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Report

The social face of emotion recognition: Evaluations versus stereotypes

Gijsbert Bijlstra *, Rob W. Holland, Daniël H.J. Wigboldus

Behavioural Science Institute, Radboud University Nijmegen, The Netherlands

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ABSTRACT

The goal of the present paper was to demonstrate the influence of general evaluations and stereotype associations on emotion recognition. Earlier research has shown that evaluative connotations between social category members and emotional expression predict whether recognition of positive or negative emotional expressions will be facilitated (e.g. Hugenberg, 2005). In the current paper we tested the hypothesis that stereotype associations influence emotion recognition processes, especially when the difference between valences of emotional expressions does not come into play. In line with this notion, when participants in the present two studies were asked to classify positive versus negative emotional expressions (i.e. happy versus anger, or happy versus sadness), valence congruency effects were found. Importantly, however, in a comparative context without differences in valence in which participants were asked to classify two distinct negative emotions (i.e. anger versus sadness) we found that recognition facilitation occurred for stereotypically associated discrete emotional expressions. With this, the current results indicate that a distinction between general evaluative and cognitive routes can be made in emotion recognition processes.

Introduction

Fast and correct recognition of emotional expressions is a prerequisite for fluent social interaction. A face carries a wealth of informative cues and can say more than a thousand words. Apart from unchangeable features in the face that carry information regarding identity or social category (e.g. sex or ethnicity), changeable features reveal how someone is feeling at that specific moment (e.g. happy, angry or sad). Previous research has shown that unchangeable features can influence the interpretation of changeable facial features in emotional recognition. More specifically, this research focused on the interplay between social categorization and recognition of emotional expressions (e.g. Becker, Kenrick, Neuberg, Blackwell, & Smith, 2007; Elfenbein & Ambady, 2002; Hugenberg, 2005; Hugenberg & Bodenhausen, 2003; Hutchings & Haddock, 2008).

How do social categorization processes influence emotion recognition? One route that has been recently explored is that evaluative category associations facilitate or inhibit the recognition of evaluative congruent emotions. For example, Hugenberg (2005) demonstrated, in line with an evaluative processes account, that white American participants show a recognition speed advantage when judging whether a white target's face displays a positive (happy) facial expression compared to negative (angry or sad) facial expressions. This phenomenon is called the happy face advantage (Leppänen & Hietanen, 2003). This effect was found by Hugenberg to be reversed when the expresser of the emotion was black, with white participants showing a recognition advantage for both negative emotions (angry and sad) compared to the positive emotion. In a similar vein, Hugenberg and Sczesny (2006) found evidence for differences in emotion recognition depending on gender: for female target faces a greater happy face advantage was found than for male target faces. The authors conclude that these effects are best explained by the spreading of evaluative associations: the valence of the target face, as triggered by the category, serves as a prime for recognizing emotional expressions independently of the discrete emotion being expressed.

However, a vast amount of research revealed evidence that social categories not only trigger evaluative associations, but also *stereotype associations* (e.g. Devine, 1989). The latter contain specific traits and cognitions that are linked to the social category. An increasing body of evidence emphasizes the importance of differentiating between evaluative and stereotype associations. For example, Amodio and Devine (2006) recently demonstrated that evaluative and cognitive processes differentially influence behavioral responses. Moreover, they argue that different neurological mechanisms underlie these effects. However, in emotion recognition literature such a distinction between processes has yet to be made.

We argue that also stereotype associations influence the ease of emotion recognition. Specifically, discrete emotions such as anger and sadness differ from each other despite both having a negative

* Corresponding author at: Department of Social and Cultural Psychology, Behavioural Science Institute, P.O. Box 9104, 6500 HE Nijmegen, The Netherlands.
E-mail address: g.bijlstra@bsi.ru.nl (G. Bijlstra).

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valence. Similarly to traits, some discrete emotional expressions are more stereotypical for some social categories than for others, independent of their general valence. For instance, anger is more strongly associated with men than women, while sadness is more strongly associated with women than men (Fischer, Rodriquez Mosquera, Vianen, & Manstead, 2004; Plant, Hyde, Keltner, & Devine, 2000). Although both emotions have a negative valence, they are associated with different social categories. In this sense, emotions do not differ from other stimuli or characteristics that may have a better normative fit with one social category than the other (Turner, Hogg, Oakes, Reicher, & Wetherell, 1987). Importantly, these stereotype associations may facilitate or inhibit the recognition of emotional expressions (e.g. sadness is recognized faster on female faces than on male faces). In this way, stereotypical views may confirm themselves in biased emotion recognition.

Interestingly, the findings of Hugenberg (2005) and Hugenberg and Sczesny (2006) did not reveal any evidence of stereotype effects on emotion recognition. No categorical differences in the processing of discrete negative emotions between social categories were found. Therefore, their findings suggest that social category information influences emotion recognition by means of general evaluative connotations with the category, rather than by specific associations between the category (e.g. black targets) and discrete emotional expressions (e.g. anger). In our view, however, these null findings for stereotype associations could be due to the research method that was employed in these earlier studies. In prior work, participants categorized both positive and negative emotional expressions on faces of two distinct social categories within one task (e.g. Hugenberg, 2005; Hugenberg & Sczesny, 2006). As a result, differences in valence were highly salient within the task and participant performance was influenced by general affective reactions towards the social categories under investigation. Consequently, recognition effects concerning discrete emotional expressions may have been overshadowed by general evaluative effects.

The goal of the present two studies was to demonstrate the influence of not only valence but also of stereotype associations on emotion recognition. In order to do this, comparative context was taken into account. On the one hand, the experimental design employed 'dual-valence comparative context conditions' which contained a positive versus a discrete negative emotional expression. On the other hand, we used a 'single-valence comparative context condition' in which two distinct negative emotional expressions were compared. In the dual-valence comparative context, participants categorized happy versus angry, or happy versus sad expressions, whereas in the single-valence comparative context, anger versus sadness were categorized. In the remainder of this article we will refer to these comparative context conditions as single- or dual-valence conditions.

When people are asked to classify two distinctive negative emotional expressions, the influence of valence on emotion recognition advantages is thought to be decreased. If category information influences emotion recognition only by means of valence, both negative emotions should be recognized faster when expressed by a member of a relatively negatively associated social category compared to members of a more positively evaluated social category. However, if specific stereotype associations (or cognitive instead of affective processes) influence emotion recognition speed, especially the discrete negative emotional expression most strongly associated with the social category should be recognized faster compared to less strong or unassociated negative emotional expressions. We therefore expected associated category-valence to influence emotion recognition speed in the dual-valence conditions, while stereotype associations were expected to facilitate emotion recognition processes in the single-valence condition. The social categories employed were White Dutch and Moroccan Dutch men (Study 1) and men versus women (Study 2).

Study 1: White Dutch versus Moroccan Dutch

The Moroccan Dutch community is currently one of the most negatively stereotyped groups in the Netherlands (Verkuyten & Zarembe, 2005) and is associated with criminality (Dotsch, Wigboldus, Langner, & van Knippenberg, 2008), a trait more strongly related to anger than to sadness. Furthermore, Otten and Stapel (2007) demonstrated that Dutch students perceive the Moroccan Dutch social category as more aggressive and hostile than the White Dutch social category. We expected that in dual-valence conditions, in general, negative emotions (both anger and sadness) would be recognized faster from Moroccan Dutch compared to White Dutch faces, whereas happy emotional expressions would be recognized faster from White Dutch compared to Moroccan Dutch faces. This would be in line with earlier valence congruency findings (e.g. Hugenberg, 2005). In contrast, in the single-valence condition, we expected that angry emotional expressions would be recognized faster than sad emotional expressions when displayed by Moroccan Dutch targets. For the White Dutch target group in this condition, no response latency differences were expected. Furthermore, we expected that a comparison of discrete negative emotional expressions between the single- and the dual-valence condition[1] would show similar response patterns with angry faces, but a change in response patterns toward sad faces between valence conditions. That is, for both the single- and dual-valence conditions we expected that Moroccan Dutch angry faces would be recognized faster than the other emotional expression under investigation. In contrast, although the same sad faces were categorized in the single- and dual-valence condition, in the dual-valence condition we expected a recognition advantage for Moroccan Dutch faces because sadness has a negative valence. In the single-valence condition, an absence of such recognition advantage was expected, because sadness is not stereotypically associated with Moroccan Dutch people.

Method

Participants and design

A total of 64 white European participants (56 women, mean age = 20.75) at the Radboud University Nijmegen were randomly assigned to one of three comparative context conditions (dual-valence: 'happy versus angry' and 'happy versus sad'; single-valence: angry versus sad). In each condition, participants saw two emotional expressions displayed by both White Dutch and Moroccan Dutch targets.

Materials and procedure

Eight models, four White Dutch and four Moroccan Dutch, were selected from the Radboud Faces Database on the basis of how well their emotional expressions were recognized in a validation study (RaFD; Langner et al., in press). Pre-testing of models' target ethnicity was done on images with a neutral expression. Fifteen white European volunteers rated the pictures on a 7-point Likert scale anchored from (1) *definitely Moroccan Dutch* to (7) *definitely White Dutch*. A paired sample *t*-test demonstrated that the White Dutch models ($M = 5.28$, $SD = 0.64$) were seen as more White Dutch and less Moroccan Dutch than the Moroccan Dutch models ($M = 1.33$, $SD = 0.42$), $t(14) = 16.17$, $p < .01$.

[1] An analysis on happiness between the comparative context conditions is not possible because responses to this concrete emotional expression were only assessed in the dual-, but not in the single-valence condition.

Subsequently, pictures of the three emotional expressions central to this experiment were selected per model, namely happy, sad, and angry. This resulted in a total of 24 pictures: three expressions × two ethnicities × four targets (models) per ethnicity.

Participants were seated in individual cubicles. Before the experiment, participants were informed that their task was to categorize emotional expressions. The procedure for this computerized experiment (Inquisit, Millisecond Software LLC, Seattle) was similar to Hugenberg (2005); see also Leppänen and Hietanen (2003) and consisted of four blocks. Before each of the two experimental blocks, we added a 20-trial practice block to familiarize participants with the task. Each trial consisted of a fixation cross presented for 1000 ms followed by one of the emotional expressions for 200 ms. In all blocks, participants were asked to classify pictures of white and Moroccan Dutch emotional faces, one image per trial, on the basis of two emotional expressions by pressing one of two buttons ('I' or 'P') with their preferred hand. The order of response mapping was counterbalanced within participants. Each experimental block consisted of sixteen pictures randomly displayed five times, resulting in 80 trials per experimental block.

The type of categorization participants made depended upon their assigned comparative context condition. In the happy versus angry dual-valence condition participants saw and classified happiness and anger expressions; in the happy versus sad dual-valence condition participants saw and classified happiness and sad expressions; finally, in the angry versus sad single-valence condition participants saw and classified angry and sad expressions.

Participants were instructed to respond as quickly and accurately as possible. Upon finishing the experiment, participants were thanked and dismissed.

Results

The primary dependent variable in this study is the mean response time needed to categorize emotional expressions. Before analyzing the data, incorrect trials (8.20%) and response latencies below 200 ms or above 3000 ms (<1%) were excluded. Due to the skewed distribution of the response latencies, all analyzes were performed on log-transformed response latencies. To facilitate the interpretation of our findings, we report mean response latencies in untransformed milliseconds. In order to test whether the previously findings of spreading of evaluative association effects (Hugenberg, 2005; Hugenberg & Sczesny, 2006) were replicated, we first analyzed both dual-valence conditions, followed by the single-valence condition and ending with a comparison of responses towards discrete negative expressions per comparative context.

Dual-valence conditions

The mean log-transformed response latencies were subjected to a 2 (target ethnicity: White Dutch versus Moroccan Dutch) × 2 (expression valence: positive versus negative) × 2 (comparative context: 'happy versus angry' versus 'happy versus sad') mixed design with repeated measures on the first two variables and comparative context as between participants variable. This analysis yielded a significant main effect of expression valence, $F(1, 40) = 8.77$, $p < .01$, $\eta_p^2 = .18$. Positive emotional expressions ($M = 474$, $SD = 80$) were recognized faster than negative emotional expressions ($M = 479$, $SD = 79$). No further main effects were found.

More importantly, in line with Hugenberg (2005) a significant two-way interaction between target ethnicity and expression valence qualified the expression valence main effect, $F(1, 40) = 4.58$, $p = .04$, $\eta_p^2 = .10$ (see Fig. 1). Responses to positive emotional expressions were faster than responses to negative emotional expressions when displayed by White Dutch targets, $F(1, 40) = 10.51$, $p < .01$, $\eta_p^2 = .21$. No difference was found between the response latencies to positive and negative emotional expressions displayed by Moroccan Dutch targets ($F < 1$). Moreover, neither the difference in classifying the positive emotional expression, $F(1, 40) = 3.31$, $p = .08$, or negative emotional expressions, $F(1, 40) = 2.06$, $p = .16$, between target groups reached significance. As expected, this two-way interaction was not qualified by the three-way interaction with comparative context as between subject variable ($F < 1$). The data revealed no difference in recognition speed for angry versus sad expressions for Moroccan Dutch faces within dual-valence conditions, supporting earlier findings by Hugenberg (2005).

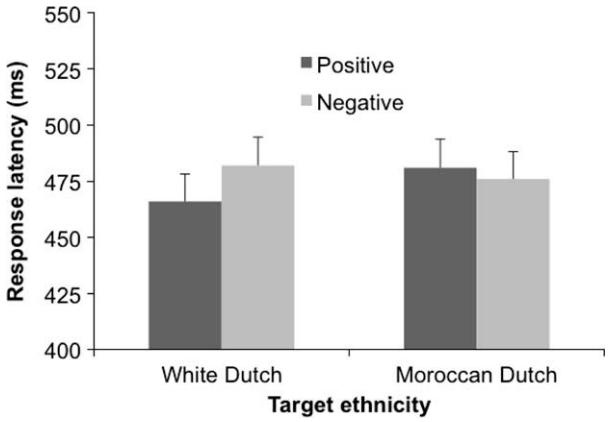

Fig. 1. Mean response latencies and SE's in milliseconds in the two dual-valence conditions together per target ethnicity.

Single-valence condition

Mean log-transformed response latencies were subjected to a 2 (target ethnicity: White Dutch versus Moroccan Dutch) × 2 (target expression: angry versus sad) within-subject analyzes of variance. This analysis yielded a main effect of target expression, $F(1, 21) = 7.10$, $p = .01$, $\eta_p^2 = .25$. Angry faces ($M = 643$, $SD = 99$) were recognized faster than sad faces ($M = 672$, $SD = 116$). Furthermore, a two-way interaction between target ethnicity and target expression was found, $F(1, 21) = 12.73$, $p < .01$, $\eta_p^2 = .38$ (see Fig. 2). Participants were more quickly at recognizing angry compared to sad Moroccan Dutch targets, $F(1, 21) = 21.13$, $p < .01$, $\eta_p^2 = .50$. For White Dutch targets, no difference between response latencies

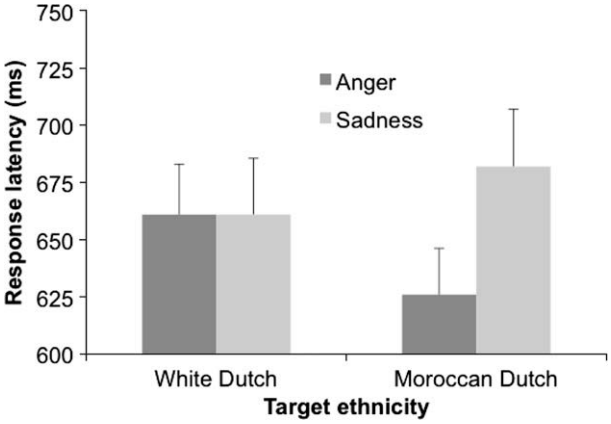

Fig. 2. Mean response latencies and SE's in milliseconds for the single-valence condition per target ethnicity.

towards target expressions was found ($F < 1$). Furthermore, Moroccan Dutch angry faces were recognized faster than angry White Dutch faces, $F(1, 21) = 7.29$, $p = .01$, $\eta_p^2 = .26$, and sad faces were recognized faster when displayed by White Dutch than by Moroccan Dutch targets, $F(1, 21) = 4.47$, $p < .05$, $\eta_p^2 = .18$.

Discrete negative emotional expressions per comparative context

Another way to test the role of valence and stereotype associations on emotion recognition is to analyze response latencies for categorizing discrete negative emotional expressions between comparative context conditions. First, we subjected the response times for *angry* faces to a 2 (target ethnicity: White Dutch versus Moroccan Dutch) × 2 (comparative context: single-valence versus dual-valence) mixed design with target ethnicity as within participants variable and comparative context as between participants variable. Firstly, response latencies for Moroccan Dutch trials were faster than for White Dutch trials, $F(1, 42) = 7.06$, $p = .01$, $\eta_p^2 = .14$. Also, a strong main effect of comparative context revealed faster response latencies in the dual-valence condition than in the single-valence condition, $F(1, 42) = 47.14$, $p < .01$, $\eta_p^2 = .53$. No other significant effects were found.

Second, response latencies towards *sad* emotional expressions were subjected to a 2 (target ethnicity: White Dutch versus Moroccan Dutch) × 2 (comparative context: single-valence versus dual-valence) mixed design with target ethnicity as within participants variable and comparative context as between participants variable. The analysis yielded a main effect of comparative context, response latencies were faster in the dual-valence condition than in the single-valence condition, $F(1, 40) = 50.76$, $p < .01$, $\eta_p^2 = .56$. As expected, a significant two-way interaction was obtained, $F(1, 40) = 6.25$, $p = .02$, $\eta_p^2 = .14$. Response patterns to sad faces changed as a function of the target ethnicity and comparative context. In the dual-valence condition no difference between response latencies to Moroccan Dutch ($M = 481$, $SD = 72$) and White Dutch sad faces ($M = 490$, $SD = 71$) was found, $F(1, 40) = 1.03$, $p = .32$. More importantly, mean response latencies in the single-valence condition pointed out that sadness was faster for White Dutch faces ($M = 661$, $SD = 116$) than for Moroccan Dutch faces ($M = 682$, $SD = 117$), $F(1, 40) = 6.54$, $p = .01$, $\eta_p^2 = .14$. Although sadness seems not strongly associated with White Dutch faces, these results suggest that sadness on a Moroccan Dutch faces is even more inconsistent with the social category.

Discussion

In line with our hypotheses, a two-way interaction between target ethnicity and expressions valence but no three-way interaction was found in the dual-valence conditions. This suggests that the evaluative connotation with the social category influences emotion recognition in situations where people have to classify positive and negative emotional expressions within one task. Furthermore, we found evidence for stereotype-congruency when judgments could not be made on a more general affective basis. In the single-valence condition, only the stereotypically associated discrete negative emotional expression – anger and not sadness – was classified faster for Moroccan Dutch faces, suggesting that cognitive processes affect participants' categorization of emotional expressions. Additionally, a comparison of discrete negative emotional expressions between comparative context conditions confirmed our predictions. No difference between response patterns towards angry faces was found between the dual- and single-valence conditions. However, for sad target faces the observed response pattern did differ between the dual- and single-valence conditions. Although participants in both valence conditions saw exactly the same faces expressing sadness, response patterns changed as a function of comparative context. Furthermore, the main effect of comparative context suggests that judgments based on affect cost less time than judgments based on cognition.

Study 2: male versus female

In our second study we aimed to replicate the findings of Study 1 using gender as social category, which allowed us to test a full design in which male and female participants judged male and female target faces. Research has shown that both men and women are evaluated positively, however, women are evaluated more positively than men (e.g., Eagly and Mladinic, 1989). In the dual-valence conditions this should lead to a pattern of results similar to the effects found in Study 1. That is, in line with earlier research directly comparing the recognition of positive and negative emotions, positive emotional expressions should be categorized faster than negative emotional expressions, especially for female faces. At the same time, however, it has been shown that people believe that men experience and express anger more often than women, whereas women experience and express sadness more often than men (Plant et al., 2000). Therefore, in the single-valence condition, sadness should be recognized faster than anger for female faces and anger should be recognized faster than sadness for male faces. For the comparison of discrete negative emotional expressions between comparative context conditions we expected no differences for responses to angry faces between the dual- and single-valence conditions. After all, in both cases anger is more related to males, either because of the relatively negative valence or because of stereotype associations. Sadness, however, will be more quickly recognized on males in the dual-valence condition, whereas it will be quicker recognized on females in the single-valence condition.

Method

Participants and design

A total of 117 participants (81 women, mean age 22.48) at the Radboud University Nijmegen were randomly assigned to one of three comparative context conditions (dual-valence: 'happy versus angry' and 'happy versus sad'; single-valence: angry versus sad) in which they saw male and female targets displaying two emotional expressions.

Materials and procedure

Twelve models, six White Dutch men and six White Dutch women, were selected from the RaFD, again, on the basis of recognition data from a validation study (Langner et al., in press). Subsequently, we selected images from these models on which anger, happiness or sadness was displayed. In total this resulted in 36 pictures: three expressions × two target gender × six targets per group. Each participant categorized two emotional expressions that corresponded with the specific comparative context in two experimental blocks, each comprised of 80 trials. For each trial, one of 24 pictures (two expressions × two target gender × six targets per group) was randomly selected and displayed for 200 ms. The experimental procedure used in Study 2 was otherwise identical to the procedure used in Study 1.

Results

As with Study 1, the primary dependent variable was the mean response time needed to categorize the displayed emotional expressions. Incorrect responses (10.50%) and response latencies

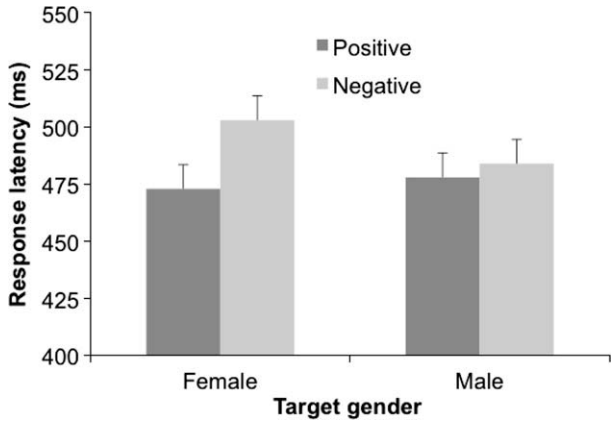

Fig. 3. Mean response latencies and SE's in milliseconds in the two dual-valence conditions together per target gender.

falling outside the range of 200–3000 ms (<1%) were excluded from subsequent analyzes. An analysis with participants' gender in both, the single- and dual-valence, comparative context condition as between subject factor revealed no main or interaction effects and therefore is not included in the analyzes. Similar to Study 1, latencies are reported in milliseconds, whereas analyzes were done on log-transformed mean response latencies.

Dual-valence conditions

Mean log-transformed response latencies were subjected to a 2 (target gender: male versus female) × 2 (expression valence: positive versus negative) × 2 (comparative context: 'happy versus angry' versus 'happy versus sad') mixed design with repeated measures on the first two variables and comparative context as between participant variable. This analysis revealed a main effect for expression valence, $F(1, 76) = 29.05$, $p < .01$, $\eta_p^2 = .27$. Positive emotional expressions ($M = 476$, $SD = 94$) were more quickly recognized than negative emotional expressions ($M = 493$, $SD = 94$). Furthermore, a main effect of target gender was found, $F(1, 76) = 7.61$, $p < .01$, $\eta_p^2 = .09$. Latencies for responding to male targets ($M = 481$, $SD = 94$) were faster than for female targets ($M = 488$, $SD = 95$).

Similar to Hugenberg and Sczesny (2006), we obtained the expected interaction between target gender and expression valence, $F(1, 76) = 20.38$, $p < .01$, $\eta_p^2 = .21$ (see Fig. 3). Positive emotional expressions were recognized faster than negative emotional expressions for female targets, $F(1, 76) = 46.75$, $p < .01$, $\eta_p^2 = .38$, but not for male targets, $F(1, 76) = 2.07$, $p = .16$. Examining the negative emotional expression, a difference for target gender was found, $F(1, 76) = 24.37$, $p < .01$, $\eta_p^2 = .24$, with faster responses for male targets than for female targets. For the positive emotional expression no such difference was found, $F(1, 76) = 2.41$, $p = .12$. Importantly, this two-way interaction was not qualified by the three-way interaction with comparative context as between participants variable, $F(1, 76) = 3.28$, $p = .07$, which indicates that in line with earlier findings by Hugenberg and Sczesny (2006), response patterns in both dual-valence conditions did not differ reliably from each other.[2]

Single-valence condition

Mean log-transformed response latencies were subjected to a 2 (target gender: male versus female) × 2 (target expression: angry versus sad) within participant analyzes of variance, which yielded a two-way interaction between target gender and target expression, $F(1, 38) = 42.53$, $p < .01$, $\eta_p^2 = .53$ (see Fig. 4). Participants were faster in recognizing anger than sadness on male targets, $F(1, 38) = 16.77$, $p < .01$, $\eta_p^2 = .31$. For female targets the opposite was true, with participants recognizing sadness more rapidly than anger, $F(1, 38) = 11.89$, $p < .01$, $\eta_p^2 = .24$. These findings are in line with the notion that stereotypically associated emotional expressions are more easily recognized within the domain of negative emotional expressions only. Additionally, both target expressions differed significantly between target gender groups. Angry male targets were recognized more quickly than angry female targets, $F(1, 38) = 40.82$, $p < .01$, $\eta_p^2 = .52$, and sad female targets were recognized more rapidly than sad male targets, $F(1, 38) = 13.42$, $p < .01$, $\eta_p^2 = .26$.

Discrete negative emotional expressions per comparative context

Next, we tested whether responses differed for negative emotional expressions on female versus male faces as a function of comparative context. First, we subjected the mean response latencies on *angry* target trials to a 2 (target gender: male versus female) × 2 (comparative context: single-valence versus dual-valence) mixed analysis of variance with target gender as within participant variable and comparative context as between participant variable. This analyzes revealed two main effects: response latencies for angry male targets were faster than for angry female targets, $F(1, 75) = 51.09$, $p = .01$, $\eta_p^2 = .41$, and responses were faster in the dual-valence compared to the single-valence condition, $F(1, 75) = 67.01$, $p < .01$, $\eta_p^2 = .47$, signaling a difference in response to general valence versus concrete expressions. As expected, no significant two-way interaction was found.

Second, in contrast to the angry target trials, an interaction was predicted for *sad* target trials. To test this prediction a 2 (target gender: male versus female) × 2 (comparative context: single-valence versus dual-valence) mixed analysis of variance was performed with target gender as within participant variable and comparative context as between participants variable on mean response latencies toward sad targets. This analysis yielded a main effect of comparative context. Response latencies were, again, faster in the dual-valence condition than in the single-valence condition, $F(1, 77) = 50.76$, $p < .01$, $\eta_p^2 = .40$. Furthermore, the expected two-way interaction between target gender and comparative context was found, $F(1, 77) = 23.53$, $p < .01$, $\eta_p^2 = .23$. Response latencies to sad faces changed depending on target gender and comparative context; in a dual-valence condition participants were faster in categorizing sadness for male targets ($M = 492$, $SD = 103$)

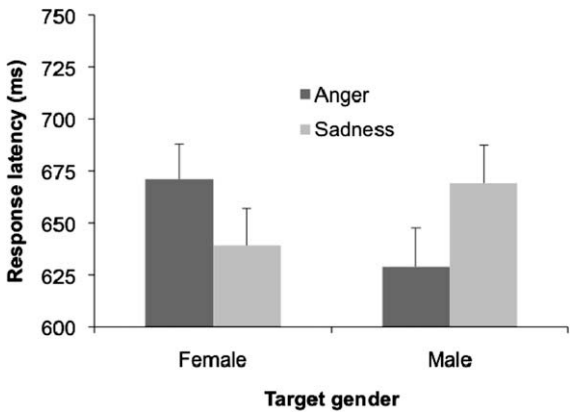

Fig. 4. Mean response latencies and SE's in milliseconds for the single-valence condition per target gender.

[2] The marginal significant three-way interaction pattern suggests that there is a trend towards a larger response latency difference between happiness and anger compared to happiness and sadness for the female social category.

than for female targets ($M = 507$, $SD = 96$), $F(1, 77) = 7.04$, $p = .01$, $\eta_p^2 = .08$. In contrast, in the single-valence condition sadness was recognized more quickly for female faces ($M = 639$, $SD = 113$) than for male faces ($M = 669$, $SD = 114$), $F(1, 77) = 17.62$, $p < .01$, $\eta_p^2 = .19$.

General discussion

The results from these two studies strongly suggest that comparative context moderates the influence of social categorization on emotion recognition. The goal of the present research was to show that depending on the comparative context, emotion recognition could be influenced by both spreading activation of evaluative associations and by stereotypically based associations. Specifically, we expected and found that when positive and negative emotional expressions (dual-valence conditions) were contrasted in a within participants design, emotion recognition is biased by general affective connotations. Our findings support the spreading activation of evaluative association as put forward by Hugenberg (2005) and Hugenberg and Sczesny (2006) across two studies. These effects seem to suggest that stereotypes do not influence emotion recognition in a dual-valence condition.

At the same time, we predicted and found evidence for the influence of stereotype associations on emotion recognition when the comparative context had minimal influence from the general valence of discrete emotional expressions. Both Studies 1 and 2 provide evidence that categorization of two emotional expressions of similar valence (single-valence conditions) is influenced by associations between a social category and discrete emotional expressions. In Study 1 we found recognition facilitation for the Moroccan Dutch stereotype consistent emotional expression, anger. Similarly, in Study 2, recognition facilitation was found for angry male faces and for sad female faces when negative emotions were compared directly. Analyzes on discrete negative emotional expressions between comparative context conditions effectively illustrated the core findings of our paper. Although the same sad faces were shown in both comparative context conditions, in the dual-valence condition we found that sadness was more quickly recognized for the relatively negatively evaluated male social category, whereas, in the single-valence condition, in line with stereotype associations sadness was recognized faster on female faces. With these findings we are the first to show that stereotype associations, as triggered by racial or gender unambiguous faces, may influence categorization of emotional expressions. This suggests a dissociation between general affective and cognitive effects in emotion recognition processes, which is supported by the notion that stereotype-related processes differ conceptually from valence-based processes (Amodio & Devine, 2006).

Apart from differences in response patterns per comparative context, we found that response latencies in the single-valence condition were, in general, slower than those in the dual-valence conditions. Interestingly, the significant differences in response latency between the single-valence and dual-valence conditions may reveal more about the process underlying the current findings. Earlier research demonstrated that emotional expressions could both elicit affective states (e.g. Winkielman, Berridge, & Willbarger, 2005) and communicate discrete emotional messages (Ekman, 1992). Recently, Ruys and Stapel (2008) showed that whether affective reactions or discrete emotional effects were found, depended on how quickly emotional expressions were presented. They argue that responses to emotional expressions build up from a general affective state to a more time-consuming, knowledge-based response later in time. From this point of view, the relatively short response latencies within the dual-valence conditions are related to judgments of general positive and negative affect. The observed increase in response latency in the single-valence condition might reflect the additional time participants need to classify discrete emotional expressions. Consequently, the likelihood of higher order cognitive processes tapping into the categorization process increases over time. Subsequently, the extent to which stereotype consistent characteristics (in this case, emotional expressions) and social categories are reflected in the perception of faces also increases with time. Importantly, however, future research should concentrate on finding more direct evidence for the role of processing depth on the relative impact of evaluative versus stereotypical category associations, for example by manipulating time constraints or task difficulty.

In everyday life we often do not have to judge whether a face is positive or negative but instead have to differentiate between discrete emotions with the same valence. The current findings suggest that stereotype associations might lead to relative quick perception of stereotype consistent emotional expressions. For example, because women are more strongly associated with expressions of sadness than anger, we tend to see more sad than angry women around us. In this manner, stereotype associations may be self-perpetuating by influencing perception in a stereotype confirming way.

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References

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.

Becker, D. V., Kenrick, D. T., Neuberg, S. L., Blackwell, K. C., & Smith, D. M. (2007). The confounded nature of angry men and happy women. *Journal of Personality and Social Psychology, 92*, 179–190.

Eagly, A. H., & Mladinic, A. (1989). Gender stereotypes and attitudes toward women and men. *Personality and Social Psychology Bulletin, 15*, 543–558.

Ekman, P. (1992). Are there basic emotions? *Psychological Review, 99*(3), 550–553.

Elfenbein, H. A., & Ambady, N. (2002). On the universality and cultural specificity of emotion recognition: A meta-analysis. *Psychological Bulletin, 128*, 205–235.

Devine, P. G. (1989). Stereotypes and prejudice. Their automatic and controlled components. *Journal of Personality and Social Psychology, 56*, 5–18.

Dotsch, R., Wigboldus, H. J., Langner, O., & van Knippenberg, A. (2008). Ethnic outgroup faces are biased in the prejudiced mind. *Psychological Science, 19*, 978–980.

Fischer, A. H., Rodriquez Mosquera, P. M., Vianen, A. E. M., & Manstead, A. S. R. (2004). Gender and culture differences in emotion. *Emotion, 4*, 87–94.

Hugenberg, K. (2005). Social categorization and the perception of facial threat: Target race moderates the response latency advantage for happy faces. *Emotion, 5*, 267–276.

Hugenberg, K., & Sczesny, S. (2006). On wonderful women and seeing smiles: Social categorization moderates the happy face response latency advantage. *Social Cognition, 24*, 516–539.

Hugenberg, K., & Bodenhausen, G. V. (2003). Facing prejudice. Implicit prejudice and the perception of facial threat. *Psychological Science, 14*, 640–643.

Hutchings, P. B., & Haddock, G. (2008). Look black in anger: The role of implicit prejudice in the categorization and perceived emotional intensity of racially ambiguous faces. *Journal of Experimental Social Psychology, 44*, 1418–1420.

Langner, O., Dotsch, R., Bijlstra, G., Wigboldus, D. H. J., Hawk, S. T., & van Knippenberg, A. (in press). Presentation and validation of the Radboud Faces Database. *Cognition and Emotion*.

Leppänen, J. M., & Hietanen, J. K. (2003). Affect and face perception: Odors modulate the recognition advantage of happy faces. *Emotion, 3*, 315–326.

Otten, S., & Stapel, D. A. (2007). Who is this Donald? How social categorization affects aggression-priming effects. *European Journal of Social Psychology, 37*, 1000–1015.

Plant, E. A., Hyde, J. S., Keltner, D., & Devine, P. G. (2000). The gender stereotyping of emotions. *Psychology of Women Quarterly, 24*, 81–92.

Ruys, K. I., & Stapel, D. A. (2008). How to heat up from the cold: Examining the preconditions for (Unconscious) mood effects. *Journal of Personality and Social Psychology, 94*, 777–791.

Turner, J. C., Hogg, M. A., Oakes, P. J., Reicher, S. D., & Wetherell, M. S. (1987). *Rediscovering the social group: A self-categorization theory*. Oxford and New York: Basil Blackwell.

Verkuyten, M., & Zarembe, K. (2005). Interethnic relations in a changing political context. *Social Psychology Quarterly, 68*, 375–386.

Winkielman, P., Berridge, K. C., & Willbarger, J. L. (2005). Unconscious affective reactions to masked happy versus angry faces influence consumption behavior and judgments of value. *Personality and Social Psychology Bulletin, 31*, 121–135.