FACIAL CUES TO RACE AND GENDER INTERACTIVELY GUIDE AGE JUDGMENTS

David J. Lick
New York University

Kerri L. Johnson
University of California, Los Angeles

Social identities are inherently intersectional, and some of these intersections bias social perception. For example, overlapping stereotypes about race and gender categories enable perceivers to efficiently judge Black targets as male and Asian targets as female. Here, we extend these intersections to a third fundamental social category dimension—age. Two studies revealed that facial cues to race and gender interactively guide age judgments, such that Black targets are judged to be masculine and therefore older whereas Asian targets judged to be feminine and therefore younger than age-matched White controls. These effects were most pronounced for male targets, which is consistent with affordance theories proposing that intersecting race, gender, and age cues are particularly salient for men due to stereotypical associations with threat. Collectively, the present findings provide new theoretical information and highlight future research directions related to intersectional categories in social perception.

Keywords: intersectionality, social categorization, age perception, gendered race

Maso Mizutani is 47 years old, yet she has been nicknamed "Japan's Lady of Eternal Youth" for her deceptively girlish appearance (Navales, 2014). Korean-born Jung Daue Yeon shares a similar story: A middle-aged woman, she has captured public attention for looking 20 years younger than her true age (AsiaOne, 2013). It is interesting to note that both women have Asian heritage. Indeed, a cursory Internet search returns numerous articles drawing links between race categories

and apparent age. With titles such as "Why Do Asians Look So Young Sometimes? Or Most of the Time?" (Kwong, 2013), these pieces highlight a widespread belief that the category Asian is synonymous with youth.

Stereotypic associations linking race and age are not limited to Asian individuals; similar beliefs operate for Black individuals, albeit in the opposite direction. One representative example surfaced after the murder of 17-year-old Trayvon Martin. In the wake of the tragedy, a viral e-mail mistakenly identified 32-year-old rapper Jayceon Terrell Taylor ("Game") as Trayvon (Robison, 2013). Assailant George Zimmerman also claimed to have misjudged Trayvon's age, stating: "I thought he was a little bit older than I was" (Stebner & Cox, 2012). In fact, Zimmerman was 29 years old at the time of the shooting, more than 10 years Trayvon's senior.

Although there is strong anecdotal support for an association between race categories and age judgments, empirical evidence remains sparse (Rhodes, 2009). The current studies aim to fill this gap in the literature. We draw upon recent theory to test whether and how people use intersectional social category information to inform their judgments of others' ages. Specifically, we propose that gendered facial cues link certain race categories to certain age groups, with Black faces being perceived as masculine and therefore older but Asian faces being perceived as feminine and therefore younger than others. If true, intersecting facial cues of race and gender may result in biased age categorizations that have gone largely unexplored before now.

INTERSECTIONAL INFLUENCES ON SOCIAL CATEGORIZATION

Categorization is a fundamental process in social cognition (Allport, 1954). Perceivers reliably sort others into social groups after brief (Ito & Urland, 2003) or even subliminal exposures (Macrae & Martin, 2007). Although fleeting, these social category judgments are important because they guide downstream impression formation and prejudice expression (Fiske & Neuberg, 1990). For these reasons, the proximal mechanisms underlying social categorization continue to be a central topic of psychological research (Johnson, Lick, & Carpinella, 2015).

Most early work on social categorization examined category dimensions in isolation from one another. For example, research on the automaticity of social categorization explored perceivers' tendency to make within-category identification errors in the "Who Said What" paradigm with regard to sex when all targets were White, or with regard to race when all targets were male (Taylor, Fiske, Etcoff, & Ruderman, 1978). Subsequent work followed suit, with researchers frequently exploring one type of social categorization while holding other dimensions constant (Ito, Thompson, & Cacioppo, 2004; Kurzban, Tooby, & Cosmides, 2001; Macrae, Bodenhausen, Milne, Thorn, & Castelli, 1997). This approach was useful because it provided tight experimental control, yielding valuable insights about the psychological mechanisms contributing to social category judgments (Macrae & Bodenhausen, 2000).

Contributions notwithstanding, early approaches belied the fact that social categories are inherently intersectional, with people occupying multiple identities at once (Cole, 2009; Purdie-Vaughns & Eibach, 2008). It has become increasingly clear that these intersections have important implications for the dynamics and outcomes of social categorization. For example, Zárate and Smith (1990) found that female targets were categorized more quickly than male targets in terms of their sex but male targets were categorized more quickly than female targets in terms of their race when both categories varied simultaneously. Stroessner (1996) found that perceivers categorized targets with two non-dominant identities (e.g., Black female) more efficiently than targets with two dominant identities (e.g., White male). Thus, unique patterns emerged when perceivers judged targets varying along multiple identity dimensions at once.

More recent work has probed the specific mechanisms by which intersecting identities affect social perception, revealing overlap in peoples' beliefs about sex, gender, and race categories. These studies make an important distinction between *sex*, which refers to biologically determined categories (i.e., male and female), and *gender*, which refers to socially constructed norms for behavior and appearance (i.e., masculine and feminine; Deaux, 1985). Most studies have focused on how facial gender—that is, the relative masculinity or femininity of a person's appearance—biases other social category judgments. For example, several studies have shown that race and gender stereotypes are highly correlated. Black individuals of both sexes are thought to be relatively masculine whereas Asian individuals of both sexes are thought to be relatively feminine (Carpinella, Chen, Hamilton, & Johnson, 2015; Goff, Thomas, & Jackson, 2008; Johnson, Freeman, & Pauker, 2012). These overlaps extend to physiognomy, such that Black faces of both sexes tend to have relatively masculine features whereas Asian faces of both sexes tend to have relatively feminine features (Carpinella et al., 2015; Johnson et al., 2012). The intersectionality of race and gender is even apparent at the neural level, where multivariate patterns of brain activity associated with the category Black are more like those associated with the category male than the category female (Stolier & Freeman, 2016). Ultimately, the combination of bottom-up physical similarities and top-down stereotypes about race and gender allows perceivers to categorize Black male targets and Asian female targets with high efficiency (Carpinella et al., 2015; Johnson et al., 2012).

Although the above studies focused primarily on the two-way overlap between race and gender, the concept of intersectionality is considerably broader. For example, studies have shown that overlapping race and gender cues also guide emotion perception. Stereotypically masculine expressions (e.g., anger) are detected earlier on Black male faces than on White male faces (Hugenberg & Bodenhausen, 2003), and perceivers are more likely to categorize ambiguous-race men as Black when they display angry expressions as opposed to happy expressions (Hugenberg & Bodenhausen, 2004). Other work has documented overlap in explicit stereotypes and neural representations for the categories Black/male/angry and the categories Asian/female/happy (Stolier & Freeman, 2016). Beyond relatively basic social

category judgments, overlapping race and gender cues also guide higher-level behavioral judgments. In one series of studies, perceivers believed Black gay men were likely to be insertive sexual partners (a traditionally masculine role) whereas Asian gay men were likely to be receptive sexual partners (a traditionally feminine role) due to their gendered facial appearances (Lick & Johnson, 2015).

Contemporary research has thus begun to probe how intersecting category cues impact social judgments. The work has focused primarily on the two-way intersection of race and gender, although recent studies have extended the findings to include emotion categories and behavioral tendencies as well. Still, notably absent from the intersectionality literature are studies of biological age. This omission seems surprising because age is considered a fundamental dimension along which people categorize others (Quinn & Macrae, 2005). Indeed, age cues are readily apparent in both the face and body, and perceivers use these cues to draw inferences about the personalities, traits, and behaviors of others (Montepare & Zebrowitz, 1998). At present, we have a limited understanding of whether and how age judgments are constrained by the other social categories to which a person belongs.

PRELIMINARY EVIDENCE LINKING AGE JUDGMENTS TO RACE AND GENDER

Although we are not aware of studies formally linking race, gender, and age judgments, some existing evidence suggests that two-way overlaps exist between gender/age and between race/age. Regarding the former, it has been established that feminized faces appear younger than masculinized faces (Perrett et al., 1998) and that older targets are rated as more masculine than younger targets (Powlishta, 2000). Moreover, adults with childlike facial features tend to be ascribed personality traits stereotypically associated with femininity (e.g., warmth, submissiveness) whereas adults with mature facial features tend to be ascribed personality traits stereotypically associated with masculinity (e.g., dominance, physical strength; Berry & McArthur, 1986; McArthur & Apatow, 1983–1984). Altogether, these findings suggest some degree of overlap among the facial cues signaling gender and age.

The overlap of race and age is more tenuous, although some recent studies have documented suggestive effects for Black men. In one series of studies, perceivers exhibited a biased tendency to evaluate young Black men as appearing older and less innocent than young White men (Goff, Jackson, Di Leone, Culotta, & DiTomasso, 2014). In another, priming participants with Black as opposed to White juvenile offenders caused them to believe the offenders were more adult-like and therefore more deserving of criminal punishment (Rattan, Levine, Dweck, & Eberhardt, 2012). These studies provide preliminary evidence that race and age perceptions are tethered to one another, although the findings are currently limited to perceptions of Black men. A full test of intersectionality among race and age judgments awaits further study.

THE CURRENT RESEARCH

In summary, both anecdotal and empirical sources suggest there are intersectional links between race and gender (Asian = feminine, Black = masculine), between gender and age (feminine = younger, masculine = older), and between race and age (Asian = younger, Black = older). To date, however, the simultaneous overlap of all three factors remains untested. Because people naturally occupy many categories at the same time, extending recent insights beyond simple two-way intersections is a logical next step for intersectionality research. We explored such multidimensional overlap in two studies. Based on existing research, we hypothesized that race cues and age cues contain similarly gendered information, creating overlap among the categories Black/masculine/older and among the categories Asian/feminine/younger. If correct, Black targets might be perceived as relatively older while Asian targets might be perceived as relatively younger than age-matched White targets due to their gendered facial appearance.

STUDY 1

Study 1 tested whether facial cues to race and gender interactively guide age judgments. We hypothesized that feminine cues conveyed by Asian faces would make them appear relatively younger whereas masculine cues conveyed by Black faces would make them appear relatively older than others.

METHOD

Participants. Eighty-five Internet users completed the study (M_{Age} = 34.28 years, 51% male, 93% straight, 72% White). We determined our target sample size a priori based on those in previously published work on age perception. Although it is difficult to calculate statistical power for nested designs, we used the method described by Westfall, Kenny, and Judd (2014) to provide a rough estimate. According to their formulae, a nested design with 85 participants rating 200 stimuli provided over 90% power to detect small-to-medium sized effects (d = 0.35).

Stimuli. Stimuli included 200 faces drawn from an existing database (Johnson et al., 2012). The faces were created with FaceGen computer software, which estimates phenotypic features based upon several hundred three-dimensional scans of human faces (Blanz & Vetter, 1999). Researchers began by setting all phenotypic features—including age—at the anthropometric average for the FaceGen database and randomly generating 40 unique identities that varied by sex (20 male, 20 female). Each identity was then morphed along a 5-point continuum using FaceGen's race morph tool (*Very Black, Slightly Black, White, Slightly Asian, Very Asian*). Gender (i.e., masculinity/femininity) and age (i.e., younger/older) cues were allowed to vary freely according to the features of Black, White, and Asian targets in FaceGen's database. Thus, if Black faces in the database appeared more masculine

FIGURE 1. Sample stimuli from Study 1, depicting unique male and female identities morphed along a race continuum from Asian (left) to White (center) to Black (right).

or older than Asian faces, this variability would be captured by the race morphing procedure. All images were standardized for size and cropped to remove hair cues prior to testing (Figure 1).

Procedure. We recruited Mechanical Turk users for a study about their perceptions of other people, with no mention of race, gender, age, or intersectionality. After providing consent, participants viewed 200 faces in random order and judged the apparent age of each one on a continuous scale ranging from 15 years old to 75 years old. Participants received as much time as necessary to render judgments. Upon completion, they reported demographic information and were debriefed about the study aims.

RESULTS

We report all data exclusions, all manipulations, and all measures in the results that follow. Because each perceiver evaluated multiple faces, judgments were nested within participant. This data structure breaks the independence assumption of the general linear model, allowing judgments from the same participant to be correlated with one another. Analyzing nested data with traditional regression or ANOVA approaches results in downwardly biased standard errors and overly liberal inferences. To avoid these issues, we tested our hypotheses using random coefficient multilevel models. The models included random intercepts and random slopes for all predictors, which correct for within-subject correlations in response patterns and provide unbiased statistical inferences (Snijders & Bosker, 2012). Although we included random effects to account for the nested design, we were specifically interested in the fixed portion of each model, which describes effects for the overall sample. All models specified a normal distribution for the outcome variable, Satterthwaite degrees of freedom, and full information maximum likelihood (FIML) estimation.

Consistent with prior research (Johnson et al., 2012), we treated Target Race as a 5-level continuous variable based on the race morph continuum used to generate the faces (-2 = *Very Asian, -1 = Slightly Asian, 0 = White, 1 = Slightly Black, 2 = Very Black*).[1] Although previous research revealed correlations between facial cues to race and gender, these cues are not perfectly collinear, so we could not rely on the race morph values as indicators of gendered appearance. Instead, we measured Target Gender by uploading each stimulus into FaceGen and recording its placement along the 81-point gender morph continuum (*-40 = Very Masculine, 0 = Androgynous, 40 = Very Feminine*). We should reiterate that this is a measure of gender, or the relative masculinity or femininity of each face. In addition to gender, we coded Target Sex based on the sex category of the original identity used to create each morph (*-0.5 = Male, 0.5 = Female*). The distinction between sex and gender is important because gendered cues vary within sex categories, such that people can appear relatively masculine or relatively feminine compared to other members of the same sex. Although our hypotheses pertained mostly to the intersection of race, age, and gender (i.e., masculinity/femininity), we also tested whether target sex moderated any of the observed effects. We report all significant interactions in the results below.

This study was designed specifically to test intersectionality among facial cues of race, gender, and age. We did not generate hypotheses about potential perceiver-level moderators, nor were our studies appropriately powered to test higher-level interactions between the target's appearance and the perceiver's own social categories. Nevertheless, on the request of an anonymous reviewer, we conducted exploratory moderator analyses of Perceiver Age and Perceiver Sex. Of all possible interactions, only two perceiver effects emerged, which we hesitate to interpret strongly because they were not predicted in advance. We omit these analyses for the sake of brevity, but are happy to share them upon request.

Preliminary Analysis of Target Sex. Before testing our primary hypotheses, we sought to replicate a well-documented effect wherein women are perceived as younger than men. We did so by regressing Perceived Age onto Target Sex. Participants judged women to be about 3 years younger than men on average, $B = -2.66$, $SE = 0.54$, $t = -4.93$, $p < .001$, 95% CI [-3.73, -1.58] (Table 1).

Intersection of Race and Age. We then tested the intersection of race and age by regressing Perceived Age onto Target Race. As predicted, targets were perceived to be younger as they morphed from Black to White to Asian, $B = -0.31$, $SE = 0.07$, $t = -4.41$, $p < .001$, 95% CI [-0.46, -0.17]. This effect was qualified by a two-way interaction with Target Sex, $B = 0.57$, $SE = 0.12$, $t = 4.81$, $p < .001$, 95% CI [0.34, 0.81] (see Figure 2a). We decomposed the interaction by examining simple slopes for race within each sex category. Centered among male faces, the simple slope of Target Race was significant, indicating that male targets were perceived to be younger as they morphed from Black to White to Asian, $B = -0.60$, $SE = 0.07$, $t = -8.08$, $p < .001$,

---

1. The same pattern emerged when we analyzed Target Race categorically. We present findings with continuous coding here to remain consistent with prior work using the same stimuli (Johnson et al., 2012).

TABLE 1. Means and Standard Deviations for Perceived Age and Actual Age as a Function of Target Race and Target Sex in Studies 1–2

Target Race	Target Sex	Perceived Age–Study 1	Actual Age–Study 2	Perceived Age–Study 2
Black				
	Male	35.89(6.92)	25.40(2.22)	29.53(6.22)
	Female	32.49(8.28)	24.90(3.45)	27.59(6.77)
	Overall	34.19(7.81)	25.15(2.83)	28.58(6.57)
White				
	Male	35.75(6.64)	26.30(1.89)	28.53(5.72)
	Female	32.39(8.13)	25.20(3.08)	28.70(7.40)
	Overall	34.08(7.60)	25.75(2.55)	28.62(6.61)
Asian				
	Male	34.35(6.58)	25.00(2.58)	25.84(4.41)
	Female	32.76(8.56)	26.50(2.01)	25.87(6.03)
	Overall	33.56(7.67)	25.75(2.38)	25.85(5.28)
Overall				
	Male	35.25(6.76)	25.57(2.24)	27.97(5.72)
	Female	32.58(8.36)	25.53(2.90)	27.39(6.86)
	Overall	33.92(7.72)	25.50(2.57)	27.68(6.32)

95% CI [-0.75, -0.45]. Centered among female faces, the simple slope of Target Race was not significant, $B = -0.03$, $SE = 0.09$, $t = -0.31$, $p = .758$, 95% CI [-0.21, 0.15].

Intersection of Race and Gender. Next, we tested the intersection of race and gender by regressing Target Gender onto Target Race. Replicating prior work, targets' facial features became increasingly feminine as they morphed from Black to White to Asian, $B = 0.87$, $SE = 0.13$, $t = 6.85$, $p < .001$, 95% CI [0.62, 1.11]. This effect was qualified by a two-way interaction with Target Sex, $B = 0.32$, $SE = 0.03$, $t = 11.17$, $p < .001$, 95% CI [0.26, 0.38]. The simple slope of Target Race was significant and directionally consistent for both sexes, but was stronger for men, $B = 1.14$, $SE = 0.02$, $t = 56.29$, $p < .001$, 95% CI [1.10, 1.18], than for women, $B = 0.83$, $SE = 0.02$, $t = 40.99$, $p < .001$, 95% CI and [0.79, 0.86].

Intersection of Gender and Age. We tested the intersection of gender and age by regressing Perceived Age onto Target Gender. As expected, targets with feminine facial features were perceived to be younger than targets with masculine facial features, $B = -0.06$, $SE = 0.01$, $t = -5.23$, $p < .001$, 95% CI [-0.08, -0.04]. This effect was qualified by a two-way interaction with Target Sex, $B = 0.25$, $SE = 0.03$, $t = 8.40$, $p < .001$, 95% CI [0.19, 0.31] (Figure 2b). The simple slope of Target Gender was significant and directionally consistent for both sexes, but it was stronger for men, $B = -0.36$, $SE = 0.02$, $t = -14.90$, $p < .001$, 95% CI [-0.41, -0.31], than for women, $B = -0.11$, $SE = 0.02$, $t = -4.40$, $p < .001$, 95% CI [-0.15, -0.06].

Intersection of Race, Gender, and Age. Finally, we tested our focal hypothesis that race cues were associated with age ratings because they were highly gendered.
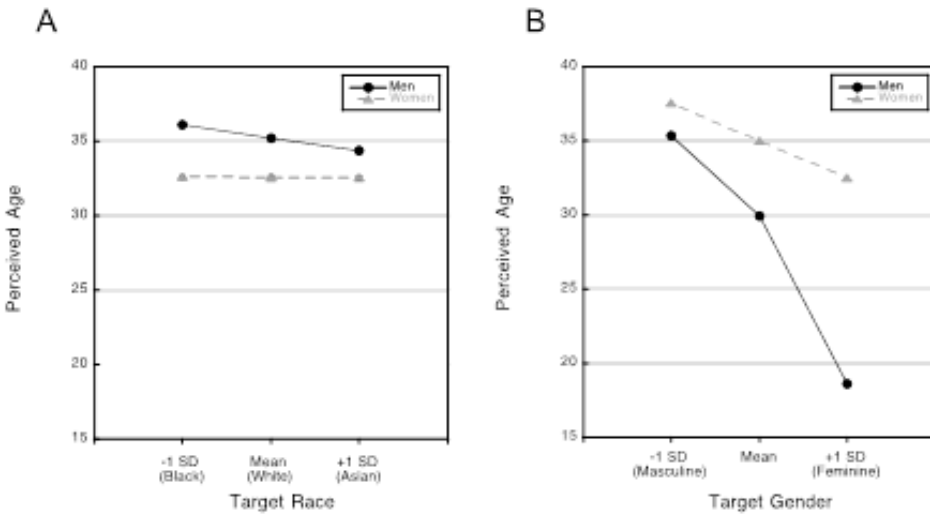
FIGURE 2. Perceived age as a function of the two-way interaction between target sex (male, female) and target race (Black, White, Asian; Fig. 2a) and the two-way interaction between target sex (male, female) and target gender (masculine, feminine; Fig. 2b) in Study 1. Standard errors were small and are thus not visible in the figures due to the wide range of the vertical axis. Note that Figure 2b makes it seem as if women were judged to be older than men on average; this is because we centered Target Gender at the grand mean for the sample, which was slightly feminized, distorting the main effect of Target Sex on Perceived Age.

We did so using two complementary analyses. The first involved a likelihood ratio test, which compares the statistical fit of nested multilevel regression models (Snijders & Bosker, 2012). Like the F-test for change in R^2 in a traditional linear regression, this analysis tests whether gendered phenotypes provide additional information for the prediction of age judgments over and above the information provided by target race. To conduct the test, we constructed a series of nested multilevel regression models. In the first model, we regressed Perceived Age onto Target Race, Target Sex, and their interaction. In the second model, we added Target Gender and its interaction terms. We then performed a likelihood ratio test on the fit of each model based on deviance values. As predicted, the inclusion of Target Gender significantly improved statistical fit of the model linking Target Race to Perceived Age, $X^2(4) = 787.6$, $p < .001$. Thus, gendered phenotypes played an important explanatory role in the observed association between race and age judgments. To adequately model the association between race and perceived age, it was necessary to account for gendered features as well.

We complemented results of the likelihood ratio test with a mediation analysis. Because the data were nested within perceiver, we computed the average age judgment for each stimulus to ensure observations were independent. We then used the PROCESS macro (Hayes, 2013) to construct a mediation model in which Target Race was the predictor, Target Gender was the mediator, and Perceived Age was the outcome. PROCESS estimates indirect effects based upon bias-corrected bootstrap confidence intervals with 5,000 draws. The indirect effect of Target Gender was not significant overall, as the confidence interval included zero, 95% CI

[-0.20, 0.08]. This is not surprising, given that Target Sex had a substantial moderating effect on the two-way intersections of race/age and of gender/age. We therefore re-computed the mediation separately for targets belonging to each sex category. Consistent with the interaction effects described above, the indirect effect of Target Gender was not significant for female targets, 95% CI [-0.37, 0.04], but was significant for male targets, 95% CI [-0.40, -0.12].

DISCUSSION

Study 1 provided support for our hypothesis that race and gender cues interactively guide age judgments. Black targets and those with masculine facial features were rated as relatively older while Asian targets and those with feminine facial features were rated as relatively younger than others. Moreover, race and gender cues had a synergistic effect on age judgments, such that the combination of Black and masculine features compelled older age ratings whereas the combination of Asian and feminine features compelled younger age ratings.

In addition to these results, Study 1 revealed an unexpected moderator: The associations between race category, gendered phenotype, and perceived age consistently varied as a function of target sex. Specifically, the race/gender/age intersections were more robust for male targets than for female targets. Although we did not predict this effect in advance, we now realize it is consistent with affordance theories of social perception. Affordance theories posit that social categorization is ubiquitous in part because it provides useful information about the behaviors and interests of unknown others (McArthur & Baron, 1983). A recent reinterpretation of this work specifically proposed that intersecting race, gender, and age cues would be most salient for judgments of young men (Neuberg & Sng, 2013). Because young men are believed to be more threatening than young women, perceivers may evaluate their potential for harm based upon stereotypes about sex and race categories. For example, prevailing stereotypes would elicit greater caution when approaching a man who is perceived to be young, masculine, and Black as opposed to old, feminine, and Asian. The affordances provided by intersecting social categories are less stereotypically obvious for young women, which may have dampened the association between race and age judgments in our study. As such, the moderating effect of target sex documented in Study 1 is consistent with affordance theories of social perception.

STUDY 2

Study 1 provided preliminary evidence that overlapping race and gender cues guide age perceptions, but our conclusions were limited by three factors. First, the findings relied on judgments of computer-generated stimuli, which do not always produce effects equivalent to real faces (Crookes et al., 2015). Second, our analysis of target gender relied on a standardized measure based on three-dimensional

scans of several hundred faces (Blanz & Vetter, 1999), which may or may not reflect subjective gender judgments made by naive perceivers. Third, Study 1 revealed an interesting but unexpected moderating effect in which the links between race, gender, and age were stronger for male faces than for female faces. Although consistent with affordance theories of social perception (Neuberg & Sng, 2013), this finding was not predicted a priori and thus requires replication. Study 2 sought to address these points by replicating our initial findings with subjective perceptions of age and gender drawn from real faces of men and women.

METHOD

Participants. Eighty-two Internet users completed the study (M_{Age} = 34.88 years, 61% male, 88% straight, 77% White). We determined our target sample size based on effect sizes from Study 1. Using the power analysis calculations provided by Westfall and colleagues (2014), we found that a nested design with 85 participants rating 60 stimuli provided over 90% power to detect small-to-medium sized effects (d = 0.35).

Stimuli. Stimuli were facial photographs of 60 heterosexual young adults drawn from public dating websites (30 men—10 Black, 10 White, 10 Asian; 30 women—10 Black, 10 White, 10 Asian). We chose images based upon the self-reported sex and race listed in targets' dating profiles. Importantly, the ages listed in targets' profiles did not vary as a function of their race and sex categories, $F(5, 54)$ = 0.69, p = .633 (Table 1). Thus, differences in perceived age cannot be accounted for by differences in the actual ages of targets belonging to each group.

Prior to testing, we resized all images to 300 × 300 pixels. Consistent with our aim of improving ecological validity, we did not control for individual variation in target appearance. The only constraint we imposed on the stimuli was that targets were devoid of facial tattoos, which are known to have negative impacts on face recognition and social perception (Funk & Todorov, 2013). There were clear differences in facial expression, presence of glasses, and headwear across targets. To ensure these cues did not vary systematically across groups, we coded each image for the presence of a smile, glasses, or a hat (0 = no, 1 = yes). We then subjected the average number of smiles, glasses, or hats to an ANOVA with Target Race (*Asian, Black, White*) and Target Sex (*male, female*) as between-subjects factors. The presence of glasses or hats did not differ across groups (ps > .167), but consistent with previous research (Briton & Hall, 1995), women were 55% more likely than men to be smiling, $F(2, 54)$ = 10.47, p = .002. As an additional check of the stimuli, we conducted a brief pilot study in which 25 Mechanical Turk users (M_{Age} = 38.84 years, 56% female, 96% straight, 64% White) rated the visual quality of each image (*1 = low quality* to *9 = high quality*). Multilevel regression revealed that perceived image quality did not vary across race/sex categories, $F(2, 75.3)$ = 0.50, p = .610.

Procedure. Mechanical Turk users were recruited for a study about their perceptions of other people with no mention of race, gender, or age. After providing consent, participants viewed 60 faces in random order and judged the apparent

age (*18–100 years,* continuous) and gender (*1 = extremely masculine* to *9 = extremely feminine*) of each one. We altered the range of possible age judgments from Study 1 to reflect the fact that targets were all adults (i.e., no one under age 18). Age and gender ratings occurred in counterbalanced block order and participants had as much time as necessary to render each judgment. Upon completion, participants reported demographic information and were debriefed.

RESULTS

We report all data exclusions, all manipulations, and all measures in the results that follow. As before, we tested our hypotheses with random coefficient multilevel models that included random intercepts and random slopes for all predictors to account for nested responses. Because the stimuli were photographs of real people who did not vary systematically in their racial phenotype, we treated Target Race as a categorical variable (*-1 = Black, 0 = White, 1 = Asian*). We treated Perceived Gender as a 9-level continuous variable based upon participants' subjective ratings (*1 = Very Masculine* to *9 = Very Feminine*), and we effect-coded Target Sex (*-0.5 = Male, 0.5 = Female*). For binary or continuous predictors, we report unstandardized regression coefficients as indices of effect size. For categorical predictors, we used the resulting *F*-test statistics to calculate correlation coefficients (*r*) as indices of effect size.

As noted above, we collected data about the targets' self-reported ages from their dating profiles. We conducted a series of control analyses to test whether accounting for self-reported age altered the results of interest. In only one case did including self-reported age as a covariate change the statistical significance of a result. We make note of this effect, but otherwise report uncontrolled analyses for the sake of space.

Preliminary Analysis of Target Sex. Before testing our primary hypotheses, we sought to replicate a well-documented effect wherein women are perceived as younger than men. We did so by regressing Perceived Age onto Target Sex. Participants judged women to be younger than men on average, $B = -0.58$, $SE = 0.21$, $t = -2.79$, $p = .007$, 95% CI [-1.00, -0.17] (Table 1).[2]

Intersection of Race and Age. Next, we examined the intersection of race and age by regressing Perceived Age onto Target Race. A significant effect of race emerged, $F(2, 165) = 88.24$, $p < .001$, $r = .72$. Pairwise comparisons revealed that Asian targets were perceived as younger than both White targets, $B = -2.79$, $SE = 0.24$, $t = -11.64$, $p < .001$, 95% CI [-3.26, -2.32], and Black targets, $B = -2.73$, $SE = 0.24$, $t = -11.37$, $p <$

---

2. The association between Target Sex and Perceived Age became nonsignificant upon controlling for targets' self-reported age. However, the effect remained in the same direction as the uncontrolled model, with women being rated somewhat younger than men, $B = -0.24$, $SE = 0.21$, $t = -1.15$, $p = .255$, 95% CI [-0.66, 0.18].
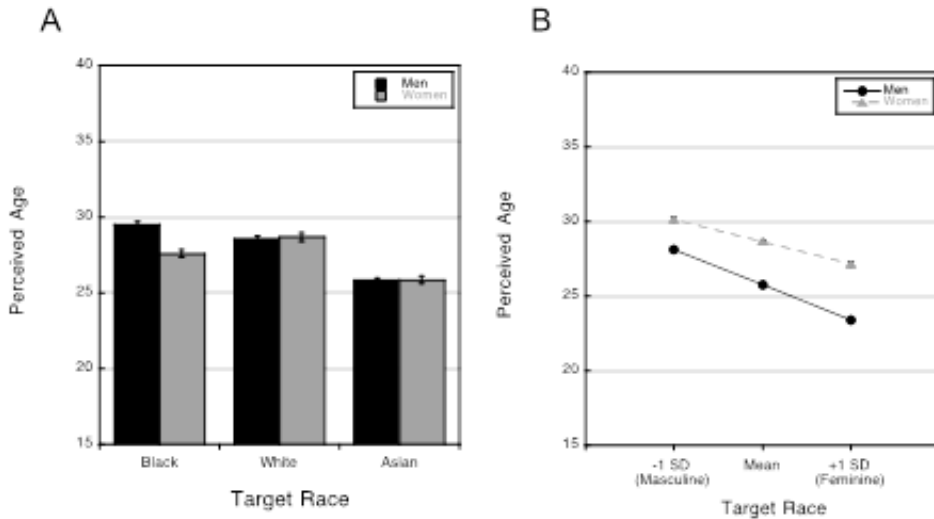
FIGURE 3. Perceived age as a function of the two-way interaction between target sex (male, female) and target race (Black, White, Asian; Fig. 3a) and the two-way interaction between target sex (male, female) and target gender (masculine, feminine; Fig. 3b) in Study 2. Standard errors were quite small and are thus not visible in Figure 3b due to the wide range of the vertical axis. Note that Figure 3b makes it seem as if women were judged to be older than men on average; this is because we centered Target Gender at the grand mean for the sample, which was slightly feminized, distorting the main effect of Target Sex on Perceived Age.

.001, 95% CI [-3.20, -2.25]. Age ratings did not differ significantly between White and Black targets, $B = 0.06$, $SE = 0.24$, $t = 0.27$, $p = .788$, 95% CI [-0.41, 0.54].

As in Study 1, the association between Target Race on Perceived Age was qualified by a two-way interaction with Target Sex, $F(2, 4557) = 18.07$, $p < .001$, $r = .09$ (Figure 3a). We decomposed the interaction by examining simple slope of race within each sex category. The simple slope of race was significant for both sexes, but the effect size was nearly 48% larger for male faces, $F(2, 310) = 82.11$, $p < .001$, $r = .59$, relative to female faces, $F(2, 456) = 42.73$, $p < .001$, $r = .40$. Pairwise comparisons revealed the expected pattern for male targets: Asian men were perceived to be younger than both White and Black men, $Bs = -2.72$ and -3.72, $SEs = 0.30$ and 0.30, $ts = -9.08$ and -12.38, $ps < .001$, 95% CIs [-3.32, -2.13] and [-4.31, -3.13], and White men were perceived to be younger than Black men, $B = -0.99$, $SE = 0.30$, $t = -3.31$, $p = .001$, 95% CI [-1.58, -0.40]. For female targets, Asian women were perceived to be younger than both White and Black women, $Bs = -2.85$ and -1.73, $SEs = 0.31$ and 0.31, $ts = -9.18$ and -5.57, $ps < .001$, 95% CIs [-3.47, -2.24] and [-2.34, -1.12]. However, Black women were perceived to be younger than White women, $B = -1.12$, $SE = 0.31$, $t = -3.61$, $p < .001$, 95% CI [-1.73, -0.51].

Intersection of Race and Gender. We tested the intersection of race and gender by regressing Perceived Gender onto Target Race. A significant effect of race emerged, $F(2, 4707) = 4.60$, $p = .010$, $r = .04$. Pairwise comparisons revealed that White and

Asian targets were perceived to be more feminine than Black targets, Bs = 0.23 and 0.29, SEs = 0.10 and 0.10, ts = 2.24 and 2.89, ps = .025 and .004, 95% CIs [0.03, 0.43] and [0.10, 0.49]. Gender ratings did not differ significantly between Asian and White targets, B = 0.07, SE = 0.10, t = 0.65, p = .513, 95% CI [-0.13, 0.27].

The association between Target Race on Perceived Gender was qualified by a two-way interaction with Target Sex, F(2, 164) = 83.71, p < .001, r = .71. The simple slope of race was significant for both sexes, but the effect was 158% larger for men, F(2, 378) = 119.83, p < .001, r = .62, relative to women, F(2, 310) = 9.71, p < .001, r = .24. Pairwise comparisons again revealed the expected pattern for male targets: White men and Asian men were perceived to be more feminine than Black men, Bs = 0.69 and 0.95, SEs = 0.06 and 0.06, ts = 10.90 and 15.00, ps < .001, 95% CIs [0.57, 0.82] and [0.83, 1.08], and Asian men were perceived to be more feminine than White men, B = 0.26, SE = 0.06, t = 4.12, p < .001, 95% CI [0.14, 0.38]. Among female targets, the pattern was less consistent. White and Asian women were perceived to be less feminine than Black women, Bs = -0.15 and -0.26, SEs = 0.06 and 0.06, ts = -2.49 and -4.39, ps = .013 and < .001, 95% CIs [-0.26, -0.03] and [-0.37, -0.14], but Asian women were perceived to be marginally less feminine than White women, B = -0.11, SE = 0.06, t = -1.91, p = .058, 95% CI [-0.23, 0.01].

Intersection of Gender and Age. We tested the intersection of gender and age by regressing Perceived Age onto Perceived Gender. A significant effect of gender emerged, such that targets perceived to be feminine were rated as younger than those perceived to be masculine, B = -0.21, SE = 0.04, t = -5.08, p < .001, 95% CI [-0.29, -0.13]. This effect was qualified by a two-way interaction with Target Sex, B = 0.35, SE = 0.15, t = 2.28, p = .025, 95% CI [0.05, 0.65] (Figure 3b).The simple slope of gendered appearance was significant and directionally consistent for both sexes, but the effect size was 85% larger among men, B = -0.76, SE = 0.10, t = -7.45, p < .001, 95% CI [-0.96, -0.56], compared to women, B = -0.41, SE = 0.11, t = -3.78, p < .001, 95% CI [-0.62, -0.20].

Intersection of Race, Gender, and Age. Finally, we tested our focal hypothesis that race cues were associated with age ratings because they were highly gendered. We did so using two complementary approaches. The first involved a likelihood ratio test, as described in Study 1. In the first model, we regressed Perceived Age onto Target Race, Target Sex, and their interaction. In the second model, we added Target Gender and its interaction terms to the equation. We then performed a likelihood ratio test on the statistical fit of these two models. As predicted, the inclusion of Target Gender significantly improved statistical fit of the model linking Target Race to Perceived Age, X^2(4) = 665.90, p < .001. Thus, as in Study 1, gendered phenotypes played an important explanatory role in the association between race and age judgments. To adequately model the association between race and perceived age, it was necessary to account for gendered appearance cues.

We complemented results of the likelihood ratio test with a mediation analysis. Because the data were nested within perceiver, we computed the average age and gender judgment for each stimulus to ensure observations were independent. We then used the MEDIATE macro (Hayes & Preacher, 2014) to test for media-

tion with a categorical predictor. MEDIATE estimates unique indirect effects for dummy vectors coding the categorical variable based on bootstrapped confidence intervals with 5,000 draws. We coded Target Race such that the first dummy vector compared Black faces to White faces and the second dummy vector compared Asian faces to White faces. The omnibus indirect effect of Target Race was significant overall, as the confidence interval did not include zero, 95% CI [0.001, 0.029]. Still, given the moderating effects of Target Sex described above, we expected that male targets were driving the mediation. We therefore re-computed the model separately for men and women. As expected, the omnibus indirect effect of Target Gender was not significant for female targets, 95% CI [-0.81, 0.28], but was significant for male targets, 95% CI [-3.75, -0.63].

DISCUSSION

Study 2 built upon our previous findings in two ways. First, we replicated the intersectional overlap among race, gender, and age perceptions with subjective gender ratings and real faces. Although the stimulus set included a relatively small number of images, the pattern of results was largely consistent with that observed in Study 1. In general, Asian targets were perceived to be relatively young due to their feminine appearance while Black targets were perceived to be relatively old due to their masculine appearance. This convergence of findings across computer-generated and real faces provides additional confidence in our results. Second, we replicated the unpredicted sex moderating effects from Study 1, finding that the intersectional overlap of race, gender, and age was more pronounced for men than for women. The consistency across studies suggests that the moderating effect of target sex was not erroneous. Instead, as Neuberg and Sng (2013) have proposed, intersecting cues of race, gender, and age appear to have greater heuristic value for judgments of men than women.

While most of the results from Study 2 supported our hypotheses, two unexpected effects emerged: Black women were rated as younger than White women and Asian women were rated as less feminine than White women. These findings are inconsistent with prior studies that found Black targets were rated as older than White targets (Goff et al., 2014; Rattan et al., 2012) and that Asian targets were rated as more feminine than White targets (Carpinella et al., 2015; Johnson et al., 2012). Why did we obtain different results? It is interesting to note that the unexpected results were restricted to female faces, for whom intersecting race, gender, and age cues carry few stereotypical affordances (Neuberg & Sng, 2013). Thus, one possible explanation is that perceivers paid less attention or achieved lower consensus in their judgments of female faces because they were not as motivationally relevant as male faces. In support of this argument, there was greater variability in age judgments of women (SD = 6.86) compared to men (SD = 5.72), though the precise reason for this difference remains unclear. A second possibility is that the unexpected effects were driven by idiosyncratic aspects of our stimuli, which we obtained from public dating websites. It is possible that women posted

profile pictures that misrepresented their true age. This practice might have varied across racial groups because of different social expectations for Black, White, and Asian dating partners (Galinsky, Hall, & Cuddy, 2013). A third possibility, which we discuss at greater length below, is that a different theoretical model may account for the unexpected effects observed among female targets. The current data cannot adjudicate between these hypotheses, making them worthy topics of future research. For now, we reiterate that most findings in Study 2 were consistent with hypotheses, providing evidence of systematic overlap in race, gender, and age judgments drawn from facial images.

GENERAL DISCUSSION

The current studies documented intersectional overlap among three fundamental dimensions of social perception: race, gender, and age. In Study 1, we found that race and gender cues interactively guided age judgments of computer-generated faces. As faces morphed from Black to White to Asian, they became more feminine and were perceived to be younger. This pattern was moderated by target sex, such that the impact of intersecting race and gender cues on age perception was stronger for male faces than female faces. Study 2 extended our initial findings to real faces. Again, we found that Asian targets tended to be rated as younger than White or Black targets due to their relatively feminine facial appearance. This pattern was also moderated by target sex, with associations between race, gender, and age being stronger for male faces compared to female faces. Although each study had limitations—for example, Study 1 being restricted to computer-generated faces and Study 2 including a relatively small number of images drawn from public dating websites—the consistency of the findings suggests a robust association between race, gender, and age.

   The current findings extend research on intersectionality in several important ways. Social psychologists have increasingly acknowledged that people naturally occupy multiple social categories at once, yet most investigations have examined how a single identity (e.g., sex) constrains perceptions of one other identity (e.g., race; Carpinella et al., 2015; Goff et al., 2008; Johnson et al., 2012). These studies have made strides toward increasing the complexity and ecological validity of social perception research, but they still simplify the phenomenon by examining just two of many possible category intersections. Our work advances the literature by exploring the impacts of higher-level intersections, providing evidence for a three-way overlap between race, gender, and age. As statistical and computing powers increase, it will become possible to examine more highly dimensional intersections, characterizing complex interplay among the various categories to which people belong.

   The current studies also extend recent insights about biases in social perception. Early theories presumed that social judgments accrued in a bottom-up fashion, with categorizations veridically reflecting the features conveyed by a target of perception (Bruce & Young, 1986; Marr, 1982). More recent theories suggest that

bottom-up processes dynamically interact with top-down processes (Freeman & Ambady, 2011; Freeman & Johnson, 2016), allowing social category judgments to become systematically biased by prior experience, stereotypical knowledge, and personal motivations (see Lick & Johnson, 2016). Our work adds to the growing consensus that social category judgments are impure percepts that are calibrated, constrained, and biased by the other groups to which a target belongs (Johnson et al., 2015). Age judgments reflect not only perceivers' appreciation of age-related cues contained in a face, but also stereotypic associations between age and other categories to which the face belongs.

Finally, our work provides new information about the role stereotypic affordances play in social categorization. Classic theories proposed that social category judgments are powerful insofar as they afford perceivers an opportunity to quickly gather information about the traits and behaviors of unknown others (McArthur & Baron, 1983). Neuberg and Sng (2013) recently rearticulated this theory, suggesting the informational value of a category depends on other categories with which it intersects. They argued that overlapping stereotypes about age, race, and gender categories should be especially pronounced for young men, who are often judged in terms of their potential to do harm. Our data support this prediction, insofar as the impact of race and gender cues on age judgments was stronger for young adult men than for young adult women. Future researchers may extend these observations further, testing how the affordances of social category intersections vary according to perceiver characteristics or situational demands.

While our findings were broadly consistent with the predictions of affordance theory, we should note that some results did not follow the expected pattern. Specifically, in Study 2, Black women were rated as younger than White women and Asian women were rated as less feminine than White women. We previously discussed potential methodological explanations for these findings, including idiosyncratic aspects of the stimuli. However, alternative theoretical explanations are also possible. For example, it may be that Black women were perceived as younger than White or Asian women due to status differences between the groups. Recent studies have shown that perceivers believe low-status groups to be less competent than high-status groups (Caprariello, Cuddy, & Fiske, 2009). Because they belong to two low-status groups, these data suggest Black women may have been perceived as incompetent, which in turn could be associated with youth. Another possibility is that participants judged each target's gender and age in relation to a specific category prototype. Indeed, previous research showed that perceivers maintain distinct prototypes for faces belonging to different race (Jaquet, Rhodes, & Hayward, 2008) and sex categories (Jaquet & Rhodes, 2008). Perceivers might have rated Black women as appearing relatively young and feminine because the Black female faces in the stimulus set were younger and more feminine than their internal prototype for Black women. Both possibilities remain speculative, but we raise them here as interesting hypotheses for future research on intersectional social perception.

In conclusion, the current studies document overlaps among three fundamental dimensions of social perception. Age judgments were constrained by intersect-

ing facial cues of race and gender, leading to the perception that Black men were masculine and thus older while Asian men were feminine and thus younger than age-matched controls. Continued research on the consequences of intersecting category cues stands to enhance the ecological validity of social perception research, highlighting previously unforeseen outcomes of common situations in which people occupy multiple category dimensions at the same time.

REFERENCES

Allport, G. W. (1954). *The nature of prejudice.* Reading, MA: Addison-Wesley.

AsiaOne. (2013). How this 46-year-old Korean mum lost 20 kg in 3 months. Retrieved from http://yourhealth.asiaone.com/content/how-46-year-old-korean-mum-lost-20kg-3-months

Berry, D. S., & McArthur, L. Z. (1986). Perceiving character in faces: The impact of age-related craniofacial changes on social perception. *Psychological Bulletin, 100*, 3-18.

Blanz, V., & Vetter, T. (1999). A morphable model for the synthesis of 3D faces. In *Proceedings of the 26th Annual SIGGRAPH Meeting* (pp. 187-194). Los Angeles, CA: Addison Wesley Longman.

Briton, N. J., & Hall, J. A. (1995). Gender-based expectancies and observer judgments of smiling. *Journal of Nonverbal Behavior, 19*, 49-65.

Bruce, V., & Young, A. W. (1986). A theoretical perspective for understanding face recognition. *British Journal of Psychology, 77*, 305-327.

Caprariello, P. A., Cuddy, A. J., & Fiske, S. T. (2009). Social structure shapes cultural stereotypes and emotions: A causal test of the stereotype content model. *Group Processes and Intergroup Relations, 12*, 147-155.

Carpinella, C. M., Chen, J., Hamilton, D., & Johnson, K. L. (2015). Gendered facial cues influence race categorizations. *Personality and Social Psychology Bulletin, 41*, 405-419.

Cole, E. R. (2009). Intersectionality and research in psychology. *American Psychologist, 64*, 170-180.

Crookes, K., Ewing, L., Gildenhuys, J. D., Kloth, N., Hayward, W. G., Oxner, M., Pond, S., & Rhodes, G. (2015). How well do computer-generated faces tap face expertise? *PloS One, 10*(11), e0141353.

Deaux, K. (1985). Sex and gender. *Annual Review of Psychology, 36*, 49-81.

Fiske, S. T., & Neuberg, S. L. (1990). A continuum model of impression formation, from category-based to individuating processes: Influence of information and motivation on attention and interpretation. In M. P. Zanna (Ed.), *Advances in experimental social psychology* (Vol. 23, pp. 1-74). San Diego, CA: Academic.

Freeman, J. B., & Ambady, N. (2011). A dynamic interactive theory of person construal. *Psychological Review, 118*, 247-279.

Freeman, J. B., & Johnson, K. L. (2016). More than meets the eye: Split-second social perception. *Trends in Cognitive Sciences, 20*, 362-374.

Funk, F., & Todorov, A. (2013). Criminal stereotypes in the courtroom: Facial tattoos affect guilt and punishment differently. *Psychology, Public Policy, and Law, 19*, 466-478.

Galinsky, A. D., Hall, E. V., & Cuddy, A. J. (2013). Gendered races: Implications for interracial marriage, leadership selection, and athletic participation. *Psychological Science, 24*, 498-506.

Goff, P. A., Jackson, M. C., Di Leone, B. A. L., Culotta, C. M., & DiTomasso, N. A. (2014). The essence of innocence: Consequences of dehumanizing Black children. *Journal of Personality and Social Psychology, 106*, 526-545.

Goff, P. A., Thomas, M. A., & Jackson, M. C. (2008). "Ain't I a woman?": Towards an intersectional approach to person perception and group-based harms. *Sex Roles, 59*, 392-403.

Hayes, A. F. (2013). *Introduction to mediation, moderation, and conditional process ana-*

lysis: A regression-based approach. New York: Guilford.

Hayes, A. F., & Preacher, K. J. (2014). Statistical mediation analysis with a multicategorical independent variable. *British Journal of Mathematical and Statistical Psychology, 67*, 451-470.

Hugenberg, K., & Bodenhausen, G. V. (2003). Facing prejudice: Implicit prejudice and the perception of facial threat. *Psychological Science, 15*, 640-643.

Hugenberg, K., & Bodenhausen, G. V. (2004). Ambiguity in social categorization: The role of prejudice and facial affect in race categorization. *Psychological Science, 15*, 342-345.

Ito, T. A., Thompson, E., & Cacioppo, J. T. (2004). Tracking the timecourse of social perception: The effects of racial cues on event-related brain potentials. *Personality and Social Psychology Bulletin, 30*, 1267-1280.

Ito, T. A., & Urland, G. R. (2003). Race and gender on the brain: Electrocortical measures of attention to the race and gender of multiply categorizable individuals. *Journal of Personality and Social Psychology, 85*, 616-626.

Jaquet, E., & Rhodes, G. (2008). Face aftereffects indicate dissociable, but not distinct, coding of male and female faces. *Journal of Experimental Psychology: Human Perception and Performance, 34*, 101-112.

Jaquet, E., Rhodes, G., & Hayward, W. G. (2008). Race-contingent aftereffects suggest distinct perceptual norms for different race faces. *Visual Cognition, 16*, 734-753.

Johnson, K. L., Freeman, J. B., & Pauker, K. (2012). Race is gendered: How covarying phenotypes and stereotypes bias sex categorization. *Journal of Personality and Social Psychology, 102*, 116-131.

Johnson, K. L., Lick, D. J., & Carpinella, C. (2015). Emergent research in social vision: An integrated approach to the determinants and consequences of social categorization. *Social and Personality Psychology Compass, 9*, 15-30

Kurzban, R., Tooby, J., & Cosmides, L. (2001). Can race be erased? Coalitional computation and social categorization. *Proceedings of the National Academy of Sciences, 98*, 15387-15392.

Kwong, M. (2013). Why do Asians look so young sometimes? Or most of the time? Retrieved from http://mabelkwong.com/2013/07/04/why-do-asians-look-so-young-sometimes-or-most-of-the-time/

Lick, D. J., & Johnson, K. L. (2015). Intersecting race and gender cues are associated with perceptions of gay men's preferred sexual roles. *Archives of Sexual Behavior, 44*, 1471-1481.

Lick, D. J., & Johnson, K. L. (2016). Straight until proven gay: A systematic bias toward straight categorizations in sexual orientation perception. *Journal of Personality and Social Psychology, 110*, 801-817.

Macrae, C. N., & Bodenhausen, G. V. (2000). Social cognition: Thinking categorically about others. *Annual Review of Psychology, 51*, 93-120.

Macrae, C. N., Bodenhausen, G. V., Milne, A. B., Thorn, T. M., & Castelli, L. (1997). On the activation of social stereotypes: The moderating role of processing objectives. *Journal of Experimental Social Psychology, 33*, 471-489.

Macrae, C. N., & Martin, D. (2007). A boy primed Sue: Feature-based processing and person construal. *European Journal of Social Psychology, 37*, 793-805.

Marr, D. (1982). *Vision: A computational investigation into the human representation and processing of visual information.* New York: Freeman.

McArthur, L. Z., & Apatow, K. (1983-1984). Impressions of baby-faced adults. *Social Cognition, 2*, 315-342.

McArthur, L. Z., & Baron, R. M. (1983). Toward an ecological theory of social perception. *Psychological Review, 90*, 215-238.

Montepare, J., & Zebrowitz, L. (1998). Person perception comes of age: The salience of age in social judgments. In M. P. Zanna (Ed.), *Advances in experimental social psychology* (pp. 93-101). New York: Academic.

Navales, E. (2014). Eternal youth: You won't believe how old these Asian women really are. Retrieved from http://audreymagazine.com/eternal-youth-you-wont-believe-how-old-these-asian-women-really-are/

Neuberg, S. L., & Sng, O. (2013). A life history theory of social perception: Stereotyping

at the intersections of age, sex, ecology (and race). *Social Cognition, 31*, 696-711.

Perrett, D. I., Lee, K. J., Penton-Voak, I., Rowland, D., Yoshikawa, S., Burt, D. M., Henzi, S. P., Castles, D. L., & Akamatsu, S. (1998). Effects of sexual dimorphism on facial attractiveness. *Nature, 394*, 884-887.

Powlishta, K. K. (2000). The effect of target age on the activation of gender stereotypes. *Sex Roles, 42*, 271-282.

Purdie-Vaughns, V., & Eibach, R. P. (2008). Intersectional invisibility: The distinctive advantages and disadvantages of multiple subordinate-group identities. *Sex Roles, 59*, 377-391.

Quinn, K. A., & Macrae, C. N. (2005). Categorizing others: The dynamics of person construal. *Journal of Personality and Social Psychology, 88*, 467-479.

Rattan, A., Levine, C. S., Dweck, C. S., & Eberhardt, J. L. (2012). Race and the fragility of the legal distinction between juveniles and adults. *PLoS ONE, 7*, e36680.

Rhodes, M. G. (2009). Age estimation of faces: A review. *Applied Cognitive Psychology, 23*, 1-12.

Robison, M. (2013). A look at more Trayvon Martin claims: Tattoos, Jesse Jackson, Antonio West, thievery. Retrieved from http://blogs.rgj.com/factchecker/2013/08/03/a-look-at-more-trayvon-claims-tattoos-jesse-jackson-antonio-west-thievery/

Snijders, T. A., & Bosker, R. J. (2012). *Multilevel analysis: An introduction to basic and advanced multilevel modeling.* London: SAGE.

Stebner, B., & Cox, L. (2012). Zimmerman to be released "imminently" and will be kept in "secret location" after judge set bond at $150,000. Retrieved from http://www.dailymail.co.uk/news/article-2132687/Zimmerman-release-imminent—kept-safe-secret-location-likely-outside-Florida.html

Stolier, R. M., & Freeman, J. B. (2016). Neural pattern similarity reveals the inherent intersection of social categories. *Nature Neuroscience, 19*, 795-797.

Stroessner, S. J. (1996). Social categorization by race or sex: Effects of perceived non-normalcy on response times. *Social Cognition, 14*, 247-276.

Taylor, S. E., Fiske, S. T., Etcoff, N. L., & Ruderman, A. J. (1978). Categorical and contextual bases of person memory and stereotyping. *Journal of Personality and Social Psychology, 36*, 778-793.

Westfall, J., Kenny, D. A., & Judd, C. M. (2014). Statistical power and optimal design in experiments in which samples of participants respond to samples of stimuli. *Journal of Experimental Psychology: General, 143*, 2020-2045.

Zárate, M. A., & Smith, E. R. (1990). Person categorization and stereotyping. *Social Cognition, 8*, 161-165.