Emotion facilitates object recognition

Evidence from spatial filtering

Jordan Wylie

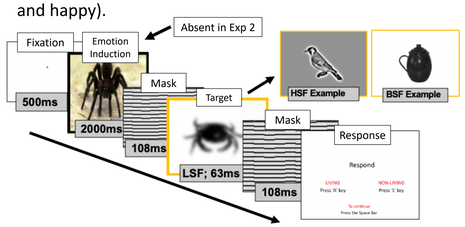
jwylie@gradcenter.cuny.edu

@jowylie2

BACKGROUND: Whereas traditional ascending-neural pathway models of object recognition rely on the ventral stream for object identification, recent work considers descending-neural pathways to explain emotion induced biases in perception. We examined how emotions, specifically fear, bias processing toward the dorsal stream to quickly influence object recognition.

METHODS

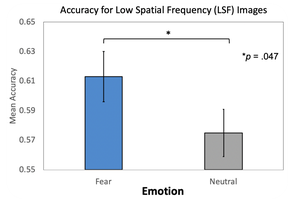
1. 2 studies (Exp 1: N = 53; Exp 2: N= 269) collected behavioral data from Queens College Subject pool
2. We manipulated spatial frequencies of common objects asked participants to quickly and accurately categorize the object as either living or not living.
3. Exp 1 used a fully within-subjects block-event emotion induction using IAPS images (fear vs. neutral, see depiction below).
4. Exp 2 used a between-subjects method, presenting an emotional movie clip prior to the experimental trials (fear, disgust, neutral, and happy).



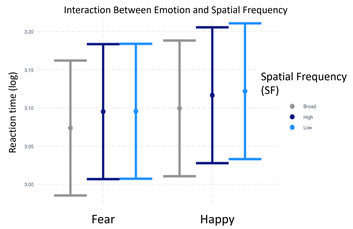
Note: Images with orange borders are examples of objects to be categorized as a measure of accuracy (primary DV). These were presented in either low, high, or broad spatial frequencies in random order without repeating. Reaction times were also collected (secondary DV).

RESULTS

Exp 1: Spatial frequency (low, high, broad) interacted with Emotion (fear vs. neutral) to influence accuracy [$F(2, 132) = 3.60$, $p = 0.03$].

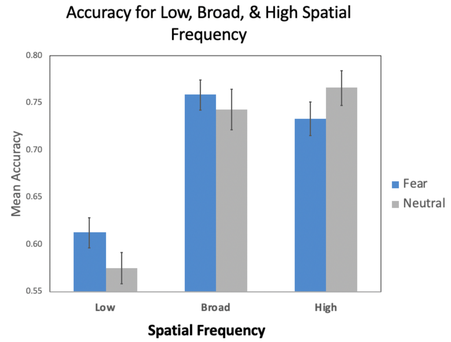


Exp 2: Planned contrasts revealed a significant decrease in reaction times for fear [$b = -0.02$, $SE = 0.009$, $p = .016$] and happy [$b = -0.02$, $SE = 0.009$, $t(30523) = -2.51$, $p = .012$] at the low spatial frequency level.



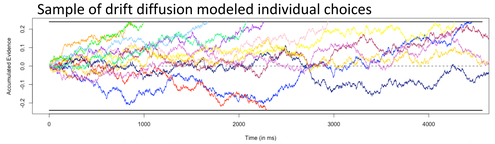
What you ***feel*** affects what you ***see***! Emotional states enhance accuracy and reduce reaction times of object identification in low spatial frequency relative to neutral states.

Experiment 1 spatial frequency findings:

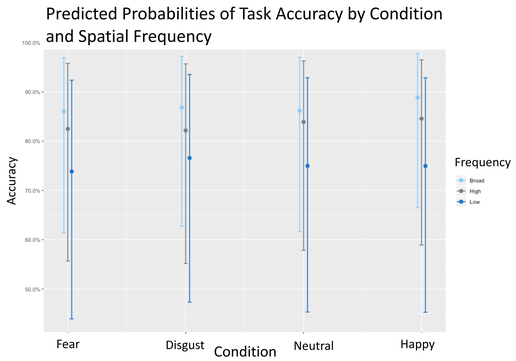


Note: Data were collapsed into a single accuracy score and then entered into a factorial ANOVA. While low is most challenging to see, only for that level was there a significant difference between performance for the fear vs. neutral conditions in the predicted direction.

Experiment 2 accuracy findings:



Note: Most of the drift rates < 2 sec; this pattern holds regardless of emotion condition



Note: As depicted above, accuracy did not vary by condition. Participants in the happy condition performed marginally worse on the low SF trials than neutral ($p = .022$). Generalized linear modeling was used for the binomial outcome.

CONCLUSIONS

- Results from Exp 1 suggest fear states may co-opt the speedy dorsal stream to quickly allow for global image analysis and facilitate awareness of important environmental features.
- Results from Exp 2 suggested that happy states may also facilitated speedy recognition, though between-subjects findings were less conclusive.

Jordan Wylie & Justin Storbeck

THE GRADUATE CENTER
CITY UNIVERSITY OF NEW YORK