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BRIEF ARTICLE

On the malleability of the meaning of contexts: the influence of another person’s emotion expressions on situation perception

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ABSTRACT
Research on the relationship between context and facial expressions generally assumes a unidirectional effect of context on expressions. However, according to the model of the meaning of emotion expressions in context (MEEC) the effect should be bidirectional. The present research tested the effect of emotion expression on the interpretation of scenes. A total of 380 participants either (a) rated facial expressions with regard to the likely appraisal of the eliciting situation by the emoter, (b) appraised the scenes alone or (c) appraised scenes shown together with the expressions they supposedly elicited. The findings strongly supported the MEEC. When a scene was combined with an expression signalling a situation that is undesirable, or high in locus of control or sudden, the participants appraised the scene correspondingly. Thus, the meaning of scenes is malleable and affected by the way that people are seen to react to them.

Traditionally, research on the understanding of emotion expressions has been conducted using carefully controlled “context-free” expressions (Hess & Hareli, 2015). Apart from the fact that it is dubious whether expressions can ever be fully devoid of context given that the face already provides the social group membership of the expresser as context information (Hess, Adams, & Kleck, 2009; Hess & Hareli, 2015), the importance of considering context explicitly when studying emotion expressions has been increasingly emphasised (e.g. Barrett, Mesquita, & Gendron, 2011).

This context has been provided by a variety of means (see also, Matsumoto & Hwang, 2010), such as combining facial expressive stimuli with pictures or stories describing the purported emotion elicitor (Carroll & Russell, 1996; Noh & Isaacowitz, 2013; Szczurek, Monin, & Gross, 2012). Social group information can be provided by adding information such as a Niqab or a surgical mask to the facial information (Fischer, Gillebaart, Rotteveel, Becker, & Vliek, 2012; Hareli, David, & Hess, 2013; Kret & de Gelder, 2012) or by providing group labels (Thibault, Bourgeois, & Hess, 2006). Alternatively, information from the face has been contrasted with information from another nonverbal channel – for example the body (Aviezer et al., 2008). That is, there is a wide range of information that can be considered context. However, what all of these have in common is the notion that the meaning of context, especially situational context, remains stable and it is the meaning of the facial expression that is malleable. We submit that this is not the case, rather the process of evaluating emotion expressions in context, also allows for and even demands a reevaluation of the context in light of the expression.

This notion is based on the model of the meaning of emotion expressions in context (MEEC; Hess & Hareli, 2016). In this model, expressions are perceived within a situational context (the real world) and then interpreted within an interpretive context (the perceived world). Importantly, the model emphasises the role of social or reengineered appraisals (Hareli & Hess, 2010; Manstead & Fischer, 2001), that is, the

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reconstructed appraisals of a situation that can be deduced from the emotional reaction of another person. This information may be used to adjust one’s own reactions in light of different goals such as that of maintaining a given relationship (e.g. Evers, Fischer, Rodriguez Mosquera, & Manstead, 2005), but it can also be used as information about the context itself. If the information provided by the context and the social appraisal of the expression are sufficiently congruent, then the emotion can be labelled readily. In case of a mismatch the perceiver has to reevaluate the match explicitly. One outcome of this process can be to change the meaning of the expression as suggested by research on the malleability of expression perception (e.g. Aviezer et al., 2008; Righart & De Gelder, 2008). Another outcome would be to reevaluate the situation. That is, according to the MEEC congruence is recreated by reinterpretation either the situation or the facial expression or both.

That emotion expressions can influence the interpretation of objects presented at the same time or shortly afterwards can be adduced from research on gaze-cuing. When eye-gaze is combined with facial expressions, differential effects as a function of emotion expressions have been found for (kitchen or garage) objects (Bayliss, Frischen, Fenske, & Tipper, 2007) or for other faces (Mumenthaler & Sander, 2012, 2015) that the gaze was directed to (but not for those that were not gazed at). These findings suggest that when a person seems to pay attention to an object or face, the facial expression of that person gains informative value that influences subsequent ratings. However, in these studies the environmental objects were either carefully chosen to be neutral (Bayliss et al., 2007) or were also faces (Mumenthaler & Sander, 2012, 2015) rather than scenes.

The present research aimed to study the malleability of the meaning of potentially emotion eliciting events depicted in scenes, that is, on whether participants would reinterpret the scene in line with a purported facial reaction to that scene.

**Methods**

**Participants**

For the main experiment, 318 (168 men, 1 other) participants with a mean age of 38 years ($SD = 12$), and for the facial expression rating study, 62 participants (37 men) with a mean age of 36 years ($SD = 12$) were recruited via Amazon Mturk, completed the survey and passed control questions probing for appropriate diligence. To determine sample size, we aimed for a minimum of 13 judges per cell, which for emotion judgments typically assures acceptable interclass correlations. Data collection was stopped when this goal was reached.

**Materials**

**Facial expressions**

Facial expressions of two positive and two negative high arousal emotions: happiness, pride, disgust and fear by two men and two women were taken from the Amsterdam Dynamic Facial Expression Set (ADFES) (Van der Schalk, Hawk, Fischer, & Doosje, 2011) resulting in a total of 4 (emotion) × 2 (gender) × 2 (identities) = 16 faces. The ADFES provides images for happiness and pride but no other positive emotion expression. The rationale for the choice of the negative emotion was a desire to match emotions across valence and arousal. Disgust and fear are both high arousal emotions (e.g. Russell, 1980) and hence “match” the sole positive options best in that regard. Specifically, we did not want to select sadness as the only low arousal emotion (Russell, 1980). Anger was not chosen because anger is a negative approach emotion (Carver & Harmon-Jones, 2009).

**Scenes**

Four photos each showing emotion eliciting scenes for happiness, pride, disgust and fear were taken from the International Affective Picture System (IAPS, Bradley & Lang, 2007) and the internet1 resulting in a total of 16 scenes.

**Procedure and dependent variables: main experiment**

Each participant completed a single trial. Following the general design by Szczurek et al. (2012), participants saw a scene randomly combined with one of the emotion expressions and were told that the expression occurred in reaction to the scene (see Figure 1 for an example). In the control condition, participants saw only the scene without any expression. Each participant completed only one trial. Participants in the experimental condition were first asked to rate the degree to which the person showed happiness, pride, disgust and fear on a series of scales anchored with 0 – not at all and 6 – very intensely. In the
control condition they were asked to indicate the likelihood that the scene would elicit these emotions. This served as a manipulation check for the meaning of the scenes.

Participants were then asked to rate the scenes on a series of 15 questions based on a short version of the appraisal section of the GRID questionnaire (Fontaine, Scherer, & Soriano, 2013). These questions cover all appraisal dimensions (see supplementary materials for the list of questions used in the main experiment). Participants were asked whether the "situation that caused the emotion" involved behaviour that, for example, violated laws or socially accepted rules of behaviour. The corresponding question for participants who saw only the context was "Did the situation shown in the photo involve behavior that violated laws or socially accepted rules of behavior?" All scales were anchored with 0 – not at all and 6 – very much.

Because some of the items correlated substantially, we conducted a principal component analysis that yielded four factors, based on the scree plot, which explained 61% of the variance. As factor 3 and 4 had considerable cross-loadings and the resulting scales had low internal consistencies, these two factors were combined. This yielded three factors: negative consequences (5 items, $\alpha = .73$), internal locus of control (6 items, $\alpha = .73$) and suddenness (2 items, $\alpha = .63$). Two items did not load sufficiently on any factor and were excluded.

**Procedure and dependent variables: facial expression ratings**

In addition, a second group of participants ($N = 62$, see above) each rated one of the facial expressions, using the same emotion scales as in the main experiment. They then were asked to reverse engineer the appraisals underlying the expression by answering the same appraisal questions as above with the instruction to assess to what degree the situation that caused the emotion had occurred suddenly, was caused by the expresser themselves, was pleasant, etc. The appraisals were combined into the same scales as for the main experiment.

**Results**

**Manipulation check**

Planned contrasts were conducted to assess whether the context scenes were considered to be likely to elicit the target emotion when shown without an expression (for means, standard deviations and $F$-values, see Table 1). The fear and pride scenes were rated as significantly more likely to elicit fear and pride, respectively, than any other scene. Disgust scenes were rated as more likely than happy and pride scenes to elicit disgust, however, fear scenes were also considered somewhat likely to elicit disgust, most likely because the two snakes used as stimuli can also be seen as disgusting. Happy scenes were rated as most likely to elicit happiness, yet, pride scenes were also expected to elicit happiness. This makes intuitive sense as most pride events, such as winning a medal, also induce happiness. Thus, overall, the scenes were found to elicit the expected emotions.

**Facial expression ratings**

To assess the reverse engineered appraisals of the presumed situations that elicited the facial expressions,
one-way analyses of variance on the three appraisal scales were conducted and followed up by post hoc tests (for means and standard errors see upper panel of Figure 2). Significant main effects of expression emerged for suddenness, $F(3,58) = 6.41$, $p = .001$, $h^2 = .25$, internal locus of control (ILC), $F(3,58) = 36.45$, $p < .001$, $h^2 = .65$, and undesirability of the situation, $F(3,58) = 61.15$, $p < .001$, $h^2 = .76$. Post hoc tests ($p < .05$) showed that for facial expressions of disgust and fear, the eliciting situations were rated as higher in undesirability and lower in internal locus of control than situations that elicit happiness and pride. Situations that elicit fear were considered to be more sudden than situations that elicit happiness and pride, and those that elicit disgust as more sudden than those that elicit pride. In sum, participants were able to deduce the likely appraisals of the situation by the emoter from the expression shown.

Hypothesis testing

To assess whether the social appraisal of the expression shown in response to the scenes affected the meaning of the scenes, a series of univariate analyses of variance with planned contrasts comparing the control condition with the expression conditions were conducted for each scene category (for means and standard errors see Figure 2, for $F$-values see Table 2, for means, standard deviations and confidence intervals see supplementary materials).

All ratings of scenes were affected by the emotion expressions that they supposedly elicited. Overall, happiness and pride scenes were more affected than disgust and fear scenes. The effect of the expressions was very systematic and matched the reverse engineered appraisals based on the expression ratings. Compared to the control condition, disgust expressions presented together with scenes increased appraisals of undesirability and lowered appraisals of internal locus of control for happy and pride scenes in line with the higher ratings of reverse engineered undesirability and higher ratings of locus and control when the expressions were appraised without context.

Similarly, fear expressions, which were appraised as high in suddenness, increased appraisals of suddenness for all scenes except fear scenes; for happy and pride scenes they also increased appraisals of undesirability and decreased appraisals of internal locus of control in line with the appraisal of the faces alone.

Happy expressions by contrast increased appraisals of internal locus of control for disgust and fear scenes, as well as decreased appraisals of suddenness for fear scenes, also in line with the appraisal of the faces alone. Pride expressions only affected fear scenes and did so in the same way as happy expressions. Thus, overall, whenever an expression affected the meaning of a scene it did so in line with the appraisal of the face alone. This suggests that participants relied on the social or reengineered appraisal of the accompanying expression when appraising the scene.

Discussion

The present results provide strong evidence that the perception of scenes is influenced by another person’s facial expressions that were supposedly elicited by these scenes. Specifically, the reverse
Figure 2. Mean ratings and standard errors for appraisals of the scenes as a function of emotion expression: main experiment. Note: Stars indicate means that are significantly different ($p < .05$) from non-starred means; ILC: internal locus of control.
engineered appraisals based on the facial expression alone matched closely the effect of this expression on the perception of a scene. When a scene was combined with an expression for which the reverse engineered appraisals assume an eliciting event that is undesirable, or high in locus of control or sudden, the participants appraised the scene correspondingly, even when this was not the case when the scene was shown alone. That is, participants relied on the emotional facial expressions of others when evaluating the scene, even though they do not know these others. As such, this process is not the same as adult social referencing (Parkinson, Phiri, & Simons, 2012), but may rather be one of the processes underlying social referencing.

These findings strongly support the MEEC and the notion that when participants are aware of both facial expressions and an eliciting context they engage both in an appraisal of the situation and in the social appraisal of the expression. When these two do not match, they adjust their perceptions accordingly. However, this adjustment also has limits. For example, the perception of disgust scenes was not as strongly affected as the perception of happy and pride scenes. Thus, disgust scenes were always rated as very undesirable irrespective of the expression that accompanied them, whereas happy and pride scenes were rated as significantly more undesirable when accompanied by disgust or fear expressions. This suggests that participants discounted the non-matching happy and pride expressions when at the same time faced with a disgusting scene. In fact, individuals who smile when faced with disgusting stimuli are perceived as affectively deviant to some degree (Szczurek et al., 2012) and hence their expressive input is likely discounted. This suggests that disgust scenes might be overall less malleable.

One factor that affects malleability is whether the discrepancy between the social appraisal of the expression and the appraisal of the scene can be readily reconciled. The MEEC supposed that adjustment to the interpretation of either scenes or faces are only required when the discrepancy is difficult to reconcile. Cultural memes are one means of such reconciliation. In this vein, in a recent study Hess and Hareli (in press) found that when asked to explain discrepant information from both sources, people often recur to cultural memes. For example, when a picture of a cute kitten is combined with an emotional fear reaction, the cultural meme of fear of cats is invoked. Thus, when a ready meme is available, no further processing of either scene or facial information is required. In the same vein, if as suggested by (Szczurek et al., 2012) individuals who do not react with disgust to disgust scenes are perceived as “deviant” sources of information, their input may be discounted and no further reconciliation is required. Future research should explore these limits of the influence of social appraisals on context perception.

In sum, the present research provides strong evidence for the notion that not only does the context in which facial expressions are shown impact the perception of these expressions (Aviezer et al., 2008; Righart & De Gelder, 2008), but conversely, the social appraisal of these facial expressions does in turn impact on the perception of the context in which they are shown. That is, neither facial expressions nor context are immutable, instead both are malleable.

**Note**

1. 7380, 1945, 3250, 7360, 1051, 1113, 1302, 1930, 1920, 2655, 2791, 1463, for pride hands holding medals or trophies were shown.

**Disclosure statement**

No potential conflict of interest was reported by the authors.

**References**


