

When acoustic stimuli turn visual circles into ellipses: sounds evoking accelerations modify visuo-motor coupling.

Thoret, E., Aramaki, M., Bringoux, L., Kronland-Martinet, R., Ystad, S.

In this study, we investigated the audiovisual integration of biological motions and in particular whether friction sounds evoking motions can modulate visuo-motor coupling. Visual processing of biological motions has been thoroughly investigated. Viviani (JEP:HPP, 1989) revealed that the perceived shape produced by the spotlight trajectory is influenced by the velocity profile. Hence, when a spotlight is moving with a velocity profile that does not comply with the  $1/3$  power law, for instance when it follows a circular trajectory with a velocity profile of an ellipse, i.e. accelerating on opposite sides of the circle, an elliptic shape is perceived. Inversely, a spotlight that follows an elliptic trajectory with a constant velocity profile seems to accelerate in the most curved parts of the ellipse (Viviani, JEP:HPP, 1992). From the auditory point of view, a recent study revealed that timbre variations of friction sounds produced when someone is drawing contain the information needed to recognize the  $1/3$  power law, and moreover to discriminate geometrical shapes to a certain extent (Thoret, JEP:HPP, 2014). Here, a first experiment confirmed visuo-motor interactions in visual open loop. A second experiment revealed that auditory perception of sounds evoking motions can strongly bias visuo-motor reproduction of geometrical and dynamical properties of a moving spotlight. These experiments showed that auditory perception modifies visuo-motor coupling. And overall, they revealed the role of auditory perception in the multisensory integration of motion in a new original fashion opening many theoretical and applicative perspectives.