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Distrust of the senses and its association with obsessive-compulsive symptoms

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ABSTRACT

Background and objectives: Leading cognitive theories of OCD suggests that despite prevalent and persistent doubt, individuals with OCD do not have perceptual deficits. An alternate cognitive theory, the Seeking Proxies for Internal States hypothesis (SPIS), proposes that sensory distrust in OCD stems from actual deficits in accessing internal states. Consistent with the SPIS, previous research has found that high-OC individuals were less accurate than low-OC individuals in producing target levels of muscle tension in a biofeedback task and that OC symptoms were positively associated with reliance on an external proxy.
Methods: The current study aimed to replicate and extend the SPIS hypothesis in two experiments using a modified version of the biofeedback-aided muscle tensing task using grip strength as the sensory input and a distance perception task. We contrasted the performance of undergraduate students self-reporting high- and low-OC symptoms.
Results: Overall, our findings failed to substantially support the SPIS hypothesis such that OC symptoms were not associated with deficient access to internal states of grip strength and distance perception or increased reliance on feedback.
Limitations: As this study was conducted in a non-clinical sample, we were unable to generalise our findings to a clinical population.
Conclusions: Findings are commensurate with the wider OCD literature suggesting the absence of cognitive and perceptual deficits in OCD individuals.

One of the primary features of obsessive-compulsive disorder (OCD) is the experience of pervasive and persistent doubt that does not reflect reality (e.g., 'I might be contaminated' or 'my door might be unlocked'; American Psychiatric Association, 2013). Individuals with OCD are compelled to alleviate the distress caused by these doubts by completing various compulsive behaviours such as repeated washing and checking. Obsessive-compulsive (OC) doubt is not only experienced in the context of typical OCD-relevant concerns such as contamination. Multiple studies have indicated that OC doubt can be about one's memory (Dar, 2004; Tolin et al., 2001), decision-making and concentration abilities (Nedeljkovic & Kyrios, 2007; Nedeljkovic, Moulding, Kyrios, & Doron, 2009), and sensory perception (Aardema, O'Connor, & Emmelkamp, 2006; Hermans et al., 2008; van den Hout, Engelhard, de Boer, du Bois, & Dek, 2008; van den Hout et al., 2009).

Recognising the centrality of doubt in OCD, recent cognitive theories have attempted to explain how obsessional doubts are maintained despite there being substantial contradictory evidence available in the environment (O'Connor, Ecker, Lahoud, & Roberts, 2012). Lazarov, Liberman, Hermesh, and Dar (2014) have recently presented one such cognitive model suggesting that distrust of sensory perception in OCD may stem from deficient access to all internal states, including cognitive (e.g., perception and memory), affective (e.g., attraction), or bodily (e.g., muscle tension). Deficient access to internal states is proposed to lead to difficulties in accurately experiencing and perceiving signals associated with these states. Consequently, the individual with OCD develops and relies on external proxies to compensate for this deficit by seeking

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externally verifiable and objective information. For example, an OCD patient with contamination concerns may develop washing rituals to serve as a proxy signalling to them that their hands are clean to compensate for deficient access to internal cleanliness cues.

This hypothesis, termed Seeking Proxies for Internal States (SPIS), is supported by data from a series of quasi-experimental studies utilising a magnitude production task involving varying levels of muscle tension, with biofeedback serving as the external proxy for muscle tension levels (Lazarov, Dar, Liberman, & Oded, 2012). Groups of undergraduate students reporting high and low levels of OC symptoms were asked to produce target levels of muscle tension. High-OC participants were found to be less accurate in producing the targets compared to low-OC participants during phases where biofeedback was initially unavailable. However, both groups performed equally well when biofeedback was introduced. Furthermore, high-OC participants were more likely to request biofeedback when viewing it was made optional. Similar findings have been found using muscle relaxation as the sensory input (Lazarov, Dar, Oded, & Liberman, 2010).

Most recently, these findings have been extended by comparing a clinical OCD group to a clinical control group diagnosed with non-OCD anxiety disorders and to a healthy control group (Lazarov et al., 2014). OCD patients were significantly less accurate than both the anxiety and healthy control groups when producing target levels of muscle tension without biofeedback. Introduction of the biofeedback eliminated this difference. OCD participants relied on this proxy more than the other groups as reflected by an increased tendency to request for the biofeedback. Based on these findings, proponents of the SPIS concluded that individuals with OCD not only have heightened distrust of their senses, but that this distrust may originate from and is maintained by a genuine deficiency in accurately perceiving their internal states.

However, this conclusion that individuals with OCD have deficient access to their internal states is in contrast to other popular cognitive theories of OCD. That is, these other theories assume that individuals with OCD are able to perceive reality correctly (Brown, Kosslyn, Breiter, Baer, & Jenike, 1994). For example, the cognitive appraisal model of OCD also posits that doubts play a central role in OCD pathology, but argue that these doubts are maintained due to maladaptive appraisals of doubts as revealing and threatening (Rachman, 2002; Salkovskis, 1989). Another cognitive model is the inference-based approach, which proposes that pathological doubts about reality are confused to be true via a state termed *inferential confusion* (Aardema et al., 2006; Aardema, O'Connor, Emmelkamp, Marchand, & Todorov, 2005; O'Connor & Robillard, 1995). Inferential confusion is characterised by maladaptive reasoning devices proposed to be exclusive to OCD that lend credibility to, or prevent disconfirmation of, the obsessional doubt. Proponents of this theory suggest that one such reasoning device is a tendency to distrust the senses, rather than an actual sensory deficit.

In sum, research testing out the predictions of the SPIS hypothesis is nascent and their key findings require replication, which is especially important given its differences with established cognitive models of OCD. Furthermore, as the SPIS hypothesis predicts that OCD is associated with deficient access to any internal state, their findings should be extended to sensory modalities and proxies beyond muscle tension and biofeedback. For example, we would expect that the formation of perceptual judgements, such as the individual's physical proximity to an object, would also require feedback from internal cues. As such, individuals with OCD would be expected to be poorer at judging their relative distance given a deficient access to these signals.

1. Study 1 – OC tendencies and access to internal states: grip strength production

The aim of Study 1 was to replicate and extend the results of Lazarov et al. (2014) using a paradigm similar to the biofeedback-aided muscle tensing task. That is, instead of instructing participants to produce target levels of muscle tension, we asked participants to produce target levels of grip strength. The choice of grip strength over muscle tension production was based on two important considerations. Firstly, Lazarov et al. (2014) had their participants tense their flexor carpi ulnaris muscle. This muscle contracts in the forearm when making a fist and would presumably be activated when gripping an object. As such, producing target levels of grip strength would be an extension of Lazarov and colleagues' (2014) existing paradigm that would allow us to test the robustness of their findings while still relying on similar physiological mechanisms.

Secondly, an alternative explanation of Lazarov and colleagues' (2014) results could be that individuals with higher levels of OC symptoms performed poorer on the task because of inherently elevated levels of doubt in OCD (Aardema, O'Connor, Pelissier, & Lavoie, 2009) that were exacerbated by their perceptions of the task as being difficult (given the unfamiliarity of isolating awareness to the flexor carpi ulnaris muscle). Experimentally increasing levels of doubt in healthy participants has been shown to produce a pattern of results on the muscle tensing task similar to OCD patients (Lazarov, Cohen, Liberman, & Dar, 2015). Therefore, we chose grip strength since participants would be presumably more familiar with and aware of their levels of grip strength and therefore experience less doubt regarding their performance.

In line with the SPIS hypothesis and consistent with previous research, we predicted that a group self-reporting more OC symptoms (high-OC) would be less accurate in estimating and producing target levels of grip strength compared to a group reporting less OC symptoms (low-OC) when feedback was initially unavailable. We also predicted that viewing the feedback would improve the performance of all participants, but that the performance of the high-OC group would improve more than the low-OC group. Furthermore, we expected that the high-OC group would be more likely to ask for feedback on their performance when given the opportunity to do so.

1.1. Method

1.1.1. Participants

Eighty-four undergraduate psychology students (females = 59, mean age = 19.35, SD = 3.34, range 17–43) at the University of New South Wales participated in exchange for course credit. Only participants scoring in the top and bottom quartiles of the Dimensional Obsessive-Compulsive Scale (DOCS; Abramowitz et al., 2010), a measure of OC symptom severity (outlined below), were included in our analyses. This use of non-clinical analogue samples in OCD research is appropriate for understanding OC-related phenomena (Abramowitz et al., 2014). The top and bottom quartiles of scorers were categorised as high- and low-OC, respectively. Our final sample consisted of 42 participants (31 females, mean age = 18.60, SD = 1.08, range 17–22): 22 high-OC and 20 low-OC participants. The mean score on the DOCS for the high-OC group (M = 25.32, SD = 8.25) approached the mean score for individuals diagnosed with OCD (M = 30.06, SD = 15.49) and was above the DOCS clinical cut-off score of 18 (Abramowitz et al., 2010). The mean score on the DOCS for the low-OC group (M = 3.60, SD = 1.93) was lower than the mean score for healthy individuals (M = 11.93, SD = 9.87; Abramowitz et al., 2010).