Different faces in the crowd: A happiness superiority effect for schematic faces in heterogeneous backgrounds

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Different Faces in the Crowd: A Happiness Superiority Effect for Schematic Faces

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Introduction

Prior studies suggest that an angry face in a crowd will catch our attention more than a happy face (Hansen & Hansen, 1988), the Anger Superiority Effect (ASE). However, this effect is prone to low level perceptual confounds when using photographic faces as stimuli. Schematic faces have been used to reduce the influence of these confounds yielding consistent replications of the ASE (Horstmann, 2009).

Becker et al. (2011) argued that the ASE in most studies is due to methodological confounds which conceal a true Happiness Superiority Effect (HSE) and made five recommendations to avoid them.

1. **Vary the number of distractors (set size)**
2. **Hold backgrounds constant across conditions of interest**
3. **Use a fixed target search design**
4. **Control for low level perceptual confounds in stimuli**
5. **Use heterogeneous backgrounds**

No previous study using schematic faces has adhered to all five of these recommendations. The current investigation aimed to do so. As we incorporate all five recommendations, we predicted a HSE, despite previous studies using schematic faces obtained an ASE.

Experiment 1

Method

In two tasks, participants indicated the presence or absence of a target face (happy targets in one task and angry targets in the other). These targets were presented amongst either 1, 3, or 5 distractors which were random combinations of sad and scheming faces (see Figure 1). Backgrounds were identical across tasks.

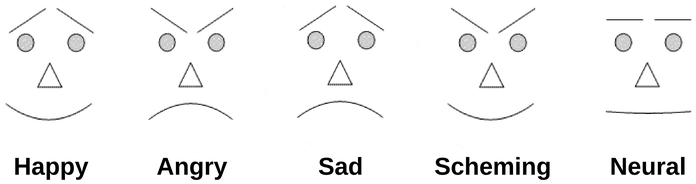

Figure 1. Schematic stimuli used in Experiments 1, 2, and 4.

Results

Participants were faster to detect happy targets, $F(1, 37) = 22.14$, $p < .001$, and detection time slowed with increasing set size, $F(3, 111) = 800.20$, $p < .001$ (see Figure 2). On non-target trials participants were also faster when searching for happy faces, $F(1, 37) = 389.76$, $p < .001$, and the response time difference between target and non-target trials increased as set size increased, $F(3, 111) = 186.61$, $p < .001$.

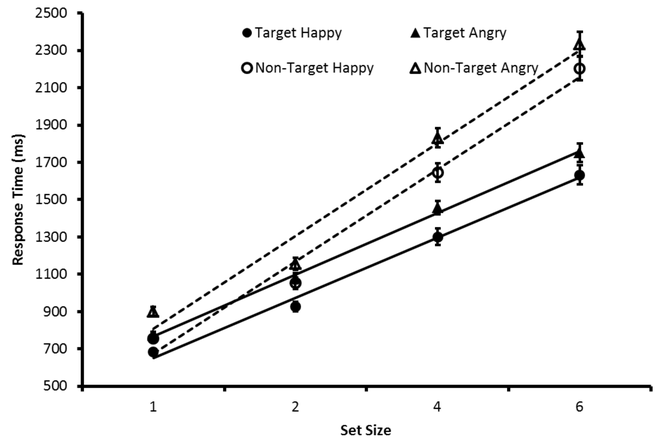

Figure 2. Response times for indicating the presence or absence of happy and angry targets in Experiment 1.

Experiments 2 and 3

Experiments 2 and 3 aimed to replicate the HSE in a discrimination task. On each trial, participants searched for target happy or angry face and indicated the nature of the target. Experiment 2 used the same stimuli as Experiment 1, Experiment 3 used these stimuli with facial circumferences added.

Results

A significant HSE was observed in both experiments Fs > 6.91, $p < .014$ and response times slowed as set size increased Fs > 211.89, $p < .001$. Inspection of response times also suggested that the happy advantage emerged at larger set sizes, but not smaller ones (see Figure 3). This interaction was significant in Experiment 2, $F(3, 93) = 4.32$, $p < .021$, but not in Experiment 3, $F(3, 87) = 1.89$, $p = .150$.

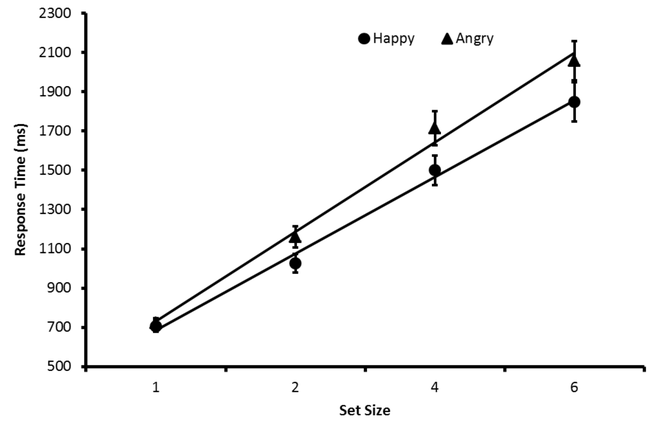

Figure 3. Response times for discriminating happy or angry targets without circumference in Experiment 2.

Experiment 4

Experiment 4 aimed to determine whether the typically observed ASE will emerge if our stimuli are presented in homogenous neutral and emotional backgrounds. Across three pairs of fixed target search tasks, participants searched through homogeneous neutral, sad or scheming backgrounds for happy or angry targets.

Results

Amongst neutral backgrounds, neither a HSE nor an ASE was observed, $F(1, 35) = 0.88$, $p = .355$. But participants were faster to respond on target trials and at smaller set sizes Fs > 12.88, $p < .001$ (see Figure 4a).

Amongst sad backgrounds the predicted ASE was observed in target trials at all set sizes except size 1 but not on non-target trials (significant three way interaction: Emotion x Trial type x Set size, $F(3, 105) = 3.87$, $p = .013$; see Figure 4b).

Amongst scheming backgrounds the ASE was significant in target and non-target trials and at all set sizes but was significantly larger in non-target trials and significantly larger with each increase in set size (Emotion x Set size, $F(3, 102) = 41.26$, $p < .001$, and Emotion x Trial type interactions, $F(3, 102) = 12.34$, $p = .001$; see Figure 4c).

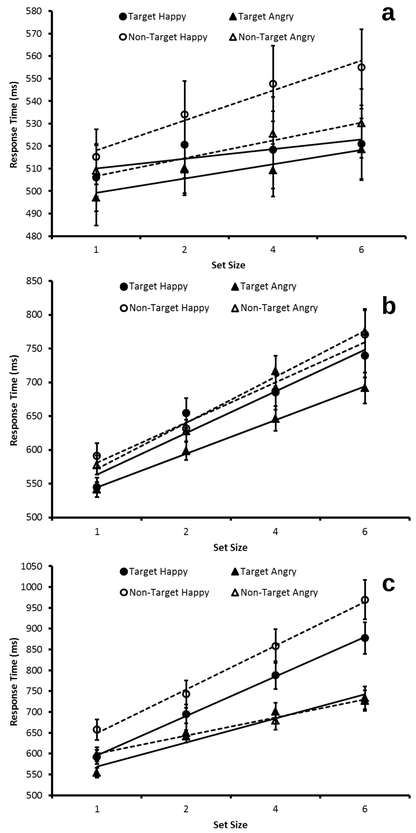

Figure 4. Response times for (a) neutral, (b) sad, and (c) scheming tasks in Experiment 4.

Conclusion

Following the recommendations of Becker et al. (2011) produced a HSE with schematic face stimuli. Background heterogeneity was identified as the key determinant leading to a HSE.

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