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Looking at You or Looking Elsewhere: The Influence of Head Orientation on the Signal Value of Emotional Facial Expressions

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Abstract The role of horizontal head tilt for the perceptions of emotional facial expressions was examined. For this, a total of 387 participants rated facial expressions of anger, fear, sadness, and happiness, as well as neutral expressions shown by two men and two women in either a direct or an averted face angle. Decoding accuracy, attributions of dominance and affiliation, emotional reactions of the perceivers, and the felt desire to approach the expresser were assessed. Head position was found to strongly influence reactions to anger and fear but less so for other emotions. Direct anger expressions were more accurately decoded, perceived as less affiliative, and elicited higher levels of anxiousness and repulsion, as well as less desire to approach than did averted anger expressions. Conversely, for fear expressions averted faces elicited more negative affect in the perceiver. These findings suggest that horizontal head position is an important cue for the assessment of threat.

Keywords Emotion · Facial expression · Head orientation

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Introduction

Facial expressions of emotions have been extensively studied over the past 100 years and the expressive movements that tend to be reliably associated with the perception of different emotional states are now well established (e.g., Elfenbein and Ambady 2002). However, facial expressions signal more than just emotional states. What this ''more'' is has elicited a very spirited debate within the literature (Ekman 1994; Fridlund 1994; Russell 1994; Hess et al. 1995). Thus, beyond simply reflecting underlying emotional state (Ekman 1994; Izard 1994), facial movement has been argued to signal action tendencies (Frijda and Tcherkassof 1997), to be an indicator of states of pleasantness and arousal (Russell and Fehr 1987), to be a concomitant of appraisal processes (Scherer 1984, 1992, 2005; Smith and Scott 1997) and to be a non-emotional signal of behavioral intentions (Fridlund 1994). Despite the seeming discrepancy among these views, these proposed signal functions of emotional facial expressions are not mutually exclusive. As Hess et al. (1995) note, it has long been recognized that verbal and nonverbal signals are inherently polyvalent.

An early version of this notion was expressed, for example, in the model of communication presented by Bühler (1934). This model distinguishes three aspects of a message: the symbolic, the symptomatic, and the appeal function. The first refers to the sign content of the message and conveys information directed at the interaction partner and corresponds to the social signaling function emphasized by Fridlund (1994). The second is the symptomatic function and corresponds to a readout of the individual's internal state or emotion, a view emphasized by Ekman (1973). The third function regards the possible actions of the interaction partner. Thus, from this view, when

studying the perception of facial expressions, not only the emotional signal value (i.e., what emotion is the person feeling), but also the behavioral intentions of the signaler (e.g., approach or avoidance), and the reactions and intentions of the perceiver are all pertinent. However, most research in the domain of emotion communication has focused on the emotional signal value of facial displays. A much smaller separate literature has focused on the last issue, that is, on people's reactions to the facial expressions of others, mainly in the context of emotional contagion, that is, the notion that observers ''catch'' the emotional state of the observed person. Research on emotional contagion (Hatfield et al. 1994) has shown that observers tend to report emotional reactions that are congruent with the emotional expression of the person they observe. For example, Blairy et al. (1999) report that observers tend to both mimic the expressions of others and share their emotion. This has also been demonstrated for vocal emotion expressions (e.g., Neumann and Strack 2000).

Expressive cues and visual attention

It is important to note, that most of the studies on the perception of emotional facial expressions have neglected the role of the visual attention of the expressor for the interpretation of emotional expressions. Instead, they have tended to focus on a specific type of stimulus, the full-face static or dynamic presentation of a person who looks directly at the observer, thereby controlling for looking behavior. Yet, previous research suggests an important role for looking behavior, because it tends to vary naturally as a function of what emotions are being expressed and has important implications for the signal value of an expression. Happiness and anger, which indicate a high likelihood of approach on the part of the expresser, tend to be expressed with direct rather than averted gaze. Emotions such as embarrassment and sorrow, however, which indicate a greater tendency to withdraw, tend to be communicated more with averted gaze (see e.g., Argyle and Cook 1976; Fehr and Exline 1987). References to looking behavior are also commonly used in our lexicon to describe different emotional states (e.g., downcast eyes to describe someone who is sad).

In this vein, Adams and Kleck (2003, 2005) found in a speeded reaction time task and self-reported perception of emotional intensity that direct gaze facilitates the processing of facially communicated approach-oriented emotions (e.g., anger and joy), whereas averted gaze facilitates the processing of facially communicated avoidance-oriented emotions (e.g., fear and sadness). The interaction between perceived emotion and gaze has also been demonstrated on the neural level (Adams et al. 2003).

This work raises the possibility that looking direction influences not only the perception of emotions but also emotional reactions to expressive faces. As mentioned earlier, observers frequently report emotional states congruent with the facial expression they are observing, and this finding is typically interpreted as due to emotional contagion. However, there is an alternative explanation for some of these findings. Specifically, seeing a happy face may make people happy because it is in and of itself a pleasant stimulus. Similarly, people may report increased levels of irritation when observing an anger face because of the threat value of such a face (Dimberg and Öhman 1996). But, as is suggested by the research reviewed above, the focus of visual attention of the expressor may play an important role not only for our interpretation of the expression but also for our emotional and behavioral responses to different facial displays.

This role would arguably be more important in the case of threat relevant displays. If an angry person has you as the focus of their attention, danger is probably directed at you. In contrast, a fearful person whose visual attention is directed elsewhere in the environment, offers information as to where in the environment the danger may be lurking. Specifically, a horizontal head tilt, and its concomitant averted gaze, clearly implies that the expresser is oriented away from the perceiver and is looking toward another object or person.

Few studies have considered head position in the context of emotion communication (Kappas et al. 1994; Kleck and Mendolia 1990; Wallbott 1998; Yoshikawa and Sato 2000). However, none of these have focused on the specific question being raised here. Specifically, the primary aim of the present study was to assess the hypothesis that the focus of visual attention as signaled by head direction modulates the signal value of threat relevant emotion displays, that is anger and fear. In addition, we studied the impact of head direction on responses to an approach expression (happiness) and a withdrawal expression (sadness). Responses to both of these have previously been found to be influenced by gaze direction when presented as full-face displays. These expressions were included to assess whether the hypothesized effects generalize to all approach and withdrawal emotions or are specific to anger and fear. Finally, neutral expressions were added as a control condition.

Methodology

Participants

A total of 166 men and 221 women with a mean age of 29 years participated in the study. Of these, 54 had completed high school, 199 had some level of university or vocational college education and 125 had a university degree.

Dependent variables

Two sets of dependent measures were obtained: emotion perception ratings and emotional reaction ratings.

Emotion perception ratings

Participants were asked to rate the facial displays regarding the emotion expressed on an emotion profile comprised of the scales happiness, anger, fear, sadness, disgust and surprise. Participants rated the expression on each scale on a seven point Likert-type scale ranging from 0 (not at all) to 6 (very intensely). Decoding accuracy was derived from the emotion profile such that when the intentionally posed emotion received the highest score, the judgment was considered accurate and a score of 1 was given, otherwise a score of 0 was given. For neutral expressions there was no single criterion scale and neutral expressions were considered accurately decoded when no emotion scale received a rating higher than 1.[1]

Emotional reaction ratings

To assess participants' emotional reactions to the stimuli, participants were asked to describe their own emotional state in response to viewing each face using an emotion reaction profile with the scales: cheerful, irritated, anxious, miserable, surprised and repulsed. The scales ranged from 0 (not at all) to 6 (very intensely). In addition participants were asked to indicate how much they would like to meet or approach the person in the picture on scale ranging from 0 (not at all) to 6 (very much).

Stimulus material

Using the directed facial action task (DFA, Levenson et al. 1990), two men and two women were instructed to pose facial expressions of happiness, sadness, fear, and anger. This procedure has been employed for the creation of standard sets of emotional facial expressions that are widely used by researchers in the field such as the JACFEE (Matsumoto and Ekman 1988) and the MSFDE (Beaupré and Hess 2005; Hess 2005).

The expressions were simultaneously filmed face on and in ¾ profile from the left side. Apparent right side profiles were obtained using Photoshop 7.0 to horizontally flip the expressions (see Fig. 1 for an example). This was done to avoid confounding direction of gaze with intensity of the expressions, as the left and right hemifaces tend to differ in expressiveness (e.g., Indersmitten and Gur 2003). This resulted in a total of 4 (actors) × 5 (4 emotions + neutral) × 3 (angles) = 60 stimuli. The stimuli were presented in a between subjects design. Each participant saw a random combination of four stimuli (with the restriction that no actor was shown twice) and was asked to rate these on one of the two sets of dependent variables described previously. This design—though requiring a larger number of participants—was chosen to avoid having any one participant rate the same expression on the same face from different angles. Emotion ratings were obtained from 89 men and 109 women and emotional reaction ratings were obtained from 77 men and 112 women.

Procedure

Participants were recruited in parks and public places in the Montreal urban area as well as in classrooms at the University of Quebec at Montreal. The experimenters introduced themselves as students at the University of Quebec at Montreal and asked for a few minutes time. Participants who agreed were given a clipboard with four pages. Each page showed a face stimulus and the rating scales. The experimenters explained the participants' task verbally and the information was repeated on the top of each page. The experimenters were blind regarding the hypotheses being tested but had had previous experience in collecting data of these sorts. The participant's responses were anonymous. Following the task, they completed a brief demographic data form.

Data analyses

Since each judge saw only a small random sample of the total stimuli (with the above-mentioned restrictions), the dependent measures were analyzed using a complete between subjects analyses. Intra class correlations were computed using two-way random effects estimation (SPSS). Coefficients ranged from –.10 for dominance to .28 for approach with a mean of .08 suggesting very low levels of dependence and hence justifying this approach.

Results

Emotion perception

The present study involved the decoding of emotional facial expressions of happiness, anger, fear, and sadness as well as neutral expressions directed toward or away from the observer. Literally hundreds of studies have been

[1] For fear expressions, inspection of the means showed that many participants rated these faces as expressing both surprise and fear. As this is not unreasonable, given the morphological overlap between the two expressions (raised eyebrows and open mouth) and the fact that surprise and fear do frequently co-occur, such combined ratings were also considered accurate.

Fig. 1 Example for straight on and averted faces

conducted on full-face direct gaze expressions using this dependent measure and thus the present data derived from ratings of the full-face stimuli necessarily replicate a series of well-established findings. These findings will be briefly presented but not discussed in detail. The results section will be primarily devoted to findings involving head orientation as a factor.

The dependent variables were decoding accuracy for each expression. Initial analyses did not reveal a main effect or any interaction involving sex of rater. This factor was therefore dropped from the following analyses. An encoder sex × emotion × head direction (direct versus averted) analysis of variance revealed a main effect of encoder sex, $F(1, 772) = 5.03$, $p = .025$, a main effect of emotion, $F(4, 772) = 37.74$, $p < .001$, and a main effect of head direction, $F(1, 772) = 4.92$, $p = .027$. These main effects were qualified by the predicted emotion × head direction interaction, $F(4, 772) = 2.50$, $p = .041$, and an encoder sex × emotion interaction, $F(4, 772) = 6.67$, $p < .001$.

Effects of head direction

The main effect of head direction revealed that overall emotions in direct faces were somewhat better recognized ($m = 66$, SD = .67) than emotions in averted faces ($m = 60$, SD = .49). This finding was qualified by the predicted emotion × head direction interaction. Post-hoc analyses confirmed the prediction that raters were less sensitive to averted anger expressions ($m = .50$, SD = .50) than to direct anger expressions ($m = .68$, SD = .47). Though the pattern of means for fear was in the expected direction, with averted fear being somewhat better recognized ($m = .66$, SD = .48) than direct fear ($m = .61$, SD = .49) this difference did not reach significance. For happiness, and sadness no differences as a function of head direction emerged. Interestingly, a relatively large difference was found for neutral expressions, which were recognized better when seen face-on ($m = .40$, SD = .49) than when seen averted ($m = .22$, SD = .41). Two possible explanations for this finding can be advanced. First, neutral faces have often been reported to be evaluated negatively. Thus, it may be possible that a neutral face also signals at least some level of threat. If this were the case, then emotional reactions to averted versus direct neutral faces should also parallel those for anger faces. Second, the averted neutral faces were most often misidentified as sad. It is possible that sadness, a withdrawal emotion, is more easily associated with an averted, withdrawing face.

To test this latter hypothesis, ratings on the sadness scale were compared across all averted and direct faces, and indeed overall there is a tendency to attribute more sadness to averted faces ($m = 1.95$, SD = 2.21 versus 1.61, SD = 1.98), $t(786) = 2.30$, $p = .022$. This supports the notion that averting the face may be considered withdrawal by the observer and, especially in the absence of other clear markers of emotion, be interpreted as sadness. Hence, averted neutral faces are less well recognized because they are more easily confused with sad faces. These two explanations are not mutually exclusive as it is possible that direct neutral faces are perceived as threatening, whereas averted neutral faces are perceived as sad.

Replications

Whereas on the whole men's emotion expressions ($m = .67$, SD = .47) were better recognized than women's ($m = .60$, SD = .49), this was the case only for men's expressions of anger and fear as well as neutral expressions ($m = .64$, SD = .48, $m = .79$, SD = .41, $m = .39$, SD = .49 versus $m = .53$, SD = .50, $m = .50$, SD = .50, $m = .24$, SD = .43, for anger, fear, and neutral, respectively). Sadness and happiness were better recognized when the encoder was a woman ($m = .63$, SD = .47, $m = .89$, SD = 32 versus $m = .80$, SD = .40, $m = .92$, SD = .27). The finding that sadness and happiness are better recognized when shown by women, whereas anger is better recognized when shown by men, replicates findings by Hess et al. (2000) and fits with the notion that emotions that are closer to the stereotypical expectations for women's emotionality are better recognized when shown by women (see Hess et al. 2005). It has been argued that a slight smile rather than the actual absence of an expression represents a 'neutral' expression for a woman (LaFrance et al. 2003). This may explain why neutral expressions were also better recognized as such when shown by a man.

Overall, happiness expressions ($m = .91$, SD = .49) were recognized significantly better than expressions of sadness ($m = .71$, SD = .45), which did not differ from fear

(m = .64, SD = .48), which in turn did not differ from anger (m = .58, SD = .49), with neutral expressions (m = .31, SD = .46) being least well recognized. Thus, all emotion expressions were well recognized but neutral expressions were not. The low accuracy for neutral expressions can be attributed to the fact that the accuracy criterion was very strict—if the perceiver saw even a very low level of any emotion in a neutral expression (greater than 1) it was scored as inaccurate. It should be noted in this context that the static facial features present in the non-expressive or neutral face can communicate emotions as well. Some individuals, for example, have slightly up- or down-turned corners of the mouth or drooping eyelids. Malatesta et al. (1987) have shown that morphological facial features associated with aging are often misattributed as emotion signals. Further, facial morphology differences associated with gender have been shown to affect the emotional attributions made to male and female neutral faces (Hess, Adams, and Kleck, 2007).

Emotional reactions

As mentioned above, we also assessed the decoders' emotional reactions to direct and averted faces. First, a multivariate analysis of variance with the factors encoder sex, emotion and head orientation[2] was conducted on the two positive emotional states, cheerfulness and surprise, and revealed no significant effects involving head orientation. Only the main effect of emotion was significant, $F(8, 1456) = 137.62$, $p < .001$. Second, a multivariate analysis with the factors participants sex, encoder sex, emotion, and head orientation was conducted on the negative emotional states of irritation, anxiety, feeling miserable, and feeling repulsed. The predicted emotion × head orientation interaction was significant, $F(16, 2776) = 1.64$, $p = .052$ and was univariately significant for anxiousness and feeling repulsed. A main effect of emotion, $F(16, 2856) = 25.73$, $p < .001$, was univariately significant for all scales. Table 1 shows the means and standard deviations for all emotion reaction ratings as a function of emotion and head orientation.

Effects congruent with emotional contagion were found such that for expressions of happiness, cheerfulness was rated highest, for anger expressions irritation was rated highest and for sadness expressions of feeling miserable were rated highest. However, both sadness and anger expressions also elicited high levels of anxiousness and feeling repulsed. In addition, fear expressions elicited more surprise and feeling repulsed than anxiousness. This pattern of results suggests that emotion expressions not only elicit contagion effects but also other important emotional reactions. Stated most broadly, emotional facial expressions are robust emotion eliciting stimuli. In this context it is reasonable to expect that head orientation would modulate the nature and intensity of the perceivers' reactions. In particular, direct anger should elicit higher levels of anxiousness and desire for withdrawal than should averted anger due to the greater threat signaled by this expression and head direction. The reverse should be the case for fear expressions. The pattern of means observed in Table 1, supports this contention. Specifically, as expected, direct anger, which should signal threat directed at the observer, elicited more anxiousness and feelings of repulsion than did averted anger. The prediction that averted fear signals a threat in the environment was supported by the finding that participants reported higher levels of feeling repulsed, albeit not higher levels of anxiousness, in response to averted than in response to direct fear expressions.

A similar pattern was found for sadness, where direct sadness elicited less anxiousness (m = 1.89, SD = 1.87) than did averted sadness (m = 2.60, SD = 2.05). This suggests that averted sadness may also signal the presence of a negative environmental object that could plausibly cause concerns for the observer. The notion that being looked at with a neutral expression is negatively valenced is supported by the observation that direct neutral expressions elicited a higher level of feeling repulsed. Happiness expressions elicited rather low levels of both reactions, regardless of head direction.

In addition, a main effect of encoder sex, $F(4, 711) = 4.23$, $p = .002$, was univariately significant for anxiousness and feeling miserable, such that men's expressions induced overall higher levels of anxiousness (m = 1.87, SD = 1.93) and lower levels of feeling miserable (m = 1.16, SD = 1.68) than did women's expressions (m = 1.63, SD = 1.81 and m = 1.40, SD = 1.86). Further, a significant participant sex × emotion interaction emerged, $F(16, 2776) = 1.67$, $p = .046$, which was univariately significant for feeling miserable $F(4, 691) = 3.97$, = .004. Specifically, women reported higher levels of feeling miserable (m = 3.01, SD = 2.15) while observing sad expressions than did men (m = 2.12, SD = 2.07), $F(1,139) = 5.77$, $p = .018$.

Approach tendency

Finally, Marsh et al. (2005), who used only direct expressions, found that fear expressions elicit stronger approach tendencies than do anger expressions. We predicted that this effect would be moderated by head direction. However, no main effect nor interaction involving head direction emerged. Marsh et al.'s finding regarding the relative levels of approach tendencies elicited by anger and

[2] As an initial analysis did not reveal a main effect or any interaction involving participant sex this factor was dropped from the analyses reported here.

Table 1 Means and standard deviations for all emotion reaction ratings as a function of emotion and head orientation

Emotion expression	Direct		Averted		Total	
	Mean	SD	Mean	SD	Mean	SD
Cheerfulness						
Anger	0.52	0.97	0.54	1.15	0.53	1.06
Fear	0.97	1.72	0.64	1.09	0.81	1.45
Happiness	4.04	1.54	3.85	1.54	3.95	1.54
Sadness	0.34	0.94	0.18	0.55	0.26	0.78
Neutral	0.95	1.47	1.04	1.51	0.99	1.49
Surprise						
Anger	1.20	1.56	1.18	1.59	1.19	1.57
Fear	3.58	2.03	3.75	1.96	3.66	1.99
Happiness	0.69	0.99	0.99	1.50	0.84	1.27
Sadness	1.04	1.53	1.18	1.81	1.11	1.66
Neutral	0.61	1.26	0.39	1.11	0.50	1.19
Irritation						
Anger	2.82	2.11	2.76	1.70	2.79	1.91
Fear	1.68	1.84	1.61	1.74	1.65	1.78
Happiness	0.50	0.97	0.35	0.77	0.42	0.88
Sadness	1.23	1.60	1.42	1.59	1.32	1.59
Neutral	1.11	1.33	0.77	1.20	0.94	1.27
Anxiousness						
Anger	2.42	1.92	1.88	1.75	2.14	1.85
Fear	2.33	1.93	2.17	1.90	2.25	1.91
Happiness	0.58	0.98	0.56	1.14	0.57	1.06
Sadness	1.92	1.87	2.64	2.03	2.27	1.98
Neutral	1.41	1.74	1.34	1.71	1.37	1.72
Feeling miserable						
Anger	1.39	1.65	1.36	1.79	1.38	1.72
Fear	1.11	1.59	1.13	1.59	1.12	1.58
Happiness	0.35	0.77	0.21	0.60	0.28	0.69
Sadness	2.45	2.14	2.90	2.14	2.67	2.14
Neutral	1.12	1.56	0.88	1.58	1.00	1.57
Feeling repulsed						
Anger	2.75	2.08	2.30	1.81	2.52	1.96
Fear	2.27	2.13	2.93	2.18	2.59	2.17
Happiness	0.51	1.13	0.33	0.90	0.42	1.02
Sadness	1.66	1.92	1.97	2.01	1.81	1.96
Neutral	1.61	1.83	0.99	1.66	1.30	1.77

fear was supported in so far as a significant main effect of emotion, $F(4, 698) = 50.24$, $p < .001$, showed that anger expressions elicited the lowest level of approach tendencies compared to all other emotions ($m = 1.57$, SD = 1.39), followed by fear ($m = 1.91$, SD = 1.47), sadness ($m = 2.03$, SD = 1.63), and neutral ($m = 2.28$, SD = 1.53), which did not differ from sadness, and finally by happiness ($m = 3.98$, SD = 1.48), which elicited the highest level of approach tendencies. This effect was qualified by a sex of participants × emotion interaction, $F(4, 698) = 3.20$, $p = .013$, such that women reported higher approach tendencies towards happy faces ($m = 4.26$, d = 1.41) than did men ($m = 3.58$, SD = 1.50). Further, participants reported slightly higher approach tendencies towards men ($m = 2.49$, SD = 1.66) than women ($m = 2.23$, SD = 1.76), $F(1, 698) = 5.40$, $p = .020$.

Discussion

The present study assessed emotional reactions to, and decoding accuracy for, emotional facial expressions

directed towards or away from the observer. Specifically, we predicted that head orientation signals the focus of attention of the expresser and that this attentional focus moderates the signal value of emotional expressions associated with threat. We predicted that anger directed at the observer as well as fear directed at the environment, away from the observer, would signal more threat than the converse combinations. Therefore we expected that observers would be more sensitive to direct anger and averted fear expressions and also would react with more negative affect to these expressions than to averted anger and direct fear expressions. These predictions were fully supported for anger expressions and partially supported for fear expressions. Participants also reported more anxiety in response to averted sadness expressions. Horizontal head position seems quite irrelevant to the interpretation of happiness expressions. As happiness expressions generally suggest that all is well in the environment, the specific location of the 'all is well' stimulus would indeed seem less relevant. Interestingly the interpretation of neutral expressions was affected by head position. Thus, gaze averted neutral expressions are rated more frequently as sad, presumably because they add the notion of withdrawal to an otherwise not very informative face. Also direct orientation neutral expressions elicited more negative affect, suggesting that neutral expressions contain some degree of negative signal value rather than indicating a complete absence of emotion in the expressor.

Overall, the present findings suggest that head position presents a contextual cue for the interpretation of facial expressions of anger and to some degree fear and neutral expressions. It is plausible given these findings that head position is an important cue for the assessment of threat by acting as a mediator of visual attention. Thus, observers react more to the threat that is implicit in an angry face directed at them than to a threat that seems directed elsewhere. Similarly, the averted fear face may signal an environmental threat and hence is reacted to more warily than is the direct fear face. In contrast, as mentioned above, the actual location of a happiness stimulus is less relevant and hence head direction does not moderate the signal value of happy faces.

In the present context, we found that direct head position facilitated the recognition of anger and neutral displays but not of other emotional expressions. In contrast, Adams and Kleck (2003) found a facilitation effect in processing efficiency for anger and joy recognition when coupled with direct relative to averted gaze in a face oriented towards the observer, and for fear and sad recognition when the stimuli displayed averted rather than direct gaze. However, one should note that they used a speeded reaction time task, which is a more sensitive measure of facilitation effects in recognition accuracy. On the other hand, a task like the one used in the present context is closer to real life social reactions to others, a context where speed of decoding and especially reaction is frequently less of an issue. In addition, in the previous work looking to the side while facing an observer may have been interpreted as social signal to the observer, rather than as a mediator of visual attention. In other words, the averted gaze in this context may have been interpreted as disengagement or withdrawal from the observer rather than orientation to an object in the environment. That the current study found clearer looking behavior/emotion interactions for threat displays relative to nonthreat displays suggests that gaze may act more as a visual mediator of attention in the context of threat, perhaps because it offers information relevant to the source of danger. Because averted heads are less likely to be seen as a personal withdrawal from an observer, this may explain why we did not find parallel effects for sadness and joy in the current study.

The important point is that gaze direction has a strong influence on the processing of the facial expressions we see around us. Based on the results reported here, a similar case can now be made for head orientation. Whereas head orientation did not markedly affect decoding accuracy for emotions other than anger and neutral, it was found to have an impact on how expressions are interpreted in a larger social context. That is, on the emotional reaction of the observer to the expressers' facial displays.

These findings regarding the participants' emotional reactions to the targets' emotional facial expressions suggest that emotional facial expressions do more than elicit contagion effects (Hatfield et al. 1994). In fact, only for happiness expressions was good evidence for contagion obtained. That is, participants reported higher levels of cheerfulness when observing happiness expressions. All other facial expression reactions were somewhat mixed suggesting that the emotional expressions elicited not only congruent affect, but also affective reactions that were modulated by the signal value of the emotion expressions. In particular as mentioned above, head orientation strongly modulated emotional reactions not only to anger and fear expressions but also to neutral and sad expressions such that direct neutral expressions elicited more negative affect than did the averted expression. In the case of sadness expressions averted sadness elicited higher levels of anxiety than did direct sadness.

In sum, the present study underlines the importance of contextual elements such as head orientation for the interpretation of facial expressions. It is not sufficient to know whether one's interaction partner is angry or afraid, knowing at what or whom these emotions are directed is just as pertinent and this information may well be found in head or gaze direction. Thus, it may indeed be a good idea for the hero in an action film to look aghast over the shoulder of the bad guy who is threatening him with a gun.

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