Pre-Analysis Plan: Nonbinary Hiring Discrimination and the Politicization of Pronouns

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Unfortunately, shortly after beginning the project on May 15, an issue arose where Google was identifying email accounts as fraudulent and shutting down access. As a result, the research design was modified to (1) use a different email provider and (2) prioritize not being detected as fraudulent by both the email provider and job boards. This has resulted in a meaningful change in how data is collected.

Background

A significant amount of research has evaluated labour market discrimination faced by women, racial minorities, and sexual minorities. However, limited research exists evaluating labour market discrimination faced by transgender people. This research is warranted: from the 2015 US Transgender Survey, 46% of respondents report being verbally harassed and 9% physically attacked in the last year for being transgender. Further, from the same survey 30% of respondents report being fired, denied a promotion, or otherwise mistreated in the work place in the last year (James et al., 2016). At the same time, the transgender population is growing significantly among younger generations. Data from the Pew Research Centre shows that while only 0.3% of Americans 50 or over identify as transgender, this percentage is 1.6% for those 30-49 and 5.1% for those 18-29. Further, under the transgender umbrella nonbinary people are the majority, making up around two thirds of the transgender population (Brown, 2022).

In recent years, use of the gender-neutral pronouns like “they/them” and the convention of asking for and declaring preferred pronouns (at the start of meetings, in email signatures, etc.) has become politicized. Whether to share pronouns is divisive in and of itself, with opinion split along political lines. A YouGov poll conducted in the United States shows that while 40% of Republicans think that “people should generally not say / display their pronouns unless asked,” that holds for only 10% for Democrats (Ballard, 2022). As a result, sharing any pronouns (whether gender neutral or binary “he/him,” “she/her”) may act as a (left-leaning) political signal, regardless of an individual’s apparent gender. As a result, when evaluating response to “they/them” pronoun disclosure it is important to parse out the additional political signals at play.

A resume audit study design will be leveraged to estimate hiring discrimination against nonbinary applicants (signaled on resumes via “they/them” pronouns listed below the name) and cisgender applicants who disclose pronouns (signaled on resumes via binary pronouns congruent with name-implied sex—for example, “she/her” for Emily and “he/him” for Jacob). Outcomes among these two treatment groups will be compared to a control applicant who does not disclose pronouns on their resume. Data collection will include resume characteristics, job posting text, employer information, and employer response to application (this will be done via phone and email monitoring). This will allow for statistical testing of differences in means across groups and estimation of how treatment (pronoun disclosure) and its interactions influence employer response.

Study Timeline

Tasks	Start Date	Duration
Send fictitious resumes to job postings	May 18, 2023	22 weeks
Preliminary analytics, power analysis update	July 15, 2023	2 weeks
Collect employer responses	May 15, 2023	30 weeks
Final analysis and write up	October 20, 2023	6 months

Timeline may be extended if target sample sized is not reached in 22 weeks.

Experimental Design

A. Geographies

Fictitious resumes will be sent in the following geographies:

CBSA	State	Population		2020 Presidential Votes		Category
		Count	Density	Democratic	Republican	
Denver-Aurora-Lakewood	CO	2,967 K	356	61%	36%	Democratic
Colorado Springs	CO	746 K	278	42%	54%	Republican
Salt Lake City	UT	1,233 K	160	52%	43%	Democratic
Provo-Orem	UT	648 K	120	26%	68%	Republican
Seattle-Tacoma-Bellevue	WA	3,980 K	678	67%	30%	Democratic
Spokane-Spokane Valley	WA	582 K	103	44%	52%	Republican

Pairs of CBSAs were selected that are (1) in states which have legislation prohibiting labour market discrimination on the basis of both sexuality and gender identity, (2) have a population of at least 500K, and (3) where one can be categorized as Democratic and the other Republican. CBSA population data is sourced from the United States Census Bureau (2021a), land square footage from TIGERweb (United States Census Bureau, 2020), and 2020 Presidential voting records from the MIT Election Data and Science Lab (2018).

B. Occupations

Fictitious resumes will be sent to the following occupations:

Occupation	Worker Count	Worker Composition			Customer Interaction	
		% Male	% Female	Category	Score	Category
Receptionist	638 K	9%	91%	Female-Dominated	87	High
Cashier	739 K	28%	72%		86	
Housekeeper	722 K	15%	85%		58	Medium
Certified Nursing Assistant	804 K	11%	89%		47	Low
Administrative Assistant	1,499 K	6%	94%		47	
Retail Salesperson	1,332 K	62%	38%	Non-Dominated	93	High
Server	527 K	36%	64%		75	
Cook	1,041 K	59%	41%		52	Medium
Baker	122 K	44%	56%		37	Low
Assembler / Fabricator	701 K	62%	38%		17	
Construction Laborer	1,161 K	97%	3%	Male-Dominated	59	Medium
Truck Driver	2,601 K	95%	5%		53	
Warehouse Worker	1,237 K	80%	20%		46	Low
Janitor / Building Cleaner	1,378 K	70%	30%		44	
Landscaper	630 K	94%	6%		32	

An equal number of occupations were selected in each Worker Composition category, where those with high worker counts and job postings were prioritized. In addition, occupations in a mix of Customer Interaction categories were included. Note that there are very few male-dominated occupations with high customer interaction, hence there are no occupations fitting this description.

Worker count and composition data is from the American Community Survey (United States Census Bureau, 2022). Data on Customer Interaction is taken from O*NET scores for the importance of "performing for people or working directly with the public. This includes serving customers in restaurants and stores, and receiving clients or guests." Association between ACS occupation codes and O*Net occupation codes was sourced from O*NET OnLine (2023).

C. Names

The following first names (where some imply the applicant is female and others male) will be used in this study.

Implied Sex	First Name	Baby Name Popularity (1990s)		Name Association Scores	
		Rank	Count	Warmth	Competence
Female	Marisa	188	16 K	3.07	3.18
Female	Leah	97	34 K	3.13	3.11
Female	Gina	199	15 K	2.96	3.10
Female	Jasmine	25	105 K	2.97	3.09
Female	Hannah	11	159 K	3.14	3.05
Female	Lindsay	104	31 K	3.13	3.00
Male	Parker	195	16 K	3.25	3.17
Male	Marcus	83	46 K	3.14	3.01
Male	Patrick	42	93 K	3.23	3.15
Male	Joel	112	34 K	3.24	3.10
Male	Jeremy	47	78 K	3.12	3.05
Male	Adrian	92	42 K	3.10	3.02

First names were randomly chosen that were (1) in the top 200 popular names given to babies born in the 1990s, and (2) had Warmth and Competence scores both between 2.95 and 3.25 (a range representing middling scores). Data on 1990s baby name popularity is from United States Social Security (Social Security, 2022) and data on name association scores is from Newman et al. (2018).

Last names were randomly selected and matched to first names, from a list of 59 last names which are (1) in the top 100 most common last names in the United States, (2) % population with the last name that are white is less than 80%, (3) % population with the last name that are African American, Pacific Islander, Native, Hispanic is less than 40% (each, not combined). This yields the final list of full names below.

Implied Sex	First Name	Last Name
Female	Marisa	Watson
Female	Leah	James
Female	Gina	Collins
Female	Jasmine	Phillips
Female	Hannah	Allen
Female	Lindsay	Campbell
Male	Parker	Reed
Male	Marcus	Thomas
Male	Patrick	Lewis
Male	Joel	Morris
Male	Jeremy	Anderson
Male	Adrian	Nelson

D. Resume Design

A process for generating occupation-specific resumes has been developed using a program by Lahey and Beasley (2009). The characteristics over which resumes are randomized are equivalent across geographies, except for Work Experience where company names are city specific (position titles and descriptions are independent of geography). In some cases, the names of Certifications also vary by city (for example, a license to serve alcohol). For all occupations and geographies, fictitious resumes are generated for an applicant born in 1999 (i.e., fictitious applicants are 24 in 2023).

Resumes are generated in pairs; within a characteristic, resumes can be matched same (i.e., if the first resume is randomly assigned characteristic A, then the matched pair will also be given characteristic A) or matched different (i.e., if the first resume is randomly assigned characteristic A, then the matched pair will be randomly assigned a characteristic aside from A). To limit fraud detection by email providers and job boards, there are in total two female names and two male names used in each state (e.g., all matched resume pairs in Colorado where the name-implied sex is female will use the same two names). Emails are specific to names, and each name will always use the same phone number when applying in a given city.

Within an occupation and implied sex, resumes are randomized across the following:

- Pronouns: one of they/them, binary pronouns congruent with implied sex, or no pronouns
  - Probability: equal chance of either disclosing pronouns or not, then $\frac{2}{3}$ chance of they/them and $\frac{1}{3}$ chance of binary pronouns given disclosure
  - Matched: different—at least one resume in a matched pair has no pronouns
- Summary: randomly drawn from a list of summaries or no summary
  - Probability: $\frac{2}{3}$ chance of getting no summary; conditional on receiving a summary, probability is equal across options
  - Matched: different
- Highest Education: one of GED, high school, Associate's degree, Bachelor's degree
  - Probability: informed by prevalence within the occupation
  - Matched: same level of education, different specialization (if applicable)
- Work Experience, 2015-2017: in the last two years of high school, applicants either did not work or may have held one of two positions
  - Probability: $\frac{5}{7}$ chance of not having worked; conditional on working, equal probability of each position
  - Matched: different (no two applicants can have the same work experience, though they can both have no work experience)
- Work Experience, after 2017: applicants have 4 jobs spanning this period
  - Probability: jobs are selected without replacement from 43 possible position / description pairs

    - Matched: same (whether last occupation held is the occupation being applied to, years of work experience in the occupation being applied to), different (other positions held, job order)
- Skills: 6 skills are randomly drawn for each applicant where 4 are generic (drawn from the same list across all occupations) and 2 are occupation specific
    - Probability: equal probability across all options
    - Matched: different, across both generic and occupation specific skills

Resumes are then randomly assigned an application order (either sent first or second) and one of two resume formats, which are designed to look as different from each other as possible (different font, resume categories are ordered differently, etc.).

E. Job Application Targets

To improve power of secondary analyses, applications will be balanced across geography and occupation type. The target sample size is 3,240 matched resume pairs (where each pair includes one of two treatments along with a control) sent to job postings—or a target of 6,480 total resumes distributed. Because the quantity of job postings varies with occupation, job application targets vary by occupation:

Occupation	Application Target		
	Percentage	Total Count	Per City Count
Receptionist	6.7%	216	36
Cashier	5.0%	162	27
Housekeeper	6.7%	216	36
Nursing Assistant	10.0%	324	54
Administrative Assistant	5.0%	162	27
Retail Salesperson	11.7%	378	63
Server	6.7%	216	36
Cook	8.3%	270	45
Baker	3.3%	108	18
Assembler / Fabricator	3.3%	108	18
Construction Laborer	5.0%	162	27
Truck Driver	10.0%	324	54
Warehouse Worker	8.3%	270	45
Janitor / Building Cleaner	5.0%	162	27
Landscaper	5.0%	162	27

Summing across occupation categories yields total targets:

Occupation Category	Application Target		
	Percentage	Total Count	Per City Count
Female-Dominated	33.3%	1080	180
Non-Dominated	33.3%	1080	180
Male-Dominated	33.3%	1080	180
High Customer Interaction	31.7%	972	162
Medium Customer Interaction	31.7%	972	162
Low Customer Interaction	36.7%	1296	216

Summing across the intersection of occupation categories yields total targets:

Worker Composition	Customer Interaction	Application Target		
		Percentage	Total Count	Per City Count
Female-Dominated	High	11.7%	378	63
Female-Dominated	Medium	6.7%	216	36
Female-Dominated	Low	15.0%	486	81
Non-Dominated	High	18.3%	594	99
Non-Dominated	Medium	8.3%	270	45
Non-Dominated	Low	6.7%	216	36
Male-Dominated	High	-	-	-
Male-Dominated	Medium	15.0%	486	81
Male-Dominated	Low	18.3%	594	99

Actual application counts will be constrained by job posting availability; while the above targets were based on preliminary investigations of job postings within the CBSAs of interest, actual counts may differ.

F. Data Collection Process

A team of research assistants will search a major job posting websites (Indeed) for occupation vacancies in the CBSAs of interest. When an appropriate job posting is found, a pair of fictitious, randomized, matched, formatted resumes will be sent in in response. To reduce cost, job postings will only be applied to if the application process involves uploading a resume PDF and answering simple, standardized questions that can be easily determined from the randomized resume (e.g., how many years of relevant experience do you have?) or that can have a standard general response (e.g., can you reliably commute to work at this location?—yes). When applying, information on job posting, employer, and resume characteristics will be recorded in an encrypted database.

Employer response will be carefully tracked via phone and email. For each geography, two phone lines will be set up using an area code local to the area. For each name, an email will be set up (12 in total). Phone voicemails and emails will be monitored on an ongoing basis to identify applications which receive a positive employer response. If an employer reaches out at least twice, they will be contacted and told that the applicant has already accepted another position.

Hypotheses Tested

For simplicity, I denote applicants who send resumes with nonbinary pronouns "T1" matched to control "C1," and resumes with binary pronouns congruent with name-implied sex "T2" matched to control resumes with no pronouns "C2."

A. Primary Hypotheses

P1. Determine whether T1 achieve lower response rates compared to C1

P2. Determine whether T2 achieve lower response rates compared to C2

P3. Determine whether T1 achieve lower response rates compared to T2

P4. Determine whether differences in response rates between T1, C1 are different for males versus females

P5. Determine whether the difference in response rates between T1, C1 are different between Republican and Democratic geographies

P6. Determine whether the difference in response rates between T1, C1 are different in occupations with high, medium, and low customer interaction

P7. Determine whether the difference in response rates between T1, C1 are different in female-dominated, male-dominated, and non-dominated occupations

B. Secondary Hypotheses

S1. Determine whether differences in response rates between T2, C2 are different for males versus females

S2. Determine whether the difference in response rates between T2, C2 are different between Republican and Democratic geographies

S3. Determine whether the difference in response rates between T2, C2 are different in occupations with high, medium, and low customer interaction

S4. Determine whether the difference in response rates between T2, C2 are different in female-dominated, male-dominated, and non-dominated occupations

S5. Determine whether the difference in response rates between T1, C1 change as relevant experience increases

S6. Determine whether the difference in response rates between T1, C1 change with employer characteristics (employer size, for Equal Opportunity Employers, etc.)

S7. Determine whether the difference in response rates between T1, C1 change with job posting characteristics (existence of key text like "diversity," etc.)

Econometric Specifications

A. Notation

Logistic regression (logit) models will be leveraged, using notation:

$$\mathrm{P}(y_{ij} = 1) = \frac{1}{1 + e^{-z}}$$

where y_{ij} is an indicator variable which equals 1 if applicant i received a positive response from firm j and z is the model specification specific to analyses described below. For all regressions, standard errors will be clustered at the firm level.

B. Primary Hypotheses

To test P1 and P2, a logistic regression will be run to estimate $\hat{\delta}$ given:

(1) $z = \alpha_j + D_i\delta + X_i'\beta_1 + Z_j'\beta_2$

where α_j are firm fixed effects, D_i is an indicator variable which equals 1 if the resume has treatment pronouns ("they/them" for T1 vs C1, binary pronouns for T2 vs C2), X_i is a vector of resume characteristics that may influence baseline employer response rates (including: years of experience in the occupation being applied to, whether the applicant is currently employed in the occupation being applied to, other occupations included in the applicant's work experience, educational background, etc.), and Z_j is a vector of occupation and firm characteristics that may influence baseline employer response rates (including: occupation indicators, firm size, etc.). Multiple specifications will be run, where some will include (α_j, X_i, Z_j) and some will exclude them (when "excluding" α_j it is replaced with α). Note that the specification excluding (α_j, X_i, Z_j) is equivalent to a proportion test; the specification excluding (X_i, Z_j) but including α_j is equivalent to a McNemar (1947) test of differences between matched pairs.

To test P3, a logistic regression will be run to estimate $\hat{\delta}$ given:

(2) $z = \alpha + D_i\delta + X_i'\beta_1 + Z_j'\beta_2$

where D_i is an indicator variable which equals 1 if the resume has "they/them" pronouns. Multiple specifications will be run, where some will include and some exclude (X_i, Z_j).

To test P4, logit (1) will be run separately for females and males. In addition, a logistic regression will be run to estimate $\hat{\delta}$ given:

(3) $z = \alpha_j + D_i\delta_1 + [D_i \cdot S_i]\delta_2 + X_i'\beta_1 + Z_j'\beta_2$

where S_i is an indicator variable which equals 1 if sex implied by name is male. Multiple specifications will be run, where some will include and some exclude (α_j, X_i, Z_j).

To test P5, logit (1) will be run separately for firms in Democratic versus Republican geographies. In addition, a logistic regression will be run to estimate $\hat{\delta}$ given:

(4) $z = \alpha_j + D_i\delta_1 + [D_i \cdot G_j]\delta_2 + X_i'\beta_1 + Z_j'\beta_2$

(5) $z = \alpha_j + D_i\delta_1 + [D_i \cdot V_j]\delta_2 + X_i'\beta_1 + Z_j'\beta_2$

where R_j is an indicator variable which equals 1 if the geography is Republican and V_j is the Republican vote share in geography within which the firm is located. Multiple specifications will be run, where some will include and some exclude (α_j, X_i, Z_j).

To test P6, logit (1) will be run separately for occupations with high, medium, and low customer interaction scores. In addition, a logistic regression will be run to estimate $\hat{\delta}$ given:

(6) $z = \alpha_j + D_i\delta_1 + [D_i \cdot HI_j]\delta_2 + [D_i \cdot LI_j]\delta_3 + X_i'\beta_1 + Z_j'\beta_2$

(7) $z = \alpha_j + D_i\delta_1 + [D_i \cdot CIS_j]\delta_2 + [D_i \cdot LI_j]\delta_3 + X_i'\beta_1 + Z_j'\beta_2$

where HI_i is an indicator variable which equals 1 if the occupation is high customer interaction, LI_j is an indicator variable which equals 1 if the occupation is low customer interaction, and CIS_j is the O*NET customer interaction score associated with the occupation. Multiple specifications will be run, where some will include and some exclude (α_j, X_i, Z_j).

To test P7, logit (1) will be run separately for female-dominated, non-dominated, and male-dominated occupations. In addition, a logistic regression will be run to estimate $\hat{\delta}$ given:

(8) $z = \alpha_j + D_i\delta_1 + [D_i \cdot FD_j]\delta_2 + [D_i \cdot MD_j]\delta_3 + X_i'\beta_1 + Z_j'\beta_2$

(9) $z = \alpha_j + D_i\delta_1 + [D_i \cdot SD_j]\delta_2 + [D_i \cdot MD_j]\delta_3 + X_i'\beta_1 + Z_j'\beta_2$

where FD_j is an indicator variable which equals 1 if the occupation is female-dominated, MD_j is an indicator variable which equals 1 if the occupation is male-dominated, and SD_j is the difference in proportion of female- to male- workers in the occupation. Multiple specifications will be run, where some will include and some exclude (α_j, X_i, Z_j).

B. Secondary Hypotheses

To test S1, S2, S3, S4 I will follow the same process as P4, P5, P6, P7 but focus on T2, C2 rather than T1, C1.

To test S5, logit (1) will be run separately for applicants with low (2 years or less) or high (3 years or more) relevant work experience. In addition, a logistic regression will be run to estimate $\hat{\delta}$ given:

(10) $$z = \alpha_j + D_i\delta_1 + [D_i \cdot RLE_i]\delta_2 + X_i'\beta_1 + Z_j'\beta_2$$

where RLE_i is years of relevant work experience. Multiple specifications will be run, where some will include and some exclude (α_j, X_i, Z_j).

To test S6, logit (1) will be run separately for different firm groups. In addition, a logistic regression will be run to estimate $\hat{\delta}$ given:

(11) $$z = \alpha_j + D_i\delta_1 + [D_i \cdot FG_j]\delta_2 + X_i'\beta_1 + Z_j'\beta_2$$

(12) $$z = D_i\delta_1 + [D_i \cdot F_j]\delta_2 + X_i'\beta_1 + Z_j'\beta_2$$

where EG_j is an indicator variable denoting firm group (e.g., it may equal 1 if firms are large or if a firm is an Equal Opportunity Employer) and F_j is a firm value (e.g., number of employees). Multiple specifications will be run, where some will include and some exclude (α_j, X_i, Z_j).
To test S7, logit (1) will be run separately for different job posting types. In addition, a logistic regression will be run to estimate $\hat{\delta}$ given:

(13) $$z = \alpha_j + D_i\delta_1 + [D_i \cdot JP_j]\delta_2 + X_i'\beta_1 + Z_j'\beta_2$$

where JP_j is an indicator variable denoting job posting group (e.g., it may equal 1 if the job posting contains the word "diversity"). Multiple specifications will be run, where some will include and some exclude (α_j, X_i, Z_j).

C. All Hypotheses

Finally, logistic regressions will be run to estimate $\hat{\delta}$ given:

(14) $$\begin{aligned} z = \alpha_j &+ D_i\delta_1 + [D_i \cdot S_i]\delta_2 + [D_i \cdot G_j]\delta_3 + [D_i \cdot HI_j]\delta_4 + [D_i \cdot LI_j]\delta_5 \\ &+ [D_i \cdot FD_j]\delta_6 + [D_i \cdot MD_j]\delta_7 + [D_i \cdot RLE_j]\delta_8 + [D_i \cdot FG_j]\delta_9 \\ &+ [D_i \cdot JP_j]\delta_{10} + X_i'\beta_1 + Z_j'\beta_2 \end{aligned}$$

(15) $$\begin{aligned} z = \alpha_j &+ D_i\delta_1 + [D_i \cdot S_i]\delta_2 + [D_i \cdot V_j]\delta_3 + [D_i \cdot CIS_j]\delta_4 + [D_i \cdot SD_j]\delta_6 \\ &+ [D_i \cdot RLE_j]\delta_8 + [D_i \cdot F_j]\delta_9 + [D_i \cdot JP_j]\delta_{10} + X_i'\beta_1 + Z_j'\beta_2 \end{aligned}$$

Multiple specifications will be run, where some will include and some exclude (α_j, X_i, Z_j). This analysis contributes to the validity of (most) hypotheses.

Robustness Checks

Heckman and Siegelman (1993) critique audit studies by showing that if there are differences in the variance of unobservable variables between treatment and control groups, this can bias discrimination estimates both upwards and downwards. The Neumark (2012) method will be used to identify unbiased discrimination estimate $\hat{\delta}$. Note that this approach requires resumes to randomly vary in quality, which is achieved by this research design since years of relevant experience and education is randomized per the above-described process. This approach requires an identifying assumption: that β_1, β_2 are equal across treatment and control groups (i.e., the extent to which resume, occupation, and employer characteristics influence probability of positive employer response is equal across T1, T2, C1, C2). This assumption will also be tested via the approach described in Neumark (2012).

<u>Power Analysis</u>

Consider proportion test $H_0: p_T - p_C = 0$, $H_1: p_T - p_C < 0$, where p_T is positive employer response for the treatment group, and p_C is positive employer response for the control group. Note that in all tables, $p_T - p_C$ is expressed as percentage points as is Minimum Detectable Effect (MDE). Note that to be conservative, all tables (including T1, C1 or T2, C2 comparisons) calculate power for a proportion test rather than a McNemar test (McNemar tests have higher power especially when there is more concordance in positive employer response; when positive employer response is totally discordant, power is lowest and similar to proportion test power).

Comparing T1 to C1 or T2 to C2, T1 (T2) occurs just as often as C1 (C2). Assuming $p_C = 10\%$, the power of this test at different $p_T - p_C$ is:

Sample Size	MDE (80% Power)	Test Power given $p_T - p_C$						
		-2.0%	-2.5%	-3.0%	-3.5%	-4.0%	-4.5%	-5.0%
Full sample: 2,160 pairs	-2.20%	72%	89%	97%	99%	100%	100%	100%
$\frac{1}{2}$ sample: 1,080 pairs	-3.05%	47%	64%	79%	89%	96%	99%	100%
$\frac{1}{3}$ sample: 720 pairs	-3.70%	34%	49%	63%	75%	86%	94%	98%

Assuming $p_C = 15\%$, the power of this test at different $p_T - p_C$ is:

Sample Size	MDE (80% Power)	Test Power given $p_T - p_C$						
		-2.0%	-2.5%	-3.0%	-3.5%	-4.0%	-4.5%	-5.0%
Full sample: 2,160 pairs	-3.08%	47%	64%	78%	88%	95%	99%	100%
$\frac{1}{2}$ sample: 1,080 pairs	-3.67%	37%	50%	63%	76%	86%	92%	96%
$\frac{1}{3}$ sample: 720 pairs	-4.57%	25%	36%	48%	59%	71%	79%	87%

Comparing T1 to T2, T1 occurs twice as often as T2 (i.e., in a sample of 3,240 there will be 2,160 T1 and 1,080 T2). Assuming $p_{T2} = 10\%$, the power of this test at different $p_{T1} - p_{T2}$ is:

Sample Size	MDE (80% Power)	Test Power given $p_{T1} - p_{T2}$						
		-2.0%	-2.5%	-3.0%	-3.5%	-4.0%	-4.5%	-5.0%
Full sample: 3,240 total	-2.65%	58%	76%	89%	96%	99%	100%	100%
$\frac{1}{2}$ sample: 1,620 total	-3.71%	34%	47%	60%	75%	86%	93%	97%
$\frac{1}{3}$ sample: 1,080 total	-4.47%	25%	35%	46%	58%	70%	81%	89%

Assuming $p_{T2} = 15\%$, the power of this test at different $p_{T1} - p_{T2}$ is:

Sample Size	MDE (80% Power)	Test Power given $p_{T1} - p_{T2}$						
		-2.0%	-2.5%	-3.0%	-3.5%	-4.0%	-4.5%	-5.0%
Full sample: 3,240 total	-3.21%	44%	60%	74%	87%	93%	98%	99%
$\frac{1}{2}$ sample: 1,620 total	-4.47%	26%	37%	49%	60%	71%	80%	87%
$\frac{1}{3}$ sample: 1,080 total	-5.38%	20%	26%	35%	44%	54%	64%	74%

When comparing T1 to T1 in group A and B, T1(A) occurs just as often as T1(B). Assuming $p_{T1_A} = 10\%$, the power of this test at different $p_{T1_B} - p_{T2_A}$ is:

Sample Size	MDE (80% Power)	Test Power given $p_{T1_B} - p_{T1_A}$						
		-2.0%	-2.5%	-3.0%	-3.5%	-4.0%	-4.5%	-5.0%
$\frac{1}{2}$ sample: 2,160 total	-3.05%	47%	64%	79%	89%	96%	99%	100%
$\frac{1}{3}$ sample: 1,440 total	-3.70%	34%	49%	63%	75%	86%	94%	98%

Assuming $p_{T1_A} = 15\%$, the power of this test at different $p_{T1_B} - p_{T1_A}$ is:

Sample Size	MDE (80% Power)	Test Power given $p_{T1_B} - p_{T1_A}$						
		-2.0%	-2.5%	-3.0%	-3.5%	-4.0%	-4.5%	-5.0%
$\frac{1}{2}$ sample: 2,160 total	3.67%	37%	50%	63%	76%	86%	92%	96%
$\frac{1}{3}$ sample: 1,440 total	4.57%	25%	36%	48%	59%	71%	79%	87%

Target sample, and the fact that probability of an applicant receiving “they/them” pronouns (conditional on pronoun disclosure) is larger than binary pronouns may be modified in July, after seeing preliminary results. Little is known about hiring discrimination based on pronoun disclosure, so expected effect size is unclear at this time.

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