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What is This?

Illusory Conjunctions of Angry Facial Expressions Follow Intergroup Biases

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Imagine you see a flash of anger in a crowd waiting for the subway, and a moment later a fight breaks out in that general vicinity. How accurately would you be able to identify who was angry? Is it possible you would misperceive the angry expression as being displayed by a Black man when a White man was the actual instigator?

Illusory conjunctions occur when features of one stimulus are mistakenly perceived as belonging to an adjacent stimulus. For example, participants briefly exposed to colored letters (e.g., a green *O* and a red *L*) sometimes report seeing the color of one letter as being the color of the other (e.g., they report the *L* as green). Researchers have repeatedly demonstrated that the initial perception of features is only loosely bound to spatial location, and when processing is limited, one's perceptual system often errs, borrowing attributes for a stimulus from its close neighbors (Treisman, 1986). Intriguingly, however, illusory conjunctions of simple symbols do not follow the lines of semantic expectations. For example, when a black ring was described as a "tire," participants almost never reported that an orange ring was black when it was adjacent to a black object (Treisman, 1988)—that is, the color black does not jump to the orange ring to make it look more "tirelike."

Although schema-driven expectations may not play a role in color-shape pairings, socially relevant stimuli, such as faces, may draw on different processing mechanisms that could make illusory conjunctions more likely to conform to social schemas. Consider an experiment in which participants were shown a drawing of a White man holding a straight razor up to a Black man on a subway: In one condition, 63% of participants later recalled the weapon as being in the hand of the Black man (Boon & Davies, 1988). This perception is consistent with the stereotype that Black men are more threatening than members of other racial groups (e.g., Cottrell & Neuberg, 2005). Such a finding suggests that when people briefly see anger in a crowd, they may misperceive the source via a nonrandom illusory conjunction that is consistent with common stereotypes. Indeed, even though research using symbolic stimuli typically shows

that illusory conjunctions are less likely to flow across categorical boundaries than to occur within categories (e.g., color is more likely to jump from one letter to another than it is to move from a letter to a number; Esterman, Prinzmetal, & Robertson, 2004), a functionalist approach to social perception predicts that facial expressions will more readily jump across the social category of race in ways that are congruent with stereotypes. Specifically, because Black men are stereotyped as physically dangerous, they should attract the angry expressions of neighboring faces when attention is limited. Support for this functionalist prediction would represent an important content-specific departure from the prevailing view of how early feature integration and binding works, particularly if it could be shown that a race-based illusory conjunction is not simply due to a tendency to project anger onto the out-group. We conducted an experiment to explore this possibility.

Method

Participants (33 male, 32 female) performed a standard computer-administered illusory-conjunction task. Stimuli were faces of six Black men and six White men making both angry and neutral expressions (selected from Tottenham et al., 2009). On each trial, a fixation point appeared for 1,000 ms. Next, two faces appeared side by side for 100 ms, flanked by two numbers (see Fig. 1a). Participants were first asked to enter the sum of the numbers and then were prompted to identify either the expression (25% of the trials) or the race (75% of the trials) of the face on the left or the right. Trials included all possible combinations of target and distractor race and expression, and were fully counterbalanced with respect to whether the target appeared on the left or the right.

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a

−2   5

b

Projection

c

Illusory Conjunctions
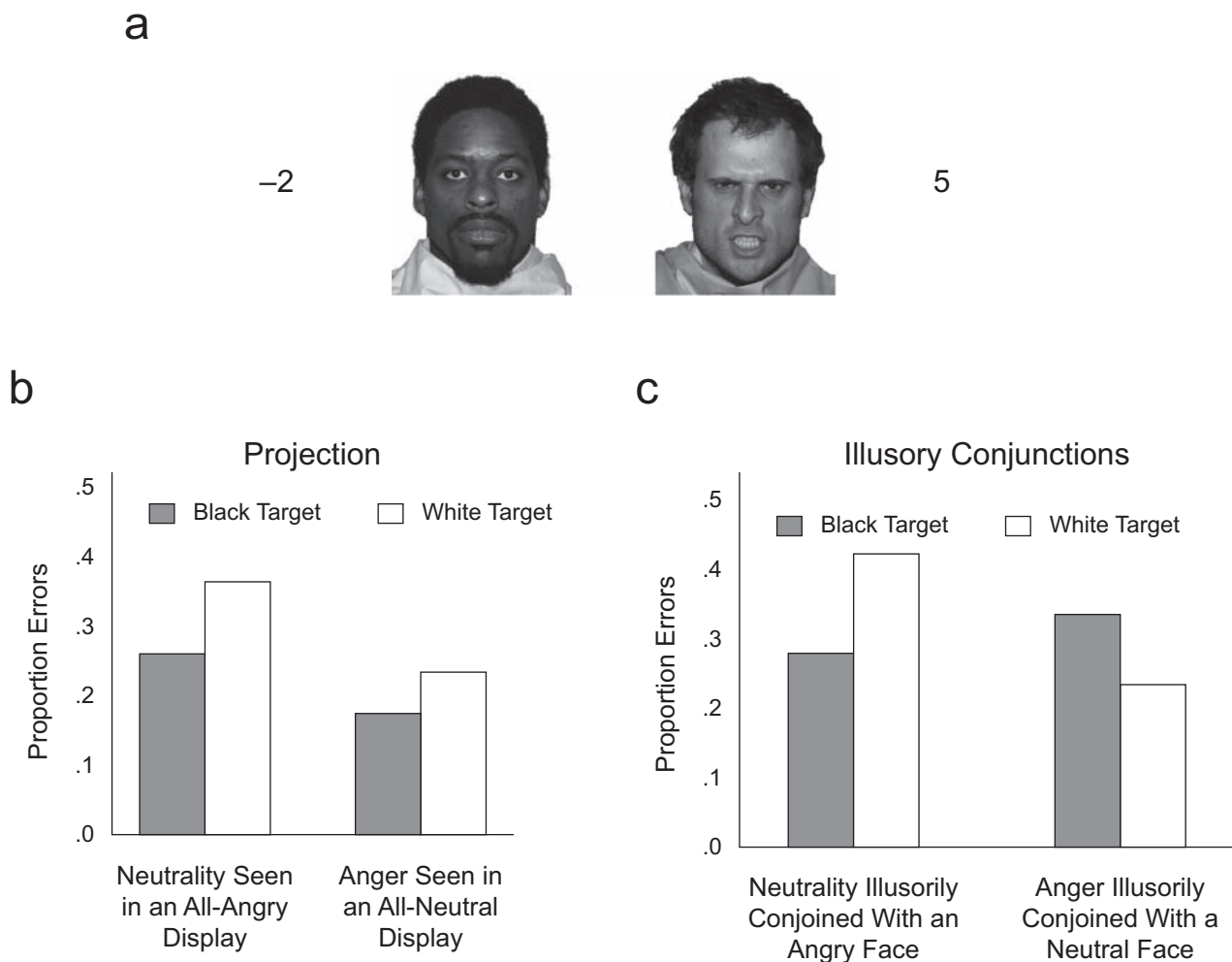
Fig. 1. Experimental stimuli and results. As shown in the example stimulus display (a), a display consisted of two faces flanked by two numbers. The graphs show the error rates as a function of target race for trials in which (b) the target and distractor displayed the same emotional expression and (c) the target and distractor displayed different emotions (a precondition for illusory conjunctions).

Results

Participants were not generally predisposed to project anger onto the Black faces: When neither the distractor nor the target face was angry, participants were actually more likely to falsely perceive anger on White men than on Black men, $t(66) = 2.21$, $p = .038$ (see Fig. 1b).[1]

Despite the absence of an overt bias to see Black men as angry, anger on a distractor was much more likely to jump to a Black target than to a White target, $t(66) = 2.60$, $p = .011$, Cohen's $d = 0.32$ (see Fig. 1c). Moreover, this effect was particularly strong with cross-race (i.e., cross-categorical) pairings: White anger flowed to neutral Black faces (34% likelihood) more readily than Black anger flowed to neutral White faces (19% likelihood), $t(66) = 3.06$, $p = .003$, Cohen's $d = 0.37$. Conversely, neutrality flowed more readily to angry White targets than to angry Black targets, $t(66) = 4.17$, $p < .001$, Cohen's $d = 0.51$ (see Fig. 1c), and again this tendency was greater for cross-race than for within-race pairings, $t(66) = 5.78$, $p < .001$, Cohen's $d = 0.73$. A bias to project neutrality onto White targets (see Fig. 1b) may explain the latter effect, but the flow of anger to Black males occurred in the absence of any bias to call them angry, which suggests that the assignment of anger to neutral Black faces was due to nonrandom illusory conjunctions that followed stereotypic expectations.

Discussion

Previous work has shown that illusory conjunctions of symbolic stimuli do not follow schema-driven expectations (Treisman, 1988) and that such conjunctions are less likely to jump across categorical boundaries than to illusorily conjoin between members of the same category (Esterman et al., 2004). In contrast, our study found that when the content is socially and functionally relevant, illusory conjunctions do follow stereotypic expectations, readily jumping across the

strong social category of race (Fiske & Neuberg, 1990). These results are consistent with an error-management-based approach to social cognition (Haselton & Nettle, 2006), in which perception is biased to err in ways that afford the least harm to the perceiver (e.g., it would be worse to misidentify a dangerous man as safe than to misidentify a safe man as dangerous). These findings have important implications for social issues ranging from eyewitness testimony to international relations, suggesting that even when people do not fabricate stereotype-consistent perceptions ex nihilo, they may be constructed from available (and stereotype-inconsistent) information in the social scene. These results also underscore the critical role that content can play in the investigation of basic cognitive processes: Findings based on simple symbolic stimuli must be supplemented with studies using more functionally relevant content in order to fully characterize and explore domain-specific texturing of cognition.

Declaration of Conflicting Interests

The authors declared that they had no conflicts of interest with respect to their authorship or the publication of this article.

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Note

1. Although we focus on errors in reporting facial expressions, we note that race was identified much more accurately than expression, $t(66) = 14.51$, $p < .0001$, Cohen's $d = 1.79$. Race was accurately attributed to the target faces.

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