

Introduction

It has been claimed that stimuli signaling threat are processed rapidly and draw our attention (e.g., Fox, Russo, & Dutton, 2002). Similarly, it has been argued that expressions of fear have a strong pull on our attention because they signal threat (e.g., Phelps, Ling, & Carrasco, 2006; Vuilleumier & Schwartz, 2001). The present study used a cuing paradigm to examine whether fearful facial expressions capture attention involuntarily (i.e., automatically), even when they are irrelevant.

We asked participants to find a letter in a particular color (red or green) and indicate whether it was a "T" or an "L". Prior to the target display, a cue display was presented. In the **face cue condition**, one fearful face and one neutral face appeared on opposite sides of the display. In the **color cue condition**, one green box and one red box appeared on opposite sides of the display (see Figure 1). In both cue conditions, the stimuli (faces and boxes) are irrelevant to the task at hand – identifying letters.

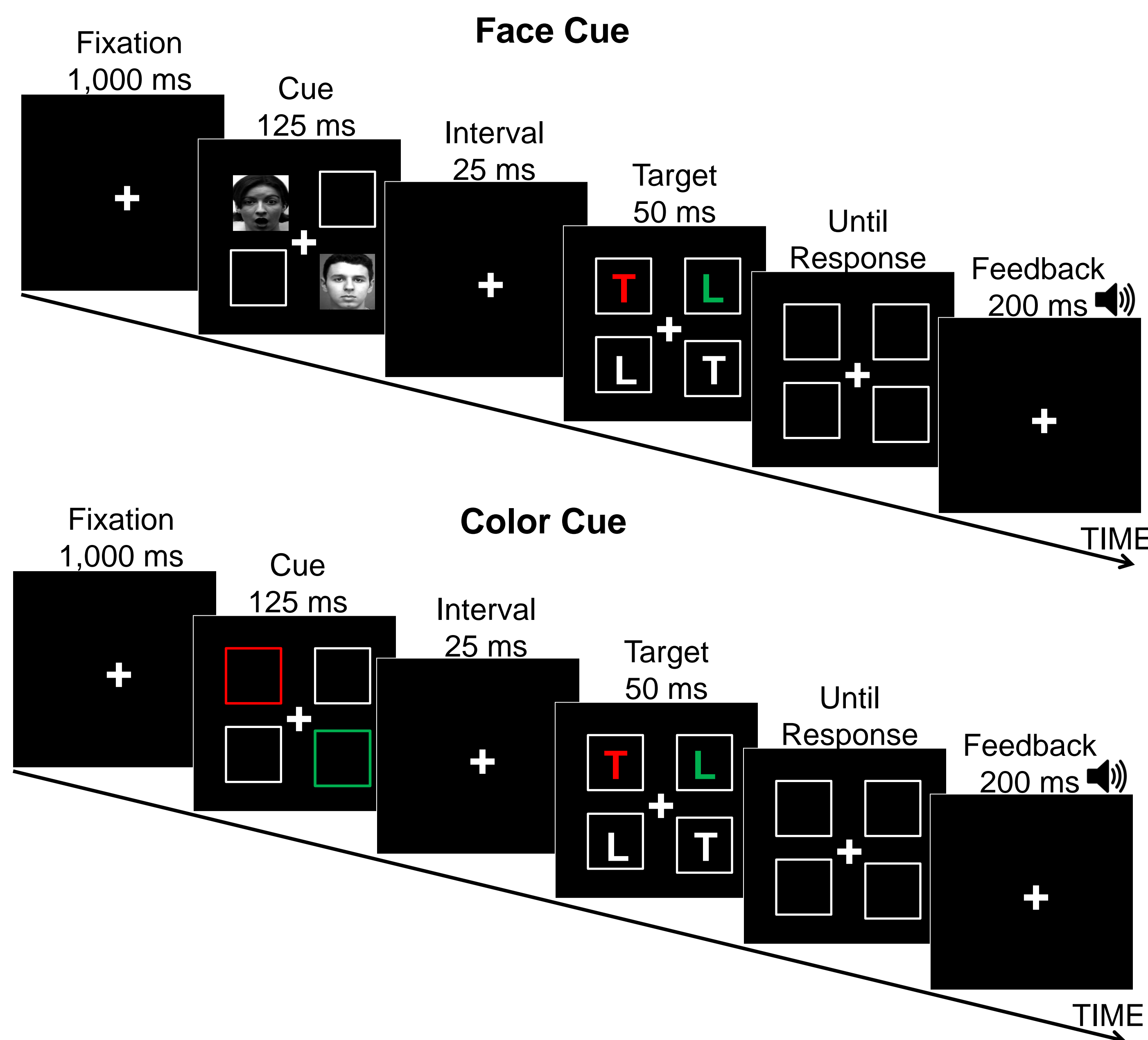


Figure 1: An example event sequence for the face cue and the color cue condition in Experiment 1. In this example, the target was the red letter. Thus, in the face cue condition, the fearful face was valid and the neutral face was invalid. In the color cue condition, the red box was valid and the green box was invalid.

Previous cuing studies have concluded that if a participant is looking for a particular color to find the target letter, then other objects in the cue display containing this same color will capture attention. For example, when looking for a red letter, a red box will capture attention. This conclusion is based on the *cue validity effect* – the finding that response time (RT) is shorter and proportion of error (PE) is smaller when the target appears in the same location as the color cue drawn in the target color than when it appeared in a different location. Stimuli in other colors do not produce a cue validity effect.

Predictions

As in previous cuing studies, we expected to obtain a cue validity effect for the target color cue in the color cue condition, indicating attention capture. The main question is whether fearful faces would also capture attention and produce a cue validity effect.

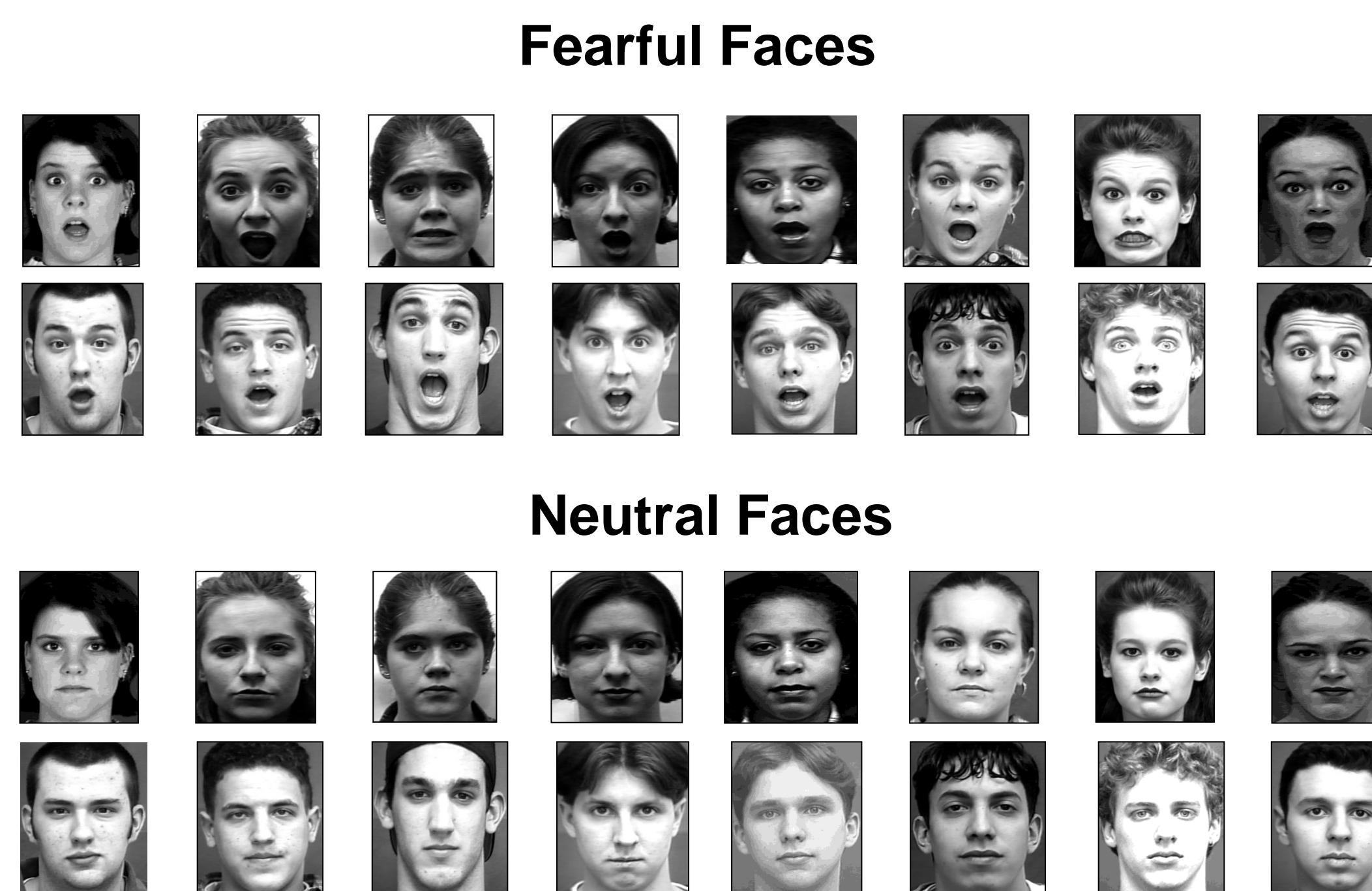
Experiment 1 (N=52)

Purpose: Examine whether fearful faces capture attention involuntarily, even when people are not looking for faces.

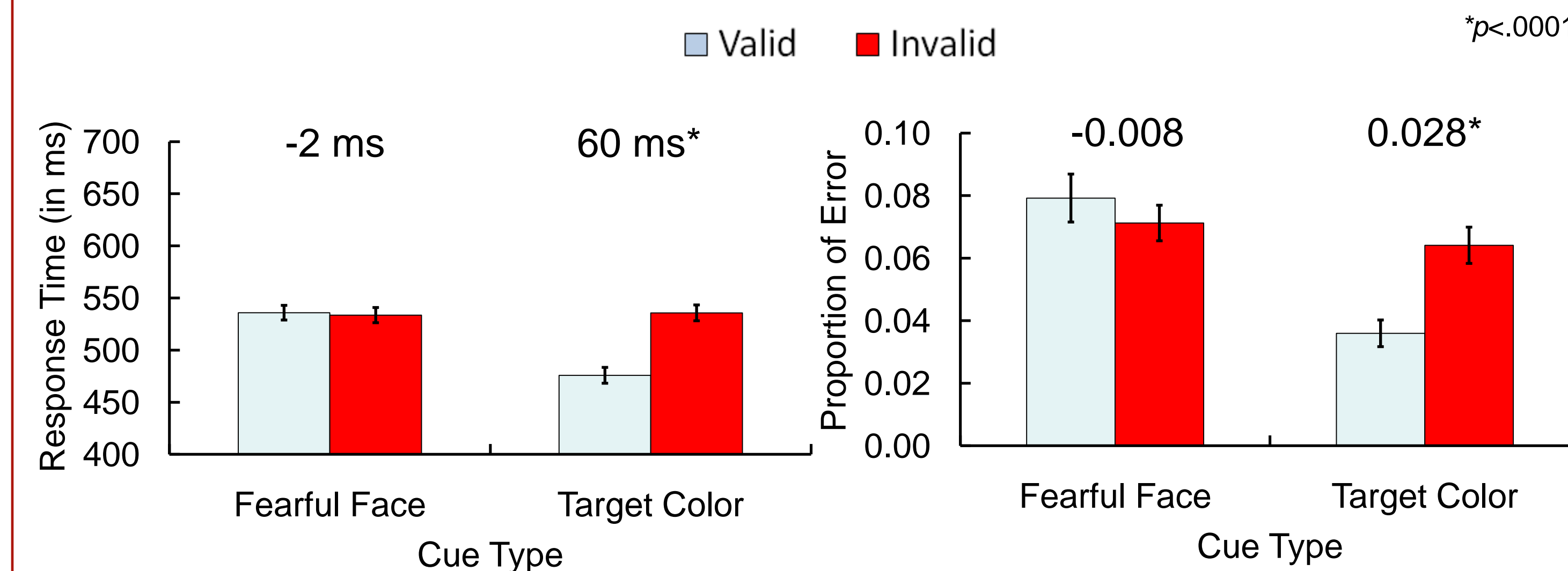
Task: Half of the participants responded to the red letter and the other half to the green letter. They pressed the key labeled "L" for the target letter "L" and the key labeled "T" for the target letter "T".

Cues: Face cues (fearful vs. neutral) and color cues (red vs. green) were intermixed within blocks

Face Stimuli: 16 fearful faces (8 males and 8 females) and 16 neutral faces (8 males and 8 females) were used.



Results and Discussion

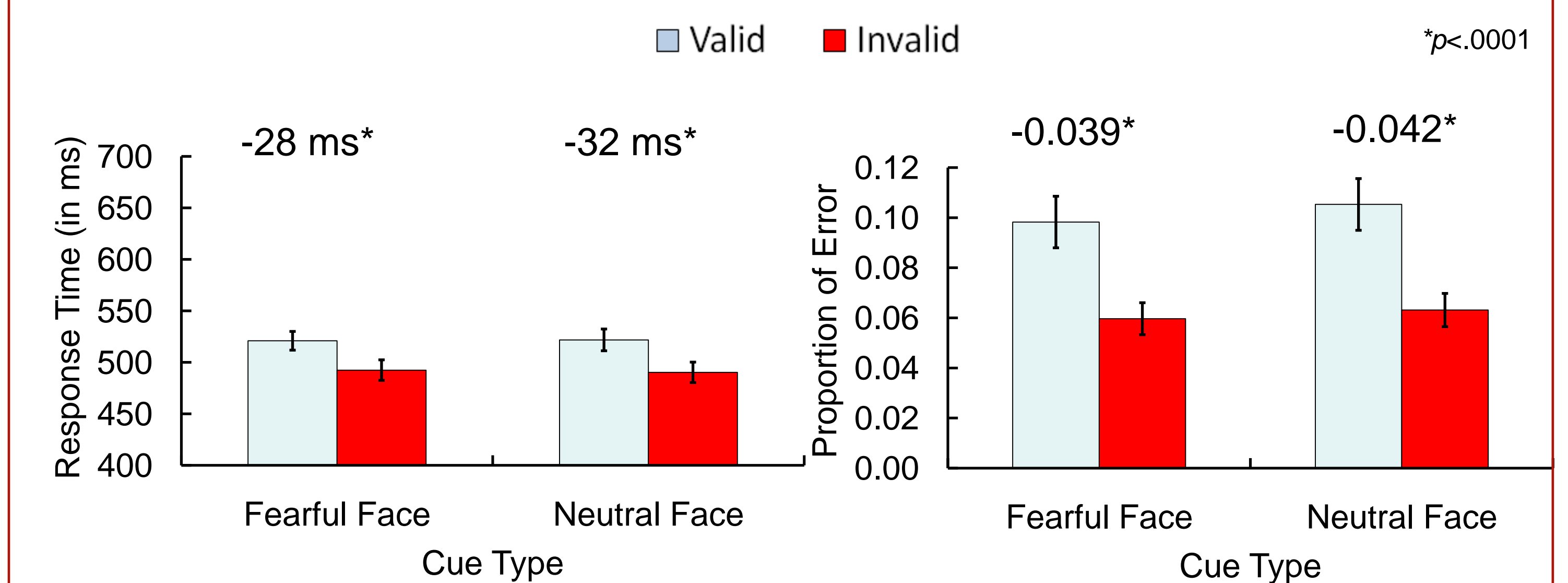


As predicted, the target color cue produced a large cue validity effect on both RT and PE, $F_s(1,51) \geq 33.36$, $p_s < .0001$. In contrast, the fearful face did not produce a cue validity effect on both RT and PE, $F_s(1,51) \leq 2.04$, $p_s \geq .1595$. These findings suggest that the fearful face did not capture attention involuntarily.

Experiment 2 (N=35)

Experiment 1 revealed no evidence that although color cues capture attention involuntarily, fearful faces do not. It is logically possible that processing faces requires attentional resources whereas colors do not (i.e., are processed pre-attentively). Because two faces appeared simultaneously in the cue display, the fearful face had to compete against the neutral face for processing resources, perhaps weakening any attention capture. Experiment 2 addressed this issue by presenting only one face (fearful or neutral) in the cue display.

Results and Discussion



The fearful face produced a reversed cue validity effect on both RT and PE, $F_s(1,34) \geq 32.83$, $p < .0001$. The neutral face also produced a reversed cue validity effect on RT and PE, $F_s(1,34) \geq 38.26$, $p < .0001$. There was no difference in the cue validity effect between these two types of face cues, $F_s < 1.0$. Again, these findings suggest that fearful faces do not capture attention involuntarily.

General Discussion

We examined whether fearful faces capture attention involuntarily (i.e., automatically) using a cuing paradigm. Both experiments provided no evidence for capture by fearful faces, suggesting that the emotional significance of stimuli does not receive enhanced processing. This finding is contrary to what previous studies have claimed. It is possible that capture by fearful facial expression occurs only when people are looking for a face (as in many previous studies); that is, the capture is contingent on the top-down task set. Further research is needed to examine this issue.

References

- Fox, E., Russo, R., & Dutton, K. (2002). Attentional bias for threat: Evidence for delayed disengagement from emotional faces. *Cognition and Emotion*, 16, 355–379.
- Phelps, E. A., Ling, S., & Carrasco, M. (2006). Emotion facilitates perception and potentiates the perceptual benefits of attention. *Psychological Science*, 17, 292–299.
- Vuilleumier, P., & Schwartz, S. (2001). Emotional facial expressions capture attention. *Neurology*, 56, 153–158.