

The relationship between temporal sensitivity and sense of agency

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ABSTRACT

Sense of agency refers to the feeling of being in control of one's actions and their associated outcomes. One important aspect of sense of agency seems to be the temporal grouping of sensory information. One previous study has shown that the time window of sense of agency is associated with individual differences in temporal sensitivity. The current study extends this knowledge by exploring how metacognition of agency in complex action-outcome relationship links to temporal sensitivity. Participants used a mouse to control a cursor along the bottom of the screen in order to either hit or avoid falling objects. The cursor either moved precisely in line with their movement, or with some delay (lag) or added movement (turbulence). We evaluated whether the impact of these manipulations on metacognition of agency, correlated with individual differences in temporal sensitivity (assessed by measuring temporal binding window using double-flash illusion task). We observed an association only during long lag manipulations. Here, in contrast to our predictions, we found that increased sensitivity of metacognition of agency was associated with a less precise temporal sensitivity. This suggests that the relationship between temporal sensitivity and sense of agency observed in previous studies is less prevalent in more complex action-outcome relationships where metacognition of agency is involved as here wider range of possible agency cues are present. That is, in the presence of other agency cues, metacognition of agency may depend more on these other cues than temporal sensitivity.

Keywords: Double-flash Illusion; Metacognition of Agency; Multisensory Integration; Temporal Binding