**Predicted timing of sound influences ambiguous perception in the bounce/stream illusion**

Yuyeon Jung, Seyoon Song, Chai-Youn Kim

School of Psychology, Korea University

Previous studies have shown that our expectations can influence how we interpret ambiguous stimuli. For example, in the bounce-stream illusion, where two discs are perceived as either passing through or bouncing off each other, prior visual history influences perception, with increased trajectory switches enhancing the likelihood of perceiving "bouncing"(Grove et al., 2016). However, the role of temporal predictions in this process remains unclear. This study investigates how temporal predictive cues impact the perception of the bounce-stream illusion. A brief sound occurring near visual coincidence is known to enhance the likelihood of perceiving the discs as bouncing (Sekuler et al., 1997). To manipulate sound timing, stimulus onset asynchronies (SOAs) of 0ms (within the temporal binding window; TBW) and -300ms (outside the TBW) were used to create the two levels of the predictive condition. In this condition, predictive cues signaled when the sound would occur, allowing for the investigation of predictions in resolving perceptual ambiguity. Specifically, each SOA was paired with a fixation color (blue or pink of equal lightness), and these associations were established during the training session. In the main session, 75% of trials in the predictive condition presented sound at the predicted timing, while 25% were no-sound trials. The non-predictive condition followed the conventional bounce-stream illusion paradigm. In this condition, five SOAs (±300, ±150, 0ms) and no-sound trials were evenly distributed. Results showed that, in the absence of sound, 0ms predictive cues were associated with significantly greater bouncing perception compared to -300ms cues (p=.036) and marginally greater than non-predictive cues (p=.055). However, in conditions with sound, no significant differences were observed between predictive and non-predictive cues, suggesting that participants relied more on sensory information than expectations. These findings highlight the crucial role of expectations in resolving perceptual ambiguity, affecting the perception of either "bouncing" or "streaming.

Supported by NRF-2023R1A2C2007289