# Attentional capture by threat is independent of uni- versus multi-modal threat intensity

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There are several modes of attentional control that help us to focus on stimuli around us that signal either reward or threat in our environment to ensure one's survival. Value-driven attention is one such mechanism of attentional control that indicates that high-value yet task irrelevant stimuli automatically grab our attention as a result of reward learning (Anderson, 2011). Stimuli predictive of greater reward have a higher potential to attract attention, indicating that such attentional bias is value-dependent. This study aims to examine whether the threat level of an aversive-associated stimulus modulates attentional capture rate.

## Methods

### Training Phase

- The training phase encompassed one practice run and three training runs of 72 trials.
- Participants were instructed to make a speedy saccade towards the target square when the trial began
- The square appeared in one of four equiluminant colours (red, blue, green and grey) each associated with either an electric shock, a loud white noise, a combination of shock and noise, or no outcome (neutral).
- Participants also rated perceived aversiveness of all four outcomes from least to most aversive
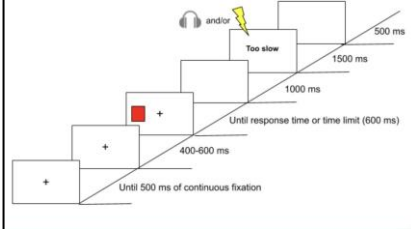
### Test Phase

- Consisted of one practice run and five test runs of 225 trials
- Once the trial started, a circle and a square appeared on either the left or right of the screen serving as a target and a distractor.
- This time, participants were instructed to look at the circle and ignore the square distractor
- The circle and square were rendered in colors that were previously associated with one of the four outcomes from the training phase.


Training Phase


Test Phase
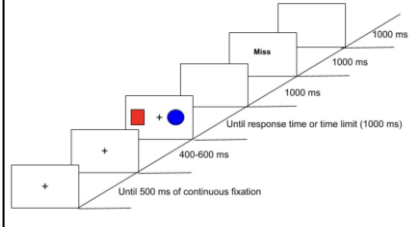
## Conclusions

- We found that a threat-signaling distractor impaired search, signifying attentional bias towards threatening stimuli
- Threat-induced attentional bias is independent of threat intensity, and that although multisensory integration augments perceived aversiveness, it does not potentiate attentional bias to threatening stimuli.
- Overall, threat intensity did not modulate the magnitude of attentional capture despite higher perceived aversiveness of the combined outcome.

## Results

### Training Phase

- For the training phase, we utilized a 1 x 4 ANOVA depicting effects of threat level on mean RT
- We found that the effect of the level of threat on mean RT was not in fact significant, $F(3, 114) = 0.87$, $p = 0.46$
- Intensity level on overall accuracy in the training phase was also found to be non-significant $F(3, 114) = 0.14$, $p = 0.94$.

### Test Phase

- For the test phase, we utilized a 2 x 3 ANOVA depicting effects of Threat level and Target or Distractor on mean RT
- Our analysis showed that the effect of threat level on mean RT was once again not in fact significant $F(2, 76) = 2.13$, $p = 0.13$
- However, the effect of target or distractor on response times was in fact significant $F(1, 38) = 6.68$, $p = 0.014$
- Further investigation revealed that there was no interaction between intensity level and target or distractor $F(2, 76) = 0.27$, $p = 0.77$
- Regarding error rate in the test phase, there was a significant effect of target and distractor $F(1, 38) = 7.51$, $p = 0.009$
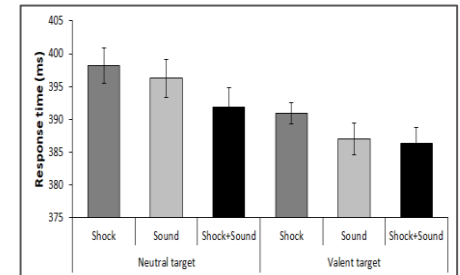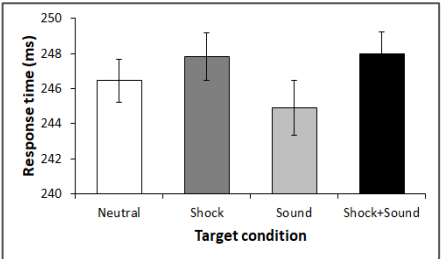




## References

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