Social Cognition, Vol. 31, No. 6, 2013, pp. 636–648

TARGET EFFECTS

SHARED SIGNAL EFFECTS OCCUR MORE STRONGLY FOR SALIENT OUTGROUPS THAN INGROUPS

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Facial expression recognition is influenced by factors exogenous to the expression itself, including targets' group membership and facial structure. The current work represents an attempt to understand the combined influence of such factors. Across two experiments, the authors found that the effects of facial structure on expression recognition (*Shared Signal*–style effects) are influenced by ingroup/outgroup status. Perceivers showed elevated influence of facial structure on expression recognition for outgroup relative to ingroup faces, especially when the ingroup/outgroup status of the target faces was salient. This work is a novel example of how target group memberships can moderate the well-replicated influence of facial structure on expression recognition.

That facial expressions serve a communicative function is well known among psychologists. Influential theories of the communicative function of emotional facial expressions date back at least to the work of Darwin (1872/1965). Contemporary researchers have expanded upon this claim (e.g., Ekman et al., 1989; Fridlund, 1994), and there is now broad consensus that facial expressions of emotion evolved in part to fulfill a communicative function. Indeed, facial expressions of emotion can efficiently signal a target's affective and emotional states, motivations, and behavioral intentions (Fridlund, 1994; Parkinson, 2005).

Despite the near universality of basic emotion recognition, there are a variety of potent influences on expression recognition, even holding the expressions themselves constant. Broadly speaking, there are two types of influences that have been observed in expression recognition (see Hugenberg & Wilson, 2013, and Young,

This research was supported by National Science Foundation Grant BCS-0951643 awarded to the first author.

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Hugenberg, & Prokhovich, 2012, for recent reviews). First, there are specific links ("Shared Signals") between facial cues or perceiver beliefs and specific expressions. These types of links create *directional biases* in expression recognition—in other words, they bias expression recognition in favor of one expression. Factors such as targets' eye gaze direction (Adams & Kleck, 2003) and facial structure (Hess, Adams, & Kleck, 2009; Sacco & Hugenberg, 2009) can influence the decoding of facial emotion. For example, averted gaze can facilitate the recognition of fear, as both gaze aversion and fear signal an avoidance intention (Adams & Kleck, 2003).

The second type of influence of expression recognition appears to *enhance expression recognition* for a variety of expressions. In short, these effects can enhance sensitivity to a wide range of expressions. For example, shared ingroup/outgroup memberships (i.e., a shared group membership between encoder and decoder) can, via multiple mechanisms, enhance expression recognition. Both due to increased experience with the specific facial signals of ingroup members (Marsh, Elfenbein, & Ambady, 2003) and due to a motivation to preferentially attend to, process, and encode ingroup expressions (Young & Hugenberg, 2010; see also Adams et al., 2010), ingroup facial expressions are processed with greater acuity (i.e., superior processing and more accuracy) than outgroup expressions.

Despite clear evidence for both broad types of effects in expression recognition, to date little work has sought to investigate how these effects interact in expression recognition. In the current work we seek to address this question. To this end, we first discuss recent research on the *Shared Signal* hypothesis, and then move to discuss recent research on ingroup/outgroup biases in face perception and expression recognition. We then present two experiments in which we demonstrate that facial structure can bias expression recognition—a clear replication of the Shared Signal hypothesis—but that these Shared Signal effects appear most powerfully for outgroup faces. This is expected to occur because participants more efficiently encode the faces and facial expressions of ingroup members and deploy relatively less efficient encoding for outgroup faces.

SHARED SIGNALS—BIAS IN EXPRESSION RECOGNITION

Given research supporting the idea that emotional expressions evolved to communicate internal states, motives, and behavioral intentions, it is sensible that expressions may interact with other facial qualities, such as eye gaze direction or facial structure, that serve a similar function. Indeed, Adams and colleagues (e.g., Adams & Kleck, 2003) present evidence for this *Shared Signal* hypothesis—that when nonexpression facial characteristics (e.g., eye gaze) share a behavioral signal with an expression, the two can mutually enhance one another. For example, gaze direction may serve a function similar to that of certain emotional expressions for the purpose of signaling behavioral intentions. Adams and Kleck (2003) reported data supporting this perspective. They argued that averting one's gaze signals the intention to avoid someone or something that is confronted in the environment, as does displaying fear. Conversely, they argued that both direct gaze and angry expressions function to signal the intention to approach an object or person. As such, they predicted and found that averted gaze facilitated recognition of fear, and that direct gaze facilitated recognition of anger. In further work, Adams and Franklin

(2009) found this relationship to be bidirectional, as emotional expression influenced classifications of gaze direction (see also Ewbank, Jennings, & Calder, 2009).

Facial structure operates in a similar manner. For example, faces with babyish features, characterized by large eyes, wide cheeks, and a small nose, act to disarm observers relative to mature faces. Adults with babyish faces are judged to be weak but supplicating, and low in dominance and competence, relative to mature faces (Zebrowitz & Montepare, 1992). Notably, fearful expressions too have evolved to signal that an individual is signaling supplication (Marsh, Adams, & Kleck, 2005). Thus, from a Shared Signal perspective, one would predict that because babyish facial structures and fearful expressions share the signal of supplication, babyish facial structure should facilitate the recognition of fear.

Sacco and Hugenberg (2009) provided evidence for this link between fear expressions and babyish facial structures, as predicted by the Shared Signal hypothesis. They had perceivers complete a speeded expression recognition task. In this task, both target expression and facial maturity/immaturity (via eye size) were manipulated within-subjects. The eyes of expressive faces were manipulated to be either 10% larger (immature) or 10% smaller (mature) than the original size. Sacco and Hugenberg found that enlarged eyes facilitated fear recognition and smaller eye size facilitated anger recognition. Follow-up studies with face roundness replicated the same relationship between facial babyishness and fearful expressions. Whereas narrow faces are signals of maturity, round faces are signals of immaturity. Congruent with the Shared Signal hypothesis, facial roundness facilitated fear recognition relative to narrow faces. Thus, both transient (eye gaze) and stable (facial structure) cues that share signals with expressions can facilitate expression recognition in the mind of the perceiver.

INGROUP ADVANTAGES IN EMOTION RECOGNITION

Shared signals between facial characteristics and expressions can certainly bias expression recognition. However, there are also broad *enhancements* in expression recognition that can be observed from some social influences as well. For example, a shared ingroup membership appears to facilitate the recognition of all expressions, rather than creating a specific group-expression link. In a recent meta-analysis, Elfenbein and Ambady (2002) examined emotion recognition across and within cultures. Although this analysis confirmed that basic expressions are universally recognized better than chance, they also found an *ingroup advantage* in expression recognition. Both in aggregate and analyzed by individual emotion, perceivers show more accurate expression recognition for own-culture faces, relative to other-culture faces. Interestingly, cross-cultural accuracy was no better for groups living in close proximity to one another than for groups separated by longer distances and national borders. In subsequent work, Elfenbein and colleagues (e.g., Marsh, Elfenbein, & Ambady, 2003) found evidence that this superior recognition for ingroup faces could partially be attributed to greater expertise with ingroup expressions.

More recent work has extended this ingroup advantage, finding an advantage for even the most minimal of ingroup conditions, holding perceiver expertise constant. Young and Hugenberg (2010; see also Thibault, Bourgeois, & Hess, 2006) exposed White perceivers to faces believed to have been placed into groups based on personality type. Participants believed that they shared a personality type with half of the faces, and that the other faces were personality outgroup members. Even though the stimuli were held constant in terms of race, and individual targets were counterbalanced across participants, these participants showed an ingroup emotion recognition advantage. Subsequent studies linked this ingroup advantage to differences in motivationally driven configural processing. Configural processing is commonly argued to be a highly efficient means of encoding faces, a type of processing apparently demonstrated for ingroup but not outgroup faces (e.g., Hugenberg & Corneille, 2009; see also Ratner & Amodio, in press). Taken together, motivational differences in processing led to more efficient processing for ingroup faces, which translated to a recognition advantage. Importantly, this ingroup advantage in expression recognition appears not to be a specific ingroup-expression link, but is rather a general advantage of expertise and motivation on expression recognition for a variety of expressions.

In addition to a general ingroup advantage, there is some evidence that ingroup faces are the beneficiary of more nuanced processing than outgroup faces. Qualities of faces such as gaze direction are processed differentially as a function of group membership. For example, participants typically show more accurate memory for same-race than cross-race faces. However, Adams et al. (2010) found that this cross-race memory effect occurs only for faces displaying direct eye gaze, whereas targets displaying averted gaze were all remembered quite poorly. Put differently, cross-race targets displaying direct gaze were remembered no better than cross-race targets displaying averted gaze. In this case, gaze serves as a signal of social affiliation. However, only ingroup targets enjoy the memorial benefit that affiliative cues seem to confer upon the transmitter. Other work shows that the effect of group membership on gaze processing is reflected in attention as well. Liuzza et al. (2011), for example, found that political group membership predicted gaze following behavior. Specifically, right-wing Italian voters showed reflexive attention shifts in response to gaze shifts from Silvio Berlusconi, whereas left-wing voters inhibited such shifts. In similar work, Pavan, Dalmaso, Galfano, and Castelli (2011) reported that White participants showed reflexive gaze shifts only in response to averted gaze from own-race targets. Interestingly, Black targets showed reflexive shifts in response to faces of either race, suggesting a role of relative social status. Taken together, such effects suggest that perceivers are more responsive to important signals from ingroup faces. Our work will extend upon such research to show that perceivers are also more responsive to irrelevant signals from outgroup faces relative to ingroup faces.

THE CURRENT WORK

Although psychologists have demonstrated that specific directional links (e.g., Shared Signal effects) and more general nondirectional effects (e.g., group-based influences) can play powerful roles in expression recognition, to date we are aware of little research that has investigated how these phenomena can work together to influence expression recognition. The current research seeks to address this question directly. Generally speaking, we hypothesize that Shared Signal style effects may be at their most powerful in situations where perceivers are less likely to accurately encode expressions. As previously discussed, past research has demonstrated a robust effect of eye gaze and facial structure on expression recognition. For this effect to occur, perceivers must actually attend to facial characteristics that are not themselves endogenous to the expression. Conversely, if perceivers are attending closely to expressions and are processing them efficiently (as they typically do with ingroup members), the biasing effect of nonexpression signals might be attenuated. In short, we predicted that Shared Signal effects signals on expression recognition would occur most powerfully for outgroup faces (especially when that ingroup/outgroup distinction is highly salient), because outgroup faces are encoded less efficiently than ingroup faces (Ratner & Amodio, 2013; Young & Hugenberg, 2010; see also Adams et al., 2010).

To address this question, we present two studies wherein participants completed a speeded expression categorization task in which participants categorized angry and happy expressions as quickly and accurately as possible. Critically, we manipulated both the facial structure of faces (mature vs. babyish) and the ingroup/outgroup status of faces (same-race vs. other-race). In Experiment 1, we manipulated the structure of faces within-subjects, but the ingroup/outgroup status of faces between-subjects. Thus, in Experiment 1, all participants saw either ingroup or outgroup (same-race vs. cross-race) faces varying both in expression (angry vs. happy) and in facial structure (mature vs. babyish). Here, because ingroup/outgroup status was manipulated between-subjects, for any given participant it did not serve as a useful cue for discriminating among targets—if all of the targets you see are ingroup members or outgroup members, then the ingroup/outgroup status itself is not a useful cue in the task. In this case, because ingroup/outgroup status was not a useful cue in the task, we predicted that participants would not use this factor in person perception. Therefore, we expected only an interaction of facial maturity and expression recognition—a Shared Signal effect whereby babyish faces would facilitate recognition of happiness and mature faces would facilitate recognition of anger for both ingroup and outgroup faces.

In Experiment 2, participants completed the same expression categorization task (happy vs. angry) for faces varying in facial structure (mature vs. babyish). However, here we manipulated the ingroup/outgroup status of faces within-subjects. All participants saw both ingroup *and* outgroup (same-race vs. other-race) faces in the task, meaning that race was a salient distinction among the targets. We hypothesized again that a Shared Signal effect would emerge. However, we predicted that when ingroup/outgroup status is made salient, this Shared Signal effect would be most potent for outgroup members. Because perceivers are more likely to attend closely to ingroup expressions, this could attenuate the effects of nonexpression factors on ingroup expression recognition.

EXPERIMENT 1

Experiment 1 served as an initial test of the hypothesis that facial maturity would facilitate recognition of angry expressions and that babyfaceness would facilitate recognition of happy expressions. Because ingroup/outgroup status was manipulated between-subjects, and was therefore not a salient cue for discriminating among the targets, we hypothesized that it would have no effect on expression

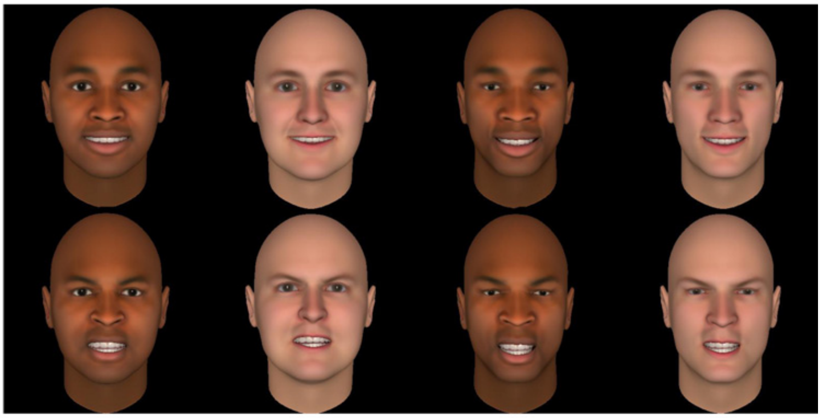

FIGURE 1. Examples of Babyish and Mature faces.

recognition. Instead, we predicted a straightforward Shared Signal effect, demonstrated by a two-way interaction of Expression and Facial Structure.

METHOD

Participants and Design. Participants were 38 White undergraduates. Six participants exhibited error rates above 25% so their data were not analyzed, leaving 32 participants in the sample. This experiment employed a 2 (target race: same-race vs. other-race) × 2 (facial structure: mature vs. babyfaced) × 2 (target expression: angry vs. happy) mixed design, with repeated-measures on the latter two factors.

Materials. Stimuli consisted of 64 faces created in Facegen Modeller v3.1 (Singular Inversions, 2006). Half of the faces were of White males (same race as participants) and half were of Black males (other race). Within each race, there were eight unique target identities. For each identity, we created four target faces: mature angry, mature happy, babyfaced angry, and babyfaced happy, adding up to 32 faces of each race. Maturity and babyishness were instantiated by manipulating the eye size and cheek roundness of each face. Mature faces were manipulated to have smaller eyes and narrower cheeks than the parent face, and babyish faces were manipulated to have larger eyes and rounder cheeks than the parent face (Sacco & Hugenberg, 2009). Angry and happy faces were created using the facial expression function in Facegen. Relative to the original parent face, angry faces displayed downturned eyebrows, upturned nostrils, and bared teeth. Happy faces displayed a wide smile, eyes opened widely, and upturned eyebrows. White and Black targets were created from the same parent face, and 64 total faces were used (see Figure 1 for examples).

Procedure. After providing consent, participants were instructed that they would view a series of faces that vary on a number of dimensions, such as expression. They were told that their task was to categorize each face as quickly as possible as

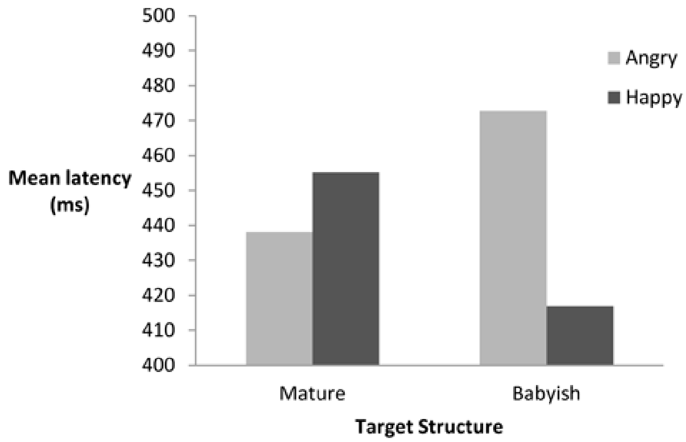

FIGURE 2. Two-way interaction between structure and expression in Experiment 1.

being either angry or happy. Participants then completed the categorization task. On each trial, participants were to press one key ("a" or "5") if the face was angry and the other key if the face was happy (see counterbalancing below). Each trial began with a central fixation point, which remained onscreen for 1 s. Next, the target face appeared for 200 ms before disappearing. Participants indicated via keystroke which emotion the face displayed. The next trial began as soon as the response was logged. A correct response was not required for trial completion.

To begin the categorization task, participants first completed a block of 16 practice trials. Participants then completed four blocks of 64 trials each, for a total of 256 trials. In each block, participants saw all 32 White faces *or* all 32 Black faces twice. After the first two blocks, the key mapping was reversed, so that the keys corresponding to happy and angry were switched. Following the speeded expression categorization task, participants provided demographic information and were debriefed.

RESULTS AND DISCUSSION

Before the data were analyzed, they were cleaned. For the response latency analysis, all incorrect trials were removed. All responses that were three or more standard deviations above the mean were changed to that value.

In this experiment, we predicted a Shared Signal effect in expression recognition, as observed by faster recognition of happy than angry expressions on babyish faces, an effect that we predicted would reverse for mature faces. Because ingroup/outgroup status was manipulated between-subjects, we predicted little if any effect of group status. In short, we predicted a two-way interaction of expression and facial structure.

To test this hypothesis, the response latency data were submitted to a 2 (target race) × 2 (expression) × 2 (structure) mixed-model ANOVA, with repeated-measures on the latter two factors. As predicted, we observed a 2-way interaction between expression and structure, $F(1, 30) = 22.74$, $p < .01$, partial $\eta^2 = .43$. However, the 3-way interaction was not significant, $F(1, 30) = 1.4$, $p > .2$, partial $\eta^2 = .047$. In other words, for participants who saw faces that were *either* White *or* Black, structure influenced emotion categorization, and target race did not moderate this relationship (see Figure 2).

Paired-samples comparisons confirm this pattern. Collapsing across target race, mature angry faces ($M = 438.04$, $SD = 185.34$) were categorized more quickly than babyish angry faces ($M = 472.72$, $SD = 199.69$), $t(31) = 3.85$, $p = .001$, $d = .18$. Conversely, babyish happy faces ($M = 416.90$, $SD = 192.38$) were categorized more quickly than mature happy faces ($M = 455.16$, $SD = 197.33$), $t(31) = -3.53$, $p = .001$, $d = .20$.

Experiment 1 provided initial evidence that recognition of happy and angry expressions is influenced by the perceived maturity displayed by a face. This work conceptually replicates past work (e.g., Adams & Franklin, 2009; Adams & Kleck, 2003; Sacco & Hugenberg, 2009), and it also extends upon that work to demonstrate that recognition of happiness, like fear, is facilitated by babyfaceness. To our knowledge, this is the first work to do so in such a paradigm, and this pattern of findings is sensible given associations between babyfaceness and positivity (Berry & McArthur, 1986). Additionally, we saw no effect of ingroup/outgroup status in a situation where group status was manipulated between-subjects. Participants who saw other-race faces were no more influenced by facial structure than participants who saw same-race faces. Indeed, Experiment 1 was designed to instantiate race, but without making it a highly salient part of the task.

EXPERIMENT 2

Experiment 2 was intended to be a replication and extension of Experiment 1. Whereas Experiment 1 found a clear Shared Signal effect unqualified by the ingroup/outgroup status of the target faces, Experiment 2 was designed in such a way to make targets' ingroup/outgroup status salient. In this experiment, we manipulated target expression, target facial structure, *and* target ingroup/outgroup status on a within-subjects basis. Here, we predicted that the Shared Signal effects would be qualified by the salient ingroup/outgroup distinction. Because perceivers attend closely to ingroup faces (when the ingroup category is salient), we predicted that the Shared Signal effects would occur more powerfully for outgroup faces than for ingroup faces. In short, because of the enhanced attention to the ingroup expression itself, the effects of facial characteristics exogenous to the expression (i.e., facial maturity) would be attenuated.

METHOD

Participants and Design. Participants were 20 White undergraduates. Two exhibited error rates above 25% so their data were not analyzed, leaving 18 participants in the sample. This experiment employed a 2 (target race: same-race vs. other-race) × 2 (facial structure: mature vs. babyfaced) × 2 (target expression: angry vs. happy) repeated-measures design.

Procedure. Materials were identical to those used in Experiment 1. The procedure was identical to that of Experiment 1, except as noted.

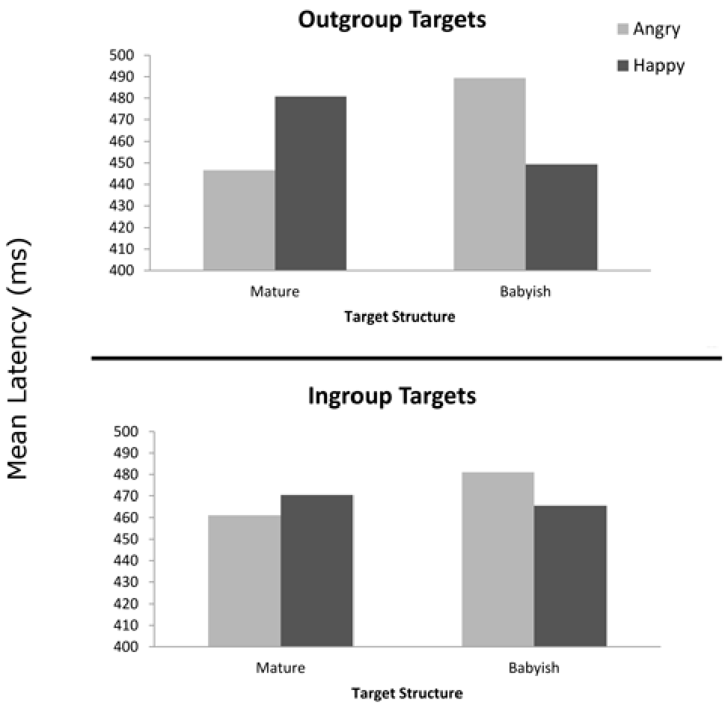

FIGURE 3. Three-way interaction between ingroup/outgroup, structure, and expression in Experiment 2.

Experiment 2 differed from Experiment 1 in that participants saw both White and Black faces. To equalize the number of exemplars seen between samples, participants observed half of the total faces of each race. Thus, each participant still saw 32 total faces, eight times each. Stimulus selection was counterbalanced equally between participants. All other procedural details were held constant.

RESULTS AND DISCUSSION

The data were first cleaned in a manner identical to Experiment 1.

In this experiment, because the ingroup/outgroup status of the faces was highly salient, we predicted that the Shared Signal effect would be qualified by the ingroup/outgroup status of the faces. Because perceivers attend more closely to the expressions of ingroup faces, we hypothesized that the influence of facial structure would be larger for outgroup than for ingroup faces. In short, we predicted a three-way interaction of expression, facial structure, and ingroup/outgroup status, with a stronger Shared Signal effect for outgroup than ingroup faces.

To test this hypothesis, we performed a 2 (ingroup/outgroup status) × 2 (expression) × 2 (structure) repeated-measures ANOVA. This analysis yielded no main effects. We observed a 2-way interaction between expression and structure indicative of Shared Signal effects, $F(1, 17) = 7.17$, $p = .016$, partial $\eta^2 = .30$, such that the recognition of anger was facilitated for mature faces relative to babyish faces, and recognition of happiness was facilitated for babyish relative to mature faces. This interaction, however, was qualified by the predicted 3-way interaction among expression, structure, and ingroup/outgroup status, $F(1, 17) = 7.35$, $p = .015$, partial $\eta^2 = .30$. As can be seen in Figure 3, the structure × expression relationship is substantially more robust for Black faces than White faces. To further investigate the nature of this interaction, we decomposed it into two 2-way interactions, one at each level of target race. For Black targets, there was a strong interaction between expression and structure, $F(1, 17) = 19.44$, $p < .001$, partial $\eta^2 = .53$. However, for White targets, the interaction between expression and structure is not significant, $F(1, 17) = 1.08$, $p > .3$, partial $\eta^2 = .06$. In other words, in an intergroup context, structure exerts a stronger influence on emotion recognition for Black faces than White faces. In fact, when the intergroup context is salient, structure does not influence emotion recognition for White ingroup faces.

Again, paired-samples comparisons confirm this pattern. Angry mature faces were categorized more quickly than angry babyish faces, $t(17) = 3.8$, $p = .001$, $d = .30$, and happy babyish faces were categorized more quickly than happy mature faces, $t(17) = -2.58$, $p = .02$, $d = .25$. Importantly, neither of these comparisons yields significant differences for White target faces, ps $> .3$.

In Experiment 2, we confirmed our predictions regarding the interplay of facial expression, facial structure, and ingroup/outgroup status. Indeed, the influence of facial structure on expression recognition—the Shared Signal effect—appears contingent on salient group memberships. In a salient intergroup context, emotion recognition for outgroup faces is more biased by factors exogenous to the expression (in this case, facial structure) than is recognition for ingroup faces. Thus, Experiment 2 enabled us to isolate a limiting condition for the effects of facial structure on expression recognition.

Experiment 2 also served to rule out an alternative explanation for Experiment 1. Although the actual size of a person's eyes is completely orthogonal to emotion, it could be that our stimulus manipulation created the perception of eyes that were actually opened more or less widely, which does covary with emotion (especially anger). In Experiment 2, we observed no Shared Signal effects for ingroup faces. If our facial morphology manipulation did in fact manipulate emotional signals in a bottom-up manner, we should have seen strong Shared Signal effects for both ingroup and outgroup faces.

GENERAL DISCUSSION

Across two experiments, we have demonstrated that the recognition of happiness and anger is influenced by a target's facial maturity level, conceptually replicating past work on the Shared Signal hypothesis. More importantly, the current work also provides a novel moderator of these Shared Signal effects. We have demonstrated that the effect of facial structure on emotion recognition was moderated by ingroup/outgroup status, but only in situations where that distinction is salient. These effects seem quite sensible given recent theory and evidence regarding the effects of group status on expression processing. Ingroup faces and facial expressions (at least when ingroup membership is made salient) elicit closer attention (e.g., Pavan et al., 2011) and superior processing than outgroup faces (e.g., Ratner & Amodio, 2013; Young & Hugenberg, 2010). In this case, this appears to leave less room for the effect of facial cues exogenous to the expression itself to influence expression recognition. In short, it appears that the superior processing afforded to ingroup faces attenuates the influence of Shared Signals on expression recognition.

OPEN QUESTIONS AND FUTURE RESEARCH

Although the current work does provide a clear moderator of Shared Signal effects, a number of open questions still remain. First, it is important to note that although we couch the current results in terms of an ingroup/outgroup distinction, by using race (i.e., Black and White faces) as an ingroup/outgroup distinction, this also manipulates a number of other characteristics, both conceptual and perceptual, above and beyond mere group membership.

For example, race might also serve as a manipulation of target valence or target status. Thus, White perceivers may like White targets more than Black targets (i.e., prejudice effects) or see White targets as higher in status than Black targets. However, the current data do not fit easily with a valence prediction—a valence effect would predict that White (but not Black) faces would facilitate recognition of happy faces, an effect that simply did not emerge in the current data. The current data, however, could potentially be interpreted as a status effect. Whereas we hypothesized that perceivers would attend to White faces because of their ingroup status, past research has also demonstrated that perceivers also attend more to and encode high status faces more than low status faces (e.g., Ratcliff, Hugenberg, Shriver, & Bernstein, 2011). Thus, the moderation of the Shared Signal effect could be attributed to target status. Were this to be the case, however, it would still be compatible with our broader hypothesis that faces that receive stronger attention and encoding should be less susceptible to Shared Signal effects. However, future research would benefit from clarifying this important distinction.

Manipulations of target race also commonly manipulate targets' facial structure, and our research is no exception. Notably, Zebrowitz, Kikuchi, and Fellous (2010) found that there are important group-based differences in the display of cues resembling basic emotion. Using connectionist models trained to recognize anger, happiness, and surprise, these authors observed structural overlaps between certain social categories and specific emotions. For example, neutrally expressive White faces show more objective resemblance to anger expressions than neutrally expressive Black faces; whereas neutrally expressive Black faces show more objective resemblance to happy expressions than neutrally expressive White faces (see also Zebrowitz, Bronstad, & Lee, 2007, for similar effects). This work augments a literature based in subjective perceptions of facial emotion. As previously mentioned, fear is more accurately recognized and anger less accurately recognized on faces with eyes manipulated to be larger than normal, and vice versa (Sacco & Hugenberg, 2009). Such perceptions can operate in a more purely top-down, stereotypic manner as well. Becker, Neel, and Anderson (2010), for example, showed in an illusory conjunction task that anger is more likely to "jump" from a distractor to a neutral Black target than to a neutral White target. In many such studies, a confluence of bottom-up and top-down factors interact to affect emotion perception.

Our work is not dissonant with this literature. Like others, we found that structural information influences the encoding of facial emotion. Importantly, our results cannot be explained merely as a result of the race/emotion overlap reported by Zebrowitz et al. (2010). For example, although this previous work would predict that happiness is particularly easy to perceive on a babyish Black face, it might also predict that anger is more quickly perceived on a mature White face than on a mature Black face. Our results do not bear out such a prediction, at least in part because structural differences based on race were intentionally minimized in stimulus creation.

Finally, another potential question is whether our manipulation of facial structure introduced another possible dimension of social category—age. If participants categorized babyfaced and mature targets as belonging to separate groups (e.g., ingroup and outgroup, respectively), this could complicate our ingroup/outgroup argument. However, despite the manipulation of facial maturity, the apparent age of the faces remains similar. Although some work has shown that babyfaces are more likely to be judged as younger, relative to mature faces, in a forced-choice paradigm (Marsh et al., 2005), babyfaceness can be manipulated orthogonally to perceived age (Adams, Nelson, Soto, Hess, & Kleck, 2012). Thus, we think it unlikely that our observed effects could be easily attributable to target age being perceived as an ingroup/outgroup distinction.

CONCLUSION

We believe that this work represents a novel advance in our understanding of how facial signals are processed in combinatory ways. Indeed, whereas extensive research has documented both specific facial cue-expression biases and broad motivated facilitation of expression recognition, we believe that the current work is the first to integrate the effects of recognition-biasing Shared Signal effects with recognition-facilitating Ingroup Advantages in expression recognition.

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