Employers' demand for personality traits

Vera Brenčič* Andrew McGee♦

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Abstract:

We measure firms' demand for workers' Big 5 personality traits in online job ads. Our personality demand measures produce intuitively plausible rankings of occupations in terms of their personality requirements, and ads with personality requirements remain posted online longer, which is consistent with firms needing more time to fill vacancies with more requirements. Firms primarily demand workers who are extroverted (31% of jobs ads), conscientious (26%), and open-to-experience (21%). Revisiting Bowles et al.'s [2001a] incentive-enhancing preferences model, we show theoretically and empirically that firms seeking conscientious workers are less likely to offer incentive pay—instead relying on fixed wage contracts.

Keywords: personality, measurement, job ads

JEL codes: C91, D82, M50

* Department of Economics, University of Alberta, 8-14 Tory Building, Edmonton, AB T6G 2H4, Canada. E-mail: vBrenčič@ualberta.ca.

♦ Corresponding Author: Department of Economics, University of Alberta, 8-14 Tory Building, Edmonton, AB T6G 2H4, Canada, and IZA. E-mail: mcgee1@ualberta.ca.

1. Introduction

Personality traits are a relatively stable set of thoughts, feelings and behaviors that result in a tendency to behave in particular ways (Roberts [2009]). The Five Factor Model (Goldberg [1982]) characterizes personality in terms of the "Big Five" traits: extroversion, conscientiousness, agreeableness, openness-to-experience, and emotional stability. According to McCrae and John [1992], extroverts tend to be more energetic, outgoing, ambitious, and assertive. Conscientious individuals tend to be diligent, well-organized, and neat. Agreeable individuals tend to be more trusting, modest, and compliant. Individuals high in openness/intellect have greater need for varied and novel experiences, aesthetic sensitivity, and curiosity. Emotionally stable individuals tend to be calm and even-tempered.

These traits influence the ways workers interact with their coworkers and customers, respond to incentives, and react to the everyday challenges of the workplace. Meta-analyses have shown that personality traits are related to job performance (e.g., Barrick and Mount [1991], Tett et al. [1991], Salgado [1997]), and some employers screen applicants on the basis of personality (e.g., Autor and Scarborough [2008], Hoffman et al. [2018]). Despite this, evidence on the extent of employers' demand for the Big Five personality traits remains scarce. The Occupational Information Network (O*Net) work styles module surveys occupational incumbents and experts on a few sub-traits of conscientiousness (e.g., initiative, energy, self-control), but these measures reflect neither employers' demand nor the full breadth of personality traits (Peterson et al. [2001]). Likewise, a handful of studies characterize employers' personality requirements for

individual occupations using job ads, but no prior work comprehensively characterizes employer demand for personality traits in a broad cross-section of occupations in a uniform fashion.[1]

We fill this gap by measuring employers' expressed demand for the Big Five personality traits in a sample of 140,193 job ads posted to Monster.com over a two-week period in 2006. Our approach builds on the insight of the lexical hypothesis in psychology, the notion that important individual differences in the way people engage with each other and their environments become encoded into language (Allport and Odbert [1936]). Specifically, we identify job ads containing trait-descriptive terms that Goldberg [1981] and John [1990] associated with each of the Big Five trait extremes.

We find that employers predominantly demand extroversion (31% of job ads), conscientiousness (26% of job ads) and openness (21% of job ads), while references to the less socially desirable extremes of the Big Five traits (i.e., introversion, non-conscientiousness, closed-to-experience, antagonism, and neuroticism) are basically absent from job ads. We pay particular attention to the problems of false positives (i.e., ads with trait-descriptive terms used for reasons having nothing to do with personality) and false negatives (i.e., ads in which we fail to identify personality trait demands). False positives prove significant: as many as half of all instances of trait-descriptive terms in job ads are false positives. For instance, "out-going" in job ads often refers to mail—not extroversion. By contrast, false negatives appear to be a less significant problem as a tripling of the number of trait-descriptive terms used to categorize ads yields increases in the fraction of ads referencing personality traits of only around 20 percent.

To validate that our measures capture personality trait requirements imposed by employers when filling vacancies, we confirm that the rankings of the 249 occupations represented in our

[1] Job ads have been used to infer personality requirements for librarians (Tokarz [2019]), civil servants (Kruyen et al. [2020]), supply management professionals (Klezl et al. [2022]), and brand managers (Wroblowska [2019]).

sample in terms of their demands for personality traits are intuitively plausible. For example, the occupations highest in demand for extroversion include occupations in which individuals interact regularly with customers or subordinates, while the occupations highest in the demand for conscientiousness include jobs where attention-to-detail and effort may be difficult to monitor. Moreover, we find that the Big Five traits are correlated with requirements for "soft skills" such as people management and customer service but uncorrelated with better-defined "hard" skills such as financial and specific software skills. In addition, we show that the demand measures for extroversion, conscientiousness, and openness—the traits most demanded in our data—are positively correlated with the length of time an ad appeared on Monster.com, which is consistent with employers requiring more time to fill vacancies with personality requirements. Demands for extroversion and conscientiousness, for instance, have negative effects on the probability of an ad being removed from Monster.com similar in magnitude to the effects of an ad requiring an associate's or bachelor's degree.

Measures of employers' demand for personality traits can be used to investigate a host of labor market phenomena ranging from gender segregation in occupations to worker-firm match effects. Here we revisit Bowles et al.'s [2001a, 2001b] incentive-enhancing traits model, which assumes that workers are endowed with preferences or traits such as conscientiousness that allow employers to elicit unobservable effort from them at lower cost. Bowles et al. observed that if workers with these traits can be identified, then employers must pay them more in a perfectly competitive labor market when employers are not able to capture worker-specific rents. The Bowles et al. model has been used as a theoretical framework motivating much of the empirical literature on personality and wages, but estimates of the wage returns to personality traits have not provided strong support for the model's hypotheses. In particular for conscientiousness, few

studies find robust evidence of a positive relationship between conscientiousness and wages. Mueller and Plug [2005], Heineck and Anger [2010] and Heineck [2011] find limited evidence of a positive correlation between wages and conscientiousness for women but not men in samples from the United States, Germany, and the UK, respectively, while Fletcher [2013] finds no evidence of a positive return to conscientious for either gender after accounting for family effects in the United States. Nyhus and Pons [2006] find a statistically insignificant but positive return to conscientious at the outset of employment relationships but a significant and large negative interaction between conscientiousness and tenure.

We propose an alternative model in which incentive-enhancing personality traits influence not wages but the employer's contract selection—specifically whether the employer uses incentive pay—when employers must engage in costly screening to identify workers with incentive-enhancing traits. Bowles et al. [2001a] assume that firms can identify workers with incentive-enhancing traits, but where personality is concerned this involves either personality testing or interviewing—both more costly than the resume reviews used to screen workers for other requirements. Moreover, employers may find learning about true personalities difficult when applicants have incentives to misrepresent themselves.[2] In our model, employers choose between offering a fixed wage or incentive-based compensation (e.g., a piece-rate or commission) when effort is unobservable and workers differ in their intrinsic motivation to supply effort. We show that the difference between expected profits to the firm from the fixed wage and incentive-pay contracts is strictly higher for firms that screen for personality traits, and thus firms indicating demand for (and thus presumably screening for) conscientiousness should

[2] McGee and McGee [2022] show that scores on incentivized personality tests such as those taken as part of a job application are only weakly to moderately correlated with scores on non-incentivized tests for the same individuals in a laboratory experiment.

be less likely to offer incentive pay. The intuition is that identifying conscientious workers has a larger payoff for the firm when it relies on intrinsic motivation with a fixed wage contract to elicit effort.

This prediction is borne out in our data, which is particularly well-suited for this analysis given that job ads often mention the form of compensation even when wages are not posted (Brenčič and Norris [2010]). Job ads indicating demand for conscientious workers are 2 to 3 percentage points less likely to offer incentive pay than other ads even after controlling for occupations. Our model and empirical findings highlight that many incentive-enhancing traits are not straightforward to observe and reward. Instead, the decision to observe these traits may be related to the working and contract conditions offered by firms.

Our study makes three primary contributions. First, we provide proof-of-concept that personality trait demands can be measured in job ads in a sensible, uniform fashion. This endeavor is similar in spirit to studies applying machine learning, text-analysis techniques to job ad data to replicate O*Net measures of occupation skill and task requirements (e.g., Djumalieva and Sleeman [2018] and Lassébie et al. [2021]), but we leverage the text data to provide the first characterization of occupations in terms of personality requirements.[3] Our findings concerning the occupational personality requirements are complementary to studies such as Krueger and Schkade [2008] and Borghans et al. [2008] documenting that workers sort into occupations based on their gregariousness and sociability. Specifically, we provide evidence that employers seek out workers with particular personality traits for different occupations, thereby shedding light on the employer-side of the matching process for a broader set of worker characteristics.

[3] Similarly Deming and Kahn (2018) use the Burning Glass data to measure a narrower set of skill requirements and show that these explain approximately 15% of variation in wages across firms.

The study also contributes in this regard to the literature measuring personality using text data from social media (e.g., Schwartz et al. [2013], Plank and Hovy [2015], Arnoux et al. [2017], Kern et al. [2019]). The study most similar to ours is that of Kern et al. [2019] who analyze tweets from Twitter users in different occupations to create occupation-specific personality profiles. In contrast to their study, we seek to measure employer demand rather than the average traits of workers in an occupation who are active on Twitter—especially if personality is systematically related to the decision to use Twitter. Moreover, the way personality manifests itself on Twitter may differ from how personalities influence behavior in other contexts. Using job ads rather than Twitter posts also allows us to examine how personality demands are related to the skills and tasks required on jobs.

Second, our findings regarding false positives highlight the pitfalls for economists of using simple text analysis tools relying on keywords to investigate the skill, trait, and task requirements of jobs. Searching for keywords related to personality without considering the context of their use would dramatically overstate the demand for these traits. Kruyen et al. [2020], for example, search for 336 trait-descriptive terms in 21,003 ads for Dutch civil servants between 1980 and 2017. They find that by 2017 each socially desirable personality trait extreme is referenced in at least 60% of ads. While high demand for one trait might reflect the nature of civil servant positions, the fact that the demand for all traits is so high is almost surely the result of false positives. Moreover, the measurement error associated with identifying keywords in inappropriate contexts is almost certainly systematic as words do not appear randomly in ads. For example, “progressive” is a trait-descriptive term associated with openness, but job ads frequently seek candidates with “progressive experience,” meaning individuals with a job history of positions of increasing responsibility. Failing to identify this false positive risks inducing a

positive correlation between the openness demand measure and outcomes of interest such as posted wages, job levels, or promotion opportunities. As text data grows in importance for the social sciences, addressing the nuances of text—specifically the meaning and use of words—will require the use and development of more sophisticated natural language processing approaches.

Third, we contribute to the non-cognitive skills literature by providing a rationale for why personality traits may not be related to wages as predicted by the incentive-enhancing preferences model. Specifically, personality traits may be difficult to observe, and not all employers will even attempt to do so. Instead, firms demanding traits like conscientiousness will tend to find fixed wage contract more appealing than contracts including extrinsic rewards for effort. Economists have naturally examined the connection between wages and psychology constructs such as personality, locus of control, self-esteem, and self-control (see Almlund et al. [2011] for a review of this literature). Given that personality traits influence how individuals react to incentives and situations, our study highlights that these traits may instead influence the conditions of employment relationships when the traits themselves are difficult to observe. Moreover, we contribute to this literature the first measures of employer demand for personality traits. Together with information in job ads on working conditions, contracts, and tasks, these measures can be used to further explore the relationships between personality and employment.

Our study's limitations are also worth noting. First, the sample is too small to provide adequate coverage of the full universe of occupations, and the Monster.com sample itself may not be representative of the population of job vacancies at the time. That said, we note that the size of the sample is also what allows us to review every instance of trait-descriptive terms to achieve a degree of accuracy where false positives are concerned that may not be possible in larger samples.

Second, the sample is at this point dated. Part of our motivation was to create measures of personality trait requirements by occupation to complement the skill and task requirements in O*Net that can be updated in near-real time. Trends including rising complementarity between cognitive and social skills (Weinberger [2014], Deming [2017]) and automation (Acemoglu and Restrepo [2020]) may have changed the importance over time of tasks that are complementary to some personality traits.

Finally, while our measures may be as good as one could possibly achieve given the review of every single instance of trait-descriptive terms in the ads, improvements to the personality demand measures are still possible. Our approach equally weights the trait-descriptive terms when some terms may be more indicative of trait demands than others. Machine-learning approaches for classifying text data might improve the predictive accuracy of the trait-demand measures, but doing so would require training datasets that could be difficult to come by in this context. Indeed, classifying job ads in a dataset such as the Burning Glass data will require a machine-learning based approach as the "brute force" approach to natural language processing taken in this study cannot be feasibly scaled up to datasets of that size. We discuss the potential for machine-learning based approaches in the conclusion.

2. Measuring personality trait demands

2.1 Data

The job ad sample consists of 142,618 job ads posted to Monster.com from June 26, 2006, to July 8, 2006. Pre-eminent among employment websites operating in the US in 2006, Monster.com ranked first in the share of visitors to these websites and the number of resumes hosted and second in the share of page views in a sample of 350 employment websites that best represented the online recruiting industry at the time (Weddle [2009]). We restrict our attention

to ads with text resulting in a final sample of 140,193 job ads.[4] According to the Bureau of Labor Statistics [2006], there were 3.8 million job openings in July 2006—some of which were presumably existing vacancies (i.e., representing the stock rather than the flow of new job postings). Given that we observe less than half of the month, our sample likely accounts for approximately 10% of new job postings in the United States in this period.

The job ad data include characteristics of the job from standardized Monster.com fields (e.g., location) and others extracted from the text of the job ad. We control for the education and experience requirements mentioned in the ad (if any), skill requirements, occupation, location, and the length of the ad in characters.[5] Similar to the job ads analyzed in Hershbein and Kahn [2018], only 54% of job ads included education requirements and 30% experience requirements. A total of 249 occupations are represented in our data with 133 occupations associated with 20 or more job ads, and 84% of ads were matched to occupations.[6] Finally, the skill requirements mentioned in the ad were constructed following Deming and Kahn [2018].[7]

In our analysis, we examine the relationships between the measured personality demands of an ad and the number of weeks the ad was posted, the offered wage, and whether or not the

[4] Ads without text result from scraping errors.

[5] The 262 location codes in the Monster data roughly correspond to PUMA codes in the American Community Survey.

[6] We use the Dorn [2009] occupation codes that aggregate U.S. Census occupation codes to a balanced panel of occupations for the 1980, 1990, and 2000 Census and the 2005-2008 ACS in order to facilitate the merge of our personality demand measures to other data sets. To identify the occupation, we first attempt to match the text following the string "Job Title:" in the ad to an occupation code, but not all ads contain the "Job Title:" string. For the remaining ads, we identify the occupation mentioned most often in the ad while giving priority to specific occupations over "not elsewhere categorized" occupations (e.g., "electrical engineer" instead of "engineer, n.e.c."). Monster had an occupation field, but it was relatively coarse with only 9 categories (i.e., business and management professions, engineering and computer science professions, education-related professions, medical professions, administrative, clerical, or legal professions, mechanics or laborers, service industry professions, research, science or technical professions, or other professions).

[7] The skill requirements include financial skills, cognitive skill, general computer skill, specific software skill, customer service skill, social skill, character, project management skill, people management skill, and writing. We construct indicators for these skill requirements using the keywords and phrases detailed in Table 1 of Deming and Kahn [2018] except for the specific software requirement for which we supplied our own list of software and programming languages.

job uses incentive compensation. When the data were collected in 2006, the ads were tracked each week for 16 weeks to determine whether they were still posted.[8] In our sample, ads disappear in 5.6 weeks on average conditional on being gone within 16 weeks, while 10% of ads remained posted after 16 weeks. To construct offered wages, we take the midpoint of the upper and lower bounds on wages listed in the ad and separately analyze ads associated with hourly and annual rates of pay. As documented in Brenčič [2012], offered wages are available for only 24% of the ads in our sample.[9] Finally, we identify 21% of the ads in our sample that indicate that bonuses, commissions, pay-for-performance, piece-rates, or incentive pay form part of a job's compensation. Summary statistics for these outcome variables and the controls described above are reported in Table 1.

2.2 Background

According to Allport and Odbert's [1936] lexical hypothesis, individual differences that are most significant in daily interactions eventually become encoded in language. Allport and Odbert [1936] initiated a literature dedicated to identifying descriptive adjectives associated with individual traits. Refining Norman's [1967] catalogue of 2,797 trait-descriptive adjectives in the English language, Goldberg [1981, 1982] further narrowed this list to 1,710 trait-descriptive adjectives. Goldberg [1981] surveyed university students concerning whether the adjectives accurately described them or someone they knew and identified five factors (each with two poles) that accounted for most of the correlations among adjectives—the Big Five taxonomy of personality traits. This research confirmed the five factors identified in earlier lexical studies

[8] An ad was deemed removed when accessing the vacancy's website resulted in the following message: "We're sorry. This job has been removed from the site and is no longer available for viewing." Ads were tracked for twice the length of the paid period; employers paid for a 60-day posting. For a more detailed discussion of the duration of the vacancy's on-line posting refer to Brenčič and Norris [2009].

[9] 301 job ads (0.2%) post a wage using a rate of pay other than hourly or annual. We exclude these ads from our analysis of posted wages for simplicity.

(e.g., Tupes and Christal [1961], Norman [1963], Borgatta [1964], Digman and Takemoto-Chock [1981]) and was subsequently validated in other studies (e.g., John [1990], Wiggins [1995]).

2.3 Methodology

We take the lexical hypothesis as our starting point and assume that firms indicate desired personality traits through the terms used in job ads. We match terms in the ads to the trait-descriptive term lists from Goldberg [1981] and John [1990] to identify ads containing terms associated with each personality trait extreme (i.e., extroversion/introversion and emotional stability/neuroticism). There are two potential sources of measurement error: Type II errors when we fail to identify words in ads indicative of desired personalities and Type I errors when we identify trait-descriptive terms in ads that are not indicative of desired personality traits. Type II errors (false negatives) occur when our 10 trait categorization dictionaries (i.e., lists of words associated with each trait) omit terms that employers use to signal preferred personalities. Type I errors (false positives) occur when an adjective is used in a different sense than that associated with personality, when the adjective describes an object, when the adjective appears as part of a proper noun (a company name), or when the adjective is used as jargon unrelated to personality.

In the next section, we demonstrate that expanding the word lists leads to rather small increases in the number of trait descriptive terms identified, suggesting that Type II errors or false negatives may not be that prevalent. The more challenging issue in measuring the use of trait-descriptive terms in job ads proves to be false positives. For instance, “flexible” is in the agreeableness dictionary, but “flexible” in job ads frequently refers to work arrangements. Similarly, job ad jargon is problematic as adjectives like “progressive” and “direct” are used in ways very particular to human resources.

To address the issue of false positives, we further require that trait-descriptive terms be used to describe desired job candidates, the job tasks, the firm's existing workers, the firm itself, or its environment .[10] We assume that firms may describe themselves, employees, or their environment using personality-related adjectives in order to attract similar applicants. We further require that the adjectives are used as adjectives (rather than another part of speech) and that the adjectives are used in a sense relevant to personality.[11,12] We thus exclude instances of words in our dictionary when they appear as proper nouns (e.g., "Progressive Insurance), nouns (e.g., "objective"), or verbs (e.g., "articulate') and when they are used to describe a firm's product or geographic location or in any sense not related to personality.

We implemented these rules using an extensive exclusion list of over 18,000 words and phrases to be ignored when measuring the frequency of personality-related adjectives. The list was developed using the natural language processing software WordStat by viewing *all* the contexts in which words in our personality dictionaries appeared in the job ads. This allowed us to identify expressions associated with false positives and to exclude them from the counts.

2.4 Measured trait demands

Table 1 reports the fraction of job ads in which trait-descriptive terms appear for each of the ten trait extremes using different categorization dictionaries and different exclusions lists for eliminating Type I errors. Column 1 reports the statistics using dictionaries including only the

[10] We consider adjectives modifying job tasks given how many job ads are written. For instance, a firm may require "courteous service," but "courteous" is a function of the individual performing the task rather than an intrinsic feature of "service." In all such instances—which admittedly fall in something of a grey area between adjectives and adverbs and require some judgment—we require that the adjective describe the person performing the task rather than an essential feature of the task.

[11] A small number of nouns appear in our lists, and for these words we count instances in which they appear as nouns.

[12] The requirement that the adjective be used in a sense relevant to personality addresses the concern that many adjectives have multiples uses and meanings.

traits themselves (e.g., "extroversion," "extrovert," and "extroverted") to reflect the fact that the Big Five personality taxonomy is known to firms and human resource professionals. Very few ads, however, explicitly state a preference for one of the Big Five personality traits: no trait extreme is represented in more than 1% of ads except for emotional stability.[13]

The traits-only categorization dictionary in Column 1, however, undoubtedly misses a great many terms signaling employers' demand for personality traits (Type II errors). Column 2 reports the summary statistics using a categorization dictionary that includes the traits themselves together with the word lists from Goldberg [1990], Saucier and Goldberg [1996], and John [1990]. Goldberg [1990] reduced Goldberg's [1981] list of 1,710 items to a list of 339 terms associated with the Big Five traits to be used in studies with subjects, while Saucier and Goldberg [1996] categorize by trait 435 of the most familiar terms in Goldberg's [1981] list. John's [1990] list consists of words assigned to a Big Five domain by at least 90% of expert judges. We include John's [1990] list to reduce our reliance on a single source, but the three lists overlap to a significant extent. Each term is placed in the categorization dictionary of the trait for which it had the highest factor loading in these studies. Because some terms load on different traits in different studies, a small number of terms appear in categorization dictionaries for more than one trait. In total, the categorization dictionary used in Column 2 includes 560 terms.[14]

In Column 2, we do not attempt to eliminate false positives; a term is counted regardless of how it is used in the ad. Using these categorization dictionaries, 53% of job ads include terms associated with extroversion and conscientiousness, while over a third of the job ads include terms associated with openness and agreeableness. The problem of false positives (Type I

[13] The fraction of ads containing references to emotional stability stems from our inclusion of "stable" in the traits-only category dictionary for emotional stability.

[14] Appendix Table 1 lists the trait categorization dictionaries (i.e., word lists) used for every column in Table 1.

errors), however, appears to be very important. Using the same categorization dictionaries but applying the rules described in the previous section to identify and remove false positives from the adjective counts in Column 3, firms primarily demand workers who are extroverted (31% of ads), conscientious (26%), and open-to-experience (21%)—nearly 50% reductions relative to Column 2. For some traits like neuroticism, almost all instances of personality-related adjectives are false positives.

To further examine the importance of false negatives, we expand in Column 4 the categorization dictionaries to include all of the terms in Goldberg's [1981] list as well as the terms from John [1990]—a near tripling of the number of terms counted in the personality demand measures—while continuing to remove false positives. The fractions of ads containing trait-descriptive terms associated with extroversion and conscientiousness, however, increase by a mere 20 to 25%, while the fractions of ads containing terms associated with the remaining trait extremes are basically unaffected by the expansion of the dictionaries. Thus while we acknowledge that Type II errors (false negatives) undoubtedly exist in the personality demand measures in Column 4, it would appear that the dictionaries have entered the region of rapidly diminishing returns to further expansion.

According to the measures in Column 4, employers primarily demand extroversion (31% of ads), conscientiousness (26%), and openness (21%), but a non-trivial number of ads also indicate demand for agreeableness (12%) and emotional stability (7%) as well. Figure 1 displays the word clouds associated with each socially desirable personality trait extreme.[15] In the word clouds, the size of a word indicates its relative frequency among the words in the trait dictionary. Two things are apparent. First, a relatively small number of words represent a disproportionately

[15] The word clouds for introversion, non-conscientiousness, antagonism, closed-to-experience, and neuroticism are available from the authors.

large share of the trait descriptive terms identified in our data for each trait. One could obtain broadly similar measures using far fewer than 1,710 terms or even the 560 used in Columns 2 and 3.

Second, two words, "verbal" (in the dictionary for extroversion) and "analytical" (in the dictionaries for conscientiousness and openness) play an outsized role in our measures of personality demands. "Verbal" (in 9% of ads) and "analytical" (in 5% of ads) appear in many ads in the phrases "verbal skill" and "analytical skill." Both contexts satisfy our rules insofar the terms are being used as adjectives modifying an attribute (skill) of the desired worker. Furthermore, who is to say that a person who has verbal skill is not verbal or that a person with analytical skill is not analytical? Throughout the paper, we treat the measures in Column 4 as our preferred measured of personality trait demands as we are agnostic on these questions, but we also recognize that these expressions—which significantly influence the measured personality trait demands—may not refer to the applicant's personality. Thus, in Column 5 we report the fraction of ads in which trait-descriptive terms are mentioned for each trait excluding "verbal" and "analytical," and in subsequent analysis we report estimates using these measures as robustness checks.

Finally, we consider how many trait-descriptive terms job ads use. While different adjectives might indicate demand for different facets (i.e., sub-traits) of personality, the number of trait descriptive terms in an ad may also signal the intensity of the employer's desire for an individual with a given trait. Table 3 reports the fraction of ads with less than or equal to a given number of references to individual personality traits or any personality trait. Conditional on an ad containing a trait-descriptive term for a trait, the modal number of such terms in an ad is one for

all of the Big Five traits. [16] That said, for each trait a small number of ads contain several terms associated with trait—as many as 16 such references in the case of openness. Finally, we note in Column 6 that 54% of job ads contain at least one trait-descriptive term.

2.5 Trait demands by occupation and skill requirements

Workers in different occupations perform different tasks in different environments, and thus the optimal personality trait combination that informs how workers respond to these situations likely varies by occupation. Table 4 reports the top 10% of occupations when ranked in descending order by the fraction of ads in an occupation using trait-descriptive terms for each trait. Here we restrict the sample to the 133 occupations for which we observe more than 20 job ads to limit the role of sampling variance; the summary statistics for all occupations in our data for all traits are reported in Appendix Tables 2 and 3.

Three things are apparent from the occupation rankings. First, the measures of employer demand for personality traits produce mostly intuitive rankings of occupations. The occupations highest in employer demand for extroversion include those in which individuals interact regularly with the public (e.g., restaurant staff, sales) or subordinates (e.g., managers). The occupations highest in the demand for conscientiousness include jobs where attention-to-detail (e.g., technical writers, proofreaders, industrial engineers, actuaries) and effort (e.g., porters, housekeepers) may be difficult to monitor. The occupations highest in demand for agreeableness include many customer-facing jobs (e.g., photographers, cashiers, bank-tellers). The occupations highest in the demand for emotional stability include many occupations in which interactions with unhappy individuals are possible (e.g., waiters/waitresses, clerks). The sampling variance

[16] We focus on the socially desirable extremes of the Big Five traits from here onward given the very small number of ads containing terms associated with other extremes.

resulting from small samples in some occupations produces a few unusual rankings (e.g., the demand for agreeableness among geologists), but overall, the rankings of occupations by employer demands for particular traits seem very plausible. Second, some occupations appear in the top 10% of the rankings for several traits. This suggests that for some occupations, personality trait bundles may be very important. Third, high-skill occupations are not well-represented in these rankings of occupations with the highest personality demands. In particular, we note the near-complete absence (apart from actuaries and industrial engineers) of STEM occupations even while many of these occupations are well-represented in our sample. This suggests that personality traits may matter most in occupations where responses to situations and other individuals are more important than well-defined skills.

To explore these issues further, Table 5 reports the correlations between the indicators for trait-descriptive terms in appearing in an ad for each trait with the same measures for the other traits and the Deming and Kahn [2018] skill requirement indicators. Panel A uses our preferred trait-descriptive term dictionaries with false positives removed, while Panel B excludes the terms "verbal" and "analytical." We focus on Panel B because of the mechanical correlation between conscientiousness and openness that results from "analytical" being in both dictionaries, but most of our discussion applies for Panel A as well. Among the traits, the demands for extroversion and agreeableness are the most highly correlated at 0.30, which is perhaps not surprising given the high rankings of occupations requiring interactions with the public for both traits in Table 4. None of the correlations between trait demands in the job ads, however, are very high. This suggests variability in the personality trait bundles required by employers.

The skill requirements could be broadly grouped into "soft skills" involving interactions with others (i.e., social skills, character, customer service, and people management) and task-

based skills (i.e., project management, financial skills, general computer skills, and specific software skills) with "cognitive" skill (defined by the keywords "problem solving," "research," "analytical," "critical thinking," "math," and "statistics") not fitting well in either category. Broadly speaking, the personality trait demands are completely uncorrelated with the task-based skills. This does not imply that high-skill jobs with well-defined tasks do not require personality traits, but rather that the trait bundle required varies even within jobs with similar task requirements. By contrast, personality trait requirements are weakly correlated with most of the soft skills, which is consistent with our earlier supposition that personality traits are most important on jobs involving interactions with others. Finally, general cognitive skill is correlated with conscientiousness and openness.

2.6 Duration of job ad posting

The previous sub-section provides evidence that our personality demand measures seem sensible in terms of how they are related to occupations and task requirements. We conclude the section by investigating whether these statistics measure something that employers are indeed screening for in their hiring processes. In particular, employers with more requirements for workers should, on average, need more time to fill vacancies than employers with fewer requirements. With this in mind, we estimate models of the probability that an ad is withdrawn from Monster.com in each week through 16 weeks after the ad was posted.

Using a duration model to test the hypothesis that employers are searching for workers with particular personality traits, however, has limitations. First, employers specifying requirements in job ads limit the pool of acceptable applicants, but the details in the ads may attract more suitable applicants. The two dynamics have countervailing effects on the probability that a vacancy is filled. Thus, one might find that a job requirement has a negative effect on the

probability that a vacancy is filled if the former effect dominates the latter, but a positive effect could result when improvements in worker-firm matching outweigh the effects of narrowing the pool of acceptable applicants. One might even find no effect on the probability of filling a vacancy if these two effects offset one another. Nevertheless, we proceed under the assumption that the effect of limiting the pool of acceptable applicants tends to outweigh the matching effects—largely because this appears to be the case when looking at well-defined job requirements such as education and experience (Baron et al. [1997]).

Second, the length of time a job ad is posted to Monster.com is not necessarily the same as the length of time it takes to fill the job vacancy for a number of reasons. First, we cannot observe whether an employer searches solely on-line or has started the search prior to posting the vacancy on the on-line job board. Second, the observed start date may not necessarily be the actual start date since the posting may have been renewed after the initial sixty-day period of posting had been exhausted. Third, ads that are withdrawn from the job board prior to exhaustion of the sixty-day prepaid period or did not reappear after the sixty-day period may not necessarily be associated with filled vacancies. For instance, the vacancy's withdrawal from the job board may indicate that either the need to fill the position ceased to exist or that the employer started searching for a suitable candidate using alternative search channels. In favor of the interpretation that the vacancy had been filled if withdrawn prior to the sixty-day period exhaustion date is the fact that posting a vacancy on-line was relatively expensive (a $365 fee for posting a single vacancy was in effect in 2004). The outcome of the vacancy is less certain when the ad was neither renewed for another sixty-day period nor withdrawn from the on-line job board prior to exhaustion of the sixty-day period.

With these caveats in mind, we estimate discrete-time proportional hazard models of the probability that an ad no longer appeared on Monster.com for each of the first 16 weeks after it was posted.[17] Specifically, we estimate complementary log-log models controlling for the week after posting using 16 indicator variables, the personality trait demand indicators, the length of the ad in characters, and various sets of additional controls. The estimated hazard ratios for the personality trait demand indicators reported in Table 6 indicate that expressions of demand for extroversion, conscientiousness and openness—the three traits referenced most often by employers—are associated lower probabilities of an ad being withdrawn from the job board in every week in all specifications in which we control for occupation. The estimated hazard ratios for extroversion in Columns 5 and 6 (0.911 and 0.876, respectively) suggest that the probability of an ad being withdrawn from the job board for an ad using trait-descriptive terms associated with extroversion in any given week is about 90% of that for an ad not containing such terms. For perspective, these hazard ratios for extroversion are similar to those for the requirement for a bachelor's degree (0.924), while the estimated hazard ratios for conscientiousness and openness are comparable to the requirement to have an associate's degree (0.951). By contrast, none of these traits have effects on the probability of an ad being withdrawn comparable to experience requirements as the estimated hazard ratios for most of the experience categories are around 0.7.[18] The observed hazard ratios for the extroversion, conscientiousness, and openness trait

[17] While the time elapsed prior to filling a vacancy may be continuous, our duration measure is discrete. Moreover, the data exhibit considerable "bunching" insofar many ads are removed following the eighth week—the end of the 60-day posting period. We estimate discrete-time rather than continuous-time proportional hazard models in view of the large number ties in our data.

[18] Complete estimates containing hazard ratios for all of the controls are available from the authors upon request. Neither the estimated hazard ratios for the education requirements nor the hazard ratios for the experience requirements vary significantly across specifications. In all of our specifications, the omitted category is the absence of experience or education requirements.

demands are consistent with the conjecture that these measures capture worker characteristics for which employers screen in the hiring process.

The same cannot be said for the agreeableness and emotional stability demand measures. The estimates suggest that both traits are associated with higher probabilities that job ad is withdrawn. Again, this is not necessarily inconsistent with employers screening for these traits as it may indicate that ads indicating demand for these traits attract well-suited applicants. Indeed, the fact that relatively few employers search for these traits may make it easier to attract individuals with these traits.

3. Incentive-enhancing personality traits, wages, and contracts

Bowles et al. [2001a, 2001b] hypothesized that some worker traits such as conscientiousness enable employers to induce effort at a lower cost when effort is not contractible. As a consequence, firms will pay workers with these traits more even when the trait does not directly contribute to production in a competitive labor market. This incentive-enhancing trait model has informed many subsequent studies of the wage returns to personality traits (e.g., Nyhus and Pons [2005], Heineck and Anger [2011], Fletcher [2013]). Among the Big Five traits, conscientiousness lends itself most directly to a hypothesis regarding its relationship to wages in the context of the incentive-enhancing trait model, but, as noted in the Introduction, the estimates of these wage returns vary considerably.

We begin by testing the hypothesis from the incentive-enhancing traits model that employers' demand for conscientiousness should be positively correlated with posted wage offers in job ads. In Table 7, we report coefficients estimates from regressions of the log of the posted wage on the personality trait measures and various sets of controls including the length of the job ad in characters, education and experience requirements, skill requirements, occupation,

and job location. We run the regressions separately for ads posting hourly wages and ads posting annual salaries, and all of the usual caveats in this literature about analyses of posted wages in a sample in which 76% of ads do not post a wage apply.[19]

Among ads posting hourly wages in Panel A, the posted wages of ads including trait-descriptive terms associated with conscientiousness are an estimated (but statistically insignificant) 0.6% less than for jobs without such terms controlling for education, experience and skill requirements, the occupation and location in Column (5). Using trait demand measures omitting the terms "verbal" and "analytical" from the categorization dictionaries in Column (6), the posted wages of ads including trait-descriptive terms associated with conscientiousness are an estimated 2.1% less than for jobs without such terms. Among ads posting annual salaries, the posted wages of ads demanding conscientiousness are 1.5% higher than those for other jobs in Column (5) but only 1% more in Column (6) omitting "verbal" and "analytical" where the estimate is statistically insignificant. Thus we find at best weak evidence in support of the incentive-enhancing preference hypothesis where conscientiousness is concerned in the sample of ads with annual but not hourly posted wages.

By contrast, the estimated coefficients for extroversion, agreeableness, and emotional stability are consistently negative, statistically significant and larger in magnitude than those for conscientiousness in all specifications and in both samples. Only for openness are the coefficient estimates positive—though it is unclear why openness would be incentive-enhancing. Overall, the mixed evidence on the associations between wages and personality traits both here and in other studies raises the following questions: if employers do not pay for personality traits, why

[19] For instance, Brenčič [2012] and Banfi and Villena-Roldan [2019] show that posted wages are more common in ads seeking less skilled workers.

do some employers seek out workers with these traits, and how do these traits influence the employment relationship?

Bowles et al. [2001a, 2001b] assume that incentive-enhancing traits are observed, but employers may find screening for and observing personality traits difficult. Even those employers that do screen applicants for personality traits may not need to reward these traits if sufficiently many employers do not observe these traits. That is, firms may be able to retain worker-specific rents in the presence of incomplete information where incentive-enhancing traits are concerned.

We propose a simple, alternative model of incentive-enhancing traits when both effort and the traits are difficult to observe. In this setting, incentive-enhancing traits may instead influence the contracts—rather than the wages—offered by employers. In principle, firms should not be observed offering fixed wage contracts due to the moral hazard problem if effort is truly unobservable or prohibitively costly to monitor. One possibility is that workers with incentive-enhancing traits supply effort even when effort is unobservable. Consequently, employers who would ordinarily face moral hazard issues have less need to offer incentive-based compensation when they seek out workers with these traits.

To illustrate, suppose that workers choose non-observable effort e and that the firm's (observed) output is a function of this effort $e + \nu$, where ν is an i.i.d. mean zero random variable. The revenue generated by the worker is $p(e + \nu)$, where p is the price of the firm's output. The worker's earnings consist of a fixed wage and any compensation conditioned on output (e.g., piece-rates or commissions) paying r per-unit of output. Further assume that the worker's utility is a function of compensation, the disutility of effort (e^2), and possibly intrinsic motivation. That is,

$$U = w + r(e + \nu) - e^2 + a(r)\theta(e - \underline{e})$$

where $\theta \geq 0$ is a parameter characterizing the degree to which the worker is intrinsically motivated. We assume that traits such as conscientiousness map into this job-specific parameter θ. Workers for whom $\theta = 0$ respond only to extrinsic incentives, while all other workers attach some importance to intrinsic motivations. The attenuation parameter $a(r)$ $(0 \leq a(r) \leq 1, a' \leq 0, a(0) = 1)$ allows for the possibility that intrinsic motivations may be attenuated by the presence of extrinsic rewards.[20] The norm $\underline{e}$ defines the minimum effort such that intrinsically motivated workers derive positive utility from supplying more than this effort level and disutility when they shirk relative to this benchmark.

Workers maximize their utility by choosing effort $e^* = \frac{r+a(r)\theta}{2}$. If labor is the only input, the firm's expected profit is $E(\pi) = p\left(\frac{r+a(r)E(\theta)}{2}\right) - w - r(\frac{r+a(r)\theta}{2})$. Suppose firms choose between a fixed wage contract $(w_1, r_1 = 0)$ and a contract paying both a fixed wage and compensation conditioned on performance $(w_2, r_2 > 0)$. Firms choose whether to screen $(S = 1)$ potential employees to learn about θ such that $E(\theta|S = 1) > E(\theta|S = 0)$. The firm-specific screening costs are given by the random variable C_i; firms with large C_i choose not to screen.

The difference in expected profits between the contracts is given by

$$E(\pi_1) - E(\pi_2) = E(\theta)\left(\frac{p - (p - r_2)a(r_2)}{2}\right) - (p - r_2)(r_2/2) - (w_1 - w_2)$$

The term $p - (p - r_2)a(r_2)$ is necessarily positive given that $r_2 < p$ and our assumption that extrinsic compensation attenuates intrinsic motivation. It follows that the difference in expected profits between a fixed wage contract and the performance pay contract will always be larger for firms that engage in screening (i.e., $E(\pi_1 - \pi_2|S = 1) > E(\pi_1 - \pi_2|S = 0)$). Put differently, the

[20] Gneezy and Rustichini [2000] and Fehr and Gachter [2000] provide evidence that extrinsic rewards "crowd out" intrinsic motivations insofar as incentive contracts elicited less effort than fixed wages in laboratory experiments.

probability that a firm hires workers on a fixed wage contract will be higher for firms screening job applicants for the trait θ.

We make three observations. First, not all firms screening will choose the fixed wage contract as $E(\pi_1 - \pi_2|S = 1)$ may be negative depending on the contract terms (w_1, w_2, r_2). Other things being equal though, screening will make the fixed wage contract more attractive relative to the performance pay compensation. Second, this conclusion stems entirely from the worker's intrinsic motivation to provide effort and has nothing to do with the possible attenuation of intrinsic motivation when paired with extrinsic compensation (i.e., the conclusion holds for any value of $a(r)$). We allow for the attenuation of intrinsic motivations because of the empirical evidence of this phenomenon and to note that this phenomenon $(a(r) < 1)$ would only tend to reinforce the finding that screening firms are more likely to choose the fixed wage.

Finally, screening firms may make different decisions regarding the contract choice because of differences in the potential contract terms (w_1, w_2, r_2) across firms or because of differences in the way underlying personality traits map into the parameter θ. How personalities manifest themselves depends on situations and contexts. If the nature of work on a particular job is particularly unpleasant or grueling, the upper bound on values of θ may be much lower than in other contexts. That is, even conscientious (and thus intrinsically motivated) workers may not derive much utility from doing exceptionally unpleasant work, in which case the benefit to screening would be very small.

To test this model of incentive-enhancing traits applied to contract selection, we estimate probit models of the probability that a job ad indicates incentive compensation (i.e., bonuses, commissions, performance pay, incentives, or piece-rates) is offered controlling for the personality trait demand indicators, the length of the ad in characters, and the same sets of controls as in the

log-posted wage regressions. In contrast with the log-posted wage regressions, the incentive compensation indicator is defined for all of the job ads in our sample.

Table 8 reports the estimated marginal effects for the Big Five traits from these probit models. With all of the controls, conscientiousness is associated with an estimated 1.9 percentage point reduction in the probability that incentive pay is offered in Column (5) with "verbal" and "analytical" included and a 3.1 percentage point reduction in Column (6) with "verbal" and "analytical" omitted. Both estimates are consistent with the hypothesis that firms seeking out workers with incentive-enhancing traits will be less impacted by moral hazard issues and thus able to offer fixed wages when effort is non-contractible.

We did not hypothesize that the remaining Big Five traits would influence contract selection, and indeed we find no evidence of a relationship between agreeableness and emotional stability and the use of incentive pay. By contrast, the estimates in Columns 5 and 6 imply that demands for openness and extroversion are associated with 1 to 2 percentage point decreases and 2 to 4 percentage point increases, respectively, in the probability that incentive pay is offered. Individuals high in openness are imaginative, curious, and open-minded, and it may be that such individuals are willing to supply effort in their endeavors to satiate their imagination, curiosity and open-mindedness even without extrinsic motivation. In this sense, openness would be an incentive-enhancing trait as envisioned in the model. By contrast, extroverts may be inclined to engage in counterproductive social behaviors that distract from effort—thus making incentive pay more even necessary for such individuals. In this sense, extroversion could be considered incentive-dis-enhancing insofar as it might exacerbate the moral hazard problem.

4. Conclusion

We develop measures of employer demand for personality traits by identifying job ads containing personality trait-descriptive terms. These novel measures complement existing measures of skill and task requirements at the occupation level in O*Net and can be used to investigate the role of personality in labor market arrangements. In that regard, we show that firms demanding conscientious workers are less likely to offer incentive pay contracts than firms not seeking conscientious workers even controlling for occupation given that such workers are more likely to supply effort in the absence of extrinsic motivation. A key insight emerging from our findings is that studies of the roles of non-cognitive traits in the labor market would do well to look beyond their relationship to wages. When these traits are difficult to observe—as they often are—non-cognitive traits may instead influence employment relationships through contracts and the work environments to which workers match.

Our measures of employer demand for personality traits, however, might be improved. The way forward is obviously to measure employer demand for personality traits in a larger sample that is more representative of the universe of job vacancies such as the Burning Glass datasets. Our "brute force" approach to identifying trait-descriptive terms and removing false positives, however, is unlikely to scale up to a dataset that is orders of magnitude larger than that used in this study. Instead, a machine-learning approach will almost certainly be necessary, but we conclude by highlighting the technical challenges that such a project would have to overcome.

First, a machine learning approach will require a training dataset to teach the algorithm to identify trait demands. Studies such as Schwartz et al. [2013] using machine learning (ML) to classify social media profiles in terms of their personality traits had access to personality tests taken on the social media platform to train the ML algorithms, but no similar training dataset will

be readily available in this context. Second, Schwartz et al. [2013] show that the predictive power of so-called open-vocabulary ML approaches to text analysis in which all words are used as potential predictors of traits are much more successful than closed-vocabulary approaches (similar to that in this study) relying on word dictionaries. Open vocabulary ML algorithms, however, need large amounts of text to achieve predictive accuracy. The job ads in our sample average only 292 words, and thus an open vocabulary ML algorithm will not likely be viable in this context. Relying on word dictionaries of trait-descriptive terms in a closed-vocabulary approach, however, might work well in this context given that employers are explicitly describing desired employees in job ads (in contrast to the largely random subjects of social media). Finally, our study highlights that the key challenge of any natural language processing ML algorithm will be to distinguish between the usages of trait-descriptive terms to reduce false positives. We leave these challenges for the future but stress the potential for personality trait demand measures in job ads to shed light on the role of personality in the work place and the labor market more generally.

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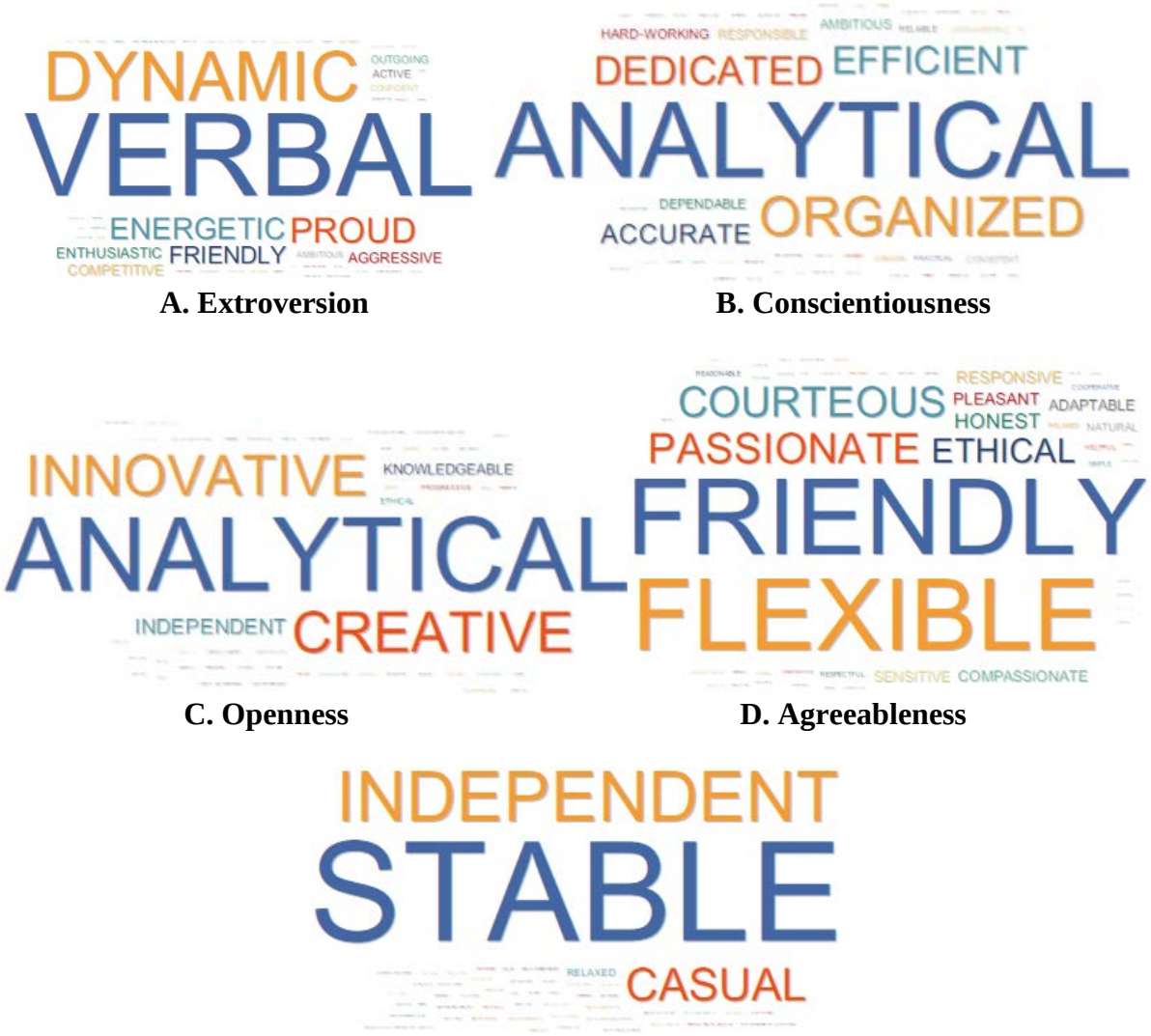

A. Extroversion **B. Conscientiousness**

C. Openness **D. Agreeableness**

E. Emotional stability

Figure 1: Personality trait word clouds from job ads

Notes: Each panel depicts the words clouds for the "socially desirable" trait extremes of the Big Five personality traits. Within each word cloud, the size of a word indicates its relative frequency in the job ad sample among the trait-descriptive terms in the dictionary for that trait extreme. The word clouds for the remaining five, socially undesirable trait extremes are available from the authors. Because the word clouds have been individually re-scaled to fit the page, comparisons of word sizes in different word clouds should be avoided.

Table 1: Summary statistics

Variable	Mean	S.D.
Weeks ad posted | Ad gone in ≤ 16 weeks	5.64	(3.32)
Ad still posted at 16 weeks	0.10	(0.29)
Hourly wage offered (n = 12,971)	17.28	(10.78)
Annual salary offered (n =20,653)	61,344.69	(28,545.98)
Incentive pay offered	0.21	(0.41)
Education requirements:		
None given	0.46	(0.50)
High school	0.14	(0.35)
Associates degree	0.06	(0.23)
Bachelor's degree	0.32	(0.47)
Post-graduate degree	0.02	(0.15)
Experience requirements:		
None given	0.70	(0.46)
< 1 year of experience	0.03	(0.18)
1-2 years of experience	0.06	(0.24)
2-5 years of experience	0.12	(0.33)
5-7 years of experience	0.06	(0.23)
7-10 years of experience	0.01	(0.12)
10-15 years of experience	0.01	(0.08)
> 15 years of experience	0.00	(0.03)
No occupation determined	0.16	(0.14)
Skill requirements:		
Customer service	0.59	(0.49)
People management	0.52	(0.50)
Financial	0.25	(0.44)
Cognitive	0.29	(0.45)
General computer	0.34	(0.47)
Social	0.39	(0.49)
Software	0.11	(0.31)
Character	0.14	(0.35)
Project management	0.06	(0.24)
Writing	0.05	(0.23)
Ad length in characters	2,653.94	(1,340.89)
Number of job ads	140,193	

Notes: The number of weeks an ad was posted was not observed for ads still posted after 16 weeks. When upper and lower bounds are given for wages, we use the mid-point and drop the top 0.5% of offered hourly and annual wages. Incentive pay included bonuses, commissions, incentive compensation, pay-for-performance, and piece-rates. The education, experience, and skill variables are all indicator variables for whether an ad included the requirement specified in the row. The skill requirement indicators were constructed as described in Deming and Kahn [2018].

Table 2: Fraction of ads containing personality trait-descriptive terms

Trait	(1)	(2)	(3)	(4)	(5)
Extroversion	0.00	0.53	0.26	0.31	0.22
Conscientiousness	0.00	0.53	0.20	0.26	0.21
Openness	0.00	0.34	0.20	0.21	0.15
Agreeableness	0.00	0.36	0.12	0.12	0.12
Emotional stability	0.04	0.15	0.07	0.07	0.07
Introversion	0.00	0.08	0.00	0.00	0.00
Non-conscientiousness	0.00	0.00	0.00	0.00	0.00
Disagreeableness	0.00	0.11	0.01	0.02	0.02
Non-openness	0.00	0.05	0.00	0.01	0.01
Neuroticism	0.00	0.01	0.00	0.00	0.00
Traits only	X				
Trait-descriptive term list		X	X		
False positives removed			X	X	X
Extended trait-descriptive term list				X	X
“Verbal” & “analytical” removed					X

Notes: Each column indicates the percentage of ads in which words for a given trait are found using different categorization dictionaries and exclusion lists. Column (1) searches for the plain English names of the traits themselves (e.g., “extrovert” and “extroversion). Column (2) searches for words in the lists from Goldberg [1990], Saucier and Goldberg [1996], and John [1990]. Column (3) removes false positives from the measures in Column (2) using exclusion lists. Column (4) expands the word list in Column (2) to include all 1,710 trait descriptive adjectives in Goldberg [1982] with false positives removed. Column (5) uses the same list as in Column (4) but removes the words “verbal” and “analytical” from the categorization dictionaries.

Table 3: Frequency of trait-descriptive terms in ads

	(1)	(2)	(3)	(4)	(5)	(6)
# of terms	Extroversion	Conscientiousness	Openness	Agreeableness	Emotional stability	Total
0	69.34	74.08	79.32	87.94	92.60	46.30
1	91.17	92.69	94.20	97.03	99.20	67.06
2	97.54	97.73	98.03	99.01	99.92	80.46
3	99.15	99.15	99.23	99.76	100.00	88.62
4	99.64	99.54	99.83	99.90	100.00	93.34
5	99.88	99.66	99.93	99.98	100.00	96.25
6	99.98	99.98	99.97	99.99		97.78
7	99.99	99.99	99.99	99.99		98.47
8	100.00	100.00	99.99	100.00		98.92
9	100.00	100.00	99.99	100.00		99.26
10		100.00	100.00	100.00		99.39
11		100.00	100.00	100.00		99.81
12		100.00	100.00			99.87
13		100.00	100.00			99.92
14			100.00			99.96
15			100.00			99.98
16			100.00			99.99
17						99.99
18						99.99
19						100.00
20						100.00
21						100.00
22						100.00
23						100.00
24						100.00

Notes: Columns (1) to (5) report the fraction of ads containing the number of trait-descriptive terms specified in each row or fewer for each of the Big 5 traits using the extended trait-descriptive term list in Column (4) of Table 1. Column (6) reports the fraction of ads containing the number of trait-descriptive terms specified in each row or fewer from any of the trait descriptive terms lists for the Big 5 traits. Multiple entries of "100.00" reflect the rounding to two decimal points; the last entry in each column reflects the maximum number of occurrences of words associated with a given trait in an ad in our sample.

Table 4: Top 10% of occupations by trait demand measures

	Extroversion	Conscientious.	Openness	Agreeableness	Emotional Stability
1	*Photographers (189)*	Clergy and religious workers (176)	Clergy and religious workers (176)	Clergy and religious workers (176)	Waiters and waitresses (435)
2	Miscellanious food preparation and service workers (444)	Technical writers (184)	Fire fighting, fire prevention, and fire inspection occs (417)	*Kindergarten and earlier school teachers (155)*	Insurance sales occupations (253)
3	Chief executives, public administrators, and legislators (4)	Management support occupations (37)	Insurance sales occupations (253)	*Photographers (189)*	*Airplane pilots and navigators (226)*
4	*Interviewers, enumerators, and surveyors (316)*	*Proofreaders (384)*	Industrial engineers (56)	*Bakers (687)*	Respiratory therapists (98)
5	*Managers of medicine and health occupations (15)*	Industrial engineers (56)	*Kindergarten and earlier school teachers (155)*	Social workers (174)	General office clerks (379)
6	Heating, air conditioning, and refrigeration mechanics (534)	Cashiers (276)	Actuaries (66)	Gardeners and groundskeepers (451)	*Mail clerks, outside of post office (356)*
7	Management support occupations (37)	Actuaries (66)	*Airplane pilots and navigators (226)*	*Airplane pilots and navigators (226)*	*Photographers (189)*
8	Advertising and related sales jobs (256)	Baggage porters, bellhops and concierges (464)	*Weighers, measurers, and checkers (368)*	Guards and police, except public service (426)	Data entry keyers (385)
9	*Kindergarten and earlier school teachers (155)*	Fire fighting, fire prevention, and fire inspection occs (417)	Advertising and related sales jobs (256)	Cashiers (276)	*Bakers (687)*
10	Real estate sales occupations (254)	Operations and systems researchers and analysts (65)	Baggage porters, bellhops and concierges (464)	*Weighers, measurers, and checkers (368)*	File clerks (335)
11	Cooks (436)	*Gardeners and groundskeepers (451)*	Athletes, sports instructors, and officials (199)	Bank tellers (383)	Housekeepers, maids, butlers, and cleaners (405)
12	Sales supervisors and proprietors (243)	Housekeepers, maids, butlers, and cleaners (405)	Patternmakers and model makers (645)	Baggage porters, bellhops and concierges (464)	Secretaries and stenographers (313)
13	Human resources and labor relations managers (8)	*Airplane pilots and navigators (226)*	Operations and systems researchers and analysts (65)	*Interviewers, enumerators, and surveyors (316)*	Customer service reps, invest., adjusters, excl. insur. (376)
14	Salespersons, n.e.c. (274)	*Writers and authors (183)*	*Writers and authors (183)*	Geologists (75)	Payroll and timekeeping clerks (338)

Notes: The table reports the top 10 % of occupations when ranked in descending order by the fraction of ads including trait-descriptive terms associated with the trait for each each column. We restrict the ranking to the 133 occupations for which we observe 20 or more ads. Occupations in italics are close to this 20 ad threshold. The occupation codes are listed in parentheses.

Table 5: Correlations among trait demand and skill measures

	Trait demand measures				
	(1)	(2)	(3)	(4)	(5)
	Extroversion	Conscient.	Openness	Agreeable	Emotional stability
Variable	A. Using the extended trait-descriptive term list				
Extroversion	1.00				
Conscientiousness	0.20	1.00			
Openness	0.20	0.37	1.00		
Agreeableness	0.24	0.17	0.17	1.00	
Emotional stability	0.07	0.04	0.14	0.09	1.00
Cognitive	0.11	0.24	0.31	0.02	-0.01
Social	0.27	0.21	0.26	0.13	0.04
Character	0.19	0.24	0.14	0.09	0.05
Writing	0.02	0.05	0.06	0.03	0.00
Customer Service	0.18	0.09	0.10	0.13	0.03
Project Management	0.03	0.06	0.09	0.00	-0.01
People Management	0.13	0.15	0.17	0.10	0.00
Financial	-0.02	0.05	0.04	-0.02	0.00
Computer	0.05	0.08	0.06	0.02	0.09
Software	0.00	0.02	0.05	-0.02	-0.01
	B. Omitting "verbal" and "analytical"				
Extroversion	1.00				
Conscientiousness	0.16	1.00			
Openness	0.15	0.15	1.00		
Agreeableness	0.27	0.18	0.19	1.00	
Emotional stability	0.07	0.05	0.18	0.09	1.00
Cognitive	0.01	0.10	0.18	0.02	-0.01
Social	0.14	0.14	0.20	0.13	0.04
Character	0.14	0.23	0.13	0.09	0.05
Writing	0.00	0.03	0.05	0.03	0.00
Customer Service	0.18	0.10	0.13	0.13	0.03
Project Management	0.00	0.02	0.06	0.00	-0.01
People Management	0.10	0.11	0.14	0.10	0.00
Financial	-0.02	0.01	-0.01	-0.02	0.00
Computer	0.01	0.06	0.03	0.02	0.09
Software	-0.02	0.00	0.03	-0.02	-0.01

Notes: The table reports the correlations between the indicators for trait-descriptive terms appearing in an ad and the other trait indicators and skill measures constructed as described in Deming and Kahn [2017]. The top panel uses the extended word list (Column (4) of Table 1) to construct the trait demand measures, while the bottom panel uses the extended word list omitting the words "verbal" and "analytical."

Table 6: Discrete-time proportional hazard models of duration of posting

Variable	(1)	(2)	(3)	(4)	(5)	(6)
Extroversion	0.861***	0.886***	0.902***	0.811***	0.911***	0.876***
	(0.005)	(0.006)	(0.006)	(0.006)	(0.007)	(0.007)
Conscientiousness	1.050***	1.054***	1.015*	0.979***	0.966***	0.977***
	(0.007)	(0.008)	(0.008)	(0.008)	(0.008)	(0.008)
Openness	1.108***	1.151***	1.039***	0.995	0.959***	0.974***
	(0.009)	(0.009)	(0.009)	(0.008)	(0.008)	(0.009)
Agreeableness	1.136***	1.151***	1.197***	1.096***	1.028***	1.039***
	(0.010)	(0.011)	(0.011)	(0.011)	(0.010)	(0.010)
Emotional stability	1.082***	1.056***	1.083***	1.065***	1.183***	1.181***
	(0.012)	(0.012)	(0.012)	(0.012)	(0.014)	(0.014)
Controls:						
Education & experience		X	X	X	X	X
Skills			X	X	X	X
Occupation				X	X	X
Location					X	X
Excluding verbal & analytical						X

Notes: Each column reports exponentiated coefficient estimates (i.e., hazard ratios) from complementary log-log models of the probability that a job ad was no longer posted to Monster.com in a given week after being posted up through 16 weeks. The model specifications include indicators for weeks after an ad was posted, the length of the job ad in characters, the indicators of personality trait demands and other controls as specified at the bottom of the table. Heteroskedasticity robust standard errors are given in parentheses. Significance levels: *** $p<0.01$, ** $p<0.05$, * $p<0.10$

Table 7: Log-wage models

	(1)	(2)	(3)	(4)	(5)	(6)
			A. Ads reporting an hourly wage (n=12,971)			
Extroversion	-0.067***	-0.064***	-0.052***	-0.027***	-0.035***	-0.059***
	(0.009)	(0.008)	(0.008)	(0.007)	(0.007)	(0.007)
Conscientiousness	-0.041***	-0.023***	-0.023***	-0.008	-0.006	-0.021***
	(0.010)	(0.009)	(0.009)	(0.008)	(0.008)	(0.008)
Openness	0.187***	0.114***	0.073***	0.059***	0.045***	0.051***
	(0.015)	(0.013)	(0.013)	(0.013)	(0.012)	(0.013)
Agreeableness	-0.090***	-0.071***	-0.036***	-0.036***	-0.031***	-0.026***
	(0.011)	(0.010)	(0.010)	(0.010)	(0.009)	(0.009)
Emotional stability	-0.107***	-0.085***	-0.064***	-0.034***	-0.038***	-0.035***
	(0.008)	(0.008)	(0.008)	(0.007)	(0.007)	(0.007)
R^2	0.050	0.229	0.331	0.475	0.537	0.539
			B. Ads reporting an annual salary (n=20,653)			
Extroversion	-0.095***	-0.077***	-0.040***	-0.049***	-0.051***	-0.055***
	(0.007)	(0.006)	(0.006)	(0.006)	(0.006)	(0.007)
Conscientiousness	-0.027***	-0.021***	-0.002	0.020***	0.015**	0.010
	(0.008)	(0.007)	(0.007)	(0.007)	(0.007)	(0.007)
Openness	0.071***	0.018**	0.027***	0.020**	0.011	0.004
	(0.008)	(0.008)	(0.008)	(0.008)	(0.008)	(0.008)
Agreeableness	-0.181***	-0.130***	-0.118***	-0.079***	-0.079***	-0.074***
	(0.011)	(0.010)	(0.009)	(0.009)	(0.009)	(0.009)
Emotional stability	-0.132***	-0.100***	-0.080***	-0.049***	-0.043***	-0.042***
	(0.009)	(0.009)	(0.009)	(0.008)	(0.008)	(0.008)
R^2	0.101	0.240	0.298	0.391	0.432	0.432
Controls:						
Education & experience		X	X	X	X	X
Skills			X	X	X	X
Occupation				X	X	X
Location					X	X
Excluding verbal & analytical						X

Notes: Each column reports coefficient estimates from log-posted wage regressions controlling for the indicators of personality trait demands, the length of the job ad in characters and other controls as specified at the bottom of the table. Heteroskedasticity robust standard errors are given in parentheses. Panel A uses the subsample of ads posting an hourly wage, while Panel B uses the subsample of ads posting an annual salary. Significance levels: *** p<0.01, ** p<0.05, * p<0.10

Table 8: Incentive pay models

	(1)	(2)	(3)	(4)	(5)	(6)
Extroversion	0.049***	0.044***	0.032***	0.022***	0.023***	0.044***
	(0.002)	(0.002)	(0.002)	(0.002)	(0.002)	(0.002)
Conscientiousness	-0.040***	-0.041***	-0.023***	-0.018***	-0.019***	-0.031***
	(0.003)	(0.003)	(0.003)	(0.003)	(0.003)	(0.003)
Openness	-0.031***	-0.026***	0.000	-0.012***	-0.011***	-0.024***
	(0.003)	(0.003)	(0.003)	(0.003)	(0.003)	(0.003)
Agreeableness	0.028***	0.016***	-0.003	-0.002	-0.002	-0.005
	(0.003)	(0.003)	(0.003)	(0.003)	(0.003)	(0.003)
Emotional stability	-0.012***	-0.013***	-0.013***	0.001	0.004	0.006
	(0.004)	(0.004)	(0.004)	(0.004)	(0.004)	(0.004)
Controls:						
Education & experience		X	X	X	X	X
Skills			X	X	X	X
Occupation				X	X	X
Location					X	X
Excluding verbal & analytical						X

Notes: Each column reports estimated marginal effects from probit models of the probability that an ad indicates that incentive pay is part of the compensation controlling for the indicators of personality trait demands, the length of the job ad in characters, and other controls as specified at the bottom of the table. Heteroskedasticity robust standard errors are given in parentheses. Significance levels: *** p<0.01, ** p<0.05, * p<0.10

Appendix Table 1: Trait descriptive terms by trait

Trait	Terms
Extroversion	*active adventurous* affirmative *aggressive ambitious* amorous *assertive assured* audacious aweless bigheaded big-mouthed blunt *boisterous bold bossy* brash *brave* brazen brisk broad-spoken brusque bubbly buoyant *carefree* chatty *cheerful* chitchatty clear-cut clownish cocky coherent *communicative* companionable *competitive* competitory *confident* conversational *courageous daring* dauntless definite *demonstrative* devil-may-care *direct* disguiseless *dominant* dynamic eager effervescent emphatic *energetic enterprising enthusiastic exhibitionistic* expansive explicit *explosive expressive* **extroversion extrovert extroverted** fatigueless fearless fervent *flamboyant flirtatious forceful* forcible forthright forward *frank friendly* frisky gabby gallant *gregarious* gushy gutsy *happy-go-lucky* hasty headlong *hearty* heroic high-spirited *humorous* hypersensual immodest *impetuous* imprudent incautious indefatigable indeliberate inexhaustible informative injudicious *intrusive* jocular jolly *jovial* lion-hearted live lively long-winded loose-tongued loud-mouthed lucid *magnetic merry* militant mirthful *mischievous* nervy *noisy opportunistic optimistic out-going outspoken* overbold overbrave overconfident overdaring overemphatic overhasty overintense overmerry overrash overtalkative overvaliant participative peppy perky *persistent* persuasive pert plain-spoken *playful* plucky pretenseless *proud rambunctious* rivalrous rollicking self-assertive self-centered self-expressive self-important self-respecting self-revealing self-satisfied sensuous *sexy* short-spoken *show-off* smooth-spoken *sociable social* sparkling speedy *spirited spontaneous* sprightly spry *spunky* stalwart steadfast stout-hearted *straightforward* sultry swellheaded *talkative* terse tireless ultrasensual uncautious unchaste unconcealing uncontriving undevious undisguised unguarded *uninhibited* unreserved *unrestrained* unselfconscious unshrinking untiring unwary valiant valorous venturesome venturous *verbal verbose* vibrant *vigorous vivacious* vivid vocal voluptuous well-spoken *witty wordy zealous zestful*
Introversion	acquiescent *aloof* anti-social *apathetic* asocial *bashful* bendable *bland* boastless broody chaste clannish clingy cliquish close-mouthed cool counselable *cowardly* coy demure *detached* discourageable dispassionate distant *docile* doleful *dull* emotionless exclusive fatalistic feelingless flatterable hermitish *humorless impartial* impassive incongenial indefinite indifferent *indirect* ineloquent inexplicit inexpressive *inhibited* **introversion introvert introverted** *joyless* lamblike leadable *lethargic* lukewarm lustless malleable manipulable *meek melancholic* moldable *morose negativistic* nonegotistical *nonpersistent* nonvocal overmodest overquiet overserious overthoughtful overtrusting overwary *passive* persuadable *pessimistic placid* pliable pliant pouty *prudish quiet* reclusive *reserved* restrainable *restrained retiring seclusive secretive sedate* self-defensive *serious* servile shrinking *shy silent sluggish* solemn *somber* stand-offish *submissive* sulky sullen temptable tight-lipped *timid*

timorous unaccessible *unadventurous unaffectionate unaggressive* unanimated unapproachable unassertive unboastful uncheerful uncheery *uncommunicative* uncompanionable *uncompetitive* unconfiding undemonstrative undramatic unemphatic *unfriendly* ungallant ungregarious unheroic *unimaginative* unlively unmirthful unneighborly unobstrusive unostentatious unpersuasive unpresuming unpretentious *unsociable* unsocial unsparkling unspeaking unstirrable *untalkative* unventurous unvoluptuous *vague* vigorless *wary* weak-hearted weak-kneed withdrawing *withdrawn* zealless

Conscientiousness abstinent accurate aimful *alert ambitious analytical* anticipative businesslike calculable calculating *careful cautious* changeless clairvoyant clear-sighted *concise* **conscientiousness conscientious** *conservative consistent* constrained *controlled conventional* crusading *cultured decisive* dedicated *deliberate dependable* designful devout *dignified* diligent *discreet* doctrinaire dogged dutiful eagle-eyed *economical efficient* evangelistic exact *exacting* exhaustive farseeing *fastidious firm* forbearing *foresighted* forethoughtful *formal* forward-looking frugal god-fearing hard-working heedful high-minded high-principled incorrupt incorruptible indivertible *industrious* invariable just law-abiding literal *logical mannerly* matter-of-fact *mature* mechanistic methodical *meticulous moralistic* moralizing mystical nonvariant *objective orderly organized* other-worldly overambitious overcareful overcautious overconscientious overdiligent overearnest overfastidious overlogical overparticular overrighteous overrigorous overscrupulous overzealous *painstaking* particular *perfectionistic* persevering *persistent* pious plain-dealing *planful poised practical* prayerful preachy *precise predictable* premeditative prim *principled* productive *prompt* proper prophetic prudent *punctual* puritanical *purposeful* purposive *rational refined reliable responsible* rigorous ritualistic saintly self-consistent self-denying *self-disciplined* self-restrained serious-minded single-minded *sophisticated* spiritual *steady stern* strait-laced *strict systematic tenacious thorough* thoroughgoing *thrifty* tidy *traditional* ultraconservative ultrafastidious ultrareligious unadulterous unchangeable unchanging undeviating unerring unextravagant unfailing unfaltering unforgetful unprogressive unresting unspontaneous unswerving untemptable unvarying unwavering unworldly *wise* worshipful

Non-conscientiousness *absent-minded aimless* blasphemous breezy cagy canny capricious *careless* changeable deceptive defiant devilish digressive discourteous *dishonest disorderly disorganized* distractible double-tongued elfish elusive *erratic* evasive exaggerative excessive *extravagant* fanciful fancy-free fickle flighty *foolhardy* footloose foresightless *forgetful* foul-mouthed foxy free-living *frivolous* frolicsome glib *haphazard* heedless heretical hit-or-miss *illogical immature* immoderate impertinent impious impish *impractical* imprecise *impulsive* inaccurate *inconsistent* inconstant *indecisive indiscreet indulgent inefficient* inexact insolent

	insubordinate intemperate irreformable irresolute *irresponsible* knavish lackadaisical lavish lawless *lax lazy* leisurely light-hearted loud *lustful* lusty melodramatic messy mutinous neglectful *negligent* **nonconscientious not conscientious** *nonconforming* ostentatious overcunning overcurious prankish profane purposeless rascally *rash rebellious reckless* retortive risqué roguish rootless rowdy sassy saucy scampish scandalmongering *scatterbrained* scheming self-destructive self-excusing shiftless shortsighted showy slick *slipshot sloppy slothful* slovenly sneaky snoopy thriftless *transparent* tricky *unambitious* unaspiring unbusinesslike uncalculating uncareful unceremonious *unconscientious* unconstructive *unconventional* undeliberate *undependable* undiligent undisciplined unearnest uneconomical unenterprising unfaithful unforseeing ungovernable unheedful unindustrious unmethodical unmindful *unobservant unpredictable* unproductive unpunctual *unreliable* unreligious *unsophisticated unstable unsystematic* unthrifty untidy untruthful variable *wasteful* whimsical wily *wishy-washy* zany
Openness	abstract accomplished affected *analytical animated* aristocratic *articulate artistic autonomous* blasé bookish brainy *bright candid* cavalier ceremonious chic *clever complex* complicated *contemplative cosmopolitan* courtly *creative* cultivated *cultured curious* dapper debonair *deep diplomatic distrustful* earthly-wise educable educated elegant *eloquent empathetic* enlightened *ethical* flaunty *foresighted* genteel graceful gracious haughty high-faluting *idealistic imaginative independent individualistic* informed *ingenious innovative* inquiring *inquisitive insightful* instructible *intellectual intelligent intense* intricate *introspective* intuitive *inventive* jaunty know-it-all *knowledgeable* learned literary literate many-sided *meditative* musical nimble-witted *nonconforming* **openness open to experience open to experiences open to new experience** *original* overstudious oversubtle *perceptive philosophical* philosophizing poetic polished profound *progressive* questioning quick-witted *refined resourceful* scholarly *scrupulous self-critical sensual sharp-witted shrewd smart sophisticated* studious stuffy suave *subjective* tasteful *tenacious* ultraintellectual ultrarefined *unconventional* unimpressible *unpredictable* unprovincial *versatile* well-read *wide-interests wise witty worldly* worldly-wise
Non-openness	awkward blunt-witted boorish childish childlike clumsy *commonplace condescending* confusable *conventional* credulous deceivable *dependent* divertible *dogmatic dull* earthly-minded graceless *ignorant* imitative *imperceptive* impressible *inarticulate* incurious indelicate inelegant inexperienced ingenuous irrational juvenile materialistic misleadable muddle-headed narrow *narrow-interests* **nonopenness not open to experience** overcredulous *patronizing* perspectiveless *pompous predictable pretentious* provincial *shallow simple* superficial *surly* thick-headed *traditional* unaccomplished unanalytic unartistic unauthoritative *uncreative* uncultivated uncultured undeliberative undignified

undiscerning undiscriminating unenlightened ungenteel ungraceful *unimaginative* unimpressionable uninformed uningenious *uninquisitive unintellectual unintelligent* unintrospective uninventive uninvestigative unmannered *unobservant* unoriginal unphilosophical unpolished unquestioning unreasoning unrefined *unreflective* unscholarly *unscrupulous* unspiritual unstudious unthinking untrained untutored unwise worldly-minded

Agreeableness — acceptant accessible *accommodating adaptable* adaptive adjustable *affectionate* **agreeableness agreeable** *altruistic amiable* amicable angelic *appreciative* approachable beneficent *benevolent* bighearted bountiful broad-minded *charitable cheerful* cherubic chipper chivalrous civil *compassionate* complacent complaisant *compliant* comradely conciliatory congenial *conscientious considerate* consolatory constant constructive *cooperative cordial courteous* democratic *diplomatic earnest earthy easy-going* empathic equalitarian *ethical* fair-minded fair-natured faithful *feminine flexible folksy forgiving friendly generous genial gentle* gentle-hearted gentlemanlike giving good-hearted good-humored *good-natured* good-tempered great-hearted *gullible helpful homespun honest* hospitable humane humanitarian *humble* impressionable inaggressive *informal* ingratiating ingratiatory inirritable intimate *jovial kind* kind-hearted kindly *lenient* long-suffering loving *loyal* magnanimous *mannerly* maternal merciful mild mild-hearted ministrative moderate *modest moral* mushy *naïve natural* neighborly nonbelligerent noncoercive nonhostile noninterfering nonrigid nonvolatile *obliging* open-hearted open-minded *optimistic* overcaring overcharitable overindulgent overpatient pacifistic *passionate patient peaceful* peacemaking philanthropic *pleasant polite praising* prejudiceless *principled* protective quiet-spoken *reasonable relaxed religious respectful* responsive *reverent selfless* self-sacrificing *sensitive sentimental simple sincere soft-hearted* soft-spoken solicitous sportsmanlike statesmanlike sugary *suggestible* sunny *sympathetic tactful* temperate tender tender-hearted *thoughtful tolerant trustful truthful trusting* ultrademocratic ultrasentimental unargumentative *unassuming* unbelligerent unbiased unbigoted uncomplaining *uncritical undemanding understanding* undespairing undiscourageable undogmatic unembittered unenvious unexacting ungrudging unhardened unimpatient unmalicious unmeddling unmercenary unmoralizing unpartisan unrevengeful *unselfish* unsuspicious unvindictive unwarlike *warm* warm-hearted well-mannered

Disagreeableness — abrasive *abrupt abusive* acid agitative *antagonistic* arbitrary *argumentative* arrogant austere authoritative autocratic balky *belligerent* biased *bigoted bitter* blustery *boastful* brawlsome bristly *bullheaded* bullish bullying *callous* cantankerous catty *caustic* censorial closed-minded closefisted *coarse* coercive *cold* cold-hearted *combative* compassionless *conceited condescending* contradictious contradictory contrary contrary-minded corrective covetous *crabby crafty cranky*

critical cruel cunning curt cynical deceitful demanding derisive derogatory destructive *devious* dictatorial **disagreeable disagreeableness** disdainful disobliging disregardful *disrespectful* disruptive *distrustful domineering egocentric egotistical* embittered exploitative *explosive* facetious factious fanatical *faultfinding* fierce fiery flammable *flippant greedy gruff* grumbly *grumpy* hardened *hard-hearted* hard-nosed hard-shelled *harsh* headstrong high-handed hostile hot-blooded hot-tempered hypercritical icy ill-humored ill-natured ill-tempered ill-willed immovable *impersonal impolite impudent* incompliant *inconsiderate* incontrollable inconvincible inflexible inharmonious inhospitable inquisitorial *insensitive insincere* insuppressible *intolerant* iron-hearted ironical irrepressible irrestrainable *irreverent irritable* magisterial malicious *manipulative masochistic* mercenary *miserly* mistrustful mulish nagging narrow-minded negative niggardly *nonreligious* nonunderstanding *obstinate* obtrusive one-sided *opinionated* ornery overbearing overcritical overgreedy overharsh overjealous overpartial overrigid oversevere overstrict oversuspicious peevish peppery persecutive petty pig-headed *pompous* precondemning predatory *prejudiced* presumptuous provocable *quarrelsome* quick-tempered *rebellious* reformative relentless remorseless reproachful retaliative revengeful *rigid rough rude ruthless* sadistic *sarcastic* satiric *scornful* scrappy *self-indulgent selfish* self-righteous *self-seeking* self-willed severe sharp-tongued short-tempered shrewish *skeptical* slanderous *sly smug snobbish* sober-minded sour spiteful *stern stingy* stormy stringent strong-minded *stubborn surly suspicious tactless tempestuous* testy *thankless thoughtless tough* tyrannical ultracritical unaccommodating unalterable unamiable unbendable unbending unbenevolent *uncharitable* unchivalrous uncomplaisant uncompromising unconstrainable unconstrained uncontradictable uncontrolled *uncooperative* uncordial *uncouth underhanded* undiplomatic unforbearing *unforgiving unfriendly* ungenerous ungentle ungiving *ungracious* unindulgent *unkind* unmalleable unmovable unobliging unpersonable unpersuadable unpitying unpleasable unpliable unreasonable unrelenting unrepressible unrestrainable *unruly* unsatisfiable *unscrupulous* unsmiling unsolicitous unsubmissive unswayable *unsympathetic* untamable untrustful unyielding *vain* vengeful *vindictive* violent *volatile* volcanic warlike wild willful

Emotional stability

arbitrative astute *autonomous brave calm casual* certain clear-headed *contented* cool-headed *courageous* deliberative discerning discriminative *down-to-earth* durable *earthy easy-going* **emotional equilibrium emotional stability** free-minded free-thinking fretless hard-headed imperturbable incoercible *independent* indestructible *individualistic* indomitable inexcitable *informal* invincible inward judicious level-headed *masculine nonchalant* nonirritable observant *passionless patient* penetrative pensive poised realistic reflective *relaxed* rugged self-assured self-confident self-controlled self-examining self-possessed self-reliant

Neuroticism	self-sufficient serene **stable** thick-skinned tough-minded *unassuming* unblushing undeceivable undefeatable *undemanding* undisturbable *unemotional unexcitable* unflinching unhurried unimpassionate unshakable unstormy *weariless* wide-awake worriless agitable alarmable *anxious bossy* busyish careworn choosy *compulsive crabby cranky defensive despondent* easeless *emotional envious excitable* exhaustible *extravagant faultfinding fearful* feelingful fidgety *finicky* fluttery *fretful* frightenable fussy *gossipy grumpy gullible* hectic *high-strung* hypersensitive *hypocritical impatient* inconfident *insecure intrusive irritable jealous meddlesome moody naïve negativistic nervous* **neurotic neuroticism** *nosey obsessive* overactive overemotional overexcitable overimaginative oversensitive perturbable picky *possessive quarrelsome restless* self-conscious *self-critical* self-deceiving self-defeating self-deluding self-deprecating self-disparaging self-doubting *self-indulgent selfish self-pitying self-punishing* self-reproachful *snobbish* soft-shelled squeamish *suggestible* supersensitive *superstitious temperamental tense* thin-skinned *touchy* unassured unconfident unhardy unpoised *unstable* unsure *volatile* weak-spirited weepy whiny wishful world-weary *worrying*

Notes: Words in bold appear in the "traits-only" list in Column (1) of Table 1. Words in italics appear in the shorter trait descriptive term list in Column (2) of Table 1 along with the words in bold. The remaining words appear in the extended list used in Column (4) of Table 1 along with all of the words in bold and italics.

Appendix Table 2: Trait summary statistics by occupation (+)

Occupation	Ext.	Con.	Ope.	Agree.	Emo. Stab.	Any trait	# of ads
Uncategorized (0)	0.26	0.19	0.14	0.09	0.07	0.45	25122
Chief executives, public administrators, and legislators (4)	0.65	0.35	0.10	0.05	0.02	0.95	194
Financial managers (7)	0.18	0.19	0.14	0.07	0.09	0.35	57
Human resources and labor relations managers (8)	0.48	0.33	0.30	0.18	0.09	0.72	250
Managers and specialists in marketing, advert., PR (13)	0.45	0.36	0.32	0.18	0.07	0.69	14311
Managers in education and related fields (14)	0.25	0.00	0.50	0.25	0.00	1.00	4
Managers of medicine and health occupations (15)	0.59	0.14	0.14	0.09	0.00	0.64	22
Managers of properties and real estate (18)	0.40	0.31	0.17	0.15	0.07	0.61	169
Funeral directors (19)	0.00	0.00	0.33	0.00	0.00	0.33	3
Managers and administrators, n.e.c. (22)	0.35	0.31	0.25	0.13	0.07	0.60	23836
Accountants and auditors (23)	0.28	0.32	0.26	0.10	0.10	0.57	5337
Insurance underwriters (24)	0.50	0.50	0.00	0.00	0.00	0.50	4
Other financial specialists (25)	0.09	0.18	0.32	0.14	0.00	0.36	22
Management analysts (26)	0.31	0.31	0.28	0.08	0.05	0.60	7179
Personnel, HR, training, and labor rel. specialists (27)	0.37	0.24	0.20	0.13	0.05	0.56	86
Buyers, wholesale and retail trade (29)	0.25	0.00	0.00	0.25	0.00	0.25	4
Purchasing managers, agents, and buyers, n.e.c. (33)	0.36	0.35	0.32	0.11	0.08	0.62	574
Business and promotion agents (34)	0.00	0.00	0.00	0.00	0.00	0.00	1
Construction inspectors (35)	0.09	0.09	0.09	0.18	0.09	0.36	11
Inspectors and compliance officers, outside (36)	0.24	0.25	0.19	0.11	0.04	0.41	314
Management support occupations (37)	0.57	0.54	0.20	0.10	0.06	0.76	145
Architects (43)	0.27	0.23	0.28	0.06	0.04	0.55	938
Aerospace engineers (44)	0.24	0.30	0.20	0.05	0.00	0.42	66
Metallurgical and materials engineers (45)	0.21	0.18	0.21	0.03	0.03	0.42	33
Petroleum, mining, and geological engineers (47)	0.15	0.05	0.15	0.00	0.05	0.30	20
Chemical engineers (48)	0.19	0.20	0.21	0.05	0.03	0.45	159
Civil engineers (53)	0.19	0.13	0.10	0.06	0.06	0.37	454
Electrical engineers (55)	0.21	0.19	0.17	0.05	0.04	0.42	907
Industrial engineers (56)	0.32	0.52	0.44	0.10	0.05	0.70	164
Mechanical engineers (57)	0.17	0.15	0.17	0.06	0.05	0.36	629
Engineers and other professionals, n.e.c (59)	0.28	0.24	0.24	0.07	0.05	0.51	7753
Computer systems analysts and computer scientists (64)	0.07	0.21	0.21	0.00	0.00	0.43	14
Operations and systems researchers and analysts (65)	0.32	0.42	0.37	0.09	0.05	0.64	655
Actuaries (66)	0.24	0.47	0.43	0.10	0.04	0.67	49
Mathematicians and statisticians (68)	0.18	0.36	0.28	0.10	0.02	0.56	90
Physicists and astronomists (69)	0.21	0.07	0.14	0.00	0.00	0.36	14
Chemists (73)	0.22	0.30	0.35	0.08	0.10	0.57	161
Atmospheric and space scientists (74)	0.00	0.00	0.00	0.00	0.00	0.00	1
Geologists (75)	0.30	0.25	0.27	0.23	0.02	0.57	60
Agricultural and food scientists (77)	0.67	0.17	0.17	0.00	0.17	0.67	6
Biological scientists (78)	0.00	0.12	0.03	0.00	0.00	0.12	33
Foresters and conservation scientists (79)	0.00	0.00	0.00	0.00	0.00	0.00	2
Medical scientists (83)	1.00	0.00	0.00	0.00	0.00	1.00	1

Physicians (84)	0.17	0.15	0.13	0.10	0.06	0.31	1561
Dentists (85)	0.01	0.00	0.00	0.01	0.00	0.02	804
Veterinarians (86)	0.53	0.47	0.53	0.35	0.00	0.88	17
Optometrists (87)	0.17	0.00	0.17	0.17	0.00	0.17	6
Podiatrists (88)	0.00	0.00	0.00	0.00	0.00	0.00	1
Other health and therapy occupations (89)	0.00	0.00	0.00	0.00	0.00	0.00	1
Registered nurses (95)	0.15	0.15	0.08	0.13	0.07	0.36	2963
Pharmacists (96)	0.07	0.03	0.03	0.02	0.01	0.11	1005
Dieticians and nutritionists (97)	0.00	0.00	0.00	0.00	0.00	0.00	5
Respiratory therapists (98)	0.14	0.07	0.09	0.07	0.25	0.55	76
Occupational therapists (99)	0.17	0.18	0.07	0.14	0.05	0.46	148
Physical therapists (103)	0.19	0.21	0.08	0.14	0.03	0.49	329
Speech therapists (104)	0.64	0.09	0.27	0.18	0.00	0.73	11
Therapists, n.e.c. (105)	0.09	0.33	0.08	0.07	0.07	0.48	90
Physicians' assistants (106)	0.12	0.04	0.04	0.04	0.00	0.16	25
Kindergarten and earlier school teachers (155)	0.52	0.22	0.43	0.48	0.04	0.78	23
Primary school teachers (156)	1.00	0.00	0.00	0.00	0.00	1.00	1
Special education teachers (158)	0.00	0.40	0.20	0.20	0.20	0.60	5
Teachers, n.e.c. (159)	0.41	0.23	0.15	0.14	0.02	0.58	566
Vocational and educational counselors (163)	0.67	0.33	0.42	0.25	0.08	0.83	12
Librarians (164)	0.19	0.16	0.22	0.03	0.06	0.47	32
Archivists and curators (165)	1.00	1.00	0.00	0.00	0.00	1.00	1
Economists, market and survey researchers (166)	0.50	0.31	0.44	0.25	0.00	0.69	16
Psychologists (167)	0.10	0.05	0.24	0.14	0.10	0.43	21
Urban and regional planners (173)	0.00	0.00	0.25	0.00	0.00	0.25	4
Social workers (174)	0.15	0.28	0.17	0.39	0.05	0.60	109
Clergy and religious workers (176)	0.03	0.90	0.90	0.88	0.05	0.98	93
Lawyers and judges (178)	0.21	0.18	0.26	0.12	0.04	0.48	1135
Writers and authors (183)	0.34	0.39	0.36	0.16	0.06	0.66	494
Technical writers (184)	0.13	0.67	0.10	0.04	0.03	0.80	358
Designers (185)	0.25	0.23	0.29	0.11	0.06	0.53	1368
Musicians and composers (186)	0.02	0.02	0.02	0.01	0.01	0.05	167
Actors, directors, and producers (187)	0.75	0.13	0.00	0.13	0.13	0.88	8
Painters, sculptors, craft-artists, and print-makers (188)	0.16	0.22	0.21	0.09	0.06	0.45	214
Photographers (189)	0.82	0.18	0.29	0.43	0.21	0.93	28
Art/entertainment performers and related occs (194)	1.00	0.00	0.00	1.00	0.00	1.00	2
Editors and reporters (195)	0.14	0.12	0.13	0.08	0.03	0.28	395
Athletes, sports instructors, and officials (199)	0.38	0.30	0.39	0.12	0.08	0.67	210
Clinical laboratory technologies and technicians (203)	0.41	0.30	0.23	0.22	0.05	0.60	145
Dental hygienists (204)	0.22	0.22	0.00	0.11	0.00	0.33	9
Radiologic technologists and technicians (206)	0.26	0.18	0.08	0.23	0.02	0.56	61
Licensed practical nurses (207)	0.12	0.19	0.02	0.13	0.06	0.31	52
Health technologists and technicians, n.e.c (208)	0.33	0.11	0.22	0.44	0.00	0.56	9
Engineering technicians (214)	0.35	0.15	0.25	0.05	0.06	0.61	93
Drafters (217)	0.06	0.06	0.06	0.03	0.04	0.17	591
Surveyors, cartographers, mapping scientists/techs (218)	0.12	0.16	0.10	0.00	0.07	0.35	69

Chemical technicians (224)	0.25	0.00	0.25	0.25	0.00	0.50	4
Other science technicians (225)	0.00	0.00	0.00	0.00	0.00	0.00	1
Airplane pilots and navigators (226)	0.40	0.40	0.40	0.35	0.45	0.65	20
Air traffic controllers (227)	0.00	0.00	0.00	0.00	0.00	0.20	498
Broadcast equipment operators (228)	0.50	0.00	0.00	0.25	0.00	0.75	4
Computer software developers (229)	0.33	0.25	0.33	0.09	0.07	0.61	2688
Programmers of numerically controlled machine tools (233)	0.00	0.00	1.00	0.00	0.00	1.00	1
Legal assistants and paralegals (234)	0.17	0.20	0.18	0.09	0.10	0.47	983
Technicians, n.e.c. (235)	0.19	0.21	0.10	0.16	0.04	0.49	3004
Sales supervisors and proprietors (243)	0.48	0.31	0.29	0.22	0.08	0.66	4641
Insurance sales occupations (253)	0.16	0.16	0.48	0.04	0.46	0.70	122
Real estate sales occupations (254)	0.52	0.21	0.35	0.08	0.09	0.67	392
Advertising and related sales jobs (256)	0.54	0.28	0.39	0.08	0.05	0.79	99
Sales engineers (258)	0.35	0.13	0.17	0.03	0.04	0.53	283
Salespersons, n.e.c. (274)	0.45	0.19	0.20	0.15	0.07	0.63	3763
Retail salespersons and sales clerks (275)	0.24	0.27	0.16	0.13	0.05	0.53	826
Cashiers (276)	0.44	0.48	0.17	0.34	0.05	0.79	197
Door-to-door sales, street sales, and news vendors (277)	0.63	0.16	0.00	0.68	0.00	0.84	19
Sales demonstrators, promoters, and models (283)	0.69	0.15	0.15	0.31	0.00	0.69	13
Office supervisors (303)	0.41	0.47	0.12	0.35	0.00	0.76	17
Computer and peripheral equipment operators (308)	0.24	0.16	0.14	0.14	0.02	0.43	63
Secretaries and stenographers (313)	0.36	0.29	0.16	0.15	0.16	0.63	3196
Typists (315)	0.33	0.40	0.07	0.33	0.13	0.53	15
Interviewers, enumerators, and surveyors (316)	0.64	0.14	0.18	0.25	0.14	0.89	28
Transportation ticket and reservation agents (318)	1.00	0.20	0.20	0.20	0.20	1.00	5
Receptionists and other information clerks (319)	0.34	0.23	0.09	0.18	0.15	0.57	1833
Human resources clerks, excl payroll and timekeeping (328)	0.33	0.00	0.00	0.00	0.33	0.33	3
Library assistants (329)	0.50	0.17	0.08	0.17	0.08	0.67	12
File clerks (335)	0.22	0.33	0.08	0.14	0.20	0.59	51
Bookkeepers and accounting and auditing clerks (337)	0.15	0.24	0.10	0.07	0.11	0.43	2372
Payroll and timekeeping clerks (338)	0.13	0.21	0.02	0.11	0.16	0.43	95
Billing clerks and related financial records processing (344)	0.26	0.34	0.10	0.10	0.12	0.50	68
Mail and paper handlers (346)	0.25	0.50	0.25	0.25	0.00	0.50	4
Telephone operators (348)	0.25	0.13	0.25	0.38	0.13	0.75	8
Other telecom operators (349)	0.00	0.00	0.00	0.00	0.00	0.00	3
Mail carriers for postal service (355)	0.00	1.00	1.00	0.00	0.00	1.00	1
Mail clerks, outside of post office (356)	0.39	0.22	0.00	0.04	0.22	0.52	23
Messengers (357)	0.43	0.36	0.57	0.50	0.14	0.79	14
Dispatchers (359)	0.28	0.28	0.09	0.14	0.09	0.55	148
Shipping and receiving clerks (364)	0.25	0.29	0.09	0.13	0.10	0.48	103
Stock and inventory clerks (365)	0.17	0.20	0.07	0.10	0.02	0.39	41
Meter readers (366)	0.00	0.00	0.00	0.25	0.25	0.50	4
Weighers, measurers, and checkers (368)	0.10	0.15	0.40	0.30	0.00	0.55	20
Material recording, sched., prod., plan., expediting cl. (373)	0.30	0.27	0.18	0.09	0.05	0.52	286
Insurance adjusters, examiners, and investigators (375)	0.31	0.23	0.12	0.08	0.15	0.62	26
Customer service reps, invest., adjusters, excl. insur. (376)	0.40	0.24	0.11	0.23	0.16	0.63	1692

Eligibility clerks for government prog., social welfare (377)	1.00	0.00	0.00	0.00	0.00	1.00	1
General office clerks (379)	0.26	0.21	0.04	0.17	0.25	0.52	84
Bank tellers (383)	0.44	0.18	0.12	0.29	0.15	0.53	34
Proofreaders (384)	0.09	0.52	0.26	0.13	0.04	0.61	23
Data entry keyers (385)	0.31	0.32	0.10	0.13	0.21	0.63	3034
Teacher's aides (387)	0.00	0.00	1.00	0.00	0.00	1.00	1
Administrative support jobs, n.e.c. (389)	0.83	0.17	0.00	0.00	0.17	1.00	6
Housekeepers, maids, butlers, and cleaners (405)	0.29	0.40	0.21	0.21	0.19	0.54	52
Laundry and dry cleaning workers (408)	0.33	0.33	0.33	0.00	0.67	1.00	3
Fire fighting, fire prevention, and fire inspection occs (417)	0.26	0.43	0.52	0.02	0.05	0.79	42
Police and detectives, public service (418)	0.39	0.01	0.00	0.01	0.00	0.39	188
Sheriffs, bailiffs, correctional institution officers (423)	0.44	0.00	0.06	0.38	0.00	0.50	16
Crossing guards (425)	0.00	0.00	0.00	0.00	0.00	0.00	4
Guards and police, except public service (426)	0.28	0.28	0.26	0.35	0.04	0.64	72
Protective service, n.e.c. (427)	1.00	0.00	1.00	1.00	0.00	1.00	1
Supervisors of food preparation and service (433)	0.00	0.00	0.00	0.00	0.00	0.00	1
Bartenders (434)	0.73	0.36	0.18	0.27	0.09	0.82	11
Waiters and waitresses (435)	0.11	0.18	0.03	0.05	0.53	0.76	38
Cooks (436)	0.50	0.09	0.23	0.18	0.06	0.67	223
Miscellanious food preparation and service workers (444)	0.68	0.39	0.13	0.18	0.09	0.81	95
Dental Assistants (445)	0.05	0.03	0.00	0.04	0.01	0.08	223
Health and nursing aides (447)	0.25	0.15	0.03	0.11	0.01	0.40	205
Supervisors of cleaning and building service (448)	0.00	0.00	0.00	0.00	0.00	0.00	3
Gardeners and groundskeepers (451)	0.44	0.41	0.00	0.37	0.04	0.70	27
Janitors (453)	0.13	0.19	0.13	0.15	0.04	0.41	78
Pest control occupations (455)	0.40	0.11	0.09	0.09	0.09	0.49	35
Hairdressers and cosmetologists (458)	0.00	0.00	0.00	0.00	0.00	0.00	3
Guides (461)	0.50	0.00	0.00	0.00	0.50	0.50	4
Baggage porters, bellhops and concierges (464)	0.37	0.46	0.39	0.26	0.02	0.76	46
Motion picture projectionists (467)	0.00	1.00	0.00	0.00	0.00	1.00	4
Child care workers (468)	0.00	0.17	0.00	0.33	0.00	0.33	6
Animal caretakers, except farm (472)	1.00	0.00	0.00	0.00	0.00	1.00	3
Farm workers, incl. nursery farming (479)	1.00	1.00	1.00	0.00	0.00	1.00	1
Supervisors of mechanics and repairers (503)	0.00	0.00	0.00	0.00	0.00	0.00	3
Automobile mechanics and repairers (505)	0.10	0.00	0.20	0.00	0.00	0.30	10
Bus, truck, and stationary engine mechanics (507)	0.20	0.10	0.00	0.00	0.00	0.20	10
Aircraft mechanics (508)	0.00	0.00	0.00	0.00	0.00	0.00	8
Small engine repairers (509)	0.17	0.50	0.00	0.00	0.00	0.50	6
Auto body repairers (514)	0.38	0.13	0.00	0.38	0.63	0.88	8
Heavy equipement and farm equipment mechanics (516)	0.27	0.00	0.09	0.09	0.00	0.36	11
Machinery maintenance occupations (519)	0.24	0.16	0.08	0.00	0.08	0.40	25
Repairers of household appliances and power tools (526)	0.64	0.64	0.09	0.55	0.18	0.73	11
Telecom and line installers and repairers (527)	0.50	0.00	0.00	0.00	0.00	0.50	2
Repairers of electrical equipment, n.e.c (533)	0.00	0.00	0.00	0.00	0.00	0.00	35
Heating, air conditioning, and refrigeration mechanics (534)	0.58	0.04	0.04	0.00	0.00	0.64	81
Locksmiths and safe repairers (536)	0.00	0.25	0.25	0.25	0.00	0.25	4

Repairers of mechanical controls and valves (539)	0.00	0.00	0.00	0.00	0.00	0.00	1
Elevator installers and repairers (543)	0.50	0.50	0.50	0.00	0.50	0.50	2
Millwrights (544)	0.10	0.20	0.10	0.05	0.05	0.30	20
Mechanics and repairers, n.e.c. (549)	0.22	0.19	0.10	0.11	0.07	0.45	473
Supervisors of construction work (558)	0.05	0.14	0.09	0.05	0.05	0.18	22
Masons, tilers, and carpet installers (563)	0.27	0.16	0.14	0.18	0.04	0.39	56
Carpenters (567)	0.08	0.20	0.04	0.12	0.00	0.32	25
Drywall installers (573)	0.00	0.00	0.00	0.00	0.00	0.00	1
Electricians (575)	0.13	0.13	0.05	0.03	0.01	0.21	384
Electric power installers and repairers (577)	0.50	0.00	0.00	0.50	0.00	0.50	2
Plasterers (584)	0.00	0.00	0.00	0.00	0.00	0.00	2
Plumbers, pipe fitters, and steamfitters (585)	0.18	0.18	0.09	0.09	0.03	0.29	34
Glaziers (589)	0.50	0.00	0.00	0.00	0.00	0.50	2
Roofers and slaters (595)	0.33	0.33	0.00	0.00	0.00	0.67	6
Drillers of earth (598)	0.87	0.13	0.00	0.87	0.00	0.87	15
Drillers of oil wells (614)	0.00	0.00	0.00	0.00	1.00	1.00	1
Explosives workers (615)	0.00	0.00	0.00	0.00	0.00	0.00	2
Miners (616)	0.00	1.00	1.00	0.00	0.00	1.00	1
Other mining occupations (617)	0.00	0.00	1.00	1.00	0.00	1.00	2
Production supervisors or foremen (628)	0.27	0.23	0.20	0.06	0.04	0.50	341
Tool and die makers and die setters (634)	0.07	0.07	0.04	0.04	0.04	0.18	28
Machinists (637)	0.09	0.12	0.09	0.03	0.05	0.25	194
Boilermakers (643)	0.00	0.00	0.60	0.00	0.20	0.80	5
Precision grinders and fitters (644)	0.00	0.33	0.00	0.00	0.00	0.33	3
Patternmakers and model makers (645)	0.31	0.35	0.38	0.00	0.00	0.65	48
Engravers (649)	0.00	0.00	0.00	0.00	0.00	0.00	2
Other metal and plastic workers (653)	1.00	1.00	0.00	0.00	0.00	1.00	3
Cabinetmakers and bench carpeters (657)	0.40	0.00	0.00	0.20	0.00	0.60	5
Furniture/wood finishers, other prec. wood workers (658)	0.50	0.00	0.00	0.50	0.50	0.50	2
Dressmakers, seamstresses, and tailors (666)	0.71	0.00	0.00	0.14	0.00	0.71	7
Upholsterers (668)	0.00	0.00	0.00	0.00	0.00	0.00	1
Hand molders and shapers, except jewelers (675)	0.22	0.22	0.00	0.00	0.22	0.33	9
Dental laboratory and medical applicance technicians (678)	0.00	0.00	0.00	1.00	0.00	1.00	1
Butchers and meat cutters (686)	0.33	0.50	0.00	0.50	0.00	0.67	6
Bakers (687)	0.44	0.12	0.08	0.40	0.20	0.60	25
Power plant operators (695)	0.00	0.00	0.00	0.00	0.00	0.00	9
Plant and system operators, stationary engineers (696)	0.14	0.24	0.11	0.04	0.04	0.41	79
Lathe, milling, and turning machine operatives (703)	0.08	0.08	0.08	0.08	0.03	0.25	40
Punching and stamping press operatives (706)	0.00	0.00	0.00	0.00	0.00	0.00	1
Rollers, roll hands, and finishers of meta (707)	0.12	0.18	0.12	0.06	0.00	0.29	17
Drilling and boring machine operators (708)	0.00	0.00	0.00	0.00	0.00	0.00	2
Grinding, abrading, buffing, and polishing workers (709)	0.26	0.26	0.13	0.13	0.06	0.48	31
Sawing machine operators and sawyers (727)	0.00	0.00	0.00	0.00	0.00	0.00	4
Printing machine operators, n.e.c. (734)	0.00	0.00	0.00	0.00	0.00	0.00	1
Typesetters and compositors (736)	0.00	0.00	0.00	0.00	0.33	0.33	3
Winding and twisting textile and apparel operatives (738)	0.17	0.00	0.33	0.17	0.00	0.50	6

Textile sewing machine operators (744)	0.00	0.00	0.00	0.00	0.00	0.00	1
Packers, fillers, and wrappers (754)	0.13	0.17	0.05	0.09	0.04	0.37	78
Furnance, kiln, and oven operators, apart from food (766)	0.00	0.00	0.00	0.00	0.00	0.00	1
Photographic process workers (774)	0.00	0.00	0.00	0.00	0.00	0.00	1
Machine operators, n.e.c. (779)	0.11	0.15	0.05	0.03	0.11	0.31	147
Welders, solderers, and metal cutters (783)	0.08	0.17	0.06	0.07	0.05	0.29	432
Painting and decoration occupations (789)	0.44	0.34	0.34	0.13	0.06	0.59	32
Production checkers, graders, and sorters in manufacturing (799)	0.29	0.32	0.25	0.09	0.05	0.57	306
Supervisors of motor vehicle transportation (803)	0.63	0.63	0.31	0.13	0.13	1.00	16
Truck, delivery, and tractor drivers (804)	0.25	0.31	0.16	0.13	0.06	0.55	3028
Bus drivers (808)	0.17	0.67	0.00	0.33	0.00	0.83	6
Taxi cab drivers and chauffeurs (809)	0.33	0.22	0.11	0.00	0.00	0.56	9
Locomotive operators: engineers and firemen (824)	0.00	0.25	0.00	0.00	0.13	0.38	8
Ship crews and marine engineers (829)	0.00	0.13	0.12	0.00	0.12	0.25	816
Miscellanious transportation occupations (834)	0.00	0.00	0.00	1.00	0.00	1.00	1
Crane, derrick, winch, hoist, longshore operators (848)	0.08	0.31	0.00	0.00	0.00	0.38	13
Excavating and loading machine operators (853)	0.00	0.75	0.50	0.00	0.00	0.75	4
Stevedores and misc. material moving occupations (859)	0.00	0.50	0.00	0.00	0.00	0.50	2
Helpers, constructions (865)	0.00	0.20	0.00	0.40	0.20	0.80	5
Production helpers (873)	0.00	0.50	0.00	0.00	0.00	0.50	2
Machine feeders and offbearers (878)	0.00	0.00	0.00	0.00	0.00	0.00	1
Packers and packagers by hand (888)	0.18	0.06	0.06	0.00	0.00	0.24	17
Laborers, freight, stock, and material handlers, n.e.c. (889)	0.16	0.30	0.05	0.05	0.06	0.44	111

Notes: The table reports the fraction of job ads in a given occupation in which trait descriptive terms associated with the trait in the column appear in Columns (1) to (5). Column 6 reports the fraction of ads in an occupation in which any trait descriptive terms appear, while Column (7) reports the number of job ads associated with each occupation. The occupation codes are listed in parentheses.

Appendix Table 3: Trait summary statistics by occupation (-)

Occupation	Int.	Non-Con.	Non-Ope.	Dis-Agree.	Neu.	Any trait	# of ads
Uncategorized (0)	0.00	0.00	0.00	0.01	0.00	0.45	25122
Chief executives, public administrators, and legislators (4)	0.00	0.00	0.00	0.01	0.00	0.95	194
Financial managers (7)	0.00	0.00	0.00	0.00	0.00	0.35	57
Human resources and labor relations managers (8)	0.01	0.00	0.03	0.02	0.00	0.72	250
Managers and specialists in marketing, advert., PR (13)	0.00	0.00	0.02	0.02	0.00	0.69	14311
Managers in education and related fields (14)	0.00	0.00	0.00	0.00	0.00	1.00	4
Managers of medicine and health occupations (15)	0.00	0.00	0.00	0.00	0.00	0.64	22
Managers of properties and real estate (18)	0.01	0.00	0.01	0.01	0.00	0.61	169
Funeral directors (19)	0.00	0.00	0.00	0.00	0.00	0.33	3
Managers and administrators, n.e.c. (22)	0.00	0.00	0.01	0.01	0.00	0.60	23836
Accountants and auditors (23)	0.00	0.00	0.00	0.01	0.00	0.57	5337
Insurance underwriters (24)	0.00	0.00	0.00	0.00	0.00	0.50	4
Other financial specialists (25)	0.00	0.00	0.00	0.00	0.00	0.36	22
Management analysts (26)	0.00	0.00	0.00	0.06	0.00	0.60	7179
Personnel, HR, training, and labor rel. specialists (27)	0.01	0.00	0.00	0.01	0.00	0.56	86
Buyers, wholesale and retail trade (29)	0.00	0.00	0.00	0.00	0.00	0.25	4
Purchasing managers, agents, and buyers, n.e.c. (33)	0.00	0.00	0.00	0.01	0.00	0.62	574
Business and promotion agents (34)	0.00	0.00	0.00	0.00	0.00	0.00	1
Construction inspectors (35)	0.00	0.00	0.00	0.00	0.00	0.36	11
Inspectors and compliance officers, outside (36)	0.00	0.00	0.00	0.00	0.00	0.41	314
Management support occupations (37)	0.00	0.00	0.00	0.00	0.00	0.76	145
Architects (43)	0.00	0.00	0.01	0.07	0.00	0.55	938
Aerospace engineers (44)	0.00	0.00	0.00	0.00	0.00	0.42	66
Metallurgical and materials engineers (45)	0.00	0.00	0.00	0.03	0.00	0.42	33
Petroleum, mining, and geological engineers (47)	0.00	0.00	0.00	0.00	0.00	0.30	20
Chemical engineers (48)	0.00	0.00	0.00	0.02	0.00	0.45	159
Civil engineers (53)	0.00	0.00	0.01	0.00	0.00	0.37	454
Electrical engineers (55)	0.00	0.00	0.00	0.04	0.00	0.42	907
Industrial engineers (56)	0.00	0.00	0.00	0.02	0.00	0.70	164
Mechanical engineers (57)	0.00	0.00	0.00	0.00	0.00	0.36	629
Engineers and other professionals, n.e.c (59)	0.00	0.00	0.00	0.02	0.00	0.51	7753
Computer systems analysts and computer scientists (64)	0.00	0.21	0.00	0.00	0.00	0.43	14
Operations and systems researchers and analysts (65)	0.00	0.00	0.00	0.01	0.00	0.64	655
Actuaries (66)	0.00	0.00	0.00	0.00	0.00	0.67	49
Mathematicians and statisticians (68)	0.00	0.00	0.00	0.01	0.00	0.56	90
Physicists and astronomists (69)	0.00	0.00	0.00	0.00	0.00	0.36	14
Chemists (73)	0.01	0.00	0.00	0.01	0.00	0.57	161
Atmospheric and space scientists (74)	0.00	0.00	0.00	0.00	0.00	0.00	1
Geologists (75)	0.00	0.00	0.00	0.00	0.00	0.57	60
Agricultural and food scientists (77)	0.00	0.00	0.00	0.00	0.00	0.67	6
Biological scientists (78)	0.00	0.00	0.00	0.00	0.00	0.12	33
Foresters and conservation scientists (79)	0.00	0.00	0.00	0.00	0.00	0.00	2
Medical scientists (83)	0.00	0.00	0.00	0.00	0.00	1.00	1

Physicians (84)	0.00	0.00	0.01	0.00	0.00	0.31	1561
Dentists (85)	0.00	0.00	0.00	0.00	0.01	0.02	804
Veterinarians (86)	0.00	0.00	0.00	0.00	0.00	0.88	17
Optometrists (87)	0.00	0.00	0.00	0.00	0.00	0.17	6
Podiatrists (88)	0.00	0.00	0.00	0.00	0.00	0.00	1
Other health and therapy occupations (89)	0.00	0.00	0.00	0.00	0.00	0.00	1
Registered nurses (95)	0.00	0.00	0.00	0.00	0.00	0.36	2963
Pharmacists (96)	0.00	0.00	0.00	0.00	0.00	0.11	1005
Dieticians and nutritionists (97)	0.00	0.00	0.00	0.00	0.00	0.00	5
Respiratory therapists (98)	0.00	0.00	0.00	0.00	0.00	0.55	76
Occupational therapists (99)	0.01	0.00	0.00	0.01	0.00	0.46	148
Physical therapists (103)	0.00	0.00	0.00	0.00	0.00	0.49	329
Speech therapists (104)	0.00	0.00	0.00	0.00	0.00	0.73	11
Therapists, n.e.c. (105)	0.00	0.00	0.00	0.01	0.00	0.48	90
Physicians' assistants (106)	0.00	0.00	0.00	0.00	0.00	0.16	25
Kindergarten and earlier school teachers (155)	0.00	0.00	0.00	0.00	0.00	0.78	23
Primary school teachers (156)	0.00	0.00	0.00	0.00	0.00	1.00	1
Special education teachers (158)	0.00	0.00	0.00	0.20	0.00	0.60	5
Teachers, n.e.c. (159)	0.00	0.00	0.01	0.00	0.01	0.58	566
Vocational and educational counselors (163)	0.00	0.00	0.00	0.00	0.08	0.83	12
Librarians (164)	0.00	0.00	0.00	0.00	0.00	0.47	32
Archivists and curators (165)	0.00	0.00	0.00	0.00	0.00	1.00	1
Economists, market and survey researchers (166)	0.00	0.00	0.00	0.00	0.00	0.69	16
Psychologists (167)	0.00	0.00	0.00	0.00	0.00	0.43	21
Urban and regional planners (173)	0.00	0.00	0.00	0.00	0.00	0.25	4
Social workers (174)	0.00	0.00	0.00	0.00	0.00	0.60	109
Clergy and religious workers (176)	0.04	0.00	0.00	0.00	0.00	0.98	93
Lawyers and judges (178)	0.00	0.00	0.00	0.01	0.00	0.48	1135
Writers and authors (183)	0.00	0.00	0.02	0.02	0.01	0.66	494
Technical writers (184)	0.00	0.00	0.00	0.01	0.00	0.80	358
Designers (185)	0.00	0.00	0.01	0.02	0.00	0.53	1368
Musicians and composers (186)	0.00	0.00	0.01	0.00	0.00	0.05	167
Actors, directors, and producers (187)	0.00	0.00	0.00	0.00	0.00	0.88	8
Painters, sculptors, craft-artists, and print-makers (188)	0.00	0.00	0.00	0.01	0.00	0.45	214
Photographers (189)	0.00	0.00	0.00	0.00	0.00	0.93	28
Art/entertainment performers and related occs (194)	0.00	0.00	0.00	0.00	0.00	1.00	2
Editors and reporters (195)	0.01	0.00	0.00	0.02	0.01	0.28	395
Athletes, sports instructors, and officials (199)	0.00	0.00	0.01	0.01	0.00	0.67	210
Clinical laboratory technologies and technicians (203)	0.00	0.00	0.00	0.00	0.00	0.60	145
Dental hygienists (204)	0.00	0.00	0.00	0.00	0.00	0.33	9
Radiologic technologists and technicians (206)	0.00	0.00	0.00	0.00	0.00	0.56	61
Licensed practical nurses (207)	0.02	0.00	0.00	0.00	0.00	0.31	52
Health technologists and technicians, n.e.c (208)	0.00	0.00	0.00	0.00	0.00	0.56	9
Engineering technicians (214)	0.00	0.00	0.00	0.01	0.00	0.61	93
Drafters (217)	0.00	0.00	0.00	0.00	0.00	0.17	591
Surveyors, cartographers, mapping scientists/techs (218)	0.00	0.00	0.01	0.00	0.00	0.35	69

Chemical technicians (224)	0.00	0.00	0.00	0.00	0.00	0.50	4
Other science technicians (225)	0.00	0.00	0.00	0.00	0.00	0.00	1
Airplane pilots and navigators (226)	0.00	0.00	0.05	0.00	0.00	0.65	20
Air traffic controllers (227)	0.20	0.00	0.00	0.00	0.00	0.20	498
Broadcast equipment operators (228)	0.00	0.00	0.00	0.00	0.00	0.75	4
Computer software developers (229)	0.00	0.00	0.00	0.04	0.00	0.61	2688
Programmers of numerically controlled machine tools (233)	0.00	0.00	0.00	0.00	0.00	1.00	1
Legal assistants and paralegals (234)	0.00	0.00	0.00	0.00	0.00	0.47	983
Technicians, n.e.c. (235)	0.00	0.00	0.00	0.01	0.00	0.49	3004
Sales supervisors and proprietors (243)	0.00	0.00	0.00	0.01	0.00	0.66	4641
Insurance sales occupations (253)	0.00	0.00	0.00	0.00	0.00	0.70	122
Real estate sales occupations (254)	0.00	0.00	0.00	0.00	0.00	0.67	392
Advertising and related sales jobs (256)	0.00	0.03	0.00	0.02	0.00	0.79	99
Sales engineers (258)	0.00	0.00	0.00	0.02	0.00	0.53	283
Salespersons, n.e.c. (274)	0.00	0.00	0.00	0.02	0.00	0.63	3763
Retail salespersons and sales clerks (275)	0.00	0.00	0.01	0.02	0.00	0.53	826
Cashiers (276)	0.00	0.00	0.00	0.01	0.00	0.79	197
Door-to-door sales, street sales, and news vendors (277)	0.00	0.00	0.00	0.00	0.00	0.84	19
Sales demonstrators, promoters, and models (283)	0.00	0.00	0.00	0.00	0.00	0.69	13
Office supervisors (303)	0.00	0.00	0.00	0.06	0.00	0.76	17
Computer and peripheral equipment operators (308)	0.00	0.00	0.00	0.00	0.00	0.43	63
Secretaries and stenographers (313)	0.00	0.00	0.00	0.01	0.00	0.63	3196
Typists (315)	0.00	0.00	0.00	0.00	0.00	0.53	15
Interviewers, enumerators, and surveyors (316)	0.00	0.00	0.00	0.04	0.00	0.89	28
Transportation ticket and reservation agents (318)	0.00	0.00	0.00	0.00	0.00	1.00	5
Receptionists and other information clerks (319)	0.00	0.00	0.00	0.00	0.00	0.57	1833
Human resources clerks, excl payroll and timekeeping (328)	0.00	0.00	0.00	0.00	0.00	0.33	3
Library assistants (329)	0.00	0.00	0.00	0.00	0.00	0.67	12
File clerks (335)	0.04	0.00	0.00	0.00	0.00	0.59	51
Bookkeepers and accounting and auditing clerks (337)	0.00	0.00	0.00	0.00	0.00	0.43	2372
Payroll and timekeeping clerks (338)	0.01	0.00	0.00	0.01	0.00	0.43	95
Billing clerks and related financial records processing (344)	0.00	0.00	0.00	0.00	0.00	0.50	68
Mail and paper handlers (346)	0.00	0.00	0.00	0.00	0.00	0.50	4
Telephone operators (348)	0.00	0.00	0.00	0.00	0.00	0.75	8
Other telecom operators (349)	0.00	0.00	0.00	0.00	0.00	0.00	3
Mail carriers for postal service (355)	0.00	0.00	0.00	0.00	0.00	1.00	1
Mail clerks, outside of post office (356)	0.00	0.00	0.00	0.00	0.00	0.52	23
Messengers (357)	0.00	0.00	0.00	0.00	0.00	0.79	14
Dispatchers (359)	0.00	0.00	0.00	0.00	0.01	0.55	148
Shipping and receiving clerks (364)	0.00	0.00	0.00	0.01	0.00	0.48	103
Stock and inventory clerks (365)	0.00	0.00	0.00	0.02	0.00	0.39	41
Meter readers (366)	0.00	0.00	0.00	0.00	0.00	0.50	4
Weighers, measurers, and checkers (368)	0.00	0.00	0.00	0.00	0.00	0.55	20
Material recording, sched., prod., plan., expediting cl. (373)	0.00	0.00	0.00	0.00	0.00	0.52	286
Insurance adjusters, examiners, and investigators (375)	0.00	0.00	0.00	0.00	0.00	0.62	26
Customer service reps, invest., adjusters, excl. insur. (376)	0.00	0.00	0.00	0.00	0.00	0.63	1692

Eligibility clerks for government prog., social welfare (377)	0.00	0.00	0.00	0.00	0.00	1.00	1
General office clerks (379)	0.00	0.00	0.00	0.00	0.00	0.52	84
Bank tellers (383)	0.00	0.00	0.00	0.00	0.00	0.53	34
Proofreaders (384)	0.00	0.00	0.00	0.00	0.00	0.61	23
Data entry keyers (385)	0.00	0.00	0.00	0.00	0.00	0.63	3034
Teacher's aides (387)	0.00	0.00	0.00	0.00	0.00	1.00	1
Administrative support jobs, n.e.c. (389)	0.00	0.00	0.00	0.00	0.00	1.00	6
Housekeepers, maids, butlers, and cleaners (405)	0.00	0.00	0.00	0.00	0.00	0.54	52
Laundry and dry cleaning workers (408)	0.00	0.00	0.00	0.00	0.00	1.00	3
Fire fighting, fire prevention, and fire inspection occs (417)	0.00	0.00	0.00	0.02	0.00	0.79	42
Police and detectives, public service (418)	0.00	0.00	0.00	0.00	0.00	0.39	188
Sheriffs, bailiffs, correctional institution officers (423)	0.00	0.00	0.00	0.00	0.00	0.50	16
Crossing guards (425)	0.00	0.00	0.00	0.00	0.00	0.00	4
Guards and police, except public service (426)	0.07	0.00	0.01	0.00	0.00	0.64	72
Protective service, n.e.c. (427)	0.00	0.00	0.00	0.00	0.00	1.00	1
Supervisors of food preparation and service (433)	0.00	0.00	0.00	0.00	0.00	0.00	1
Bartenders (434)	0.09	0.00	0.18	0.00	0.00	0.82	11
Waiters and waitresses (435)	0.00	0.00	0.00	0.00	0.00	0.76	38
Cooks (436)	0.00	0.00	0.01	0.03	0.00	0.67	223
Miscellanious food preparation and service workers (444)	0.00	0.00	0.00	0.00	0.00	0.81	95
Dental Assistants (445)	0.00	0.00	0.00	0.00	0.00	0.08	223
Health and nursing aides (447)	0.00	0.00	0.00	0.00	0.00	0.40	205
Supervisors of cleaning and building service (448)	0.00	0.00	0.00	0.00	0.00	0.00	3
Gardeners and groundskeepers (451)	0.00	0.00	0.07	0.00	0.00	0.70	27
Janitors (453)	0.00	0.00	0.00	0.00	0.00	0.41	78
Pest control occupations (455)	0.00	0.00	0.00	0.03	0.00	0.49	35
Hairdressers and cosmetologists (458)	0.00	0.00	0.00	0.00	0.00	0.00	3
Guides (461)	0.00	0.00	0.00	0.00	0.50	0.50	4
Baggage porters, bellhops and concierges (464)	0.00	0.00	0.00	0.00	0.00	0.76	46
Motion picture projectionists (467)	0.00	0.00	0.00	0.00	0.00	1.00	4
Child care workers (468)	0.00	0.00	0.00	0.00	0.00	0.33	6
Animal caretakers, except farm (472)	0.00	0.00	0.00	0.00	0.00	1.00	3
Farm workers, incl. nursery farming (479)	0.00	0.00	0.00	0.00	0.00	1.00	1
Supervisors of mechanics and repairers (503)	0.00	0.00	0.00	0.00	0.00	0.00	3
Automobile mechanics and repairers (505)	0.00	0.00	0.00	0.00	0.00	0.30	10
Bus, truck, and stationary engine mechanics (507)	0.00	0.00	0.00	0.00	0.00	0.20	10
Aircraft mechanics (508)	0.00	0.00	0.00	0.00	0.00	0.00	8
Small engine repairers (509)	0.00	0.00	0.00	0.00	0.00	0.50	6
Auto body repairers (514)	0.00	0.00	0.00	0.00	0.00	0.88	8
Heavy equipement and farm equipment mechanics (516)	0.00	0.00	0.09	0.00	0.00	0.36	11
Machinery maintenance occupations (519)	0.00	0.00	0.00	0.00	0.00	0.40	25
Repairers of household appliances and power tools (526)	0.00	0.00	0.00	0.00	0.00	0.73	11
Telecom and line installers and repairers (527)	0.00	0.00	0.00	0.00	0.00	0.50	2
Repairers of electrical equipment, n.e.c (533)	0.00	0.00	0.00	0.00	0.00	0.00	35
Heating, air conditioning, and refrigeration mechanics (534)	0.00	0.00	0.00	0.01	0.00	0.64	81
Locksmiths and safe repairers (536)	0.00	0.00	0.00	0.00	0.00	0.25	4

Repairers of mechanical controls and valves (539)	0.00	0.00	0.00	0.00	0.00	0.00	1
Elevator installers and repairers (543)	0.00	0.00	0.00	0.00	0.00	0.50	2
Millwrights (544)	0.00	0.00	0.00	0.00	0.00	0.30	20
Mechanics and repairers, n.e.c. (549)	0.00	0.00	0.00	0.00	0.00	0.45	473
Supervisors of construction work (558)	0.00	0.00	0.00	0.00	0.00	0.18	22
Masons, tilers, and carpet installers (563)	0.00	0.00	0.02	0.00	0.00	0.39	56
Carpenters (567)	0.00	0.00	0.00	0.00	0.00	0.32	25
Drywall installers (573)	0.00	0.00	0.00	0.00	0.00	0.00	1
Electricians (575)	0.00	0.00	0.00	0.00	0.00	0.21	384
Electric power installers and repairers (577)	0.00	0.00	0.00	0.00	0.00	0.50	2
Plasterers (584)	0.00	0.00	0.00	0.00	0.00	0.00	2
Plumbers, pipe fitters, and steamfitters (585)	0.00	0.00	0.00	0.00	0.00	0.29	34
Glaziers (589)	0.00	0.00	0.00	0.00	0.00	0.50	2
Roofers and slaters (595)	0.00	0.00	0.00	0.00	0.00	0.67	6
Drillers of earth (598)	0.00	0.00	0.00	0.00	0.00	0.87	15
Drillers of oil wells (614)	0.00	0.00	0.00	0.00	0.00	1.00	1
Explosives workers (615)	0.00	0.00	0.00	0.00	0.00	0.00	2
Miners (616)	0.00	0.00	0.00	0.00	0.00	1.00	1
Other mining occupations (617)	0.00	0.00	0.00	0.00	0.00	1.00	2
Production supervisors or foremen (628)	0.00	0.00	0.00	0.00	0.01	0.50	341
Tool and die makers and die setters (634)	0.00	0.00	0.00	0.00	0.00	0.18	28
Machinists (637)	0.00	0.00	0.00	0.00	0.00	0.25	194
Boilermakers (643)	0.00	0.00	0.00	0.00	0.00	0.80	5
Precision grinders and fitters (644)	0.00	0.00	0.00	0.00	0.00	0.33	3
Patternmakers and model makers (645)	0.00	0.00	0.00	0.19	0.00	0.65	48
Engravers (649)	0.00	0.00	0.00	0.00	0.00	0.00	2
Other metal and plastic workers (653)	0.00	0.00	0.00	0.00	0.00	1.00	3
Cabinetmakers and bench carpeters (657)	0.00	0.00	0.00	0.00	0.00	0.60	5
Furniture/wood finishers, other prec. wood workers (658)	0.00	0.00	0.00	0.00	0.00	0.50	2
Dressmakers, seamstresses, and tailors (666)	0.00	0.00	0.14	0.00	0.00	0.71	7
Upholsterers (668)	0.00	0.00	0.00	0.00	0.00	0.00	1
Hand molders and shapers, except jewelers (675)	0.00	0.00	0.00	0.00	0.00	0.33	9
Dental laboratory and medical applicance technicians (678)	0.00	0.00	0.00	0.00	0.00	1.00	1
Butchers and meat cutters (686)	0.00	0.00	0.00	0.00	0.00	0.67	6
Bakers (687)	0.00	0.00	0.00	0.00	0.00	0.60	25
Power plant operators (695)	0.00	0.00	0.00	0.00	0.00	0.00	9
Plant and system operators, stationary engineers (696)	0.00	0.00	0.00	0.00	0.01	0.41	79
Lathe, milling, and turning machine operatives (703)	0.00	0.00	0.00	0.00	0.00	0.25	40
Punching and stamping press operatives (706)	0.00	0.00	0.00	0.00	0.00	0.00	1
Rollers, roll hands, and finishers of meta (707)	0.00	0.00	0.00	0.00	0.00	0.29	17
Drilling and boring machine operators (708)	0.00	0.00	0.00	0.00	0.00	0.00	2
Grinding, abrading, buffing, and polishing workers (709)	0.00	0.00	0.00	0.00	0.00	0.48	31
Sawing machine operators and sawyers (727)	0.00	0.00	0.00	0.00	0.00	0.00	4
Printing machine operators, n.e.c. (734)	0.00	0.00	0.00	0.00	0.00	0.00	1
Typesetters and compositors (736)	0.00	0.00	0.00	0.00	0.00	0.33	3
Winding and twisting textile and apparel operatives (738)	0.00	0.00	0.00	0.00	0.00	0.50	6

Textile sewing machine operators (744)	0.00	0.00	0.00	0.00	0.00	0.00	1
Packers, fillers, and wrappers (754)	0.00	0.00	0.00	0.03	0.00	0.37	78
Furnance, kiln, and oven operators, apart from food (766)	0.00	0.00	0.00	0.00	0.00	0.00	1
Photographic process workers (774)	0.00	0.00	0.00	0.00	0.00	0.00	1
Machine operators, n.e.c. (779)	0.00	0.00	0.00	0.01	0.00	0.31	147
Welders, solderers, and metal cutters (783)	0.00	0.00	0.00	0.01	0.00	0.29	432
Painting and decoration occupations (789)	0.00	0.00	0.00	0.00	0.00	0.59	32
Production checkers, graders, and sorters in manufacturing (799)	0.00	0.00	0.00	0.02	0.00	0.57	306
Supervisors of motor vehicle transportation (803)	0.00	0.00	0.00	0.00	0.00	1.00	16
Truck, delivery, and tractor drivers (804)	0.00	0.00	0.02	0.04	0.00	0.55	3028
Bus drivers (808)	0.00	0.00	0.00	0.17	0.00	0.83	6
Taxi cab drivers and chauffeurs (809)	0.00	0.00	0.00	0.00	0.00	0.56	9
Locomotive operators: engineers and firemen (824)	0.00	0.00	0.00	0.00	0.00	0.38	8
Ship crews and marine engineers (829)	0.00	0.00	0.00	0.00	0.00	0.25	816
Miscellanious transportation occupations (834)	0.00	0.00	0.00	0.00	0.00	1.00	1
Crane, derrick, winch, hoist, longshore operators (848)	0.00	0.00	0.00	0.00	0.00	0.38	13
Excavating and loading machine operators (853)	0.00	0.00	0.00	0.00	0.00	0.75	4
Stevedores and misc. material moving occupations (859)	0.00	0.00	0.00	0.00	0.00	0.50	2
Helpers, constructions (865)	0.00	0.00	0.00	0.00	0.00	0.80	5
Production helpers (873)	0.00	0.00	0.00	0.00	0.00	0.50	2
Machine feeders and offbearers (878)	0.00	0.00	0.00	0.00	0.00	0.00	1
Packers and packagers by hand (888)	0.00	0.00	0.06	0.00	0.00	0.24	17
Laborers, freight, stock, and material handlers, n.e.c. (889)	0.00	0.00	0.01	0.00	0.00	0.44	111

Notes: The table reports the fraction of job ads in a given occupation in which trait descriptive terms associated with the trait in the column appear in Columns (1) to (5). Column 6 reports the fraction of ads in an occupation in which any trait descriptive terms appear, while Column (7) reports the number of job ads associated with each occupation. The occupation codes are listed in parentheses.