a Prison Record	Favorable Outcome	10	10	20
	Unfavorable Outcome	9	214	223
	Total	19	224	243

Table A2
Results of In-person Matched Tests

		Observations without a Prison Record		
		Favorable Outcome	Unfavorable Outcome	Total
Observations with a Prison Record	Favorable Outcome	2	3	5
	Unfavorable Outcome	6	32	38
	Total	8	35	43

Table A3
CCRE Estimates of Likelihood of Receiving a Favorable Response to Employment Application –Food service male analysis

	Online/Internet Applications N = 1,050		In-person Applications N = 1,050	
	b	*SE*	*b*	*SE*
Intercept	-7.087***	1.112	-1.473**	0.491
Black	-0.902	0.466	-0.813	0.475
Hispanic	0.282	0.417	-1.330*	0.599
Prison Record	-0.007	0.356	-0.871*	0.435
Community College Degree	0.257	0.381	0.076	0.444
Random Effects				
Job Type	29.919	12.256		
Employer			1.919	1.096

* p < .05, ** p < .01, *** p < .001.
Note: Standard error of random effects reported.

Notes

[1] A majority of individuals released from prison are either black or Hispanic (Hughes & Wilson, 2003), but we know little about the role that race and ethnicity play in the prisoner reentry process (see Swisher & Waller, 2008).

[2] Puerto Ricans are U.S. citizens. Pager et al. (2009: 784) noted that, "In other labor markets [i.e., outside of New York City], where markers of citizenship…are more prominent sources of differences, evidence of ethnic discrimination may be stronger." Mexicans account for 63 percent of the total Hispanic population in the U.S. (Ennis et al., 2011).

[3] Skills and qualifications were determined by conducting a content analysis of the advertisements for entry-level positions that we would have otherwise applied for during the experiment. We coded the criteria employers were seeking among ideal candidates, which led to the identification of a skill set featuring five dimensions: computer skills, written and verbal communication skills, customer service skills, ability to work with others in a team environment, and organizational abilities.

[4] See Appendix C for an example of a pair of résumés, one for with the prison condition and one without.

[5] The sentence length was not specified on the résumé.

[6] The community college degree was indicated on the résumé as an associate's degree in general business. This degree is intended for students who do not plan to transfer to a four-year college.

[7] In the case of black last names, we limited the sampling frame from the U.S. Census Bureau's research to last names that were more likely (greater than 50 percent) among the black population in the U.S (e.g., almost 52 percent of all Dorseys in the U.S. in 2000 were black). For whites and Hispanics, all last names in the respective sampling frame were more than 94 percent white or Hispanic (e.g., 98.1 percent of Yoders in the U.S. in 2000 were white and 94.5 percent of Vazquezes were Hispanic).

[8] Greg Schwartz, Jermaine Booker, and Jose Velazquez are examples of the white, black, and Hispanic names, respectively, that were selected.

[9] We selected three major providers of free email accounts (Gmail, Hotmail, and Yahoo) and randomly assigned a provider to each résumé. Email addresses used the full name of the job applicant or the initial of their first name and their full last name, depending on what was available through the email provider.

[10] The areas of residence were similar to one another demographically and socioeconomically and in terms of the location of crime and incarcerated individuals.

[11] The CareerBuilder search engine was accessed via a link to the online version of the Phoenix metropolitan area's newspaper, *The Arizona Republic* (https://www.azcentral.com/jobs/). Craigslist was accessed at http://phoenix.craigslist.org/. We limited our job search to advertisements posted within the previous seven days.

[12] The unemployment rate in 2012 during the same summer timeframe was above seven percent.

[13] The most common reason a résumé could not be submitted was because the employer had deactivated the advertisement.

[14] Appendix D presents a separate analysis of the food service sector jobs from the audit and correspondence methods to control for type of job. While the N's are small, in general, these results are consistent with the findings for the larger sample from a wider range of jobs. However, this Appendix presents a stricter comparison of the effects of race/ethnicity and a prison record within job type and across method of application (audit and correspondence). Because of the small N there are few significant differences: that said, among the in person (audit) applicants, those with a prison record have a 50 percent lower chance of receiving a favorable response (i.e. callback). This result is shown by the McNemar test. The multilevel model showed that Hispanic applicants and those with a prison record were significantly less likely to receive a favorable response.

[15] For example, to test arrest versus no arrest would add twelve more tester categories to our design, dramatically increasing the cost and complexity.

[16] A number of our testers with a conviction reported this process.

[17] **Exact** - Proportions: Inequality, two dependent groups (McNemar)

Options:	approximation		
Analysis:	A priori: Compute required sample size		
Input:	Tail(s)	=	One
	Odds ratio	=	.5
	α err prob	=	0.05
	Power (1-β err prob)	=	0.8
	Prop discordant pairs	=	.21
Output:	Lower critical N	=	22.0000000
	Upper critical N	=	22.0000000
	Total sample size	=	277
	Actual power	=	0.8120462
	Actual α	=	0.0434744
	Proportion p12	=	0.0700000
	Proportion p21	=	0.1400000

[18] **Exact** - Proportions: Inequality, two dependent groups (McNemar)

Options:	approximation		
Analysis:	Post hoc: Compute achieved power		
Input:	Tail(s)	=	One
	Odds ratio	=	0.5
	α err prob	=	0.05
	Total sample size	=	43
	Prop discordant pairs	=	0.21
Output:	Lower critical N	=	1.0000000
	Upper critical N	=	1.0000000
	Power (1-β err prob)	=	0.1040492
	Actual α	=	0.0107422
	Proportion p12	=	0.0700000
	Proportion p21	=	0.1400000

References

Albright, S., & Denq, F. (1996). Employer attitudes toward hiring ex-offenders. *The Prison Journal*, *76*(2), 118–137.

Arizona Department of Corrections (2012). Corrections at a glance: January 2012-December 2012. Retrieved January 15, 2013 from http://www.azcorrections.gov/adc/reports/glance.aspx

Ayres, I., & Siegelman, P. (1995). Race and gender discrimination in bargaining for a new car. *The American Economic Review*, *85*(3), 304–321.

Bendick, M., Jackson, C. W., & Reinoso, V. A. (1994). Measuring employment discrimination through controlled experiments. *Review of Black Political Economy*, *23*(1), 25–49.

Bendick, M., Jackson, C. W., Reinoso, V. A., & Hodges, L. E. (1991). Discrimination against Latino job applicants: A controlled experiment. *Human Resource Management*, *30*(4), 469–485.

Bertrand, M., & Mullainathan, S. (2004). Are Greg and Emily more employable than Lakisha and Jamal? A field experiment on labor market discrimination. *The American Economic Review*, *94*(4), 991–1013.

Burton, V. S., Cullen, F. T., & Travis, L. F. (1987). Collateral consequences of a felony conviction: A national study of state statutes. *Federal Probation*, *3*, 52–60.

Carson, E. A., & Sabol, W. J. (2012). *Prisoners in 2011.* (NCJ 239808) Washington, DC: U.S. Department of Justice.

Clear, T. R. (2007). *Imprisoning communities: How mass incarceration makes disadvantaged neighborhoods worse.* New York: Oxford University Press.

Ennis, S. R., Rios-Vargas, M., & Albert, N. G. (2011). *The Hispanic population: 2010.* Washington, DC: U.S. Department of Commerce.

Faul, F., Erdfelder, E., Lang, A. G., & Buchner, A. (2007). G* Power 3: A flexible statistical power analysis program for the social, behavioral, and biomedical sciences. *Behavior Research Methods*, *39*(2), 175–191.

Freeman, R. B. (1994). Crime and the job market. *NBER Working Paper No. 4910.* Cambridge, MA: National Bureau of Economic Research.

Galgano, S. W. (2009). Barriers to reintegration: An audit study of the impact of race and offender status on employment opportunities for women. *Social Thought & Research*, *30*(1), 21–37.

Giguere, R., & Dundes, L. (2002). Help wanted: A survey of employer concerns about hiring ex-convicts. *Criminal Justice Policy Review*, *13*(4), 396–408.

Goldstein, H., Browne, W., & Rasbash, J. (2002). Partitioning variation in multilevel models. *Understanding Statistics*, *1*(4), 223–231.

Harrison, P. M., & Beck, A. J. (2006). *Prison and jail inmates at midyear 2005.* Rockville, MD: Bureau of Justice Statistics.

Heckman, J. J., & Siegelman, P. (1993). The Urban Institute audit studies: Their methods and findings. In M. E. Fix, & R. J. Struyk (Eds.), *Clear and convincing evidence: Measurement of discrimination in America* (pp. 187–258). Urban Institute.

Hirschfield, P. J., & Piquero, A. R. (2010). Normalization and legitimation: Modeling stigmatizing attitudes toward ex-offenders. *Criminology*, *48*(1), 27–55.

Holzer, H. J., Raphael, S., & Stoll, M. A. (2002a). *Can employers play a more positive role in prisoner reentry?* Washington, DC: Urban Institute.

Holzer, H. J., Raphael, S., & Stoll, M. A. (2002b). *Perceived criminality, criminal background checks, and the racial hiring practices of employers.* Madison, WI: Institute for Research on Poverty.

Holzer, H., & Stoll, M. (2001). *Employers and welfare Recipients: The effects of welfare reform in the workplace.* San Francisco, CA: Public Policy Institute of California.

Hughes, T., & Wilson, D. J. (2003). Reentry trends in the United States: Inmates returning to the community after serving time in prison. Retrieved March 6, 2010, from http: www.ojp.usdoj.gov/bjs/reentry/reentry.htm

Kuhn, P., & Skuterud, M. (2000). Job search methods: Internet versus traditional. *Monthly Labor Review*, *123*(1), 3–11.

Lachin, J. M. (1992). Power and sample size evaluation for the mcnemar test with application to matched case-control studies. *Statistics in Medicine*, *11*(9), 1239–1251.

Lalonde, R. J., & Cho, R. M. (2008). The impact of incarceration in state prison on the employment prospects of women. *Journal of Quantitative Criminology*, *24*(3), 243–265.

Lavender, A. D. (1988). Hispanic given names in five United States cities: Onomastics as a research tool in ethnic identity. *Hispanic Journal of Behavioral Sciences*, *10*(2), 105–125.

Mauer, M., & King, R. (2007). *Uneven justice: State rates of incarceration by race and ethnicity.* Washington, DC: The Sentencing Project.

Nakamura, A. O., Shaw, K. L., Freeman, R. B., Nakamura, E., & Pyman, A. (2009). Jobs online. In D. H. Autor (Ed.), *Studies of labor market intermediation* (pp. 27–65). Chicago, IL: University of Chicago Press.

Pager, D. (2003). The mark of a criminal record. *American Journal of Sociology*, *108*(5), 937–975.

Pager, D. (2007). *Marked: Race, crime and finding work in an era of mass incarceration.* Chicago: University of Chicago Press.

Pager, D., Western, B., & Bonikowski, B. (2009). Discrimination in a low-wage labor market: A field experiment. *American Sociological Review*, *74*(5), 777–799.

Rabe-Hesketh, S., & Skrondal, A. (2008). *Multilevel and longitudinal modeling using Stata* (2nd ed.). College Station, TX: Stata Press.

Raudenbush, S. W., & Bryk, A. S. (2002). *Hierarchical linear models: Applications and data analysis methods.* Thousand Oaks, CA: Sage Publications.

Snijders, T. A. B., & Bosker, R. J. (1999). *Multilevel analysis: An introduction to basic and advanced multilevel modeling.* Thousand Oaks, CA: Sage Publications.

Spybrook, J., Raudenbush, S. W., Liu, X. F., Congdon, R., & Martínez, A. (2006). *Optimal design for longitudinal and multilevel research: Documentation for the "Optimal Design" software.* Survey Research Center of the Institute of Social Research at University of Michigan.

Stevenson, B. (2008). The internet and job search. *NBER working paper 13886.* Cambridge, MA: National Bureau of Economic Research.

Swisher, R. R., & Waller, M. R. (2008). Confining fatherhood: Incarceration and paternal involvement among nonresident White, African American, and Latino fathers. *Journal of Family Issues*, *29*(8), 1067–1088.

Uggen, C. (2000). Work as a turning point in the life course of criminals: A duration model of age, employment, and recidivism. *American Sociological Review*, *65*(4), 529–546.

Uggen, C., Vuolo, M., Lageson, S., Ruhland, E., & Whitham, H. K. (2014). The Edge of Stigma: An Experimental Audit of the Effects of Low-Level Criminal Records on Employment. *Criminology*, *52*(4), 627–654.

United States Department of Commerce, Bureau of the Census (1918). *Negro Population: 1790-1915.* Washington, DC: U.S. Government Printing Office.

Visher, C. A., & Kachnowski, V. (2007). Finding work on the outside: Results from the "returning home" project in Chicago. In S. Bushway, M. A. Stoll, & D. F. Weiman (Eds.), *Barriers to reentry? The labor market for released prisoners in post-industrial America* (pp. 80–114). New York: Russell Sage Foundation.

Waldfogel, J. (1994, March). Does conviction have a persistent effect on income and employment? *International Review of Law and Economics, 14*, 103–119.

Western, B. (2006). *Punishment and inequality in America.* New York: Russell Sage Foundation.

Word, D. L., Coleman, C. D., Nunziata, R., & Kominski, R. (2010). *Demographic aspects of surnames from Census 2000.* Washington, DC: U.S. Census Bureau.