



High obsessive-compulsive individuals may have attenuated access to internal cues associated with active movement: Evidence from a head repositioning study

Or Ezrati*, Eyal Sherman, Reuven Dar

School of Psychological Sciences, Tel Aviv University, Tel Aviv, Israel

ARTICLE INFO

Keywords:
OCD
Movement
Agency
Proprioception

ABSTRACT

Background and objectives: The Seeking Proxies for Internal States model of OCD posits that obsessive-compulsive (OC) individuals have attenuated access to their internal states. Consequently, they seek and rely on discernible substitutes for these internal states. Previous research has supported these conjectures. Other studies, using a variety of measures, reported a reduced sense of agency (SoA) in OCD. The current study aimed to connect these two bodies of research by focusing on internal signals associated with active movement, which are related to the SoA. We hypothesized that the performance accuracy of high OC participants would be similar for active and passive movements, while that of low OC participants would be higher when the movement is acquired actively.

Method: Participants with high vs. low OC tendencies were asked to reposition their head to a target angle that was acquired actively or passively. This was repeated with eyes blindfolded to evaluate reliance on visual information. Accuracy of repositioning was measured with a cervical range-of-motion device.

Results: As predicted, while low OC participants presented a significant decrease in their accuracy after passive (compared to active) acquisition, high OC participants' accuracy did not differ between acquisition types. Contrary to our predictions, reliance on vision was similar across groups.

Limitations: The generalization of our findings to OCD requires replication with a clinical sample.

Conclusions: This study implies that high OC individuals have a deficient access to internal cues involved in active movement. This might contribute to their doubt regarding their actions and to their reduced SoA.

1. Introduction

Doubt has been recognized as a key feature of Obsessive-Compulsive Disorder (OCD) (American Psychiatric Association, 2013), and has been suggested as a principal factor in the instigation of OC symptoms (e.g., Boyer & Liénard, 2006; Szechtman & Woody, 2004). According to the Seeking Proxies for Internal States (SPIS; Lazarov, Dar, Liberman, & Oded, 2012; Lazarov, Dar, Oded, & Liberman, 2010; Lazarov, Liberman, Hermesh, & Dar, 2014; Liberman & Dar, 2009), obsessive doubt is related to an attenuation of access to internal states (such as bodily states, preferences, emotions, proprioception) in obsessive-compulsive (OC) individuals. The SPIS model proposes that OC individuals resort to *proxies* to compensate for the attenuated access to their internal states. Proxies are substitutes for the internal state that the individual perceives as easier to monitor and discern, such as rules, behaviors, or environmental stimuli (Lazarov et al., 2014; Liberman & Dar, 2009).

In support of the SPIS model, previous studies have shown that

individuals high in OC tendencies (Dar, Lazarov, & Liberman, 2016; Lazarov et al., 2012) and OCD patients (Lazarov et al., 2014) have reduced access to certain internal states, including relaxation level, muscle tension and emotions. For instance, Lazarov et al. (2014) demonstrated that participants with OCD had larger errors when asked to reproduce a given degree of muscle tension, as compared with non-clinical and anxiety control participants. This difference was eliminated when participants were provided with biofeedback as an external proxy for this internal state.

The current study aimed to extend the SPIS model, and specifically the attenuation of internal bodily cues, to the field of agency. The sense of agency (SoA) is defined as “the registration that I am the initiator of my actions” (Synofzik, Vosgerau, & Voss, 2013). Agency experiences rely on successful integration and compatibility of predictive and postdictive authorship cues (e.g., Gentsch & Synofzik, 2014; Synofzik, Vosgerau, & Lindner, 2009; Synofzik et al., 2013). In the case of movement, predictive cues include the internal copy of the motor

* Corresponding author. School of Psychological Sciences, Tel Aviv University, Tel Aviv 69978, Israel.

E-mail addresses: orez@post.tau.ac.il (O. Ezrati), eyalsherman@mail.tau.ac.il (E. Sherman), ruvidar@tauex.tau.ac.il (R. Dar).

command and its associated outcome prediction (Synofzik et al., 2013, 2009; Tsakiris, Prabhu, & Haggard, 2006). Postdictive cues include external cues (e.g., seeing one's hand moving) and internal cues of proprioception (e.g., feeling the position and movement of one's hand) and interoception (e.g., re-afferent signals from muscle contraction). The integration of these cues leads to the formation of the SoA (Gentsch & Synofzik, 2014). The internal copy mentioned above (“efference copy”) is unique to movements resulting from the intention to move, i.e., active movement. When combined with an internal representation of the environment, the efference copy yields the outcome prediction (Wolpert & Flanagan, 2001). This prediction is then compared to postdictive information from the body and the environment and contributes to perceptual stability, enabling accurate guidance of behavior. In passive movements, in which no efference copy is produced, outcome predictions are much less informative than in active movements (Bays & Wolpert, 2007; Miall & Wolpert, 1996; Roy & Cullen, 2004), and therefore the SoA is diminished (Synofzik et al., 2013, 2009; Tsakiris et al., 2006).

If individuals with OCD have reduced access to their internal signals, as the SPIS model posits, the above considerations imply that this deficit should impair the processes leading to the SoA. Indeed, preliminary findings suggest a reduced SoA in OC individuals (Belayachi & Van der Linden, 2010; Gentsch, Endrass, & Kathmann, 2012; Oren, Eitam, & Dar, 2017, 2016; Rossi et al., 2005). Gentsch et al. (2012) examined event-related potentials during sensory attenuation (i.e., the suppressed perception of self-compared with externally-generated stimuli) in OCD and control participants. Sensory attenuation is believed to be correlated with the SoA, as it is assumed to result from the predicted sensory outcome of an action. In ERP data, sensory attenuation is presumed to be reflected in the suppression of the N1 component when perceiving a sensory outcome of a self-generated (compared with externally-generated) motor action stimuli. In Gentsch et al.'s study, the expected suppression of N1 was reduced in OCD participants. According to the authors, this finding suggests that individuals with OCD fail to predict and suppress the sensory consequences of their own actions, implying impaired efferent-based motor prediction in OCD. Rossi et al. (2005) findings regarding a similar phenomenon (sensory gating) allude to the same conclusion. Another marker of agency is the temporal binding effect, which relates to the subjective compression of the temporal interval between an intentional, active action and its external sensory outcome (Haggard, Clark, & Kalogeras, 2002; Buehner & Humphreys, 2009; Ebert & Wegner, 2010). Pertinent to the current study, Oren et al. (2017) recently found a decreased Intentional Binding effect in high OC individuals, compared to low OC individuals. Together, these findings support the possibility of attenuated access to efferent information in OC individuals.

The present study sought to address the attenuation of the internal precursors of SoA by exploring the differences between active and passive movement, which is highly relevant to the study of SoA (Haggard, 2008, 2017). Previous research found that proprioceptive accuracy is generally higher in active, compared with passive movement (e.g., Laufer, Hoeherman, & Dickstein, 2001; Lonn, Crenshaw, Djupsjo, & Pedersen, 2000; Paillard & Brouchon, 1968). This difference has been accounted for by elements available only in active movement such as the efference copy and re-afferent signals, which originate from peripheral muscle receptors known to respond selectively to active contraction and enhance proprioceptive acuity (Gandevia, McCloskey, & Burke, 1992; Gritsenko et al., 2007; Laufer et al., 2001; Proske & Gandevia, 2012). Thus, differences in accuracy between active and passive movement pertain to the presence of the internal precursors of SoA.

The current study aimed to explore the possibility that the deficient SoA in OC individuals stems from their attenuated access to internal cues, and specifically the efference copy of their motor action and the re-afferent motor signals. This was done by examining how participants with high and low OC tendencies rely on varying sources of information

when performing a motor task, particularly focusing on sources that are relevant to the construal of the SoA. To this end, we measured participants' accuracy in a head repositioning task (Loudon, Ruhl, & Field, 1997). In this task, participants' head is first rotated to a certain target angle and re-centered. Then, in the following test phase, participants are asked to relocate their head to the acquired target angle.

To test the hypothesis of attenuated access to internal cues relevant to SoA in OCD, we manipulated the acquisition of target locations, comparing active vs. passive acquisition. Based on prior findings, we predicted that participants' errors would be greater when the targets are acquired passively rather than actively. More importantly, we predicted that the two groups would be differentially affected by the two modes of acquisition. Based on the SPIS model, we assumed that access to internal cues typical of active movement would be attenuated in OC individuals, and hence we expected that their performance would be less sensitive to the type of acquisition.

We also sought to manipulate the availability of visual cues, as previous research has demonstrated increased reliance in OC participants on external “proxies” for internal states (Lazarov et al., 2012, 2014). Given the prominence of vision in spatial orientation, we hypothesized that participants' reproduction error would be greater when blindfolded compared with the unrestricted vision condition; and given OC individuals' increased reliance on external cues, we expected that they would rely more heavily on visual stimuli in order to reproduce the head rotation angle. Thus, we predicted the deterioration from the unrestricted to the restricted vision condition would be more marked in the high OC group.

2. Method

2.1. Participants

Fifty four participants were recruited for the study. The participants were students who had completed the Obsessive–Compulsive Inventory-Revised (OCI-R; see Materials below) prior to the experiment and scored in the top and bottom 25% of the distribution of responders. Four participants were excluded from the study because when they completed the OCI-R again as part of the experiment itself, their answers no longer placed them in the top or bottom 25% of the distribution. The remaining sample consisted of 24 low OC participants (61% women, mean age of 23.6, SD = 1.8, range: 18–26) and 26 high OC participants (73% women, mean age of 23.2, SD = 2.48, range: 18–31). All participants reported Hebrew as their native language and having normal hearing and normal (or corrected) vision. All participants signed an informed consent prior to participation, received payment or course credit for their participation and were fully debriefed after the completion of the experiment. The experimental protocol was approved by the Tel Aviv University Ethics Committee.

2.2. Materials

2.2.1. The Obsessive–Compulsive Inventory-Revised (OCI-R, Foa, Kozak, Salkovskis, Coles, & Amir, 1998)

The OCI-R lists 18 characteristic symptoms of OCD. Each symptom is followed by a 5-point Likert scale ranging from 0 (not at all) to 4 (extremely), on which participants indicate the symptom's prevalence during the last month. The OCI-R has been shown to have good validity, test–retest reliability, and internal consistency in both clinical (Foa et al., 2002) and non-clinical samples (Hajack, Huppert, Simons, & Foa, 2004). The participants completed the OCI-R in the screening phase and again in the last part of the experiment itself.

2.2.2. Apparatus

The cervical range-of-motion device (CROM Deluxe; Performance Attainment Associates, Roseville, Minnesota) was used to assess cervical angles. The CROM is a plastic device that is affixed to the head of

Download English Version:

<https://daneshyari.com/en/article/7267470>

Download Persian Version:

<https://daneshyari.com/article/7267470>

[Daneshyari.com](https://daneshyari.com)