Advancing the Understanding of the Visual Saltation Illusion from investigating the second flash to novel presentation modes

デヘス シェリル アン マナリグド

Name: de Jesus, Sheryl Anne Manaligod
Dissertation title: Advancing the Understanding of the Visual Saltation Illusion: from investigating the second flash to novel presentation modes
（saltation 錯視の理解の深化：第 2 フラッシュの調査から、新しい提示モードへ）
Category:甲

Abstract of Dissertation

The visual saltation illusion (VSI), or reduced visual rabbit illusion, is a notable phenomenon in visual perception where a series of flashes appears equidistant across the visual field, even if some flashes occur at the same location. This dissertation investigates the VSI through two interrelated studies, each employing different experimental paradigms to delve deeper into its cognitive and neurological mechanisms. Collectively, these studies enhance our understanding of the VSI by examining its occurrence under various conditions, the impact of stimulus characteristics, and its manifestation in non-linear presentations. The first study revisits the traditional linear presentation of the VSI, introducing a novel approach by altering the position of the second flash. This study presented the second flash at the position of the third flash, out of sequential order, or at the midpoint between the first and last flash but not aligned linearly. Experiments showed that participants consistently misperceived the second flash as being near the midpoint between the first and third flashes, regardless of its actual position. This finding highlights the robustness of the VSI and suggests a specific neurological process that underlies this perceptual anomaly, setting the stage for further exploration of the VSI's underlying mechanisms. Second, the VSI is explored in two novel modes: expansion and contraction. Participants fixated on a central point while three stimuli flashed below the fovea in either an expanding or contracting sequence. Despite the actual size of the stimuli, observers consistently misperceived the second flash as medium-sized compared to the first and third flashes. Further analysis investigated whether stimulus duration or interstimulus interval (ISI) influenced the VSI. Results indicated that the VSI was observed regardless of these parameters, as long as the stimulus onset asynchronies were less than 184 ms. This finding suggests that VSI extends beyond linear presentations and opens avenues for exploring the illusion under various conditions. Together, these studies provide a comprehensive exploration of the VSI from multiple perspectives. They suggest that the VSI is not merely a perceptual anomaly but a complex phenomenon involving both low-level sensory processing and high-level cognitive interpretation. The occurrence of the illusion across different paradigms implies specific neural mechanisms that mediate the perception of continuity and equidistance in the visual field. The studies also highlight the importance of stimulus onset asynchronies in shaping the VSI's strength and nature. Future research could utilize neuroimaging techniques, like fMRI or EEG, to identify specific brain regions and networks involved in VSI perception. Additionally, exploring the VSI in populations with visual or neurological impairments could provide further insights into its neural and cognitive mechanisms.