Task-Dependent Fluency and Devaluation of Gender-Ambiguous Faces: The Effects of Categorization Disfluency on Hireability

by

Ilona Nemeth

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Master of Arts
Department of Psychology
College of Arts and Sciences
University of South Florida St. Petersburg

Major Professor: Jennifer O'Brien, Ph.D.
Mark Pezzo, Ph.D.
Christina Salnaitis, Ph.D.

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Abstract

The evaluation of faces is an automatic process that involves perceiving facial features. The allocation of attention towards certain facial features can enhance the processing of faces; however, previous research has shown that evaluating ambiguous features makes faces more difficult to process resulting in lower ratings of likability and trustworthiness. Our research tested the extent to which individuals, when primed to focus attention on gender, would experience difficulty in the categorization of faces with ambiguous gender. Further, we examined how cognitive fluency impacted the devaluation of these faces, especially within the context of hireability for gender-stereotyped jobs. Our first prediction was that ambiguous gender would influence cognitive fluency of faces when asked to categorize by gender. Additionally, it was predicted that when presented with gender-stereotyped employment positions, faces ambiguous in gender would be perceived as less hireable than their pure male and female counterparts. Results showed that fluency was affected for those who were primed to focus on gender in that categorizing faces by gender produced longer latencies than those categorizing by the non-ambiguous dimension of race. Results also showed that purely male or female faces were deemed overall less hireable than faces that were ambiguous on the dimension of gender. These findings suggest that although there was a significant impact of the categorization difficulty affecting the time to categorize faces for those in the gender categorization task, this disfluency did not reflect an overall devaluation of

gender-ambiguous faces regarding hireability. The focus on the ambiguous component of gender did not make salient for participants the lack of correspondence between gender-typicality and the gender-stereotyped job roles. Though previous research suggested that gender ambiguity led to devaluation in other contexts, this effect was not seen within a hiring context.

Introduction

While women are increasingly gaining representation in the workplace and achieving equal or higher educational degrees to that of men, there are still gaps in representation for managerial and leadership roles (Monzani, Bark, Dick, & Peiro, 2015). When considering women for managerial or leadership roles, individuals are more likely to associate masculine qualities with roles stereotypical of leaders. This leaves women at a disadvantage when considered in this context, due to their association with feminine-typed roles (Stockhausen, Koeser, & Sczesny, 2013). Gender-specific facial features have also been shown to impact ratings for possessing leadership qualities. For example, male-typical facial features are preferred for individuals in leadership roles (Stockhausen et al., 2013). As such, the gender-typicality of one's face can play a role in hiring decisions. For a face that contains blends of both male and female features, the decision to hire for masculine- or feminine-typed positions may not be as clear. Occupational sexism, therefore, may not only be a barrier that women face in attaining leadership positions but can also play a role for individuals with gender-ambiguity in their ability to attain positions that pertain to either masculine stereotyped or feminine stereotyped jobs. Often, the process for selecting an applicant for a job role reflects the extent to which an individual evaluates correspondence between the role and the applicant's gender (Stockhausen et al., 2013). These interactions require an individual to evaluate the faces they encounter, usually drawing upon automatic processes that involve categorizations or judgments of the face.

Categorization of Face Gender

Facial components indicative of face-related category membership, including race, age, and gender, are employed by individuals in evaluating faces (Winkielman, Olszanowski, & Gola, 2015). Processing gender has been thought to occur relatively automatically with the perception of a face (Ito & Urland, 2005). However, more recent research has demonstrated that categorizing the gender or race of an individual depends upon motivation and context, which may interfere with automaticity of categorization. For example, priming individuals to focus on a semantic versus a non-semantic task when viewing a face can lead to differences in early and later cognitive processing of gender. Tomelleri and Castelli (2012) tested the assumption that when gender identification is made difficult (e.g. inverting a face), task-irrelevant information is not processed. In the first of two studies, participants were instructed to perform either a visual feature detection task (identify the presence or absence of dots on a face) or a gender categorization task. Event-related brain potentials (ERPs) revealed that detection of gender occurred during early perceptual processing (N170) and continued into later cognitive processing (P300), regardless of task manipulation. In the second study, the procedure was repeated with all faces inverted. Results revealed that when the faces were made more difficult to process through inversion, early perceptual processing of gender information still occurred across both conditions. However, gender information was only relevant in later cognitive processing (P300) in those asked to categorize the face by gender and not present when asked to identify the presence of dots. This led to the

conclusion that categorizing by gender is largely goal-independent and occurs automatically in early processing, but when the task requires more effortful processing, further analyses does not occur if gender was not relevant to the task.

Effects of Priming on Face Categorization

Considerable attention has been paid to demonstrating the link between categorization of facial stimuli and the cognitive mechanisms behind such categorization (e.g. Owen, Halberstadt, Carr, & Winkielman, 2016; Winkielman et al., 2015; Lick & Johnson, 2014). Priming has been shown to impact the categorization of faces. In examining the effects of gender on categorization, Quek and Finkbeiner (2014) found that priming influenced the time to categorize faces. Participants classified the gender of target faces by making responses on a touch panel. Results found that target faces produced much faster categorization times when preceded by a masked prime face that was congruent with the target face (same gender) than those incongruent with the target face (opposite gender). Priming and the goal of the behavior both influence the speed of evaluation and the categorization of faces.

Social Judgments of Faces

There has been evidence that affective and motivational responses to faces result from the act of processing specific features, such as emotional expressions, which can then influence social judgments about them (e.g. Owen, et al., 2016; Winkielman, et al., 2015). Studies show that the differences in ratings of attractiveness and trustworthiness in gender-influenced or expression-influenced faces reflect internal inclinations of likeability. For example, both smiling faces and female faces have been known to

enhance responses in attractiveness ratings (Winkielman et al., 2015). This is thought to occur due to the attractiveness of the faces acting as a reward to the perceiver.

These affective consequences (or social judgments) of face evaluations may produce consequences in the larger, professional world, and in turn may affect an individual's trajectory towards obtaining goals and professional success. For example, when measuring probability to hire for job roles in leadership, Stockhausen and colleagues found that individuals prefer to hire faces that reflect more masculine features as reflective of a congruency between job-typicality and facial appearance (Stockhausen, Koeser, & Sczensy, 2013). Thus, a process involved in social judgment, which could negatively affect an individual, may be the perceived misfit between the typicality of facial features and the ostensible fit of the face among social roles. Faces that are encountered may not always fall within a particular preconceived category of membership one may hold, thus eliciting difficulty in assigning its membership.

Cognitive Fluency and Devaluation

Cognitive fluency is the experience of ease or difficulty during the processing of information and assigning its membership to a category (Lick & Johnson, 2013). Disfluency occurs when the perception of a stimulus is incongruent to previously held norms about that particular stimuls' membership within a certain group. For example, research has shown that faces that consist of morphs of two neutral, average faces have revealed high attractiveness ratings (also known as the beauty-in-averageness effect) but show a reverse effect for two famous faces that are morphed (Winkielman et al., 2015). This is because two well-known morphed faces contain competing features that disrupt the automaticity of processing these faces. Thus, social evaluations are impacted by the

fluency with which particular features of the face require in their processing. When certain features are difficult to process, such as when well-known facial features are morphed, cognitive and categorization difficulty can result (Winkielman et al., 2015).

Ambiguity in gender can also lead to difficulty in categorizing faces and can elicit negative affect due to the difficulty experienced in processing these faces. Owen et al., (2016) proposed that viewing gender-ambiguous faces would result in evaluative judgments that are the product of the cognitive difficulty in which one experiences when asking participants to categorize a face as male or female. Aligned with their predictions, their study revealed that requiring the categorization of male or female upon examining gender-ambiguous faces, resulted in attractiveness ratings that were lower than ratings of the pure-gender faces, as well as more difficulty in gender classification (Owen et al., 2016). From this evidence, the researchers concluded that first requiring individuals to categorize the faces based on gender elicited difficulty due to the ambiguity of the gender, and this further led to a depression of attractiveness ratings for these faces. In their second study, a third category was added in which participants categorized faces as either Caucasian or Asian. Faces in this study consisted of not only gender-morphed faces but race-morphed faces. Results revealed that attractiveness ratings for gender-morphs were rated as much less attractive when compared to the no-categorization group and racial-categorization group (Owen et al., 2016). When again faced with the specific task of gender categorization, participants faced disfluency, resulting in less than optimal ratings of attractiveness when compared to the race categorization condition and no-categorization condition. The perceptual difficulty experienced when evaluating faces on the ambiguous dimension of gender were present when requiring individuals to classify

faces based on the morphed component, which resulted in longer categorization times for both the race categorization and gender categorization condition. Results also showed attractiveness ratings were lowest for those who had to categorize by gender, followed by the no-categorization condition, and finally the race categorization condition. The findings related to the race categorization condition eliminate the possibility that the findings from their previous study were due to the amount of time spent attending to faces. Instead, the results of the second study suggest it is a disfluency mechanism, caused by the categorization difficulty produced by focus on a particular aspect of the stimulus, which leads to negative affect that then depresses ratings of appeal for that stimulus based on its ambiguous dimension. (Owen et al. 2016).

Task-dependent Cognitive Fluency

Task-dependent cognitive fluency occurs when evaluation requires focusing on a specific aspect or dimension of a stimulus with the fluency reliant upon the ease in which one can perceive and process the information contained in that task (Winkielman et al., 2015). The allocation of one's attention should then produce disfluency if the task requires evaluating a stimulus that contains task-relevant ambiguous features. In other words, task-relevance dictates the impact that the ambiguous features have on categorization judgments, which may further lead to affective evaluation judgments. The focus on the ambiguous dimension elicits that fluency effects are not directed by the wider processing of a target, but are dependent on the current task.

To test the interplay of features and fluency, Winkielman et al. (2015) conducted two experiments using task-dependency as the theoretical framework. The goal was to investigate the extent to which focus on a specific facial feature generated disfluency and

negative judgments regarding attractiveness and trustworthiness. In one study, results revealed that when participants judged faces on morphed emotional expressions (66% anger, 50/50, and 66% happiness), categorization of emotional expressions took longest when expressions were the most ambiguous, revealing an inverted *U*-shaped effect. In the gender categorization condition, the emotional expression of the face showed no impact on reaction time. Thus, fluency of emotionally ambiguous faces depended on the categorization task. Researchers concluded that the effect of emotional features influenced fluency, but only when participants were asked to focus on the emotional-specific task (Winkielman et al., 2015).

When addressing gender as a feature, the researchers found similar results when faces varied on the dimension of gender. Reaction times took longer when participants categorized race and gender-ambiguous faces by gender than when participants categorized race and gender-ambiguous faces based on race. In general, the disfluency that resulted from categorizing gender morphs based on gender revealed itself in the devaluation (measured as attractiveness and trustworthiness) of these faces. From these results, researchers concluded that not only do morphs of faces result in disfluency and devaluation, but also that this disfluency is dependent on the task at hand. The allocation of attention qualifies the disfluency experienced by the individual.

Gender-typicality and Hireability

Gender schemas, which are mental representations formed by an individual regarding the appropriateness of activities or behaviors for members of genders, may be used as guides for hiring professionals who deem a position appropriate for members of certain genders (Dinella, Fulcher, & Weisgram, 2014). Stockhausen et al. (2013) studied

the impact of an applicant's appearance, whether masculine or feminine, on the likelihood of being hired for roles that were masculine-typical or feminine-typical. In the first hypothesis, researchers assumed that masculine-looking applicants, regardless of sex, would be chosen more often for male-typical employment than feminine-looking applicants. Conversely, feminine-looking applicants would be chosen more often than masculine-looking applicants for positions that were female-typical. Secondly, researchers hypothesized that longer fixation times would occur for participants who viewed applicants whose appearances were gender-ambiguous, such as females who appeared masculine or males who appeared feminine. They also hypothesized these fixation times would impact hiring decisions. Support was found for both hypotheses in that candidates were chosen for gender-typical roles according to their masculine or feminine appearances and longer fixation times were found for those applicants whose appearances were gender-ambiguous (Stockhausen et al., 2013). These findings suggest there are social ramifications regarding face-typicality and hiring, especially when there is a lack of correspondence between the applicant's face gender and a gender-stereotyped job position.

It is likely that the disfluency described above stems from preconceived notions regarding social roles and gender roles. In the framework of social role theory, men and women are divided into societal roles that stem from shared expectations of the identity of what being a man or being a woman entails (Diekman & Goodfriend, 2006). Role congruity theory extends the notion of social role theory by positing that individuals belonging to certain groups are reacted to positively in terms of behavior that aligns with their perceived group membership or are sanctioned and viewed negatively when

behaviors are dissimilar to stereotypical qualities of group membership. These expectations include occupational roles, such as leadership. (Bosak & Sczesny, 2011). According to role congruity theory, men and women will internalize the concept of gendered norms in line with their beliefs of gender-appropriate goals, which can impact occupational goals (Barth, Guadagno, Rice, Eno, & Minney, 2015). Disfluency related to face gender may interrupt this process by producing negative affect in the peceiver. The likelihood to hire gender-ambiguous faces may be lowered due to this disfluency mechanism.

Current Study

Our first aim is to test the effects of cognitive fluency as it pertains to categorizing gender-ambiguous faces. Additionally, the effects of disfluency caused by gender-ambiguity on hiring decisions based on gender-stereotypical job roles will be examined. It is hypothesized that for gender-ambiguous faces, participants categorizing by face gender will exhibit longer latencies to categorize than those who categorize by race. This is a conceptual replication of findings from Winkelman et al. (2015) and Owen et al. (2016) and will reflect that disfluency results from gender when it is the task-relevant feature. Our second hypothesis is that gender-ambiguous faces will be deemed less hireable than their pure male and female counterparts, regardless of the gender-stereotype of the job. Because previous research has found gender-typicality to impact hireablity for male and female candidates, we aimed to expand on these findings within the realm of priming and gender stereotypes (Stockhausen et al., 2013). The current study intends to extend the knowledge of task-dependent fluency in gender ambiguity as it pertains to the perception of hireability of individuals. There are two objectives of this study. The first is

to understand the effects of cognitive fluency on decisions to hire. The second is to further explore the stereotyped roles ingrained in occupational sexism and how this may relate to the hireability of gender-ambiguous faces. Research in this area can help shed light on hiring decisions made involving faces that are ambiguous to categorization. Possible ramifications, such as devaluation stemming from the consideration of a gender-ambiguous person for a gender-stereotyped position, will also be explored. The results of this study can serve to enhance knowledge regarding existing theories about social-cognitive mechanisms of evaluation and the role that gender-ambiguity may play in determining a goodness-of-fit for individuals pursuing positions that may be influenced by stereotyped judgments. The implications of this research may add to existing literature in cognitive fluency of faces regarding ambiguous features as well as the devaluation of faces within the context of gender-stereotyped roles.

Method

Participants

Participants were 47 undergraduate students (37 female, 10 male) between the ages of 18 and 64, who participated for course credit through the University of South Florida St. Petersburg's Psychology participant pool. All participants reported normal or corrected-to-normal visual acuity. A large number of the participants were right-handed (40), followed by left-handed (5), and ambidextrous (2). The majority of participants were White (35), followed by those who identified as multiracial (5), Black (3), Hispanic or Latino (2), Arab or Middle Eastern (1), and one who declined to answer. Participants completed electronic informed consent before beginning the experimental session.

Stimuli

Stimuli consisted of 120 faces that were created from 12 pairs of male and female Asian faces and 12 pairs of male and female White faces. Images were taken from The Chicago Face Database and The MR2 Face Database (Strohminger, Gray, Chituc, Heffner, Schein, & Heagins, in press; Ma, Correll, & Wittenbrink, 2015) and were morphed using Morpheus Photo Mixer software v3.17 ("Morpheus Photo Mixer", 2016). The faces consisted of 24 pure male and female faces, 12 40% female faces, 12 50% female faces, and 12 60% female faces (half White, half Asian) for a total of 120 faces. Each task block (categorization, male stereotype job, female stereotype job) contained a different set of faces in order to avoid influence of familiarity on affective judgments. All images measured 3.2 inches wide and 3.2 inches high, were presented in color, and were displayed on the same uniform white background. The faces were cropped so that the inner facial features were salient, in an approximate oval. Examples of morphed faces appear in Appendix I.

Design

The experiment consisted of one between-subjects condition, face categorization (race or gender), and three within-subjects conditions of race (White or Asian), job gender stereotype (male or female), and percentage of gender morph (0% female, 40% female, 50% female, 60% female, and 100% female). The levels of the independent variable of gender morph served to demonstrate the disfluency effects of the ambiguous component (gender) when instructing participants to focus on gender. The race categorization condition served as a control variable in which these influences were not expected to occur. The dependent variables included fluency, which was measured as

reaction time (in milliseconds) to categorize facial images in the categorization block, probability to hire a face in hireability block, which was operationalized as a yes or no hiring decision, and certainty of hireability decision, measured using a 7-point Likert scale with 1 meaning *not at all certain* and 7 meaning *very certain*. [1]

Procedure

Participants were told that the aim of the study was to explore first impressions during hiring procedures and that they would be asked to play the role of a hiring manager for a large company. After informed consent was administered, participants were instructed to follow prompts on a computer for the duration of the study. The experiment was conducted and distributed using the online survey platform Qualtrics. In each block, images were presented on the screen until participants made their speeded responses using key presses.

Categorization task. Participants were randomly assigned to the race- or gender categorization condition and then viewed the first block of 40 images of faces in random order that included both White and Asian faces, which were purely male or female or morphed on the dimension of gender. Participants were asked to make categorization decisions as quickly as possible by pressing the corresponding keys on their keyboard. Participants in the gender categorization condition were instructed to indicate whether each face was male or female, while those in the race categorization condition were instructed to indicate whether each face was White or Asian. This task served to prime participants to focus on either the ambiguous feature of the face (gender) or the unambiguous, task-irrelevant feature (race).

[1.] Due to the limitations of time, reaction times for hiring decisions and ratings of decision certainty were not analyzed for this thesis but will be incorporated at a later date for publication.

Hireability task. After completion of the categorization task, participants then completed two blocks of a hireability task, counterbalanced across all participants. Each block consisted of an advertisement for a candidate containing a gender-stereotyped (male or female) description. Participants read the job description and were then shown 40 new gender-ambiguous and unambiguous faces in random order. Examples of gendered job descriptions can be found in Appendix II. Participants were instructed to answer "yes" or "no" by pressing corresponding keys on their keyboard as quickly as possible when the following question appeared on the screen: "Would you hire this person for the job?" Following this, participants indicated how certain they were about their decision using a 7-point Likert scale (1 = *not at all certain* to 7 = *very certain*). After the first block that included a job description and faces, participants were presented with the second job description and completed an identical procedure with the final block of 40 faces in random order. The experiment took approximately 20 minutes to complete.

Data Analysis

Fluency

Fluency was calculated as an average time to categorize faces (averaged across all 40 faces) during the categorization block. For reaction time data, trials in which response times were +/-3 *SD* from the average response time for that individual were removed from analysis. A total of 75 reaction times from the race categorization condition and 94 from the gender categorization condition were removed. After individual reaction times were removed, individuals were then excluded from further analysis if their average reaction times across all 40 trials were +/-3 *SD* from the average response times for all individuals in their respective condition. We excluded data entirely from 3 participants

from the gender condition who failed to classify faces within these time constraints. Average categorization condition reaction times were then compared between groups using an independent samples *t*-test.

Hireability

Probability to hire was analyzed using a 2 (face categorization: gender or race, between-subjects) x 2 (face race: White or Asian, within-subjects) x 2 (job gender stereotype: male or female, within-subjects) x 5 (percent of gender morph: ranging from 0% female to 100% female, within-subjects) mixed-model analysis of variance (ANOVA). All ANOVA tables can be found in Tables A8-A12 in Appendix III. Follow-up ANOVAs were conducted for each face categorization condition (gender, race) separately if significant three-way or four-way interactions were found with face categorization. Post-hoc analyses were conducted using Bonferroni corrections to test the above hypotheses. Homogeneity of variance was assessed using Levene's test. If violated, Welch's *F* statistic is reported. Sphericity was assessed using Mauchly's sphericity test. If violated, the Greenhouse-Geisser correction is reported. Alpha levels are set at .05 (excluding Bonferroni corrections). Only significant effects are reported; all findings can be seen in Tables A1-A7 in Appendix III.

Results

Fluency Manipulation Check

Verifying that the morphing procedure had the intended effect on the perception of an applicant's gender, results revealed significantly slower reaction times for those in the gender condition, $t(44) = 3.48$, $p = .001$. Means and standard deviations are depicted in Table A1. These results suggest that the task at hand had an effect on categorization of

faces. Specifically, our results suggest that when the task requires focus on a feature that is difficult to process, fluency is affected.

Hireability Results

Face categorization x job gender stereotype x face race x percentage of gender morph. Results from the forced choice hiring decisions revealed a significant three-way interaction between face categorization, job gender stereotypes, and gender moprh, $F(4, 180) = 3.64$, $p = .007$. This was supported by significant main effects of face categorization (race > gender), $F(1, 45) = 4.01$, $p = .051$, job gender stereotype (female > male), $F(1, 45) = 6.02$, $p = .018$, and percentage of gender morph, $F(2.76, 124.37) = 6.66$, $p < .001$. Faces that were 0% female ($M = 1.39$, $SD = 0.05$) were significantly less hireable than 50% female faces ($M = 1.37$, $SD = 0.04$), $p = .052$, and 60% female faces ($M = 1.32$, $SD = 0.04$), $p = .001$. Faces that were 60% female were significantly more hireable than 100% female faces ($M = 1.39$, $SD = 0.04$), $p = .004$.

An independent samples t-test was performed comparing the mean hireability of faces in each job gender stereotype for those in the gender categorization condition and race categorization condition. For the male job stereotype, participants in the race categorization condition ($M = 1.53$, $SD = 0.30$) rated Asian faces that were 40% female as more hireable compared to the gender categorization condition ($M = 1.20$, $SD = 0.31$), $t(45) = 3.70$, $p = .001$. Those in the race categorization condition ($M = 1.21$, $SD = 0.33$) also rated Asian faces that were 100% female as more hireable when compared to the gender categorization condition ($M = 1.42$, $SD = 0.39$), $t(45) = 2.04$, $p = .048$.

For the female job stereotype, those in the race categorization condition ($M = 1.19$, $SD = 0.33$) rated White faces that were 50% female more hireable than those in the

gender categorization condition (M = 1.38, SD = 0.29), $t(45) = 2.03$ p = .048. There was also a significant difference between the hireability of White 100% female faces in that participants in the race categorization condition (M = 1.34, SD = 0.37) rated these faces as more hireable than those in the gender categorization condition (M = 1.59, SD = 0.28), $t(45) = 2.56$, p = .014. 0% Asian female faces were rated more hireable in the race categorization condition (M = 1.16, SD = 0.31) compared to the gender categorization (M = 1.39, SD = 0.32), $t(45) = 2.50$, p = .016. 50% Asian female faces were also rated more hireable in the race categorization condition (M = 1.20, SD = 0.32) compared to the gender categorization condition (M = 1.39, SD = 0.26), $t(45) = 2.21$, p = .032. Finally, 100% female Asian faces were also rated more hireable by those in the race categorization condition (M = 1.22, SD = 0.32) compared to the gender categorization condition (M = 1.43, SD = 0.31), $t(45) = 2.31$, p = .026.

Gender categorization condition. For those in the gender categorization condition, there was a significant interaction between job gender stereotype and gender morph, $F(4, 84) = 3.93$, p = .006 (see Figure 1). This finding was supported by a significant main effect of percentage of gender morph, $F(2.62, 55.07) = 4.46$, p = .010, on probability to hire. Bonferonni post hoc analyses revealed that hiring probabilities across job gender stereotypes were lower for faces that were 100% female when compared to faces that were 60% female, p = .012. Probabilities to hire faces that were 0% female were lower than faces that were morphed 60% female, p = .012. See Table A2 for means and standard deviations.

In comparing hireability by job gender stereotype between percentage of gender morphs, participants were significantly more likely to hire faces that were 40% female for

the female stereotype job than the male stereotype job, $p = .001$. Participants were also more likely to hire faces that were 60% female for the female stereotype job than the male stereotype job, $p = .041$.

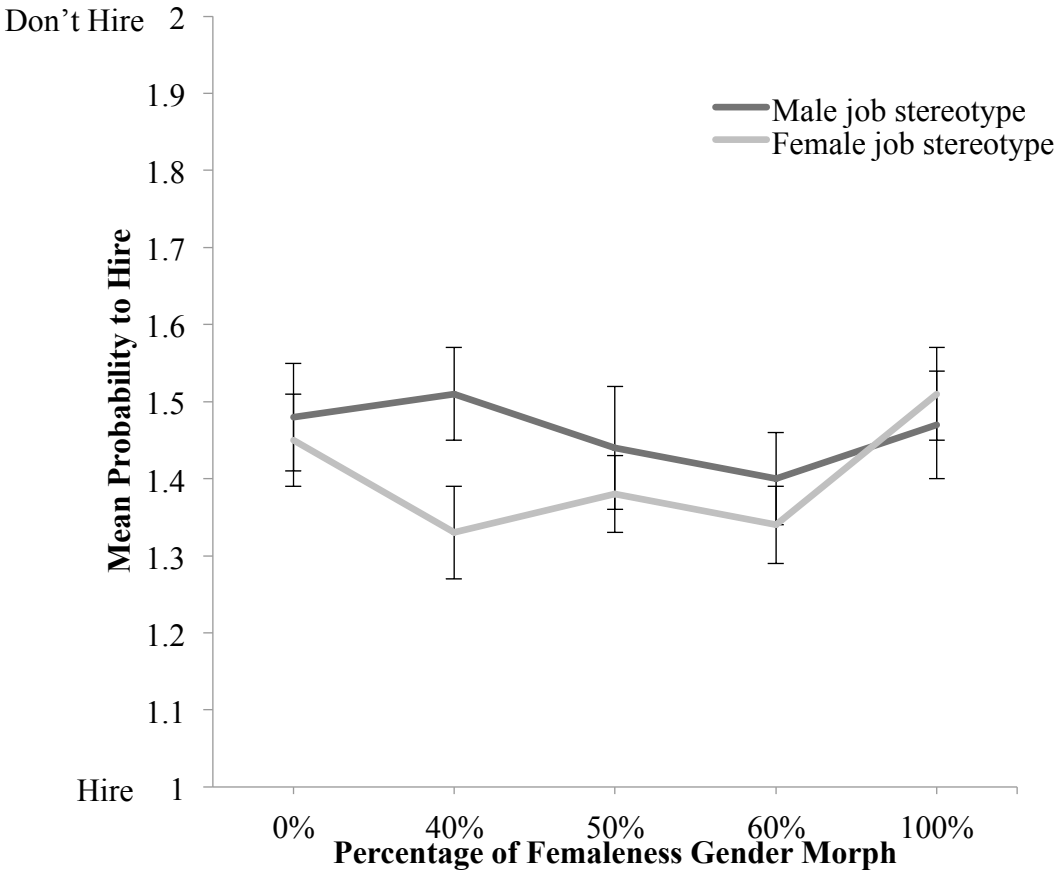

Figure 1. Gender Categorization Hireability by Job Gender Stereotype and Percentage of Gender Morph. Forced choice hiring decisions are represented as 1 = Yes and 2 = No.

Bonferonni post hoc analyses also revealed that when faced with a male stereotyped job description, participants rendered faces that were 40% female as less hireable than faces that were 60% female, $p = .004$. When faced with a female stereotyped job description, participants rendered faces that were 40% female as more hireable than faces that were 0% female, $p = .029$. Faces that were 60% female were also rendered more hireable than faces that were 0% female, $p = .039$. Faces that were 40%

female were rendered as more hireable than faces that were 100% female, $p = .008$. Faces that were 60% female were also rendered more hireable than faces that were 100% female, $p = .005$. See Table A3 for means and standard deviations.

Race categorization condition. For those in the race categorization task, there was also a significant interaction between stereotype and morph, $F(4, 96) = 3.27$, $p = .015$ (see Figure 2). This finding was supported by a significant main effect of morph on probability to hire, $F(2.60, 62.32) = 3.04$, $p = .042$. Results revealed that none of the follow up post hoc comparisons were significant. See Table A4 for means and standard deviations.

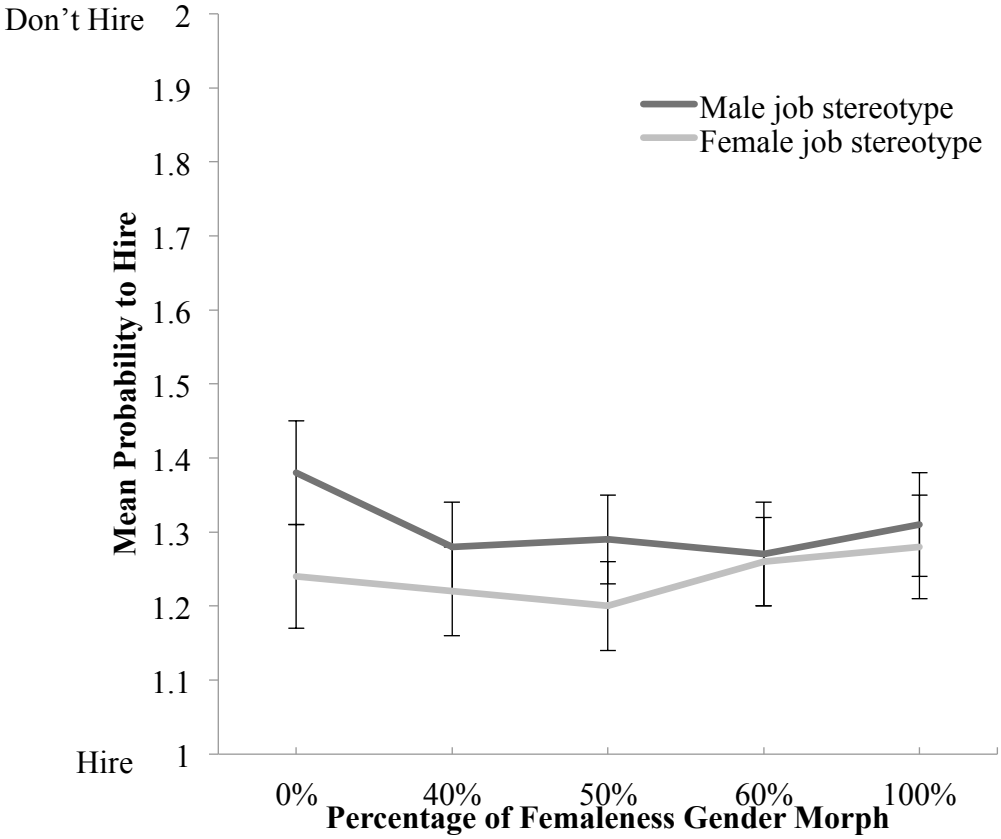

Figure 2. Race Categorization Hireability by Job Gender Stereotype and Percentage of Gender Morph. Forced choice hiring decisions are represented as 1 = Yes and 2 = No.

In comparing hireability by job gender stereotype between percentage of gender morphs, participants were more likely to hire faces that were 0% female for the female stereotype job than the male stereotype job, $p = .017$. Participants were also more likely to hire faces that were 50% female for the female stereotype job than the male stereotype job, $p = .028$. Means and standard deviations are depicted in Table A5.

Effects of Stimulus Face Race

There was also a significant three-way interaction between job gender stereotype, face race, and percentage of gender morph, which did not significantly interact with face categorization, $F(3.17, 142.83) = 6.05$, $p = .001$. This interaction was supported by a main effect of job gender stereotype (female > male), $F(1, 45) = 6.02$, $p = .018$, face race (White > Asian), $F(1, 45) = 7.19$, $p = .010$, and percentage of gender morph, $F(2.76, 124.37) = 6.66$, $p < .001$.

White faces. There was a significant interaction for White faces between job gender stereotype and percentage of gender morph, $F(4, 184) = 3.36$, $p = .011$ (see Figure 3). This finding was supported by significant main effects of job gender stereotype (female > male), $F(1, 46) = 4.41$, $p = .041$, and percentage of gender morph $F(3.14, 144.36) = 5.69$, $p < .001$. Overall, participants rated faces that were 100% female ($M = 1.46$, $SD = 0.05$) as significantly less hireable when compared to faces that were 60% female ($M = 1.36$, $SD = 0.05$), $p = .022$, 50% female ($M = 1.34$, $SD = 0.05$), $p = .008$, and 40% female ($M = 1.36$, $SD = 0.05$), $p = .021$.

Follow up post hoc comparisons revealed that for the female stereotype job, faces that were 50% female were more hireable than 0% female, $p = .009$. Faces that were

100% female were less hireable than 40% female (p = .001),, 50% female (p < .001), and 60% female (p = .001). Means and standard deviations are depicted in Table A6.

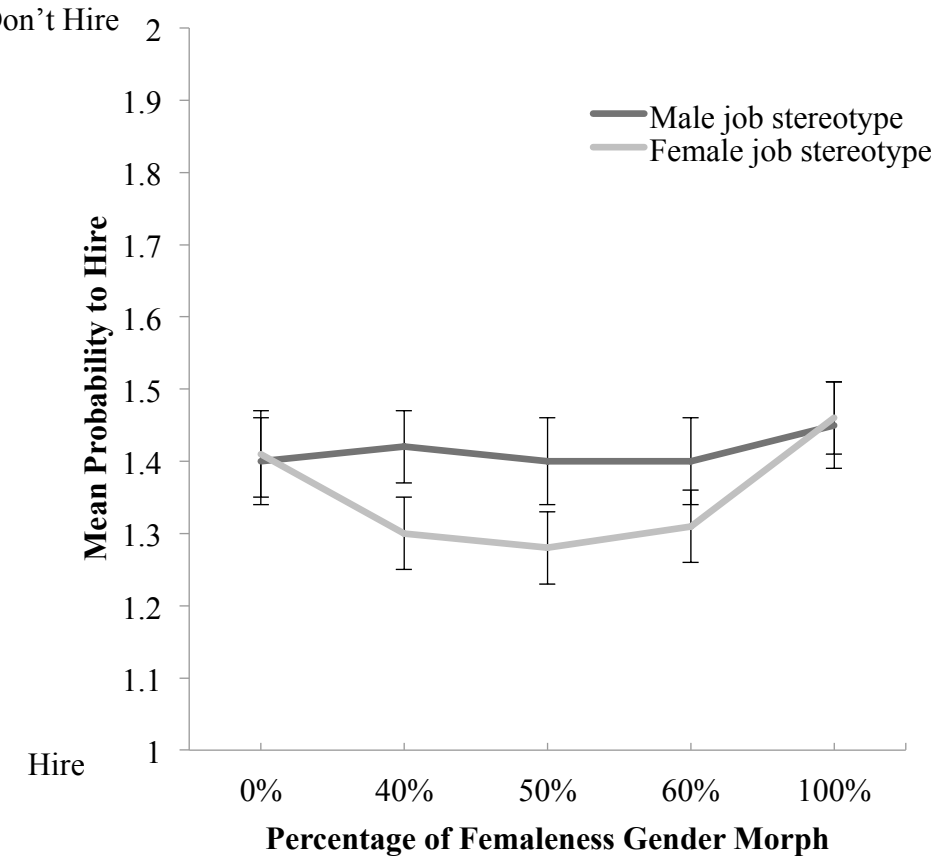

Figure 3. Hireability for White Faces by Job Gender Stereotype and Percentage of Gender Morph. Forced choice hiring decisions are represented as 1 = Yes and 2 = No.

Asian faces. There was a significant interaction for Asian faces between job gender stereotype and percentage of gender morph, $F(4, 184) = 6.19$, $p < .001$ (see Figure 3). This finding was supported by a significant main effect of percentage of gender morph $F(3.04, 139.97) = 4.12$, $p = .008$. Faces that were 0% female ($M = 1.36$, $SD = 0.05$) were rated significantly less hireable than faces that were 60% female ($M = 1.27$, $SD = 0.04$), $p = .007$.

Follow up post hoc comparisons revealed that for the male stereotype job, faces that were 0% female were less hireable than 50% female ($p = .007$), 60% female faces ($p < .001$), and 100% female ($p < .041$). Faces that were and 60% female were more hireable than faces that were 40% female ($p = .025$). Means and standard deviations are depicted in Table A7.

Figure 4. Hireability for Asian Faces by Job Gender Stereotype and Percentage of Gender Morph. Forced choice hiring decisions are represented as 1 = Yes and 2 = No.

Discussion

Our research had two aims: to replicate the findings of previous research that involved task-dependent fluency on ambiguous components and to extend these findings to illustrate the effects of fluency on decisions to hire, especially within gender-stereotypes. Using stimuli comprised of White and Asian faces morphed on the dimension of gender (100% male to 100% female), we found that focus on gender led to cognitive disfluency, as manifested in longer times to categorize faces when the task involved the ambiguous component of gender but not race. This demonstrates the transaction between evaluation and stimulus features in the context of the current task, supporting previous findings for task-dependent fluency (Winkielman et al., 2015).

Second, we aimed to demonstrate that devaluation would occur for gender-ambiguous faces, reflected in lower probabilities to hire when compared with faces that were purely male or purely female. Our results found that faces that were morphed on gender reflected higher probabilities to hire than non-ambiguous female faces or male faces for those in both face categorization tasks. In other words, when participants were primed to focus on the gender of the applicant, faces that were ambiguous on gender were deemed more hireable. Additionally, participants who were primed to focus on the non-ambiguous feature of race saw all faces as overall more hireable than those primed to focus on gender.

Face race also interacted with hireability, revealing that White and Asian faces both interacted with stereotype and gender morph. Asian faces in the male stereotype job

were more hireable than others when they reflected percentages that were heavier on the female dimension (for example, 0% female faces were less hireable than 50% female, 40% female, or 100% female). There were no significant comparisons in the context of the female stereotype job. For Asian faces, 0% female faces were rated the least hireable within the male stereotype job compared to other intermediate gender morphs. It appeared that Asian male faces were the most devalued for a job role desiring traits and skills stereotypically associated with being male. These findings are inconsistent with previous research that highlighted White male college students' perceptions of the stereotypes of Asians as hardworking and as the model minority (Cabrera, 2014).

White faces revealed the opposite: there were significant differences when comparing the hireability of morphs in the female stereotype job but not the male stereotype job. Faces that were 100% female were significantly less hireable than all other morphs, aside from 0% female faces. 0% female faces were also significantly less hireable than the most ambiguous gender morph (50% female). Our results revealed that within the female stereotype job, devaluation occurred for faces that were not ambiguous in gender, and were reflected in lower probabilities to hire. Interestingly, those who were asked to focus on race during the categorization task did not reveal significant comparisons of hireability between the five degrees of gender morphs.

Overall, our findings were not in support of our hypothesis that faces that are ambiguous on the dimension of gender would reveal lower probabilities to hire. It appears that the opposite was true for this study. Faces that were ambiguous were actually rated more hireable than unambiguous faces. Additionally, it appears that traditional gender roles did not impact the selection for appropriate applicants for the

gender-stereotyped job positions. The most hireable faces for the male stereotype job among Asian faces were those that were heavier on the female dimension. For White faces, faces that were heavier on maleness received higher ratings of hireablity for the female stereotype job than female faces.

We found that these hireability decisions were inconsistent with previous research, which highlighted the judgmental impact of morphed features as qualified by disfluency (Winkielman et al., 2015). Our research found that when faces were morphed on gender, causing disfluency, judgments related to these faces for those who were primed to focus on this ambiguity were not devalued. Instead, participants rated the hireability of these faces as much higher than male and female unambiguous faces. This implies that social evaluations reflect the larger processes occurring at multiple levels within human interaction, not just for hireability, but trustworthiness, attractiveness, and general liking, as previous research has suggested (Winkielman et al., 2015; Owen et al., 2016). Not only did devaluation not occur because of fluency in processing target faces, more importantly, the focus on the ambiguous did not produce these results. Similar to the findings from Owen et al. (2016) regarding faces morphed on both dimensions of gender and race, the participants in our study appeared to have enjoyed the morphed faces and chose to hire them more often. In our findings, gender-morphed faces received higher ratings of hireability regardless of job gender stereotype.

From our research, it was found that effects of disfluency influenced the amount of time to categorize faces based on the ambiguous dimension of gender. However, these disfluency effects were not found to spill over into the gendered job descriptions to impact hireablity. That is, the task of assigning membership of gender to faces

encountered, and the experienced difficulty of this process, did not negatively impact the evaluations of the target face. As our research suggests, the effects of disfluency may not impact hireability of these faces, especially when considering gendered job descriptions in which stereotyped judgments of gendered roles come into play. Though previous research reflected the applications of judgments in gender-ambiguous faces along other dimensions, our findings suggest that those who may possess competing visual features pertaining to both genders may not be adversely impacted in their perceived employability as job candidates. It appears that participants did not rely upon information from the gender-typicality of facial features and widely known social roles to gauge the lack of fit between the applicant's gender and the desired skills of candidate.

Despite advances regarding available categories to assign one's own gender, traditional gender roles and stereotypes may still impact previously held norms for the typicality of male and female faces, eliciting disfluency in the viewer. This will be important because of the obstacles that individuals face during in-person interviews for positions. Though their appearance may create difficulty in categorizing and perceiving gender, this does not seem to place these faces at a disadvantage. It appears that information other than a lack of correspondence between the job role and perceived gender of the applicant has an impact on hiring judgments for these individuals.

Limitations

The limitations to this research relate to the lab setting. Participants who view faces through images morphed on a computer screen may react differently than they would when faced with real gender-ambiguous individuals in-vivo. Follow-up studies regarding this realm could explore the interactions that participants engage in when faced

with interviewing a gender-ambiguous person and having to rely on social cues to interact appropriately with the target individual. However, evaluative judgments reported by participants in this regard may differ due to additional cues provided from the target. Interacting in-person may readily reveal appropriate gender categorization cues based on these interactions, an affordance which is not granted through computerized gender morphs. Further research could explore the interplay of social interactions and evaluative judgments in addition to categorizing individuals based on gender.

Another limitation to the study would be the effects of public policy and social desirability bias. Title VII forbids discrimination when it comes to any aspect of employment, including hiring and job assignments based on gender identity, sex, or sexual orientation. Participants may be more liberal in their hireability decisions in order to appear more egalitarian and law-abiding to our research team.

Regarding hireability, participants in this study may have used other indices for hiring based on the gendered job descriptions. For example, previous research has suggested that attractiveness or femaleness of faces impact other judgments (e.g. Owen et al., 2016; Winkielman et al., 2015). Because the images in this study were cropped to exclude ears and hair, participants may not have been able to correctly identify even the non-ambiguous male and female faces. This could have impacted the likelihood to hire these faces within a gendered stereotype context. Participants may have also rated faces on their hireability based on the perceived salary of each of the job positions and not on the correspondence of facial appearance to their implied gender stereotypes.

Summary and Future Directions

The implications of what our research has added to the realm of social psychology include evidence of links that exists between what is perceived to be ambiguous, thus difficult to process, and that this disfluency speaks to the context in which the perceiver is exposed. The context and goal of the perceiver adds to the psychological experience of the ambiguous, and therefore, generates an overall negative evaluation of the target on some dimensions of judgments but not others. Our findings add to the existing research on the phenomenon of ambiguity, disfluency, cognition, and social evaluations. Future directions may explore the impact that attractiveness has on the hireability of these faces. Additionally, providing feedback for participants on whether or not they were correct in identifying male and female faces may be used to gauge the extent to which these categorizations of gender impacted the correspondence of facial features to gendered job positions. Because our research did not align with previous findings regarding a matching process between face-typicality and gendered job descriptions (e.g. Stockhausen et al, 2013), future research may wish to explore the extent to which the perceiver assesses the correspondence between facial features of applicants and job positions.

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Appendix I:

Morphed Faces

Appendix I: Morphed Faces

Asian Faces

0% Female

40% Female

50% Female

60% Female

100% Female

White Faces

0% Female

40% Female

50% Female

60% Female

100% Female

Appendix II:

Job Descriptions

Appendix II: Job Descriptions

Male Stereotype Job Description

Dear applicant,

Thompson & Wallace Inc. are seeking full-time employment for a qualified applicant who displays skills in **leadership** and **employee management**. The ideal candidate will possess the skills required in order to be an **aggressive, numbers-driven analytic, who can meet the high expectations set by our company**. The candidate will **work well under pressure, possess logical and mathematical skills, and express an authoritative demeanor for success**. If you feel you are a **dominant** and **self-confident** employee able to take on **leadership roles**, please contact our office today to schedule an interview.

Female Stereotype Job Description

Dear applicant,

Thompson & Wallace Inc. are seeking full-time employment for a qualified applicant who displays skills in **cooperation** and **effective communication**. The ideal candidate will possess the skills required in order to be a **team player, socially competent, and who can meet the expectations of cohesiveness and team-oriented behavior as set by our company**. The candidate will **work well with others**, possess an **easy going and agreeable disposition**, and express a desire to **maintain organization and cleanliness**. If you feel you are an **easy to get along with and conflict-avoiding employee who is able to take on teamwork roles**, please contact our office today to schedule an interview.

Appendix III:

Tables

Appendix III: Tables

Table A1

Mean Reaction Times (in Milliseconds) to Categorize Faces by Categorization Task

Categorization	N	*M*	*SD*
Gender	21	1152.10	302.05
Race	25	876.60	235.20

Table A2

Mean Probability in Gender Categorization Condition By Gender Morph

Target	*M*	*SD*
0% Female	1.47	0.06
40% Female	1.42	0.05
50% Female	1.41	0.06
60%Female	1.37	0.05
100% Female	1.49	0.06

Table A3

Mean Probability to Hire in Gender Categorization Condition By Stereotype and Morph

	Gender Categorization Condition			
	Male Stereotype		Female Stereotype	
Target	*M*	*SD*	*M*	*SD*
100% Male	1.48	0.07	1.45	0.06
60%Male/40%Female	1.51	0.06	1.33	0.06
50%Male/Female	1.44	0.08	1.38	0.05
40%Male/60%Female	1.40	0.06	1.34	0.05
100% Female	1.47	0.07	1.51	0.06

Table A4

Mean Probability in Race Categorization Condition By Gender Morph

Target	*M*	*SD*
0% Female	1.31	0.06
40% Female	1.25	0.06
50% Female	1.24	0.06
60%Female	1.26	0.06
100% Female	1.29	0.07

Appendix III: Tables (Continued)

Table A5

Mean Probability to Hire in Race Categorization Condition By Stereotype and Morph

	Race Categorization Condition			
	Male Stereotype		Female Stereotype	
Target	*M*	*SD*	*M*	*SD*
100% Male	1.38	0.07	1.24	0.07
60%Male/40%Female	1.28	0.06	1.22	0.06
50%Male/Female	1.29	0.06	1.20	0.06
40%Male/60%Female	1.27	0.07	1.26	0.06
100% Female	1.31	0.07	1.28	0.07

Table A6

Effects of Stimulus Face Race on Hireability for White Faces

	Male Stereotype		Female Stereotype	
Morph	*M*	*SD*	*M*	*SD*
100% Male	1.40	0.06	1.41	0.06
60%Male/40%Female	1.42	0.05	1.30	0.05
50%Male/Female	1.40	0.06	1.28	0.05
40%Male/60%Female	1.40	0.06	1.31	0.05
100% Female	1.45	0.06	1.46	0.05

Table A7

Effects of Stimulus Face Race on Hireability for Asian Faces

	Male Stereotype		Female Stereotype	
Morph	*M*	*SD*	*M*	*SD*
100% Male	1.46	0.06	1.27	0.05
60%Male/40%Female	1.36	0.05	1.24	0.05
50%Male/Female	1.31	0.05	1.29	0.05
40%Male/60%Female	1.26	0.05	1.28	0.04
100% Female	1.31	0.05	1.32	0.05

Appendix III: Tables (Continued)

Table A8

Four-Way Analysis of Variance of Face Categorization x Job Gender Stereotype x Face Race x Percentage of Gender Morph

Source	*SS*	*df*	*MS*	*F*	*p*
Between-Subjects Summary					
Face categorization	6.07	1.00	6.07	4.01*	.051
Error (Between)	68.12	45.00	1.51		
Within-Subjects Summary					
Job gender stereotype	0.86	1.00	0.86	6.02*	.018
Face categorization x Job gender stereotype	0.10	1.00	.010	.068	.796
Error(Job gender stereotype)	6.42	45.00	.143		
Face Race	1.20	1.00	1.20	7.19*	.010
Face Race x Face categorization	0.24	1.00	0.24	1.43	.238
Error(Face Race)	7.53	45.00	0.17		
Percentage of gender morph	0.96	2.76	0.35	6.66**	.000
Percentage of gender	0.20	4.00	0.50	1.40	.236

morph x Face categorization					
Error(Percentage of gender morph)	6.46	124.37	0.05		
Job gender stereotype x Face race	2.26	1.00	2.26	0.00	.987
Job gender stereotype x Face race x Face categorization	0.25	1.00	0.25	2.83	.100
Error(Job gender stereotype x Face Race)	3.97	45.00	0.09		
Job gender stereotype x Percentage of gender morph	0.48	4.00	0.12	4.01**	.004
Face categorization x Job gender stereotype x Percentage of gender morph	0.43	4.00	0.11	3.64**	.007
Error (Job gender stereotype x morph)	0.44	4.00	0.11	3.64**	.007
Face race x Percentage of gender morph	0.34	4.00	0.08	3.18*	.015

Face categorization x Percentage of gender morph x Face race	0.05	4.00	0.01	0.47	.762
Error(Face race x Percentage of gender morph)	4.77	180.00	0.03		
Job gender stereotype x Face race x Percentage of gender morph	0.74	3.17	0.23	6.05**	.001
Face categorization x Job gender stereotype x Face race x Percentage of gender morph	0.06	4.00	0.01	0.46	.765
Error(Job gender stereotype x Face race x Percentage of gender morph)	5.47	142.83	0.04		

Note. * indicates $p < .05$; ** indicates $p < .01$.

Table A9

Two-Way Analysis of Variance of Job Gender Stereotype by Percentage of Gender Morph for Face Categorization of Gender Condition

Source	*Type SS*	*df*	*MS*	*F*	*p*
Job gender stereotype	0.32	1.00	0.32	2.39	.137
Error(Job gender stereotype)	2.84	21.00	0.14		
Face race	0.17	1.00	0.17	1.90	.183
Error(Face race)	1.92	21.00	0.09		
Percentage of gender morph	0.77	2.62	0.30	4.46*	.010
Error(Percentage of gender morph)	3.65	55.07	0.07		
Job gender stereotype x Face race	0.12	1.00	0.12	0.85	.367
Error(Job gender stereotype x Face race)	2.95	21.00	0.14		
Job gender stereotype x Percentage of gender morph	0.60	4.00	0.15	3.93**	.006
Error (Job gender stereotype x Percentage of gender morph)	3.19	84.00	0.04		
Face race x Percentage of gender morph	0.26	4.00	0.06	1.85	.128

Error(Face race x Percentage of gender morph)	2.91	84.00	0.04		
Job gender stereotype x Face race x Percentage of gender morph	0.50	4.00	0.13	3.13*	.019
Error(Job gender stereotype x Face race x Percentage of gender morph)	3.37	84.00	0.04		

Note. * indicates $p < .05$; ** indicates $p < .01$.

Table A10

Two-Way Analysis of Variance of Job Gender Stereotype by Percentage of Gender Morph for Face Categorization of Race Condition

Source	*Type SS*	*df*	*MS*	*F*	*p*
Job gender stereotype	0.56	1.00	0.56	3.76	.064
Error(Job gender stereotype)	3.58	24.00	0.15		
Face race	1.34	1.00	1.34	5.75*	.025
Error(Face race)	5.60	24.00	0.23		
Percentage of gender morph	0.36	2.60	0.14	3.04*	.042
Error(Percentage of gender morph)	2.81	62.32	0.05		
Job gender stereotype x Face race	0.13	1.00	0.13	3.09	.092
Error(Job gender stereotype x Face race)	1.02	24.00	0.04		
Job gender stereotype x Percentage of gender morph	0.30	4.00	0.08	3.27*	.015
Error (Job gender stereotype x Percentage of gender morph)	2.19	96.00	0.02		
Face race x Percentage of gender morph	0.12	4.00	0.03	1.58	.187
Error(Face race x Percentage of	1.87	96.00	0.02		

gender morph)					
Job gender stereotype x Face race x Percentage of gender morph	0.28	2.54	0.11	3.14*	.039
Error(Job gender stereotype x Face race x Percentage of gender morph)	2.10	60.99	0.03		

Note. * indicates $p < .05$; ** indicates $p < .01$.

Table A11

Two-Way Analysis of Variance of Job Gender Stereotype by Percentage of Gender Morph for White Faces

Source	*SS*	*df*	*MS*	*F*	*p*
Job Gender Stereotype	0.46	1.00	0.46	4.41*	.041
Error(Stereotype)	4.83	46.00	0.11		
Percentage of Gender Morph	0.83	3.14	0.27	5.69**	.001
Error(Percentage of gender morph)	6.72	144.36	0.05		
Job Gender Stereotype x Percentage of Gender Morph	0.41	4.00	0.10	3.36*	.011
Error (Job gender stereotype x Percentage of gender morph)	5.62	184.00	0.03		

Note. * indicates $p < .05$; ** indicates $p < .01$.

Table A12

Two-Way Analysis of Variance of Job Gender Stereotype by Percentage of Gender Morph for Asian Faces

Source	*SS*	*df*	*MS*	*F*	*p*
Job Gender Stereotype	0.41	1.00	0.41	3.26	.078
Error(Job gender stereotype)	5.82	46.00	0.13		
Percentage of Gender Morph	0.43	3.04	0.14	4.12**	.008
Error(Percentage of gender morph)	4.76	139.97	0.03		
Job Gender Stereotype x Percentage of Gender Morph	0.77	4.00	0.19	6.19**	.000
Error (Job gender stereotype x Percentage of gender morph)	5.72	184.00	0.03		

Note. * indicates $p < .05$; ** indicates $p < .01$.