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The Combined Effect of Gaze Direction and Facial Expression on Cueing Spatial Attention

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Empirical evidence shows an effect of gaze direction on cueing spatial attention, regardless of the emotional expression shown by a face, whereas a combined effect of gaze direction and facial expression has been observed on individuals' evaluative judgments. In 2 experiments, the authors investigated whether gaze direction and facial expression affect spatial attention depending upon the presence of an evaluative goal. Disgusted, fearful, happy, or neutral faces gazing left or right were followed by positive or negative target words presented either at the spatial location looked at by the face or at the opposite spatial location. Participants responded to target words based on affective valence (i.e., positive/negative) in Experiment 1 and on letter case (lowercase/uppercase) in Experiment 2. Results showed that participants responded much faster to targets presented at the spatial location looked at by disgusted or fearful faces but only in Experiment 1, when an evaluative task was used. The present findings clearly show that negative facial expressions enhance the attentional shifts due to eye-gaze direction, provided that there was an explicit evaluative goal present.

Keywords: gaze direction, facial expression, spatial attention, social cues

Humans rely on information from the eyes to infer other people's mental states and intentions (e.g., Baron-Cohen, Weelwright, & Jolliffe, 1997): We are sensitive to where another individual is looking, and by shifting eye gaze to the same location, we have a good idea of their focus of interest (e.g., Driver et al., 1999) as we understand that people tend to look at what they like and look away from what they dislike (e.g., Baron-Cohen, Campbell, Karmilloff-Smith, Grant, & Walker, 1995). Similarly, by observing the facial expression shown by another individual, we draw inferences about the person's emotions, intentions, and state of mind (e.g., Baron-Cohen, 1995). Indeed, we process emotional facial expressions even when they are to be ignored (e.g., Pecchinenda & Heil, 2007), and we automatically interpret changes in facial expressions as reflecting changes in mental states (e.g., Jellema & Pecchinenda, 2005; Tan, Jellema, & Pecchinenda, 2007).

The information conveyed by a face can be rich but also misleading and ambiguous, as it can change quickly. Therefore, it makes good adaptive sense for our cognitive system to rely on more than one source of information available from the face; namely, the direction of eye gaze and the emotional facial expression. This would help us to understand whether somebody else is looking at something good or bad, and it may signal the presence of potential rewards or threats in the environment. Indeed, neuroimaging studies have shown interconnections between brain areas such as the superior temporal sulcus (STS) and the inferior parietal sulcus (IPS), involved in the perception of variant, changeable features of a face (e.g., Haxby, Hoffman, & Gobbini, 2000) and in encoding the relation between gaze direction and the location of the object being looked at, which underlie the recruitment of the spatial attention system (e.g., Pelphrey, Singerman, Allison, & McCarthy, 2003), and brain areas such as the fusiform gyrus (FFG) and amygdala involved in perception of emotional expressions (e.g., Adams, Gordon, Baird, Ambady, & Kleck, 2003; Wicker, Perrett, Baron-Cohen, & Decety, 2003). On the basis of this neural architecture, one would expect an interaction between processing gaze direction and processing facial expressions. In contrast, behavioral evidence of a combined effect of gaze direction and facial expression on cueing spatial attention is mixed.

Behavioral studies have used a variant of the standard attentional cueing paradigm in which the symbolic cue (i.e., an arrow) is replaced by a social cue (i.e., a face gazing left or right; Friesen & Kingstone, 1998). Participants are required to respond as quickly as possible to a peripheral target that appears shortly after the centrally presented gaze cue. Typically, responses are faster to targets presented at the spatial location looked at by the face (valid gaze cue) than to targets presented at the opposite spatial location (invalid gaze cue). Using this paradigm, many studies have provided empirical evidence that gaze direction reflexively cues attention to the spatial location looked at by the face at short stimulus onset asynchrony (SOA; for a review, see Frischen, Bayliss, & Tipper, 2007). In contrast, only a few studies have experimentally manipulated facial expression and gaze direction to assess their combined effect on cueing spatial attention. In a series of experiments that used faces showing happy, neutral, or angry expressions presented with direct or averted (left and right) gaze, Hietanen and Leppänen (2003) found no evidence of an interactive

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effect of gaze direction and facial expression on cueing attention. Regardless of the SOAs used and the emotional facial expression, only spatial cueing effects due to gaze direction were observed. Similar findings were reported by Bayliss, Frischen, Fenske, and Tipper (2007) with happy or disgusted faces and targets consisting of pictures of objects belonging to two semantic categories (kitchen vs. garage). In contrast, Putman, Hermans, and von Honk, (2006) reported an interactive effect of gaze direction and facial expression using dynamic stimuli with larger gaze cueing effects for faces changing expression from neutral to fearful than from neutral to happy. Similarly, Fichtenholtz, Hopfinger, Graham, Detwiler, and LaBar (2007) have used faces showing dynamic changes in both gaze direction and emotional expression (from neutral to fearful or happy). Targets were a positive picture and a negative picture depicting a baby or a snake, and participants responded on the basis of the picture's content (baby vs. snake). Although behavioral findings showed only gaze cueing effect, regardless of facial expression, event-related potential (ERP) results showed a different pattern. The components linked to early stages of stimulus processing (P130, N180) were modulated by facial expression alone. In contrast, the P3 complex was modulated by both gaze and facial expression, showing a reduction in P3 amplitude to targets gazed at by a fearful face, which indicated the contextual advantage of the fearful expression to shifting attention to the cued location. Finally, other studies have observed modest effects with fearful facial expressions but only in individuals with high levels of anxiety (e.g., Fox, Mathews, Calder, & Yiend, 2007; Mathews, Fox, Yiend, & Calder, 2003) or trait fearfulness (Tipples, 2006).

Considering the mixed pattern of results and the methodological differences between studies (e.g., presentation time, SOAs, type of task used [target detection vs. target categorization]; see Frischen et al., 2007, for a review), it is difficult to draw clear conclusions. Particularly, the null findings are difficult to reconcile with evidence indicating that both gaze direction and facial expression affect our perception and preferences. First, gaze direction and facial expression affect participants' perception of emotions and their attribution of emotional traits: Angry and joyful faces are more efficiently (e.g., faster response times [RTs] and fewer errors) labeled when presented with direct gaze, whereas fearful and sad faces are more efficiently labeled when presented with averted gaze (Adams & Kleck, 2003, 2005). Second, gaze direction and facial expression affect participants' judgments of attractiveness: When presented with direct gaze, smiling faces are rated as more attractive than neutral faces, whereas when presented with averted gaze, neutral faces are rated as more attractive than happy faces (Jones, DeBruine, Little, Conway, & Feinberg, 2006). Third, gaze direction affects individuals' evaluative judgments, as faces predictive of the spatial location of the target are judged as more trustworthy than the predictive-invalid faces (e.g., Bayliss & Tipper, 2006). Similarly, gaze direction and facial expression affect participants' preferences for objects: In the study described earlier, in which Bayliss et al. (2007) showed happy or disgusted faces with direct or averted gaze (i.e., gazing left or right), at the end of the attentional cueing task, they asked participants to rate their preference toward the target objects. Although findings showed no effects of facial expressions on gaze cueing, objects gazed at by a face showing a disgusted expression were liked less than objects gazed at by a face showing a happy expression.

As the findings reviewed earlier clearly show that an effect of both gaze direction and facial expression emerges when that task requires participants to make evaluative judgments, one could argue that processing the information conveyed by these social cues affects individuals' behaviors, depending on the presence of a motivational goal. This argument is in line with Bargh's proposal of conditional automaticity (Bargh, 1989), according to which, incoming information is automatically processed and evaluated as good or bad. However, its effects on behavior do not necessarily follow in a rigid, deterministic way but may depend on contextual goals. The testable hypothesis then is whether processing gaze direction and facial expression affects attentional shifts, provided that the task requires adopting an evaluative goal.

To this aim, we conducted two experiments using the attentional cueing paradigm, in which disgusted, fearful, happy, or neutral facial expressions were presented gazing left or right. Positive and negative words were used as targets. To assess whether the effect of both facial expression and gaze direction on attentional shifts depends on the presence of an evaluative goal, in Experiment 1, participants performed an evaluative task and responded on the basis of whether the targets denoted something positive or negative. In contrast, in Experiment 2, participants performed a perceptual task and responded on the basis of whether the targets were printed in lower- or uppercase letters. If the behavioral effect of processing facial expression and gaze direction on attentional shifts depends on the presence of a motivational goal, then gaze-cueing effects should be larger when faces show an emotional expression than when they show a neutral expression, but only in Experiment 1 when the task requires participants to evaluate the targets as positive or negative.

Experiment 1

Method

Participants. Twenty-eight psychology undergraduates (21 women, 7 men; age: $M = 21.3$, $SD = 5.7$) performed the evaluative version of a spatial cueing task in partial fulfillment of course credits.

Materials and apparatus. Eight photographs selected from the Pictures of Facial Affect (Ekman & Friesen, 1976) depicted a woman or a man showing a happy (C2-18, WF2-12), disgusted (C1-4, WF3-11), afraid (C1-23, WF3-16), or neutral (C2-3, WF2-5) facial expression. Pictures were adjusted for contrast and color, and two new versions were created using Adobe Photoshop digital image manipulation software: one version gazing left and the other gazing right. A total of 288 target words were selected from the Affective Norms for English Words (ANEW; Bradley & Lang, 1999) on the basis of valence and arousal: half were positive (valence: $M = 7.36$, $SD = 0.7$; range = 5.68–8.72; arousal: $M = 5.25$, $SD = 1.06$; range = 2.39–8.1), and the other half were negative (valence: $M = 2.55$, $SD = 0.66$; range = 1.25–3.91; arousal: $M = 5.68$, $SD = 0.93$; range = 3.83–7.86). Each word was presented twice, once in valid gaze-cued trials and once in invalid gaze-cued trials.

Stimuli were presented on a 17-in. (43.18-cm) monitor (1024 × 768 pixels, 60 Hz) connected to a 1-GHz Pentium computer using E-Prime software (Schneider, Eschman, & Zuccolotto, 2002; see also www.pstnet.com/eprime). The faces subtended 7° of vertical visual angle when presented on screen. Words were printed in a font size of 18. Figure 1 shows examples of the stimuli used and of the procedural events.

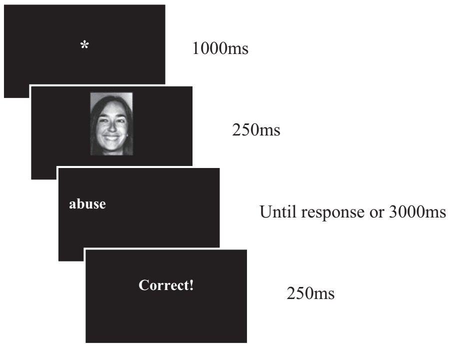

Figure 1. Sequence of trial events in the spatial cueing task. Printed with permission (Ekman & Friesen, 1976).

Procedure. After we obtained informed consent, participants sat in front of a computer screen at a distance of approximately 60 cm in a dimly lit room. After 40 practice trials, participants completed 576 trials (4 blocks of 144 trials). Each block consisted of equally probable factorial combinations of facial expression (happy, neutral, fear, disgust), target position (left, right), target valence (positive, negative), and gaze direction (left, right). The direction of eye gaze was equally likely to look toward (i.e., valid gaze cued) or away from (i.e., invalid gaze cued) the target word.

Each trial began with the presentation in the center of the screen of a fixation point (1,000 ms) followed by a face (250 ms). The face could look left or right (the eyes located at the same height as the fixation point) and show one of four facial expressions (happy, neutral, disgust, or fear). Immediately after the face, a target word was presented either to the left or right, at the same height as the eyes, and remained on screen until response or 3,000 ms elapsed, after which feedback followed for 250 ms. The intertrial interval varied randomly from 500 to 1,250 ms. Trials appeared in a new random order for every participant, each of whom was instructed to press one of two keys using the index and middle finger of their dominant hand depending on whether the word denoted something positive or negative. The keys U and B were chosen as they are perpendicular to the left–right target position, and key assignment was counterbalanced. Keys were labeled P and N (positive vs. negative). Both speed and accuracy were emphasized. Participants were explicitly told that the eye gaze did not predict where the target word would appear.

Experimental design. The experimental design was a 4 (facial expression: disgust, fear, happiness, neutral) $\times$ 2 (gaze cue: valid gaze cued, invalid gaze cued) $\times$ 2 (target valence: positive, negative) within-participant design.

Data reduction. Trials on which an error was made (1%) and with RTs faster than 100 ms or slower than 1,500 ms (1.5%) were excluded from analyses. Mean RTs were computed for each condition.

Results and Discussion

Analysis of variance (ANOVA) results showed a significant main effect of facial expression, $F(3, 81) = 15.74$, $p < .001$, partial $\eta^2 = .368$, with longer RTs when the face showed a negative expression (disgusted: $M = 889$ ms, $SE = 16$ ms; fearful: $M = 887$ ms, $SE = 16$ ms) than when it showed a happy ($M = 868$ ms, $SE = 17$ ms) or neutral ($M = 873$ ms, $SE = 16$ ms) expression, ps $< .001$. The main effects of gaze cue, $F(1, 27) = 25.38$, $p < .001$, partial $\eta^2 = .485$; and target valence, $F(1, 27) = 18.62$, $p < .001$, partial $\eta^2 = .408$, were significant. Overall, there were longer RTs to targets presented at invalid gaze-cued locations ($M = 885$ ms, $SE = 16$ ms) than to targets at valid gaze-cued locations ($M = 874$ ms, $SE = 16$ ms) and longer RTs to negative target words ($M = 893$ ms, $SE = 17$ ms) than to positive target words ($M = 865$ ms, $SE = 16$ ms). The Facial Expression $\times$ Target Valence interaction was significant, $F(3, 81) = 5.78$, $p < .001$, partial $\eta^2 = .176$. Post hoc comparisons showed longer RTs to negative target words when presented with a negative expression (disgusted: $M = 903$ ms, $SE = 17$; fearful: $M = 903$ ms, $SE = 17$) than with a neutral one ($M = 879$ ms, $SE = 16$ ms), $t(27) = 5.35$, $p < .000$; and $t(27) = 3.86$, $p < .001$, respectively. In contrast, there were shorter RTs to positive words when presented with a happy ($M = 847$ ms, $SE = 17$ ms) than with a neutral expression ($M = 868$ ms, $SE = 16$ ms), $t(27) = 3.87$, $p < .001$. The two-way interaction Facial Expression $\times$ Gaze Cue was significant, $F(3, 81) = 2.81$, $p < .05$, partial $\eta^2 = .094$. Follow-up analyses conducted separately on each facial expression showed spatial cueing effects only for trials with negative faces (see Figure 2).

More specifically, RTs to target words were shorter when presented at the spatial location looked at by a disgusted face (valid gaze cued: $M = 880$ ms, $SE = 16$ ms) than when presented at the spatial location

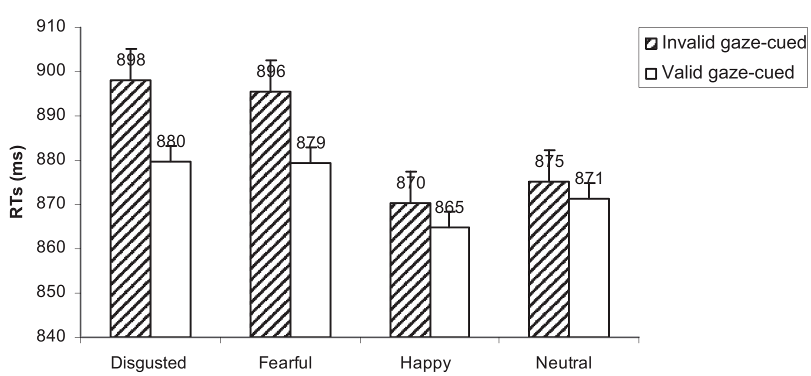

Figure 2. Mean reaction times (RTs), and standard errors, to target words on valid gaze-cued and invalid gaze-cued trials as a function of facial expression for Experiment 1 (evaluative task).

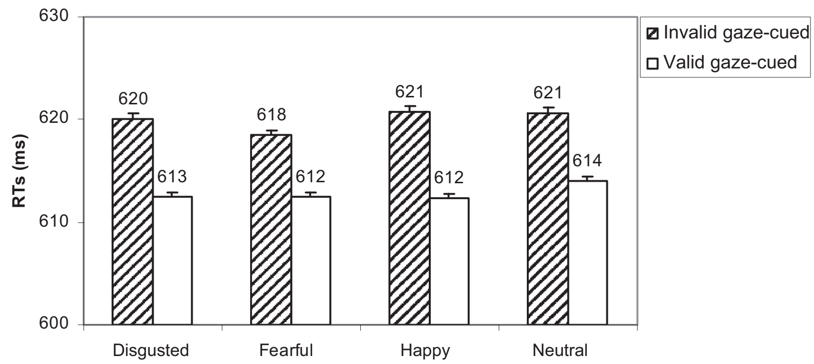

Figure 3. Mean reaction times (RTs), and standard errors, to target words on valid gaze-cued and invalid gaze-cued trials as a function of facial expression for Experiment 2 (perceptual task).

not looked at by a disgusted face (invalid gaze cued: $M = 898$ ms, $SE = 17$ ms), $t(27) = 3.91$, $p < .001$. Similarly, RTs to target words were shorter when presented at the spatial location looked at by a fearful face (valid gaze cued: $M = 879$ ms, $SE = 17$ ms) than when presented at the spatial location not looked at by a fearful face (invalid gaze cued: $M = 896$ ms, $SE = 16$ ms), $t(27) = 4.64$, $p < .001$. No other main effects or interactions reached statistical significance.

The present findings clearly show that, when participants respond on the basis of targets' valence, for negative facial expressions both facial expression and gaze direction affect spatial attention. However, the present experiment differed from others not only for the task used as it required participants to explicitly adopt an evaluative goal, but also for the targets used as they were affectively valent stimuli. Therefore, one may argue that stimulus valence alone could be sufficient for the effect to emerge. Experiment 2 addressed this issue by using the same methodology as that in Experiment 1, the only difference being that participants performed a perceptual task, and this time they responded to the target words on the basis of whether they were printed in lowercase or uppercase letters. If the effects reported in Experiment 1 are not engendered by the presence of an explicit evaluative goal, and stimulus valence alone is sufficient for the effect to emerge, then the same pattern of results should be observed regardless of the task used.

Figure 4. Spatial cueing effects, computed as the difference (in milliseconds) in reaction times to valid and invalid trials, for the four facial expressions as a function of the task performed in the two experiments.

Experiment 2

Method

Participants. Twenty-eight undergraduates (24 women and 4 men; age: $M = 20.7$; $SD = 6.2$) performed the nonevaluative version of a spatial cueing task in partial fulfillment of course credits.

Apparatus, stimuli, procedure, and experimental design. The only difference from Experiment 1 is that participants responded depending on letter case: Half the target words were in lowercase letters, and the other half were in uppercase letters; keys were labeled L and U (lowercase vs. uppercase).

Data reduction. Trials on which an error was made (1%) and with RTs faster than 100 ms or slower than 1,500 ms (1%) were excluded from analyses. Mean RTs were computed for each condition.

Results

ANOVA results showed only a significant main effect of gaze cue, $F(1, 27) = 21.84$, $p < .00$, partial $\eta^2 = .447$, indicating longer RTs to target words presented at invalid gaze-cued locations ($M = 620$ ms, $SE = 11.4$ ms) than to target words at valid gaze-cued locations ($M = 613$ ms, $SE = 11.7$ ms). It is interesting that this cueing effect was significant for all faces, $ts(27) > 1.8$, $p < .05$ (see Figure 3).

In line with past findings, and despite using affectively valent words, only gaze-cueing effects were observed when participants responded on the basis of the perceptual characteristic of the targets. To assess whether performing the evaluative task solely enhanced gaze-cueing effects for negative faces or whether it also attenuated gaze-cueing effects for happy and neutral faces, we compared the spatial cueing effects (i.e., valid gaze-cued locations minus invalid gaze-cued locations) for each face across the two experiments[1] (see Figure 4).

Results showed a significant difference in spatial cueing effects for disgusted faces (Experiment 1: $M = -18.4$ ms, $SE = 4.7$ ms; Experiment 2: $M = -7.5$ ms, $SE = 2.6$ ms), $t(54) = 2.04$, $p < .05$,

[1] Similar results were obtained when the log-transformed data were analyzed using a mixed-factorial ANOVA, with experiment as the between-participants factor and facial expression, gaze cue, and target valence as within-participant factors.

partial $\eta^2 = .071$; and fearful faces (Experiment 1: $M = -16.3$ ms, $SE = 3.5$ ms; Experiment 2: $M = -6.0$ ms, $SE = 3.2$ ms), $t(54) = 2.19$, $p < .05$, partial $\eta^2 = .081$; but not for happy faces (Experiment 1: $M = -5.6$ ms, $SE = 4.7$ ms; Experiment 2: $M = -8.5$ ms, $SE = 2.7$ ms) and neutral faces (Experiment 1: $M = -3.7$ ms, $SE = 4.6$ ms; Experiment 2: $M = -6.6$ ms, $SE = 3.6$), $ts(54) < 0.5$, *ns*.

General Discussion

In two experiments, we investigated whether the presence of an explicit motivational goal to evaluate incoming information is necessary for both facial expression and eye gaze to affect spatial attention. To this aim, we presented happy, disgusted, fearful, and neutral faces gazing either left or right in a spatial cueing paradigm. Target word appeared either at the spatial location looked at by the face or in the opposite spatial location. In Experiment 1, the task required to explicitly adopt an evaluative goal and participants responded to target words on the basis of stimulus valence. In contrast, in Experiment 2, participants responded to target words on the basis of a perceptual characteristic of the stimulus (i.e., letter case). The present findings clearly show that the information concerning the presence of a negative state (i.e., disgust and fear) conveyed by the face—but not that concerning the presence of a positive (i.e., happy) or neutral state—interacted with gaze direction, engendering larger spatial cueing effects, but only when an evaluative goal was present as in Experiment 1. This resulted in an advantage of about 18 ms for targets looked at by disgusted faces and 16 ms for targets looked at by fearful faces. It is interesting that the type of task performed did not affect the spatial cueing effects for neutral and happy faces across the two experiments.

The findings from the two experiments also differed with regard to two other aspects. First, only in Experiment 1 did we observe affective congruence effects with faster RTs when there was a match in affective valence between the happy facial expression and the positive target words. As affective valence is represented in semantic memory, this finding is in line with evidence showing that these effects rely on semantic processing and do not occur when only perceptual processing is involved (e.g., Pecchinenda, Ganteaume, & Banse, 2006). In addition, for negative stimuli, there were overall slower responses to negative target words, particularly when preceded by faces showing negative expressions. Although this finding is at odds with the facilitation effects usually expected because of affective congruence, it is not unusual, as longer RTs to negative stimuli (e.g., words and facial expressions) have often been reported in the literature (e.g., Leppänen, Tenhunen, & Hietanen, 2003). The possible explanations are numerous, encompassing the different stages in the stimulus–response processing sequence. At the stimulus encoding phase, the fact that negative facial expressions contain more overlapping features than positive ones may play a role: Namely, whereas happy faces can be easily encoded on the basis of the presence of a smile as a distinctive feature, negative faces may require a complete visual analysis as they share more overlapping features in the mouth, nose, eyes, and eyebrows regions. Of course, if categorization can be based on a single salient feature as for happy faces, then a complete visual analysis of the stimulus may not be necessary. Furthermore, at the other end of the processing chain, positive stimuli engender approach motor behavior and, depending on the responses used, facilitate response execution, whereas negative stimuli engender withdrawal motor behavior and may interfere with response execution (e.g., Wentura, Rothermund, & Bak, 2000).

Second, the findings of the two experiments differed with regard to the speed of responses, with overall slower responses when participants performed the evaluative task and faster responses when participants performed the perceptual task. Given that RTs between the two experiments differed more than 200 ms, one may argue that a more parsimonious explanation for the larger gaze-cueing effects engendered by faces showing a negative expression in Experiment 1 are due to the evaluative task requiring a deeper level of processing. Accordingly, the different findings between the two studies could be due to difference in depth of processing or task difficulty in general. However, such an account would not explain why this was not also the case for happy expressions, and it is at odd with the findings reported by Bayliss et al. (2007), who did ask participants to respond on the basis of the semantic category of targets (i.e., kitchen objects vs. garage objects). If it were sufficient to use a task requiring a deeper level of processing, then Bayliss et al. (2007) should have observed an effect of facial expression on gaze cueing. The fact that they did not observe such an effect argues in favor of our interpretation that it is not sufficient to process targets at a semantic level, but it is indeed the presence of an explicit goal to evaluate incoming information for affective valence that engenders the effect. Similarly, it is interesting that, even though Fichtenholtz et al. (2007) used affectively valent target pictures and participant response was based on whether the picture denoted a snake or a baby, behavioral measures did not reveal an effect of facial expression on gaze cueing, but such an effect was present for the P3 complex of the ERP components. One wonders whether the presence of a contextual goal to evaluate is necessary only for the effect to be observable on behavior; for instance, if inhibitory processes were put in place to limit the behavioral effects of processing affective information. Alternatively, it is possible that by repeating the same two targets (one positive and one negative) throughout the experiment, participants may have developed a strategy after a few trials and based their response on some perceptual characteristics of the target stimulus rather than fully processing stimulus content. Such a processing strategy would have made their task similar to our perceptual task in Experiment 2.

The present findings help shed some light on the reasons for the mixed evidence characteristic of past studies: The greater gaze-cueing effects observed with fearful faces in anxious or trait-fearful participants (e.g., Fox et al., 2007; Mathews et al., 2003; Tipples, 2006) could be due to the fact that anxiety and fearfulness provide a specific motivational goal for processing incoming information. In fact, that the effect of different social cues on spatial attention may depend on the presence of an evaluative goal is in line with recent evidence showing that the amygdala is engaged in processing incoming information, depending on whether there is a fit between current processing goal and some aspects of the stimulus (e.g., Cunningham, Van Bavel, & Johnsen, 2008). In light of this evidence, one could speculate on the role of the existing interconnections between the STS and the IPS involved in processing variant aspects of social cues and the amygdala, as these connections may become functionally activated, depending on current processing priorities and the fit between the affective valence of incoming information and current motivational goal.

An interesting question still open for future research is why gaze direction and facial expression affect attentional shifts only for negative expressions but not for positive ones. For instance, it is possible that the effect is specific to negative facial expressions or—and more interesting—that when the facial expression is easily discriminable (as could be the case for happy faces), this information is processed rapidly before it can be combined with gaze information (see Graham & LaBar, 2007). Indeed, this would be consistent with the overall shorter RTs observed with positive stimuli. If this were the case, then rendering facial expression less discriminable by using emotional blends should allow the effect to emerge also for positive facial expressions. The present findings also raise the interesting question of whether the combined effect of gaze direction and facial expression on cueing attention occurs because both sources of information are present in the face, and facial expression is processed even when it is irrelevant to the task at hand (e.g., Pecchinenda & Heil, 2007), as well as the question as to what extent other social attention cues (e.g., oriented bodies, pointed heads, gestures, and tilted heads) interact with facial expressions in cueing attention.

In summary, in line with the evolutionary view on the adaptive function of emotions, positing the existence of automatic and efficient processes for detecting affective information, (e.g., Öhman & Mineka, 2001), and particularly negative one, (e.g., Le Doux, 2002), the present findings show that, when an evaluative goal is present, a face with a negative expression looking at a certain location is a more powerful attention-orienting cue than a neutral or happy face looking at the same location. Such a stimulus provides information not only about the focus of attention of another individual but also about the significance of the object or person being viewed. The present results also help to reconcile previous findings, as they show that interactions between facial expressions and gaze direction on spatial attention may not be evident when using a nonevaluative task but become evident depending on the presence of a motivational goal (e.g., Bargh, 1989) as when an evaluative task is used. Considering that information from the face can be used to deceive in social interactions (e.g., Emery, 2000), it is possible that the conditionality of the effect is functional in preventing attentional shifts by misleading social cues.

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