Social Identity & Scene Perception

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Abstract

Growing social cognition research has demonstrated striking effect of social factors on basic cognitive processes such as time perception, joint action task and emotional responses. An eye tracking experiment was conducted to investigate the effect of ingroup-outgroup membership (gender identity) on perception of the affective scenes (pleasant and unpleasant) in terms of differences in saccadic latencies. 40 participants were shown series of neutral faces each face was followed by a scene. To ensure the gender identity, they were instructed to press 'z' for in-group and 'x' for out-group faces and thereafter were instructed to make an eye movement towards up/down for pleasant/unpleasant scenes. To make the gender identity salient, an adapted version of gender specific self-esteem scale was administered before the experiment. The result showed faster saccadic latencies for pleasant scenes as compared to unpleasant scenes. The saccadic latency for unpleasant scenes was faster when preceded by ingroup faces as compared to outgroup faces. The RT was shortest for in-group pleasant condition and longest for out-group-unpleasant condition.

Key words: Group Categorization, Valence (pleasant / unpleasant), Saccadic latency, Scene perception

Do we see the world through our social lenses? Scientists have shown that naturalistic scene perception is not simply a reflection of its physical attributes such as color, orientation and luminance, but it also depends on its semantic content, co-occurrence of other objects, and task constraints (Navalpakkam & Itti, 2005; Torralba, Oliva, Castelhano, & Henderson, 2006). We perceive scenes by allocating attention to the object of utmost salience which in turn give meaning to a complex scene. The contextual guidance model (Torralba et.al, 2006) highlighted role of global pathways in holistic perception of the scene by extracting the global features which activates knowledge and expectations of a scene. Lang, Greenwald, Bradley and Hamm (1993) have demonstrated an advantage for positive or negative stimuli over neutral stimuli. In a study conducted by Calvo and Lang (2005) it was observed that when emotional and neutral pictures were presented simultaneously, the probability of the first fixation and the ratio of viewing time in the first 500 ms were higher for emotional scenes than for neutral pictures, proposing that emotional meaning captures initial attnetion orienting and promotes early engagement of attention.

Roots for this emotionality hypothesis can be traced back to work on emotion by Darwin (1872) and Ekman (1973) claiming adaptive and evolutionary nature of emotional state. Previous studies have investigated role of higher order social cognitive factors in emotion recognition specifically emotional expressions using human faces. Emotional expressions provide meaningful signals about the social environment and serve important functions in social interaction (Fischer & Manstead, 2008). Recognition of emotional information in a social context involving individuals with varied social categories has been explained.

Social-cognitive mechanisms of in-group and out-group categorization are sufficient to elicit performance differences for face recognition (Bernstein, Young & Hugenberg, 2007). In a study, they found that recognition performance was better for targets categorized as in-group members, despite the fact that perceptual expertise was equivalent for in-group and out-group faces. Arbitrarily assigning a person to two different novel groups is enough to create intergroup bias (Tajfel, Billig, Bundy, & Flament, 1971) and mere presence of ingroup or outgroup member may influence the nature of the social interaction (Tajfel & Turner, 1979). We prefer emotional exchange with ingroup members over outgroup members; which defines the ingroup- outgroup

boundaries (Keltner & Haidt, 1999). It has also been reported that perceivers who strongly identified with ingroup members were better at recognizing emotional expressions of ingroup members (Thibault, Bourgeois & Hess, 2006). The ingroup bias can be explained in terms of emotional convergence and divergence. Hess, Thibault, Adams & Kleck, (2010) highlighted group bias in emotional recognition of positive and negative emotions as a product of these processes. They found that people interpret positive emotions of the ingroup more readily as compared to those of outgroup members and that their reactions to the upcoming situations are influenced by this bias known as convergence. In contrast to positive emotions, divergence exists in the way people respond to the emotion of anger and fear displayed by outgroup or ingroup members. People tend to show faster reactions to outgroup display of anger as a symbol of threat while the reactions might slow down for ingroup member as they are perceived as no threat stimuli. Thus group membership does affect the emotional recognition in the social interaction. How group membership can influence natural scene perception is not clear. No research so far has investigated the effect of group membership on emotional scene perception. Do we perceive the positive and negative scenes uniformly when it is clubbed with ingroup or outgroup members? Does group membership shapes perception of emotional scenes? We explored effect of group membership in terms of pre-existing social category such as gender on emotional scene perception using saccadic latencies. We investigated the effect of ingroup-outgroup membership (gender identity; same gender versus opposite gender) on perception of the affective scenes (pleasant and unpleasant valence) using measure of saccadic latencies. We hypothesized that a) saccadic latencies (RT) will be shorter for pleasant scenes as compared to unpleasant scenes, b) saccadic latency will vary as a function of group membership (ingroup-outgroup) and valence of the scenes (pleasant –unpleasant).

Method

Forty undergraduate students (18 female, M age = 19, SD= 2) participated in an eye tracking experiment at Indian Institute of Management, Indore. Nine point calibration from a distance of approximately 60 cm from a Tobii T120 eye tracker was conducted. Following a fixation cross which appeared on the screen for 500 ms 42 neutral frontal faces (21 male and 21 female) were presented for 1 sec. In order to ensure processing of gender of the faces, participants were

instructed to press the 'z' key on the keyboard on appearance of same gender (male-male/ female-female) and press the 'x' key on appearance of opposite gender of the face (male-female/female-male). Each key response was then followed by display of the either pleasant or unpleasant IAPS scenes and a slide with the two black dots (each appeared for 1 sec). 42 pictures of IAPS scenes (International Affective picture system) bearing 2 levels of valence (21 pleasant and 21 unpleasant) were used for the study. As per Indian ratings of these IAPS pictures, all scenes were of medium arousal levels ranging from 4.5 to 5.83 with valence ratings ranging from 1.7 to 8.06 (Lohani, Gupta & Srinivasan, 2013).

Participants were asked to make an eye movement towards upper/lower dot for pleasant/unpleasant scenes (Trial structure in Fig 1). Key press and eye movement responses were counter-balanced across participants. To make the gender identity salient, a 5 items gender specific self-esteem scale (items from Rosenberg (1965) self-esteem scale with a suffix 'as a female/male') was administered prior to the experiment. These five questions were; 'as a female/male, I feel that I have a number of good qualities/ I am able to do things as well as most other people/ I feel that I'm a person of worth, at least on an equal plane with others / I wish I could have more respect for myself and I take a positive attitude toward myself.

{Insert Figure 1 here}

Results

Two participants were excluded on the basis on outlier analysis. Their saccadic latencies were more than three standard deviations from the sample mean. Accuracy rate of key press for the gender identification of the neutral frontal faces was equal or more than 95%. Mean score of gender specific self-esteem (used as a prime before the experimental task) was 3.15 with SD 1.41.

Saccadic latencies (Reaction Time in milliseconds) were inspected in a 2 (Group Identity: Ingroup /Outgroup) X 2 (Valence of Scenes: Positive / Negative) repeated ANOVA. The main effects were significant {Emotional Valence, F (1, 37) = 19.048, $p = .001$, $\eta_p^2 = .34$, *power =.98* and Group Identity, F (1, 37) = 48.391, $p = .001$, $\eta_p^2 = .567$, *power =1}* and qualified by the predicted interaction, F (1, 37)= 4.391 $p = .043$, $\eta_p^2 = .100$, *power =.53* (see Figure 2). In general, saccadic latencies were shorter for pleasant scenes as compared to unpleasant scenes (M pleasant

= 229.629, SE= 2.46; M unpleasant = 250.506, SE = 3.16). Similarly, saccadic latencies were shorter when primed with ingroup neutral faces as compared to when preceded by outgroup faces (M ingroup = 229.267, SE= 2.04; M outgroup = 250.868, SE = 2.29). The saccadic latency for unpleasant scenes was shorter when preceded by ingroup faces as compared to outgroup faces (M ingroup unpleasant = 237.100, SE=3.13; M outgroup unpleasant= 264.637; SE= 3.13). Similar trend was observed in case of pleasant scenes (M ingroup pleasant = 222.159, SE=3.87; M outgroup pleasant= 236.376; SE= 3.81). The RT was shortest for in-group pleasant condition (M ingroup pleasant = 222.159, SE 3.87) and longest for out-group-unpleasant condition (M outgroup unpleasant= 264.637; SE= 3.13). No difference was found between saccadic latencies of scene perception in ingroup unpleasant condition and outgroup pleasant condition (M ingroup unpleasant = 237.100, SE=3.13; M outgroup pleasant= 236.376; SE= 3.81).

{Insert Figure 2 here}

Conclusion

Consistent with the previous studies on positivity dominance, pleasant scenes are perceived faster as compared to unpleasant scenes (Ekman, 1973). Kissler and Keil (2008) found similar trend that when instructed to make a saccade toward a picture in the right peripheral visual field, only pleasant pictures were facilitated and the saccadic reaction times for unpleasant pictures were slow in comparison to pleasant pictures. Although event related potentials showed advantage to negative stimuli over positive stimuli (Smith, Cacioppo, Larsen & Chartrand, 2003). The emotionality hypothesis claims an equal advantage for both positive and negative stimuli over neutral stimuli (Lang, Greenwald, Bradley, and Hamm, 1993).

More importantly, the priming with ingroup/ outgroup identity impacted saccadic latencies of perceiving pleasant and unpleasant scenes. Specifically, both pleasant and unpleasant scenes were perceived faster when primed with ingroup identity as compared to outgroup identity. Outgroup identity escalated the effect of emotional valance on scene perception. It takes more time to perceive emotional valence of the scenes when primed with outgroup identity. It is likely that people take longer time to perceive emotional scenes in an outgroup context because their reactions to these may have significant threat or benefit for them as compared to ingroup

members. It is congruent with the concept of divergence (Hess et al, 2010; Freeman & Ambady, 2011).

Interestingly, saccadic latency was almost identical for ingroup unpleasant and out group pleasant condition. Unpleasant or threatening scene perception preceded by ingroup identity are found to be similar to pleasant scene perception when primed with outgroup identity. Previous researches have suggested that people report diverging mood state in response to outgroup emotional expressions and reported more negative mood when primed with positive out-group displays (Epstude & Mussweiler, 2009). These findings support the general assumption that group membership is important for how one perceives emotional scenes. A finding of the present experiment adds value to the literature by demonstrating the advantage of ingroup priming over outgroup in perception of emotional scenes. While further studies are needed to investigate the underlying mechanisms involved, these data show the social identity matters in pleasant and unpleasant scene perception. Moreover, it suggests that the social scientists need to explore further how the same emotional stimulus can be experienced differently depending on its contextual associations with group identification.

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Figure 1: Trial structure of the experiment

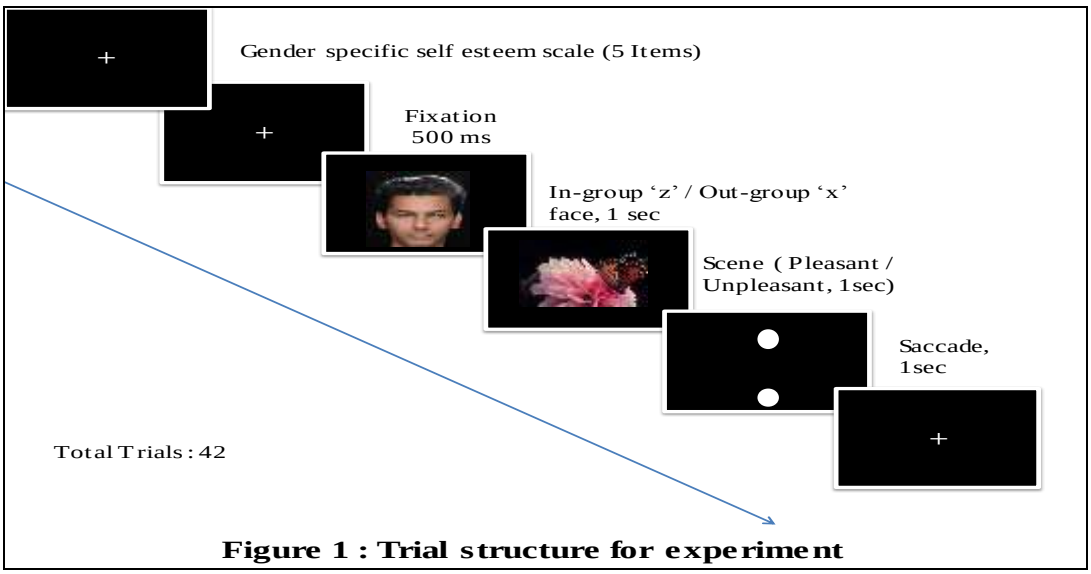

Figure 1 : Trial structure for experiment

Figure 2: Saccadic latencies of scene perception across the conditions