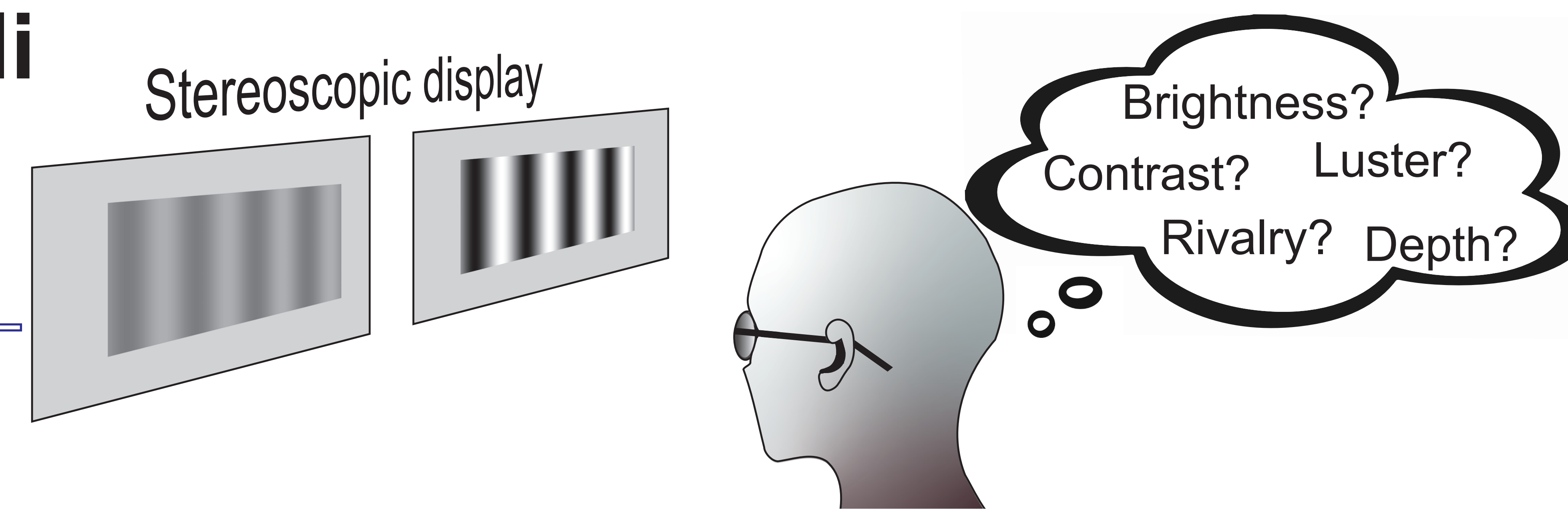


The Multifaceted Appearance of Dichoptic Gratings and Noise Stimuli

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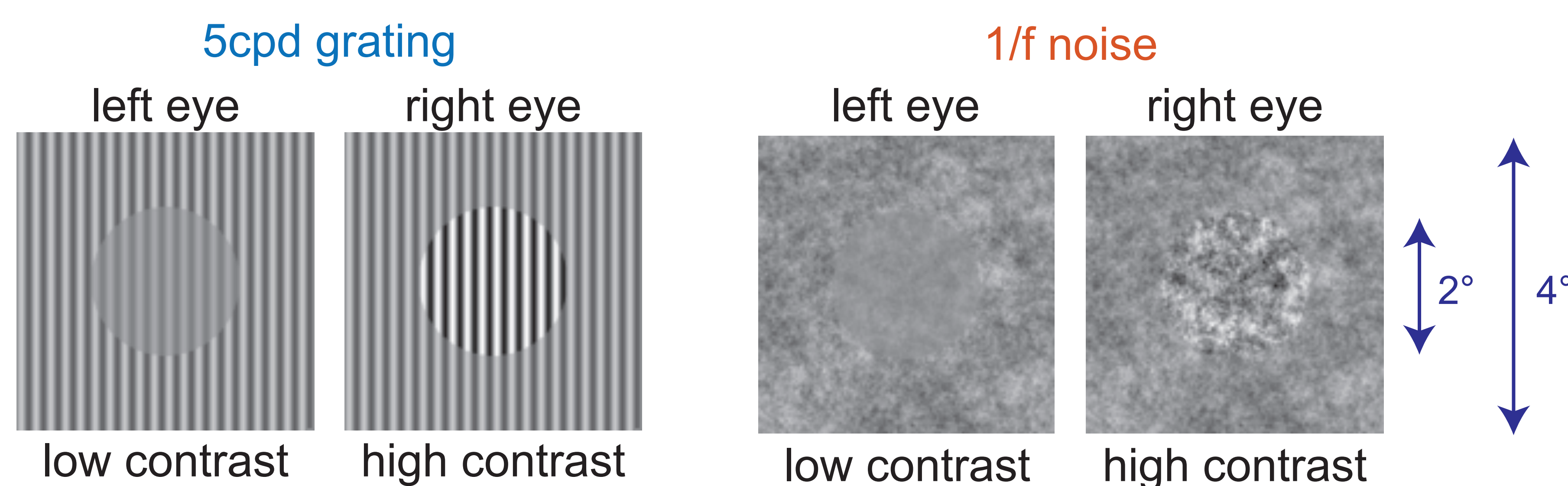


Introduction

Stereoscopic display systems present different images to each eye, creating compelling 3D percepts. If the brightness or contrast of the two displays differs, this can lead to additional perceptual phenomena. Oftentimes, the perception of images with contrast differences between the two eyes (dichoptic stimuli) is a unique experience that fundamentally differs from the perception of non-dichoptic stimuli. Dichoptic stimuli can vary in their perceived brightness^{1,2,3} and contrast^{4,5}, as well as elicit perception of luster^{6,7}, rivalry^{6,7}, and depth^{7,8}. The prevalence and co-occurrence of these phenomena is poorly understood. We examined dichoptic visual percepts across a range of contrast variations using two types of stimuli.

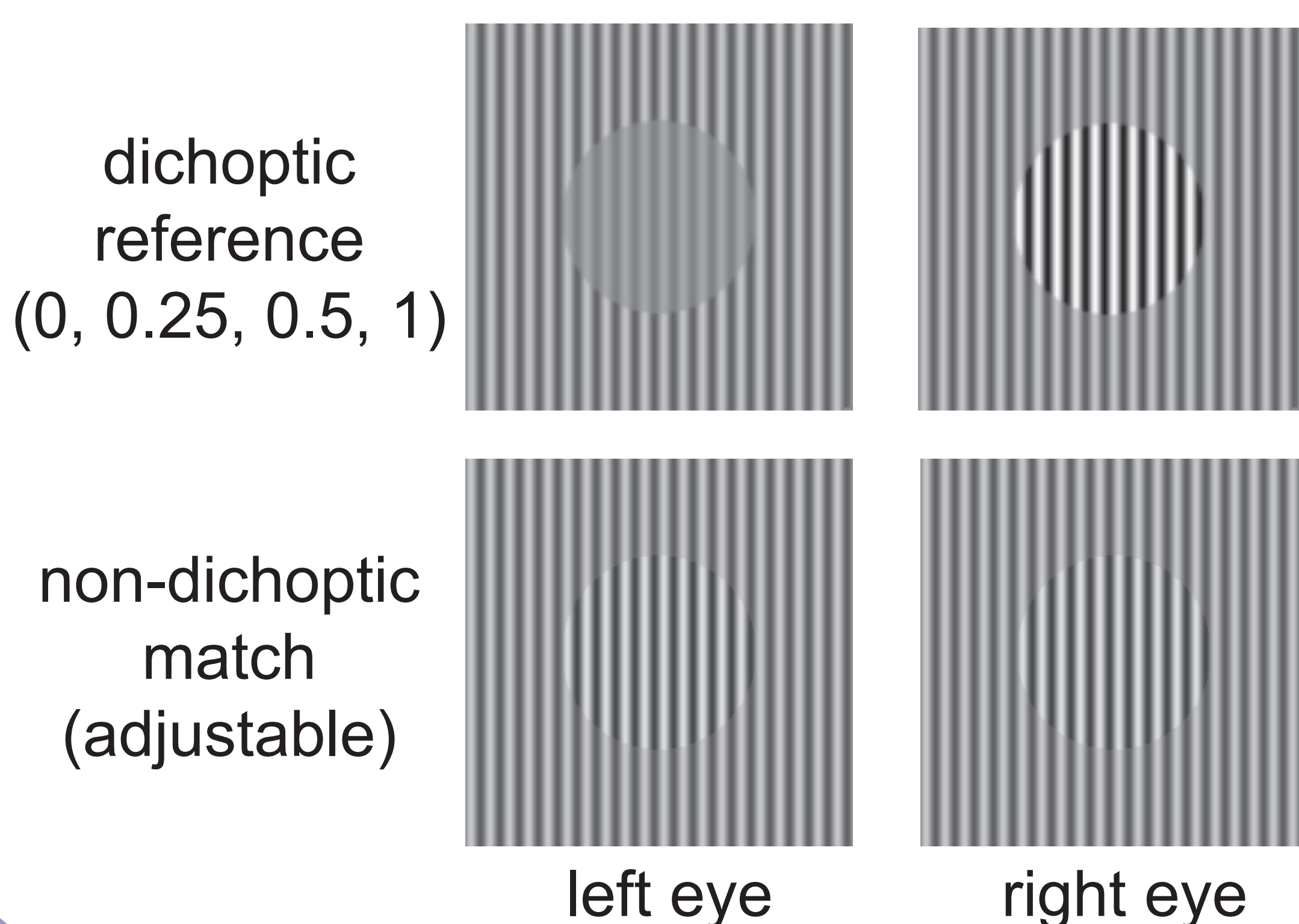
Methods

Stimuli



Procedure

Step 1: Matching



Step 2: Questions

Able to find exact match?
 If not, which one looked:
 1) brighter?
 2) higher contrast?
 3) more lustrous?
 4) more rivalrous?
 5) closer to you?

Dichoptic	Non-dichoptic
Same	Unsure

Acknowledgements

Funding resources: UC Berkeley CIVO Fellowship, NSF #2041726

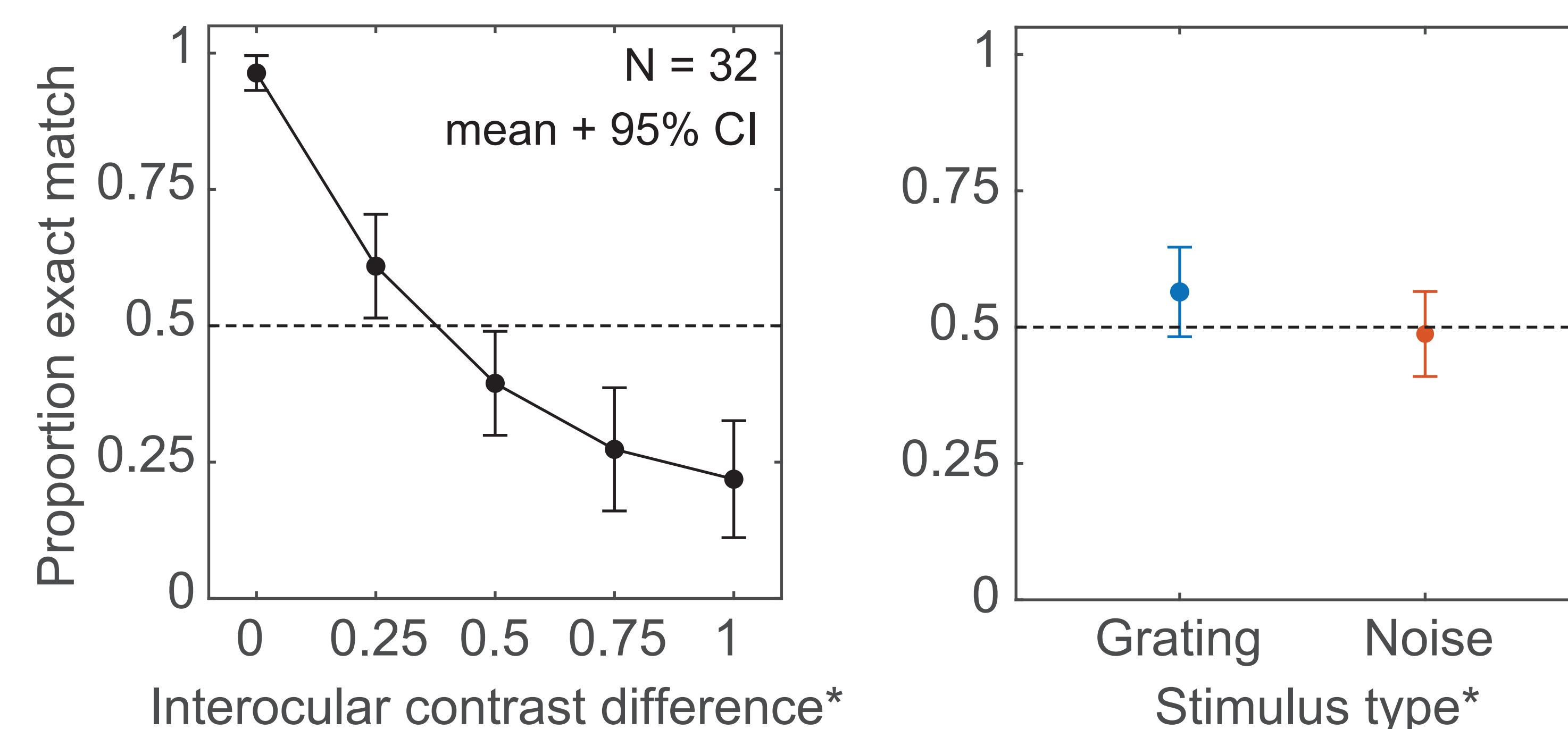
References

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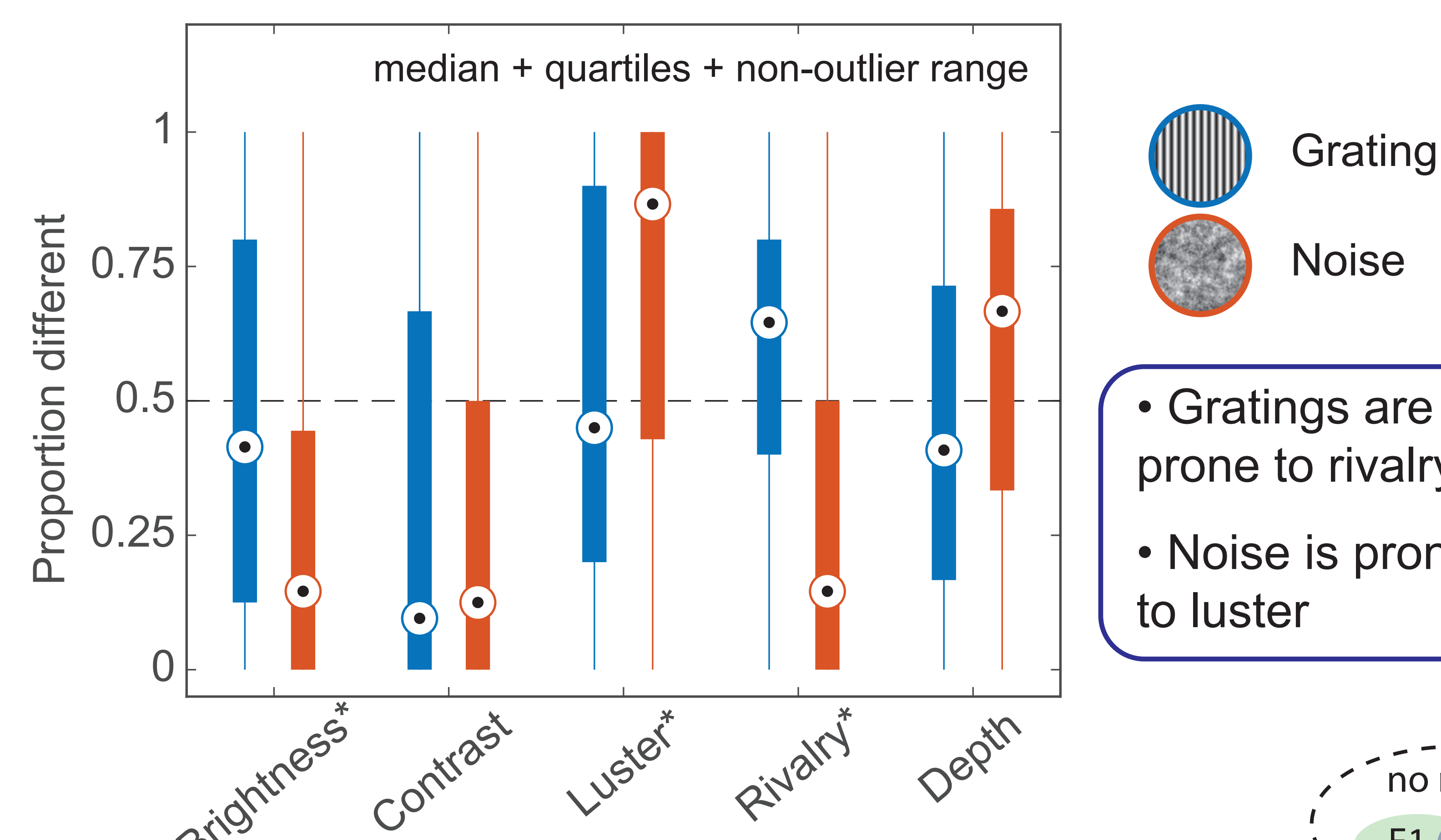
Results

- As interocular contrast difference ↑, exact matches ↓
- Gratings tend to have slightly more matches than noise

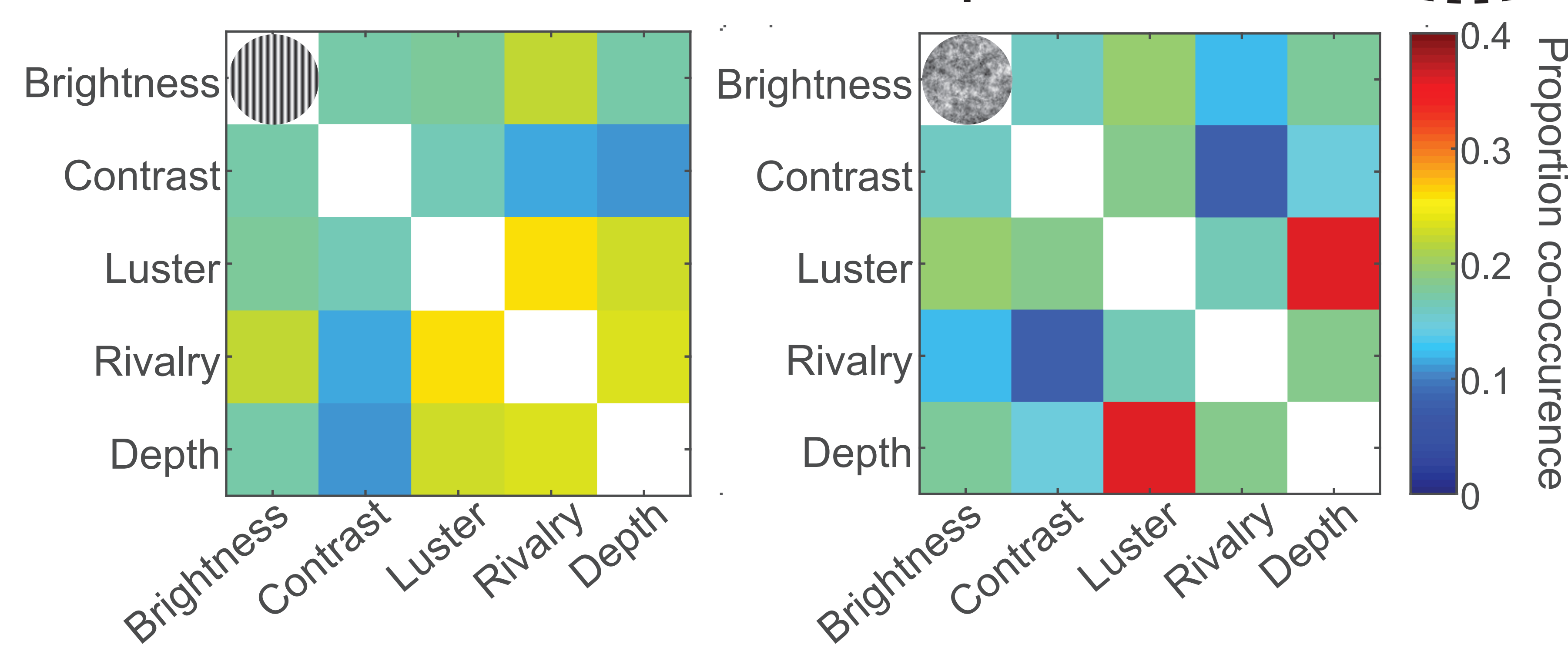
Exact Match



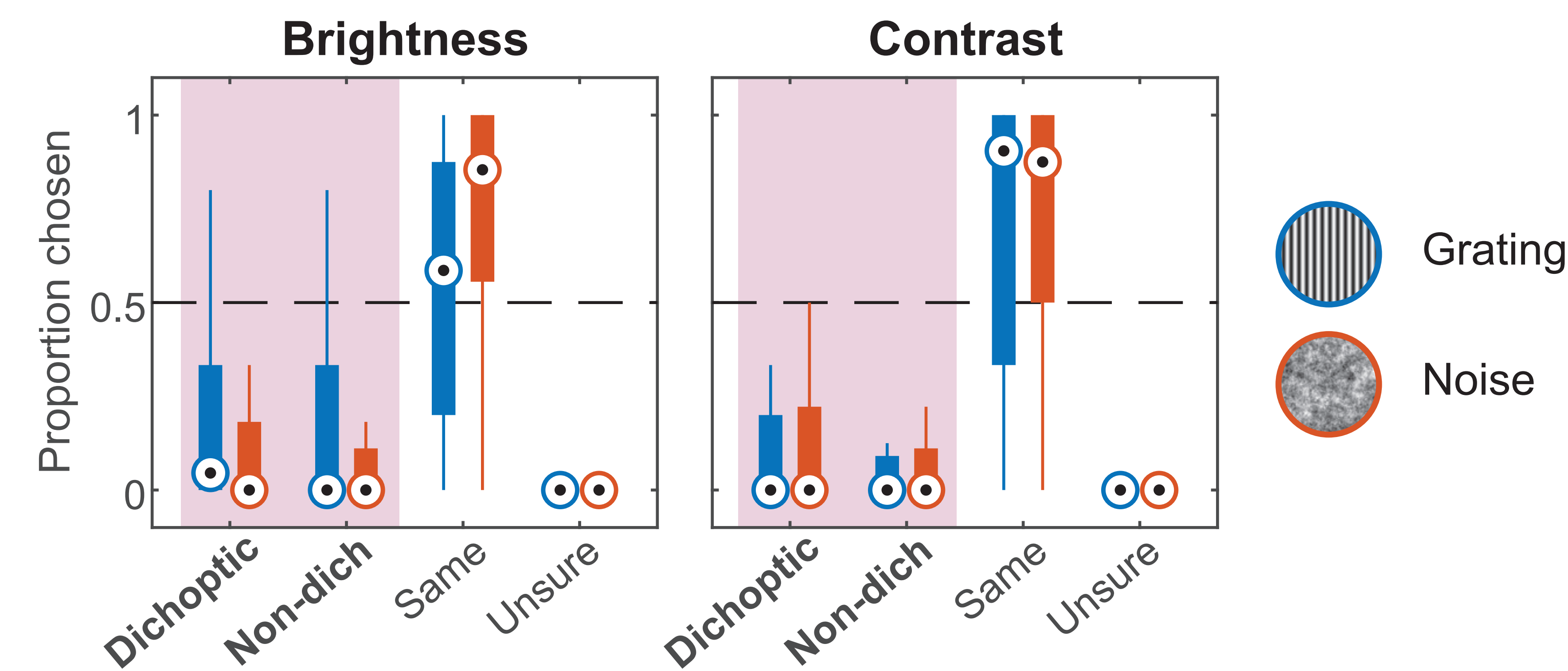
Perceptual Effects



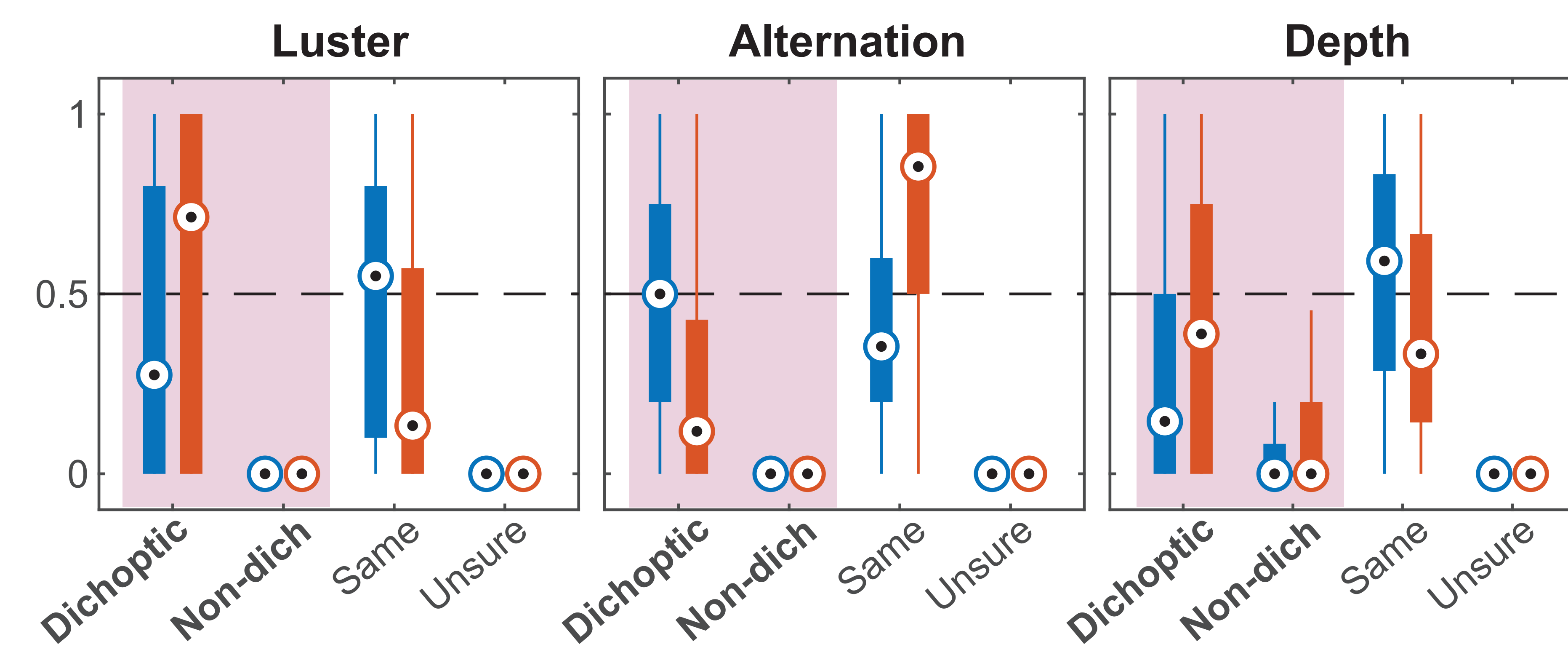
Co-occurrence of Perceptual Effects



- Dichoptic vs. non-dichoptic: similar in brightness & contrast



- Dichoptic: more luster, rivalry, and judged to be closer in depth
- These effects were quite common (25%-50% of the time)



Conclusion

Both grating and noise patterns generate multifaceted percepts when there is an interocular contrast difference between the two eyes. However, there are subtle differences between the two types of stimuli. Future work can explore ways of modulating these effects to develop useful rendering methods for stereoscopic rendering pipelines.