**Domain-specific working memory loads selectively increase negative interpertations of surprised facial expressions**

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# intro

## Facial expressions and individual differences (what is valence bias?)

### Facial expressions are an important social signal

### Individuals differ (trait) in their tendency to interpret ambiguous images, like a surprised face.

### Despite the bias, everyone seems to show an initial negativity bias – positivity is associated with emotion regulationBehavioral data support the initial negativity hypothesis

#### Faster RTs for negative interpretations (Neta & Whalen 2009)

#### LSF

#### Oddball

### Brain data support the initial negativity hypothesis

#### Overriding negativity relies on regulation of amygdala responses by frontal areas (i.e., vmPFC) (Kim et al., 2003; Petro et al., 2018/9)

## Cognitive loads / task interference (could WM loads affect bias?)

### In our daily lives, these resources are not always available.

#### We often encounter distractions in daily life. E.g., a phone notification, noises in the office, etc.

### Active WM maintenance affects concurrent processes.

#### WM maintenance can recruit resources away from the “emotional brain” (Van Dillen et al., 2009)

#### Emotional expression categorization is worse during high, compared to low, cognitive load (Ahmed, 2018)

### Other work has tested the effects of cognitive load on valence bias (Mattek et al., 20\*\*), but did not find an effect for interpretations of surprise. This could be due to domain-specific effects of cognitive load (Egner & Etkin, 20\*\*, others)

## *The present study*

### In this study, we predict:

#### *H1: WM loads with emotional content will result in more negative interpretations of ambiguity than WM loads with neutral content.*

#### *H2: This effect may be larger for larger WM loads (with emotional content)*

# Methods

## Stimuli

Describe faces, IAPS.

## Procedure

Within-subjects design, 2 Load (low, high) x 2 domain (emo, neu) design

We manipulated the WM domain and load across trials. Participants were instructed to hold images from an image matrix in WM while they rated happy, angry, and surprised faces. After, participants saw a single probe image and indicated whether or not this probe was present in the previous image matrix.

Show an example in **Figure 1**?

Participants were randomly assigned to a version of the task (response buttons counter-balanced, image locations in matrices counter-balanced).

## Data Analysis

Shapiro-wilks test to assess normality. Data from non-normal distributions analyzed with Friedman’s and Wilcoxon signed rank tests. Data from normal distributions analyzed with repeated measures ANOVA. All analyses Bonferroni corrected.

# Results

**Subjective Ratings**

We found a significant effect on subjective ratings of surprise. Specifically, ratings from trials with an emotional WM load were more negative than those with a neutral WM load. There was no effect of load (low vs. high). **Figure 2?**

**Reaction times**

A 2x2 ANOVA showed a trending main effect of domain, such that RTs during emotional WM trials take marginally longer than neutral WM trials. There is no effect of load and there is no interaction.

Additionally, we looked for differences in RTs for trials where surprise is rated as positive, compared to surprise rated as negative for each of the four WM load conditions. During low neutral load trials, positive interpretations of surprise took significantly longer than negative interpretations. There were no differences between RTs for positive and negative interpretations in the other three WM load conditions.

# DISCUSSION

## Summary of the results

### Domain-specific WM loads alter subjective interpretations of surprise

## WM loads mitigate typical RT differences across positive and negative interpretations

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