Isolating cues to social judgements from faces: The possible effects of hairstyles

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A previous study provided evidence for the existence of "nonverbal accents" by demonstrating differences in judgements by American observers of the nationality of Japanese national and Japanese American emotional and neutral expressions. The stimuli used in that study, however, confounded differences in potential contextual cues such as hairstyles with nationality. To test whether any contextual cues may have contributed to differences in judgements of nationality, we replicated that study and tested whether one type of contextual cue—hairstyles—affected nationality judgements. Hairstyle differences contributed to differences in judging nationality, especially in judgements of Japanese nationals. These findings suggested that participants may have been able to distinguish the nationality of the expressors not because of a variation in facial expressions of emotion but because of other factors such as hairstyles. The findings raise questions about the basis of nonverbal accents in facial expressions.

Keywords: culture, face, gender, nationality, nonverbal accent, social judgement

Judging faces is a common methodology in the area of social cognition and faces convey many important messages. The multiple signs and signals of the face include emotion, cognition, gender, age, ethnicity, identity, and personality and can come from multiple cues (Hwang & Matsumoto, 2016; Re & Rule, 2016). These cues include physiognomy (physical structure of the face), morphology (movements of the mimetic muscles on the face that move skin and produce "expressions"), and artefacts (hairstyles, glasses, jewellery, cosmetics, and other non-natural features that produce appearance and impression changes). When conducting social judgement studies using faces as stimuli, care is needed in attributing findings about judgements to specific cues that produced those judgements. If stimuli include multiple cues that can affect social judgements, as they typically do, it may be difficult to attribute the source of the judgements to a single cue.

Over a decade ago, a study provided evidence for the existence of "nonverbal accents—cultural variations in the appearance of basic facial expressions of emotion" (Marsh, Elfenbein, & Ambady, 2003, p. 375). In that study, American observers judged the nationality of Japanese nationals and Japanese Americans portraying emotional or neutral expressions. Observers identified nationality at above-chance levels for both expression types, and accuracy rates for emotional expressions were higher than those for neutral expressions. The findings were interpreted as indicating the existence of subtle cultural differences in the expressions (termed *nonverbal accents*) despite the fact that the physical signalling properties of the faces (i.e., morphological aspects of the faces) were equivalent.

This interpretation has had considerable influence, having been cited many times as a basis for unique, somewhat mysterious cultural differences in facial expressions of emotion that go beyond the specific muscle movements of the face (Adams et al., 2010; Elfenbein, Beaupre', Levesque, & Hess, 2007; Feldman Barrett, Mesquita, & Gendron, 2011). This conclusion also formed the foundation for the notion of "nonverbal cultural dialects" in emotional expressions, which borrows from the notion of linguistic dialects (Elfenbein, 2013; Elfenbein et al., 2007).

That interpretation, however, may have been limited because morphology (expressions) was confounded with other sources that also may have given cues to judgements of nationality. That is, the observed differences in judgements of nationality between the Japanese nationals and Japanese Americans in that study may have occurred because of differences in other, nonmorphological cues and not in "nonverbal accents" of the muscle movements themselves. These nonmorphological cues may have included hairstyle, the presence of cosmetic cues, or even different facial physiognomies between Japanese nationals and Japanese Americans.

In fact, the original study (Marsh et al., 2003) reported that the nationality of even neutral expressions

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was identified at above-chance levels. That study and subsequent reviews of it argued that because the accuracy rates of the emotional expressions were higher than those for the neutral expressions, artefacts such as hairstyles could not possibly have influenced the results (Elfenbein, 2013; Marsh et al., 2003). Yet, the fact that the neutral expressions themselves were identified at above-chance levels suggested precisely that nonmorphological artefacts influenced the findings because something in those neutral expressions provided cues to nationality; those cues were likely not expressions because neutral stimuli contain little, if any, expressive signals (regardless of the fact that neutral stimuli can be *inferred* to portray affective states; see Adams, Nelson, Soto, Hess, & Kleck, 2012). If those artefacts existed, they could have interacted with emotional expressions to produce differential effects on the emotional expressions vis-à-vis the neutral expressions, which might have produced greater effects on the emotional expressions in their experiment. If the artefacts existed differentially between Japanese nationals and Japanese Americans, those artefacts may have contributed to the nationality judgements.

One way to address this potential confound is to examine the possible influence of artefacts on judgements. Here, we explored the effects of a specific, nonmorphological, artifactual cue—hairstyles—on such judgements. We examined the possibility that hairstyle differences between the Japanese national and Japanese American expressors in the stimuli used in Marsh et al. (2003) may have had an effect on nationality judgements because of cultural differences in attention to hair care between the United States and Japan. There are several sources of evidence to suggest such differences. For example, data on total annual sales in all industries and services (including hair care, but others as well) have indicated that total sales in the United States and Japan in 2015 were $113.4 Bn and $99.5 Bn, respectively (for details, see Organisation for Economic Co-Operation and Development, 2016). When prorated by population and gross domestic product (GDP) per capita, this means that the Japanese spent approximately 2.57 times more than did the Americans of their annual income on industry and retail sales altogether. More specific to hair care, in 2015, Japanese spent approximately $18.6 Bn on hairdressing and beauty salons (see Recruit Annual Report, 2015); thus, the average person in Japan spent approximately $141. Americans spent approximately $20 Bn during the same time period (Beauty Salon Trends, Market Research, 2014); thus, the average person in the United States spent approximately $62. When prorated according to GDP per capita, the Japanese spent 2.63 times as much of their annual income on hairdressing and beauty salons than did Americans.

Data on sales of beauty and personal care in the United States and Japan also lend credence to cultural differences in attention to hair care. Annual sales in this area in the United States and Japan in 2015 were $76.3 Bn and $37.1 Bn, respectively. When prorated by the population GDP per capita, the Japanese spent 1.43 times more than did the Americans on beauty and personal care products, including hair care products. According to a U.S. Department of Commerce report (for details, see Cosmetics and Toiletries Market Overviews, 2015):

Japan's market size for beauty and personal care products account for roughly 30% of the aggregate Asia Pacific market, which is roughly one third of the global market. From the viewpoint of not only size but also trends and market demand, Japan can be regarded as a gateway to other Asian markets. Success in the Japanese market can raise product/brand profile and visibility, particularly in other Asian markets. The United States is the second largest exporter of cosmetics to Japan. U.S. manufacturers of cosmetics should keep an eye on the Japanese market, as it offers rewarding opportunities for competitive U.S. brands and products. (p. 44).

The U.S. Department of Commerce report (see Cosmetics and Toiletries Market Overviews, 2015) stated that Japan comprises approximately 10% of the global market in beauty and personal care products. It also made reference to gender differences in attention to hair care in the United States and Japan: "Men's skincare and personal care products are drawing an increasing amount of attention in the Japanese marketplace" (p. 44). Men's skincare and personal care products were listed as one of the best prospects in Japan in the same report.

That attention to hairstyles differs between national cultures makes sense. Although research has suggested the existence of possible universal standards for attractiveness (Fessler et al., 2005; Karremans, Frankenhuis, & Arons, 2010; Langlois et al., 2000; Rhodes et al., 2001), each culture facilitates specific features of a person in different ways that are more or less relevant to judgements of attractiveness in that culture (Re & Rule, 2016). This leads to culture-specific ways of adornment and the use of artefacts, cosmetics, accessories, and so on; one of those artefacts is hairstyle.

The culture-level data cited earlier suggested that there may be cultural differences between Japanese national and Japanese Americans in their attention to hair care. Such differences may be observable and may affect judgements of their identities, such as nationalities. We tested these ideas by utilizing exactly the same

stimuli as in the previous Marsh et al. (2003) study in two conditions. In one condition, we replicated that study almost exactly; in the other condition, we switched the hairstyles of the Japanese nationals and Japanese Americans. We then compared the accuracy of judgements of nationality by American observers between the original and switched hairstyles. We predicted that the switch in hairstyles would produce lower accuracy in judgements of nationality for the various expressions, especially for the Japanese nationals, because the switching of hairstyles on Japanese national expressors would reduce their recognizability (given the relatively greater attention to hair care in Japan). We made no prediction about Japanese American expressors. In addition, the degree to which hairstyles matter may vary depending on observer gender; females may be more sensitive in their perceptions than males regarding hairstyles because there are subtle observer gender differences in facial expressions of emotion (Hall & Matsumoto, 2004). Thus, we also tested whether observers' gender moderated the association between hairstyle and judgements of nationality (as did Marsh et al., 2003).

Method

Design

The study utilised a five-way, mixed design, with Hairstyle (Original vs. Switched) and Observer Gender as between-subjects conditions, and Expressor Nationality (Japanese National vs. Japanese American), Expressor Gender, and Expression Type (Emotional vs. Neutral) as within-subjects conditions.

Participants

Participants were 178 students ($N = 146$ females, $M_{age} = 23.63$ years) from an urban university in Northern California who participated for partial course credit. They were all born and raised in the United States. Sixty-eight percent identified themselves as Caucasian, 9.6% as African American, 9.0% as multi-ethnic, 8.4% as Asian or Pacific Islander, 3.9% as Hispanic/Latino, and 1% as Middle Eastern.

Facial stimuli

All photographs were selected from Matsumoto and Ekman's (1988) Japanese and Caucasian Facial Expressions of Emotion (the JACFEE) and Neutral Faces (the JACNeuF). The JACFEE is a set of 56 photographs of facial expressions of seven emotions: anger, contempt, disgust, fear, happiness, sadness, and surprise.

Half the expressors were of Japanese ethnicity and half were European Americans, with equal numbers of males and females. The JACNeuF contains photographs of the same expressors appearing in the JACFEE, but with neutral expressions.

We used the same set of photographs of expressors of Japanese ethnicity (half by Japanese nationals, half by Japanese Americans) that were used by Marsh et al. (2003), with two exceptions. (The photographs that were excluded included one by the first author, who might have been recognized by the participants; his photograph of fear and another photograph of fear displayed by a Japanese national were not used.) Thus, a total of 32 photographs were used, 16 displaying emotions (two male angry, two male and two female disgust, two female fear, two male and two female sad, and two male and two female surprise expressions) and 16 neutrals of the same expressors. As in Marsh et al. (2003), we did not include happy expressions.

Two sets of the photographs were prepared in accordance with the Hairstyle condition. In the Original condition, stimuli were presented as they were originally portrayed. In the Switched condition, we used Adobe Photoshop to switch the hairstyles of the Japanese national and Japanese American of the same sex portraying the same emotion.

Judgement tasks and procedures

Data were collected in groups that differed only in the photographs shown; all judgement tasks and procedures were the same for observers in both conditions. Participants were randomly assigned to either the Original or Switched hairstyle conditions. Participants first completed a brief demographic questionnaire that asked for age, sex, marital status, and student status and major. Next, as in Marsh et al. (2003), we conducted a familiarization trial in which participants were shown each of the faces and asked to select as many as six personality traits for the expressor shown. The six trait labels were: efficient, independent, ignorant, open, likable, and rude.

After the familiarization trials, participants were informed that half the faces they had seen were Japanese nationals and that the other half were Japanese Americans. They were then shown the photographs again and were asked to judge the nationality of each expressor by checking a box next to either the word "American" or "Japanese" on their answer sheets. Each observer saw and judged all stimuli, which included a mixture of neutral and emotional expressions, as was done in Marsh et al. (2003). After the judgement tasks were finished, participants were debriefed and excused.

Results

Preliminary analyses

We first recoded the raw judgement data into accuracy scores (1 = *correct*, 0 = *not correct*) and averaged them across Japanese national and Japanese American emotional and neutral expressions within each participant, separately for male and female expressors. Marsh et al. (2003) did not report scores separately for the two nationalities or for male and female expressors and did not report analyses including expressor nationality or gender as separate variables, which we did (discussed later). As in Marsh et al. (2003), we then converted the raw accuracy scores to arcsine transformed Wagner's (1993) unbiased hit rates, which corrected for response category usage and stimulus occurrence. Table 1 reports the descriptive statistics for both raw judgement data and unbiased hit rates.

Main analyses

We computed an initial, overall five-way, mixed analysis of variance (ANOVA) on the unbiased hit rates using Expressor Nationality (Japanese Nationals vs. Japanese Americans), Expression Type (Emotion vs. Neutral), and Expressor Gender (Males vs. Females) as repeated measures, and Hairstyle (Original vs. Switched) and Observer Gender (Males vs. Females) as between-subjects measures. Because the goal of the study was to examine the effects of hairstyle on nationality judgements, we focused on effects involving hairstyle.[1] The Hairstyle main effect was significant, $F(1, 172) = 8.32$, $p = .004$, $\eta_p^2 = .046$,

indicating that switching hairstyles reduced accuracy rates in general. This interpretation was qualified by a significant interaction between Hairstyle by Expressor Nationality, $F(1, 172) = 10.30$, $p = .002$, $\eta_p^2 = .056$. Simple effects analyses indicated that switching hairstyles produced significant decreases in accuracy rates for Japanese nationals, $F(1, 176) = 29.93$, $p < .001$, $\eta_p^2 = .141$, as predicted, but not for Japanese Americans, $F(1, 176) = 1.05$, $p = .308$, $\eta_p^2 = .006$. No other effects involving Hairstyle were significant.

We then computed four planned moderation analyses on each Expressor Nationality and Expression Type on the arcsine transformed unbiased hit rates. For these analyses, we utilized SPSS PROCESS (Hayes, 2013), which is an ordinary least squares regression path analysis modelling tool that can be used for multiple purposes. Here, we used it to estimate effects in interactions in moderation models, as our goal was to test the possible moderation of Observer Gender on the direct effect of Hairstyle on judgement accuracies, which was consistent with what Marsh et al. (2003) had done (they examined the interaction between expression type and observer gender). We utilized Model 1, which is based on the computation of moderated multiple regressions as described by numerous authors (e.g., Cohen, Cohen, West, & Aiken, 2003; Darlington & Hayes, 2017; Hayes, 2013; Saunders, 1956).

Main analyses

For Japanese nationals' emotional expressions, the overall model testing the effects of Observer Gender, Hairstyle, and their interaction on accuracy was

Table 1

Descriptive Statistics for Japanese National and Japanese American Emotional and Neutral Expressions, Separately for Original and Switched Hairstyles, and Raw Judgement Data and Unbiased Hit Rates

Nationality	Expression Type	Raw Data Hairstyle Original	Raw Data Hairstyle Switched	Unbiased Hit Rates Hairstyle Original	Unbiased Hit Rates Hairstyle Switched
Japanese Nationals	Emotion				
	M	3.82	2.96	0.13	0.10
	SD	1.49	1.55	0.08	0.07
	Neutral				
	M	4.28	3.49	0.17	0.12
	SD	1.48	1.48	0.08	0.07
Japanese American	Emotion				
	M	3.75	4.37	0.15	0.16
	SD	1.40	1.45	0.09	0.08
	Neutral				
	M	3.45	3.16	0.13	0.10
	SD	1.55	1.54	0.08	0.06

significant, $R(178) = .28$, $F(3, 174) = 5.06$, $p = .002$. The direct effect of Hairstyle was significant, $t(178) = -2.21$, $p = .028$, and the confidence intervals (CIs) did not include zero, 95% CI $[-0.15, -0.01]$. Switching hairstyles produced lower nationality accuracy rates for Japanese nationals' emotional expressions, as predicted. In addition, conditional effects analyses indicated that the hairstyle effect was especially prominent among female observers, $t(146) = -3.84$, $p < .001$, 95% CI $[-0.07, -0.02]$, but not male observers, $t(32) = -0.59$, $p = .556$, 95% CI $[-0.07, 0.04]$.

For Japanese nationals' neutral expressions, the overall model was significant, $R(178) = .26$, $F(3, 174) = 4.15$, $p = .007$. The direct effect of Hairstyle was not significant, $t(178) = 0.70$, $p = .490$, 95% CI $[-0.05, 0.10]$. The conditional effects analyses, however, indicated that males were less accurate in identifying nationality in the switched hairstyles than they were for the original hairstyles, $t(32) = -2.72$, $p = .007$, 95% CI $[-0.13, -0.02]$. Females also were less accurate on the switched hairstyles, although the effect was marginally significant and the CIs overlapped with zero, $t(146) = -1.86$, $p = .064$, 95% CI $[-0.05, 0.002]$. These findings provided tentative support that switching the hairstyles produced lower nationality accuracy rates for Japanese nationals' neutral expressions, as predicted.

For Japanese American emotional expressions, the overall model was not significant, $R(178) = .11$, $F(3, 174) = 0.76$, $p = .516$. The direct effect of hairstyle was not significant, $t(178) = 0.68$, $p = .495$, 95% CI $[-0.05, 0.10]$. No conditional effects were significant.

For Japanese American neutral expressions, the overall model was significant, $R(178) = .25$, $F(3, 174) = 3.75$, $p = .012$. The direct effect of Hairstyle was significant, $t(178) = -2.47$, $p = .015$, 95% CI $[-0.16, -0.02]$. The conditional effects analysis indicated that switching hairstyles significantly reduced accuracy rates for female observers, $t(146) = -3.35$, $p = .001$, 95% CI $[-0.07, -0.02]$, but not for males, $t(32) = 0.22$, $p = .823$, 95% CI $[-0.05, 0.06]$.

Post hoc findings

The overall ANOVA reported earlier also indicated that the Expressor Gender main effect was significant, $F(1, 172) = 33.81$, $p < .001$, $\eta_p^2 = .164$, which we report as a post hoc finding. Male expressors ($M = .16$, $SE = .006$) were more accurately identified than were female expressors ($M = .11$, $SE = .005$).

Discussion

We hypothesized that a switch in hairstyles would produce lower accuracy in judgements of nationality,

especially for Japanese nationals. As predicted, we obtained evidence for the effects of hairstyle on judgements of Japanese nationals' emotional expressions, and tentative positive effects for Japanese nationals' neutral expressions. These findings provided moderate support for the hypothesis. We also found that switching hairstyles reduced accuracy rates for Japanese American neutral expressions but not emotional expressions.

This study was not conducted without limitations. Although we attempted to replicate the Marsh et al. (2003) study (in the Original hairstyle condition), there were differences. First, we created separate scores for expressor nationality and gender and tested these effects whereas Marsh et al. did not. Doing so allowed us to examine differential effects of hairstyles on the two nationalities (which is what indeed occurred) and expressor gender while also examining the exact same effects as did Marsh et al. In addition, whereas Marsh et al. included 36 photographs, we included 32 photographs, dropping two photographs of the first author and the accompanying expressor of the same emotion. These differences in the methodologies should be taken into account when interpreting our findings.

The findings from this study recast the interpretations made in Marsh et al. (2003) that the difference in the nationality judgements occurred because of "nonverbal accents" or "cultural dialects" in emotional expressions. Instead, those findings might have occurred because of differences in hairstyles of the expressors and not because of morphological (i.e., expressive) differences (Note as well concerns about testing unbiased hit rates against zero, as described in Footnote 1.) As suggested in the introduction, U.S.–Japan culture-level differences in attention to hair care may have produced noticeable differences in hairstyles between the Japanese national and Japanese American expressors, which may have influenced nationality judgements. Japan may be a culture for which there is greater consciousness of the use of artefacts, adornments, cosmetics, and accessories to accentuate appearance relative to that of the United States. This may be seen not only in artefacts related to personal appearance but also to personal belongings such as cars, homes, furnishings, and so on. If such cultural differences are relatively more accentuated in Japan versus the United States, as the culture-level data appear to show, the appearance effects of such artefacts would be more noticeable on Japanese expressors when compared to American expressors, which is what we found. In addition, Japanese culture may foster a more specific style of hair than may American culture, and style specificity may have contributed to the positive effects for Japanese national expressors but not for Japanese Americans.

The conditional effects of observer gender on the relation between hairstyle and judgement also were

noteworthy. Hairstyles or cosmetics, accessories, and so on may differentially affect females more than males in social judgements because females may be relatively more culturally influenced by the social needs of managing those elements for their social activities as compared to males (although there were positive effects for male observers with Japanese national neutral expressions as well). Sales data (cited in the introduction) consistently has shown that sales of hair care products and use of salons for females are higher than those for males in all countries surveyed. Females also may be judged more often by those sources in social interactions. As noted in the introduction, observer gender differences in judgements of emotion from facial expressions also have been documented (Hall & Matsumoto, 2004). Thus, those factors may be relatively more important for females in making social judgements, which would explain why we obtained stronger effects for female observers. However, because of the relative imbalance of sample sizes for male and female observers, our interpretations concerning observer gender differences should be noted with this caveat.

We made no predictions concerning Japanese American expressors. Indeed, we found that there were no hairstyle effects for Japanese American emotional expressions, but there was a conditional effect of observer gender on judgements of Japanese American neutral expressions, indicating that switching hairstyles of Japanese American neutral expressions significantly reduced accuracy rates among female observers. This latter effect might have occurred for the same reasons as they did for the Japanese national expressors; that is, if the Japanese nationals had a somewhat distinctive hairstyle as compared to the Japanese Americans, switching their hairstyles should have reduced the Japanese Americans' recognizability as Americans, and this may have been more noticeable for female observers. Our tentative interpretation, however, is speculative at this time.

The post hoc finding that regardless of nationality, male expressors were more accurately identified than female expressors was new to the literature. This finding may have occurred because of the possibility that cosmetic hairstyle effects are more dramatically observed on males than on females. Note that we made no prediction about expressor gender; thus, this interpretation is entirely speculative and should be investigated further.

The findings reported here are in line with those of many other studies examining social judgements based on nonmorphological facial cues (Re & Rule, 2016). Several aspects of facial physiognomy, including skin appearance, symmetry, fatty deposits, and bone structure, contribute to judgements of attractiveness and personality; nonmorphological cues also contribute to judgements of success, competence, sexual orientation, and social group membership (for a comprehensive review, see Re & Rule, 2016). Judgement of nationality may be another social judgement that may be based on nonmorphological cues.

The current findings have considerable theoretical and empirical import. Methodologically, the findings urge researchers to exercise caution when interpreting the source of messages to specific facial cues. Because faces contain at least three sources of cues—physiognomic, morphological, and artifactual—drawing claims about sources of messages to a single cue requires a methodology that controls for the effects of the other sources.

Theoretically, these findings raise questions about the validity of nonverbal accents or cultural dialects in emotional expressions, at least on the basis of differences in judgements of the nationality on (or via) faces. Such claims are better supported by data from production studies where actual, spontaneously produced facial expressions of emotion are elicited across cultures and the facial muscle movements are measured. If cultural dialects in emotional expressions actually exist, they should be demonstrated in studies that spontaneously and reliably elicit emotions in participants and where the specific facial muscle movements in reaction to the spontaneously elicited emotions are measured. Interpretations of cultural dialects or nonverbal accents can be justifiably reached only by doing such careful and precise research on facial expressions of emotions actually produced by individuals from different cultures and by demonstrating that the produced facial expressions are different across cultures. To our knowledge, no such study exists to date.

Hairstyles are not the only artifactual or contextual cue that may discriminate people of different nationalities; contexts also matter. Any future research on this topic will provide a better understanding of why and how similarities and differences in judgements exist. Future research may focus on isolating other social judgements to more facial cues by experimentally manipulating these cues and testing their effects on judgements. In addition, exploring why the expressor and observer gender effects occurred in judgements of nationality and whether these effects are socially cultivated, or how the nature of the underlying cognitive processes are different across genders, would be meaningful to consider. Future research also may examine how emotion messages may or may not differ depending on differences in facial artefacts and whether there are other meaningful contextual factors that can explain variations in judging facial expressions of emotions.

Acknowledgement

Footnote

[1] The goal of this study was not to examine whether expressions with switched hairstyles were observed at greater than chance levels but rather whether switching hairstyles reduced accuracy rates using the same data-transformation procedures (arcsine transformed unbiased hit rates) that Marsh et al. (2003) used. In fact, we do not believe that unbiased hit rates can be compared against chance when setting chance to zero (as Marsh et al., 2003, did). Wagner (1993) provided an alternative formula for the computation of chance values that was indeed nonzero. Because of the way unbiased hit rates are computed (correcting for stimulus occurrence and response category usage), chance, random observations given a set of occurring stimuli would not result in zero values. The raw judgement data presented in Table 1 show that the actual observations are all fluctuating around chance (4.00, given eight expressions in each cell). Despite these near-chance values, all the unbiased hit rates are not zero and if tested against zero in single-sample t tests as Marsh et al. (2003) did, would produce significant findings. We believe the findings of such tests would be misleading given the computational formulas of the unbiased hit rates.

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