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Discrimination at the intersection of Age, Race, and Gender:

Evidence from a lab-in-the-field experiment

by

Joanna N. Lahey[1]
Texas A&M University and NBER

and

Doug R. Oxley
University of Wyoming

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Abstract: Although hiring discrimination has been found in many audit studies and laboratory experiments, little is known about how, why, and for whom this discrimination occurs. This paper combines the new technologies of resume randomization and eye-tracking within a laboratory setting to get a clearer picture of the mechanics of discrimination.

MBA, MPA, HR, and business students participated in this laboratory study. Each was shown 40 resumes with randomized inputs for hypothetical high school graduate applicants to a clerical position which they rated on a Likert (1-7) scale. They then choose two resumes for interview purposes. During this process of rating, their eye movements were tracked, showing where and for how long they looked at relevant portions of each resume.

We found strong evidence of (quadratic) age discrimination based on date of high school graduation as well as evidence for race discrimination based on names. We did not find direct evidence of gender discrimination, but gender interacts with race and age. Results on race*age are particularly striking, with black resumes starting at a lower level but eventually becoming preferred over white resumes for this entry-level job, while white resumes show the opposite pattern. Participants also spent longer times looking at young resumes compared to older resumes, and longer looking at white resumes compared to black resumes.

These results highlight the importance of the intersection of group characteristics for fully understanding the labor market demand for different types of workers.

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I. Introduction

Although employed older workers, on average, have better economic outcomes than employed younger workers, unemployed older people face greater difficulties finding work than do unemployed younger people (e.g. Diamond and Hausman 1984; Hirsch, Macpherson, and Hardy 2000; US Bureau of Labor Statistics 2012). One reason for these difficulties is age discrimination at the hiring level (Lahey 2008). This hiring discrimination can have profound negative consequences on the quality of life for those who are not financially, mentally, or emotionally ready to retire (Nelson 2002). Additionally, already stressed public programs such as Social Security, Medicare, and Disability suffer when older job seekers cannot find work (Burtless and Quinn 2001, 2002; Diamond and Orszag 2002). Less-educated workers, those with a high school degree, are especially at risk should they need to find new employment prior to the ages of Social Security or Medicare receipt (Chan and Stevens 2001; Government Accountability Office [GAO] 2012).

Significant research (Albert et al. 2011; Bendick et al. 1996, 1999; Lahey 2008; see Finkelstein et al. 1995 for a meta-analysis of laboratory work) demonstrates that in field and laboratory settings, employers and laboratory subjects favor resumes from younger job applicants over those from older job applicants. Less work has been done to determine how age discrimination differs against people of different races or genders; a literature review by Posthuma and Campion (2009) finds calls for such research, but no published papers. Additionally, research has mixed findings on what types of people are more likely to discriminate against older workers in hiring (see Perry et al. 1996; and Posthuma and Campion 2009 for literature reviews). Finally, why there is hiring discrimination based on age is still an open question.

This paper addresses that call for further research using a laboratory experiment in which we randomly vary the content of resumes for an entry-level clerical position. We provide resumes that vary by date of high school graduation, indicating that the applicant is between the ages of 36 and 76 to study the effect of age of applicant on hiring. By including names on resumes that signal different races and genders, we examine how age discrimination interacts with race and gender. We then ask MBA, MPA, HR, and undergraduate business students to rate the resumes on a 1-7 Likert scale and bring back their top five rated resumes and ask them to choose their top two choices to bring in for an interview.

On average, we find that the rating of the resumes and the probability of being called in for an interview declines with age of the applicant at first, and then flattens out and even increases at older ages. Age discrimination for this type of position is non-linear and resembles a quadratic. However, when we look at age discrimination by race, blacks show a strikingly different pattern than that for whites. While whites follow the general trend shown in the full results, blacks show a pattern that is exactly the opposite. Blacks have *higher* ratings and are *more* likely to be called in for an interview as they get older, but then this increase flattens out

and scores turn down with age. While this pattern occurs in the Likert ratings for both men and women, the pattern is most pronounced for men. The same pattern holds with the interview outcome for women, but such a small number of black men are chosen for an interview (2% of all applicants, compared to a 5% average for the entire sample), that it is impossible to determine a pattern by age.

We also track for how long each participant views resumes and what portion of the resume each participant looks at and for how long. In this draft we present results on the length of time spent viewing each resume by age and by race. Future work will focus on which parts of the resumes participants view. Preliminary work not shown in this draft suggests that items put on the resume, such as computer work and volunteer training, do have different impacts for older and younger workers and participants do fixate on these items longer for older workers than for younger workers, but more work needs to be done cleaning the eye-tracking data before we can make definitive statements about the reasons for statistical discrimination against older workers.

These results suggest that age discrimination exists for entry-level jobs and that the pattern of discrimination by age depends on the race and gender of the applicant. In addition, for entry-level jobs for high school graduates, discrimination against blacks is highly dependent on the age and gender of the applicant. As high-school educated blacks get older, they are *more* likely to be hired for entry-level positions while corresponding whites are *less* likely to be rated highly or chosen to interview for these positions, up to the point where the ratings between blacks and whites are indistinguishable from one another. After ratings meet each other for the two races, they turn around and black applicants again become less highly rated while white applicants become more highly rated. These results are driven by both men and women in the Likert ratings, but are only driven by women in the interview ratings. We suggest that the name becomes more salient in the interview condition and that age is unable to overcome race discrimination. While more research needs to be done to determine precisely why discrimination against blacks declines with age, we note that these results are consistent with recent results finding that gay black male recent college graduates have better employment outcomes than straight black male recent college graduates, suggesting that intersectionality is not always a bad thing for disadvantaged groups (Pedulla 2014), depending on the type of intersection.

II. Methods

Experimental Design

The study took place at the Brain and Gender Laboratory at Texas A&M University. Subjects were recruited via flyer and were restricted to MBA and MPA graduate students and human resources and business school students more generally. Subject earnings were $20 for the session. One hundred fifty-two participants in the study between January 2013 and January 2014. Two participants were dropped for being non-native English speakers and one participant

was dropped because of a diagnosed learning disability. Total time allotted to the study was one hour, but the majority of participants finished in less than 45 minutes.

Participants rated resumes for an open administrative assistant position. The resumes they viewed were created randomly using the program from Beasley and Lahey (2008) and used an online database of resume inputs drawn from actual resumes and from previous studies on discrimination. Variation included age, gender, race, high school attended, and work experience. Fictional applicant names indicated race (Bertrand and Mullainathan 2004, Figlio 2005), gender (http://www.babynamewizard.com/), and socioeconomic status (Figlio 2005). Addresses were drawn from the Houston, Texas metropolitan area. High schools were drawn from the greater Texas area.

Using the program, we generated 40 unique resumes for each participant, for a total of 6,080 unique resumes. Some resume line items were repeated across participants, however, each participant only saw each specific line item at most once. 50% of the resumes were given female names, 9% were given black names, and 13% were given Hispanic names. These percentages were chosen to reflect the current composition of clerical workers in Texas according to the CPS and are shown in Table 1.

Procedure

Upon entering the laboratory, participants read an informed consent form and provided consent. Participants' eyes were calibrated with eye tracking equipment to observe where on screen a participant was looking. Participants were told that the purpose of the research was to study how hiring managers make job interview decisions. They were given the description of a clerical position and asked to evaluate applicants for that position. Participants then viewed five sample resumes, and, following that, rated 40 candidates' resumes one at a time for a hypothetical clerical position using a Likert scale regarding the ability of the candidate to fulfill the position. Participants rank ordered their top two resumes and their top one resume for fulfilling the position from a presentation of their top five most highly rated resumes (with the more recent resume presented in the case of rating ties). Participants were allowed to move back and forth between their top five picks to help them make their choices. After rating the resumes, participants completed an implicit association test (IAT) using older and younger faces (Greenwald, Nosek and Banaji 2003; Nosek, Greenwald and Banaji 2007). They then completed questions for a social distance scale (following Bogardus 1933) for various work roles and at various ages and completed a series of questions to measure stereotypes of older workers (Henkens 2005). Participants answered questions regarding their concern and effectiveness of a variety of public policy issues. Finally, participants answered a variety of demographic questions. After they completed the survey, and participants were debriefed and paid.

The demographics of our sample reflected a variety of people affiliated with the Texas A&M community, with an intended bias towards those from the Mays Business School. As

shown in Table 1, 38% of participants were at the Masters level and 1% were PhD students. 38% were upper division undergraduates and 23% were lower division undergraduates. 76% of participants studied business, 13% studied government, 6% studied humanities, and 5% studied other social sciences. The average age was 22 and 56% of the sample was female. The sample was 89% White, 7% Asian, and 5% Black or African American. 15% of participants reported that they identify as Hispanic or Latino.

Empirical Methods and Theoretical predictions

We first test for the existence of age, race, and gender discrimination on the entire sample for each potential type of discrimination in a naïve regression framework.

$$(1) \qquad Hireability_r = \beta_1 * Age_r + \beta_2 * Age_r^2 + \gamma$$

Here $Hireability_r$ is either a Likert (1-7) score with 7 as the highest rating and 1 as the lowest rating, or it is a binary variable indicating whether or not the resume was picked as one of the top two resumes. *Age* is the age of applicant on the resume. Some regressions include a full set of subject fixed effects, γ, while others are clustered by subject.

We then explore how the effect of age varies by race and by gender, both graphically and in a regression framework.

$$(2) \qquad Hireability_r = \beta_1 * Age_r + \beta_2 * Age_r^2 + \beta_3 * Group_r + \beta_4 * Group_r * Age_r + \beta_5 * Group * Age_r^2 + \gamma$$

III. Results

Table 1 provides summary statistics for the resume sample and for the participant sample. The average Likert score given to all participants was 4.63, with a standard deviation of 1.39. By design, the probability of an interview across all applicants was 2/40 = 0.05. This probability of interview is similar to those found in audit studies for high school graduates applying to entry-level positions. The standard deviation of the probability of an interview was 0.22.

We first use local weighted regression graphs to show patterns in the data based on age. Figure 1a shows how participants rate resumes by age of the resume applicant using a 1-7 Likert scale. Here we see a decrease by age until before age 70 where there is a slight up-tick in ratings by age. Similarly, Figure 1b shows these same results using the binary probability of an interview (literally, being chosen as a top two candidate). Here we again see a decrease in the probability of an interview by age, but here the increase in probability starts earlier, in the mid-50s and is more pronounced. These graphs suggest that the effect of age on hireability outcomes may be quadratic.

We test the shape of the curve using equation (1). Table 2 provides baseline results for the two *Hireability* outcomes. Columns (1) and (2) show numerically the pattern provided in Figure 1a for the resume Likert rating, but the coefficients on *age* and age^2 are not significantly different from zero. The results in columns (3) and (4), using the interview outcome both show the expected quadratic shape and are significant at the 5% level. These results provide suggestive evidence of decreased Likert ratings with age and significant evidence that there is a quadratic effect of age on whether or not a resume is chosen as a top two resume.

Recall that 9% of our resume sample was designed to show applicants with traditionally black names. In Figures 2a and 2b, we separate out the effects of age on both hireability outcomes for blacks and whites. Figures 2a and 2b again demonstrate the same patterns of quadratic decline and increase by age for whites. However, the pattern for blacks is strikingly different. In Figure 2a, blacks start at a much lower Likert rating than whites and their rating gradually *increases* with age until the mid-50s. At that point it decreases again to a value slightly above the starting point. Figure 2b shows a similar pattern of a positive quadratic for whites and a negative quadratic for blacks for the interview outcome, though the probability of interview for blacks never reaches the probability of interview for whites. Fitting these data to a quadratic allows us to fit confidence intervals around the outcomes, as in Figures 3a and 3b. Figure 3a demonstrates that although blacks start at the beginning of the age distribution as being rated lower than whites, they actually do surpass the ratings of whites with a statistically significant difference in the late 50s, early 60s before having their ratings drop below those of whites again in the late 70s. These differences are not statistically different for the interview outcome, shown in Figure 3b, although very few blacks are chosen for interviews, leading to large confidence bands around the lines for black.

Table 3, Panel I, demonstrates the importance of interacting race and age on the hireability outcomes, as in equation (2). Columns (1) and (3) show only the effect of having a black name controlling for an age quadratic, but not interacting that quadratic with race. Although the effect of having a black name has a negative sign in these regressions, it is not significant for either outcome. However, when race is interacted with the quadratics, the main effects and interacted effects become significant at standard levels.

Figures 4a-4d separate out the local weighted regression age/race charts by gender. The Likert outcomes in Figures 4a and 4b look similar by gender, although the pattern of Likert ratings are higher for women than they are for men. The interview results in Figures 4c and 4d show similar patterns for whites of both genders, but the results for blacks are less consistent, specifically for the men. Again, results for women show a higher probability for an interview than for men. The unusual shape to men's results is likely due to the low probability of being brought in for an interview at any age; only seven black men resumes were chosen as "top two," while fourteen black women's resumes were chosen as "top two."

Table 3, Panels II and III, translate these data into regression results by gender, again using equation (2). Here the signs for panels (2) and (4) are consistent across all specifications, but the significance varies in unpredictable ways across the specifications. Interactions for women are marginally significant across both specifications, while only the Likert outcomes show significant interactions for men. Black men are significantly less likely to be interviewed; indeed, only 7 resumes for black men were chosen for interviews.

Table 4 presents preliminary eye-tracking results. Here we measured the total time spent looking at each resume both in the Likert rating period and in the interview stage. The pattern of these results maps to the pattern shown for the ratings. When race is not controlled for, time spent on resumes shows a marginally significant upside-down U shape with respect to age. These results become more significant when the effect of black names is allowed to vary separately by age. Again, black names show the opposite pattern with age as whites. On average, respondents spend less time looking at black names as white names, but this effect diminishes with age of the resume.

IV. Discussion

It is important to note that our results only hold for a specific segment of the labor force. The job advertised was that of an entry level administrative assistant position and the applicant pool provided to the participants has less than a year of post high school education. These same patterns, particularly those by race, might not be found for a position requiring more education or experience. Future research should explore these differences by labor market segment.

These results also underscore the importance of looking at not only one group characteristic when doing an audit or laboratory discrimination study. Looking only at the labor market experience of black resumes or white resumes provides a limited view of the labor market, and limiting to only inexperienced younger workers only provides a limited snapshot of differential treatment by group characteristic. The labor market facing any one group may vary systematically by another group characteristic. Awareness of and testing for intersectionality is important.

Fortunately, using large samples and modern technology, it is possible to incorporate more heterogeneity in test resumes so that each study can get a broader picture of the labor market that it is testing. Future experimenters can easily do power calculations for sample size using G*Power and create large heterogeneous stimuli using the program from Lahey and Beasley (2009), both available for free online. Using these programs incorporating intersectionality requires little additional marginal effort over running a study that does not allow for heterogeneous effects.

The results shown in this short paper are the first pass in a large project examining how people view resumes. Related work demonstrates which resume characteristics increase or decrease ratings and interview probabilities for different groups in order to get at the question of why there is discrimination and how applicants can mitigate the effects of such discrimination.

Future work on this part of the project will incorporate different parameterizations for age and different cuts of the age universe in order to increase power and interpretation. It will also incorporate different measures of socioeconomic status taken from undergraduate psychology student ratings of the first names, addresses, and high schools used in the resumes. Resumes will also be rated on "quality" as predicted in a regression framework with all elements of the resume except those indicating group status. We will also explore how participant characteristics interact with the characteristics of the resumes.

Additional future work will incorporate the more of the results of eye-tracking views, essentially tracking where people are looking when they view and rate these resumes. Finally, we plan to repeat this experiment on actual human resource professionals to determine how their ratings and views differ from those of our student sample.

V. Conclusion

This paper uses a laboratory experiment on graduate and undergraduate business, policy, and human resource students. Participants are asked to rate 40 resumes for an entry-level clerical position on a Likert (1-7) scale and to choose the top two resumes to come in for an interview. Our results demonstrate that these ratings for resumes decrease with age, then slightly increase. When resume analysis is separated by race of the applicant, white resumes again show this pattern, but black resumes show an opposite pattern, increasing with age, then decreasing. The patterns of results are similar for age and race for time spent on each resume. On average, women have higher ratings than men, but the significance of the results differs between the two outcome variables by gender.

These results demonstrate that intersectionality exists and different group sub-populations may have different labor market experiences than the average. Future work should take care to use the technology available to allow for more of these differences in order to get a more complete view of the labor market.

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Figures

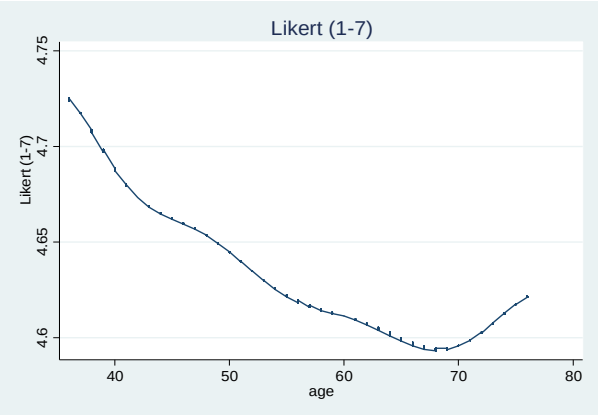
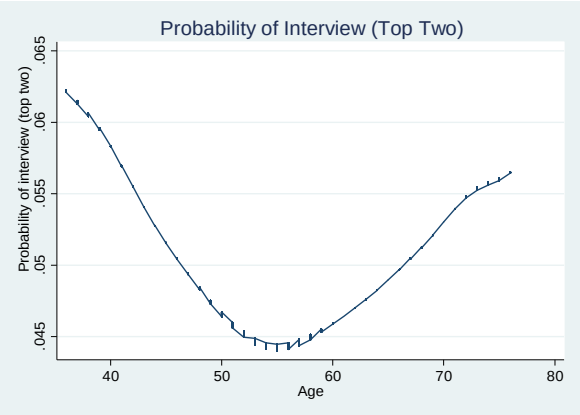


Figure 1a



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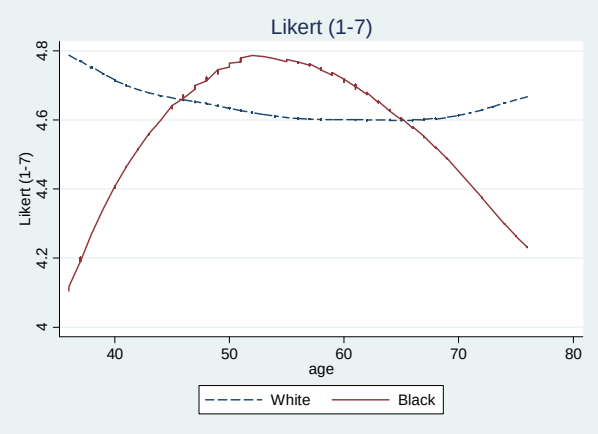

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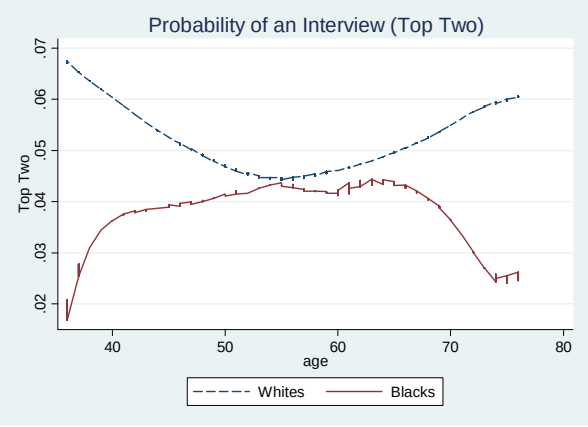


Figure 2b

Notes: Results from a Local Average Regression (lowess) command.

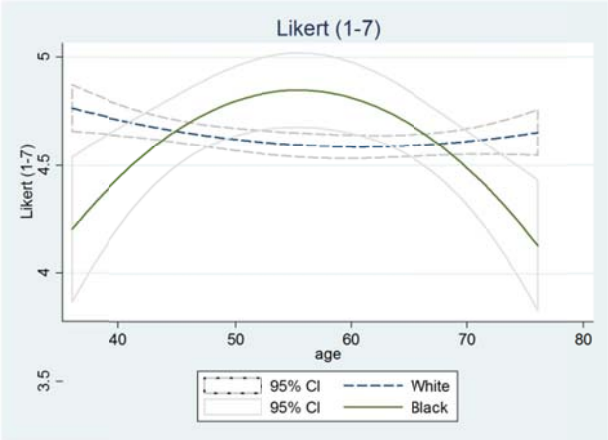


Figure 3a

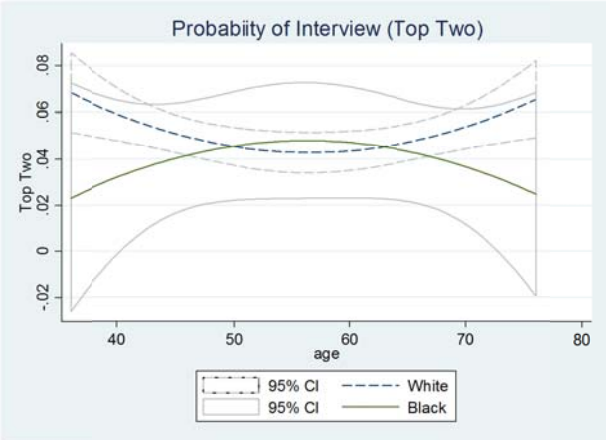
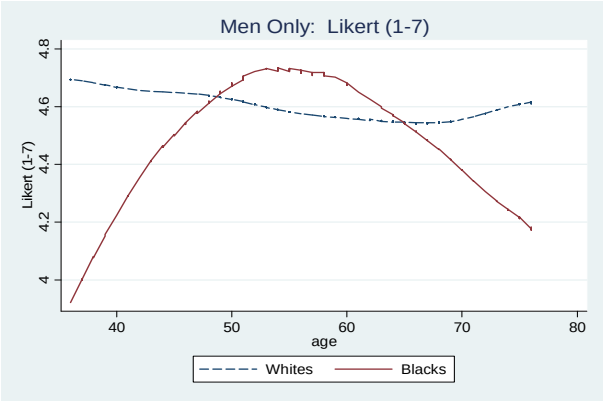
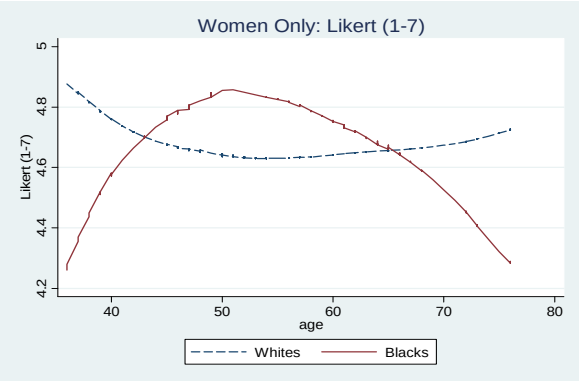
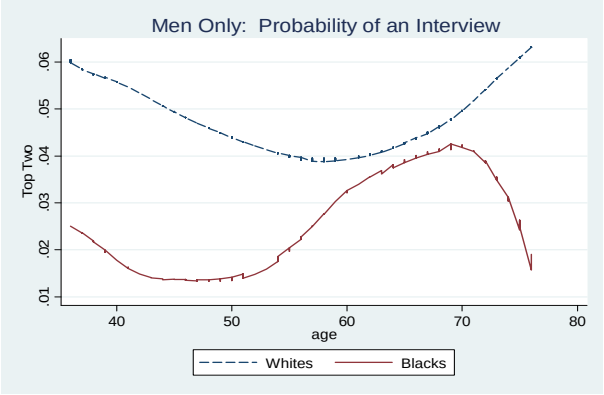
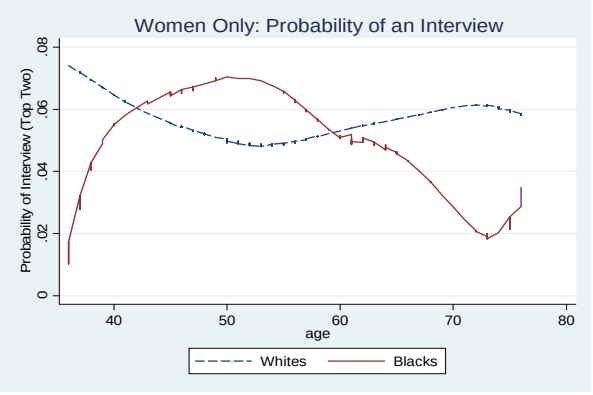


Figure 3b









Figures 4a-4d

Notes: Results from a Local Average Regression (lowess) command.

Table 1: Summary Statistics

	Mean	SD
Resume Characteristics		
Female	0.50	0.50
Black	0.09	0.29
Hispanic	0.13	0.34
Age	56.20	11.78
Participant Characteristics		
Female	0.56	
White	0.89	
Asian	0.07	
Black	0.05	
Hispanic	0.15	
MA student	0.38	
PhD student	0.01	
Upper division	0.38	
Lower division	0.23	
Business	0.76	
Government	0.13	
Social Science	0.05	
Humanities	0.06	
Age	21.98	2.84
Ratings		
Likert (1-7)	4.63	1.39
Top Two	0.05	0.22
Eye-tracking		
First pass (in sec)	16.34	10.16
Total seconds	17.60	12.00
# fixations 1st pass	30.83	22.43
# fixations total	33.05	26.16

Note: 5960 resumes.

Table 2: Baseline Results by Age of Resume

	Likert rating (1-7)		Chosen to interview (top two)	
	(1)	(2)	(3)	(4)
age	-0.0144	-0.0151	-0.0054**	-0.0057**
	(0.0157)	(0.0155)	(0.0025)	(0.0024)
age squared	0.0001	0.0001	0.0000**	0.0001**
	(0.0001)	(0.0001)	(0.0000)	(0.0000)
participant dummies	No	Yes	No	Yes
Observations	5,960	5,960	5,960	5,960
R-squared	0.001	0.135		

Notes: Robust standard errors in parentheses are clustered on subject in columns (1) and (3). Columns (1) and (2) provide results from ordinary least squares regression. Columns (3) and (4) provide probit regression results and report marginal effects.
*** p<0.01, ** p<0.05, * p<0.1

Table 3: Effect of black names with and without age interactions

	Likert rating (1-7)		Chosen to interview (top two)	
	Panel I: All			
	(1)	(2)	(3)	(4)
black name	**-0.0053**	-3.294***	**-0.0074**	-0.1390***
	(0.0512)	(1.2090)	**(0.0077)**	(0.0509)
black*age		**0.1180*** **		**0.0166** **
		(0.0445)		**(0.0070)**
black*age squared		**-0.0010** **		**-0.0001** **
		(0.0004)		**(0.0001)**
age	-0.0151	-0.0295*	-0.0057**	-0.0073***
	(0.0155)	(0.0167)	(0.0023)	(0.0025)
age squared	0.0001	0.0002	0.0001**	0.0001***
	(0.0001)	(0.0001)	(0.0000)	(0.0000)
	Panel II: Women			
	(1)	(2)	(3)	(4)
black name	**0.0031**	-3.321*	**-0.0064**	-0.147**
	(0.0797)	(1.9160)	**(0.0146)**	(0.0696)
black*age		**0.131***		**0.0249***
		(0.0708)		**(0.0147)**
black*age squared		**-0.00123***		**-0.0002***
		(0.0006)		**(0.0001)**
age	-0.0174	-0.0301	-0.005	-0.00707*
	(0.0217)	(0.0231)	(0.0039)	(0.0041)
age squared	0.0001	0.0003	0.0000	0.0001*
	(0.0002)	(0.0002)	(0.0000)	(0.0000)
	Panel III: Men			
	(1)	(2)	(3)	(4)
black name	**-0.0502**	-7.243***	**-0.0256** **	-0.1070
	(0.0841)	(1.9730)	**(0.0125)**	(0.0724)
black*age		**0.264*** **		**0.0131**
		(0.0725)		**(0.0178)**
black*age squared		**-0.00231*** **		**-0.0001**
		(0.0006)		**(0.0002)**
age	-0.0104	-0.0330	-0.0112***	-0.0117***
	(0.0226)	(0.0237)	(0.0039)	(0.0041)
age squared	0.0001	0.0003	0.0001***	0.0001***
	(0.0002)	(0.0002)	(0.0000)	(0.0000)

Note: Results include participant fixed effects. Panel I has 5,960 observations. Panel II columns (1) and (2) have 2,982 observations. Panel II columns (3) and (4) have 2,521 observations; 23 participants predicted failure perfectly and were dropped. Panel III columns (1) and (2) have 2,978 participants. Panel III columns (3) and (4) have 2,201 participants; 39 participants predicted failure perfectly and were dropped.

Table 4: Total Seconds Spent on Resume by Age of Resume

	Likert rating (1-7)		Chosen to interview (top two)	
	(1)	(2)	(3)	(4)
age	-0.228*	-0.1470	-0.3000**	-0.2340**
	(0.1350)	(0.1120)	(0.1450)	(0.1180)
age squared	0.00216*	0.0014	0.0028**	0.0022**
	(0.0012)	(0.0010)	(0.0013)	(0.0011)
black name			-21.57*	-25.81**
			(11.54)	(10.38)
black*age			0.7970*	0.9590**
			(0.4320)	(0.3840)
black*age squared			-0.0073*	-0.0088**
			(0.0039)	(0.0034)
participant dummies	No	Yes	No	Yes
Observations	6,249	6,249	6,249	6,249
R-squared	0.001	0.335	0.002	0.336

Notes: Robust standard errors in parentheses are clustered on subject in columns (1) and (3).
*** p<0.01, ** p<0.05, * p<0.1