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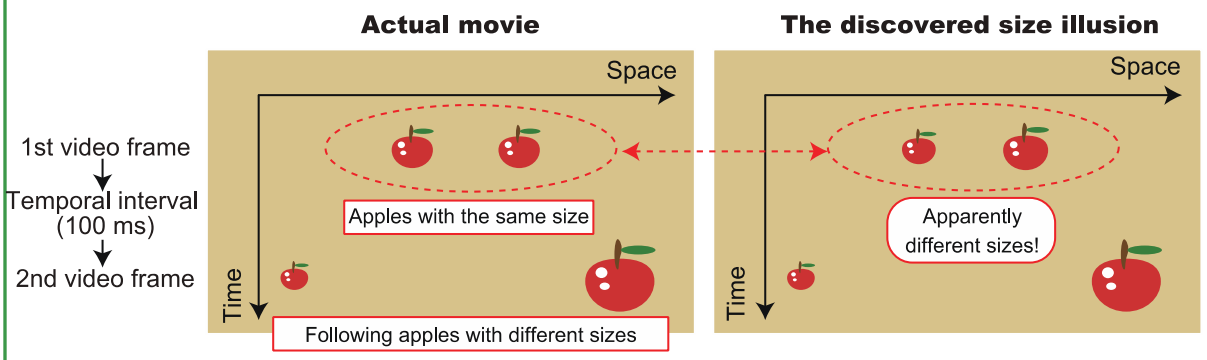
Future alters past

Postdictive processing in vision

***Abstract*— We demonstrate a novel visual illusion wherein the appearance of past events is altered by the appearance of future events. Human observers were presented a two-frame apparent motion of a flash; here we changed the size of the flash across frames. We observed that the size of the flash on the first frame was perceptually attracted toward the size of the flash on the second frame. The apparent change in the size of visual flash possibly stems from averaging of flash sizes on the basis of spatiotemporal integration of visual flashes. This sort of understanding of psychophysical mechanism for visual perception can contribute to future information technologies in a novel and user-friendly manner.**

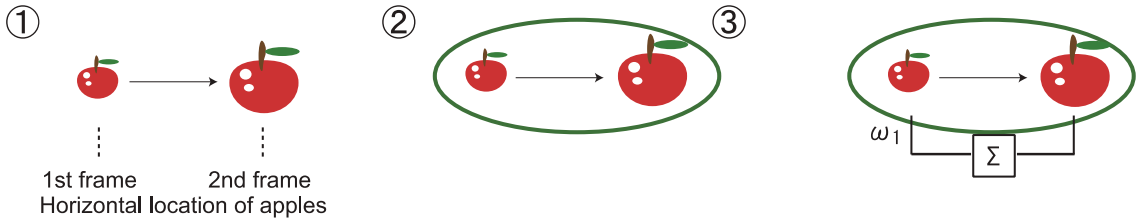
Appearance of past events modulated by that of future events



On the 1st video frame, two apples with the same size are presented. On the 2nd frame, two apples with the different sizes are presented peripherally. The observers are required to judge which apple in the 1st frame is larger.

Surprisingly, the size of the apples in the 1st video frame is perceived to be different! Specifically, the perceived size of the apples on the 1st frame is biased toward the size of the nearest on the 2nd frame.

Schematic explanation for putative mechanism



In the right side of the movie above, the rightward apparent motion of an apple is perceived.

In the brain, the representations of the apples on different frames are presumably integrated as a result of motion processing.

Under the integration, the brain tries to average the representations of the apples, resulting in the appearance modulation of the apples.

Related works

[1] T. Kawabe, "Nonretinotopic processing is related to postdictive size modulation in apparent motion," *Attention, Perception, & Psychophysics*, 73, pp. 1522-1531, 2012.
[2] T. Kawabe, "Postdictive modulation of visual orientation," *PLoS ONE*, 7(2): e32608, 2012.

Contact

Takahiro Kawabe Sensory Representation Research Group, Human Information Science Laboratory
E-mail : kawabe.takahiro{at}lab.ntt.co.jp (Please replace {at} with @)