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An ideomotor illusion in the rubber hand illusion: when ideomotor processes participate to body awareness

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Introduction

The present study investigates the role of self-initiated movement and of the anticipation of its tactile consequences on the construction of a body awareness. The theoretical framework of this presentation is based on ideo-motor theories (James, 1890 ; Hommel, 2001) which postulates that controlling an action is based on the anticipation of its outcome. From a methodological point of view and to explore the construction of a body awareness, we used the Rubber Hand Illusion's (RHI) protocol (Botvinick & Cohen, 1998). The latter consists in stroking a false plastic hand, visibly placed before the participant, with paint brush. At the exact same time, the experimenter also strokes the participant's hidden real hand. Rapidly, when the fake hand and the participant's real hand are synchronously stimulated, a sense of ownership towards the false plastic hand is induced in the participant.

Until then, ideo-motor theories have never been used to explain this illusion and have been even less used to understand the mechanisms that underlie body awareness (sense of ownership and sense of agency). Our presentation will argue in favor of the use of these theories in this field of research and it will be based on a modified version of the RHI's procedure.

Method

In this regard, participants were all presented with a passive and an active version of the RHI (within-subject factor). During the passive version, participants only observe the experimenter stroking the fake plastic hand. In the active version, the participant strokes by himself the false plastic hand. The second modification of the RHI's procedure, applied for every participant, concerns the fact that the paint-brush stroking the fake hand is not actually really touching it, in sum there is only the intention of stroking the fake hand without contact. The strength of the induced illusion is measured through 1/ a questionnaire filled in by the participants 2/ the time to feel the illusion and 3/ proprioceptive drifts (i.e., the difference between the felt location of the participant's real hand before and after the induction in the illusion).

Results

The preliminary results (16 participants) seem to highlight the induction of a stronger illusion in the passive condition than in the active one. However, the most outstanding result is to have

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managed to induce an illusion in the illusion successfully. Indeed, a large majority of the participants reported that they were feeling as if the fake plastic hand was stroked from a distance, both in the active condition than passive condition.

Conclusion

This result confirms the hypothesis that ideomotor mechanisms are involved in the construction of body awareness. Indeed, anticipating the sensory effects of a movement on one's own body, even if there is no real sensory feedback towards the hand executing the stroking movement, is sufficient to create a sense of ownership towards the false plastic hand.

References

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