

Title: Hearing melody modulates perceptual dominance of musical scores during binocular rivalry

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Two dissimilar images viewed dichoptically compete for perceptual awareness, with perception alternating spontaneously over time. Dubbed binocular rivalry, this phenomenon is a useful means for manipulating and thereby studying conscious visual awareness (Blake & Logothetis, 2002). Previous studies showed that information within other sensory modalities can influence perceptual dominance of related visual stimuli during binocular rivalry (Lunghi et al., 2010; van Ee et al., 2009; Zhou et al., 2010). The current study investigated the influence of audiovisual integration on binocular rivalry dynamics by exploiting auditory musical melodies and visual musical scores.

Observers viewed one of seven scores scrolling from right to left within a viewing window and a grating moving in the opposite direction dichoptically. On "congruent" trials, observers also heard the melody signified by the score; on "incongruent" trials, they heard a different melody from the one signified by the score; on "no sound" trials, only visual stimuli were presented. Observers were divided into two groups depending on whether they were instructed to read scores actively and rehearse the melody while tracking rivalry ("with instruction" group) or they were instructed simply to track rivalry ("without instruction" group). In addition, observers unable to read musical scores were also tested.

In both "with" and "without instruction" groups, musical scores predominated over the grating significantly more in "congruent" trials compared to "incongruent" or "no sound" trials, an effect driven by longer dominance durations on "congruent" trials. The instruction manipulation did not influence the difference between congruent and incongruent conditions. For participants unable to read music, auditory melodies had no effect whatsoever on binocular rivalry.

These results imply that learned associations between structured auditory information and abstract visual representations of that information can impact binocular rivalry dynamics.