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## Enhancement of the Rubber Hand Illusion (RHI) by the touch-proprioceptive coupling: a self-initiated procedure of the RHI

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# Enhancement of Rubber Hand Illusion (RHI) by the touch-proprioceptive coupling: a self initiated procedure of the RHI



## INTRODUCTION

As defined by de Vignemont et al. (2005), body awareness is the sense that the body we live in is ours (sense of ownership) and that we are responsible of our actions (sense of agency). It can be investigated by the Rubber Hand Illusion (RHI) where the participants are under the illusion that a false hand become their own (Botvinick et Cohen, 1998) because an experimenter strokes synchronously the false and the participant's real hand. In the classical RHI the participant remains completely passive.

Gapenne (2014) postulated that proprioception through action is a fundamental factor in the construction of body awareness. Moreover, Varela et al. (1983) states that it is through action that human beings distinguish themselves from their environment both physically and psychically. In this optic, we created a new version of the RHI where participants self-initiated the strokes on the false hand.

**Hypothesis:** We hypothesized that self-initiated strokes on the false hand will create a touch-proprioceptive coupling which will create a sense of ownership but also a sense of agency towards the false static hand.

## PROCEDURE

### 3 experimental RHI conditions :

#### Asynchronous RHI

False and real hands are not stroked at the same time

#### Passive synchronous RHI

The experimenter strokes the false and the real hand at the same time

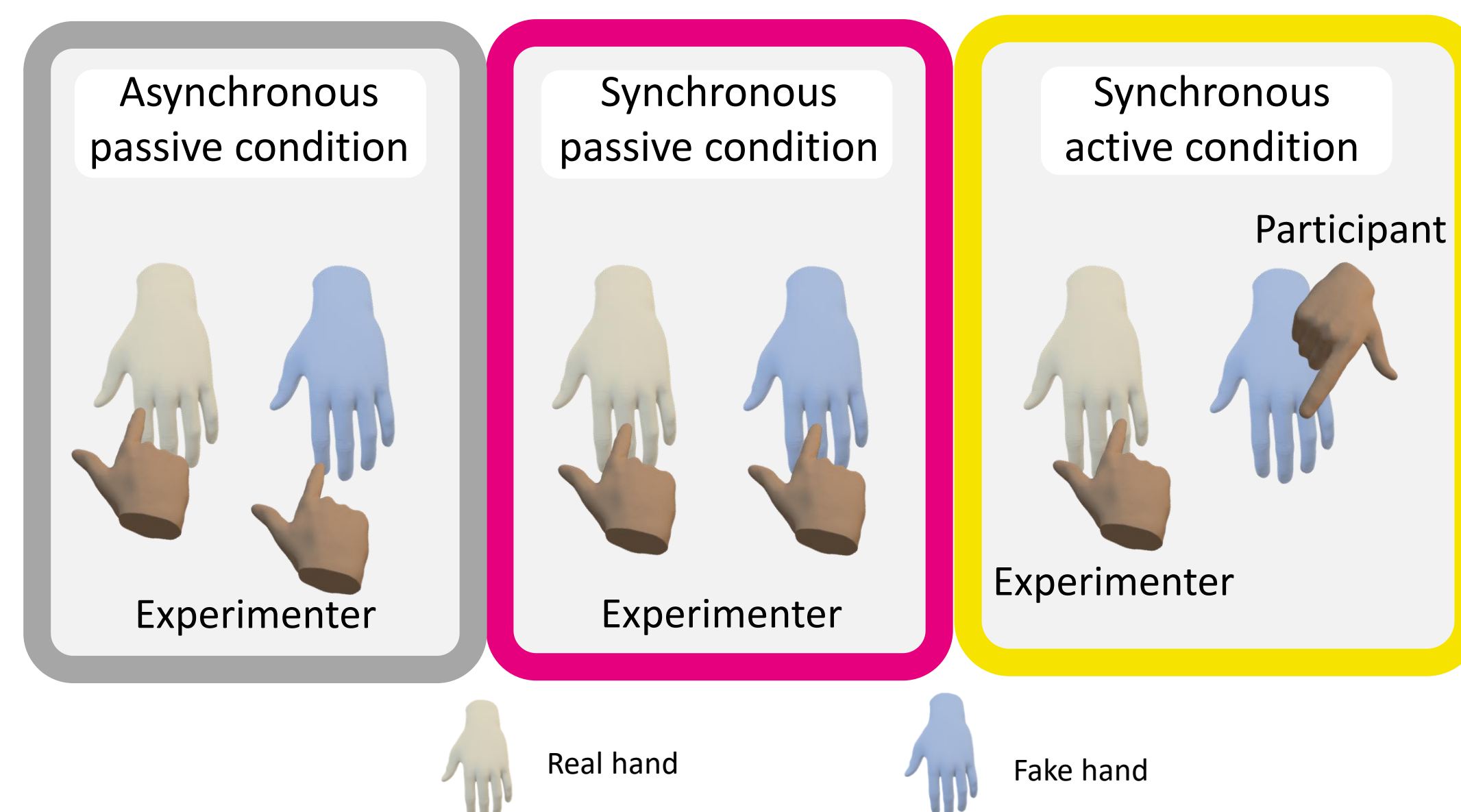
#### Active synchronous RHI

Participants stroke the false hand and the experimenter strokes the real one at the same

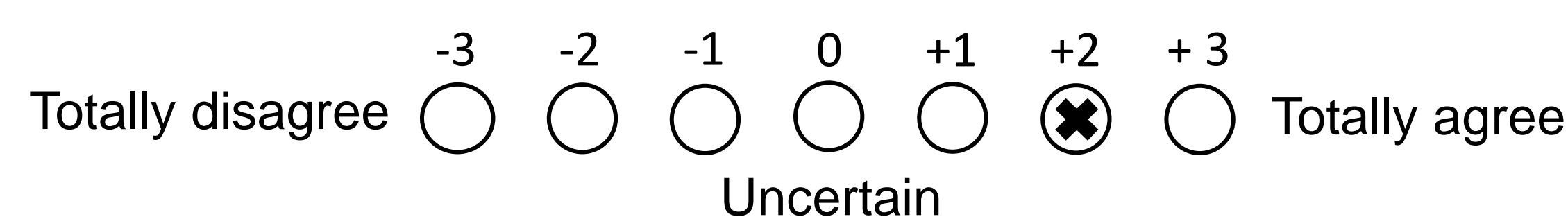
Participants respond to 4 categories of questions investigating body awareness: Q1: Ownership / Q2: Ownership Control / Q3: Agency / Q4: Agency Control

Participants respond on a 7 points scale (DV)

### Experimental design: S(36)\*RHI3\*Q4

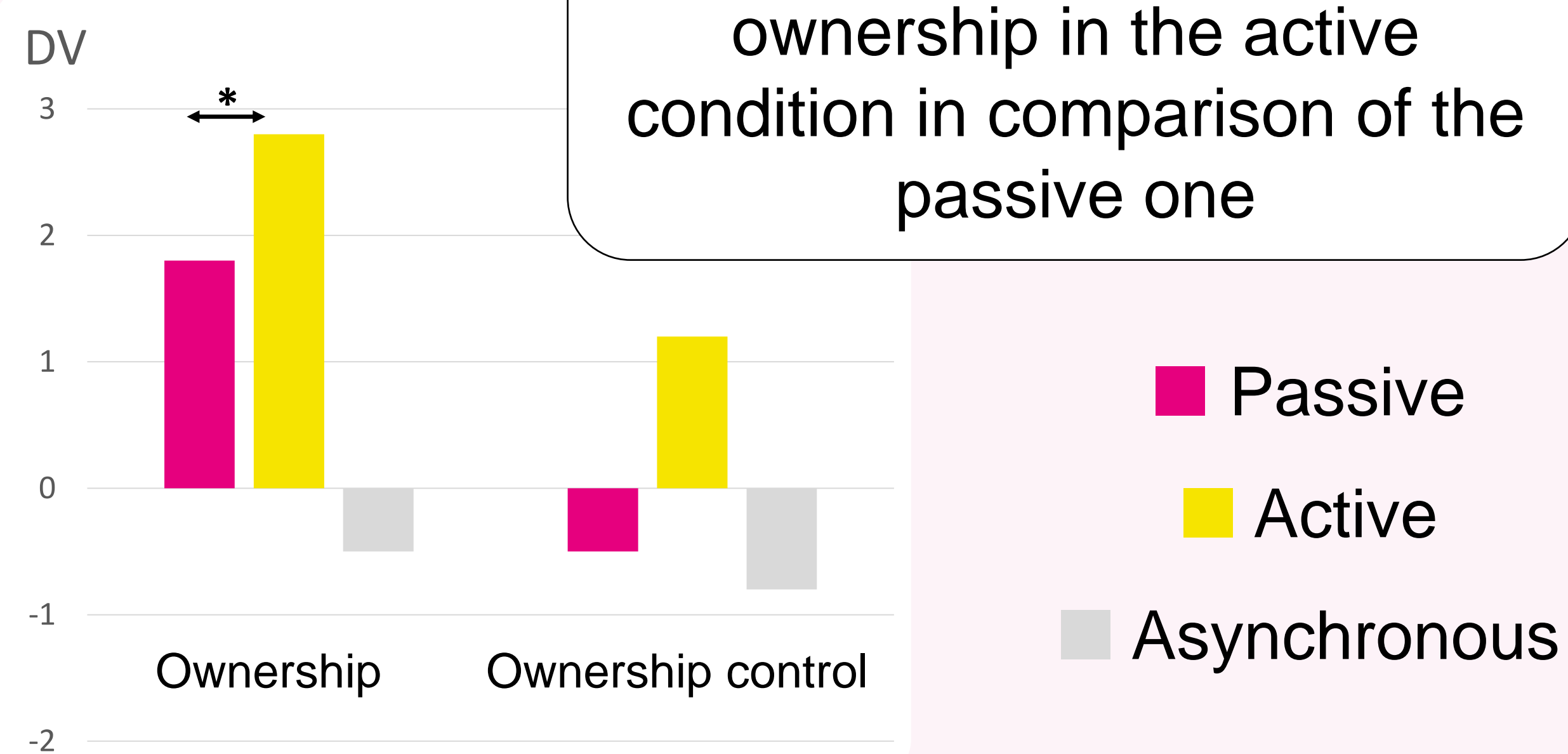


"I felt like I could have moved the false hand" (Q3: Agency)



## RESULTS

Enhancement of the sense of ownership in the active condition in comparison of the passive one



Creation of a sense of agency in the active condition but not in the passive one

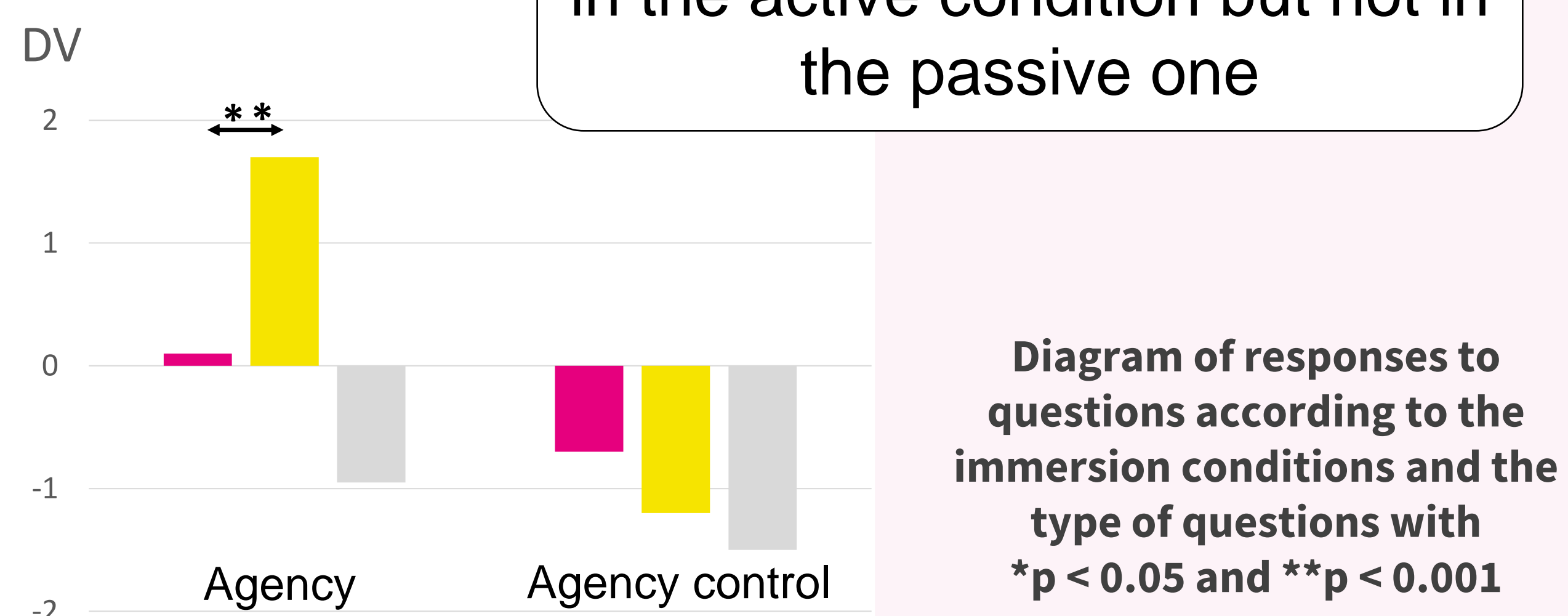


Diagram of responses to questions according to the immersion conditions and the type of questions with \*p < 0.05 and \*\*p < 0.001

## DISCUSSION

There is indeed a creation of a stronger sense of ownership in the active condition. Remarkably enough in the active condition there is a creation of a sense of agency toward a false inert hand. This latter result would mean that acting on this false hand would give it life. We could name it the **Frankenstein effect**.

It would therefore be through action (sense of agency) that we would come to life and define ourselves as an entity distinct from the environment (sense of ownership).

What do you think of the Frankenstein effect and its possible applications ?



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