



The Effect of Emotion on Associative Memory: Anger Versus Fear

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Research Purpose

To determine if negative emotions, anger and fear, affect associative memory differently

Abstract

Studies show that emotion enhances memory for individual items but weakens memory for associations between items. One explanation for this associative memory impairment is that emotional stimuli capture attention, causing enhanced encoding of the emotional item but reduced encoding of the surrounding environment. This hypothesis generates the prediction that emotional information always impairs associative memory. Alternatively, it may be that emotion orients attention towards threats in the environment, thus suggesting anger and fear have different effects on memory for associated information. To adjudicate between these hypotheses, subjects studied sets of three images, consisting of two objects and a face with either a neutral, angry, or fearful expression. Subjects were later tested on their memory for the associations between the three items. Supporting our first hypothesis, memory for both angry and fearful associations was worse than memory for neutral associations. Contrary to our second hypothesis, there were no differences in memory for angry versus fearful associations. Thus, emotional information itself seems to capture attention, weakening memory for related information. If we understand the mechanisms of how negative emotion influences associative memory, we may discover methods of counteracting the impairment via various memory-improving techniques. This could lead to increased memory accuracy for emotional events and thus increased accuracy and reliability of eyewitness testimonies.

Background

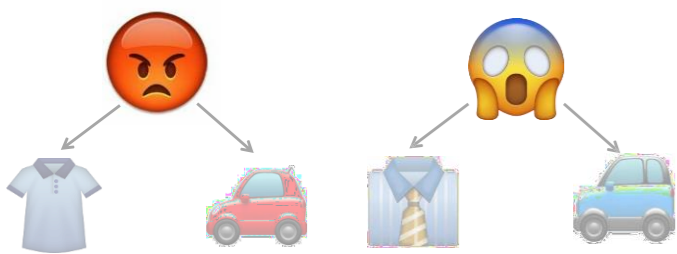
The perception of negative emotion affects memory

- Strengthens memory for individual items¹ (i.e. remembering an angry face)
- Hinders associative memory² (i.e. remembering an angry face with its surrounding environment)

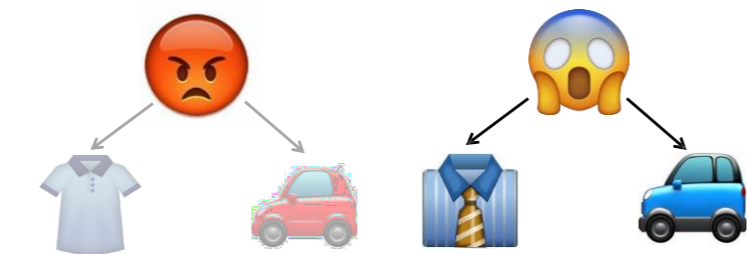
Why does emotion affect associative memory?

Hypothesis 1: Emotion itself captures attention.

Hypothesis 2: Emotion signals where to direct attention.



Prediction: Both angry and fearful faces disrupt associative memory.



Prediction: Angry faces (threats themselves) disrupt associative memory; fearful faces (threats in environment) do not.

Methods

Study Phase

n = 40 UO undergraduates



Neutral Triad
(12 total)



Angry Triad
(12 total)



Fearful Triad
(12 total)

Recognition Test



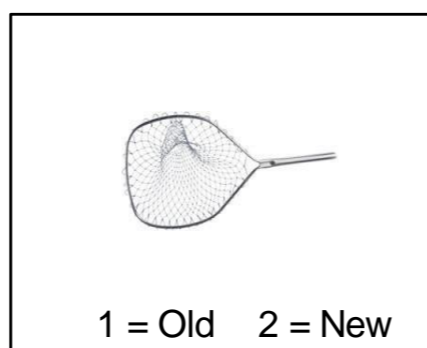
Old Object from Neutral Triad



Old Object from Angry Triad

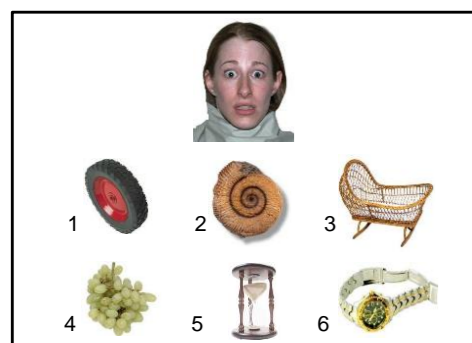


Old Object from Fearful Triad



New Object

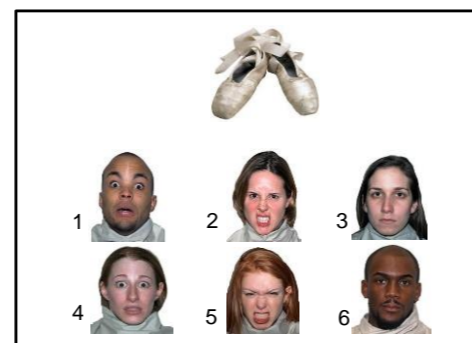
Association Test



Face cue, object options
(Face/Object)



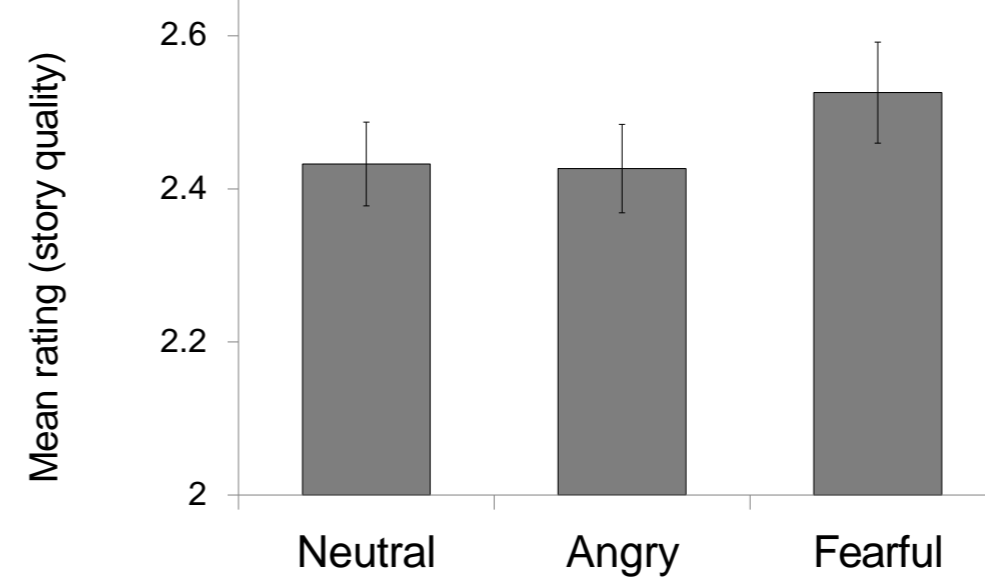
Object cue, object options
(Object/Object)



Object cue, face options
(Object/Face)

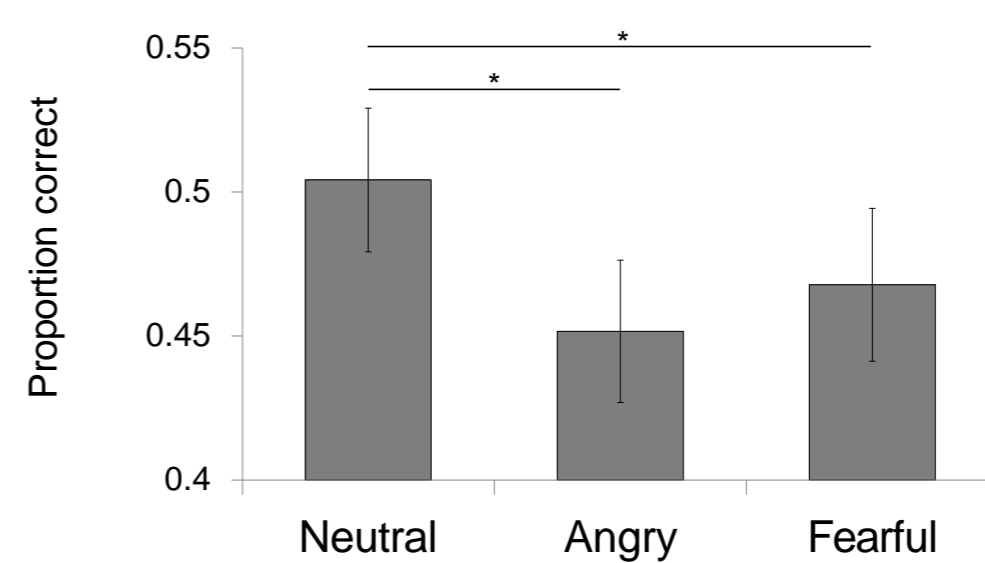
Results

Study Phase

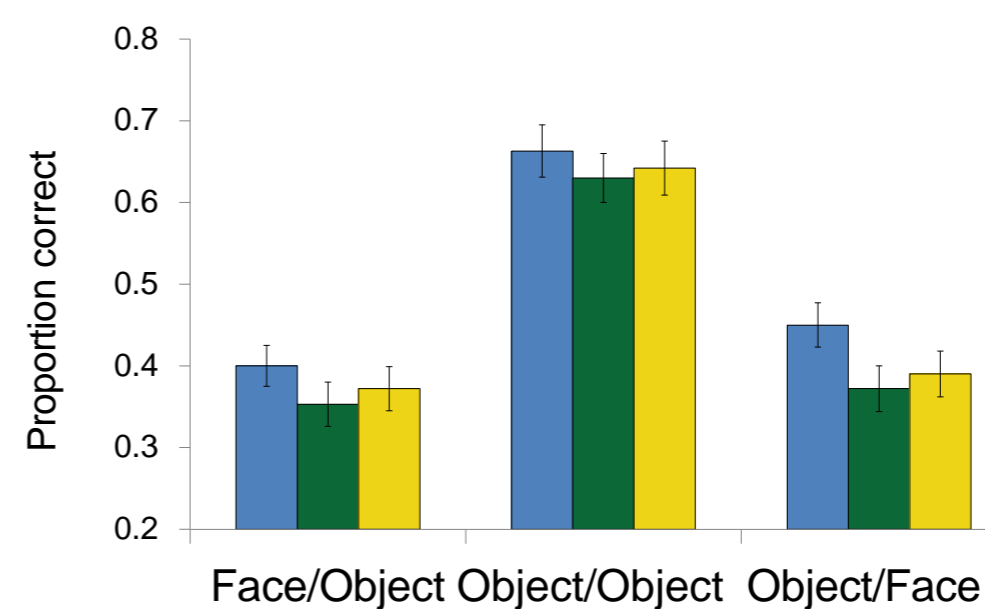


- No overall effect of emotion on story quality
- A trend towards higher story quality for fearful faces compared to neutral and angry faces

Association Test

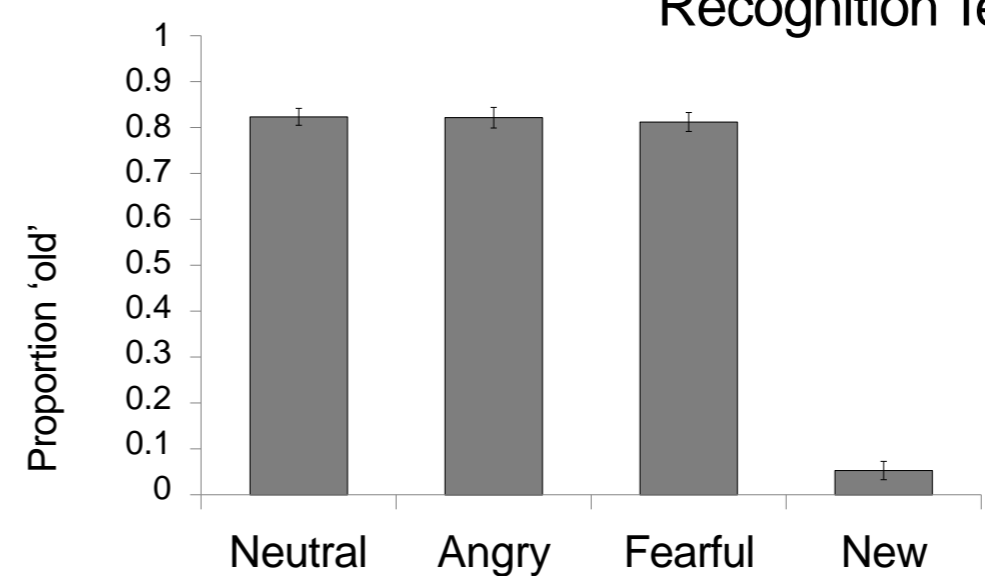


- Poorer memory for angry and fearful associations
- No difference between angry and fearful triads



- Impairment for angry and fearful triads consistent across all cue/object combinations

Recognition Test



- No differences in item recognition based on emotion condition.

Conclusions

- Perception of negative emotion disrupts associative memory
- Anger and fear cause similar associative memory impairment
- Attention is driven towards negative emotion, rather than towards potential sources of threat

Acknowledgements:

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References:

1. Bisby, & Burgess. (2017). Differential effects of negative emotion on memory for items and associations, and their relationship to intrusive imagery. *Current Opinion in Behavioral Sciences*, 17(C), 124-132.
2. Bisby, Horner, Bush, Burgess. (2018). Negative Emotional Content Disrupts the Coherence of Episodic Memories. *Journal of Experimental Psychology: General*, 147(2), 243-256.