Unbundling the Effects of College on First-Job Search: Returns to Majors, Minors, Internships, Study Abroad, and Computer Skills

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SOLE - May 4, 2024

Initial match between new college graduates and their first job

The importance of college graduates' first jobs

- ▷ Growth in college-educated workers and college premium (Autor et al., 2020)

- ▷ Long-term effects of initial labor market conditions and first jobs
  (von Wachter, 2020; Arellano-Bover, 2024)

⇒ The annual sorting of college seniors & first jobs is key, from individual and aggregate perspectives

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Labor demand for newly minted US college graduates

- ▷ A college education is a multidimensional package

- ⇒ What are the causal effects of majors, minors, and other heterogeneous college experiences on first-job search?

This paper

Large-scale résumé audit study

- ▷ Submitted 36,880 fictitious résumés of graduating seniors
- ▷ Randomly assigned résumé characteristics
- ▷ Spring-summer seasons of 2016 and 2017

Estimate causal callback returns to:

1. Majors
2. Minors
3. Internship experience
4. Study Abroad experience
5. Computer skills

Key features of the audit study

Callback returns: **callback as outcome measure**
- ▷ Limitations, yet simple and conceptually attractive
- ▷ More callbacks $\rightarrow$ greater choice set $\rightarrow$ higher first-job quality
- ▷ Tight 2016-17 labor market:
  - ▷ Callback rate more likely to proxy job quality rather than employment margin

Targeted, large-sample focus on labor-market entrants and first jobs

Map job postings' text into occupation codes
- ▷ *Heterogeneity*: Ex-post occupation wage growth
- ▷ *Heterogeneity*: Skills requirements
  - ▷ Analytical skills
  - ▷ Interpersonal skills

Are college graduates lacking soft, non-cognitive, life skills?

New Grads Have No Idea How to Behave in the Office. Help Is on the Way.

As the Class of 2023 enters the workforce, employers are seeing a lack of the skills necessary to navigate the office. The solution: instruction on how to send an email, the right way to buttonhole the boss and what not to wear.

JUSTIN METZ

By *Lindsay Ellis* Follow

Updated June 16, 2023 12:01 am ET

Are college graduates lacking soft, non-cognitive, life skills?

Workplace News & Trends › Employee Relations › Employers Say Students Aren't Learning Soft Skills in College

NEWS

Employers Say Students Aren't Learning Soft Skills in College

Part 2: College grads are deficient in critical thinking, teamwork, speaking and writing, executives say

October 21, 2019 | Dana Wilkie

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Literature contribution

1. Returns to college field of study

Altonji et al., 2012; Altonji et al. 2016; Hastings et al., 2013; Nunley et al., 2016; Kirkeboen et al., 2016; Bleemer and Mehta, 2022; Choi et al., 2023

- → Causal first-job callback returns to eight common US majors
- → First estimates of returns to *minors*

2. Returns to other, heterogeneous college investments

Kessler et al., 2019; Cheng and Florick, 2020; Margaryan et al., 2022

- → Causal returns to internships, study abroad experience, and computer skills
- → Broadly representative of students at large, public flagship universities
- → Precise estimates of returns to study abroad, link to soft skills

3. First-job matching and young workers' labor market entry

Kahn, 2010; Oreopoulos et al., 2012; Altonji et al., 2016; Weinstein, 2018; Schwandt and von Wachter, 2019; Weinstein, 2022; Arellano-Bover, 2021, 2022, 2024

- → Comprehensive characterization of labor demand for college labor-market entrants
- → Show what college experience features matter most for first-job matching

Experimental Design

The audit: Job ads

▷ Two rounds: April–July 2016 and April–July 2017

▷ Popular internet job board

→ Create job bank:
  ▷ White-collar jobs (sales, banking, customer service, finance, insurance, marketing)
  ▷ Not requiring: training/certifications, foreign languages
  ▷ Jobs posted in the last seven days

→ Randomly selected 9,220 unique job postings from job bank ▸ occ. distribution

The audit: Résumés with randomly assigned attributes (Lahey and Beasley, 2009)

12 public flagship universities across the five Census regions

Estimate callback returns to five attributes:

1. Major: Economics, Biology, Chemistry, Finance, Marketing, Psych., Anthropology, Philosophy
2. Minor: No minor, History, Math
3. Internship: None, social internship (sales), quantitative internship (analyst)
4. Study abroad: Yes/no
5. Computer skills: None, basic, data analysis, programming, data analysis + programming

Other common résumé characteristics ▸ more

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⇒ **36,880 résumés sent to 9,220 unique job postings** (four per job ad)

→ *Callback rate = 14.95%*

Empirical Approach

Empirical Approach

Estimate versions of:

$$\text{Callback}_i = \delta + \mathbf{R}_i'\beta + \mathbf{X}_i'\gamma + \Phi_{u(i)} + \psi_{j(i)} + \nu_i$$

- ▷ $\mathbf{R}_i'$ = résumé characteristics vector (majors, minors, internships, study abroad, computer skills)
- ▷ $\mathbf{X}_i'$ = applicant's race/ethnicity and gender
- ▷ $\Phi_{u(i)}$ = university fixed effects
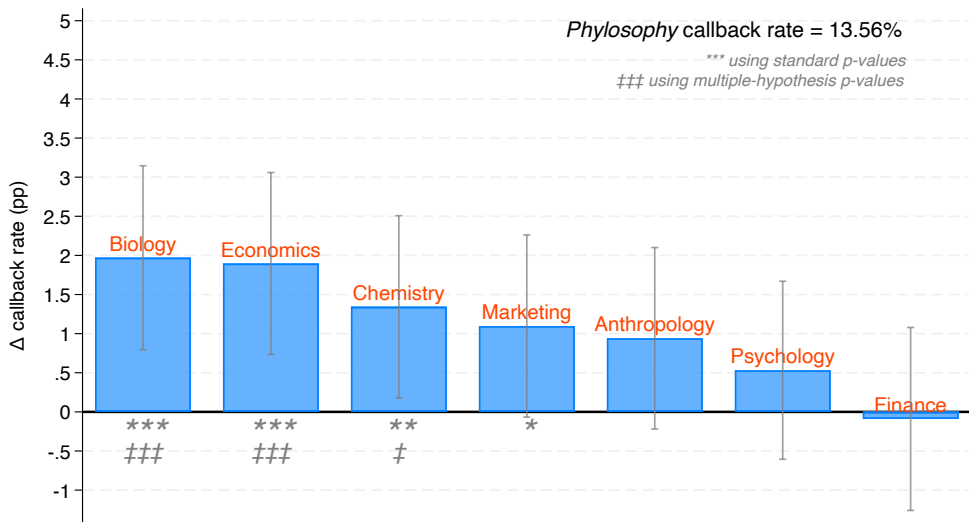- ▷ $\psi_{j(i)}$ = job ad fixed effects

Standard errors clustered at the job ad level

Report standard p-values and p-values that account for multiple hypothesis testing
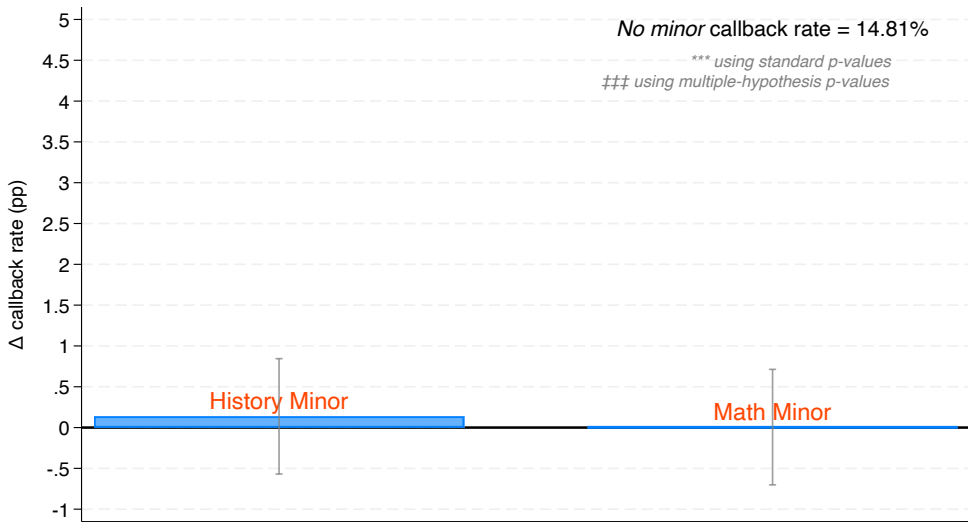(Romano and Wolf, 2005a,b; 2016)

Main Results

Majors matter
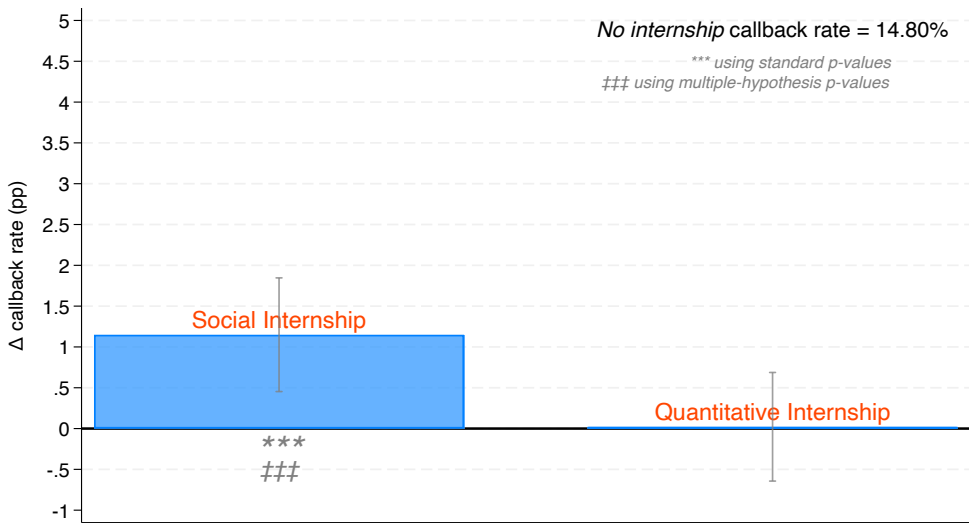
p-value (standard) of joint test where H_0 is equal callbacks across majors = **0.002**
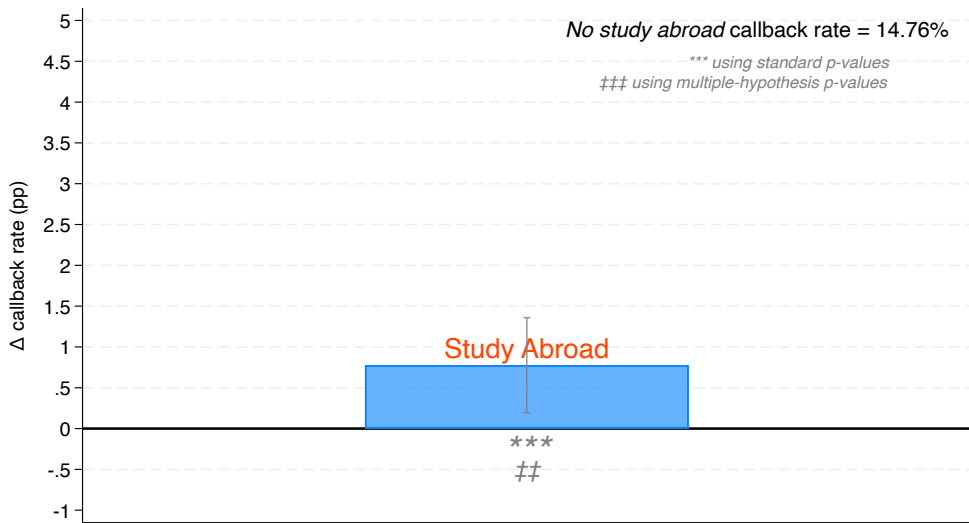
The irrelevance of Minors
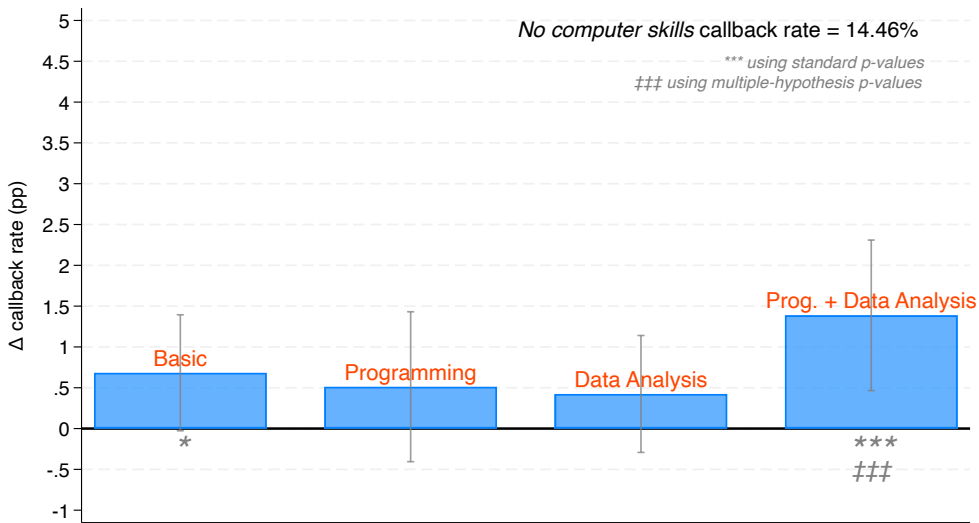
Social internships help, quantitative ones don't

Positive returns to Study Abroad experience

Only advanced computer skills help

Heterogeneous Returns

Job ad text → occupations → heterogeneity

Split sample by above/below median:

1. Ex-post occupational wage growth (2016/17–2019/20) *(ACS)*
2. Analytical skills intensity *(O*NET)*
3. Interpersonal skills intensity *(O*NET)*

Job ad text → occupations → heterogeneity

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Select heterogeneity results:

▷ Majors matter more in highly analytical-skill-intensive jobs ▸ go
▷ Minors' irrelevance holds across subsamples ▸ go
▷ Social internships more valuable in highly interpersonal-skill-intensive jobs ▸ go
▷ Study abroad more valuable in highly interpersonal-skill-intensive jobs ▸ go
▷ Advanced computer skills similarly valuable in low/high analytical-skill jobs ▸ go

Conclusion

Large-scale audit study on US college graduates' first-job match

▷ Causal callback returns to curricular and extracurricular experiences:
    Majors, minors, internship experience, study abroad, computer skills

▷ New insights into labor demand in this crucial matching

▷ Precise zero returns to History/Math minors

▷ Firms value analytical majors (Bio, Econ) and advanced computer skills

▷ Firms value social/life skills of social internships and study abroad

▷ Conclusions could vary: business cycle (bust years) or technological change
    → Small yet revealing window in the labor market entry of 2016–17 cohorts

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Thanks!
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APPENDIX SLIDES

Majors by analytical skills
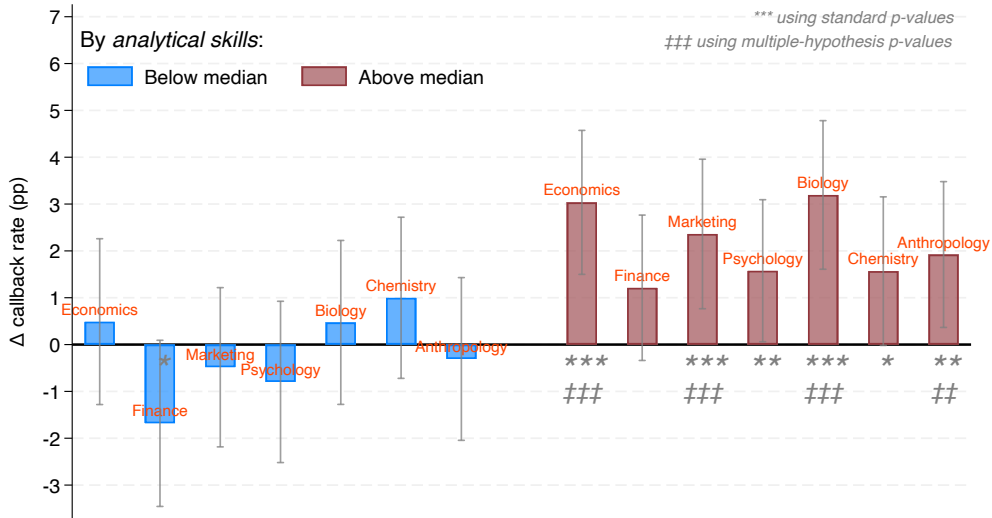
◂ back

Minors are irrelevant across the board
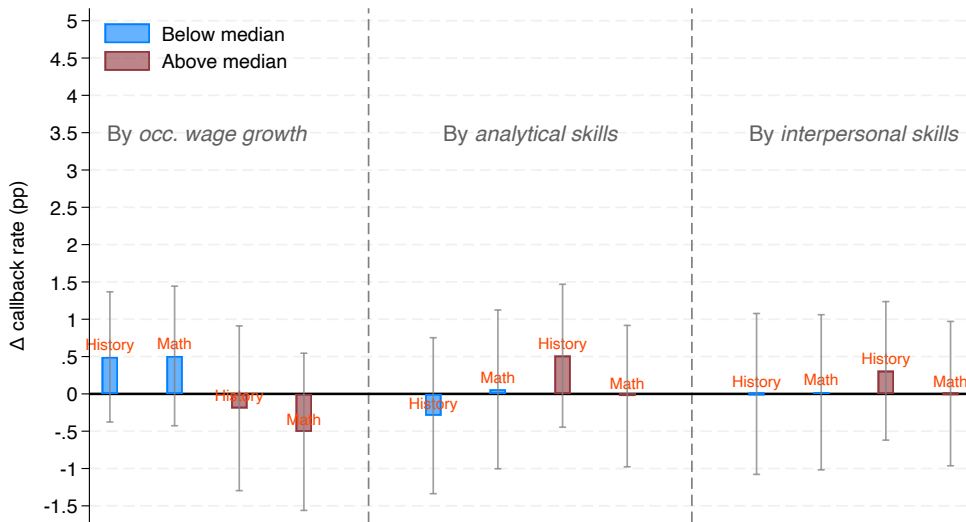
Internships by interpersonal skills
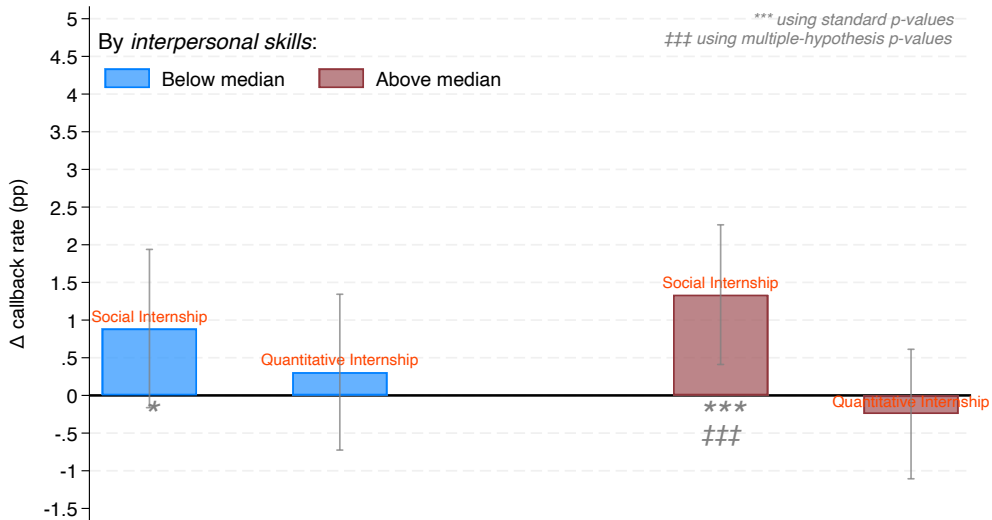
▸ back

Study abroad by interpersonal skills
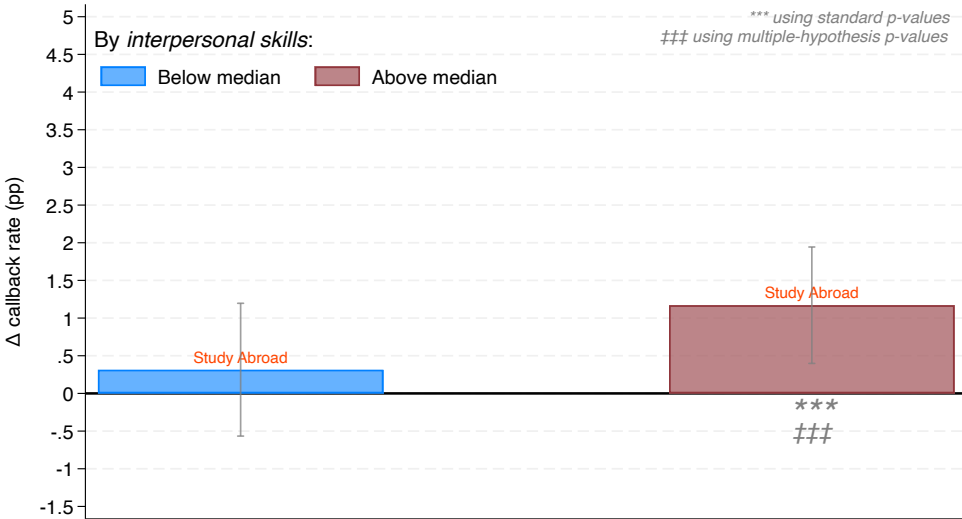
Computer skills by analytical skills

*** using standard p-values
‡‡‡ using multiple-hypothesis p-values

By *analytical skills*:

Below median   Above median

Δ callback rate (pp)

Basic   Programming   Data Analysis   Prog. + Data Analysis   Basic   Programming   Data Analysis   Prog. + Data Analys

**   *
‡
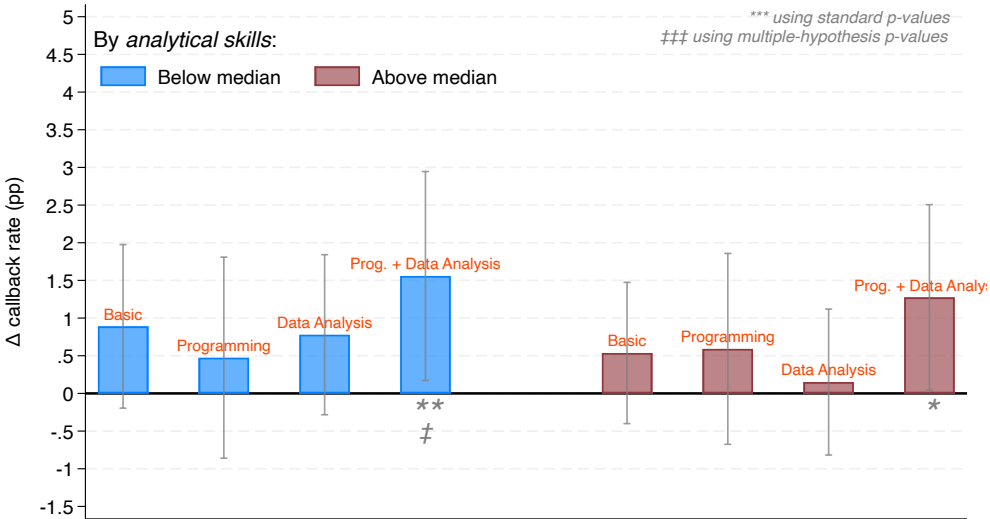
3-digit occupation distribution of job postings ▸ back

Bar chart titled "% of job postings" (x-axis):

Occupation	% of job postings
Sales Representatives (Services)	19.9
Information & Record Clerks	14.4
Financial Specialists	13.6
Business Operations Specialists	7.6
Sales Representatives (Wholesale & Manufacturing)	6.4
Financial Clerks	6.4
Supervisors of Sales Workers	5.8
Advertising, Marketing, Promotions, Public Relations, & Sales Managers	5.5
Media & Communication Workers	3.1
Operations Specialties Managers	2.8
Retail Sales Workers	2.5
Secretaries and Administrative Assistants	2.3
Supervisors of Office & Administrative Support Workers	2.2
Other Sales and Related Workers	1.6
Other Office and Administrative Support Workers	1.4
Other	4.4

Table A1: Summary Statistics for and Probabilities Assigned to Résumé Characteristics

Résumé Characteristic	Mean/Std. Dev.	Assigned Probability	Résumé Characteristic	Mean/Std. Dev.	Assigned Probability	Résumé Characteristic	Mean/Std. Dev.	Assigned Probability
Demographic–Black	0.329 (0.470)	0.333	Major–Philosophy	0.124 (0.329)	0.125	Computer–Data Analysis	0.250 (0.433)	0.250
Demographic–Hispanic	0.336 (0.472)	0.333	Major–Chemistry	0.125 (0.330)	0.125	Computer–Basic Skills	0.250 (0.433)	0.250
Demographic–Women	0.500 (0.500)	0.500	Major–Biology	0.124 (0.329)	0.125	Language–Native Fluent	0.082 (0.275)	0.083
University–Southeast #1	0.082 (0.275)	0.083	Major–Psychology	0.126 (0.332)	0.125	Language–Native Proficient	0.085 (0.279)	0.083
University–Southeast #2	0.085 (0.279)	0.083	Minor–Mathematics	0.252 (0.434)	0.250	Language–Nonnative Fluent	0.085 (0.277)	0.083
University–Midwest #1	0.083 (0.276)	0.083	Minor–History	0.245 (0.430)	0.250	Language–Nonnative Proficient	0.085 (0.279)	0.083
University–Midwest #2	0.083 (0.275)	0.083	GPA–3.8 and 4.0	0.250 (0.433)	0.250	Volunteer Work	0.250 (0.433)	0.250
University–Midwest #3	0.085 (0.278)	0.083	GPA–3.4 and 3.6	0.248 (0.432)	0.250	College Job–Sales	0.335 (0.472)	0.333
University – Northeast 1	0.084 (0.277)	0.083	GPA–3.0 and 3.2	0.250 (0.433)	0.250	College Job–Campus Employment	0.337 (0.473)	0.333
University–Northeast #2	0.085 (0.279)	0.083	Intern–Marketing Analyst	0.083 (0.276)	0.083	Study Abroad–Italy	0.035 (0.185)	0.031
University–Southwest #1	0.084 (0.278)	0.083	Intern–Financial Analyst	0.083 (0.277)	0.083	Study Abroad–Mexico	0.035 (0.184)	0.031
University–Southwest #2	0.080 (0.271)	0.083	Intern–Marketing Sales	0.083 (0.276)	0.083	Study Abroad–China	0.037 (0.188)	0.031
University–West #1	0.083 (0.276)	0.083	Intern–Financial Sales	0.082 (0.274)	0.083	Study Abroad–Dubai	0.035 (0.184)	0.031
University–West #2	0.084 (0.278)	0.083	Intern–General Research	0.083 (0.275)	0.083	Study Abroad–Argentina	0.036 (0.186)	0.031
Major–Finance	0.124 (0.330)	0.125	Intern–General Sales	0.082 (0.275)	0.083	Study Abroad–South Africa	0.036 (0.186)	0.031
Major–Marketing	0.126 (0.332)	0.125	Computer–Programming and Data Analysis	0.124 (0.330)	0.125	Study Abroad–Japan	0.036 (0.186)	0.031
Major–Anthropology	0.124 (0.329)	0.125	Computer–Programming	0.126 (0.331)	0.125	Cover Letter	0.250 (0.433)	0.250

Notes: Mean and standard deviations for each variable capturing the randomly assigned résumé credentials as well as the assigned probabilities. Each variable name includes a group identifier, such as "Demographic", "University", "Major", etc., followed by the name of the variable.

▸ back