

# Mass Attitudes and Discrimination Against Hypothetical Job Candidates in Japan: A resumé-based survey experiment

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## Abstract

A substantial literature addresses the various forms of discrimination in the Japanese labor market, but little experimental work investigates these prejudices. Here, I present experimental evidence from a national survey of Japanese adults in order to assess both professional and social discrimination against hypothetical job applicants. Leveraging the prevalence of standardized *rirekisho* resumé forms, I present respondents with a hypothetical applicant's *rirekisho*, with key attributes such as gender, nationality, and schooling location randomized. Because adolescents living in regions affected by the 2011 Fukushima Daiichi nuclear disaster are now entering the labor market as recent college graduates, the experiment also afforded the opportunity to assess labor-market discrimination against individuals perceived to have been exposed to radioactive fall-out (proxied by primary-school location). Three key findings emerged from the experimental trial: 1.) female applicants were universally preferred over male applicants, suggesting positive public attitudes toward increased labor-market engagement by female college graduates; 2.) there is no evidence of discrimination against individuals who were living in Fukushima at the time of the 2011 accident in this context; and, 3.) there is significant discrimination against non-Japanese applicants in both professional and social contexts, and the effect of Korean nationality is consistently negative and significant. Together, these results suggest some cause for optimism regarding the treatment of some potentially marginalized groups, while nonetheless provoking substantial concern for others.

## 1 Introduction

Much work has addressed the various forms of discrimination present in Japanese society, and how they filter into the labor market. Particular attention has focused on the negative effects of gender and ethnic discrimination on labor-market outcomes, with the latter largely centering on prejudice against resident and immigrant Koreans. Other forms of discrimination may also constitute major challenges for maintaining equality in Japanese society. In

particular, the last decade has witnessed continued claims of discriminatory attitudes and behaviors against perceived victims of the 2011 Fukushima Daiichi Nuclear Power Plant accident. Yet, despite such reports, few existing studies systematically consider these prejudicial attitudes in the mass public. In other national settings, audit studies—often using resumé that manipulate the features of fictional applicants to actual job positions—have proved to be an effective means of identifying demand-side discrimination in the labor market (Pager et al., 2009; Bertrand and Mullainathan, 2004). Unfortunately, little experimental work examines the influence of prejudicial attitudes in the Japanese context. A burgeoning literature employs conjoint survey experiments to identify similar effects in politically relevant contexts in Japan (Rosenbluth et al., 2016; Kage et al., 2019; Horiuchi et al., 2020). However, conjoint analyses can also suffer from certain limitations that suggest some caution in interpreting their results (Krosnick, 1999; Wainwright, 2003; Abramson et al., 2019; Bansak et al., 2019). Moreover, no such studies assess the alleged marginalization of Fukushima victims in Japanese society.

The present study seeks to advance the growing experimental literature on discrimination in Japan by assessing the extent to which discrimination affects perceived victims of the Fukushima accident, in comparison to other, traditionally marginalized groups. To do so, I employ a resumé-style experiment embedded in a national survey of Japanese adults.<sup>1</sup> Respondents were presented with a digital version of a traditional *rirekisho* (Japanese resumé) form, randomizing key traits of a hypothetical, college-graduate applicant. In particular, the present approach leverages the fact that job applicants who were in school in Fukushima Prefecture at the time of the March 2011 accident are now graduating from college, and may indicate their primary-school location on *rirekisho* forms. This allowed me to assess potential discrimination against those perceived to have been affected by the accident, while simultaneously manipulating standard traits known to be associated with labor-market discrimination, such as gender and nationality. Manipulating these traits simultaneously allows me to identify the extent of discrimination against Fukushima victims, and to directly assess the extent of such discrimination relative to other prejudices known to be active in the Japanese context. The design also offers various advantages over existing scholarship, for instance by providing a more naturalistic means of assessing respondent preferences over labor-market decisions in comparison to typical conjoint choice tasks. The present approach also leverages some of the benefits of resumé-based audit field studies, while nonetheless exploiting the detailed measurement of respondent attitudes—in both professional *and* social contexts—afforded by surveys.

Ultimately, I find no evidence of discrimination against hypothetical applicants who lived in Fukushima at the time of the accident, or since, despite the apparent strength of other forms of discrimination among the Japanese public, namely against non-Japanese individuals. Contrary to the expectation that subjects would also discriminate against women in professional contexts, I also observe a general preference for female applicants along all

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<sup>1</sup>The survey is a non-probability sample, balanced on key demographics including age, gender, and region. All studies are exempt from IRB review, pursuant to Yale University IRB Protocol #1510016677 and #1602017289.

measured social and professional dimensions. At the same time, I find broad evidence of discriminatory attitudes toward non-Japanese individuals, and particularly toward Koreans. This anti-Korean bias has strong and significant effects on all measured outcomes, underlining the severity of such prejudicial attitudes.

These results represent an initial experimental test of discrimination based on radiation exposure in the Japanese context, providing a reassuring counterpoint to existing research on the stigmatization of Fukushima victims: although subjects clearly demonstrated discriminatory attitudes against some classes of hypothetical applicants, no such prejudice was applied to those from Fukushima. At the same time, this comparison highlights the problem posed by the continued marginalization of some disadvantaged groups in Japanese society. As such, this work adds to the broader literature on labor-market discrimination against potential job applicants based on traits such as gender, ethnicity, and geographic location.

The remainder of the paper proceeds as follows. [Section 2](#) provides a review of relevant literature on radiation stigmatization, discrimination in the Japanese labor market, as well as on evidence from existing experimental studies of discrimination in Japan and elsewhere. In [Section 3](#), I describe the experimental design in depth, along with the statistical methods used in assessing core hypotheses. [Section 4](#) presents the results of these analyses, along with discussion. I offer concluding remarks in [Section 5](#).

## 2 Relevant Literature

### 2.1 Japanese Labor-Force Discrimination

#### 2.1.1 Discrimination Against the Radiation-Affected

There is substantial evidence of social stigma associated with nuclear power and waste repositories ([Slovic et al., 1991, 1994](#); [Kunreuther and Slovic, 1999](#)). Recent academic research on the impacts of the Fukushima Daiichi accident in particular shows that such stigmatization has also affected victims of the accident ([Hasegawa et al., 2016](#); [Maeda and Oe, 2017](#); [Ohto et al., 2017](#)). For instance, [Maeda and Oe \(2017, p. 42S\)](#) describe “[p]ublic stigma, generally called ‘radiation stigma,’ toward people living in Fukushima and self-stigma among evacuees [as] unique psychosocial issues never seen in other areas affected by natural disasters.” Self-stigma among victims has also been reported in other work, for instance, [Ohto et al. \(2017\)](#). [Ben-Ezra et al. \(2012\)](#); [Endorsed \(2014\)](#) also note feelings of stigmatization among a convenience sample of victims of the Fukushima accident, which correlated with increased prevalence of symptoms of post-traumatic stress disorder (PTSD). Highlighting the potential severity of this stigmatization, [Maeda and Oe \(2017, p. 42S\)](#) note the resemblance to ranging prejudice faced by survivors of the Hiroshima and Nagasaki atomic bombings ([Shintomi 2015](#); see also [Tatara 1998](#); [Watts 2000](#); [Atomic Heritage Foundation 2017](#); [Symchych 2018](#)).

The effects of stigmatization, along more generalized forms of discrimination affecting individuals living in Fukushima since the accident, have led to numerous claims of personal harm caused by *fūhyōhigai*, or “harmful rumors”—in this case, economic and social damage caused by fears of radiological contamination ([Sekiya, 2012](#)). For instance, there was

considerable concern over radioactive contamination of foods from Fukushima in the aftermath of the accident. [Sternsdorff-Cisterna \(2015, 2018\)](#), for instance, discusses the deficit of public trust in government assurances that food from the prefecture had been sufficiently tested and was safe to consume; [Mabon and Kawabe \(2015\)](#) describe the negative impact of the accident on commercial fisheries. Numerous references to *fūhyōhigai* also appeared in a series of in-person interviews I conducted in Tokyo and Fukushima throughout the summer of 2016. One interview I conducted with an academic expert on nuclear weapons in Tokyo provided initial evidence of the discriminatory attitudes toward victims of the Fukushima accident. The subject described concerns about radioactive contamination of school lunches among other parents at their child’s preschool; and noted how radiation inspired “a fear of unhealthiness and uncleanness,” that led parents to object to any food from Fukushima being included in lunches, irrespective of whether it had been inspected ([Baron, 2016a](#)). In another interview with an expert on the accident, the subject noted widespread anecdotes of social stigma and discrimination, including refusals of service to evacuees (e.g., refusing to fill cars with Fukushima Prefecture license plates at gas stations), and justifications against hiring job applicants who might have been exposed to radiation, especially in food-service positions ([Baron, 2018a](#)). A former employee of the Tokyo Electric Power Company (TEPCO; the company responsible for the Fukushima Daiichi Nuclear Power Plant) described growing prejudice against victims who had received compensation by the government for their relocation, because of claims that some victims had used their compensation packages to fund lavish new lifestyles in urban Japan ([Baron, 2016b](#)). At the same time, this anecdotal evidence of discrimination has not been systematically investigated, highlighting the relevance of the present study.

### 2.1.2 Gender Discrimination

Considerably more research exists to provide evidence of systematic gender imbalance in the Japanese labor force, and the role that demand-side discrimination (i.e., from employers) plays in establishing inequality. In fact, until the late-1990s, gender-typing in job advertisements was the norm in the Japanese labor market. Such ads were commonplace prior to the government’s 1997 amendment to the 1985 Equal Employment Opportunity Law (EEOL) ([Kumamoto-Healey, 2005](#); [Mun, 2010](#)). The original EEOL had only required employers to make token gestures toward equal opportunity, and until the 1997 amendment, employers effectively maintained separate systems for employing women and men, whereby only men had realistic opportunities to obtain management-level careers ([Kumamoto-Healey, 2005](#)). Through an analysis of such job advertisements in Kawasaki, Japan, [Mun \(2010, p. 2000\)](#) also find evidence of systematic restrictions to “women’s access to higher paying jobs and those with longer on-the-job training periods.”

Characterizing this gender disparity is the apparent “M”-curve of Japanese female labor-force participation ([White, 1991](#)). The M-curve indicates a tendency among women to exit the labor force beginning in their late-20s, during peak childbearing years. While labor-force participation picks up again in women’s late-30s through their 40s, the levels of labor-force participation never rebound to those attained prior to the initial drop-off, suggesting an

inability for women to re-enter or reintegrate into the labor force (Barrett, 2004; Kang, 2017). The M-curve itself has changed considerably since the 1960s, indicating that women remain in the labor force for longer and are generally less likely to exit; as well, the second peak in the M-curve appears higher, implying greater ability of women to re-enter the labor force (Macnaughtan, 2015). Nonetheless, the M-curve remains a distinguishing symbol of Japanese female labor-force participation (along with South Korea; see, e.g., Kang 2017).

In addition to the inegalitarian causes underlying the M-curve, women remain disadvantaged along other dimensions that bear relevance to labor-force participation. For instance, Aiba and Wharton (2001) find evidence that female wages are negatively influenced by age, the types of jobs in which they are employed, and by the proportion of women in those positions, while male wages are not. That is, “women earn less than men because they are more likely to be employed in predominantly female jobs, are younger, and have fewer supervisory responsibilities” (Aiba and Wharton, 2001, p. 81). In a comparative study of the gender wage gap in Sweden and Japan, Kumlin (2007) finds that other human-capital factors such as education, and the sexual division of household labor such as childcare, account for a substantial portion of the Japanese gender wage gap. Beyond these wage-related disparities, Inoue et al. (2016) also show that non-regular female workers in the Japanese labor-force suffer from poor psychological and physical health.

Demand-side discrimination (be it taste-based (Becker, 1957), or statistical (Phelps, 1972) in nature) also appears to be a contributing factor in explaining inequality in female labor-force participation (cf., Mun 2010, p. 2002; Kawaguchi 2007; cf., Sano 2009). Nemoto (2008) notes the enduring history of discriminatory hiring practices throughout Japanese industries. Using data from the Japanese General Social Surveys, Yasuda et al. (2011) find evidence of discriminatory attitudes among Japanese employers, pointing to taste-based sex discrimination in the workplace—though not necessarily in other spheres (for instance, Yasuda et al. 2011 observe little evidence of taste-based discrimination against women in political contexts; see also Kage et al. 2019, discussed below). Barrett (2004) describes systematic relegation of women in Japanese workplace settings, suggesting broad discrimination on the part of employers.

Other work on related lawmaking is also suggestive of demand-side drivers of inequality (Kawaguchi, 2009). For instance, work by Kato and Kodama (2014) seeks to demonstrate the beneficial effects of labor-market deregulation pursuant to 1985 amendment of the Labor Standards Act, which had restricted the amount of overtime hours women could work. The 1985 amendment, in contrast, exempted various industries and occupations, which Kato and Kodama (2014) find has a positive and significant effect on the proportion of female workers in those positions. Kato and Kodama (2015) shows how workplace policies to enhance gender equality—e.g., by providing on-site daycare—can increase the proportion of women in the workforce, and in higher positions. On the other hand, Kato and Kodama (2015) also show how performance-related pay policies adversely affect women.<sup>2</sup>

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<sup>2</sup>See also Kato and Kodama (2018).

### 2.1.3 Discrimination Based on Nationality

As well, there is much evidence of discrimination against foreigners in Japan. Despite a growing population of immigrants and foreign residents in Japan, even high-ranking government officials continue to tout a conception of the nation as ethnically and culturally unified (Burgess, 2007b,a). These beliefs appear to be widespread in Japanese society (Lie, 2009), and are pervasive in the academic literature on Japanese society (see, e.g., Reischauer and Jansen 1995; Kumagai and Keyser 1996). Indeed, as Lie (2009, p. 4) notes, “neither the Japanese government census nor sociologists’ surveys recognize ethnic diversity in Japan.” Exacerbating this lack of representation, Lie (2009, p. 4) notes the fact of discrimination against “non-Japanese Japanese.” Such discrimination has been well-documented, for instance with regard to Japan’s *zainichi* population of permanent Korean residents in Japan (see, e.g., Chapman 2007; Ryang 2013). The severity of exclusion of and discrimination against Koreans in Japan has, in fact, led some to compare treatment of Japan’s *zainichi* (resident Korean) minority to an apartheid system (Hicks, 2019).

Kashiwazaki (2013) describes how even amidst a growing recognition of increasing multiculturalism in Japan, immigrants have been “incorporated into the host society *as foreigners* rather than by becoming Japanese nationals,” sequestering even long-term residents from mainstream Japanese society (Kashiwazaki 2013, p. 31; emphasis in original). According to Shipper (2002), there does exist a strong hierarchy among perceived foreigners. In fact, *zainichi* and *nikkeijin* (non-resident Japanese, from the Japanese diaspora) may rank toward the top of this hierarchy. Nonetheless, discrimination appears to affect all perceived foreigners in Japanese society. For instance, Westerners residing in Japan also appear to experience systematic bias, despite occupying positions of privilege among foreigners due to the general appeal of Western culture and high (perceived) human capital Froese (2010); Myslinska (2014). Froese (2010) discusses the prevalence of microaggressions against Western expatriates to Japan and South Korea; Myslinska (2014) describes various forms of discrimination against Caucasian “*gaijin*”—itself a derogatory term for foreigners—in broad social circumstances, including with respect to employment.

Generalized racial-ethnic bias against these perceived others in Japanese society appears to filter further into professional inequality. Morita (2015) discusses various cases of racial differentiation and discrimination against immigrants from elsewhere in Northeast Asia, Latin America, and Southeast Asia. Lee and Park (2005) focus on the lack of state action on supporting immigrants’ rights in Japan, with comparison to South Korea; they describe the position taken by the Ministry of Labor against integrating foreign workers—especially unskilled workers—into the Japanese labor market. Also by way of comparison to South Korea, Yi (2017) describes the role of social structures such as Japan’s registry systems that distinguish non-citizens and “exclude [them] from employment opportunities” (Arudou 2015, quoted in Yi 2017). Work by Rosenbluth et al. (2016), discussed at greater length below, demonstrates that even employers who putatively support immigration for economic purposes nonetheless hold discriminatory attitudes toward foreigner workers, and oppose the social integration of immigrant laborers.

Such findings underscore the importance of considering interactions between social dis-



crimination, on the one hand, and professional or labor-market discrimination, on the other. Tsuda (2011), for instance, compares results from research on immigrant earnings in San Diego to data from Hamamatsu, Japan. Tsuda (2011) finds that, whereas human capital is a key determinant of earnings among immigrants to the United States, in Japan *social* capital plays a central role in influencing immigrant wages. According to Tsuda (2011, pp. 643), this fuels a discriminatory labor market, in which “Japanese employers strongly prefer male foreign workers and Japanese descent *nikkeijin* immigrants from South America, both of whom earn much higher wages than female and *non-nikkeijin* foreigners in [the] Hamamatsu, Japan sample.”<sup>3</sup> Card et al. (2012) find further evidence that public opposition to immigration is channeled through social discrimination. In particular, Card et al. (2012) examines the influence of compositional concerns—that is, the ways in which fears of immigration’s effects on the demographic and cultural makeup of “neighborhoods, schools, and workplaces” yields discriminatory attitudes toward immigrants (Card et al., 2012, p. 110). Nukaga (2006) finds evidence that larger proportions of foreigners in a prefecture correlates positively with xenophobic attitudes, but that some factors, such as education, may moderate xenophobic attitudes among the public.

## 2.2 Prior Experimental Work

While the present study does not directly audit the status of discrimination along the dimensions noted above, it bears considerable similarity to existing audit studies undertaken in the field. Audit studies have been increasingly common in the social sciences since the 1960s, with a particular focus on discrimination based on race, ethnicity, and gender (Gad-dis, 2018). Pager et al. (2009) conducted an in-person field experiment of discrimination in a low-wage labor market in New York City, using black, Latino, and white applicants between the ages of 22 and 26.<sup>4</sup> They find that black applicants were half as likely to receive callbacks or offers than were equally qualified white applicants. In fact, even white applicants with criminal records did no worse than did Latino and black applicants with clean records.

Of particular note among recent audit studies is Bertrand and Mullainathan (2004)’s landmark field experiment using resumés to assess gender- and race-based labor-market discrimination. Bertrand and Mullainathan (2004) randomly manipulated the names of fictional applicants on otherwise-identical resumés, using African-American- or white-sounding male and female names to compare the successes rates of callbacks for each name, for a variety of positions. They found evidence of a substantial race gap in callbacks, such that applicants with white-sounding names were approximately 50% more likely to receive callbacks than were otherwise identical applicants with black-sounding names—a result which persisted across occupation types, earnings, and job requirements (Bertrand and Mullainathan, 2004).

Following on Bertrand and Mullainathan (2004)’s influential work, a large literature continues to utilize resumé-based and other, related field experiments in order to examine

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<sup>3</sup>Of course, this distinction also highlights the important role of gender, and its potential interaction with ethnicity in this context.

<sup>4</sup>Pager et al. (2009, p. 781) describe these individuals as “well-spoken, clean-cut young men . . . Most were college-educated between 5 feet 10 inches and 6 feet in height.”

labor-market discrimination. In particular, numerous similar designs have been implemented outside of the United States, with similar results. [Oreopoulos \(2011\)](#) finds evidence of broad discrimination in the Canadian job market against skilled immigrants with foreign experience and South Asian, Chinese, or Greek names, when compared to those with English names. Two experiments in Sweden find additional evidence of discrimination against non-Western names. [Carlsson and Rooth \(2007\)](#) manipulate whether applicants to 1,552 job postings had either Middle Eastern- or Swedish-sounding names. Similarly to [Bertrand and Mullainathan \(2004\)](#)’s initial study, they find that a Swedish-sounding name yields around 50% more callbacks. Moreover, they find that differential callback rates are influenced by the characteristics of prospective employers, with male recruiters and smaller companies showing less propensity to give callbacks to applicants with Middle Eastern names. [Bursell \(2014\)](#) used over 3,500 written applications, including cover letters and CVs, to jobs in Stockholm, Sweden, as advertised on Sweden’s Public Employment Service website Platsbanken. [Bursell \(2014\)](#) finds considerable evidence of ethnic discrimination against both “male and female applicants with Arabic and North African names,” but no substantive or significant difference in callback rates between male and female applicants ([Bursell, 2014](#), p. 400).

However, relatively few audit experiments have been conducted in non-Western countries, especially in Asia ([Baert, 2018](#)). Moreover, examples of audit studies conducted in Asia yield varying results. [Banerjee et al. \(2009\)](#)’s study of labor-market discrimination in Delhi found no evidence of discrimination against applicants with identifiably lower-caste names for software jobs, but did indicate large and significant discriminatory effects for call-center jobs, along with some differences based on gender. They found no evidence of discrimination against applicants with Muslim names, relative to those with Hindu names, for either job type. [Lee and Khalid \(2016\)](#) randomize whether fictitious recent graduates applying to jobs in Malaysia have either Malay or Chinese names. They find that, while multiple factors influence employer decisions, including language proficiency, racial identity plays a primary role among these—with Chinese, and Chinese-fluent applicants faring better than Malay applicants. Results from a field experiment by [Maurer-Fazio \(2012\)](#) conducted on Chinese firms posting job openings on an Internet job board finds that, while around half of firms treat applicants with Han Chinese, Mongolian, Tibetan, and Uighur names equally, other firms—especially privately owned firms—engage in considerable discrimination against non-Han Chinese applicants. [Zhou et al. \(2013\)](#) use 19,130 fictitious resumé to study gender discrimination in China. In contrast to [Maurer-Fazio \(2012\)](#)’s results, they find evidence that preferential bias toward males is greater in state-owned firms, relative to private and foreign firms, which tend to prefer female applicants.

### 2.2.1 Experimental Studies in Japan

Critically few experimental studies assess discriminatory attitudes in Japan; fewer still use experimental methods to examine labor-market discrimination. At the same time, recent years have witnessed a considerable increase in the use of survey-experimental studies to examine discriminatory attitudes. This work offers important insights into the nature and extent of prejudicial attitudes in various social and professional contexts in Japan.



Of particular relevance to labor-market discrimination are studies by [Rosenbluth et al. \(2016\)](#) and [Kage et al. \(2018\)](#), which employ a series of survey experiments conducted on the Japanese public to assess mass attitudes toward immigration, on both economic and cultural grounds. [Rosenbluth et al. \(2016\)](#) in particular finds evidence of two primary types of anti-immigration bias: discrimination, characteristic of individuals who are “negatively predisposed to immigrants on both economic and cultural grounds” ([Rosenbluth et al., 2016](#), p. 3); and exploitation, by which corporate leaders in particular “favor immigration for the sake to [*sic*] increased productivity and on condition that immigrants are not socially integrated” ([Rosenbluth et al., 2016](#), p. 4). [Kage et al. \(2018\)](#) use conjoint experiments to investigate mass preferences over immigrants’ characteristics. They find most respondents view immigrants negatively, with greater demonstrated aversion to East Asian immigrants.

Other studies provide experimental evidence regarding potential discrimination in other contexts. [Nakagawa \(2002, 2003\)](#) uses data from a field experiment to audit discrimination against the elderly in the rental-housing market in Osaka, Japan. [Nakagawa \(2003\)](#) finds that such discrimination does exist, and that it largely results from statistical discrimination related to concerns about unstable income among the elderly, and the possibility of accidents caused by negligence. Using a series of survey experimental studies on female participation in politics, [Kage et al. \(2019\)](#) find no evidence of demand-side discrimination against female candidates. In fact, [Kage et al. \(2019\)](#) find evidence that respondents *preferred* female candidates for election to the House of Representatives.<sup>5</sup> In a conjoint experiment conducted on a sample of Japanese voting-age citizens (20-years-old and over), [Horiuchi et al. \(2020\)](#) assess public preferences over politicians’ personal traits. While [Horiuchi et al. \(2020\)](#) find evidence that the public prefers younger, more experienced, and better-educated candidates, they observe no evidence of a gender-based preference in politicians—buttressing the results of [Kage et al. \(2019\)](#). Interestingly, [Kage et al. \(2018\)](#) also note interesting results regarding the effects of gender. They find a preference among respondents for female immigrants. Together, these observations on the effects of female gender in such experimental settings hold important implications for the results presented below (see [Section 4](#)).

## 3 Empirical Strategy

### 3.1 Survey Instrument

In order to investigate the nature and extent of prejudicial attitudes toward perceived Fukushima victims relative to other forms of discrimination, I conducted an original national survey of Japanese adults between January 12 and January 20, 2020. The survey was administered through the Yale University Secure Qualtrics platform, with a sample of  $n = 2,762$  subjects recruited by Dynata (formerly Survey Sampling International, SSI). The national survey was balanced on key demographics, including age, gender, and region.

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<sup>5</sup>[Kage et al. \(2019\)](#) find a negative point estimate for the effect of female gender on support for promoting a politician, though it is not significant at the  $p < .1$  level.

After consenting to participate in the experiment, respondents were first asked to complete a series of questions measuring standard demographic and politically relevant covariates, largely adapted from the University of Tokyo Institute of Social Science (ISS) Japanese Life Course Panel Survey and the Japanese Population Census. These key covariates include: age, gender, location (prefecture), education, household income, partisan identification, and ideology. These measures are used for regression adjustment in the analyses described in [Section 3.2](#) below. Respondents were also asked a series of additional covariate questions, including marital status, children under the age of 18, employment, political interest, and vote choice in the 25th House of Councillors election in July, 2019.<sup>6</sup>

### 3.1.1 *Rirekisho* Design

Following initial covariate measurement, subjects were presented with an image of a *rirekisho* form, with randomized text constituting multiple factorial treatments.<sup>7</sup> The use of the *rirekisho* form constitutes a unique aspect of the present study. Whereas a growing number of experimental studies have utilized factorial designs to assess prejudicial attitudes among the Japanese public ([Rosenbluth et al., 2016](#); [Kage et al., 2018, 2019](#); [Horiuchi et al., 2020](#)), the present case provides respondents with a more naturalistic decision task by way of the familiar *rirekisho* format.<sup>8</sup> A sample *rirekisho* form with randomized fields indicated in English text is visible as [Figure 1](#).<sup>9</sup> The key factors manipulated in the experiment were: female or male (baseline) gender, as indicated by name; Japanese (baseline), Chinese, Korean, or US nationality, as indicated by name;<sup>10</sup> primary schooling in Futaba Town (Fukushima Prefecture; baseline), Tokyo, or Yamamoto Town (Miyagi Prefecture); and college location in Fukushima City (Fukushima Prefecture; baseline), Tokyo, or Sendai (Miyagi Prefecture). [Appendix A](#) provides a complete breakdown of all levels for each factor.

The sample *rirekisho* presented in [Figure 1](#) indicates the form pertaining to a female applicant, as reflected by the image in the top-left pane including a female silhouette, and the *kanji* character indicating the applicant’s female gender (女) circled. While it is standard in Japanese resumés for applicants to include a professional picture of themselves, the experimental design employed an illustration in order to avoid any issues of privacy that may have arisen from utilizing an actual photograph, as well as inconsistencies between photographed

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<sup>6</sup>The demographic questions fielded here were shared in common with another set of survey questions, following the resumé survey in the instrument. The latter portion of the survey was fielded in parallel with a survey conducted by YouGov in the United States. These secondary covariate measures were specifically included in order to ensure that questions in the US and Japanese surveys comported with one another, but they are not included in the present analysis.

<sup>7</sup>See [Gaddis \(2018, p. 14\)](#) on the examination of multiple, simultaneous manipulations in similar studies.

<sup>8</sup>As well, the use of such a form adds a degree of technical complexity, as the design of the form uses somewhat more involved HTML and CSS coding than does the typical conjoint table.

<sup>9</sup>The female silhouette apparent in [Figure 1](#) and indication of female gender (the circled 女 character) were also randomized to match the gender of the applicant’s name.

<sup>10</sup>Names were generated using the most common male and female first names, and most common last name in each country. Only one name of each nationality was employed, though future studies may find further insight in randomizing over a larger set of names; see, e.g., [Gaddis \(2017\)](#).

**Figure 1:** Sample *Rirekisho* Form (Female Applicant)

履歴書 令和1 11月 1日

(ふりがな) Applicant name furigana (if applicable)

氏名  
Applicant name


平成9年5月9日生 (満22歳)

男  
☒ 女

(ふりがな)  
現住所 〒

(ふりがな)  
連絡先 〒

自宅の電話番号:  
携帯電話番号:  
eメールアドレス:



年	月	学歴・職歴 (各別にまとめて書く)

自己PR  
私の強みはファシリテーション力です。チームメンバーの間を取り持ち、力を発揮しやすい能力を整えることができます。その強みを最も発揮したのがアルバイトでの経験です。最初は、語学の問題もあり、リーダーの日本人と他の外国人メンバーとの意思疎通が上手くいかず、チームはパフォーマンスを発揮できていない状況でした。そこで私は、彼らに現状の不満点を聞き出していました。すると、リーダーの指示が曖昧で何をすればいいかわからないことが不満だとわかりました。そこで私は、両者の間のパイプ役となり、リーダーの指示をわかりやすい形で彼らに伝えるようにしました。この取り組みの結果、チームがまとまり、多国籍メンバーのチームでも事業を立ち上げることが出来ました。

免許・資格  
Qualifications  
以上

志望の動機、特技、好きな学科など	通勤時間
志望の動機、特技、好きな学科など	<p>扶養家族数 (配偶者を除く) 0人</p> <p>配偶者 <input checked="" type="radio"/> 有 <input type="radio"/> 無      配偶者の扶養義務 <input checked="" type="radio"/> 有 <input type="radio"/> 無</p>

本人希望記入欄 (特に給料・職種・勤務時間・勤務地・その他についての希望などがあれば記入)  
Special requests

年	月	学歴・職歴 (各別にまとめて書く)
		学歴
平成25年	3月	Middle school
平成28年	3月	High school
令和2年	3月	University (major)
		職歴
		Part-time job experience (if any)
		以上

Randomized fields are indicated in English throughout.

individuals' physical features.<sup>11</sup>

Randomizing the hypothetical applicant's primary school and college location offered an opportunity to assess discrimination on two key dimensions. First, the comparison between municipalities in Fukushima Prefecture and other municipalities allowed me to examine the possibility that individuals coming from Fukushima suffer from discriminatory treatment. Individuals who attended middle and high school in Fukushima would have been in the prefecture on March 11, 2011, when the Great East Japan Earthquake struck, causing a tsunami that led to the meltdown of multiple reactors at the Fukushima Daiichi Nuclear Power Plant. The plant itself is located in two towns, Ōkuma and Futaba; thus, signaling primary schooling in Futaba was used to suggest that the applicant could have been affected by the accident. While Fukushima City was never severely impacted by the accident, it did experience some fallout, and there are reports of general stigmatization of individuals from Fukushima Prefecture more generally.

At the same time, in order to account for the possibility that any observed discriminatory attitudes against hypothetical applicants from Fukushima were instead a consequence of

<sup>11</sup>See, for instance, [Bóo et al. \(2013\)](#) on the effects of facial attractiveness in a resumé field experiment.

regional prejudices, I included Yamamoto Town, a small town of similar size to Futaba, in Miyagi Prefecture, as an alternative factor level. Miyagi Prefecture was also impacted by the 2011 Earthquake and tsunami, but not the subsequent radiological disaster. It is worth noting that location is indicated by school name, as each school name includes the location of its municipality. On the advice of academic colleagues in Japan, all school names used in the experiment are hypothetical.<sup>12</sup> However, they were made to reflect realistic school names as much as possible.

Randomly assigning applicant gender and nationality (indicated by name) independently of all other traits, allows me to identify the causal effect of each feature on a set of attitudinal outcomes, discussed below. The *rirekisho* form also includes randomized text in several other fields pertaining to secondary applicant traits.<sup>13</sup> They include: part-time job experience, qualifications, and special requests (e.g., availability for phone calls, desire to have a job with fixed hours). These fields were, in part, included for further, exploratory analysis, e.g., to examine whether requests for fixed hours interact with female gender to yield greater discriminatory effects against females (e.g., because subjects may have perceived these women to be planning to have children and exit the labor force, yielding evidence of statistical discrimination).

### 3.1.2 Outcome Measures

After viewing the *rirekisho*, respondents were asked a battery of attitudinal measures regarding their attitudes toward the applicant in professional and in social contexts. In order to gauge professional attitudes, I asked respondents to indicate: 1.) whether the hypothetical applicant was employable; and, 2.) if the respondent would hire the applicant. Response choices to these outcomes are ternary, indicating affirmative attitudes (the respondent is employable/the respondent would want to hire them), negative attitudes (the applicant is not employable/the respondent would not want to hire them); or a “Don’t know” (DK) outcome. Positive outcomes are coded as 1, negative outcomes as  $-1$ , and DK outcomes as 0.

Additional, social outcomes regarded the respondent’s willingness to interact with the applicant in various social situations; would the respondent be comfortable: 3.) having the applicant as a coworker; 4.) living next to the applicant as a neighbor; and, 5.) having the applicant marry the respondent’s child (supposing the respondent had children). All social questions were measured with ternary response choices, indicating comfort (1); reluctance ( $-1$ ), or neither (0).

Together, both professional and social outcome measures sought to target discriminatory attitudes toward individuals of a given profile, both on the labor market, as well as in broader social contexts. In order to streamline analysis, and reduce issues raised by multiple comparisons, I condensed the full set of outcome measures into two attitude indices,

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<sup>12</sup>The original design incorporated actual school names. One colleague from Fukushima City was, in fact, surprised to see his daughter’s school included on the list, and raised concerns regarding the use of a real school name in a study on stigmatization.

<sup>13</sup>These variables are included in analyses, but are excluded from explanatory figures and tables.

respectively representing subjects' professional and social attitudes. In order to construct a *professional attitudes index* ( $Y_{prof}$ ), I averaged each subject's responses to Outcomes 1 – 2 (Cronbach's  $\alpha = 0.84$ ; standardized  $\alpha = 0.84$ ). The *social attitudes index* ( $Y_{sosc}$ ) was similarly constructed by averaging each respondent's responses to Outcomes 3 – 5 (Cronbach's  $\alpha = 0.84$ ; standardized  $\alpha = 0.84$ ). Effects were also estimated with individual outcomes, but all hypothesis testing was conducted using these index variables.

## 3.2 Analysis and Methods<sup>14</sup>

### 3.2.1 Estimation of Treatment Effects with OLS

The primary targets of analysis are the average marginal component effects (AMCEs) of the following variables on the outcomes described in [Section 3.1.2](#) above: gender, nationality, Fukushima as primary schooling location, and Fukushima as college location. Note that the effects of location are considered relative to Fukushima baselines, since the relevant hypotheses ([Section 3.3](#)) jointly assess the effect of an applicant who was not in Fukushima; the effect of nationality is also assessed jointly.

The following variables included in the specifications below are indicators of the hypothetical applicant's selected traits: female; Chinese, Korean, American; Tokyo primary school, Yamamoto primary school; Tokyo college, Sendai college. The following variables are coded as multi-level factors in R for the purposes of regression analysis: major, qualifications, experience, and requests. The remaining variables are respondent-level covariates. Effects for each of the two main outcomes are estimated using OLS with the respective specifications below.<sup>15</sup>

**Model 1** estimates effects on  $Y_{prof}$ , that is the professional attitude index:

$$\begin{aligned}
 Y_{prof,i} = & \alpha_0 + \alpha_1 \times \text{female}_{Ai} + \alpha_2 \times \text{Chinese}_{Ai} + \alpha_3 \times \text{Korean} + \alpha_4 \times \text{American} \\
 & \alpha_5 \times \text{Tokyo primary sch.}_{Ai} + \alpha_6 \times \text{Sendai primary sch.}_{Ai} + \\
 (1) \quad & \alpha_7 \times \text{Tokyo college}_{Ai} + \alpha_8 \times \text{Sendai college}_{Ai} + \alpha_9 \times \text{major}_{Ai} + \\
 & \alpha_{10} \times \text{qualifications}_{Ai} + \alpha_{11} \times \text{experience}_{Ai} + \alpha_{12} \times \text{requests}_{Ai} + \\
 & \alpha_{13} \times \text{female}_i + \alpha_{14} \times \text{party}_i + \alpha_{15} \times \text{ideo}_i + \alpha_{16} \times \text{education}_i + \\
 & \alpha_{17} \times \text{income}_i + \alpha_{18} \times \text{age}_i + \epsilon_{1i}.
 \end{aligned}$$

Similarly, **Model 2** estimates effects on  $Y_{sosc}$ , the social attitude index:

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<sup>14</sup>The study is described in a pre-analysis plan, registered at EGAP prior to surveying, and amended prior to analysis. The text of [Section 3.2](#) and [Section 3.3](#) follows closely from the pre-analysis plan.

<sup>15</sup>These analyses, as well as associated hypotheses presented in [Section 3.3](#), have been preregistered and are available on Evidence in Governance and Policy (EGAP).

$$\begin{aligned}
(2) \quad Y_{social,i} = & \beta_0 + \beta_1 \times \text{female}_{Ai} + \beta_2 \times \text{Chinese}_{Ai} + \beta_3 \times \text{Korean} + \beta_4 \times \text{American} \\
& \beta_5 \times \text{Tokyo primary sch.}_{Ai} + \beta_6 \times \text{Sendai primary sch.}_{Ai} + \\
& \beta_7 \times \text{Tokyo college}_{Ai} + \beta_8 \times \text{Sendai college}_{Ai} + \beta_9 \times \text{major}_{Ai} + \\
& \beta_{10} \times \text{qualifications}_{Ai} + \beta_{11} \times \text{experience}_{Ai} + \beta_{12} \times \text{requests}_{Ai} + \\
& \beta_{13} \times \text{female}_i + \beta_{14} \times \text{party}_i + \beta_{15} \times \text{ideo}_i + \beta_{16} \times \text{education}_i + \\
& \beta_{17} \times \text{income}_i + \beta_{18} \times \text{age}_i + \epsilon_{2i}.
\end{aligned}$$

For both models,  $A$  subscripts indicate the randomly assigned traits of the hypothetical applicant. Variables lacking this subscript indicate respondent-level covariates. For instance,  $\text{female}_{Ai}$  regards the gender of the hypothetical applicant whose resumé is presented to respondent  $i$ , whereas  $\text{female}_i$  indicates respondent  $i$ 's self-reported gender.  $\epsilon_{1i}$  and  $\epsilon_{2i}$  represent the respective error terms for each specification.  $\alpha_9$ ,  $\alpha_{10}$ ,  $\alpha_{11}$ ,  $\beta_9$ ,  $\beta_{10}$ , and  $\beta_{11}$  represent vectors of coefficients corresponding to each level of the respective factor.<sup>16</sup> Unadjusted treatment-effect estimates were also estimated, but do not comprise the primary inferential targets.<sup>17</sup>

### 3.2.2 Descriptive Analysis with Bayesian Additive Regression Trees (BART)

AMCEs do not account for potential interactions between treatments. To handle potential sources of nonlinearity, I therefore employ BART (Chipman et al., 2010) to nonparametrically estimate treatment effects accounting for potential interactions between treatments.<sup>18</sup> BART can model nonlinearity in treatments, as well as interactions between treatments, flexibly and automatically. This reduces possible biases that may arise from improper model selection, and minimizes the possibility of error from incorrect specification of tuning parameters (Green and Kern, 2012). I use BART in order to produce a series of predicted outcome values for each possible combination of treatments. In this case, I produce BART predictions using the actual vectors of treatment assignments as a set of training data, for the main treatments noted above: gender, nationality, primary school location, and college locations. A test set is comprised of all possible combinations over these assignments, yielding 72 potential treatment “profiles” for which predictions are computed.

## 3.3 Hypotheses

The primary purpose of this paper is to assess possible professional and social discrimination on the basis of gender, nationality, and perceived exposure to radiation following a nuclear accident. The key hypotheses noted below address these traits in turn. All hypothesis

<sup>16</sup>Individual coefficients are omitted for these variables, as they do not represent inferential targets of interest.

<sup>17</sup>Tabular results are available in [Appendix C](#) and [Appendix D](#).

<sup>18</sup>I use the [bartMachine\(\)](#) R package in order to fit BART models.



testing proceeds with a significance level  $\alpha = 0.05$ , and using two-tailed tests with normal approximations, computed using HC2 robust SEs for all OLS coefficients.

First, I hypothesized that the profiles of applicants from both Tokyo and Yamamoto Town would be viewed more favorably than those of hypothetical applicants from Futaba Town. Again, I test this hypothesis jointly:

*Hypothesis 1a (Primary School in Fukushima):  $\alpha_5 + \alpha_6 > 0$  and  $\beta_5 + \beta_6 > 0$ .*

Similarly, I hypothesized that applicants from Tokyo and Sendai would be viewed more favorably relative to those from Fukushima:

*Hypothesis 1b (College in Fukushima):  $\alpha_7 + \alpha_8 > 0$  and  $\beta_7 + \beta_8 > 0$ .*

I also assess the relative magnitudes of these effects on social, versus professional outcomes. I expected that the effects of the social attitudes index would be stronger than those on the professional attitudes index, since concerned of radiation exposure could activate (unfounded) concerns about the applicant's health (cancer, reproductive health):

*Hypothesis 1c (Primary School Sosc. vs. Prof.):  $\beta_5 + \beta_6 > \alpha_5 + \alpha_6$ ; and,*

*Hypothesis 1d (College Sosc. vs. Prof.):  $\beta_7 + \beta_8 > \alpha_7 + \alpha_8$ .*

Next, I hypothesized that the AMCE of changing a hypothetical applicant's gender from male to female would have a negative effect on respondents' professional attitudes, on average:

*Hypothesis 2a (Female, Prof.):  $\alpha_1 < 0$ .*

For social attitudes, however, I anticipated that female gender would have a weakly positive effect:<sup>19</sup>

*Hypothesis 2b (Female, Sosc.):  $\beta_1 > 0$ , when estimated using the social attitudes index.*

Finally, I hypothesized a jointly negative effect of the hypothetical applicant being non-Japanese (i.e., Korean, Chinese, or American, versus a Japanese baseline), on both professional and social indices:

*Hypothesis 3a (Non-Japanese, Prof.):  $\sum_{k=2}^4 \alpha_k < 0$ ; and,*

*Hypothesis 3b (Non-Japanese, Sosc.):  $\sum_{k=2}^4 \beta_k < 0$ .*

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<sup>19</sup>In particular, the design preregistration notes that I expected a positive effect on responses to Outcome 3, but I did not expect that gender would have a substantial effect on Outcomes 4 – 6. I did, however, hypothesize that these estimates would be positive.

## 4 Results

### 4.1 BART Results

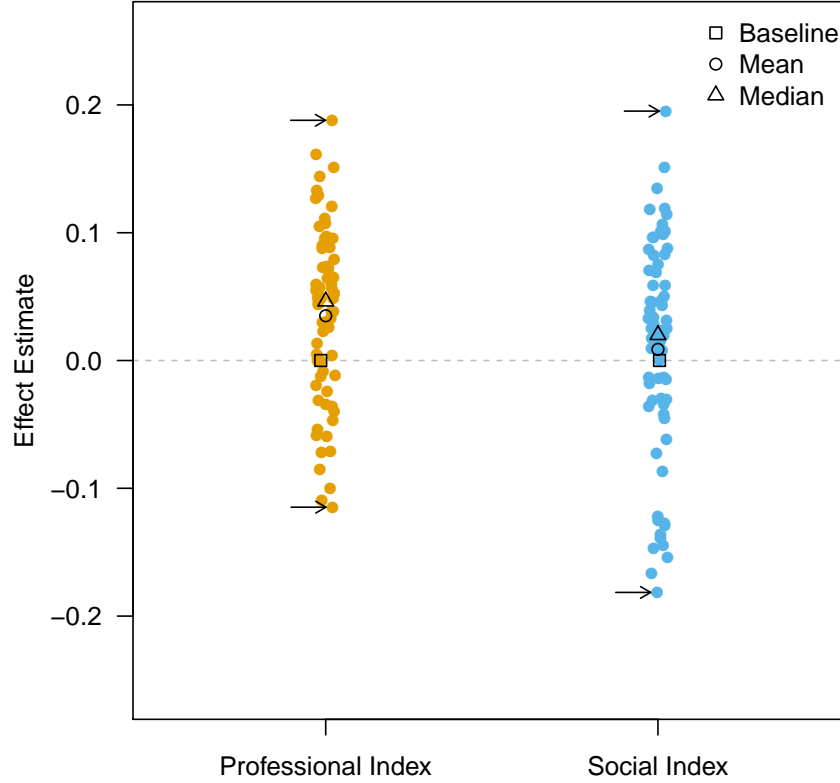
I begin by presenting descriptive findings obtained from BART model fits. As noted above, BART allows us to flexibly estimate predicted outcome values for each potential combination of main treatments. In order to estimate treatment effects for each outcome, I subtracted the predicted outcome of a baseline applicant profile from all other predictions for that outcome. The baseline profile I employed was that of a Japanese, male applicant, whose primary and collegiate education were conducted in Tokyo. This profile was selected because such an applicant lacks traits generally believed to be associated with discriminatory attitudes (i.e., the applicant is male, Japanese, and from an urban center).

Results are presented graphically in [Figure 2](#) for both professional and social index outcomes. It is apparent that the social index prediction for the baseline profile was remarkably similar to the average and median predictions for that index. On the professional attitudes index, this difference was more noticeable, with the baseline profile having a modestly lower predicted outcome than the mean and median predictions using the professional attitude index.

Also indicated on [Figure 2](#) are the best- and worst-performing profiles for each index. That is, the profiles that yielded the largest positive effects, and those that yielded the largest negative effects, for each index outcome. Notably, the best-performing profile was the same across both outcomes: a Japanese female from Yamamoto Town, who went to college in Tokyo. The worst-performing profiles were different for each outcome, but each profile was that of a Korean male. In the case of the professional attitudinal index, the worst-performing profile was that of a male Korean who completed primary schooling in Futaba Town, and went to college in Sendai. Tellingly, the worst-performing profile on the social attitudes index was also a male Korean applicant, with primary schooling completed in Yamamoto Town, and college in Tokyo. While these results are reassuring, insofar as they suggest that applicants who lived in Fukushima Prefecture were not specifically discriminated against, the relative distaste for Korean applicants is troubling.

It is interesting that the best-performing profile was that of a Japanese female from rural Japan, but with a college education from Tokyo. It is likely that such an applicant profile appealed to respondents both in terms of nationality, though the high performance of a female applicant runs somewhat contrary to expectations, based on considerable evidence of gender discrimination in workplace contexts (cf., [Kage et al. 2018](#)). Interestingly, while the profile of a female applicant who came from a small town and completed university schooling in Tokyo is apparently attractive to respondents, such a progression from rural to urban schooling corresponds to the worst-performing profile according to the social attitudes index, when applied to a Korean male. It is unclear why these worst-performing profiles feature Korean males who could reasonably be assumed to have been raised in rural Japan (e.g., as *zainichi*). However, as discussed below, there is strong evidence of systematic discrimination against Korean applicants in multiple contexts.

**Figure 2:** BART Effect Estimates for Professional and Social Indices



## 4.2 Estimation of Effects of Applicant Traits

I now present results from the two main OLS specifications described in [Section 3.2](#) above. Individual AMCE estimates are presented graphically in [Figure 3](#) (these results are also presented in tabular format in [Appendix D](#)). A complete assessment of the hypotheses stated above is also presented below.

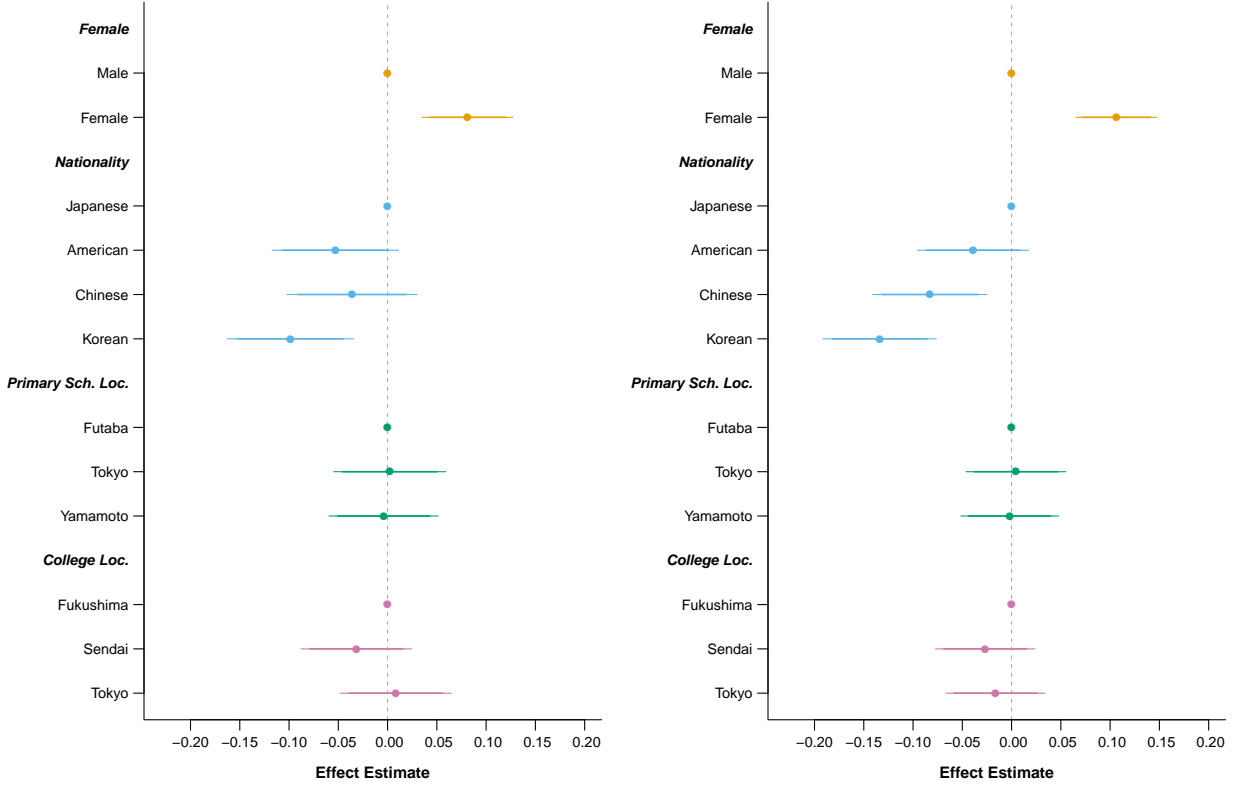
Immediately apparent is the lack of apparent discrimination against applicants from Fukushima Prefecture—including from Futaba Town. As a result, we cannot reject the null hypothesis of no effects in either case, contradicting the expectations of both *Hypothesis 1a* and *Hypothesis 1b*. Accordingly, I do not provide further analysis pertaining to either *Hypothesis 1c* or *Hypothesis 1d*.

[Figure 3](#) also provides insight into the other hypotheses presented above. Interestingly, the AMCE of female applicant gender was *positive* for both outcome measures, contrary to *Hypothesis 2a*. In fact, the AMCE shown in [Figure 3b](#) shows a large estimated AMCE of female gender on the social attitude index, in line with, but exceeding the expectations of, *Hypothesis 2b*, which posited only a weakly positive effect.

**Figure 3:** Main Results (AMCEs)

(a) Coefficient Plot of Effects on Prof. Inx.

(b) Coefficient Plot of Effects on Sosc. Inx.



90% and 95% confidence intervals are indicated as horizontal bars around each point estimate, with SEs computed as described in [Section 3.3](#).

In contrast, it is apparent that all point estimates of the AMCEs of non-Japanese nationality are negative. Particularly striking are the large and significant negative AMCE estimates associated with Korean applicants. Interestingly, Koreans represent the only nationality for which we observe significant discriminatory effects with respect to the professional attitude index (AMCE =  $-0.099$ ; SE = 0.033). When considered with respect to the social attitudes index, the effect of Korean nationality is substantially larger (AMCE =  $-0.134$ ; SE = 0.029). When considering the social attitudes index, we also observe a negative and significant AMCE for Chinese nationality (AMCE =  $-0.083$ ; SE = 0.030), comparable in magnitude to the negative effect of Korean nationality on the professional index.

Although the estimates are not indicated in [Figure 3](#), it is worth noting that the secondary applicant traits included in the experiment ultimately had little effect on respondent attitudes. The one exception regards the inclusion of a special request that an employer contact the hypothetical applicant on weekends, or outside of the window of 3pm to 7pm

on weekdays, due to university classes. The inclusion of this request had a positive and significant effect on the professional attitudes index. However, no other secondary attributes appeared to influence either index.

#### 4.2.1 Results and Discussion Pertaining to Key Hypotheses

Results pertaining to each of the hypotheses presented in [Section 3.3](#) are summarized in [Table 1](#). In general, the experimental results provide little validation of these hypotheses. Of particular interest is the apparent lack of discrimination against applicants who lived in Fukushima at the time of the accident and thereafter. As described above, considerable evidence points to stigmatization and self-stigmatization among both victims as well as those *perceived* to have been affected by radiation following the accident. The present results, however, provide no evidence of discrimination against individuals affiliated with Fukushima Prefecture, let alone Futaba Town, where the Fukushima Daiichi Nuclear Power Plant is located.

In contrast to the concerning results pointing to broad discrimination against Korean applicants, discussed at greater length below, I cannot reject the null hypothesis of no discrimination against those from Fukushima (*Hypothesis 1a* and *Hypothesis 1b*). These null findings provide a reassuring counterpoint to existing work on the stigmatization of Fukushima victims: given the persistence of other forms of discrimination in these experimental settings, the null effect of the Fukushima treatments provides strong evidence against broad discrimination of perceived victims of the accident. There are multiple potential explanations for this null finding. For instance, the Japanese government has expended considerable effort to educate the public about the (lack of) risks posed by radiation ([Polleri, 2019](#)). Such educational approaches have been successful in reducing radiation-related health concerns, for instance among students ([Tsubokura et al., 2018](#)). It is also important to note that the accident’s salience has likely waned over the last nine years. As well, although initial public fears that the accident could have a large impact on public health may have fueled discriminatory attitudes and behavior soon after the accident, members of the public, the lack of any such developments over the last decade lends credence to persistent assurances by the government and experts against such concerns (see, e.g., [Yamashita et al. 2018](#)). Extensive food-safety assessments have continued to demonstrate the lack of radioactive contamination in Fukushima’s agricultural products, and the volume of such exports has also increased ([Post, 2018](#)). It is likely apparent to members of the public, then, that the worst fears of the accident’s consequences may have been exaggerated or even unsubstantiated.

At the same time, the failure to reject the null hypothesis in the present setting does not necessarily apply generally to other forms of stigmatization against Fukushima victims. For instance, as described briefly above, one expert on the disaster whom I interviewed during fieldwork in Tokyo suggested that workplace discrimination may not be apparent from simply showing respondents a *rirekisho*. However, if a former resident of Fukushima who may have been affected by radiation were to seek employment in a customer-facing position, e.g., as a waiter at a restaurant, a prospective employer might decide not to hire the prospective employee—either due to personal prejudice or based on the expectation that patrons would

**Table 1:** Results Pertaining to Key Hypotheses

Hypothesis	Test	Estimate(s)	(SE)	Validated
<i>H1a: Primary Sch. in Fukushima</i>	$\alpha_5 + \alpha_6 > 0$	-0.002	(0.050)	✗
	$\beta_5 + \beta_6 > 0$	-0.003	(0.054)	✗
<i>H1b: College in Fukushima</i>	$\alpha_7 + \alpha_8 > 0$	-0.023	(0.050)	✗
	$\beta_7 + \beta_8 > 0$	-0.002	(0.050)	✗
<i>H2a: Female (Prof.)</i>	$\alpha_1 < 0$	0.081	(0.024)	✗
<i>H2b: Female (Sosc.)</i>	$\beta_1 > 0$	0.106	(0.021)	✓
<i>H3a: Non-Japanese (Prof.)</i>	$\sum_{k=2}^4 \alpha_k < 0$	-0.188	(0.080)	✓
<i>H3b: Non-Japanese (Sosc.)</i>	$\sum_{k=2}^4 \beta_k < 0$	-0.256	(0.071)	✓

All hypothesis testing conducted with two-tailed tests, with  $\alpha = .05$ . The AMCE for female gender is significant, but positive; as such, *Hypothesis 1a* is marked as not validated. Since neither *Hypothesis 1a* nor *Hypothesis 1b* was validated, I do not evaluate *Hypothesis 1c* and *Hypothesis 1d*, and exclude them here.

be uncomfortable (Baron, 2018a).

As well, much of the discrimination faced by residents of Fukushima has occurred in other social interactions outside of the context of labor relations and hiring decisions, as indicated by the widespread concern regarding the safety of foods grown in or harvested from Fukushima, even after safety inspections. Perhaps the most severe aspects of stigmatization associated with the Fukushima Daiichi accident concern fears that radiation causes birth defects. According to one physician I interviewed in Fukushima in 2018, even female medical students expressed doubts that they should attempt to have children, due to fears that radiation exposure could lead them to pass on genetic defects to their children (Baron, 2018b). Such consequences of low-level radiation exposure are unsubstantiated scientifically (Sever et al., 1988; Lie et al., 1992; Green et al., 1997), constituting *fūhyōhigai*. To the extent that members of the Japanese public perceive such risks, discrimination may persist in the context of romantic relationships, as was the case for Hiroshima and Nagasaki survivors. Reassuringly, I do not observe evidence of discrimination against Fukushima residents with respect to the marriage outcome that was included in the social attitudes index. However, this could also be a result of the modest strength of the Fukushima treatments, especially relative to other treatments like gender and nationality.

Shifting attention to the remaining hypotheses, while *Hypothesis 2a* posited that the AMCE of a female applicant would be negative, we instead observe a large and significant *positive* effect of female gender. In fact, the AMCE of female gender was positive for all outcomes. Indeed, although *Hypothesis 2b* suggested a weakly positive effect of female gender on social outcomes, we observe considerable stability in the effect of female gender, with large effect estimates across the board. As such, although *Hypothesis 2b* is indicated as having been validated in Table 1, it bears repeating that the observed effect sizes also exceeded expectations.



The universally positive AMCEs of female applicant gender provide potential cause for optimism, especially in conjunction with recent results from experimental studies by [Kage et al. \(2018, 2019\)](#); [Horiuchi et al. \(2020\)](#). These results suggest the possibility of changing attitudes toward women in current-day Japan, against the backdrop of historical gender inequality in the Japanese labor force. However, caution is nonetheless warranted. For instance, it is important to note that the applicant profiles being considered were all for a 22-year-old individual, but sex discrimination in the Japanese labor force is more likely to occur with respect to women who are more likely to have children ([Kage et al., 2019](#)).

Even barring such a possibility, other avenues of discrimination may persist. [Kage et al. \(2018, p. 24\)](#) also note how current Abe Cabinet policies aimed at enhancing female labor-force participation may yield negative effects on support for immigration. The present experimental design is only able to test certain kinds of discrimination, namely attitudes toward a potential female applicant and her employability. Such a test cannot assess the nature and extent of workplace treatment of women. That is, while women may be regarded as more employable than men, their treatment within the workplace may nonetheless be highly tinged with sexism. The experiment also did not consider how attitudes toward female applicants may change depending on the *type* of job to which they are applying. It is possible, for instance, that while female applicants are generally regarded favorably relative to males, with further context, women could be systematically disadvantaged. Respondents may still systematically discriminate between men and women for certain types of employment, even if they are more generally favorable to females entering the workforce. That is, they may prefer female applicants, but when given the choice, would funnel such women into “pink collar” jobs. For instance, [Bertrand and Mullainathan \(2004, p. 998\)](#) found some evidence that female applicants to sales jobs received more callbacks than did males, though the difference was not statistically significant. In an audit study conducted in England, [Riach and Rich \(2006\)](#) found evidence of discrimination against male applicants to a “female” occupation (secretarial positions), whereas female applicants were discriminated against in a “male” occupation (engineer).

The present experiment showed no evidence of discrimination against individuals from Fukushima Prefecture, nor against college-aged women; in fact, respondents showed a preference for female applicants. However, we observe clear evidence of discrimination against non-Japanese individuals in both professional and social contexts. Point estimates of the effect of non-Japanese nationality are correctly (negatively) signed for all nationalities. In addition, *Hypothesis 3a* and *Hypothesis 3b* each posited a jointly negative effect of non-Japanese applicant nationality. As predicted, non-Japanese nationality had a jointly significant effect on both attitudinal indices, supporting both *Hypothesis 3a* and *Hypothesis 3b*. The significant effect of non-Japanese nationality on social attitudes is particularly expected given the individual AMCE estimates. The AMCEs of both Chinese and Korean nationality are negative and significant. As well, the point estimate of the AMCE of American nationality on each index is negatively signed, though the effect is nonetheless insignificant in both cases.

Though perhaps less extreme, the effects of non-Japanese nationality on the professional attitudes index also provide a dim view of Japanese attitudes toward non-Japanese labor-

market participants: the point estimates of all AMCEs for non-Japanese nationalities are negative, and the effect of Korean nationality is always significant. As troubling as these estimates are, it is worth noting that respondents were made aware of the hypothetical applicant’s nationality *only* by the respondent’s name. With stronger cues regarding nationality, the effects of prejudicial attitudes may have been even stronger. In that case, the estimates presented here could be conservative. On the other hand, since the names employed here are the most common names of each nationality, respondents might show less discrimination against some non-Japanese names than others, even holding nationality constant (Gaddis, 2017).

#### 4.2.2 Results Regarding Respondent-Level Traits

Finally, we also observe several significant relationships between respondents’ individual-level traits and professional and social attitudes. Age, education, nonidentification with a political party (relative to the baseline of the Liberal Democratic Party), and political ideology are all significant predictors of attitudes toward the hypothetical applicant. In particular, age and (five-point) ideology were both negative and significant predictors of both attitudes. That is, both more elderly and more conservative respondents held significantly more negative attitudes toward the hypothetical applicants. A significant negative coefficient was also found for respondents who indicated no partisan affiliation. Education was the only significant predictor of more positive attitudes toward the applicants.

## 5 Conclusion

In this article, I have considered discriminatory attitudes among the Japanese public using an experimental design that blends the features of audit methods with the benefits conferred by survey instruments. As a result, the design provides traction on questions related to both potential professional discrimination, and to prejudicial social attitudes, in a relatively naturalistic setting. The design itself therefore offers to advance the means of conducting survey experiments to assess prejudicial attitudes against women, ethnic minorities, and other marginalized groups in Japanese society, including victims of the 2011 Fukushima Daiichi nuclear accident. Interestingly, the experimental results largely contrast with the hypothesized expectations of discriminatory mass attitudes in Japan. In particular, I found no evidence of discrimination against hypothetical applicants with ties to Fukushima Prefecture, suggesting that stigmatization of individuals affected by the 2011 accident has either subsided, or does not apply in this context. As well, respondents showed a clear preference for female profiles that may be suggestive of changing attitudes toward women in Japan, amidst government efforts toward establishing greater gender equality (Powell and Hughes 2019; though such efforts, under Prime Minister Abe’s “Womenomics” policy have also been sharply criticized; cf., Tanaka 2019; see also Kage et al. 2018). However, the experiment revealed troubling results regarding attitudes toward Koreans, with the mere inclusion of an identifiably Korean name yielding substantial negative attitudinal effects on nearly all mea-

sured outcomes. Moreover, in social contexts, discrimination based on nationality appeared to apply more broadly—especially to Chinese nationality, and less so to Western individuals (though effects on the latter type were not individually significant).

Together, these results could suggest both potential progress in establishing greater equality in Japanese society (e.g., regarding gender), as well as the considerable work that remains to be done (to reduce xenophobia). This being said, the study does feature limitations that suggest caution in generalizing the results. A primary critique regards the fact that the present study remains constrained to the survey context. Without field experimentation, it is difficult to draw externally valid conclusions about actual labor-market discrimination. Of course, as noted above, the survey-experimental context provides some advantages, e.g., by allowing for intensive measurement of attitudes. However, other critiques remain. For instance, the sample assessed here was drawn from the general population of Japan, and may not provide sufficient insight into the actual decisions of employers.

As noted above, discrimination may occur in various other settings that the present experiment is ill-equipped to assess, and the strength of the cue of Fukushima residence, and potential radiation exposure, was minimal.<sup>20</sup> As well, even on the labor market, bias against those perceived to have been exposed to radiation may not arise in employer review of *rirekisho*, although it could manifest in contexts such as in-person interviews. Discrimination could also be associated with job position, with service-sector positions presenting more fertile venues for problematic treatment of victims. The present experiment was also limited in its focus on hypothetical, *college-aged* applicants. It is unclear that discrimination against female applicants to open positions would manifest in the same ways for these younger applicants as it would for applicants in their 30s—that is, those women most likely to exit or be excluded from the labor market, even despite government action on this very demographic group (Kage et al., 2018).<sup>21</sup> As well, the present survey did not test the effects of job position on sex-based discrimination; whereas members of the public may prefer female profiles, on average, female applicants to traditionally male-dominated positions may be systematically excluded.

Some of these limitations can be easily addressed by further research, both by using augmented surveys, as well as by advancing the state of field experimentation in Japan with proper audit studies. At the same time, the present study offers a novel combination of existing approaches to assessing discrimination, blending the benefits of factorial survey-experimental designs for intensive measurement of attitudes, and the naturalistic format of a résumé audit study that can reveal preferences through real-world behavior. Future studies may therefore benefit from adapting the methods employed here, and placing increased attention on the sample under consideration (e.g., by replicating such designs on employer samples). While still subject to potential threats to inference like social desirability bias that are inherent in most survey methods, such augmentations could provide novel insight into multifaceted preferences among key populations of interest.

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<sup>20</sup>On the other hand, anecdotal evidence suggests that, immediately following the accident, the mere mention of Fukushima could have yielded strong, negative effects.

<sup>21</sup>Horiuchi et al. (2020) also demonstrate public preferences regarding the age of political candidates.

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## A Resume Fields

- Name
  - Female/Japanese: 佐藤 明日香 (さとう あすか; Asuka Satō)
  - Female/Chinese: 李 梓萱 (リ ズーシュエン; Zixuan Li)
  - Female/Korean: 金 知恵 (キム ジヘ; Ji-hye Kim)
  - Female/American: スミス ジェシカ (Jessica Smith)
  - Male/Japanese: 佐藤 翔太 (さとう しょうた; Shōta Satō)
  - Male/Chinese: 李 浩然 (リ ハオラン; Haoran Li)
  - Male/Korean: 金 智 (キム チフン; Ji-hoon Kim)
  - Male/American: スミス マイケル (Michael Smith)
- Middle/high school names<sup>22</sup> and location (one selected)
  - Tokyo 23 Wards, Tokyo (middle/high school): 世田谷区立学校/世田谷区立中学校
  - Sendai City, Miyagi Prefecture (middle/high school): 宮城県立山元町学校/宮城県立山元町中央高校
  - Futaba Town, Fukushima Prefecture (middle/high school): 福島県立双葉町学校/福島県立双葉町中央高校
- College name<sup>22</sup> and location (one selected)
  - Tokyo 23 Wards, Tokyo: 東京中央大学
  - Sendai City, Miyagi Prefecture: 仙台中央大学
  - Fukushima City, Fukushima Prefecture: 福島中央大学
- College major (one selected and indicated in parentheses next to college name)

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<sup>22</sup>All school names are hypothetical, based on recommendations from area experts.

- Marketing: マーケティング
- Politics/political science: 政治学
- Biology: 生物学
- Physics: 物理学
- Computer science: コンピュータサイエンス
- Nursing: 看護学
- Economics: 経済学
- Licenses/qualifications (one selected)
  - Driver’s license: 普通自動車免許 (MT/AT)
  - 820 TOEIC score: TOEIC: 820
- Part-time work experience (one selected)
  - Hall-shift leader at a restaurant (job/duration): 飲食店にて、ホールシフトリーダーとして勤務/平成29年 令和2年
  - Paperwork assistance at a trading company: 商社の輸出入管理部署にて、書類事務の補佐/平成29年 令和2年
  - Assistant in an advertising agency’s publishing department: 広告代理店の出版部門にて、事務補佐/平成29年 令和2年
  - Debugging and data entry at an IT software company: IT ソフトウェア会社にて、デバッグ、データ入力などの業務に従事/平成29年 令和2年
  - None
- Job-related preferences (one selected)
  - Statement that the applicant is unavailable for contact between 3pm and 7pm weekdays due to university classes, but free all day on weekends: 大学の授業のため、平日は15 19時の間にご連絡いただけますと幸いです。土日は終日連絡可能です。
  - Statement that the applicant is available for night shifts and weekend work: 夜勤や週末の勤務も可能です。
  - Statement that the applicant prefers only to work weekdays for family reasons: 家庭の事情のため、平日日中のみの勤務を希望いたします。
  - None

## B Outcomes

Respondents are asked a series of attitudinal questions regarding the hypothetical applicant immediately after examining the *virekisho*:

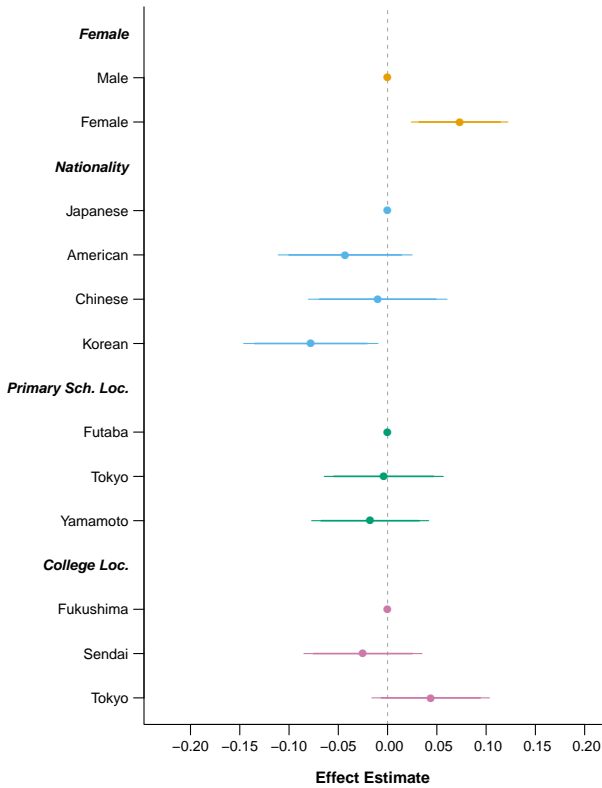
1. この人物が新規雇用の応募者だとした場合、どの程度適性があると思いますか？  
(Do you think this person is employable?)
  - 適性がある (Employable)
  - 適性はない (Not employable)
  - わからない (Don't know)
2. この人物が候補者だとした場合、雇用したいと思いますか？ (If this person were a candidate, would you want to hire them?)
  - 雇いたい (I would want to hire them)
  - 雇いたくない (I would not want to hire them)
  - わからない (Don't know)
3. この人物と、同僚として働くことになる場合、どう感じますか？ 快く思いますか？ 気が進みませんか？ どちらでもないですか？ (Would you feel comfortable working with this person as a colleague?)
  - 快く思う (Comfortable)
  - 気が進まない (Reluctant)
  - どちらでもない (Neither)
4. この人物が、隣人になることをどのように感じますか？ 快く思いますか？ 気が進みませんか？ どちらでもないですか？ (Would you feel comfortable to have this person as a neighbor?)
  - 快く思う (Comfortable)
  - 気が進まない (Reluctant)
  - どちらでもない (Neither)
5. あなたに子供がいたとした場合、この人物が、自分の子供の結婚相手になるとしたら、どのように感じますか？ 快く思いますか？ 気が進みませんか？ どちらでもないですか？ (If you had a child, would you feel comfortable having this person marry your child?)
  - 快く思う (Comfortable)
  - 気が進まない (Reluctant)
  - どちらでもない (Neither)



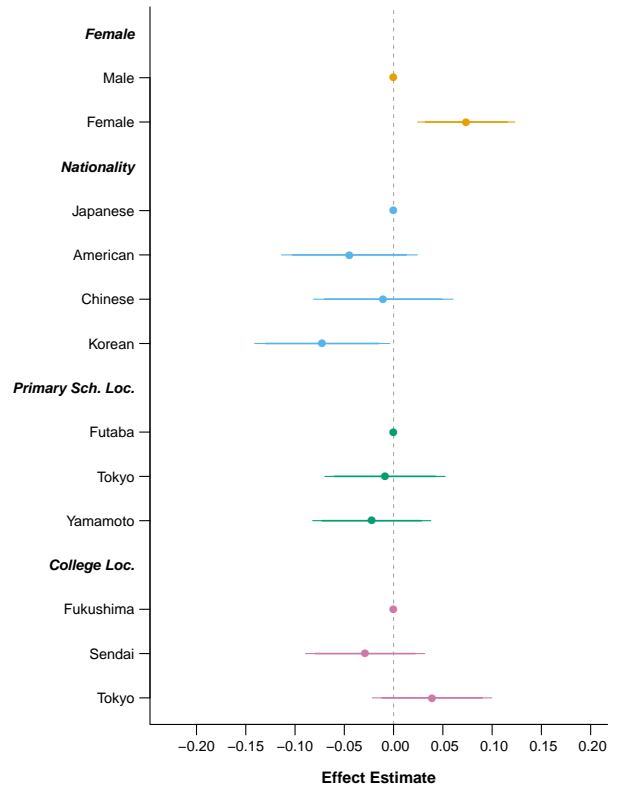
6. 放射線に曝された人物がある仕事の候補者だとした場合、被曝しているという事実が採用の際に考慮に入れられるべきだと思いますか？ (If a job candidate had been exposed to radiation, do you think the fact that they were exposed should be taken into account when hiring?)
- 考慮に入れられるべきだ (Should be taken into account)
  - 考慮に入れられるべきではない (Should not be taken into account)

## C Coefficient Plots

(a) Coefficient Plot of Adjusted Effects on Employable Professional Outcome

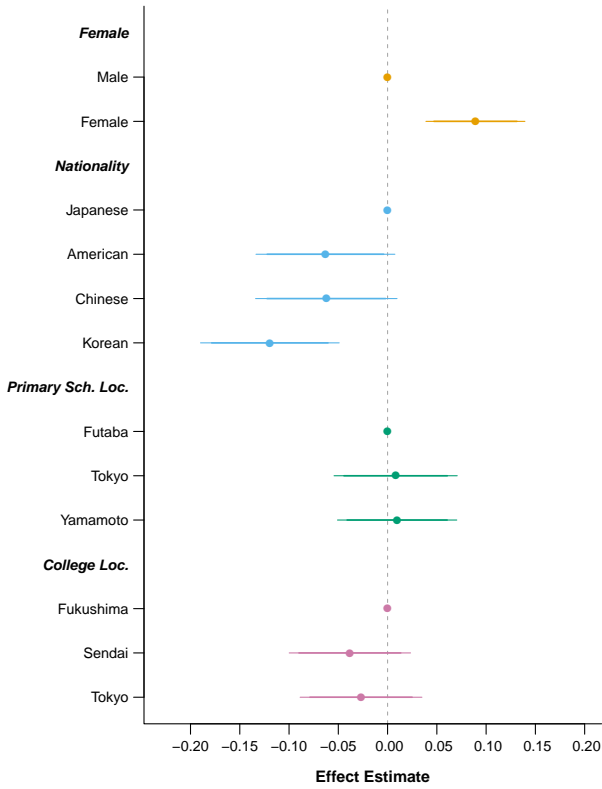


(b) Coefficient Plot of Unadjusted Effects on Employable Professional Outcome

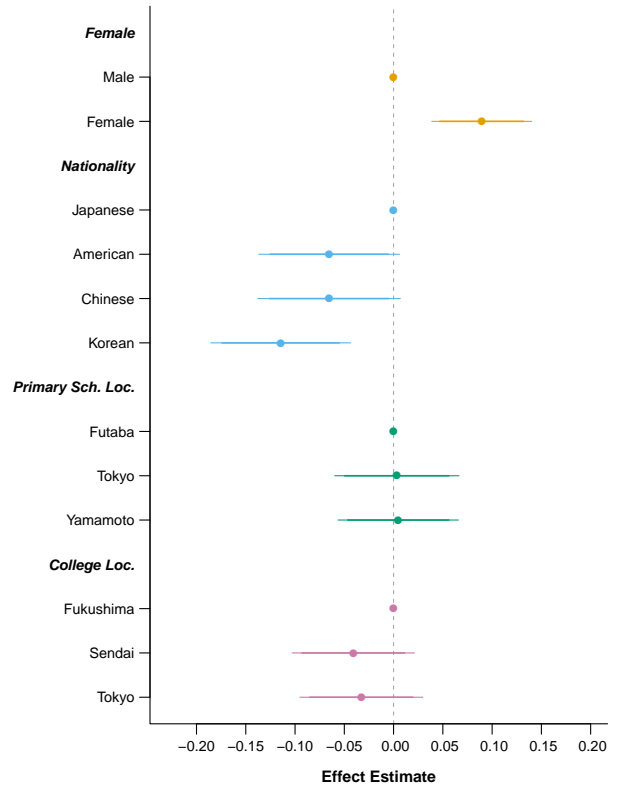


90% and 95% confidence intervals are indicated as horizontal bars around each point estimate, with SEs computed as described in [Section 3.3](#).

(a) Coefficient Plot of Adjusted Effects on Hire Professional Outcome

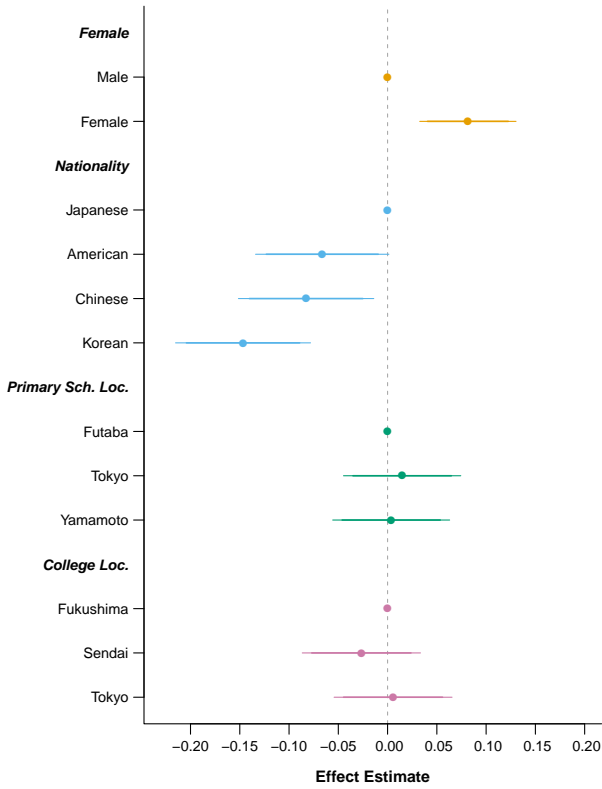


(b) Coefficient Plot of Unadjusted Effects on Hire Professional Outcome

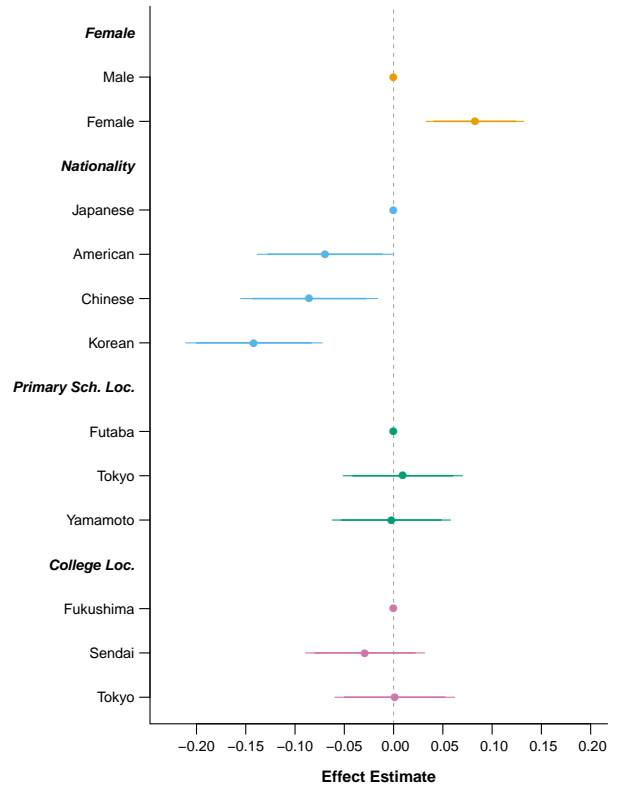


90% and 95% confidence intervals are indicated as horizontal bars around each point estimate, with SEs computed as described in [Section 3.3](#).

(a) Coefficient Plot of Adjusted Effects on Coworker Social Outcome

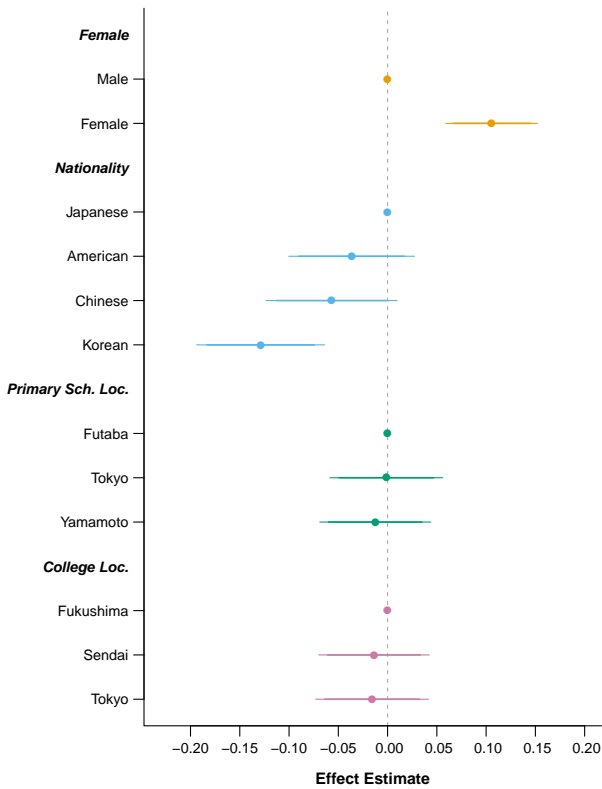


(b) Coefficient Plot of Unadjusted Effects on Coworker Social Outcome

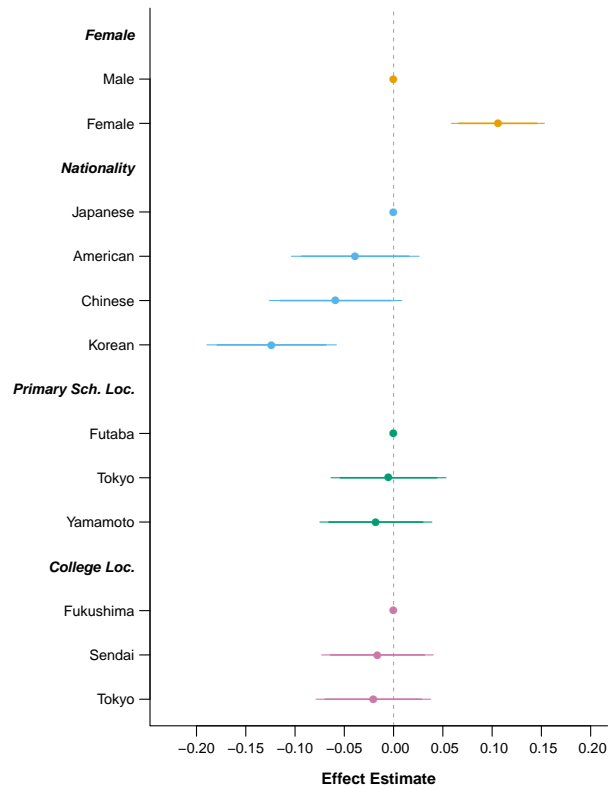


90% and 95% confidence intervals are indicated as horizontal bars around each point estimate, with SEs computed as described in [Section 3.3](#).

(a) Coefficient Plot of Adjusted Effects on Neighbor Social Outcome

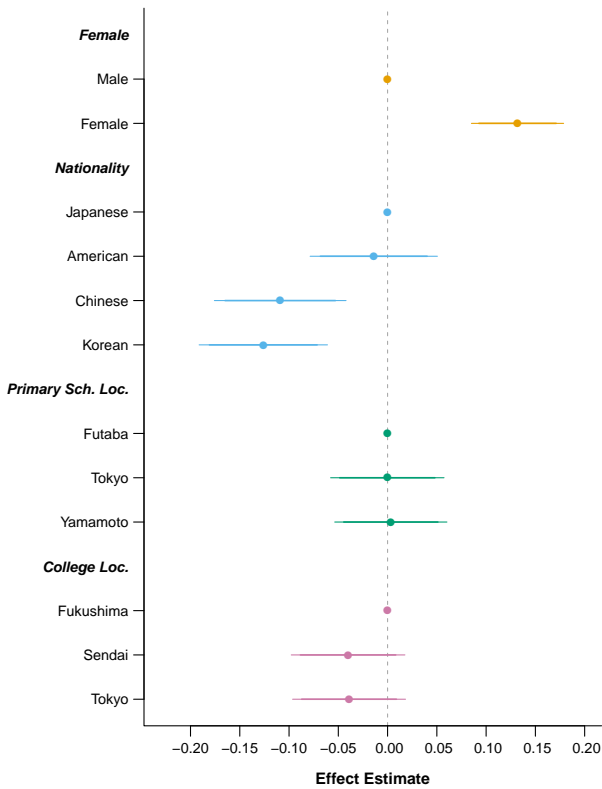


(b) Coefficient Plot of Unadjusted Effects on Neighbor Social Outcome

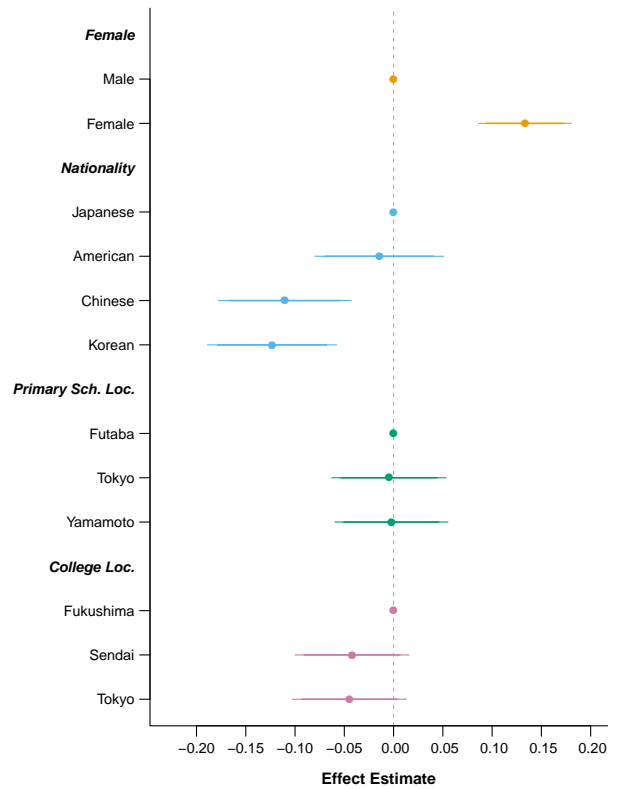


90% and 95% confidence intervals are indicated as horizontal bars around each point estimate, with SEs computed as described in [Section 3.3](#).

(a) Coefficient Plot of Adjusted Effects on Marry Social Outcome



(b) Coefficient Plot of Unadjusted Effects on Marry Social Outcome



90% and 95% confidence intervals are indicated as horizontal bars around each point estimate, with SEs computed as described in [Section 3.3](#).

## D Tabular Results

**Table 2:** Estimated Main Effects (Professional Index)

	Unadjusted		Adjusted	
	<i>Effect</i>	<i>(SE)</i>	<i>Effect</i>	<i>(SE)</i>
<b><i>Female</i></b>				
Female	0.082	(0.024)	0.081	(0.023)
<b><i>Nationality</i></b>				
American	−0.055	(0.033)	−0.053	(0.033)
Chinese	−0.038	(0.034)	−0.036	(0.034)
Korean	−0.094	(0.033)	−0.099	(0.033)
<b><i>Primary Sch. Loc.</i></b>				
Tokyo	−0.003	(0.029)	0.002	(0.029)
Yamamoto	−0.009	(0.029)	−0.004	(0.028)
<b><i>College Loc.</i></b>				
Sendai	−0.035	(0.029)	−0.032	(0.029)
Tokyo	0.003	(0.029)	0.008	(0.029)



**Table 3:** Estimated Main Effects (Social Index)

	Unadjusted		Adjusted	
	<i>Effect</i>	<i>(SE)</i>	<i>Effect</i>	<i>(SE)</i>
<b><i>Female</i></b>				
Female	0.107	(0.021 )	0.106	(0.021 )
<b><i>Nationality</i></b>				
American	−0.041	(0.029 )	−0.039	(0.029 )
Chinese	−0.085	(0.030 )	−0.083	(0.030 )
Korean	−0.130	(0.030 )	−0.134	(0.029 )
<b><i>Primary Sch. Loc.</i></b>				
Tokyo	0.000	(0.026 )	0.004	(0.026 )
Yamamoto	−0.007	(0.026 )	−0.002	(0.025 )
<b><i>College Loc.</i></b>				
Sendai	−0.029	(0.026 )	−0.027	(0.026 )
Tokyo	−0.021	(0.026 )	−0.016	(0.026 )

**Table 4:** Estimated Main Effects (Comfort (Coworker))

	Unadjusted		Adjusted	
	<i>Effect</i>	<i>(SE)</i>	<i>Effect</i>	<i>(SE)</i>
<b><i>Female</i></b>				
Female	0.083	(0.025 )	0.081	(0.025 )
<b><i>Nationality</i></b>				
American	−0.070	(0.035 )	−0.066	(0.035 )
Chinese	−0.086	(0.035 )	−0.083	(0.035 )
Korean	−0.142	(0.035 )	−0.147	(0.035 )
<b><i>Primary Sch. Loc.</i></b>				
Tokyo	0.009	(0.031 )	0.015	(0.030 )
Yamamoto	−0.002	(0.031 )	0.004	(0.030 )
<b><i>College Loc.</i></b>				
Sendai	−0.029	(0.031 )	−0.027	(0.031 )
Tokyo	0.001	(0.031 )	0.006	(0.031 )

**Table 5:** Estimated Main Effects (Employability)

	Unadjusted		Adjusted	
	<i>Effect</i>	<i>(SE)</i>	<i>Effect</i>	<i>(SE)</i>
<b><i>Female</i></b>				
Female	0.074	(0.025 )	0.073	(0.025 )
<b><i>Nationality</i></b>				
American	−0.045	(0.035 )	−0.043	(0.035 )
Chinese	−0.011	(0.036 )	−0.010	(0.036 )
Korean	−0.072	(0.035 )	−0.078	(0.035 )
<b><i>Primary Sch. Loc.</i></b>				
Tokyo	−0.009	(0.031 )	−0.004	(0.031 )
Yamamoto	−0.022	(0.031 )	−0.018	(0.030 )
<b><i>College Loc.</i></b>				
Sendai	−0.029	(0.031 )	−0.025	(0.031 )
Tokyo	0.039	(0.031 )	0.044	(0.031 )

**Table 6:** Estimated Main Effects (Hireability)

	Unadjusted		Adjusted	
	<i>Effect</i>	<i>(SE)</i>	<i>Effect</i>	<i>(SE)</i>
<b><i>Female</i></b>				
Female	0.090	(0.026 )	0.089	(0.026 )
<b><i>Nationality</i></b>				
American	−0.065	(0.036 )	−0.063	(0.036 )
Chinese	−0.065	(0.037 )	−0.062	(0.037 )
Korean	−0.115	(0.036 )	−0.119	(0.036 )
<b><i>Primary Sch. Loc.</i></b>				
Tokyo	0.003	(0.032 )	0.008	(0.032 )
Yamamoto	0.005	(0.031 )	0.010	(0.031 )
<b><i>College Loc.</i></b>				
Sendai	−0.041	(0.032 )	−0.038	(0.031 )
Tokyo	−0.033	(0.032 )	−0.027	(0.032 )

**Table 7:** Estimated Main Effects (Comfort (Marriage))

	Unadjusted		Adjusted	
	<i>Effect</i>	<i>(SE)</i>	<i>Effect</i>	<i>(SE)</i>
<b><i>Female</i></b>				
Female	0.133	(0.024 )	0.132	(0.024 )
<b><i>Nationality</i></b>				
American	−0.014	(0.033 )	−0.014	(0.033 )
Chinese	−0.111	(0.034 )	−0.109	(0.034 )
Korean	−0.123	(0.033 )	−0.126	(0.033 )
<b><i>Primary Sch. Loc.</i></b>				
Tokyo	−0.005	(0.030 )	0.000	(0.029 )
Yamamoto	−0.002	(0.029 )	0.003	(0.029 )
<b><i>College Loc.</i></b>				
Sendai	−0.042	(0.030 )	−0.040	(0.029 )
Tokyo	−0.045	(0.030 )	−0.039	(0.029 )

**Table 8:** Estimated Main Effects (Comfort (Neighbor))

	Unadjusted		Adjusted	
	<i>Effect</i>	<i>(SE)</i>	<i>Effect</i>	<i>(SE)</i>
<b><i>Female</i></b>				
Female	0.106	(0.024 )	0.106	(0.024 )
<b><i>Nationality</i></b>				
American	−0.039	(0.033 )	−0.036	(0.033 )
Chinese	−0.059	(0.034 )	−0.057	(0.034 )
Korean	−0.124	(0.034 )	−0.129	(0.033 )
<b><i>Primary Sch. Loc.</i></b>				
Tokyo	−0.005	(0.030 )	−0.001	(0.029 )
Yamamoto	−0.018	(0.029 )	−0.012	(0.029 )
<b><i>College Loc.</i></b>				
Sendai	−0.016	(0.029 )	−0.014	(0.029 )
Tokyo	−0.020	(0.030 )	−0.016	(0.029 )