Obsessive-Compulsive Tendencies are Related to Seeking Proxies for Internal States in Everyday Life

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Abstract

Background and Objectives: In recent years we have proposed and investigated the Seeking Proxies for Internal States (SPIS) model of obsessive-compulsive disorder (OCD), which postulates that deficient access to internal states is a key feature of the disorder. According to this model, rules and rituals that often characterize people with OCD can be understood as proxies for deficiently accessible internal states. Here we compliment this earlier experimental work by examining whether reliance on proxies for internal states in everyday life is associated with OCD.

Methods: We developed an inventory for assessing reliance on proxies in everyday life and examined its relationship with obsessive-compulsive tendencies in two internet panel studies. The internal states included hunger, enjoyment, interpersonal liking, preferences, a sense of understanding, and intuitions about correct solutions to problems. The proxies included one's own behavior, the opinion of others, and objective indices such as grades and elapsed time since eating.

Results: In both studies, participants with obsessive-compulsive tendencies reported relying more on external, discernable proxies for a variety of internal states. These results remained significant after controlling for concurrent anxiety and depression.

Limitations: Our inventory is by necessity limited in its sampling of internal states and proxies and further correlational and experimental studies will be needed to examine additional areas of application, such as decision making and interpersonal liking.

Conclusions: These results are consistent with and expand the Seeking Proxies for Internal States (SPIS) model and may have implications for understanding and treating individual with OCD.

Keywords: obsessive-compulsive disorder, rituals, emotions, biofeedback.

1. Introduction

Obsessive Compulsive Disorder (OCD) is defined by the presence of obsessions (recurrent and persistent thoughts, urges, or impulses that the individual attempts to ignore, suppress, or neutralize) and/or compulsions (repetitive behaviors or mental acts that the individual feels driven to perform; American Psychiatric Association, 2013). However, there are many other features that have been found to characterize people with OCD. Obsessive-compulsive individuals tend to intensively monitor their thoughts and actions (Riesel, Endrass, Auerbach, & Kathmann, 2015; Yoris et al., 2017). Their behavior is often governed by rigid rules and procedures (American Psychiatric Association, 2013). They experience pervasive doubts (Dar, 2004; Samuels et al., 2017) and difficulty in making decisions (Frost & Shows, ,1992; Sarig, Dar, & Liberman, 2012). The complex phenomenology of OCD poses challenging questions for psychologists trying to understand it: What is the psychological mechanism that creates and maintains this complex phenomenology? What do these phenomena have in common? Do they serve a similar function?

Building on previous models of OCD (e.g., Boyer & Liénard, 2006; Shapiro, 1965; Summerfeldt, 2004; Szechtman & Woody, 2004), we recently proposed a comprehensive model of OCD, which we termed Seeking Proxies for Internal States (SPIS; Lazarov, Dar, Oded, & Liberman, 2010; Liberman & Dar, 2009). According to the SPIS model, a core feature of OCD is impaired access to internal states, which drives people with OCD to seek and rely on more easily discernable indices or "proxies" for those states. Internal states in this model are defined broadly, encompassing emotions and preferences as well as bodily states and sensations. For example, a person with OCD might find it difficult to gage his love for his girlfriend, and might use the length of their phone calls as an index for his feelings towards her. Another obsessive-compulsive (OC) person may review how long she has slept in order to infer how tired she is.

A number of theoretical accounts have postulated that OC individuals have reduced confidence in their memory and other cognitive functions, such as perception and decision making (Cartwright-Hatton & Wells, 1997; Nedeljkovic & Kyrios, 2007). The SPIS model builds on these accounts and extends them in two important ways: First, it postulates that OC individuals have difficulty accessing their *internal states* rather than their *cognitive functions*. Not all internal states are cognitive functions, and not all cognitive functions are internal states. For example, feeling love is not a cognitive function, and according to the SPIS model, people high in OC tendencies would have impaired access to their own feeling of love. Being conscious of the content of one's thoughts, on the other hand, is a cognitive function but is not an internal state, and the SPIS model predicts that OC tendencies would not be associated with reduced access to the content of one's thoughts. Second, we propose that OCD is characterized not only by reduced access to (and/or increased doubt in) internal states, but also by seeking proxies for these deficiently accessible internal states, as we now turn to elaborate.

When in need of information that they cannot readily access, people often use indirect indices, or in our terms, proxies for that information. For example, academic excellence is difficult to estimate, and therefore university administrators use the number of published papers or the number of citations as proxies for academic excellence. We propose that people with OCD likewise seek proxies for deficiently accessible internal states and that rules and rituals serve as such proxies. For example, a person who does not know if s/he understands what she reads might test her own memory of the text in order to decide on that question. As another example, a person who lacks a sense of which movies she likes, might develop a rule to always prefer European to American movies.

Unlike goals with clear end-states, goals with vague end-states do not afford a clear stopping signal. For example, action towards the goal of filling-up gas in one's car naturally terminate when the gas tank is full. But when should a person stop washing her hands, or securing her house? It has been

proposed that in order to terminate this type of actions, people often rely on feeling satisfied with what they have done (Liberman & Dar, 2009; Szechtman & Woody, 2004). Lacking access to their own state of satisfaction, however, might make it difficult for people with OCD to stop such actions, and drive them to develop rituals, which are fixed scripts with prescribed stopping rules. For example, instead of stopping when s/he feels that s/he washed enough, a person with OCD might develop a washing ritual that involves using hot water, applying soap three times and letting the water run for 30 seconds each time.

The SPIS model suggests, then, that to the extent that stopping an action is not governed by an easily discernable criterion (e.g., the gas tank is full) but rather by an internal state (e.g., the sense of having done enough), people with OCD would find it difficult to stop that action and would develop rituals and arbitrary stopping rules. Notably, the classic OCD domains of cleanliness, safety and morality often present people with avoidance goals that tend to have vague end-points. The SPIS model predicts, however, that a difficulty to stop and reliance on rules and rituals would manifest not only in these domains but also in many other goal-directed actions, inasmuch as stopping those actions requires reliance on internal states. The present article compliments our earlier experimental work by examining the SPIS theory in the context of such common, everyday-life experiences of seeking proxies for internal states.

Thus far, the SPIS model has been tested in the laboratory, with controlled experimental situations that introduced a need to access internal states. For example, a series of studies in our laboratory (Lazarov et al., 2010; Lazarov, Dar, Liberman, & Oded, 2011, 2012) used biofeedback as a proxy for the internal states of relaxation and muscle tension. Lazarov and colleagues (2012) asked participants to attain different levels of forearm muscle tension both with and without the aid of biofeedback. As predicted, high OC participants were as accurate as low OC participants in producing

the designated muscle tension levels when biofeedback was available, but performed significantly less well without the biofeedback. Similar results were obtained when relaxation rather than muscle tension was used as the internal state to be achieved (Lazarov et al., 2010).

Other studies showed that OC tendencies were related to reliance on relevant but false feedback in judging internal states. In Lazarov et al. (2011, Study 1), high and low OC participants were instructed to relax their forearm muscles while viewing false pre-programmed putative "biofeedback" on their muscle tension. Each participant underwent two successive phases of false feedback, one indicating gradual increase and one indicating gradual decrease in muscle tension. Following each phase, participants rated their perceived muscle tension. As predicted, high OC participants were significantly more influenced than low OC participants by the false biofeedback in evaluating their own muscle tension, indicating that they relied more on the (false) biofeedback proxy in gaging this internal state. Similar results were obtained when relaxation was the target internal state (Lazarov et al., 2010). Importantly, even more pronounced results were obtained with clinical OCD participants who were compared to both anxiety disorders and non-clinical controls (Lazarov et al., 2014). In both procedures, anxiety disorder participants did not differ from the non-clinical controls, demonstrating that reliance on proxies for internals states is specific to OCD and not attributable to anxiety.

Finally, a recent series of studies by Dar, Lazarov and Liberman (2014) examined the relationships between OC tendencies and performance on the Mayer-Salovey-Caruso Emotional Intelligence Test (MSCEIT; Mayer, Salovey, Caruso & Sitarenios, 2003; Palmer, Gignac, Manocha, & Stough, 2005). As predicted, OC tendencies were associated with lower scores on the Experiential area of the MSCEIT, which relies on access to experienced emotions, but not on the Strategic area, which relies on semantic knowledge about emotions.

The work described above examined internal states that lend themselves to laboratory investigation of causal effects. Indeed, with both the biofeedback procedures and the MSCEIT we found that an experimental manipulation that undermined people's confidence in their internal states produced a pattern of results resembling that of people high in OC tendencies (for biofeedback-aided relaxation see Lazarov et al., 2011; for biofeedback-aided muscle tensing see Lazarov et al., 2012; for MSCEIT see Dar et al., 2014, Study 3). But the construct of internal states is obviously broader and more clinically relevant than is captured in these studies, encompassing a rich variety of behaviors, sensations, emotions and preferences. Based on clinical experience, we believe that people high in OC tendencies struggle with a wide variety of internal states: a difficulty to access their own feelings of love, their esthetic preferences, their level of enjoyment during vacations, the sense of understanding what they have read. We thus set to explore whether seeking proxies for such personally important internal states in one's everyday-life experiences would be related to OC tendencies. To that end, we compiled a list of internal states, and tested the hypothesis that seeking proxies for these states would be related to OC tendencies. More specifically, we hypothesized that OC tendencies would predict reliance on proxies for internal states over and above any relation that anxiety and depression might have with this dimension.

2. Studies 1 & 2: Seeking proxies for internal states and OC tendencies

2.1 Method

2.1.1. Measures

The Seeking Proxies for Internal States Inventory (SPISI; see Table 1). Items for the SPISI were selected with the intention of representing a wide range of internal states and proxies for these states while keeping the inventory as concise as possible. Internal states include, among others, hunger, interpersonal closeness, preferences, and a sense of understanding, while proxies include one's own behavior, the

opinion of others, and objective indices such as grades and elapsed time. Items were based on clinical material from clients with OCD, and we chose ones that could be applicable to most potential responders. For example, we preferred the item “I know how close I am to someone by how often we interact” to an item that would more specifically tap intimate relationships among dating couples. Some items refer to specific states and proxies (e.g., "To know how hungry I am, I consider what and when I’ve eaten today") whereas others tap more general tendencies (e.g., "I look for rules that would tell me what I’m supposed to do").

An initial pool of 58 items was generated with the help of clinical psychology graduate students at Tel Aviv University who participated in a seminar on the SPIS model. We first eliminated all items with a Pearson correlation coefficient of less than 0.30 with the corrected scale total score. This procedure retained 28 items scale, with a Cronbach’s alpha coefficient of 0.86. The scale was shortened to its current version of 15 items using successive internet sample studies, a process that was guided by the aim of keeping the internal consistency high, avoiding redundancy in content, and eliminating items with the smallest correlations with the corrected total scale score.

Obsessive-*compulsive Inventory-Revised* (OCI-R; Foa et al., 2002). The OCI-R lists 18 characteristic symptoms of OCD. Each symptom is followed by a 4-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 English version of the OCI-R was translated to Hebrew (Study 1) and to Dutch (Study 2) using a back translation procedure. The Cronbach alpha of the Hebrew version of the OCI-R was .89 and corresponding value of the Dutch version the was .92.

The Depression, Anxiety and Stress Scales (DASS-21; Lovibond & Lovibond, 1995). The DASS-21 is a self-report measure of one-week state negative affect, with the specific aim of achieving maximal differentiation between the affective syndromes of depression, anxiety and stress. It is assessed across 21 items which determine the negative emotional symptoms experienced by the participant over the previous week. Items are scored on a 4-point Likert-type scale from "did not apply to me at all" to "apply to me very much, or most of the time". The factor structure of the DASS-21 is stable, and its scales possess good convergent and divergent validity and high internal consistency in clinical and in non-clinical samples and in different ethnic groups in adults (Lovibond & Lovibond, 1995). The English version of the DASS-21 was translated to Hebrew (Study 1) and to Dutch (Study 2) using a back translation procedure. The Cronbach alpha of the three scales in Hebrew ranged between .85 and .89, and the corresponding values of the Dutch version ranged between .89 and .90.

2.1.2. Participants

In Study 1 we administered the Hebrew version of the SPISI to 241 participants of an Israeli internet-based panel(Midgam; https://www.midgampanel.com/) who received a small fee for completing the measures described above. Participants in this panel constitute a fairly representative sample of Jewish-Israeli society in terms of geographical location, ethnic origin, level of religiosity, educational level and socio-economic status. Panelists were contacted via email and asked to participate in a short study in psychology; they were not given any additional information regarding the study. The sample consisted of 49.90% women and had a mean age of 41.8 years (SD = 13.4; range: 19-65).

In Study 2 the SPISI was translated to Dutch and administered to a representative sample of the Dutch population via an internet panel (LISS; Longitudinal Internet Studies for the Social sciences) administered by CentERdata (Tilburg University, The Netherlands). The LISS Panel is based on a true probability sample of households drawn from the population register of the Netherlands and as in the

Israeli panel, participants are paid for completing surveys. The initial request to participate was sent to 1588 individuals, of whom 1253 (78.9%) responded and all but eight completed the full battery (N = 1245). The sample comprised 54% women, with mean age 50.36 (SD = 17.76, range 16-77). In addition to the SPISI, participants in both panels completed the OCI-R and the DASS-21, in that order.

2.2. Results

In Study 1 (the Israeli sample), the mean of the SPISI (sum of the ratings) was 33.95 (SD = 9.37). Cronbach's alpha of the SPISI was 0.87, and item-total correlations ranged between 0.36 and 0.65. The Pearson correlation coefficient between the SPISI and the OCI-R was 0.56, 95% CI [.47, .64], and remained high (0.51, 95% CI [.41, .60]) after controlling for anxiety, depression and stress scores on the DASS-21 (Table 2). Among the OCI-R subscales, the correlations of the SPISI with all subscales were moderate to large and did not differ between them ($p > .05$). The correlations of the SPISI with the DASS-21 subscales were moderate and did not differ between them ($p > .05$). Sex differences did not reach statistical significance, $t(236) = 1.91$, $p = .06$, and there was no correlation with level of education. Age was mildly correlated with SPISI scores, $r = -0.20$, $p = .002$, 95% CI [.08, .32], such that older individuals received lower scores.

The results of Study 2 (the Dutch sample) were remarkably similar to those of Study 1 (see Tables 1 and 2). The mean of the SPISI was practically identical to the one obtained in the Israeli sample ($M = 33.9$, $SD = 9.62$). Cronbach's alpha of the SPISI was 0.86, and item-total correlations ranged between 0.40 and 0.61[1]. The correlation between the scale and the OCI-R was $r = 0.56$, 95% IC [.52, .60], again identical to the one obtained in the Israeli sample, and remained moderate ($r = 0.42$, 95% CI [.37, .46]) after controlling for anxiety, depression and stress scores on the DASS-21. As can be seen in Table 2, the SPISI was significantly correlated with all sub-scales of the OCI-R, with correlation

coefficients ranging between 0.26 and 0.41. There were no sex differences, $t(1251) = 1.03$, $p = .30$ and no correlation with education ($r = .008$). Age was mildly correlated with SPISI scores, $r = -0.17$, $p < .001$, 95% CI [.12, .22]; As in Study 1, older participants had lower scores on the SPISI.

The results of the two samples indicate that people high in OC tendencies, more than those low in OC tendencies, reported using a variety of proxies for different internal states: They reported turning to their actions to learn how they felt, deciding whether they are hungry based on what and when they have eaten, deciding whether they understood something based on whether they remembered parts of it by heart, deciding whether they enjoyed a vacation based on how much they managed to do, deciding on interpersonal closeness based on the frequency of interaction and deciding on what to wear according to pre-determined criteria. They also reported, more generally, using rules and others' opinions in problem-solving and in making decisions. It is perhaps worth emphasizing that in all these cases, an alternative to using these proxies exists, which is directly accessing one's level of hunger, enjoyment, understanding, and interpersonal closeness. Some people simply know by introspection whether they like someone, whether they understand a text they read, and whether they are hungry. According to the SPIS model and the results we present here, these people are not likely to have high OC tendencies.

The large number of participants in Studies 1 and 2 ($N_{combined} = 1486$) and the comparable results between these two samples enabled combining them in order to examine with a finer resolution the relations between OC tendencies and the SPISI scores. We divided the range of OCI-R scores into percentiles, and plotted the mean score of the SPISI by OCI-R percentile (Figure 1; a similar plot of each of the SPISI items is presented in Appendix A). Figure 1 reveals that the two groups with the highest OCI-R score (percentiles 80-90 and 90-100) show a particularly strong elavation in SPISI scores.

3. General Discussion

Two studies demonstrated that people with higher obsessive-compulsive tendencies tend to rely more on external, discernable proxies for a variety of internal states, including hunger, enjoyment, interpersonal liking, a sense of understanding, and intuitions about correct solutions to problems. These results are consistent with the SPIS model of OCD, according to which deficient access to internal states is a key feature of the disorder. These results are also consistent with clinical observations according to which OCD patients report a variety of problems that can be traced to insufficiently clear internal states, from difficulty to decide about partners and relationships (because they are not sure whether what they experience is love; Doron, Derby, Szepsenwol, Nahaloni, & Moulding, 2016), difficulty to evaluate and choose products, even after they start using them (because they are not sure whether they feel satisfied; Nestadt et al., 2016), and difficulty in experiencing intrinsic motivation (because they are unsure whether what they experience is true enjoyment; Liberman & Dar, 2009; Reed, 1985; Shapiro, 1965).

The present studies not only complement our experimental laboratory work on internal states and proxies for those states, but also point to directions for future experiments. For example, it would be interesting to examine in controlled laboratory studies whether OC tendencies would predict susceptibility to the effects of false feedback of one's level of arousal on participants' ratings of attractive targets (Stern, Botto, & Herrick, 1972; Valins, 1966). In the area of decision making, future experiments could seek to uncover which types of decisions pose a problem for people with enhanced OC tendencies, and what proxies they use in these situations. Would high OC tendencies be related to a failure to feel satisfied with one's decision (Schwartz, Ward, Monterosso, Lyubomirsky, White, & Lehman, 2002)? Would people with OC tendencies attempt to avoid decisions that are based on intuition (Norenzarayan, Smith, Kim, & Nisbett, 2002; Wilson & Schooler, 1991)? Would they seek more

decision-aids in the form of customer and expert reviews? These directions are implicated by items of the SPISI, but deserve closer exploration in designated studies.

3.1 Is deficient access to internal states necessarily a problem?

Deficient access to internal states would not necessarily pose a problem as long as one's life doesn't present one with a need to access internal states, or if the proxies one has for internal states are available and reliable. A problem does arise, however, when internal states are called upon and the proxies only partly reflect the state that they are taken to index. For example, in many (but not all) societies a person is expected to assess his or her feeling of love when deciding to marry his/her partner. How much time one spends talking to his/her partner over the phone is related but not identical to how much one loves his/her partner. A busy day at a faraway place with a bad phone connection might make one forego calling one's partner without necessarily indicating receding love. Relying on this proxy might not only be misleading, but could potentially be destructive to one's relationships.

3.2. Reduced access to internal states or reduced intensity of experience?

A high score on the SPISI suggests a difficulty to access internal states but does not tell us whether the states themselves are muted and therefore are difficult to access, or, alternatively, the states are intact and only access to them is deficient. Self-report questionnaires cannot tell these two possibilities apart and therefore we did not attempt to do so in the present set of studies[2]. Moreover, in many real-life situations, deficient access to internal states and muted intensity of those states would co-occur, because both would lead to intensified self-monitoring and reliance on proxies, which in turn would attenuate these very states (Radomsky, Dugas, Alcolado, & Lavoie, 2014; van den Hout & Kindt, 2003a). For example, research has found that participants who monitored their level of closeness to a conversation partner ended up feeling less close to the partner than control participants, who engaged in monitoring of an irrelevant state (room temperature; Shapira, Gundar-Goshen, Liberman, & Dar, 2013).

Returning to one of the SPISI items, a person who is busy creating mental lists of what he manages to do during a vacation in order to gage the extent to which he is enjoying the vacation is likely to undermine any spontaneous feeling of enjoyment that might have existed within him. Thus, in many situations deficient access and attenuated experiences reinforce each other, and the question which of them came first carries theoretical rather than practical importance.

3.3. Implications for treatment

Our studies show that difficulty to access internal states and the use of proxies for those states increase with OC tendencies, and are especially prevalent among people who score in the highest range of OC tendencies. Educating patients and clinicians about these theoretical constructs and their everyday life manifestations might be a useful step in cognitive-behavior therapy for OCD, as it would help the patient and the therapist to understand and draw a connection between seemingly unrelated behaviors (e.g., attempting to learn study material by heart and monitoring text messages to one's partner).

An important question for therapy is whether it is possible to help clients to access their internal states more reliably, and whether such intervention has the potential to reduce OC symptoms. We believe that the answer is positive, but at this stage we can only sketch some potential paths for addressing this issue in treatment. First, clients can be educated about the problems involved with relying on proxies for internal states, and encouraged to reduce their use. For example, clients could be invited to generate a variety of reasons why their partner might fail to call or maintain a long conversation. Naturally, many of these reasons would be unrelated to love, and might help to convince the patient that the length and frequency of phone calls is not a good proxy for love. A variety of interventions, including biofeedback training (for a review, see Schoenberg, 2014) and mindfulness/ acceptance-based techniques (for a review, see Norton, Abbott, Norberg, & Hunt, 2015) could then be used to help people develop a better sense of their own internal states, and subsequently reduce OC

symptoms. Of course, much further work needs to be invested in creating treatment protocols along these lines and in testing their efficacy.

4. Limitations

Although our results are based on large, representative samples of both Israeli and Dutch populations and although SPISI scores in these samples were especially high among the highest 20 percent of scorers of the OCI-R, we did not examine OCD patients and hence extending our findings to this population remains, at this point, speculative. It will be important to examine, in future studies, the SPISI scores of OCD patients and compare them to both patients with general anxiety disorders and with non-clinical control participants. We expect OCD patients to score higher on the SPISI than people in either of these control groups.

This last prediction notwithstanding, it is important to note that the SPISI does not capture many of the more idiosyncratic worries that may torment OC patients, such as “Am I a pedophile?” “Am I homosexual?” “Is my prayer sincere?” “Do I love my parents/sister/partner?” (e.g., Doron et al., 2016; Huppert, Siev, & Kushner, 2007, Nikodijevic, Moulding, Anglim, Aardema, & Nedeljkovic, 2015; Williams & Farris, 2011). Although these concerns do reflect reduced access to internal states, they are unlikely to apply to the general population, and hence were not included in the SPISI.

Finally, we should mention that the SPISI is based on self-report, a method that is limited by respondents’ ability to introspect about their problems. It is entirely possible, for example, that a person who lacks access to internal states (e.g., does not know when s/he is hungry) would score low on the SPISI simply because s/he does not know that about him/herself (e.g., uses proxies without noticing that s/he is doing that; thinks that s/he is continuously hungry). This is why it is important to develop, in addition to self-report measures, performance-based tests of accessibility to internal states (see, for example, Lazarov et al., 2011, 2012, 2014).

5. Conclusions

Two studies demonstrate that individuals high on obsessive-compulsive tendencies rely more on external, discernable proxies for a variety of significant, everyday life internal states. These results are consistent with the SPIS model of OCD, according to which deficient access to internal states is a key feature of the disorder. These findings connect the SPIS model to OCD phenomenology and may have important implications for our understanding of OCD as well as for improving psychotherapy for this disorder.

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Table 1: Items of the Seeking Proxies for Internal States Inventory (SPISI) and Their Correlations with the OCI-R in the two panels.

	Correlation with OCI-R	
	Study 1 (Israel, *N* = 237)	Study 2 (Netherlands, *N* = 1245)
I look for rules that would tell me what I'm supposed to do	.37	.31
Sometimes I have to infer my feelings from my own actions	.40	.28
To know how hungry I am, I consider what and when I've eaten today	.33	.33
I turn to others to know if I acted right	.24	.36
I find it difficult to form an opinion about a person without hearing other opinions	.29	.36
I need clear evidence to be sure what others think about me	.35	.34
I tend to consult others about daily decisions	.33	.44
To know if I have understood what I've read, I check to see if I remember parts of it by heart	.32	.42
When choosing, I prefer to use clear criteria rather than intuition	.22	.18
I would prefer to use a formula to solve a math problem even if I think I know the answer	.30	.24
Because I have difficulty deciding, I've developed fixed rules	.44	.46
I know how close I am to someone by how often we interact	.37	.24
I know if I've enjoyed my vacation based on how much I've managed to do	.31	.34
I choose what to wear based on pre-determined criteria	.36	.30
I am only sure I understand what I've studied if I receive a good grade on the exam	.33	.30

Note: responses are provided on a scale of 1("Not at all") to 5 ("Very much"). All correlation coefficients are significant at an alpha level of .001.

Table 2: Correlations of the SPISI total score with OCI-R and related measures

Measures	Study 1 (Israeli participants) *N* = 237	Study 2 (Dutch participants) *N* = 1245
OCI-R total	0.56*	0.56*
OCI-R total, controlling for DASS-21	0.51*	0.42*
OCI-R obsessing	0.42*	0.46*
OCI-R ordering	0.44*	0.47*
OCI-R hoarding	0.44*	0.35*
OCI-R washing	0.40*	0.40*
OCI-R neutralizing	0.40*	0.48*
OCI-R checking	0.43*	0.44*
DASS-21 depression	0.19*	0.37*
DASS-21 anxiety	0.24*	0.37*
DASS-21 stress	0.27*	0.40*
Age	-0.20*	-0.17
Education	0.06	-0.08

*$p < .0005$

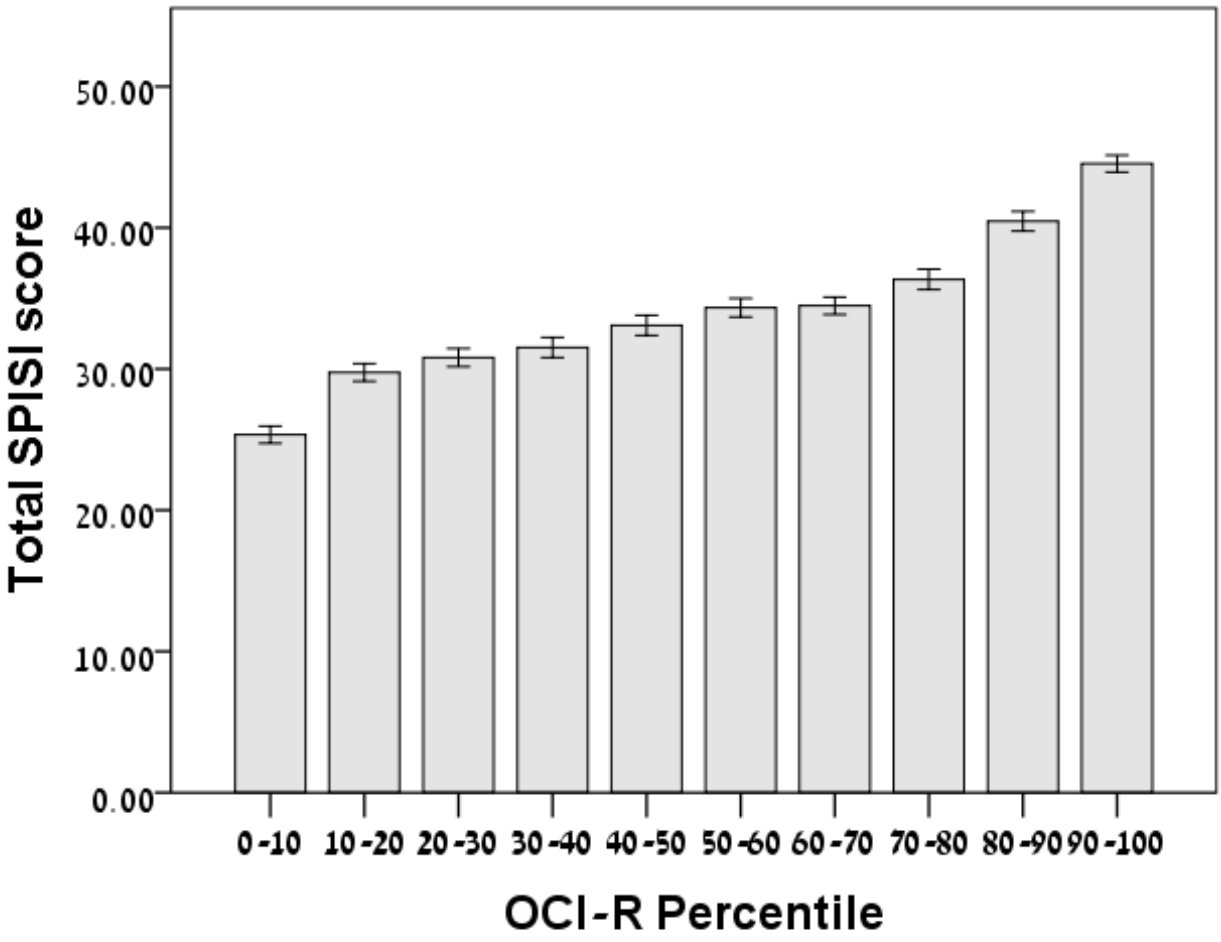

Figure 1. SPISI score by percentile score on the OCI-R

Footnotes

1. The English version of the questionnaire, the items of which are presented in Table 1, was administered to an online sample of 240 English speaking students in the UK (Oren, Liberman and Dar, under review, Study 2), and yielded a mean score (M = 34.70, SD = 11.03), internal reliability (alpha of .89) and item-total correlations (0.46 – 0.65) that were very similar to the ones obtained in the two studies reported here.

2. But see Lazarov et al. (2012) for a discussion of this question in the context of the sense of muscle tension.

Acknowledgments

We would like to thank Ela Oren for her help in developing the SPISI items.

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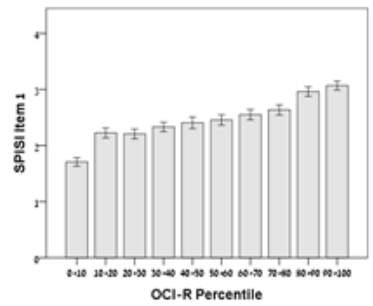
Appendix A. Means of individual SPISI items by percentile score on the OCI-R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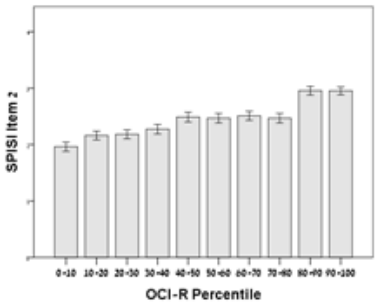
OCI-R Percentile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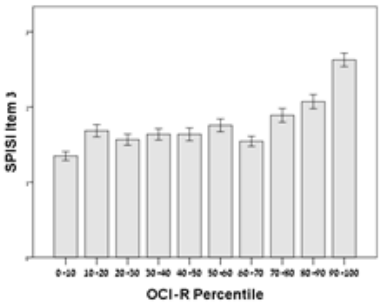
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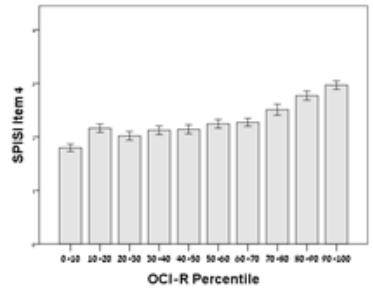
OCI-R Percentile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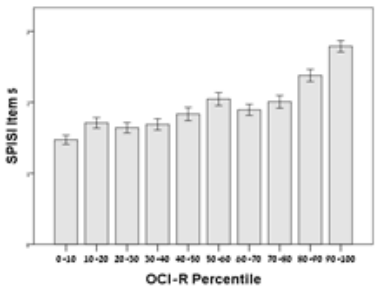
OCI-R Percentile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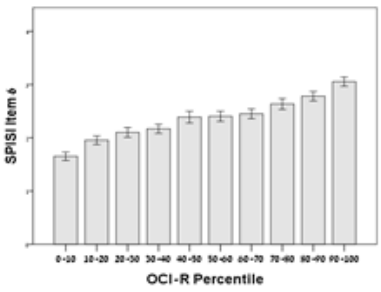
OCI-R Percentile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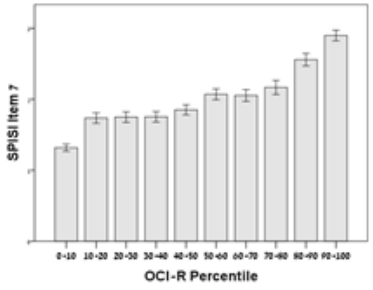
OCI-R Percentile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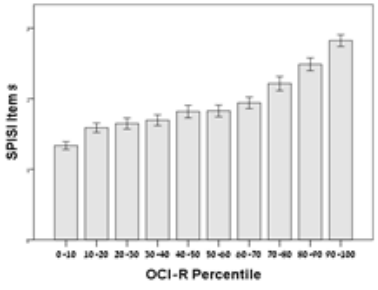
OCI-R Percentile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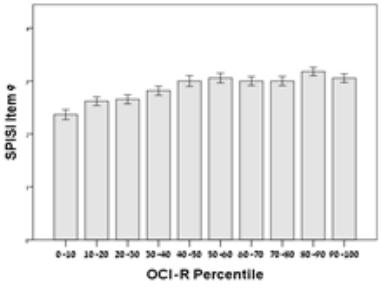
OCI-R Percentile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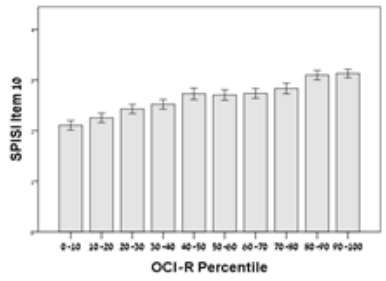
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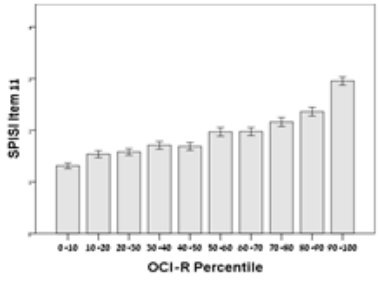
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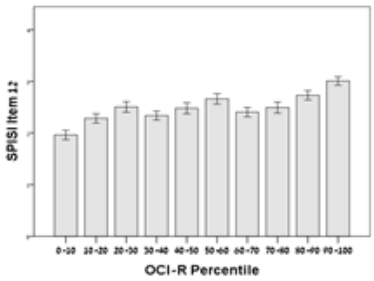
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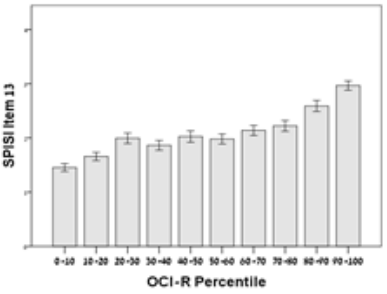
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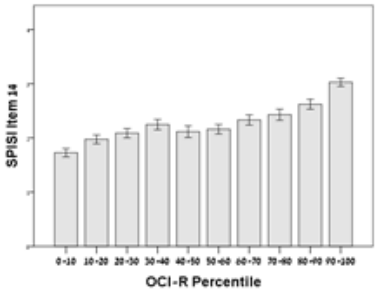
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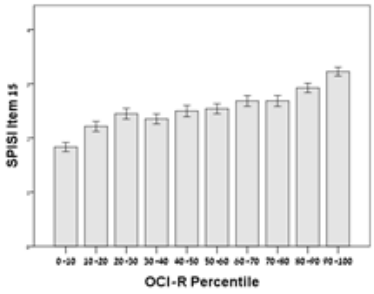
SPISI Item 15
OCI-R Percentile