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First Impressions From Faces Among U.S. and Culturally Isolated Tsimane' People in the Bolivian Rainforest

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Abstract

The authors examined the generalizability of first impressions from faces previously documented in industrialized cultures to the Tsimane' people in the remote Bolivian rainforest. Tsimane' as well as U.S. judges showed within-culture agreement in impressions of attractiveness, babyfacedness, and traits (healthy, intelligent/knowledgeable, dominant/respected, and sociable/warm) of own-culture faces. Both groups also showed within-culture agreement for impressions of other-culture faces, although it was weaker than for own-culture faces, particularly among Tsimane' judges. Moreover, there was between-culture agreement, particularly for Tsimane' faces. Use of facial attractiveness to judge traits contributed to agreement within and between cultures but did not fully explain it. Furthermore, Tsimane', like U.S., judges showed a strong attractiveness halo in impressions of faces from both cultures as well as the babyface stereotype, albeit more weakly. In addition to cross-cultural similarities in trait impressions from faces, supporting a universal mechanism, some effects were moderated by perceiver and face culture, consistent with perceiver attunements conditioned by culturally specific perceptual learning.

Keywords

attractiveness, babyfacedness, culture, face perception, trait impressions

The belief that faces provide cues to character spans the centuries, from Aristotle, who specified precise associations like “prominent ears and chattering, to 18th-century physiognomists, whose writings on the topic were assiduously followed by matchmakers and almost cost Darwin his passage on the *Beagle*,¹ to modern-day face readers, whom one encounters on the streets of

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Hong Kong and on the web, where a search for professional face readers brings up 10,600 results. The association of appearance and character is supported by systematic research evidence documenting rapid and consensual first impressions from faces (Bar, Neta, & Linz, 2006; Rule & Ambady, 2008; Willis & Todorov, 2006) as well as sensitivity to variations in facial attractiveness and babyfacedness in young infants (Kramer, Zebrowitz, San Giovanni, & Sherak, 1995; Langlois, Ritter, Roggman, & Vaughn, 1991; Langlois, Roggman, Casey, & Ritter, 1987), which suggest that “face reading” is a universal phenomenon. The present research provides a more definitive answer to the universality question than previous research by comparing first impressions from faces in the United States with a traditional culture that is insulated from Western influences, the Tsimane’ of Bolivia. More specifically, we examined within- and between-culture agreement in trait impressions and judgments of facial attractiveness and babyfacedness, as well as the contribution of the latter appearance qualities to trait impressions.

The Tsimane’ are an ethnic and linguistic group of approximately 8,000 indigenous people, who live in roughly 100 villages along rivers and logging roads at the foothills of the Andes in the Bolivian Amazon. Their villages are small, each with about 24 households, linked by bonds of marriage and blood. Subsistence centers on farming, hunting, fishing, and gathering. A few individuals are fluent in Spanish and have some schooling. However, the Tsimane’ people are extremely isolated from modern culture. The main market town is at least 2 hours away by foot from some villages and days away by road or rivers for many others. Furthermore, the market town itself has a population of only 19,000, and it is an 18-hour bus ride from the capital, La Paz.²

There is little research examining impressions from faces among people isolated from industrialized cultures, like our Tsimane’ participants. A classic study by Ekman and Friesen (1971) demonstrated decoding of facial expressions among New Guinea tribal people that paralleled emotion recognition in modern societies. More recently, Jones and Hill (1993) investigated impressions of facial attractiveness among indigenous Hiwi Indians in Venezuela and compared them to those of “Westerners” (Americans of European ancestry, Brazilians, and Russians). Most relevant to our study, which focused on male faces, they found that intergroup agreement in ratings of the attractiveness of Brazilian male faces was higher for pairs of “Western” judges (mean $r = .66$) than for pairs of Hiwi and Western judges (mean $r = .33$). Similarly, intergroup agreement in ratings of the attractiveness of the faces of Ache Indians, an indigenous people in Paraguay, was higher for pairs of “Western” judges (mean $r = .58$) than for pairs of Hiwi and Western judges (mean $r = .20$). Ache and Hiwi judges showed agreement in ratings of the attractiveness of Ache faces that was similar to that shown among Westerners ($r = .50$), whereas their agreement in ratings of the attractiveness of Brazilian faces was lower than that shown by Westerners ($r = .21$). These results suggest that there are both universal standards of attractiveness as well as some variation across cultures.

On an evolutionary psychology account, facial attractiveness is a proxy for qualities that have functional significance, such as health, fertility, and dominance (Buss, 1989; Gangestad & Buss, 1993; Luevano & Zebrowitz, 2007). Insofar as facial cues to such qualities are universal, this account would predict U.S.-Tsimane’ agreement in at least some trait impressions from faces. So would the hypothesis that consensual trait impressions from faces derive from the overgeneralization of responses to facial qualities that guide adaptive behavior. For example, traits that are accurately revealed by facial cues that characterize low fitness, babies, or emotion are perceived in normal adults with neutral expressions when their facial structure resembles the unfit, babies, or a particular emotion (Zebrowitz, Fellous, Mignault, & Andreoletti, 2003; Zebrowitz, Kikuchi, & Fellous, 2010; Zebrowitz & Montepare, 2008).

Consistent with the prediction of cross-cultural similarity in trait impressions from faces, U.S. and Korean judges showed agreement in their impressions of the dominance, strength, warmth, and honesty of own- and other-culture faces, as well as their impressions of attractiveness and babyfacedness (McArthur & Berry, 1987; Zebrowitz, Montepare, & Lee, 1993). Similar agreement in impressions of own- and other-culture faces have been reported for judges from Japan and the

United States (Rule et al., 2010) and judges from China and the United States (Albright, Malloy, Dong, Kenny, & Fang, 1997). Although the East Asian judges in these studies were relatively isolated from Western faces and cultural influences, it remains possible that exposure to Western media shaped reactions to faces that matched those of Americans. On the other hand, functional explanations for trait impressions from faces implicate universal mechanisms that predict similar trait impressions among U.S. judges and the Tsimane' despite the absence of media exposure for the latter. These explanations would predict not only U.S.-Tsimane' agreement in impressions but also cultural similarities in face stereotypes. Specifically, Tsimane', like U.S. judges, should show the attractiveness halo effect, in which more attractive people are perceived to have more positive traits, and the babyface stereotype, in which more babyfaced adults are perceived to have more childlike traits.

There is also reason to predict at least some cultural differences in agreement and in facial stereotypes. The ecological theory of social perception holds that what a person perceives in faces depends not only on what information exists but also on what information the person is able to detect as a result of perceptual learning, the "education of attention" (Gibson, 1966), and what information is useful to that perceiver (McArthur & Baron, 1983; Zebrowitz, Bronstad, & Montepare, 2006 [AQ: 1]), which can vary across cultures (Park & Schaller, 2009). Cultural variations in either perceptual experience or the utility of information, such as how reliably attractiveness reveals health, may weaken between-culture agreement in first impressions.

The faces a person has experienced determine the prototypical or "average" face for that individual. Because faces closer to the prototype are judged more attractive (Bronstad, Langlois, & Russell, 2008; Langlois & Roggman, 1990; Rhodes, 2006), differences in the prototypical face for American and Tsimane' judges may suppress agreement in attractiveness ratings. Evidence for varying standards of attractiveness includes the Jones and Hill (1993) research that was summarized above and the finding that Americans who presumably share common perceptual experiences by virtue of being friends or relatives also show stronger consensus in their judgments of attractiveness than do strangers (Bronstad & Russell, 2007). Experience with a particular group of faces also may better attune perceivers to the structural variations that provide trait cues just as it better attunes them to identity cues (Furl, Phillips, & O'Toole, 2002; Sangrigoli, Pallier, Argenti, Ventureyra, & de Schonen, 2005). Although Zebrowitz, Montepare et al. (1993) found little difference in within-race agreement about various traits of own-race versus other-race faces, this may be attributed to levels of agreement too high to reveal such variations. We expected larger differences in agreement about own- and other-culture faces in the present study, where perceivers were judging faces from an ethnic group to which they had little or no prior exposure. We also expected the difference in agreement about own- and other-culture faces to be larger for Tsimane' than U.S. judges, inasmuch as the latter live in a multicultural environment where they have perceptual experience with a wider range of faces.

Cultural differences in trait impressions may result not only from inexperience with faces from another culture but also from cultural variations in the adaptive value of particular traits. People may be most attuned to the facial qualities that convey highly valued traits with the result that there is greater within-culture agreement in impressions of the traits that are most valued in that culture. Differences in the valuation of traits also may produce cultural differences in the attractiveness halo effect. For example, attractiveness was more strongly associated with concern for others in Korea, a collectivist culture, than in the United States, where it was more strongly associated with dominance (Wheeler & Kim, 1997). Similarly, American students evaluated attractive American faces more favorably than unattractive faces on culturally valued individualistic traits but not on communal traits, whereas Taiwanese students evaluated attractive American faces more favorably on both individualistic traits and the communal traits more valued in Taiwanese culture (Shaffer, Crepaz, & Sun, 2000).

Whereas the foregoing investigators found equally robust physical attractiveness stereotyping across individualist and collectivist cultures, albeit moderated by the particular trait, others have

suggested that culture also may influence the overall strength of physical attractiveness stereotyping, with stronger effects in individualistic cultures, where a person's identity is based on personal attributes, than in collectivist cultures, where identity is defined by a person's place in the social system (Dion, 2002; Dion, Pak, & Dion, 1990). Consistent with this suggestion, the positive association of attractiveness with expected and self-reported life outcomes was stronger in American than more collectivistic Ghanian culture and stronger in contexts that emphasize individuality than those that emphasize stable relationships (Anderson, Adams, & Plaut, 2008). Since Tsimane' culture is less individualistic than U.S. culture (Reyes-García et al., 2009), these findings suggest that the halo effect may be weaker for the Tsimane.' On the other hand, the reliable evidence for attractiveness stereotyping in several collectivist cultures suggests that it will be shown by Tsimane' judges on culturally valued traits even though it may have less impact on life outcomes than in more individualistic cultures.

The present investigation extends previous research that has compared judgments of attractiveness in remote and modern cultures to also consider impressions of babyfacedness and traits. We predicted significant within-culture agreement for all impressions, with stronger agreement for own-culture faces, particularly among Tsimane' judges who have limited perceptual experience with faces of other ethnicities. We also predicted significant between-culture agreement, although we expected it to be weaker than within-culture agreement. In addition, we investigated whether cross-cultural agreement in trait impressions was mediated by facial attractiveness and/or babyfacedness. Finally, we expected the attractiveness halo effect and the babyface stereotype to be replicated among the Tsimane' both when judging own- and other-culture faces, although the traits showing the strongest attractiveness effects may differ for Tsimane' and U.S. judges.

Method

Facial Stimuli

White U.S. faces. Black and white images of 40 faces with neutral emotional expression were drawn from a sample of 185 adolescent men from the Intergenerational Studies (IGS) archive, a longitudinal study of representative samples of individuals born in Berkeley, California, in the late 1920s or attending school in Oakland, California, in the 1930s (Eichorn, 1981). The faces of all 185 men had been previously rated on a 7-point scale of attractiveness and babyfacedness (Zebrowitz, Olson, & Hoffman, 1993). The faces selected included 10 high-attractive and 10 low-attractive faces that scored in the top 10% and the bottom 20% in rated attractiveness; 10 high babyfaced and 10 low babyfaced that scored in the top 30% and the bottom 20% in rated babyfacedness (mean age = 17.45, $SD = .47$). Our selection of American faces at the extremes of the attractiveness dimension tested the limits of the previous finding of lower agreement in attractiveness ratings between than within ethnic groups.

Tsimane' faces. Color images of 55 neutral expression male faces, comparable in age to the U.S. faces, were drawn from photographs of Tsimane' men taken by the TAPS researchers (mean age = 19.96, $SD = 3.48$). An additional 38 men, who were slightly older, were also rated for another study.

We were interested in first impressions from faces that are independent of sex stereotypes (e.g., men rated as more dominant, women rated as more sociable). Including women's faces while avoiding sex-stereotyped ratings would have required blocking the faces by sex and doubling the total number of faces rated in order to provide sufficient variability in appearance within each sex (Biernat, Manis, Stapel, & Suls, 2007). Because such a lengthy protocol would have taxed the patience of Tsimane' judges, who were unused to surveys of this kind, we limited our study to faces of men.

Judges

Sixteen White U.S. undergraduate students (8 men) rated the White U.S. faces, and 14 White U.S. undergraduate students (7 men) rated the Tsimane' faces. Forty Tsimane' young adults (20 men) rated the White U.S. faces and 40 (20 men) rated the Tsimane' faces.³ U.S. participants received credit toward a research participation requirement. Tsimane' participants received flashlight batteries, a metal knife, or fish hooks and fishing lines.

Rating Scales

The faces were rated on 4 traits and 2 appearance qualities. U.S. judges made their ratings on 7-point bipolar scales. Tsimane' judges made their ratings on 4-point scales illustrated with piles of stones: 3 stones was labeled *very*; 2 stones was labeled *little bit*; 1 stone was labeled *not very*; 0 stones was labeled *not at all*.

Faces were rated on the following scales: attractive, babyfaced, healthy, intelligent/knowledgeable, dominant/respected, and warm/sociable. For Tsimane' judges, the label *knowledgeable* and the dual labels *dominant/respected* and *warm/sociable* were used for all faces. For U.S. judges, the labels *intelligent*, *dominant*, and *warm*, initially used for U.S. faces, were changed to the related qualities of *knowledgeable*, *respected*, and *sociable* for Tsimane' faces because these concepts are better understood by Tsimane' judges. For example, Tsimane' understand knowledgeability as it pertains to plants, animals, weather, soils, and diseases (Reyes-García et al., 2010), whereas the abstract concept of *intelligence* is less culturally relevant. Tsimane' judges also rated how well known each person was to them on the 4-point stone scale to use as a control variable.

Procedure

White judges viewed images and input responses on Pentium 4 personal computers with Windows XP and 19" CRT displays. MediaLab 2004.2.1 (Empirisoft 2004) was used to display images and collect ratings. U.S. faces were shown in a random order. Tsimane' faces were blocked into four age groups, 15 to 20 ($N = 30$), 21 to 25 ($N = 25$), 26 to 30 ($N = 22$), and 31 to 36 ($N = 16$), with age group order counterbalanced across raters and faces within each age group shown in a random order. Only data from the first two age groups are reported here in order to approximately match the age of the U.S. faces. After rating all the faces on one scale, the same faces were shown again and rated on another scale. Faces were shown for 5 to 6 s for each rating. There were two orders of trait ratings, with attractiveness and babyfacedness rated in counterbalanced order after the traits. The order of trait ratings was as follows: healthy, dominant/respected, sociable/warm, intelligent/knowledgeable for half the judges, and the reverse order for the other half.

Tsimane' judges rated photographs of the faces presented in photo albums. Data collection was carried out by a trained Tsimane'-Spanish translator, who explained the procedure to the raters in the Tsimane' language, and assured them of confidentiality. Informed consent was obtained verbally, not in written form, owing to the low levels of literacy in the Tsimane' adult population. The Institutional Review Board for research with human subjects of Brandeis University approved the study protocol and the consent procedure. One group of Tsimane' judges rated all the U.S. faces, and a year later, a second group rated all the Tsimane' faces. The order of the faces from each culture was counterbalanced across judges with half rating them in one random order and the others rating them in the reverse order. The same two orders of trait and facial appearance ratings were used as for U.S. judges. The investigator explained each scale to participants in the Tsimane' language, asking them to point to the pile of stones that showed their impression of the

face (i.e., 0 to 3 stones), and recorded their responses. Before the data were collected, Tsimane judges were given practice trials to teach them how to use the stone rating scales with happy, sad, and neutral expression faces. After illustrating with one example of each expression, participants were shown another example of each to make sure they understood how to use the scale. When rating babyfacedness of the faces, Tsimane' judges were given additional clarification: "I want you to tell me how babyfaced you think the faces are. None of these people is a baby. They are all young men. But, some have faces that look more like a baby's face and others have faces that look more like a grown man's face."

Results

Overview of Analyses

To examine within- and between-culture agreement, we computed "split-half reliabilities" by correlating mean ratings of own- or other-culture faces, provided by one half of the participants (those with even subject ID numbers), with mean ratings provided by the second half. Male and female raters and the two orders of trait ratings were equally represented in each half. This measure of agreement had several advantages as compared with alpha coefficients. First, the correlation coefficients permitted inferential statistical comparison of within-culture agreement for own- versus other-culture faces as well as within- versus between-culture agreement, which alpha coefficients could not. Second, this metric enabled us to compute partial correlations that controlled how well-known the Tsimane' faces were to the Tsimane' judges, which is what we report. Third, it also enabled us to examine agreement with attractiveness or babyfacedness controlled to determine whether either of these appearance qualities mediated agreement in trait impressions. Finally, it should be noted that any cultural differences in agreement are not biased by the fact that there were fewer U.S. than Tsimane' judges, because face is the unit of analysis in the split half correlations between mean ratings of each face across odd and even numbered judges.⁴ Face was also the unit of analysis when examining facial appearance stereotypes. Specifically, for judges from each culture, we correlated mean ratings of attractiveness or babyfacedness with mean ratings of each trait. In order to assess the independent influence of each appearance quality, the correlations with attractiveness partialled out babyfacedness, and the correlations with babyfacedness partialled out attractiveness. Correlations for Tsimane' raters also partialled out ratings of how well-known the faces are.

Within-Culture Agreement

As shown in Table 1 and Figure 1, the split-half correlations revealed more within-culture agreement among U.S. than Tsimane' judges for both groups of faces (respective means = .74 and .44, averaging across face culture). Whereas U.S. judges showed highly significant agreement on all six dimensions whether rating own- or other-culture faces, Tsimane' judges showed stronger agreement in ratings of own-culture faces. Specifically, they showed significant agreement on all six dimensions for Tsimane' faces but failed to show significant agreement in ratings of how warm or dominant U.S. faces looked. Comparisons between the agreement coefficients for own- and other-culture faces using r to z transformations revealed that Tsimane' judges showed higher agreement regarding babyfaced ($z = 1.94, p = .05$), health ($z = 2.35, p = .02$), and dominant/respected ($z = 2.13, p = .04$) for own- than other-culture faces, with no significant differences in agreement about own- and other-culture faces on the other dimensions (all $ps > .35$). U.S. judges showed higher agreement only regarding the babyfacedness of own- than other-culture faces ($z = 1.98, p < .05$), with no significant own-culture advantage for other impressions.

Table 1. Agreement Within-Culture (Split Half Correlations) and Between-Culture With and Without Attractiveness Controlled

Culture Pair and Face Culture	Attractive	Babyface	Healthy	Intelligent / Knowledgeable	Dominant / Respected	Warm / Sociable	M
U.S.-U.S.							
U.S. faces	.78***	.85***	.78***	.65***	.80***	.86***	.79
Controlling attractive	—	.87***	.56***	.67***	.85***	.79***	.75
Tsimane' faces	.68***	.68***	.69***	.63***	.66***	.74***	.68
Controlling attractive	—	.63***	.46**	.43**	.21	.50***	.48
Tsimane'-Tsimane'							
U.S. faces	.50**	.39*	.33*	.60***	.09	.23	.36
Controlling attractive	—	.36*	.01	.50**	-.01	.14	.25
Tsimane' faces	.43***	.68***	.69***	.46**	.50***	.38**	.52
Controlling attractive	—	.66***	.61***	.26+	.41**	.22	.43
U.S.-Tsimane'							
U.S. faces	.50**	.22	.47**	.32*	.25	.44**	.50
Controlling attractive	—	.16	.04	.14	.25	.19	.28
Tsimane' faces	.29*	.61***	.66***	.54***	.41**	.41**	.49
Controlling attractive	—	.61***	.51***	.47***	.10	.12	.30

$N = 40$ U.S. faces and $N = 55$ Tsimane' faces. Coefficients represent agreement between mean ratings of each face provided by odd and even numbered judges within each culture. Tsimane' agreement on Tsimane' faces controlled mean ratings of how well those faces were known. Partial correlations for within-culture agreement controlled attractiveness ratings by judges from that culture; partial correlations for between-culture agreement controlled attractiveness ratings by judges from both cultures. Means across all ratings controlling attractiveness were calculated including the relevant attractive correlation in order to be comparable with the uncontrolled means.

* $p \leq .05$. ** $p \leq .01$. *** $p \leq .001$.

Between-Culture Agreement

Between-culture agreement was remarkably strong, with significant effects for all impressions of Tsimane' faces as well as for all impressions of U.S. faces except for babyfaced and dominant/respected. Nevertheless, as predicted, U.S. judges showed weaker between- than within-culture agreement for all impressions of U.S. faces: attractive ($z = 2.13, p = .03$), babyfaced ($z = 4.44, p < .001$), healthy ($z = 2.30, p = .02$), dominant ($z = 3.63, p < .001$), and warm ($z = 3.53, p < .001$), with a marginally significant trend for intelligent ($z = 1.91, p = .06$). They also showed more within- than between-culture agreement for some impressions of Tsimane' faces: attractive ($z = 2.70, p < .01$), sociable ($z = 2.62, p < .01$), and a marginally significant trend for respected ($z = 1.82, p = .07$). Contrary to prediction, Tsimane' judges did not show more within- than between-culture agreement for any impressions of Tsimane' faces and only a marginal effect for impressions of knowledgeable for U.S. faces ($z = 1.68, p = .09$).

Contribution of Attractiveness and Babyfacedness to Agreement in Trait Impressions

Controlling attractiveness. Agreement among U.S. judges for all impressions of U.S. faces remained significant when controlling attractiveness (Table 1 and Figure 1), although there was a nonsignificant trend toward lower agreement for impressions of health ($z = 1.77, p = .08$). U.S. judges' agreement for impressions of Tsimane' faces also remained significant when controlling attractiveness, with the

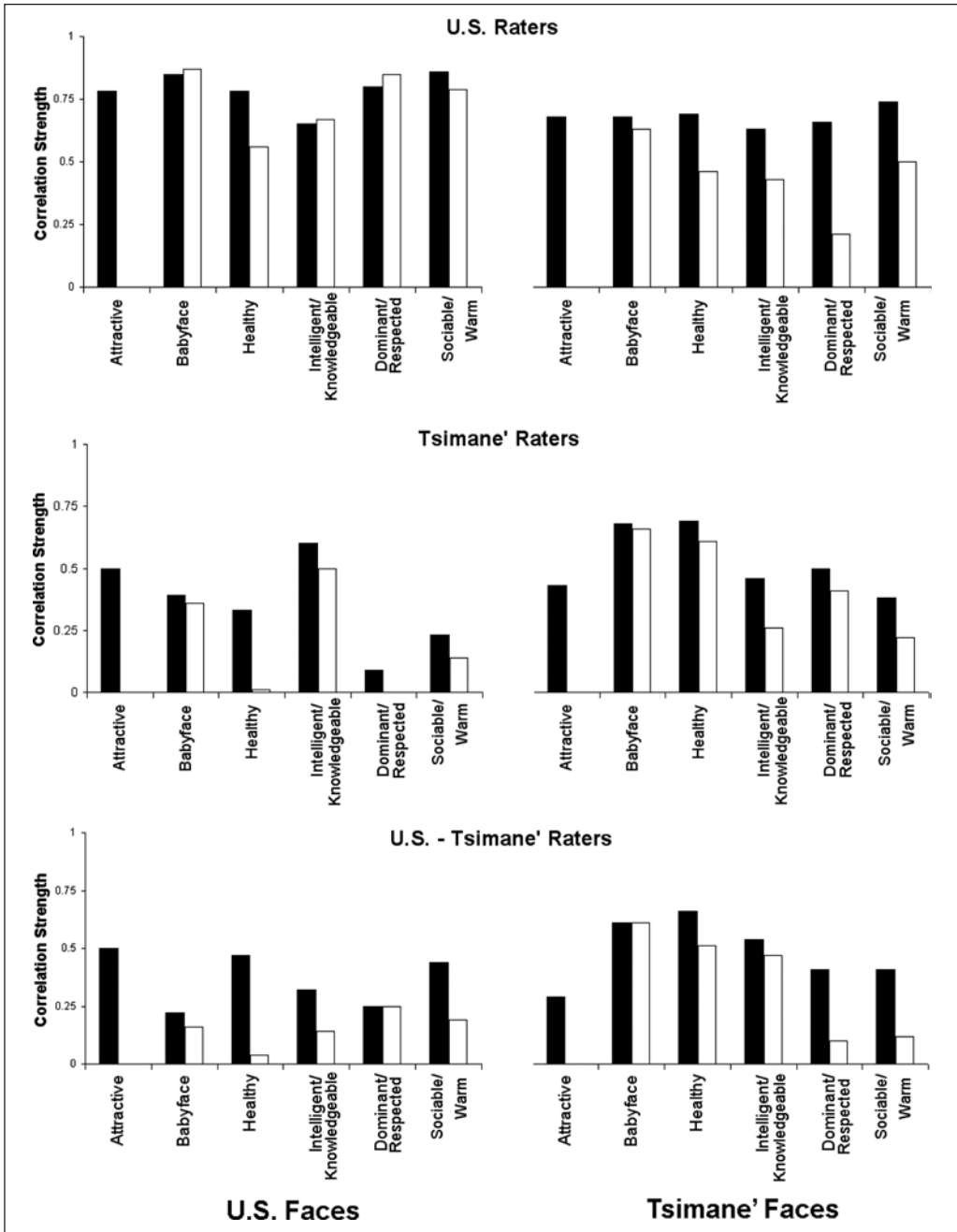


Figure 1. Within- and Between-Culture Agreement in Impressions of U.S. and Tsimane' Faces Are Shown by the Black Bars; Agreement Controlling the Attractiveness of the Faces Is Shown by the White Bars; Tsimane' Agreement in Impressions of Tsimane' Faces Also Controls How Well Known the Faces Were.

exception of impressions of respected, which showed a significant decrease ($z = 2.96, p < .01$). In addition, controlling attractiveness decreased U.S. judges' agreement in impressions of Tsimane' faces' health ($z = 1.79, p = .07$) and sociability ($z = 2.04, p = .04$), although the agreement remained

significant. Agreement among Tsimane' judges lost significance with attractiveness controlled for impressions of U.S. faces on the dimensions of healthy and for impressions of Tsimane' faces on the dimensions of knowledgeable and sociable, although neither of these decreases was statistically significant. Between-culture agreement for U.S. faces lost significance with attractiveness controlled for impressions of healthy, knowledgeable, and warm/sociable, although the decrease in agreement was significant only for impressions of health ($z = 2.02, p = .04$). Between-culture agreement for Tsimane' faces lost significance for impressions of dominant/respected and warm/sociable, although the decreases in agreement were not significant ($z_s = 1.71$ and 1.61 , respectively, $ps = .09$ and $.11$). In sum, controlling attractiveness resulted in the loss of significance for several agreement coefficients, with the reduction in agreement significant or marginally significant for U.S. judges' agreement regarding the health of faces from both cultures, for U.S. judges' agreement regarding how respected and sociable Tsimane' faces were, and for between-culture agreement on the health of U.S. faces.

Controlling babyfaceness. Controlling babyfaceness did not reduce within-culture agreement among U.S. or Tsimane' judges in their impressions of either U.S. or Tsimane' faces. It also did not reduce between-culture agreement in any trait impressions. However, it did improve between-culture agreement in impressions of the dominance of U.S. faces. The nonsignificant agreement became significant with babyfaceness controlled, $r(37) = .33, p < .05$. This result indicates that U.S.-Tsimane' agreement about how dominant/respected U.S. faces were was suppressed by their disagreement regarding their relative babyfaceness.

Cultural Similarities and Differences in Face Stereotypes

Attractiveness. The results provide strong evidence for the well-documented attractiveness halo effect even among judges in the remote Tsimane' culture and even when people were rating ethnically unfamiliar faces (Table 2). Both U.S. and Tsimane' judges rated more attractive U.S. and Tsimane' faces as more healthy, intelligent/knowledgeable, and warm/sociable. Tsimane' judges also rated more attractive faces as more dominant/respected, whereas U.S. judges did not rate them as more dominant. It is noteworthy that there was no consistent tendency for the influence of attractiveness to be greater for U.S. than Tsimane' faces even though the former were pre-selected to represent extremes on the attractiveness dimension within a representative sample. Although the overall effect of attractiveness was not markedly different for judges or faces from the two cultures, there were some variations across traits. U.S. judges showed a stronger halo effect than Tsimane' judges for impressions of how healthy Tsimane' faces were ($z = 2.16, p = .03$) and a marginally stronger halo for impressions of how warm/sociable U.S. faces were ($z = 1.82, p = .07$). In addition, U.S. judges' ratings of how respected the Tsimane' faces were showed a stronger halo effect than Tsimane' judges' ratings of how dominant/respected they were ($z = 2.68, p < .01$), whereas Tsimane' judges' ratings of how dominant/respected the U.S. faces were showed a marginally stronger halo than U.S. judges' ratings of how dominant they were ($z = 1.86, p = .06$).

Babyfaceness. The results provide mixed evidence for the babyface stereotype, which was strongest when people rated faces from their own culture. Consistent with the effects of babyfaceness in previous research, U.S. judges rated more babyfaced U.S. faces as significantly less dominant, Tsimane' judges rated more babyfaced Tsimane' faces as marginally less dominant/respected, and U.S. judges rated more babyfaced people from both cultures as more warm or sociable (Table 2). However, contrary to prediction, U.S. judges did not rate more babyfaced Tsimane' as less respected, Tsimane' judges did not rate more babyfaced U.S. faces as more dominant/respected, and Tsimane' judges did not rate individuals from either culture as more warm/sociable. Finally, U.S. judges associated babyfaceness in U.S. faces with poorer health, a facet of the babyface stereotype that has not been previously documented but is consistent with evidence that more babyfaced individuals are perceived as physically weaker (see Montepare & Zebrowitz, 1998).

Table 2. The Influence of Attractiveness and Babyfaceness on Trait Impressions Across Judge and Face Culture

	Healthy	Intelligent / Knowledgeable	Dominant / Respected	Warm / Sociable
Attractiveness				
U.S. judges–U.S. faces	.84***	.44**	.17	.69***
U.S. judges–Tsimane' faces	.75***	.62***	.83***	.72***
Tsimane judges–U.S. faces	.70***	.53**	.54**	.40**
Tsimane' judges–Tsimane' faces	.50**	.61***	.58***	.59***
Babyfaceness				
U.S. judges–U.S. faces	-.45**	.13	-.85***	.32*
U.S. judges–Tsimane' faces	.04	.04	-.09	.35***
Tsimane' judges–U.S. faces	-.20	-.19	-.10	.04
Tsimane' judges–Tsimane' faces	.01	.04	-.25†	-.16

$N = 40$ U.S. faces and $N = 55$ Tsimane' faces. Coefficients represent relationships between mean ratings of the faces across judges. Tsimane' ratings of Tsimane' faces partial out mean ratings of how well those faces were known. All attractiveness correlations partial out babyfaceness, and all babyface correlations partial out attractiveness. † $p = 0.10$. * $p < .05$. ** $p < .01$. *** $p < .001$.

The weakness of the babyface stereotype for other-culture faces may reflect greater difficulty judging the babyfaceness of these faces. Indeed, as noted above, judges' within-culture agreement on babyface ratings was significantly lower for other-culture than own-culture faces. To investigate this possibility, we examined correlations between U.S. judges' ratings of U.S. faces' babyfaceness and Tsimane' judges' ratings of them on the dimensions of dominant/respected and warm/sociable, controlling Tsimane' ratings of attractiveness. Similarly, we examined correlations between Tsimane' judges' ratings of Tsimane' faces' babyfaceness and U.S. judges' ratings of them on the dimension of respected, controlling U.S. ratings of attractiveness.

There was a significant correlation between U.S. judges' ratings of the babyfaceness of U.S. faces and Tsimane' judges' impressions of how dominant/respected they were, $r(37) = -.34, p = .03$, paralleling the babyface stereotype shown for U.S. judges' dominance ratings and suggesting that the failure of Tsimane' judges to show the babyface stereotype for U.S. faces was due, at least in part, to difficulty judging their babyfaceness. On the other hand, the correlation between U.S. judges' ratings of babyfaceness and Tsimane' judges' ratings of the warmth/sociability of U.S. faces was not significant, $r(37) = .19, p < .25$. Neither was the correlation between Tsimane' judges ratings of the babyfaceness of Tsimane' faces and U.S. judges' ratings of how respected they are, $r(52) = -.20, p < .15$.

Discussion

The present findings demonstrate strong generalizability of previously documented consensual trait impressions from faces. First, we found significant within-culture agreement in trait impressions as well as impressions of attractiveness and babyfaceness even among Tsimane' judges residing in a remote area of the Bolivian rainforest. Second, within-culture agreement for Tsimane' and U.S. judges was shown not only for faces of people from their own culture but also for faces from the other culture to which they have had little, if any, previous exposure. Third, there was significant between-culture agreement in all impressions of Tsimane' faces as well as impressions of U.S. faces, except for babyfaced and dominant. Fourth, the attractiveness halo and the babyface

stereotype were shown by Tsimane' as well as U.S. judges. Finally, the reliability and strength of trait impressions from faces were sometimes moderated by judge or face culture.

As predicted, within-culture agreement tended to be stronger for familiar-looking, own-culture faces than for faces from the other culture. This result is consistent with the argument that experience with a particular group of faces may better attune perceivers to the structural variations that provide trait cues just as it better attunes them to identity cues (Furl et al., 2002; Sangrigoli et al., 2005). In addition, the own-culture advantage tended to be stronger for Tsimane' than U.S. judges, which may reflect U.S. judges' greater perceptual experience with faces from a variety of ethnic groups.

Interestingly, the agreement advantage for own-culture faces was not shown for attractiveness judgments, which elicited slightly higher agreement for U.S. faces within both groups of judges. Although this result may appear contrary to the previous evidence for more within-culture agreement in attractiveness ratings of familiar faces among indigenous South American Indians (Jones & Hill, 1993), the discrepancy can be attributed to the fact that the U.S. faces in the present study were selected to represent the extremes of attractiveness within a representative population. Thus, Tsimane' judges were as able to agree on the attractiveness of unfamiliar U.S. faces as on the attractiveness of people from their own culture when the U.S. faces had large variations.

In contrast to the pattern of agreement for impressions of attractiveness, both groups of judges showed a significant own-culture advantage for impressions of babyfacedness even though U.S. faces were also pre-selected to represent extremes on this dimension. For U.S. judges, this pattern reflected particularly strong agreement regarding the babyfacedness of own-culture faces, with agreement about the babyfacedness of Tsimane' faces comparable to agreement about their attractiveness. For Tsimane' judges, this pattern also reflected particularly strong agreement regarding the babyfacedness of own-culture faces—stronger than agreement about their attractiveness—coupled with fairly low agreement about the babyfacedness of U.S. faces. Thus, Tsimane' judges had particular difficulty evaluating the babyfacedness of U.S. faces despite their selection to show strong variations, whereas they agreed more on the babyfacedness than the attractiveness of Tsimane' faces.

Although Tsimane' judges did show significant within-culture agreement, it was consistently weaker than that shown by U.S. judges whether judging own- or other-culture faces, and it failed to attain significance for ratings of U.S. faces on dominant/respected and warm/sociable. This result suggests that U.S. perceivers may have more shared standards for forming impressions from facial appearance. This could result from their exposure to media images designed to reinforce associations between particular facial qualities and particular traits as well as the greater necessity to make judgments about people from superficial qualities like facial appearance because, unlike the Tsimane', people in the U.S. are more likely to interact with strangers about whom they have little other information. The greater U.S. within-culture agreement could also reflect greater measurement error for the Tsimane'. Being unfamiliar with rating tasks as well as two-dimensional images of faces could decrease Tsimane-Tsimane agreement and underestimate any shared standards for forming impressions from faces (Reyes-García et al., 2004).

Between-culture agreement was surprisingly strong, failing to attain significance only for babyface and dominant/respected ratings of U.S. faces. The lack of between-culture agreement for dominant/respected ratings may reflect in part the tendency for disagreement about babyfacedness to suppress agreement about dominance, since the latter achieved statistical significance when babyface ratings were controlled. However, the fact that U.S. judges rated these faces on a "dominant" scale and Tsimane' judges rated them on a "dominant/respected" scale may also have contributed to the low agreement on this impression.

Although between-culture agreement was strong, it showed the predicted tendency to be weaker than within-culture agreement for U.S. judges' impressions of U.S. faces on all dimensions and for U.S. judges' impressions of Tsimane' faces on the dimensions of attractive, dominant/respected, and warm/sociable. Although it is possible that differences in trait labels used for Tsimane' and

U.S. judges contributed to greater within- than between-culture agreement on some traits, this cannot explain greater within-culture agreement regarding attractiveness, babyfacedness, or health, nor is it consistent with the finding that Tsimane' judges' between- and within-culture agreement did not differ significantly despite differences in the trait labels. The comparable between- and within-culture agreement for Tsimane' judges suggests that the cues that guide the first impressions of Tsimane' judges are shared by U.S. judges.

The present findings revealed that shared impressions of attractiveness made a modest contribution to trait impressions, with no particular impression being most reliably affected. In some instances, controlling attractiveness produced significant decreases in agreement, and it also sometimes caused agreement to lose significance. However, in even more instances, agreement in trait impressions was unaffected when attractiveness was controlled. This indicates that within- and between-culture agreement in trait impressions of faces does not derive only from a culturally universal "attractiveness halo effect." It remains for future research to identify facial cues besides attractiveness that contribute to the agreement in impressions of own- and other-culture faces that remained in the present study with attractiveness controlled. The theoretical and practical significance of such an investigation is highlighted by recent research that demonstrated accuracy of the Tsimane' ratings in the present study, with ethnobotanical plant knowledge predicting impressions of knowledgeability and mid-arm circumference predicting impressions of dominant/respected (Undurraga et al., 2010). One possible contributor to agreement other than attractiveness is resemblance to emotion expressions. Research has demonstrated that trait impressions from neutral expression faces, like those used in the present study, are influenced by the extent to which the facial structure objectively resembles anger, surprised, or happy faces (Zebrowitz et al., 2010). Since there is considerable cultural universality in these emotion expressions (Ekman & Friesen, 1971), cross-cultural agreement in trait impressions may be partially mediated by shared use of emotion resemblance when judging traits.

In addition to documenting the generalizability of consensual trait impressions from faces to Tsimane' judges, the present findings also document the generalizability of facial appearance stereotypes. Not only was the halo effect shown by U.S. judges even when rating unfamiliar Tsimane' faces, but it was also shown by Tsimane' judges on all trait dimensions, whether rating Tsimane' or U.S. faces. Thus, the aphorism "what is beautiful is good and what is ugly is bad" holds true even among people residing in a remote Bolivian rainforest, consistent with the anomalous face overgeneralization hypothesis that predicts culturally universal responses to variations in facial attractiveness (Zebrowitz et al., 2003; Zebrowitz & Rhodes, 2004). Moreover, contrary to the suggestion that the attractiveness stereotype would be stronger in more individualistic cultures (Anderson et al., 2008; Dion, 2002; Dion et al., 1990), the strength of the halo effect was fairly comparable across U.S. and Tsimane' judges in the present context of judging faces of strangers. Although there may be cultural differences in the social outcomes accruing to variations in attractiveness in other contexts, the fact that Tsimane' judges perceived more attractive individuals as more knowledgeable, respected, and sociable strongly suggests that there would be such associations within their culture. Finally, in contrast to previous research, cultural differences in the specific traits that showed a halo effect did not map onto a simple distinction between traits valued in collectivist versus individualistic cultures (Shaffer et al., 2000; Wheeler & Kim, 1997). The most striking difference was that U.S. judges did not show a halo effect when rating U.S. faces on "dominant," whereas they did show it when rating Tsimane' faces on "respected," and Tsimane' judges showed it when rating all faces on "dominant/respected." Rather than any cultural difference in the tendency to perceive more attractive U.S. faces as more powerful, this pattern of results suggests that attractiveness is more strongly associated with impressions of "respected" than impressions of "dominant."

The babyface stereotype was less robust across cultures than the attractiveness halo effect. U.S. judges associated higher babyfacedness with lower dominance for U.S. faces, and Tsimane' judges associated it with lower dominance/respect for Tsimane' faces. The failure of judges to show this babyface stereotype for other-culture faces contrasts with previous research comparing

U.S. and Korean judges' ratings of own- and other-culture faces (McArthur & Berry, 1987; Zebrowitz, Montepare et al., 1993). In the case of Tsimane' judges, this failure appears to reflect difficulty judging the babyfacedness of U.S. faces, since U.S. judges' ratings of the babyfacedness of U.S. faces did significantly predict Tsimane' judges' impressions of how dominant/respected they were. On the other hand, differences between babyface ratings of Tsimane' faces by U.S. and Tsimane' judges does not account for the failure of U.S. judges to show the babyface stereotype for impressions of how respected Tsimane' faces were. Perhaps that failure reflects a stronger link between babyfacedness and impressions of dominance, which was tapped by use of the label *dominant/respected* for Tsimane' judges and *dominant* for U.S. judges rating U.S. faces in contrast to the label *respected* used for U.S. judges rating Tsimane' faces.

Another limitation to the generalizability of the babyface stereotype was that U.S. judges associated higher babyfacedness with higher warmth for U.S. faces and higher sociability for Tsimane' faces, whereas Tsimane' judges' ratings of warm/sociable did not show this facet of the babyface stereotype even when U.S. judges' babyface ratings were used as a predictor. This may reflect the fact that the association of babyfacedness with warmth/sociability is generally weaker than its association with dominance, as evidenced by the effects for U.S. judges in the present study as well as in the effect sizes in previous research (Montepare & Zebrowitz, 1998; Zebrowitz & Montepare, 1992; Zebrowitz, Montepare et al., 1993).

Some general limitations to the present study should be noted. First, we studied only male faces due to constraints on the time Tsimane' judges could devote to the task. Future research should investigate whether the cultural similarities and differences we have documented also hold true for female faces. Second, our analyses did not allow us to correct Tsimane' ratings for how well the faces were known to each judge, because we used face as the unit of analysis, correcting for how well each face was known across all judges. However, it should be noted that between-culture agreement was significant for all impressions despite the possibility that some Tsimane' raters were acquainted with some of the people being judged, which, if anything, would depress between-culture agreement. It thus appears that the mean ratings of each face by Tsimane' judges were not unduly biased by an acquaintance factor.

Another potential limitation is differences in rating scales across the two cultures. However, the actual pattern of results supports a possible effect of these differences only for impressions of dominant/respected. As discussed above, different labels on the scales used to assess this impression may explain differences in the attractiveness halo effect and the babyface stereotype shown by U.S. and Tsimane' judges. Also as discussed, different labels may have contributed to the lack of between-culture agreement in this impression for U.S. faces, which contrasted with the significant between-culture agreement for all other trait impressions despite rating scale differences. Rating scale differences could conceivably depress between-culture agreement, even if significant, thus contributing to the finding that U.S. judges showed lower between- than within-culture agreement. Arguing against this possibility is the fact that Tsimane' judges showed equally high between- and within-culture agreement despite differences in the rating scales. Finally, it should be noted that the different scales do not compromise our conclusions about within-culture agreement. Specifically, U.S. judges' agreement in impressions of U.S. versus Tsimane' faces did not differ on the traits that had label differences, and Tsimane' judges' agreement in impressions of U.S. versus Tsimane' faces was based on identical scales. All in all, first impressions from faces were remarkably similar for U.S. and Tsimane' judges despite differences in the format and labeling of the rating scales, and these scale differences do not compromise any of the conclusions we draw.

Conclusions

Our findings make several notable contributions to the literature on first impressions from faces: We have provided the first evidence for agreement in trait impressions from faces among people

from a culture that is largely isolated from media and other external influences that could affect face perception; the first evidence for agreement in trait impressions between people from two cultures that have little if any contact with one other; and the first evidence that a culturally isolated people show the attractiveness and babyface stereotypes. We also found that agreement was sometimes moderated by perceiver and face culture, consistent with the suggestion that perceptual experiences can foster differences in attunements to particular facial cues (McArthur & Baron, 1983; Zebrowitz & Montepare, 2006). Overall, the evidence provided for similar trait impressions from faces across Tsimane' and U.S. judges indicates that some universal mechanism guides these impressions. Although the use of facial attractiveness provides a partial mechanism, future research is needed to account for the agreement that attractiveness did not explain. Whatever the mechanism for the agreement, our results indicate that people in the United States who are perceived as attractive, babyfaced, healthy, or intelligent by their compatriots will tend to elicit similar impressions even in the remote Bolivian rainforest, and any Tsimane' who venture out from the rainforest are likely to elicit impressions of how attractive, babyfaced, healthy, knowledgeable, respected, and sociable they are that resemble those to which they have become accustomed.

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Notes

1. Darwin reports in his autobiography that "I heard that I had run a very narrow risk on being rejected on account of the shape of my nose! He [the Captain] was an ardent disciple of Lavater, and was convinced that he could judge of a man's character by the outline of his features, and he doubted whether anyone with my nose could possess sufficient energy and determination for the voyage" (Darwin, 1887).
2. At the time the Tsimane' ratings of U.S. faces were collected in the summer of 2007, solar panels had just been introduced to each village along with a television to use in the schools, but electricity was unreliable and there was little, if any, media exposure. Direct exposure to Westerners was limited primarily to a small group of anthropologists and some missionaries and, for those who traveled to the main market town, to Bolivians who are primarily an ethnic mix of indigenous peoples and European descendants.
3. Ratings of U.S. faces were collected from a large number of additional Tsimane' judges who wanted to participate in the study. We randomly selected 40 of these judges for our analyses in order to equalize the number of male and female judges, to balance the face and trait rating orders, and to equal the number of Tsimane' judges who rated Tsimane' faces.
4. We performed all analyses across judges of both sexes both because we had no predictions regarding sex differences and also because previous research has demonstrated strong male-female agreement in first impressions from faces (e.g., Zebrowitz & Montepare, 1992; Zebrowitz, Montepare et al., 1993).

References

- Albright, L., Malloy, T. E., Dong, Q., Kenny, D. A., & Fang, X. (1997). Cross-cultural consensus in personality judgments. *Journal of Personality and Social Psychology, 72*(3), 558-569.

- Anderson, S. L., Adams, G., & Plaut, V. C. (2008). The cultural grounding of personal relationship: The importance of attractiveness in everyday life. *Journal of Personality and Social Psychology, 95*, 352-368.
- Bar, M., Neta, M., & Linz, H. (2006). Very first impressions. *Emotion, 6*(2), 269-278.
- Biernat, M., Manis, M., Stapel, D. A., & Suls, J. (2007). Stereotypes and shifting standards: Assimilation and contrast in social judgment. In D. A. Stapel & J. Sulus (Eds.), *Assimilation and contrast in social psychology* (pp. 75-97). New York: Psychology Press.
- Bronstad, P. M., Langlois, J. H., & Russell, R. (2008). Computational models of facial attractiveness judgments. *Perception, 37*(1), 126-142.
- Bronstad, P. M., & Russell, R. (2007). Beauty is in the 'we' of the beholder: Greater agreement on facial attractiveness among close relations. *Perception, 36*(11), 1674-1681.
- Buss, D. M. (1989). Sex differences in human mate preferences: Evolutionary hypotheses tested in 37 cultures. *Behavioural and Brain Sciences, 12*, 1-49.
- Darwin, C. (1887). *The autobiography of Charles Darwin: 1809-1882* (Project Gutenberg, EBook #2010). Available at <http://www.gutenberg.org>
- Dion, K. K. (2002). Cultural perspectives on facial attractiveness. In G. Rhodes & L. A. Zebrowitz (Eds.), *Facial attractiveness: Evolutionary, cognitive, and social perspectives* (pp. 239-260). Westport, CT: Ablex.
- Dion, K. K., Pak, A. W., & Dion, K. L. (1990). Stereotyping physical attractiveness: A sociocultural perspective. *Journal of Cross-cultural Psychology, 21*, 378-398.
- Eichorn, D. H. (1981). Samples and procedures. In D. H. Eichorn, J. A. Clausen, N. Haan, M. P. Honzik, & P. H. Mussen (Eds.), *Present and past in middle life* (pp. 33-51). San Diego, CA: Academic Press.
- Ekman, P., & Friesen, W. V. (1971). Constants across cultures in the face and emotion. *Journal of Personality and Social Psychology, 17*(2), 124-129.
- Furl, N., Phillips, P. J., & O'Toole, A. J. (2002). Face recognition algorithms and the other-race effect: Computational mechanisms for a developmental contact hypothesis. *Cognitive Science, 26*(6), 797-815.
- Gangestad, S. W., & Buss, D. M. (1993). Pathogen prevalence and human mate preferences. *Ethnology and Sociobiology, 14*, 89-96.
- Gibson, J. J. (1966). *The senses considered as perceptual systems*. Oxford, UK: Houghton Mifflin.
- Griffin, A. M., & Langlois, J. H. (2006). **IAQ: 2** Stereotype directionality and attractiveness stereotyping: Is beauty good or is ugly bad? *Social Cognition, 24*(2), 187-206.
- Jones, D., & Hill, K. (1993). Criteria of facial attractiveness in five populations. *Human Nature, 4*, 271-296.
- Kramer, S., Zebrowitz, L. A., San Giovanni, J. P., & Sherak, B. (1995). Infants' preferences for attractiveness and babyfacedness. In R. J. B. B. G. Bardy & Y. Guiard (Eds.), *Studies in perception and action III* (pp. 389-392). Mahwah, NJ: Lawrence Erlbaum Associates, Inc.
- Langlois, J. H., Ritter, J. M., Roggman, L. A., & Vaughn, L. S. (1991). Facial diversity and infant preferences for attractive faces. *Developmental Psychology, 27*(1), 79-84.
- Langlois, J. H., & Roggman, L. A. (1990). Attractive faces are only average. *Psychological Science, 1*(2), 115-121.
- Langlois, J. H., Roggman, L. A., Casey, R. J., & Ritter, J. M. (1987). Infant preferences for attractive faces: Rudiments of a stereotype? *Developmental Psychology, 23*(3), 363-369.
- Luevano, V. X., & Zebrowitz, L. A. (2007). Do impressions of health, dominance, and warmth explain why masculine faces are preferred more in a short-term mate? *Evolutionary Psychology, 5*, 15-27.
- McArthur, L. Z., & Baron, R. M. (1983). Toward an ecological theory of social perception. *Psychological Review, 90*, 215-238.
- McArthur, L. Z., & Berry, D. S. (1987). Cross-cultural agreement in perceptions of babyfaced adults. *Journal of Cross-Cultural Psychology, 18*, 165-192.
- Montepare, J. M., & Zebrowitz, L. A. (1998). Person perception comes of age: The salience and significance of age in social judgments. In M. P. Zanna (Ed.), *Advances in experimental social psychology* (Vol. 30, pp. 93-163). San Diego, CA: Academic Press.
- Park, J. H., & Schaller, M. (2009). Parasites, minds and cultures. *The Psychologist, 22*(11), 942-945.

- Reyes-García, V., Byron, E., Vadez, V., Godoy, R., Apaza, L., Pérez, E., Leonard, W., & Wilkie, D. (2004). Measuring culture as shared knowledge: Do test types matter? Data from Tsimane' Amerindians, Bolivia. *Field Methods, 16*(2), 135-156.
- Reyes-García, V., Godoy, R., Vadez, V., Ruiz-Mallen, I., Huanca, T., Leonard, W., McDade, T., Tanner, S., & TAPS Bolivia Study Team. (2009). The pay-offs to sociability: Do solitary and social leisure relate to happiness? *Human Nature, 20*, 431-446.
- Reyes-García, V., Kightley, E., Ruiz-Mallen, I., Fuentes-Pela'ez, N., Demps, K., Huanca, T., & Martinez-Rodriguez, M. R. (2010). Schooling and local environmental knowledge: Do they complement or substitute each other? *International Journal of Educational Development, 30*, 305-313.
- Reyes-García, V., Molina, J. L., Broesch, J., Calvet-Mir, L., Huanca, T., Saus, J., Tanner, S., Leonard, W. R., McDade, T. W., & TAPS Study Team. (2008). **[AQ: 3]** Do the aged and knowledgeable men enjoy more prestige? A test of predictions from the prestige-bias model of cultural transmission. *Evolution and Human Behavior, 29*(4), 275-281.
- Rhodes, G. (2006). The evolutionary psychology of facial beauty. In S. T. Fiske, A. E. Kazdin, & D. L. Schacter (Eds.), *Annual review of psychology* (Vol. 57, pp. 199-226.). Palo Alto, CA: Annual Reviews.
- Rule, N. O., & Ambady, N. (2008). Brief exposures: Male sexual orientation is accurately perceived at 50ms. *Journal of Experimental Social Psychology, 44*(4), 1100-1105.
- Rule, N. O., Ambady, N., Adams, R. B., Jr., Ozono, H., Nakashima, S., Yoshikawa, S., et al. (2010). Polling the face: Prediction and consensus across cultures. *Journal of Personality and Social Psychology, 98*(1), 1-15.
- Sangrigoli, S., Pallier, C., Argenti, A. M., Ventureyra, V. A. G., & de Schonen, S. (2005). Reversibility of the Other-race effect in face recognition during childhood. *Psychological Science, 16*(6), 440-444.
- Shaffer, D. R., Crepaz, N., & Sun, C. R. (2000). Physical attractiveness stereotyping in cross-cultural perspective—Similarities and differences between Americans and Taiwanese. *Journal of Cross-Cultural Psychology, 31*(5), 557-582.
- Undurraga, E. A., Eisenberg, D. T. A., Magvanjav, O., Wang, R., Leonard, W. R., McDade, T. W., Reyes-García, V., Nyberg, C., Tanner, S., Huanca, T., Godoy, R. A., & TAPS Bolivia Study Team. (2010). Human's cognitive ability to assess facial cues from photographs: A study of sexual selection in the Bolivian Amazon. *PLoS ONE, 5*(6), e11027.
- Wheeler, L., & Kim, Y. (1997). What is beautiful is culturally good: The physical attractiveness stereotype has different content in collectivistic cultures. *Personality and Social Psychology Bulletin, 23*, 795-800.
- Willis, J., & Todorov, A. (2006). First impressions: Making up your mind after a 100-ms exposure to a face. *Psychological Science, 17*(7), 592-598.
- Zebrowitz, L. A., Bronstad, M. P., & Montepare, J. M. (2011). An ecological theory of face perception. In N. Ambady, R. Adams, K. Nakayama, & S. Shimojo (Eds.), *The science of social vision* (pp. 3-30). Oxford, UK: Oxford University Press.
- Zebrowitz, L. A., Fellous, J. M., Mignault, A., & Androletti, C. (2003). Trait impressions as overgeneralized responses to adaptively significant facial qualities: Evidence from connectionist modeling. *Personality and Social Psychology Review, 7*, 194-215.
- Zebrowitz, L. A., Kikuchi, M., & Fellous, J. M. (2010). Facial resemblance to emotions: Group differences, impression effects, and race stereotypes. *Journal of Personality and Social Psychology, 98*(2), 175-189.
- Zebrowitz, L. A., & Montepare, J. M. (1992). Impressions of babyfaced males and females across the lifespan. *Developmental Psychology, 28*, 1143-1152.
- Zebrowitz, L. A., & Montepare, J. M. (2006). The ecological approach to person perception: Evolutionary roots and contemporary offshoots. In M. Schaller, J. A. Simpson, & D. T. Kenrick (Eds.), *Evolution and social psychology* (pp. 81-113). New York: Psychology Press.
- Zebrowitz, L. A., & Montepare, J. M. (2008). Social psychological face perception: Why appearance matters. *Social and Personality Psychology Compass, 2*, 1497-1517.
- Zebrowitz, L. A., Montepare, J. M., & Lee, H. K. (1993). They don't all look alike: Differentiating same versus other race individuals. *Journal of Personality and Social Psychology, 65*, 85-101.

- Zebrowitz, L. A., Olson, K., & Hoffman, K. (1993). Stability of babyfacedness and attractiveness across the lifespan. *Journal of Personality and Social Psychology, 64*, 453-466.
- Zebrowitz, L. A., & Rhodes, G. (2004). Sensitivity to 'bad genes' and the anomalous face overgeneralization effect: Accuracy, cue validity, and cue utilization in judging intelligence and health. *Journal of Nonverbal Behavior, 28*, 167-185.

Bios**[AQ: 4]**