

All Eyes on Memes: Exploring Internet Meme Appreciation With Eye Tracking and Gaze Transition Entropy

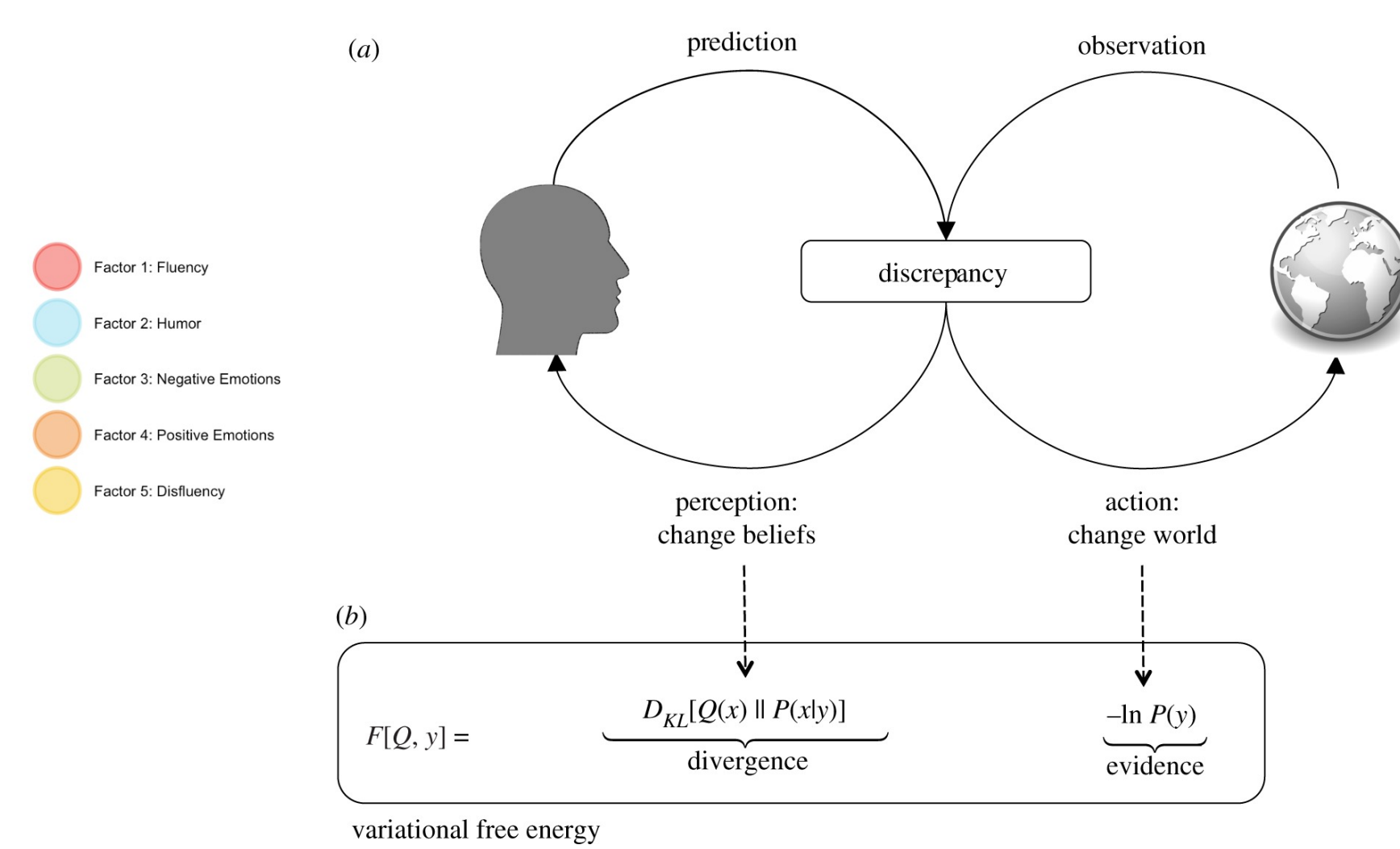
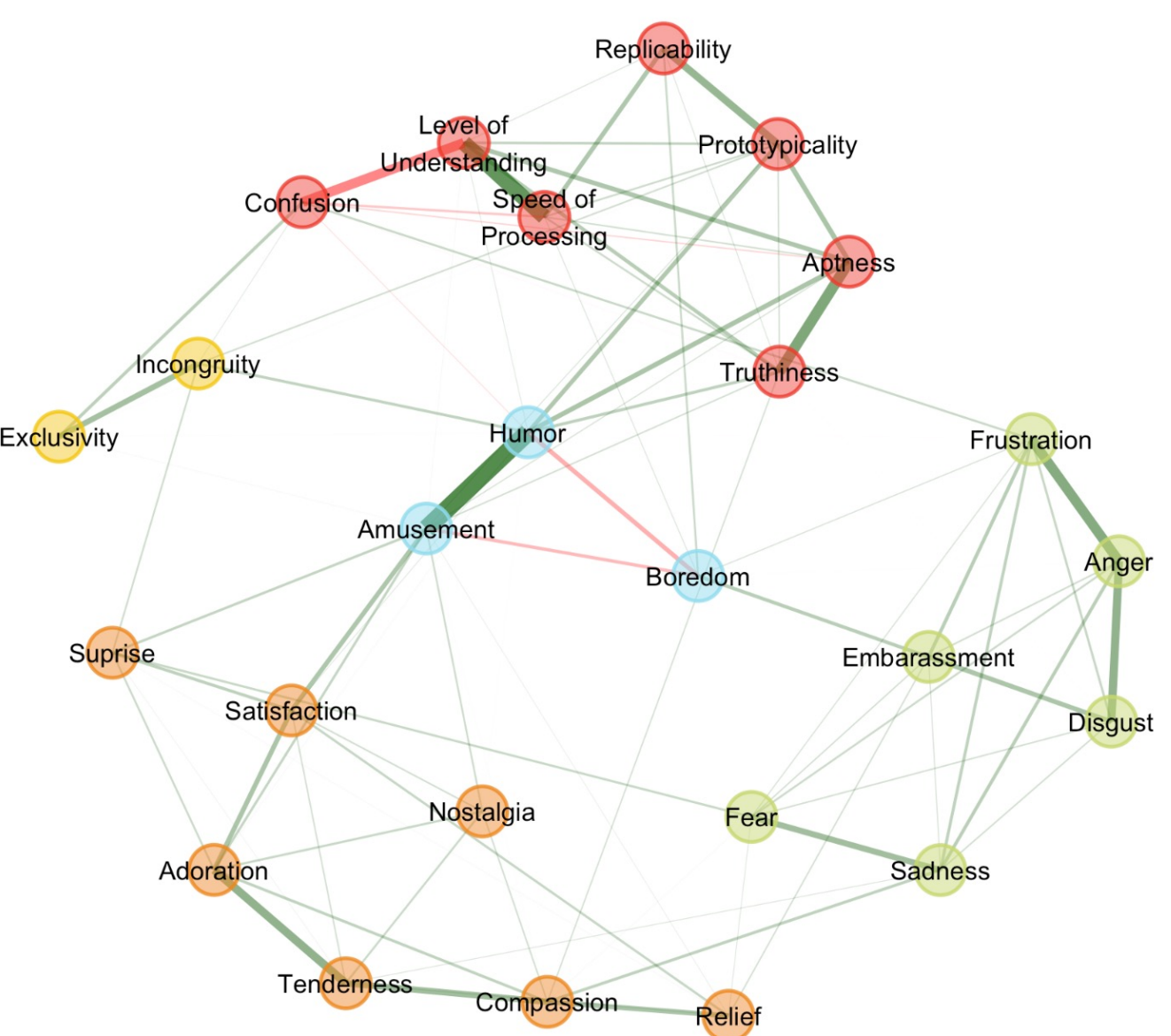


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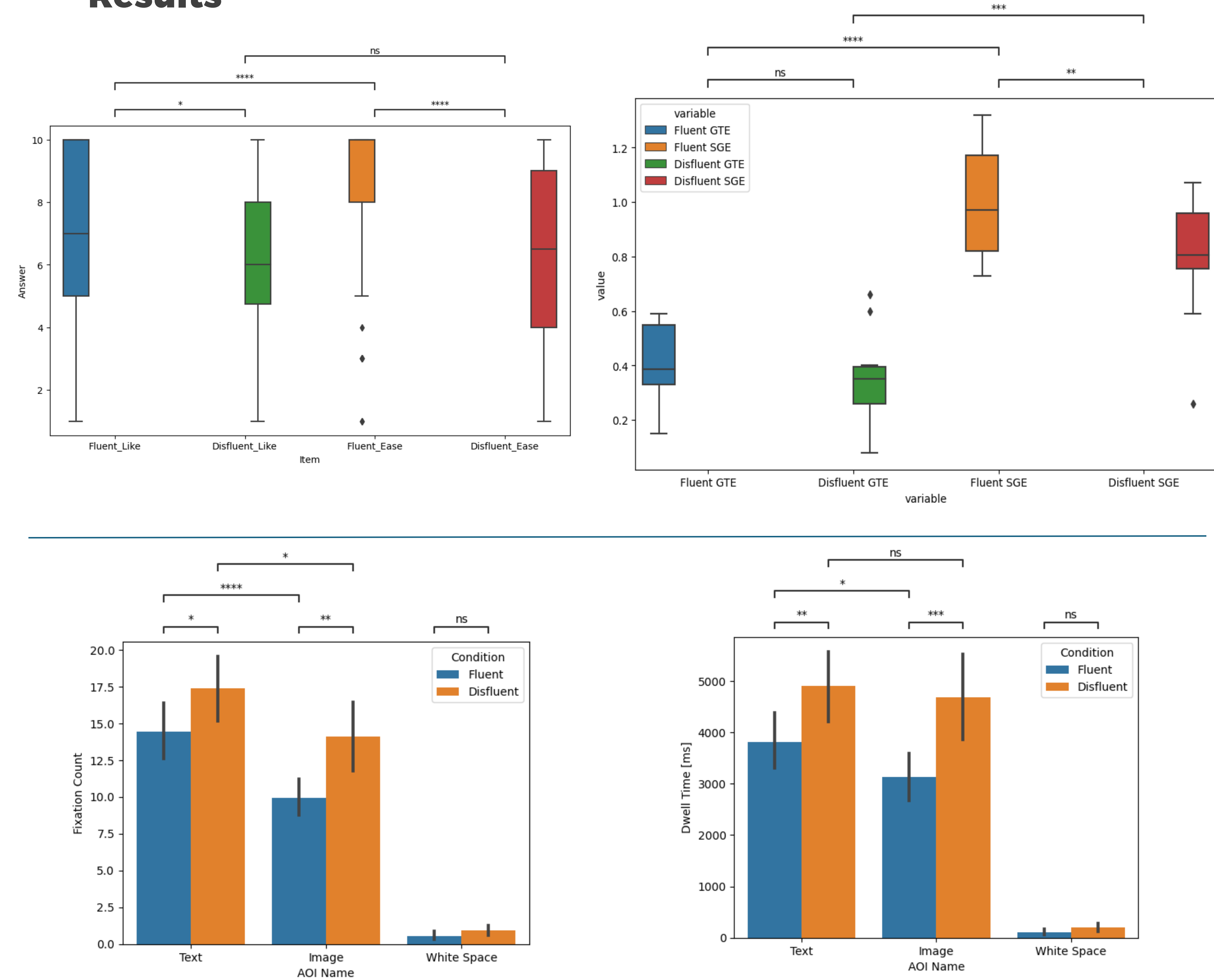


Background

Internet memes are, typically, humorous combinations of images and text that are often found on social media platforms. They are mini “aha” moments that can vary on difficulty of resolvability. Previous research on the appreciation of internet memes has shown that five factors (humor, positive and negative emotions, fluency, and disfluency) influence the overall appreciation of internet memes¹. Further investigation has shown psychophysiological differences in fluent and disfluent internet memes². In this pilot study, we implemented eye-tracking technology to further investigate differences in fluent and disfluent memes. We use fixation data and gaze transition entropy³ as a measure of ‘top-down’ influences on gaze control⁵, information gathering⁴, and visual scanning efficiency⁵.



Results



Methodology

N = 8 participants viewed and rated a set of 20 internet memes while their eye movements were recorded by Tobii Pro Spectrum eye tracker at 60hz.

Participants gave their ratings of liking and ease of processing for each meme.

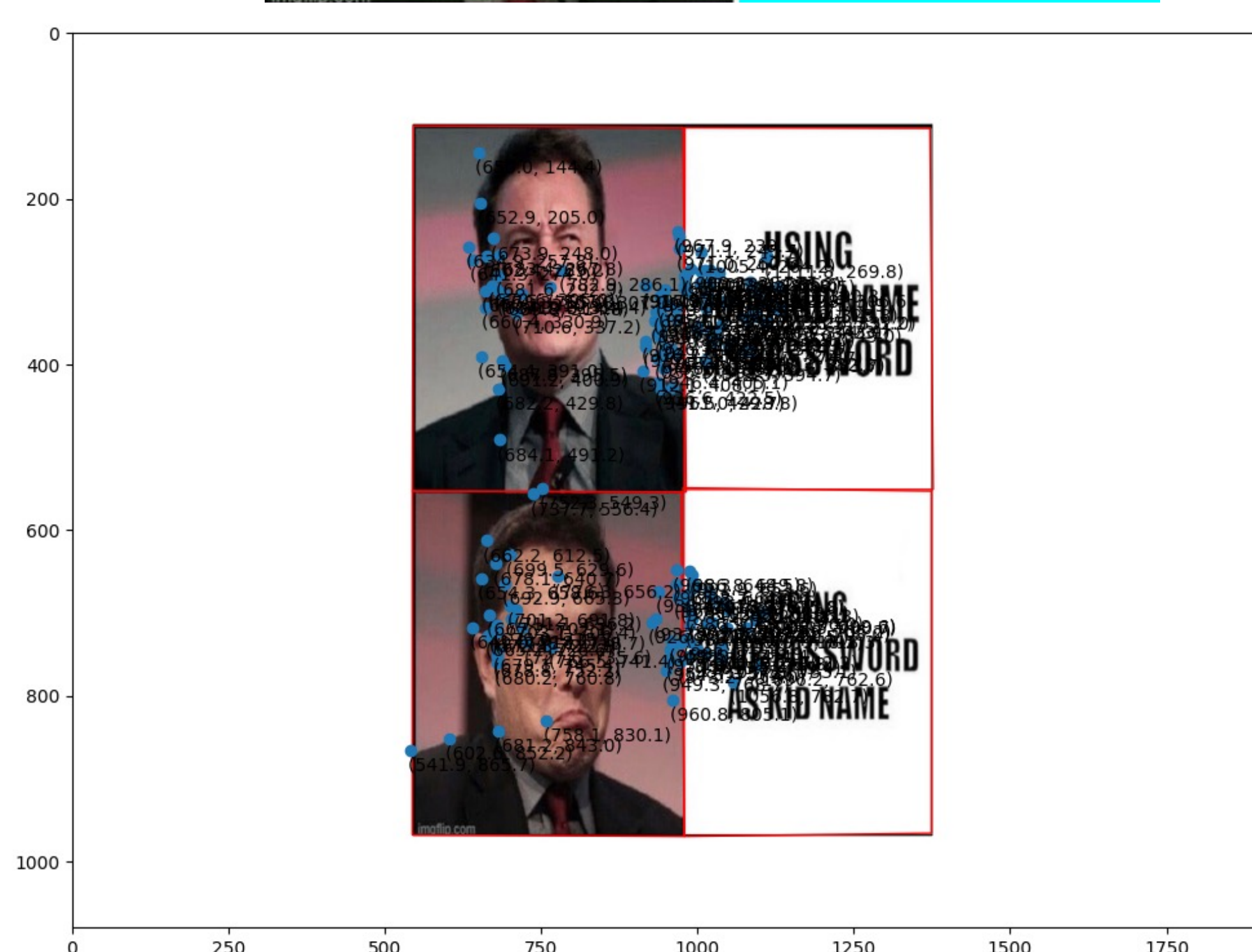
We implemented ‘gaze transition entropy’ analysis on the raw gaze data by:

1. Drawing Regions of Interest (ROIs) on the memes
2. Calculating a transition probability matrix of going from one region to another
3. Calculating the Shannon entropy on the overall dispersivity of fixations (stationary gaze entropy; SGE)
4. Calculating the Shannon entropy over the transition probability matrix (gaze transition entropy; GTE)

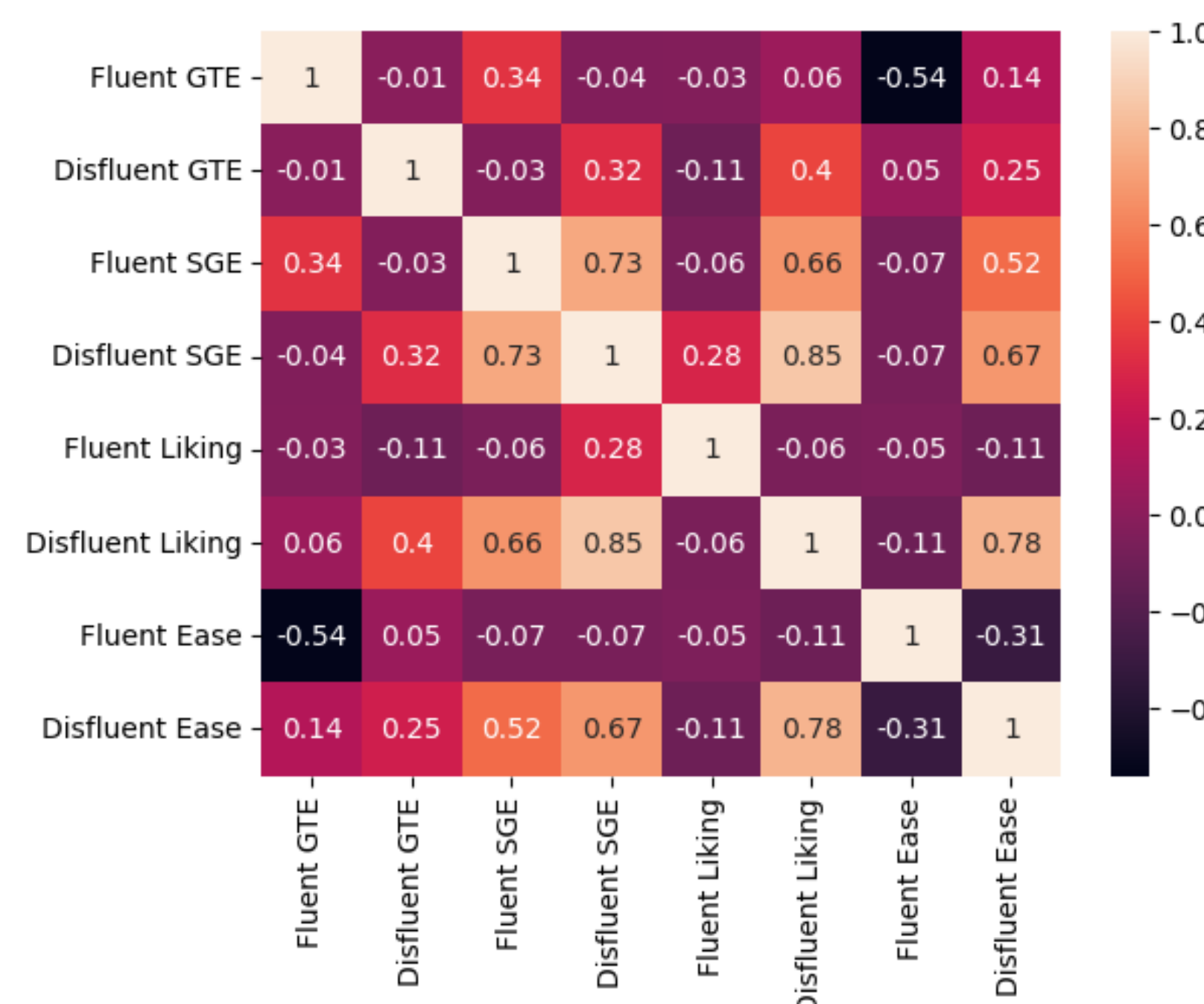


The Gaze Transition Matrix

	ROI1	ROI2	ROI3	ROI4
ROI1	20.0	9.0	23.0	2.0
ROI2	12.0	12.0	0.0	13.0
ROI3	22.0	1.0	12.0	1.0
ROI4	1.0	15.0	1.0	15.0



- We found that fluent memes were easier to process and liked more than disfluent ones
- We also found that participants had more and longer fixations on disfluent memes with more time being spent on text ROIs.
- We found SGE was higher for fluent memes but no significant differences in GTE for fluent and disfluent memes
- Higher GTE for fluent memes was correlated with lower ease of processing
- Higher SGE for fluent and disfluent memes was correlated with greater liking of disfluent memes



Discussion

In this pilot study, we found further evidence for the processing fluency bias in the appreciation of internet memes.

We also found that disfluent memes have longer dwell times, overall and especially in texts regions, perhaps due to the greater complexity of content contained in the meme.

We found no significant differences in gaze transition entropy. However, greater GTE in fluent memes is negatively correlated with ease of processing. As randomness in visual search in fluent memes increases, perceived ease of processing lowers.

Additionally, we found that stationary gaze entropy was significantly greater for fluent memes. Higher values of SGE suggest a more equally distributed visual attention over the ROIs. Also, SGE in general was correlated with the liking of disfluent memes.

Since this is a pilot study, the statistical power and generalization of the results are extremely limited. We are currently collecting more eye-tracking data to further highlight differences in visual attention for fluent and disfluent memes. We will also introduce pupillometry measures along with a comparison of Mooney images, non-humorous aha stimuli.

References

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