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The impact of social contact on interoception in ecological conditions

Interoception refers to the ability to perceive our own internal states. It is crucial for physical integrity and for successful cognitive functioning, as it underpins decision making and emotion regulation¹. Recent research has shown that social contact allows adults to sharpen their interoception^{2,3,4}. However, previous studies investigated a strict and standardized type of social contact, **far from ecological situation**, and did not allow to determine if the use of social contact could improve interoception during real interactions.

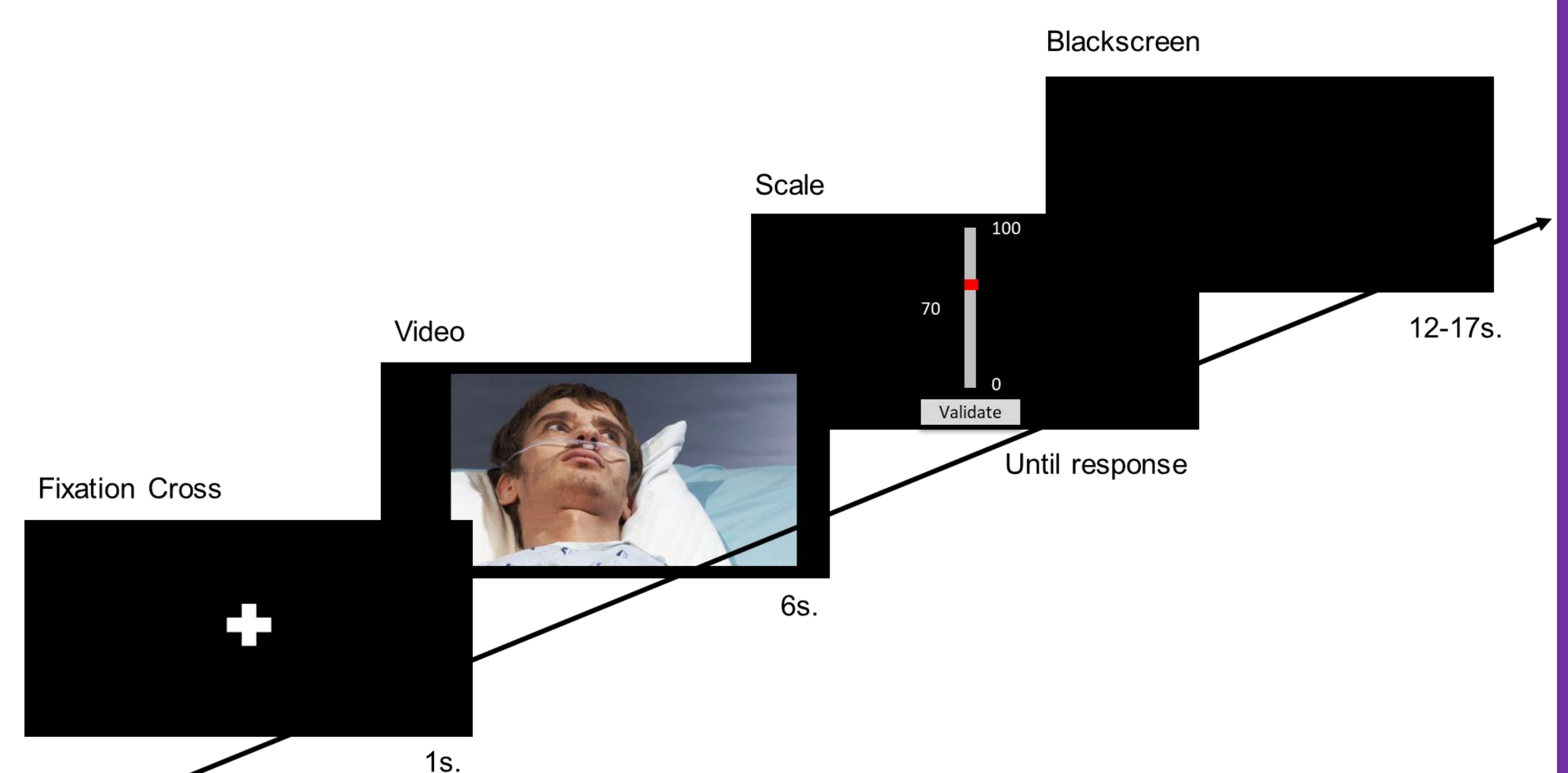
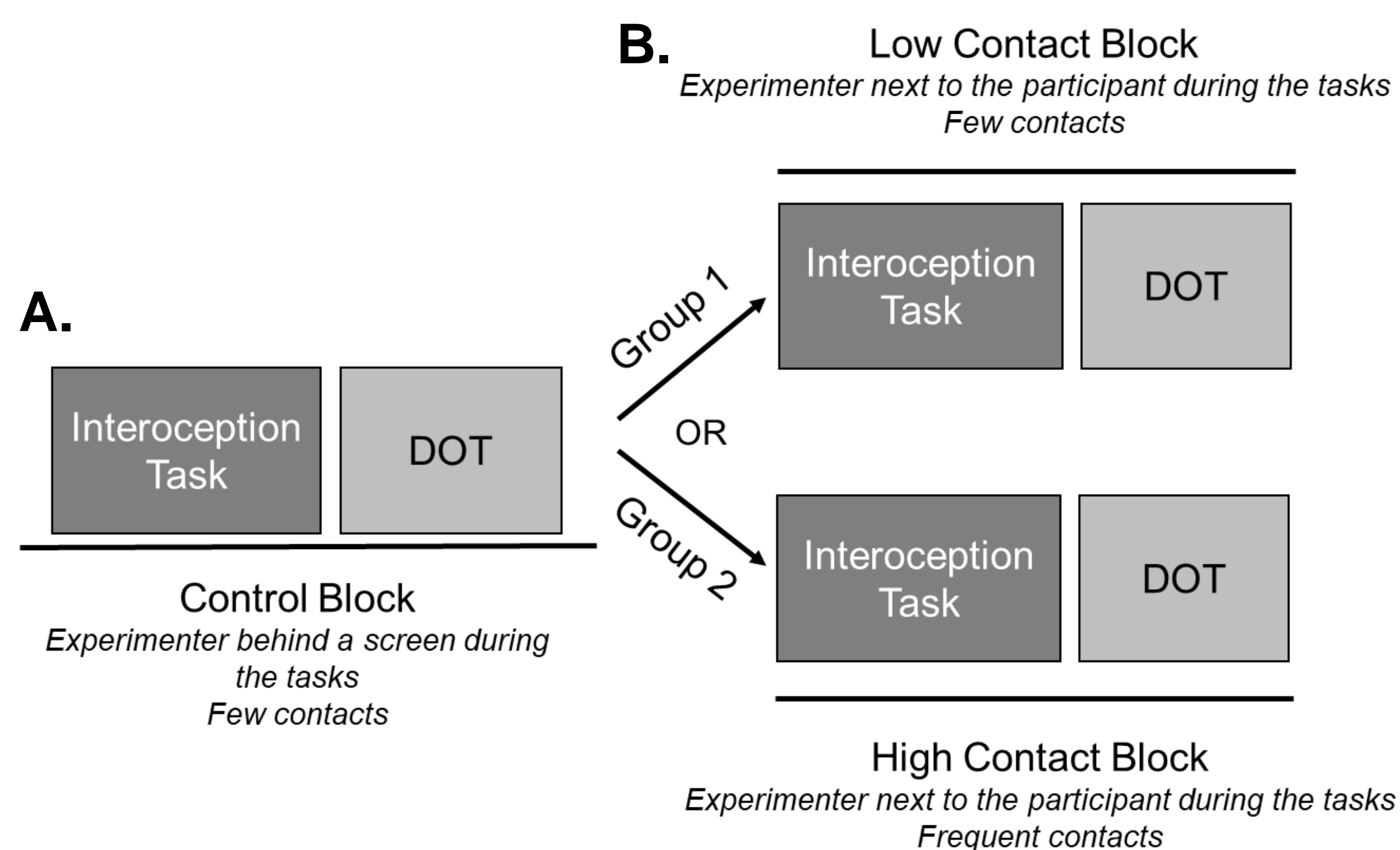
Aims: (I) Determine whether social contact, as performed in everyday life situation, can increase interoception and (II) determine if social contact impacts interoception, or cognitive ability in general.

Method

Two participant's groups will perform an **interoception task** by watching emotional videos and **rate the intensity of the physiological changes induced by each video** (see Fig. 2). Their skin conductance response (SCR) will be recorded. Both groups will first perform the task alone (Control Block), and then in the presence of the experimenter who will make more or less social contacts according to the group (High Social Contact vs. Low Social Contact Block) (see Fig. 1). Participants will also complete an implicitly measure cognitive abilities (The DOT Memory task), in order to determine if social contact improves interoception specifically or impacts cognitive abilities in general. Data will be collected as soon as the sanitary condition allows it.

Figure 1: Experimental design of the study. **A.** The Control Block is composed of the Interoception Task and the Dot Memory Task (DOT). The experimenter will sit behind a screen and make few contacts with the participant. **B.** Then, the participants will perform the Interoception Task and the DOT, either in the Low Contact Block, or in the High Contact Block. In the High Contact Block, the experimenter will make more frequent contacts with the participant between and during the tasks, compared to the Low Contact Block. In each block, the order of presentation of the tasks will be counterbalanced across participants.

Figure 2: Time course of an experimental trial in the interoception task. The durations are expressed in seconds (s.). After seeing an emotional video, the participant rates the intensity of his/her bodily reactions to the video, by moving the red cursor of the scale using the mouse. The rating provided by the participant is indicated on the left of a scale (going from 0 to 100). When ready, the participant has to click on « validate » to launch the next trial. A black screen lasting from 12 to 17 seconds allowed to the electrodermal response to return to its baseline level before the next trial. *The picture displayed in Figure 2 is one of the negative videos we used to induce emotion.*



Expected Results

As detailed below, we expect a specific effect of social contact on interoception, but a general effect of social presence on cognitive performances.

Figure 3 : Measure of interoceptive accuracy

We will compute the correlations between the participants' ratings and their SCR amplitude as a proxy of interoceptive accuracy. We will perform Fisher's r-to-z transformation in order to normalize the values. As depicted in Figure 3, we expect interoceptive accuracy to be higher in Low contact Block as compared to the Control Block, indicating that social presence increases interoception. Moreover, we expect interoceptive accuracy to be higher in the High than the Low Contact Block, indicating that social contact improves interoception.

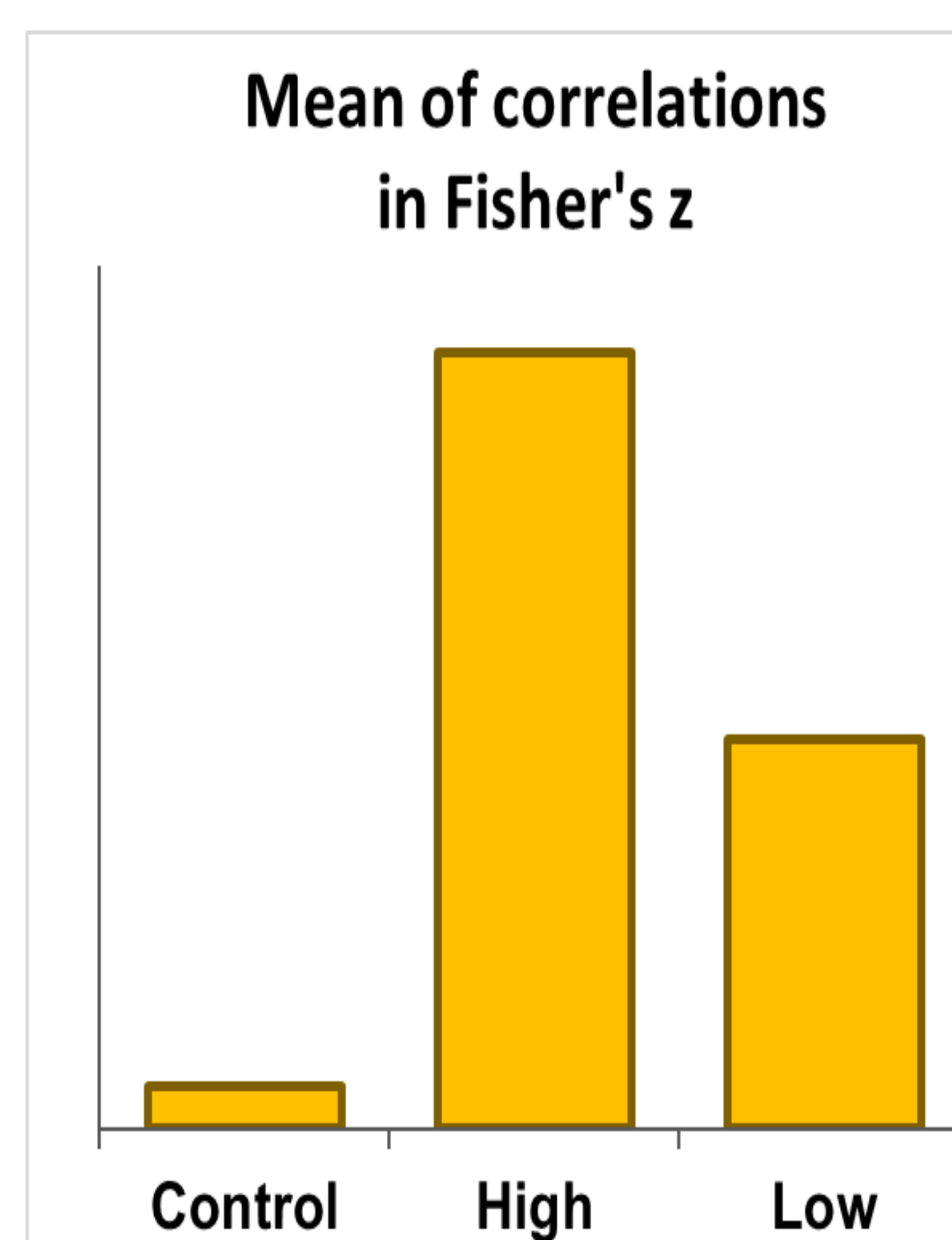
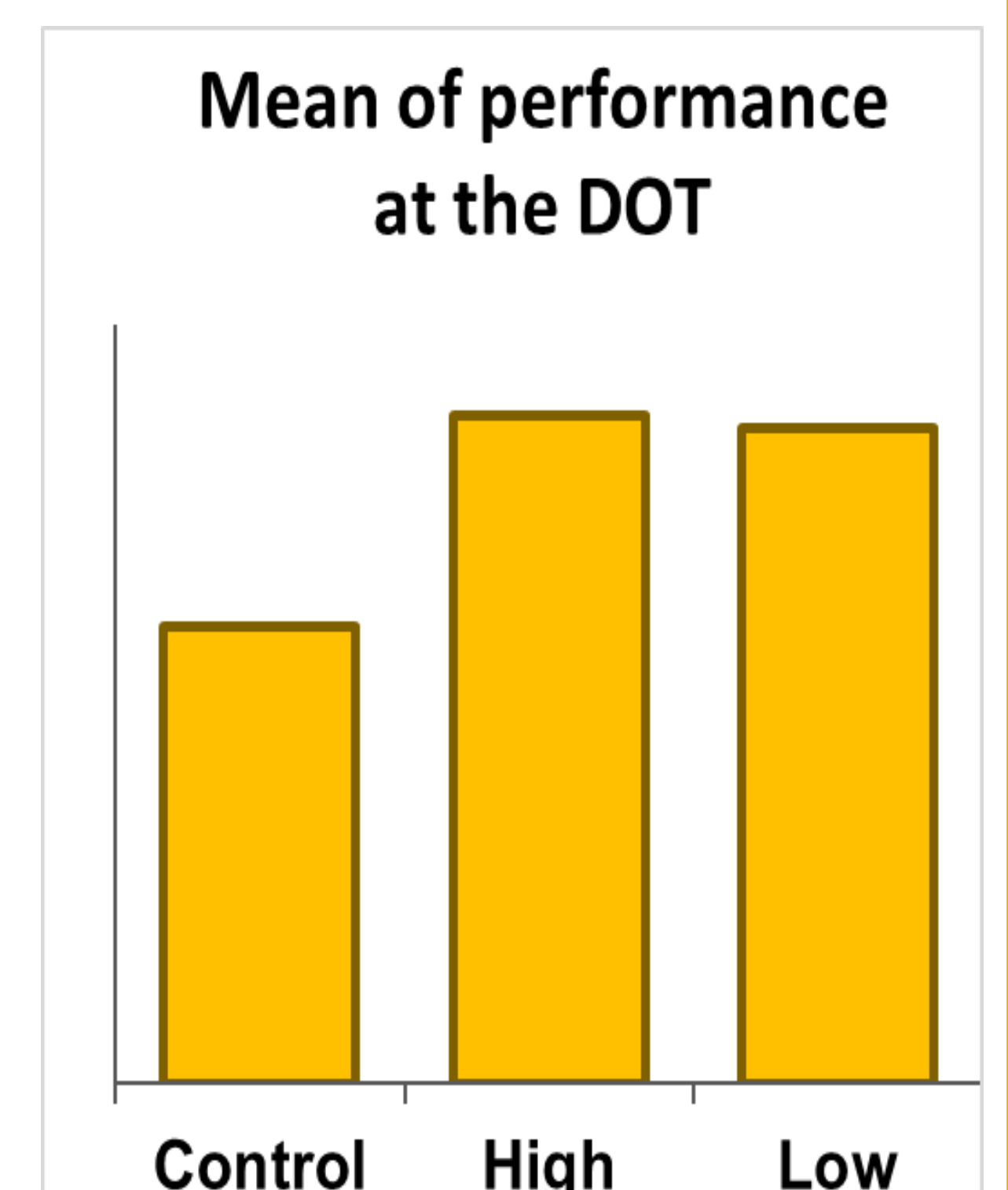


Figure 4 : Measure of spatial memory

We will calculate the average number of correct dots disposed in each matrix and the average number of matrix succeeded for each participant. As depicted in the graph, we expect both measures to be higher in the presence of the experimenter (High and Low Blocks) as compared to the absence of the experimenter (Control Block), indicating that social presence increases general cognitive abilities. However, we expect similar performances between the High and the Low Contact Block, indicating that social contact doesn't impact general cognitive abilities.



¹ Garfinkel SN, Seth AK, Barrett AB, Suzuki K, Critchley HD (2015): Knowing your own heart: Distinguishing interoceptive accuracy from interoceptive awareness. *Biol Psychol* 104:65–74.

² Baltazar, M., Hazem, N., Vilarem, E., Beaucousin, V., Picq, J. L., & Conty, L. (2014). Eye contact elicits bodily self-awareness in human adults. *Cognition*, 133(1), 120-127.

³ Hazem, N., George, N., Baltazar, M., & Conty, L. (2017). I know you can see me: Social attention influences bodily self-awareness. *Biol Psychol*, 124, 21-29.

⁴ Hazem, N., Beaudenaut, M., George, N., & Conty, L. (2018). Social Contact Enhances Bodily Self-Awareness. *Sci Rep*, 8(1), 4195.