

Effects of isoluminance on serial dependence and contraction bias

Human perception and decision-making are shaped by prior experience, giving rise to history biases across multiple timescales. Serial dependence reflects a short-term attractive bias toward the previous trial [1], whereas contraction bias captures the attraction of responses toward the mean of previously experienced stimuli [2]. Although these biases may arise from shared mechanisms, their relationship remains unclear, particularly in the presence of contrast-dependent perceptual effects.

In this study, we investigated how stimulus contrast modulates both serial and contraction biases in a spatial working memory task. Our previous work using similar tasks indicated that high-contrast stimuli produce a repulsive contraction bias, with the repulsion decreasing at lower contrast levels [3]. We hypothesized that these effects are driven by contrast-dependent perceptual adaptation, which may mask an underlying attractive memory-driven contraction bias, and that isoluminant stimuli could reveal this latent component. To test this, participants (N = 34) performed a delayed spatial recall task under isoluminant and low-contrast conditions. Our regression analysis revealed a significant overall interaction between isoluminance and delay; however, it did not specifically affect either serial dependence or contraction bias. Moreover, we did not observe a significant correlation at the individual level between the strengths of serial dependence and contraction bias, suggesting that these two phenomena may be dissociable in this task.

[1] Fischer, J., & Whitney, D. (2014). Serial dependence in visual perception. *Nature neuroscience*, 17(5), 738-743.

[2] Allred, S. R., Crawford, L. E., Duffy, S., & Smith, J. (2016). Working memory and spatial judgments: Cognitive load increases the central tendency bias. *Psychonomic bulletin & review*, 23(6), 1825-1831.

[3] Pérez-Bellido A., Tschiersch M., Mahrach A., Zhu J., Wang Z., Constantinidis C., Compte A. (2023). Exploring the Behavioral Differences between Serial Dependence and Prior-Dependent Biases in Human and Monkey Observers. BARCCSYN 2023, Barcelona (Spain).