Journal of Experimental Social Psychology 49 (2013) 152–155

Contents lists available at SciVerse ScienceDirect

Journal of Experimental Social Psychology

journal homepage: www.elsevier.com/locate/jesp

FlashReport

Effects of emotional body language on rapid out-group judgments

Lindsay Hinzman *, Spencer D. Kelly

Colgate University

HIGHLIGHTS

- Using two target out-groups we examined the effect of EBL on face processing.
- Out-group faces were processed faster with angry vs. happy EBL.
- In-group faces were processed faster with happy vs. angry EBL.
- Similar results were obtained using both Asian and Black targets.
- The phenomenon is likely due to an out-group, not a stereotyping, effect.

ARTICLE INFO

Article history:
Received 16 September 2010
Revised 10 June 2012
Available online 3 August 2012

Keywords:
Out-group
Face perception
Emotional body language
Gesture

ABSTRACT

The aim of this study was to examine the influence of emotional body language (EBL) on in- and out-group face processing. In Experiment 1, White participants viewed pictures of in-group (White) and out-group (Black) faces positioned on bodies conveying either happy or angry emotions. Experiment 2 employed the same paradigm, presenting Asian faces as the out-group condition. In both experiments the task was to identify the race of the face as quickly as possible. For both experiments, there was a significant interaction between race of face and EBL, such that out-group faces were processed faster with angry vs. happy EBL. Furthermore, a trend was observed such that in-group faces were processed faster with happy vs. angry EBL. When considered together, the effect appears to be due to an out-group, not a stereotyping, phenomenon. The results of both experiments provide support for the hypothesis that emotional body language may influence quick, unconscious, and automatic processing of faces of different races.

Introduction

Discrimination and inter-group conflict are predicated upon the basic categorization of someone by his or her race or out-group status (Allport, 1954; Bijlstra, Holland, & Wigboldus, 2010; Dovidio, Kawakami, Johnson, Johnson, & Howard, 1997; Miller, Maner, & Becker, 2010). Although the face is a powerful cue for such categorization (Fazio, Jackson, Dunton, & Williams, 1995; Hugenberg & Bodenhausen, 2003, 2004), there is good theoretical reason to believe that more embodied cues, such as emotional expressions of the whole body (de Gelder, 2006), may also play a significant role in how people categorize the world into out-groups and in-groups.

Although faces and bodies are almost always found together (at least outside of the psychology laboratory), emotional body language (EBL) has yet to be explored in relation to in- and out-group face processing. de Gelder (2006) proposes a two-systems model to explain how people interpret EBL: first, there is an automatic and reflexive system mediated by a sub-cortical pathway that makes quick judgments about emotions conveyed through another person's body; and second, there is a more strategic and conscious system mediated by a cortical pathway that integrates the current EBL information with information conveyed through the face to develop a more nuanced perception.

Meeren, van Heijnsbergen, and de Gelder (2005) demonstrated that EBL modulates the early perception of emotional faces. When EBL was paired with an emotionally incongruent face (e.g., an angry body and fearful face), the ability to identify the facial expression was reduced. Given this affective impact of the body on the face, the current study investigated how EBL influenced the processing of emotionally charged in- and out-group faces. Specifically, we explored whether people would be quicker to identify out-group faces—typically associated with negative emotions—when paired with angry vs. happy EBL and faster to identify in-group faces—typically associated with positive emotions—when paired with happy vs. angry EBL.

It is difficult to distinguish a behavior motivated by an *out-group bias*—a negative response to a member of a different group—from one fueled by *stereotype effect*—a cognitive association between members of a specific out-group and a culturally held belief (Hamilton, 1981). Many recent studies have aimed to understand the behavioral manifestation of these two behaviors (Amodio & Devine, 2006; Bijlstra et al., 2010; Dunham, 2011; Miller et al., 2010). Because stereotyping arises from out-group bias after the formation of a learned social response to a member of an

* Corresponding author.
E-mail address: lhinzman@gmail.com (L. Hinzman).

0022-1031/$ – see front matter
http://dx.doi.org/10.1016/j.jesp.2012.07.010

out-group (Allport, 1954; Billig, 1985; Dovidio et al., 1997; Hamilton, 1981), the current study aims to demonstrate that an association between an out-group face and a specific EBL is due to a general preference for in-group faces, rather than a specific association between an emotion and a specific group of people. Therefore, two experiments will employ the same task using targets from different racial out-groups. We predicted that the association between out-group faces and negative affect would arise from an out-group, not a stereotyping, effect. Specifically, we predicted that a similar pattern of behavior would arise among participants when responding to targets from two distinct racial out-groups.

Experiment 1

Method

Participants

Forty-two White college students (14 males), ages 18–22 with normal vision volunteered to participate after giving informed consent. Participants were recruited from a pool of Introductory Psychology students and received course credit.

Stimulus material

The four gray-scale, whole-body stimuli were borrowed from a validated data set of EBL and depicted either happy (2) or angry (2) postures of men (Meeren et al., 2005; Schindler, Van Gool, & de Gelder, 2008).

Face stimuli were taken from a computer-generated database (Pauker et al., 2009) depicting either prototypical Black or White male faces (4 Black, 4 White) with neutral expression and were generated with FaceGen Modeller 3.1. The prototypical Black and White faces depicted Afrocentric and Eurocentric features, respectively (Blair, Judd, Sadler, & Jenkins, 2002; Maddox & Gray, 2002) and represented an age-range similar to that of the participants. They were cropped so that the participants could not tell whether the faces had hair.

The faces were digitally edited to fit on the bodies using Adobe Photoshop Elements 6.0. Each face was paired with each body, yielding four categories: Black–angry, Black–happy, White–angry and White–happy; each category contained eight stimuli for a total of 32 stimuli (Fig. 1, top panel).

Experimental procedure

The experimental procedure was modeled after Meeren et al. (2005). Each trial started with the presentation of a white fixation point slightly above center of a black screen for 1000 ms, followed by a 200 ms presentation of a stimulus followed by the fixation screen. The next stimulus followed 1000 ms after the response. The experiment was preceded by a four-trial practice session.

Participants were asked to indicate on a keyboard as rapidly and accurately as possible whether the face was a Black or White man. All participants used the first two fingers on their right hands to make these judgments. Each stimulus was presented to every participant 4 times for a total of 128 randomized experimental presentations per participant.

Design and analysis

In this 2×2 design the two within-subjects variables were race of face (Black or White) and EBL (angry or happy), and the dependent measures were error rates and response times (ms). Before analyzing the RT data, we removed inaccurate responses and outliers that were greater than two standard deviations from the mean. To analyze the data, a 2×2 within-subjects ANOVA was conducted, and follow-up planned t-tests (one-tailed) explored the interaction of race of face and EBL.

Results and discussion

For error rates, there was no significant interaction for race of face and EBL, $F(1,40) = 0.02$, *ns,* but there was a significant interaction between race of face and EBL for response times, $F(1,40) = 13.51$, $p = 0.001$. Fig. 1 (bottom panel) shows that Black faces elicited significantly faster responses for angry bodies than happy bodies, $t(41) = -2.597$, $p = 0.006$, and conversely, White faces elicited significantly faster responses for happy bodies than angry bodies $t(41) = 3.134$, $p = 0.002$.

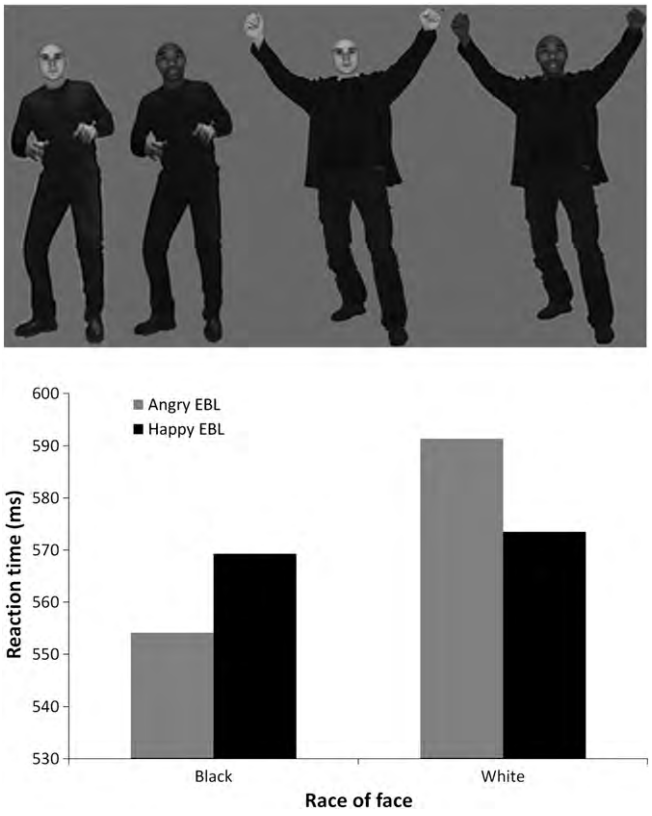

Fig. 1. Top: Example of stimuli used; White–angry, Black–angry, White–happy, Black–happy. Bottom: Reaction time results. In the Black face condition, reaction times were fastest for angry vs. happy EBL, $t(41) = -2.597$, $p = 0.006$. In the White face condition, reaction times were fastest for happy vs. angry EBL, $t(41) = 3.134$, $p = 0.002$.

Confirming our first prediction, we observed an interaction between EBL and race—when faces were Black, reaction times were faster with angry bodies, but when faces were White, reaction times were faster with happy bodies.

One explanation for the results is that angry bodies were perceived as threatening and happy bodies as welcoming, and that these emotions primed the race of faces, suggesting that Black targets are more easily associated with fear than White targets. This interpretation fits with previous research demonstrating that positive and negative contexts are differentially associated with Black and White faces (Cunningham, Preacher, & Banaji, 2001; Hugenberg & Bodenhausen, 2003; Payne, 2001). An alternative explanation, that negative emotions primed an out-group face, is explored in Experiment 2.

Experiment 2

Method

Participants

Thirty-five White college students (17 males), ages 18–22 with normal vision volunteered to participate after giving informed consent. Participants were recruited from a pool of Introductory Psychology students and received course credit.

Stimulus material

The four gray-scale, whole-body stimuli were identical to those used in Study 1 and depicted either happy (2) or angry (2) postures of men.

Asian face stimuli were taken from an in-house face database and depicted Asian male faces with neutral expression. The Asian and White faces were prepared in the same way as Experiment 1, yielding four categories: Asian-angry, Asian-happy, White-angry and White–happy; each category contained eight stimuli for a total of 32 stimuli (Fig. 2, top panel).

Experimental procedure

Participants were asked to indicate on a keyboard as rapidly and accurately as possible whether the face was a White or Asian man. The experimental procedure used in Experiment 2 was otherwise identical to the procedure used for Experiment 1.

Design and analysis

The design and analysis were the same as Experiment 1.

Results and discussion

For error rates, there was no significant interaction for race of face and EBL, $F(1,33) = 1.61$, *ns,* but there was a significant interaction between race of face and EBL for response times, $F(1,33) = 4.92$, $p = 0.033$. Fig. 2 (bottom panel) demonstrates that Asian faces elicited significantly faster responses for angry bodies than happy bodies, $t(33) = -1.674$, $p = 0.05$, and although not statistically significant, there was a trend that White faces elicited faster responses for happy bodies than angry bodies $t(33) = 1.128$, $p = 0.133$.

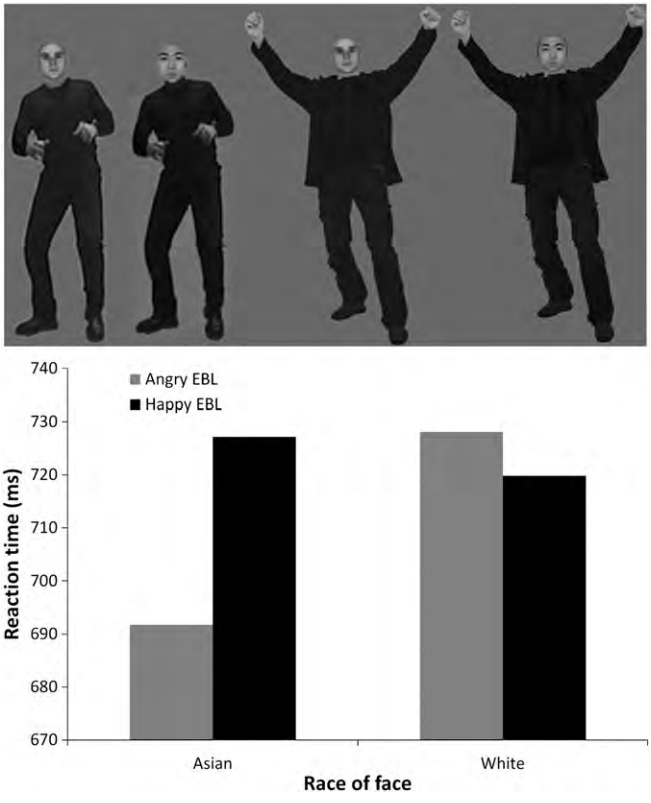

Fig. 2. Top: Example of stimuli used; White–angry, Asian–angry, White–happy, Asian–happy. Bottom: Reaction time results. In the Asian face condition, reaction times were fastest for angry vs. happy EBL, $t(33) = -1.674$, $p = 0.05$.

Confirming our second prediction, we observed an interaction between EBL and race similar to the interaction observed in Experiment 1—when faces were Asian, reaction times were faster with angry bodies than happy bodies. Taken together, the results suggest that the phenomenon observed in both experiments is mediated by an overall out-group effect rather than a specific stereotype association between a particular race target and particular emotional reaction. This finding is consistent with previous research indicating that the association between negative affect and an out-group target is a robust phenomenon observed when participants evaluate Black targets and targets from a novel minimal out-group (Dunham, 2011; Miller et al., 2010).

General discussion

The present findings are particularly interesting in relation to electrophysiological research by Meeren et al. (2005) who found that EBL (e.g., an angry bodily expression) slowed processing of incongruent (fearful) vs. congruent (angry) facial expressions because it disrupted early neural processing of the face-body composites (as measured by incongruent stimuli producing a larger sensory P1 component to incongruent stimuli in occipital regions). Because we used the same brief stimulus presentation (200 ms) and the same implicit paradigm for integrating faces and EBL—the task did not require attention to the bodies—we can similarly conclude that the integration of EBL and the race of faces was a fast and automatic process (de Gelder's first pathway) rather than a slow and deliberate one (de Gelder's second pathway). Researchers have recently begun to use analogous cognitive neuroscience approaches to study race processing (e.g., Dickter & Bartholow, 2010; Ito, Thompson, & Cacioppo, 2004; Ito & Urland, 2005), and it will be important for future studies to explore the neural time course of the sort of integration reported here—that is, how, when, and where does the neural processing of the race of a face interact with its most pervasive context, the body?

The results also indicate that the automatic process guiding the integration of EBL and race is a manifestation of an out-group effect, (i.e., an overall negative evaluation of Blacks and Asians relative to Whites among White participants). Interestingly, Hugenberg and Bodenhausen (2003) used a similar reaction time task and attributed the association between Black targets and Anger to a stereotyping effect among White participants. An alternative explanation for the results, and the one supported here, comes from Dunham (2011), who concludes that Hugenberg and Bodenhausen detected a specific manifestation of a general out-group effect.

This conclusion is supported by additional research demonstrating that threat cues are equally likely to be associated with Black targets as they are with minimal out-group targets (Miller et al., 2010). Furthermore, tasks involving minimal controlled processing, like the reaction time task in the current study, are more likely to evoke an out-group bias vs. a stereotype effect (Amodio & Devine, 2006). An interesting next step in this line of research will be to examine the time course of an out-group vs. stereotype activation in the context of de Gelder's two-systems model of person construal. At what point does the top-down stereotype activation interfere with the bottom-up prime of an out-group member, and how does this ultimately affect our perception of other people?

Finally, the present results make an interesting connection to the growing research on how the body is a fundamental part of human communication (Clark, 1996; Corballis, 2003; McNeill, 1992). The finding that EBL is inextricably tied to race processing connects to recent work showing that even non-emotional hand gestures are automatically processed with speech during language comprehension (Kelly, Creigh, & Bartolotti, 2010; Kelly, Özyürek, & Maris, 2010). For example, Kelly, Creigh et al. (2010) showed that the semantic relationship between co-speech iconic gestures—gestures that visually depict imagistic information about actions and/or objects—and accompanying spoken words either enhanced (when congruent) or disrupted (when incongruent) people's ability to perform a completely unrelated task: to identify the

gender of a speaker's voice. Coupled with the work on EBL by de Gelder (2006), the present results suggest that research on gesture-speech integration should go beyond just the semantic relationship between speech and gesture (which is the primary focus of that body of work—for a review, see Hostetter, 2011) and additionally explore the emotional relationship between the two modalities.

In conclusion, the present study builds on past research by showing that emotional body language modulates how people process in- and out-group faces. By extending previous research to include emotional information conveyed through the body, and not just the face, the results fit well with theories of communication that consider the body, as a whole, to be a powerful force in how people automatically perceive social, emotional, and cognitive signals from others.

References

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

Amodio, D. M., & Devine, P. G. (2006). Stereotyping and evaluation in implicit race bias: Evidence for independent constructs and unique effects on behavior. *Journal of Personality and Social Psychology*, *91*, 652–661.

Bijlstra, G., Holland, R. W., & Wigboldus, D. H. J. (2010). The social face of emotion recognition: Evaluations versus stereotypes. *Journal of Experimental Social Psychology*, *46*, 657–663.

Billig, M. (1985). Prejudice, categorization and particularization: From a perceptual to a rhetorical approach. *European Journal of Social Psychology*, *15*, 79–103, http://dx.doi.org/10.1002/ejsp.2420150107.

Blair, I., Judd, C., Sadler, M., & Jenkins, C. (2002). The role of Afrocentric features in person perception: Judging by features and categories. *Journal of Personality and Social Psychology*, *83*(1), 5–25, http://dx.doi.org/10.1037/0022-3514.83.1.5.

Clark, H. H. (1996). *Using language.* Cambridge: Cambridge University Press.

Corballis, M. C. (2003). *From hand to mouth: The origins of language.* Princeton, NJ: Princeton. University Press.

Cunningham, W., Preacher, K., & Banaji, M. (2001). Implicit attitude measures: Consistency, stability, and convergent validity. *Psychological Science*, *12*(2), 163–170, http://dx.doi.org/10.1111/1467-9280.00328.

de Gelder, B. (2006). Towards the neurobiology of emotional body language. *Nature Reviews Neuroscience*, *7*(3), 242–249 (Retrieved from PsycINFO database).

Dickter, C., & Bartholow, B. (2010). Ingroup categorization and response conflict: Interactive effects of target race, flanker compatibility, and infrequency on N2 amplitude. *Psychophysiology*, *47*(3), 596–601, http://dx.doi.org/10.1111/j.1469-8986.2010.00963.x.

Dovidio, J. F., Kawakami, K., Johnson, C., Johnson, B., & Howard, A. (1997). On the nature of prejudice: Automatic and controlled processes. *Journal of Experimental Social Psychology*, *33*, 510–540.

Dunham, Yarrow (2011). An angry = Outgroup effect. *Journal of Experimental Social Psychology*, *47*, 668–671.

Fazio, R. H., Jackson, J. R., Dunton, B. C., & Williams, C. J. (1995). Variability in automatic activation as an unobtrusive measure of racial attitudes: A bona fide pipeline? *Journal of Personality and Social Psychology*, *69*, 1013–1027.

Hamilton, D. L. (1981). Stereotyping and intergroup behavior: Some thoughts on the cognitive approach. In D. L. Hamilton (Ed.), *Cognitive processes in stereotyping and intergroup behavior* (pp. 333–353). Hillsdale, NJ: Erlbaum.

Hostetter, A. B. (2011). When do gestures communicate? A meta-analysis. *Psychological Bulletin*, *137*, 297–315.

Hugenberg, K., & Bodenhausen, G. (2003). Facing prejudice: Implicit prejudice and the perception of facial threat. *Psychological Science*, *14*(6), 640–643, http://dx.doi.org/10.1046/j.0956-7976.2003.psci_1478.x.

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

Ito, T., Thompson, E., & Cacioppo, J. (2004). Tracking the timecourse of social perception: The effects of racial cues on event-related brain potentials. *Personality and Social Psychology Bulletin*, *30*(10), 1267–1280, http://dx.doi.org/10.1177/0146167204264335.

Ito, T., & Urland, G. (2005). The influence of processing objectives on the perception of faces: An ERP study of race and gender perception. *Cognitive, Affective, & Behavioral Neuroscience*, *5*(1), 21–36, http://dx.doi.org/10.3758/CABN.5.1.21.

Kelly, S. D., Creigh, P., & Bartolotti, J. (2010a). Integrating speech and iconic gestures in a Stroop-like task: evidence for automatic processing. *Journal of Cognitive Neuroscience*, *22*(4), 683–694.

Kelly, S. D., Özyürek, A., & Maris, E. (2010b). Two sides of the same coin: Speech and gesture mutually interact to enhance comprehension. *Psychological Science*, *21*(2), 260–267.

Maddox, K., & Gray, S. (2002). Cognitive representations of Black Americans: Reexploring the role of skin tone. *Personality and Social Psychology Bulletin*, *28*(2), 250–259, http://dx.doi.org/10.1177/0146167202282010.

McNeill, D. (1992). *Hand and mind: What gestures reveal about thought.* Chicago: University of Chicago Press.

Meeren, H. K. M., van Heijnsbergen, C. R. J., & de Gelder, B. (2005). Rapid perceptual integration of facial expression and emotional body language. *Proceedings of the National Academy of Sciences*, *102*(45), 16518–16523, http://dx.doi.org/10.1073/pnas.0507650102.

Miller, S. L., Maner, J. K., & Becker, D. V. (2010). Self-protective biases in group categorization: Threat cues shape the psychological boundary between "us" and "them". *Journal of Personality and Social Psychology*, *99*, 62–77.

Pauker, K., Weisbuch, M., Ambady, N., Sommers, S., Adams, R., & Ivcevic, Z. (2009). Not so black and white: Memory for ambiguous group members. *Journal of Personality and Social Psychology*, *96*(4), 795–810, http://dx.doi.org/10.1037/a0013265.

Payne, B. (2001). Prejudice and perception: The role of automatic and controlled processes in misperceiving a weapon. *Journal of Personality and Social Psychology*, *81*(2), 181–192, http://dx.doi.org/10.1037/0022-3514.81.2.181.

Schindler, K., Van Gool, L., & de Gelder, B. (2008). Recognizing emotions expressed by body pose: A biologically inspired neural model. *Neural Networks*, *21*(9), 1238–1246, http://dx.doi.org/10.1016/j.neunet.2008.05.003.