The Role of Facial Mimicry in the Recognition of Affect

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Abstract

How do you decide whether the emotion expressed on another person's face is positive or negative? Emotions may be perceived via two routes. The longer (slower) route involves matching visual input with stored knowledge about emotions. The shorter (faster) route involves empathic emotions that serve as proprioceptive cues in emotion recognition. In line with embodied-cognition theory (Barsalou, Niedenthal, Barbey, & Ruppert, 2003), we propose that mimicry may result in faster emotion recognition because it facilitates use of the shorter route. To test this idea, we studied the effect of constraining mimicry on speed of emotion recognition.

Consistent with the present view, perceivers spontaneously mimic facial expressions of emotions (Dimberg, 1990), and their own experienced emotions are affected accordingly (Stel, Van Baaren, & Vonk, in press). Freezing the face reduces the experience of emotional empathy (Stel et al., in press). Blairy, Herrera, and Hess (1999) failed to demonstrate a link between mimicry and accuracy of emotion recognition. However, we propose that mimicry facilitates the short route of one's access to others' emotions, which means that mimicry should affect speed, but not accuracy, of emotion recognition.

We hypothesized that participants will recognize a briefly exposed facial expression of emotion more slowly when they are unable to mimic facial expressions than when they are free to mimic the expression. Moreover, we expect this effect to be more pronounced for women than for men: Women are more facially expressive than are men (LaFrance & Hecht, 2000), and facial feedback may be more important in emotion-related processing for women than it is for men.

METHOD

We tested 62 students (31 females, 31 males) from Radboud University Nijmegen. Their average age was 21 years (range = 17–36). Participants were paid the equivalent of €2.5. Two equivalent sets of 28 photographs showing faces with emotional expressions were selected from Ekman and Friesen (1976) and Matsumoto and Ekman (1988). Within each set, half of the emotions displayed were positive, and half were negative. Each stimulus was presented on a computer screen for 67 ms. Participants pushed a button to indicate whether the displayed affect was positive or negative. After eight practice trials, the two sets of 28 photographs were shown. Photographs were ordered randomly within each set. Participants viewed each set of photographs in a different condition: facial-constraint or control. In the facial-constraint condition, participants were asked to avoid facial movements, a manipulation that reduces mimicry substantially (Stel et al., in press). In addition, a 3- × 8-cm sensitive-skin plaster, applied to the forehead above the eyebrows, provided physical feedback about involuntary facial movements. Finally, we instructed participants to clench their teeth, limiting movement around the mouth. In the control condition, participants were instructed to keep their shoulders from moving. We assumed that this condition was just as effortful as the facial-constraint condition because it entailed keeping the shoulders stationary while moving the hands to respond. The conditions were blocked, with the order of instructions and assignment of photos to the conditions counterbalanced.

During a short break between the two trial blocks, the second set of instructions was given, and the plaster was applied or removed. Funneled debriefing indicated that none of the participants were aware of the goal of our study.

RESULTS

Four participants were excluded because they exceeded the mean reaction time (RT) by 3 standard deviations or more. The two sets of photographs produced comparable results and were not analyzed further.

A 2 (facial condition) × 2 (valence of emotion) × 2 (sex of stimulus) × 2 (sex of participant) analysis of variance (ANOVA) was conducted on RTs on trials with correct responses. The predicted interaction between facial condition and sex of participant was significant, $F(1, 56) = 6.15$, $p_{rep} = .93$: Facial constraint slowed recognition for women, $t(29) = 2.36$, $p_{rep} = .91$, but not for men, $t(27) = 1.17$, $p_{rep} = .68$ (see Table 1).

Table 1. Mean Reaction Times and Percentafe of Errors by Facial Condition and Sex of Participant

	RT (ms)				Error percentage			
Condition	Women		Men		Women		Men	
	M	SD	M	SD	M	SD	M	SD
Facial constraint	688_a	120	668_a	119	8.69_a	6.41	10.33_a	7.42
Control	648_b	99	688_b	136	6.90_a	3.74	10.84_a	10.12

Note. Within each dependent measure, means with different subscripts differ significantly ($p < .05$)

The main effects of valence and sex of the stimulus were significant, Fs$(1, 56) \geq 15.29$, p_{rep}s > .99, and were qualified by a significant interaction, $F(1, 56) = 60.57$, $p_{rep} > .99$. Positive emotions were recognized 97 ms more rapidly than negative emotions when female faces were shown, but were recognized 10 ms more slowly than negative emotions when male faces were shown. These effects of stimulus characteristics are not relevant to our present purpose.

Analyses of error rates showed that no effects involving facial constraint reached significance ($\alpha = .05$).

DISCUSSION

Women, but not men, were slower to recognize the affective valence of briefly displayed facial expressions when constrained from mimicking them, an effect we attribute to the fact that facial constraints hinder women's capacity to empathize. Alternatively, it is possible that the facial-constraint condition was distracting, and therefore diverted resources from the focal task of speedy affect recognition to a much higher extent than did the shoulder-constraint control condition. However, there is no obvious way to explain why men and women would have been differentially distracted by the facial constraints, and, therefore, enhanced distraction in the facial-constraint condition seems an unlikely explanation of the results.

These results seem to contradict previous studies in which a constraint to mimic did not differentially affect empathic emotions felt by women and men (e.g., Stel et al., in press). However, in these previous studies, stimuli were presented for longer durations than in the present study, reducing the advantage of women with regard to emotion processing because both male and female participants were granted sufficient stimulus input and processing time to assess the stimulus person's emotions.

The present results are in line with recent functional magnetic resonance imaging results that indicate the existence of a short route in processing emotional expressions (e.g., Whalen et al., 1998) and with evidence showing the existence of different pathways in perception (e.g., Danckert & Goodale, 2000). Our data suggest that men and women use the short and long route to emotion recognition differently from one another. This may be the case because women are more empathic in general (e.g., Baron-Cohen, 2002), which suggests that these specific embodiment processes play a greater role in women's emotion perception than in men's. Therefore, we conclude that mimicry-induced proprioceptive cues constitute preconscious input to the process of affective valence categorization, facilitating speed of affect recognition, but only for women because of their enhanced emotional expressiveness.

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