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All smiles perceived equally: Facial expressions trump target characteristics in impression formation

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Abstract Race, gender, and emotionally expressive facial behavior have been associated with trait inferences in past research. However, it is unclear how interactions among these factors influence trait perceptions. In the current research, we test the roles of targets' race, gender, and facial expression along with participants' culture in predicting personality ratings. Caucasian and Asian-American participants rated the big-5 personality traits of either smiling or inexpressive photographs of Caucasian and Asian male and female faces. Ratings of extraversion, agreeableness, and conscientiousness differed significantly across inexpressive targets as a function of race and gender categorization and individual characteristics. Smiling was associated with reduced variation in perceptions of targets' extraversion and agreeableness relative to ratings made of inexpressive targets. In addition, participant culture generally did not significantly impact trait ratings. Results suggest that emotionally expressive facial behavior reduces the use of information based on race or gender in forming impressions of interpersonally relevant traits.

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Introduction

Imagine choosing between two doctors' profiles: one a smiling, Asian female and the other a stony-faced White male. According to Lill and Wilkinson (2005), you are likely to prefer the smiling doctor. But is there other information that you might glean from the photo that could influence your decision? How might the doctor's ethnicity or gender impact your perceptions? Would your own gender or ethnicity sway your impression? Are all smiles perceived equally, or would you interpret them differently based on other characteristics? Individuals quickly and spontaneously form impressions of others that guide their expectations of others' behavior (Hess and Thibault 2009; Rule and Ambady 2010; Willis and Todorov 2006). These expectations, in turn, can prompt behaviors that confirm others' impressions (Chen and Bargh 1997; Darley and Fazio 1980), making these first impressions an important part of social interactions. Past research has examined the roles of perceiver characteristics, target characteristics, and emotionally expressive facial behavior in impression formation. We believe it is necessary to further evaluate the independent and interacting effects of these factors on initial impression formation in order to better understand interpersonal processes. In the current study, we test how ratings of targets' big-5 personality traits are influenced by the interaction of target group memberships (i.e., race, gender), target facial expression (smiling vs. inexpressive), and perceiver culture (European vs. Asian American).

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Sources of information in impression formation

Cues based on group membership (i.e., stereotypes) play a role in formation of initial impressions of others (Kunda and Thagard 1996; Paunonen et al. 1999). Observers can quickly and easily categorize others into social groups like race and gender (Fiske and Neuberg 1990; Martin and Macrae 2007; though see, for example, Pauker et al. 2009 on ambiguous group memberships). Through socialization by parents, peers, and cultural products, we have culturally-shaped ideas of what it means to be a member of a given social group, and these ideas influence the information we infer about others (Hughes et al. 2006; Dietz 1998; Adler et al. 1992; Condry and Condry 1976). Women, for example, are rated as warmer and less competent than men (Glick and Fiske 1996), while Asians are perceived to be less warm but more competent than European Americans (Fiske et al. 2002; Lin et al. 2005).

Facial expressions of emotion also communicate information about personality characteristics. Expressions of anger, for example, are associated with high levels of dominance, displays of sadness and fear with low levels of dominance, and expressions of happiness with high levels of affiliation (Knutson 1996; Montepare and Dobish 2003). Smiles, in particular, are consistently associated with a host of positive inferences. People who smile are rated as more pleasant, sincere, sociable, competent, honest, carefree, relaxed, polite, warm, attractive, and familiar (for a review, see Hess et al. 2002). Smiling, in turn, yields beneficial outcomes: smilers receive greater leniency for academic dishonesty (LaFrance and Hecht 1995), elicit cooperation (Scharlemann et al. 2001) and, as previously mentioned, are more likely to be preferred as doctors (Lill and Wilkinson 2005).

Combining sources of information

Individuals have access to multiple sources of information when forming impressions of others. Because race and gender can cue stereotype-based information (Glick and Fiske 1996; Fiske et al. 2002; Lin et al. 2005), we can predict that inexpressive faces will be rated differently from each other in accordance with the stereotypes associated with their race or gender. Because emotional expression signals information about interpersonal intentions (Knutson 1996; Montepare and Dobish 2003; Hess et al. 2002), we can predict that smiling will be associated with ratings of traits that are relevant to interpersonal interactions. However, it is unclear how gender, race, and smiling will interact during impression formation.

Research suggests that the impact of emotional expressions on personality ratings varies across groups. For

example, Hess et al. (2000) found that the relative difference between ratings of inexpressive and emotionally expressive faces varied as a function of targets' ethnicity and sex. Additionally, Hareli et al. (2009) found that the impact of smiling on trait ratings was greater for female than it was for male targets. In their study, inexpressive and smiling men were rated similarly in dominance, while women were rated as more dominant while smiling than while inexpressive. These studies suggest that the relative impact of smiling varies across race and gender groups. However, because these studies did not directly compare personality ratings of smiling targets across race or gender, it remains unclear whether differences in ratings of targets' personalities remained across smiling faces or whether smiling faces were perceived similarly, regardless of race or gender.

By providing behavioral information, smiles may effectually nullify the role of factors like gender and ethnicity in driving inferences of others' personalities (Albright et al. 1988; Ambady and Rosenthal 1992), leading smiling faces to be perceived similarly. Stereotypes do not apply to all individuals within a group, making them fairly invalid sources of information from which to form impressions of others. Kunda and Thagard (1996) reviewed evidence suggesting that stereotypes have no effect on trait inferences when information about behavior relevant to the trait is also available. For example, when only the gender of a target was made available, participants expected males to be more assertive than females; yet, when participants were told that the target had rudely interrupted another student, male and female targets were rated as equally assertive (Locksley et al. 1980). Similarly, Hess et al. (2005) found that women were expected to display less anger than men in response to an offense, unless the woman was described as being high in dominance. This additional, contextual information negated inferences based on gender group membership. Providing relevant information about personality reduces the influence of stereotypes in impression formation. Because emotional behavior (namely, smiling) signals information about interpersonal intentions and is associated with personality ratings (Knutson 1996; Montepare and Dobish 2003; Hess et al. 2002), it may reduce the impact of information from stereotypes on impression formation.

Perceiver characteristics in impression formation

The studies above were carried out in Western cultural contexts with primarily Caucasian raters, a context in which expressive behavior is encouraged and valued; what do we know about the information derived from facial expression in cultural contexts where the norms for

emotional expression call for more restraint, as is the case in East Asian contexts (Markus and Kitayama 1991)? Albright et al. (1997) found that regardless of whether Chinese or Americans were judging members of their own or the other cultural group, smiling was strongly correlated with ratings of extraversion and agreeableness. Japanese and American raters also agree on inferences of power and warmth based on photographs of American and Japanese politicians (Rule et al. 2010). This evidence suggests that, despite differences in beliefs about the degree to which one should express emotion, individuals across cultural contexts seem to associate smiling faces with similar personality characteristics. However, the strength of these associations may vary across cultural contexts. Matsumoto and Kudoh (1993) found that while both Japanese and American raters judged smiling targets as more sociable than inexpressive targets, the impact of smiling on sociability judgments was stronger for American than Japanese raters. In Western contexts, behaviors tend to be more readily attributed to dispositions, while East Asians tend to take the context into account and assume situational explanations for individuals' behaviors (Morris and Peng 1994; Miyamoto and Kitayama 2002; Knowles et al. 2001; Choi et al. 2003). East Asians are also more likely than European Americans to endorse controlling their emotions by suppressing or masking them, so emotional expressions may not be assumed to reflect one's actual feelings in these contexts (Matsumoto 1993; Matsumoto et al. 2008; Matsumoto 1990; Kim et al. 1999). For these reasons, smiles may signal personality characteristics more strongly among European American raters.

Big-5 personality ratings

The existing impression formation literature has focused on trait inferences that are highly relevant to social interactions (i.e., dominance, affiliation). The big-5 (extraversion, agreeableness, conscientiousness, neuroticism, and openness to experience) includes characteristics that are highly relevant to social interaction as well as characteristics that are less so. Extraversion and agreeableness are related to ratings of dominance and affiliation, respectively, making it possible to relate the findings of the current research to past work focusing on these dimensions (Trapnell and Wiggins 1990). Conscientiousness, neuroticism, and openness do not seem to cue interpersonal intentions; however, they are relevant to a variety of social domains (Wiggins and Pincus 1992). For example, inferences of conscientiousness could play a role in hiring decisions. By obtaining trait inferences of

the big-5, we are able to test the impacts of target race, gender, facial expressions, and perceiver culture on impression formation of traits with varied degrees of interpersonal relevance. In particular, the inclusion of less interpersonally relevant personality dimensions allows us to more explicitly test the limits of the signaling power of smiling in impression formation.

The current study

The current study aims to provide insight into existing gaps in our understanding of the interacting effects of target race and gender, emotional behavior, and perceiver culture in impression formation. We showed Caucasian and Asian American raters a set of either smiling or inexpressive still photographs of Caucasian and Japanese male and female faces, and asked that they rate participants' levels of the big 5 personality dimensions. By examining the effects of rater culture and target race, gender, and facial expression on personality ratings, we aim to test (1) whether smiling faces are perceived more similarly to each other than inexpressive faces, (2) whether the impact of smiling on personality inferences differs in cultures with differing norms for the expression of happiness, and (3) whether the signaling power of smiling is constrained to personality characteristics that cue interpersonal intentions.

We hypothesize that, replicating past research, smiling will increase perceptions of all targets' interpersonally relevant personality dimensions (i.e., extraversion and agreeableness), but not their conscientiousness, neuroticism, or openness to experience. Of primary interest in the current study, we expect that information derived from smiling will undermine use of information based on race or gender in driving personality ratings. Thus, we expect targets to be rated more similarly to each other in extraversion and agreeableness while smiling than while inexpressive, regardless of race or gender. We expect no systematic group-based differences in ratings of conscientiousness, neuroticism, or openness. Further, replicating past research, we expect targets whose group memberships signal extraversion (Caucasians, males) and agreeableness (Caucasians, females) to be rated as higher in these traits than other targets while inexpressive. This means that for smiling faces to be perceived similarly, smiling should have a greater impact on impressions of extraversion and agreeableness for targets that are rated lower in these traits while inexpressive. Finally, we hypothesize that Caucasian raters will infer higher levels of extraversion and agreeableness from smiling faces than will Asian raters.

Methods

Participants

Participants were 50 European-American and 43 East Asian-American undergraduate students participating for psychology course credit. Participants were randomly assigned to one of two groups: the "inexpressive condition" making judgments of inexpressive faces ($n = 46$) and the "smile condition" making judgments of smiling faces ($n = 47$). Sample demographics are presented in Table 1. European Americans were all born in the United States and had parents who were also born in the United States. Asian Americans were either first ($n = 20$) or second-generation ($n = 23$) immigrants with parents that had been born in Taiwan ($n = 7$) Japan ($n = 3$), Korea ($n = 15$), China ($n = 13$), Vietnam ($n = 1$), or a combination of these ($n = 4$). For those born abroad, average number of years in the U.S. at the time of data collection was 8.06 years ($SD = 5.93$). All Asian American participants identified themselves as Asian or Asian American.

Cultural orientation

Because we hypothesized that cultural differences in perceptions of smiling faces would be driven by differences in culturally shaped meanings associated with smiles, it was important to gauge the degree to which European and Asian American participants identified with their cultural backgrounds. We administered the American version of the General Ethnicity Questionnaire (GEQ-A; Tsai et al. 2000) to all participants in order to assess the degree to which participants were oriented to American culture. All Asian American participants also completed the ethnic version of the GEQ (GEQ-E), which assessed their orientation to their native culture. The GEQ is comprised of 38 items assessing social affiliation, activities, attitudes, exposure, food, and language, and allows for independent assessment of orientation towards multiple cultures. Participants rated questions on a 5-point Likert scale (1 = Strongly disagree, 5 = Strongly agree). Scale reliabilities within each cultural

context were high (GEQ-A: .82 for European American and .89 for Asian American; GEQ-E: .91 for Asian Americans). As shown in Table 1, European American participants were more oriented towards American culture than Asian American participants [t (66.16) = 3.61, $p = .001$]. Among Asian Americans, there was a strong negative correlation between American and Asian orientation [r (32) = −.68, $p < .001$]. On average, Asian-American participants were more strongly oriented to American culture ($M = 3.76$, $SD = .51$) than their native culture [$M = 3.37$, $SD = .50$; t (31) = −4.34, $p < .001$].

Stimuli

Photo stimuli were drawn from the Japanese and Caucasian Facial Expressions of Emotion and Neutral Faces (JACFEE and JACNeuF) collection (Matsumoto and Ekman 1988). This stimuli set was chosen because it is comprised of equal numbers of male and female Japanese and Caucasian targets displaying seven different emotional expressions, including happiness, and has been extensively validated. This allowed us to systematically vary the targets' race, gender, and facial expression across participants.

We selected photographs of eight targets: two Caucasian males (CM1, CM2), two Caucasian females (CF1, CF2), two Japanese males (JM1, JM2), and two Japanese females (JF1, JF2). Each target had a photograph while inexpressive and one while smiling. In past research, participants have commonly been shown images of a single face while both inexpressive and emotionally expressive. However, this presentation is problematic if a true gauge of initial impression formation is desirable. If participants view each face more than once, they may adjust their initial ratings as more information becomes available with each additional presentation of the face. Because we are interested in the process of initial impression formation, we instead ensured that participants saw each face only once. Each participant viewed photographs of all eight targets, but was randomly assigned to view either all neutral or all smiling photographs. Target photographs were interspersed with 14 photographs of other targets and facial expressions, for a

Table 1 Sample characteristics

	Means (SD) and percentages	
	Asian American ($n = 43$)	European American ($n = 50$)
% Female	83.7a	68.0b
Age	19.86 (1.75)a	19.74 (1.41)a
Cultural orientation		
GEQ-American	3.76 (.51)a	4.08 (.30)b
GEQ-Asian	3.37 (.50)	–
Years in U.S.	8.06 (5.93)	–

A dash indicates that data were not applicable. Means with different subscripts are different at $p < .01$

total 22 photo stimuli per participant. Negative facial expressions were included for exploratory purposes, but were not a focus of the current study. Photographs were presented in random order for each participant.

Race and gender are often treated as essentialized groups, yet these are socially constructed categories with a great deal of variation within them. We chose not to average individual targets' ratings within race and gender categories. This allowed us to identify patterns of personality ratings based on target ethnicity and gender while still allowing for variation in personality ratings within each of these groups. Indeed, the fit of statistical models were greater when targets were entered individually rather than by category, indicating that individual targets within each gender and racial group were perceived differently from each other to some extent. When presenting results, we report target ratings by their race and gender in order to facilitate identification of patterns within and across groups.

Measures

Target personality

Participants' ratings of the targets' personality characteristics were assessed using the Ten-Item Personality Inventory (TIPI; Gosling et al. 2003), a well-validated measure of the big-5 personality dimensions: extraversion, agreeableness, conscientiousness, neuroticism, and openness to experience. Items were rated on a 7-point scale (1 = Disagree strongly, 7 = Agree strongly). This short scale was selected in efforts to maintain participant attention across multiple iterations of the rating task. Averaged across smiling and inexpressive targets, participants made reliable judgments of most targets' extraversion, agreeableness, and conscientiousness ($\alpha = .6$ to $\alpha = .82$). Participants were unable to make reliable judgments of one target in each of these categories (α's $< .6$). There were no overall differences in results when these targets were removed from analyses, so the results presented include ratings of all targets. Participants were not able, in most cases, to make reliable judgments of either neuroticism or openness to experiences, so these personality traits were excluded from analyses. Reliability of neuroticism ratings for still photos was low in past research as well (Borkenau and Liebler 1992).

Target attractiveness

Target attractiveness was measured through a single item ("How attractive was that individual?") administered following ratings of personality. Attractiveness was included as a covariate in all analyses because it has been shown to influence trait ratings of personality characteristics, particularly extraversion, in past research (Albright et al. 1988; Eagly et al. 1991).

Procedure

Upon arrival in the laboratory, informed consent was obtained from all individual participants included in the study. Participants viewed images one at a time on a computer screen. For each image that appeared on the screen, participants were instructed to complete the personality and attractiveness ratings. Participants rated a total of 22 targets, including the eight targets of interest. Following all images, participants completed the GEQ and demographic information. Participation took approximately 1 h.

Data analysis plan

We first aimed to test whether participants that viewed smiling faces rated them more similarly to each other than did participants who rated inexpressive faces. To do so, we computed a value reflecting the standard deviation across each participant's ratings of targets' extraversion, agreeableness, and conscientiousness. We then conducted three 2 × 2 Analyses of Variance (ANOVA's) with target emotional expression (inexpressive, smiling), participant culture (European American, Asian American), and their interaction predicting the standard deviation across all eight targets' ratings of extraversion, agreeableness, and conscientiousness. To more fully understand the patterns driving results of the analyses above, and to test the hypothesis that participant culture influences ratings of smiling targets, Mixed Hierarchical Linear Models (HLM) were computed separately for extraversion, agreeableness, and conscientiousness. Target (CM1, CM2, CF1, CF2, JM1, JM2, JF1, JF2) was entered as a within-participant factor. Target emotional expression (inexpressive; smiling) and participant culture (European American; Asian American)[1] were added as between-subjects factors in a 3-way factorial model. Target attractiveness was included as a covariate; however, there were no differences in results when this variable was excluded from analyses. Post-hoc means comparisons based on overall

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[1] To more fully test the effects of participant culture, we also ran the analyses above using a dichotomous score reflecting high and low levels of American cultural orientation (GEQ-A) for each group instead of participants' self-reported cultural background. This analysis did not change the pattern of results from that reported below. We also ran the analyses above in a sample restricted to Asian participants which tested whether orientations towards their native cultures predicted trait ratings. In this case, effects on agreeableness ratings reported in text as significant were reduced to marginal significance. However, the overall pattern remained comparable to those reported in the main text, signifying that this may be a result of underpowered analyses rather than true cultural difference.

effects were used to examine the nature and direction of effects. Bonferroni adjustments for multiple hypothesis testing were made in all post hoc analyses, and all reported *p* values have been adjusted to reflect these more conservative criteria.
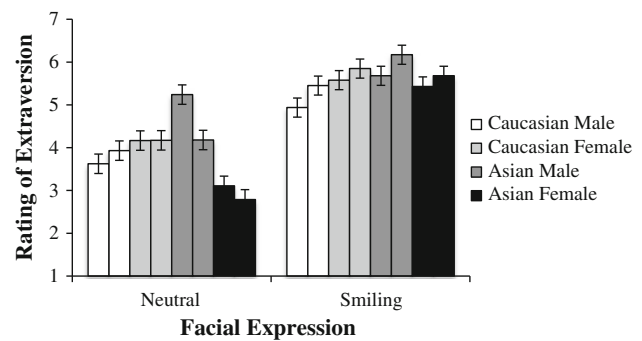
Results

Extraversion

ANOVA results showed that the standard deviation across participants' ratings of smiling faces was lower than the standard deviation across ratings of inexpressive faces [$F(1, 89) = 18.37, p < .001$], indicating that smiling faces were indeed rated more similarly to each other than were inexpressive faces. There was no significant effect of participant culture on the standard deviation of extraversion ratings [$F(1, 89) = .39, p = .533$], nor was the interaction between participant culture and target facial expression significant [$F(1, 89) = .86, p = .357$].

Mixed HLM analysis yielded a main effect of target facial expression [$F(1, 89.16) = 76.45, p < .001$] indicating that targets were rated as more extraverted when they smiled than when they were not expressive. A main effect of target [$F(7, 620.44) = 11.74, p < .001$] indicated that individual targets received average extraversion ratings that differed from each other. Main effects were qualified by a significant interaction between target and facial expression [$F(7, 620.34) = 7.38, p < .001$]. Post-hoc comparisons revealed that, as indicated by the ANOVA analysis reported above, participants were more likely to perceive differences in targets' levels of extraversion when they were inexpressive (see Fig. 1). Out of a possible 28 total comparisons between targets, 14 comparisons of inexpressive targets yielded significant differences (all *p*'s < .01), compared with only two significant differences across ratings of smiling faces (CM1 < CF2, *p* = .019; CM1 < JM2, *p* < .001; all other *p*'s > .146). As seen in Fig. 1, the impacts of smiling differed across individual targets. In line with the stereotype, Japanese female targets were perceived as being significantly lower in extraversion than most other targets while inexpressive (*p*'s < .003). Smiling had a greater impact on extraversion ratings for these targets than it did for others. One of the two Japanese males (JM2) was rated as significantly more extraverted than other targets while inexpressive, and impressions of this target did not significantly differ when he was rated while smiling (*p* = .180).

There were no significant effects of participant culture on ratings of extraversion [$F(1, 90.25) = .746, p = .290$], nor any significant interactions between participant culture and target [$F(7, 620.32) = .232, p = .977$] or target facial

Fig. 1 Ratings of extraversion for each target, grouped by facial expression

expression [$F(1, 88.81) = .167, p = .684$]. There was a marginally significant three-way interaction between rater culture, target, and target facial expression on ratings of extraversion [$F(7, 620.24) = 1.93, p = .063$]. However, post hoc analyses adjusted for multiple comparisons did not reveal any significant differences between European and Asian American participants' ratings of targets while either expressive or inexpressive.

Agreeableness

ANOVA results again showed that the standard deviation across participants' ratings of smiling faces was lower than the standard deviation across ratings of inexpressive faces [$F(1, 89) = 18.10, p < .001$], indicating that smiling faces were rated more similarly to each other than were inexpressive faces. There was no significant effect of participant culture on the standard deviation of agreeableness ratings [$F(1, 89) = .18, p = .677$], nor was the interaction between participant culture and target facial expression significant [$F(1, 89) = .08, p = .773$].

As was the case with extraversion, a main effect of target facial expression emerged [$F(1, 88.29) = 25.91, p < .001$], such that targets were rated as more agreeable when they were smiling than when they were inexpressive. A main effect of target [$F(7, 619.67) = 13.07, p < .001$] indicated that individual targets received average ratings of agreeableness that differed from each other. As was the case with extraversion ratings, main effects were qualified by a significant interaction between target and facial expression [$F(7, 619.55) = 8.27, p < .001$]. Again, post hoc comparisons revealed that participants were more likely to rate targets as different from each other in their levels of agreeableness when they were inexpressive (see Fig. 2). Out of 28 total comparisons between targets, 15 comparisons of inexpressive targets were significantly different (all *p*'s < .003), while only three comparisons were significantly different for smiling targets (CM1 < JM1, *p* = .042; CM1 < JF1, *p* = .004;

CM1 < JF2, $p = .026$). Smiling had a larger impact on some targets' ratings than others (see Fig. 2). In line with the stereotype, Caucasian males were rated as significantly less agreeable than most other targets while inexpressive (all p's < .003), as was one Japanese female (JF1, $p < .006$), yet these targets' ratings increased more than others' as a result of being rated while smiling, reducing most of these differences to nonsignificance. Meanwhile, Caucasian females and one Japanese male (JM1) received the highest ratings of agreeableness while inexpressive, and their ratings were not significantly impacted by smiling (p's > .113).

There was no significant main effect of the rater culture on ratings of agreeableness [F (1, 89.59) = .201, $p = .655$]. There was a marginally significant interaction between rater culture and target [F (7, 619.52) = 1.91, $p = .065$]. This effect was driven by ratings of a single target (CM1) whom American participants rated as significantly less agreeable than Asian participants ($p = .010$). There was also a marginally significant interaction between participant culture and target facial expression [F (1, 87.90) = 3.17, $p = .078$]. Post-hoc comparisons suggest that smiling has a marginally greater impact on European Americans' ratings of agreeableness than it does for Asian American raters. There was no significant three-way interaction between facial expression, target, and rater culture on ratings of agreeableness [F (7, 619.42) = 1.22, $p = .290$].

Conscientiousness

ANOVA results showed that the standard deviation across participants' ratings of smiling faces did not differ from the standard deviation across ratings of inexpressive faces [F (1, 89) = 2.32, $p = .132$], indicating that smiling did not reduce variability in participants' impressions of conscientiousness. There was no significant effect of participant culture on the standard deviation of conscientiousness

ratings [F (1, 89) = 3.18, $p = .078$], nor was the interaction between participant culture and target facial expression significant [F (1, 89) = .01, $p = .930$].

Mixed HLM analysis revealed a main effect of target also emerged for ratings of conscientiousness [F (7, 621.91) = 5.90, $p < .001$], indicating that individual targets received average conscientiousness ratings that differed from each other. Unlike extraversion and agreeableness, there was no significant effect of target facial expression on ratings of conscientiousness [F (1, 89.53) = .01, $p = .911$], nor any significant interaction between target and facial expression [F (7, 621.76) = .1.29, $p = .254$]. Post-hoc analyses revealed no discernible patterns of differences in ratings based on target ethnicity or gender (Fig. 3).

There was also no main effect of rater culture on ratings of conscientiousness [F (1, 91.14) = 1.19, $p = .278$]. There was, however, a significant interaction between rater culture and target [F (7, 621.74) = 2.25, $p = .029$]. One Caucasian male target was rated as particularly low in conscientiousness by European American, but not by Asian American raters. One Japanese female target was rated as particularly low in conscientiousness by Asian American, but not by European American raters. There was not a significant interaction between rater culture and target facial expression [F (1, 89.03) = .41, $p = .525$] or between facial expression, target, and rater culture [F (7, 621.61) = 1.03, $p = .412$] on ratings of conscientiousness.

Discussion

In the present study, we examined the impacts of target and rater characteristics on impression formation of inexpressive and smiling faces. We first hypothesized that smiling would increase ratings of extraversion and agreeableness, but not conscientiousness, across targets. In support of this hypothesis, and in replication of past research finding that
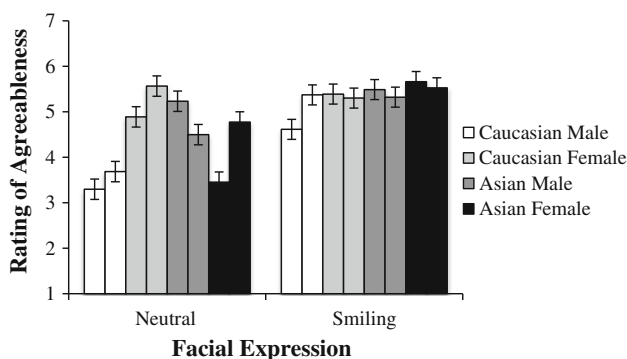
Fig. 2 Ratings of agreeableness for each target, grouped by facial expression
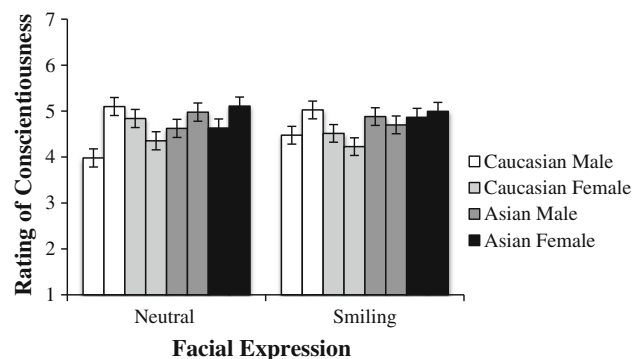
Fig. 3 Ratings of conscientiousness for each target, grouped by facial expression

smiling is associated with interpersonally relevant personality dimensions (Knutson 1996; Montepare and Dobish 2003; Hess et al. 2002; Albright et al. 1997), smiling faces received higher ratings of extraversion and agreeableness than inexpressive faces while ratings of conscientiousness were unaffected by facial expression.

Of primary interest in the current research, we hypothesized that smiling would undermine the use of stereotypes on impressions of targets' extraversion and agreeableness, leading smiling faces to be perceived more similarly than inexpressive faces. Our evidence supports this hypothesis, finding that variation in ratings of extraversion and agreeableness across the eight targets was lower for smiling than for inexpressive faces. Furthermore, there were fewer significant differences in ratings of extraversion and agreeableness for smiling than for inexpressive targets. It seems that smiling levels the playing field when it comes to interpersonally relevant personality traits. When inexpressive, some targets seem to incur substantial interpersonal costs in that they are perceived to have lower levels of extraversion and agreeableness, which are interpersonally desirable traits, than others. When these same targets smile, they are rated substantially more similarly to others in extraversion and agreeableness. This means that, consistent with the findings of Hareli et al. (2009) and Hess et al. (2000), the gains to smiling are disproportionate across targets. As the current research clarifies, when targets are perceived as highly extraverted or agreeable when inexpressive, smiling does little to change others' perceptions of them. However, targets that are rated very low in these traits when inexpressive are able to "catch up" to the ratings of others through smiling.

We hypothesized that inexpressive targets' personalities would be rated differently from each other in line with stereotypes associated with their race and gender. We found some evidence for patterns of personality inferences based on race and gender. However, observed patterns are only partially consistent with stereotypes of women as higher in warmth than men, and Asians as lower in warmth than Caucasians (Fiske et al. 2002; Glick and Fiske 1996). Specifically, Caucasian, but not Japanese, males were rated as lower in agreeableness than females. Japanese females but not males were also rated as lower in extraversion than Caucasians. This may reflect more specific stereotypes of particular subgroups (e.g., Asian women as subservient; Pyke and Johnson 2003; Mok 1998). Nevertheless, the reduction or elimination of these differences in ratings of smiling faces provides support for the hypothesis that smiling provides cues related to personality that are strong enough to negate the use of information based on gender or race in forming impressions of others.

However, it is worth noting that we also found evidence for differences in personality inferences within target race and gender groups—particularly in inexpressive faces. Most notably, one Japanese male target was rated particularly high in extraversion while inexpressive, and one Japanese female rated particularly low in agreeableness while inexpressive. This may be due to differences in facial morphology across individual targets. A number of studies have found facial morphology plays an important role in driving impression formation. For example, fuller faces have been associated with ratings of warmth in past research (Hassin and Trope 2000). It is possible that counter-stereotypical patterns in our data may have been driven by individual-level differences in facial structure. Unfortunately, the current study did not have sufficient range in physiognomies to examine these as a source of within-group variation across ratings of extraversion, agreeableness, or conscientiousness.

Finally, we hypothesized that Caucasian raters would infer higher levels of extraversion and agreeableness from smiling faces than would Asian raters. However, we found little evidence for an impact of rater culture on personality inferences. Caucasians did perceive one Caucasian target to be lower in conscientiousness than others, while Asian American raters perceived one Japanese target as particularly low in conscientiousness. It is possible that each group is more discerning in their judgments of conscientiousness in their own group members. Characteristics of our sample of Asian participants may have decreased our ability to detect true cultural differences. First, all participants were recruited in the U.S., meaning that our sample suffers from issues of self-selection into the American cultural context as well as the potential for adaptation to American cultural values and practices. Indeed, on average, the Asian American participants in our sample tended to identify more strongly with American than with Asian culture. We attempted to address this issue by testing the potential impact of cultural orientation in place of participants' self-identified group membership. However, this did not change the reported pattern of results. Still, it may be that a sample of East Asian participants that identified more strongly with Asian norms and practices may have displayed the hypothesized cultural differences in their ratings of smiling targets' personalities. An additional area of concern in this regard is that Asian participants in our sample hail from nations throughout East Asia, while the Asian targets presented to participants were all of Japanese descent. Subtle differences in facial expressions of emotion across East Asian groups may have obscured cultural differences that would have emerged had the participant sample been restricted to Japanese participants' ratings of Japanese targets (Marsh et al. 2003).

Limitations and future directions

The current research is limited in a number of important ways. Women are strongly overrepresented in our sample of raters. As a result, we were unable to rigorously test for how participant gender might influence personality inferences. Additionally, participants and targets represented only Caucasian and East Asian individuals. We cannot extrapolate from these findings to suggest individuals from all groups will be perceived equally while smiling. Future research would benefit from greater heterogeneity in target and participant characteristics to determine whether the results of the current study extend to targets and raters of more diverse cultural contexts.

Another limitation lies in the restricted use of facial expressions in our target stimuli. Smiling was the only emotionally expressive facial behavior assessed in this study. Furthermore, all targets in the "smiling" condition displayed genuine, or Duchenne, smiles. It is not clear whether different facial expressions of emotions (e.g., anger, sadness) or other types of smiles (e.g., embarrassed, nervous, polite; Ambadar et al. 2009) would influence personality inferences in similar ways. The results of our study suggest that other facial expressions might undermine differences in personality inferences on inexpressive targets only when the expression conveys clear information about the personality characteristic (e.g., nervous smiling and neuroticism). Future research testing these possibilities would strengthen certainty in the results of this study.

Another limitation of the current study was the restricted range of ethnic and facial feature combinations within our stimuli set. As discussed above, this study included only two targets within each group, and these targets were sometimes rated differently from each other. This signifies the importance of testing the role of facial morphology alongside group membership by more systematically varying facial features within target groups. Because our research did not systematically control for facial morphology, it is impossible for us to identify which components of inexpressive faces drive differences in ratings within groups, and how these may alter the impact of smiling.

Finally, the faces in this study were presented in the absence of situational cues. Cultural norms for appropriate expressivity vary across situations. In the workplace, for example, positive emotions may be considered appropriate in one cultural context and lack of emotions may be considered appropriate in another. In this case, smiling may be perceived positively in one cultural group and negatively in the other. It is possible that, by removing faces from context, the current study was not sensitive enough to uncover cultural differences in inferences from smiling faces. A more thorough understanding of how people interpret and form impressions of others in real-world situations, particularly when cultural norms conflict, is an important next step toward understanding and optimizing initial encounters with diverse cultural groups.

The results of this study have implications across the wide range of domains impacted by impression formation, including employment and hiring decisions (Branscombe and Smith 1990), law enforcement and political decision-making (Hassin and Trope 2000, Study 4), and perceptions of emotion across cultural contexts. In all of these cases, the results of the current study suggest that perceivers should be especially wary of the impressions they form of others when little behavioral information is available. The impressions formed of inexpressive individuals may be especially susceptible to influence from information based on race or gender-based stereotypes.

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