

Research Article

Who Sees Trees Before Forest?

The Obsessive-Compulsive Style of Visual Attention

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ABSTRACT—*It has been suggested that individuals with obsessive-compulsive personalities tend to focus on small local details in their surroundings, whereas histrionic individuals are characterized by more global information processing. Using the global-local hierarchical-letters paradigm, we were able to provide support for the first but not the second hypothesis. Measures related to obsessive-compulsive personality disorder were associated with excessive visual attention to small details of the hierarchical letters. Specifically, the obsessive-compulsive cognitive style was associated with local interference, which reflects the effects of distraction by to-be-ignored small details on identification of global information.*

A fundamental assumption of cognitive approaches to personality and psychopathology is that individuals differ in their response to objectively similar situations because of differences in the way they process those situations. These differences can exist at many stages of cognitive processing, ranging from lower-level processes such as the initial detection of threat (e.g., Öhman, Lundqvist, & Esteves, 2001), to higher-level mental representations such as broad schemata of the self and of the world (e.g., Beck, 1976). Sometimes these individual differences in lower-level information processing occur primarily in the processing of affectively valenced information (for reviews, see Mineka, Rafeali, & Yovel, 2003; Williams, Watts, MacLeod, & Mathews, 1997). However, personality also has important effects on lower-level cognitive processing of non-affectively valenced information (e.g., Witkin & Goodenough, 1977), although this topic has been less frequently studied (but see Granholm, Cadenhead, Shafer, & Filoteo, 2002).

According to many theories of personality and cognition (e.g., Mischel & Shoda, 1999), individuals' characteristic ways of perceiving and thinking mediate their cognitive, emotional, and

social functioning; accordingly, the way individuals perform on certain cognitive tasks is associated with broader characteristics of their personality. Several early such theories (e.g., Gardner, Holzman, Klein, Linton, & Spence, 1959; Shapiro, 1965) were heavily influenced by psychodynamic theories of personality. For example, Shapiro (1965) described several patterns of perceiving and thinking that he argued to be typical of certain "neurotic styles" (e.g., "the obsessive-compulsive style," "the hysterical style"), and he suggested that these cognitive styles are the causal basis for the various cognitive, emotional, and behavioral characteristics that are associated with these pathological personality types.

Shapiro (1965) argued that obsessive-compulsive individuals' attention is active, intense, and sharply focused, particularly on small details. Consequently, these people perceive and apprehend their surroundings in a detailed and narrowed manner; for example, they "will notice a bit of dust or worry over some insignificant inaccuracy that, everything else aside, simply will not gain the attention of another person" (p. 27). In contrast, according to Shapiro, hysteric individuals' cognition is global in that it is impressionistic, lacking in sharpness and details, and easily drawn to whatever is vivid and striking. Shapiro based his theory on clinical observations and on psychological tests such as the Rorschach. Later conceptualizations of related cognitive styles were similar (e.g., Witkin, Goodenough, & Oltman, 1979). Shapiro's portrayals of hysterical and obsessive-compulsive neurotic styles roughly correspond to the contemporary histrionic and obsessive-compulsive Axis II personality disorders (HPD and OCPD, respectively) in recent versions of the American Psychiatric Association's (APA's) *Diagnostic and Statistical Manual of Mental Disorders* (DSM; APA, 1987, 1994).¹ Indeed, according to the fourth edition of the DSM, perfectionism and preoccupation with details characterize OCPD, whereas excessively impressionistic speech that lacks in details is a criterion for HPD (APA, 1994).

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¹It should be noted that OCPD and obsessive-compulsive disorder (OCD—an Axis I disorder) are separate and quite different disorders. Briefly, people with OCPD do not have true obsessions or compulsive rituals such as those seen in OCD, and the two disorders do not co-occur in a majority of cases.

The current study examined the basic features of attention described in Shapiro's (1965) characterizations of the obsessive-compulsive and the histrionic cognitive styles. To do this, we used Navon's (1977) now-classic global-local paradigm for the study of hierarchical visual attention, which seems to offer an appropriate operationalization of these cognitive characteristics (i.e., global vs. local visual attention). The basic assumption that underlies the global-local paradigm is that any visual scene can be thought of as composed of a hierarchical network of subscenes that are interrelated by spatial relationships (Kimchi, 1992). The globality of any of these subscenes depends on the place it occupies in this hierarchy. Thus, properties at higher levels are more global than those at lower levels, which are in turn more local. For example, a car has some global properties (e.g., shape, color), but it also has some local components (e.g., wheels, a license plate), each of which can be considered global in relation to its own component parts (e.g., the figures on the license plate).

Navon's (1977) global-local paradigm addresses this issue in an elegant way (for a review, see Kimchi, 1992). The stimuli in this paradigm are figures (e.g., letters) that are constructed by suitable displays of smaller figures. The two types of figures in these hierarchical stimuli are equally complicated and identifiable, and neither can be predicted by the characteristics of the other (see Fig. 1a). The bigger and smaller figures differ in their relative size, but more important, they differ in their globality, or their relative placement in the aforementioned hierarchy (Navon, 1977). Thus, the larger figure is the global level of the hierarchical stimulus, whereas the smaller figures are its local level.

In the focused-attention global-local task used in the current study (based on Navon, 1977, Experiment 3), participants were asked to focus their attention on one of the levels (global or local) of each of a series of hierarchical letters and to decide on each trial which of the two target letters (*H* or *T*) was present in that prespecified level (e.g., the global), while ignoring the other level (e.g., the local). Thus, the task included two parts; for each part, only one level of the stimuli (i.e., the global or the local) was relevant. For example, in the global part of the task, the correct response for a big *H* made of small *T*s was "H," whereas in the local part, the correct response for this same stimulus was "T." In each part, three types of stimuli were used (see Fig. 1a): a *consistent type*, in which the same target letter appeared at both the global and the local levels; an *inconsistent type*, in which different target letters appeared at the two levels; and a *neutral type*, in which the unattended level (e.g., local in the global part of the task) was not a target letter.

Two well-established attentional effects are typically reported with this task (Kimchi, 1992; Fig. 1b illustrates these effects). First, participants identify the letter more rapidly when the global rather than the local level is relevant. This is the *global-precedence* effect. Second, when the two levels of the hierarchical stimulus are inconsistent and the local level is relevant, a

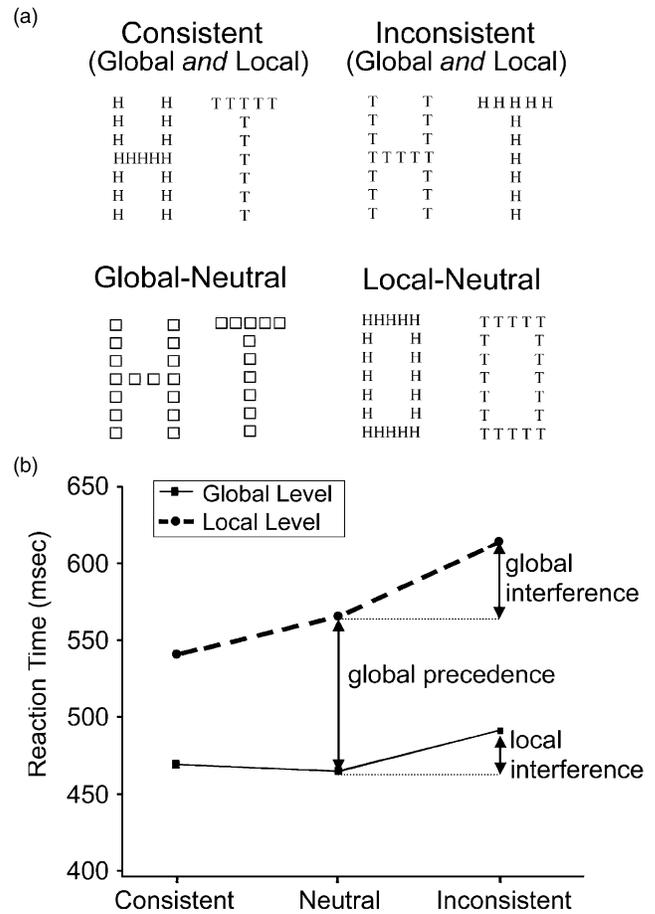


Fig. 1. Examples of the stimuli (a) and average response latencies (b) in the six conditions of the global-local task. The target letter was always *T* or *H*. In the consistent and inconsistent conditions, the stimuli were the same for the global and local conditions. In the neutral condition, the stimuli for the global and local conditions differed, as shown. Stimuli are not drawn to scale. The three attentional effects of interest are labeled in the graph of reaction times. These indices were used in the correlational analyses examining the relation between the personality measures and attention to global and local visual information.

robust Stroop-like influence of the global on the local level is typically found (Kimchi, 1992). This is the *global-interference* effect. Both effects reflect that the global level is more salient than the local level—that the "forest" is more salient than the "trees." Therefore, both effects seem directly related to Shapiro's (1965) histrionic global cognitive style and inversely related to the obsessive-compulsive cognitive style (see Dickman, 1985; Maynard & Meyer, 1996).

A third attentional effect that is sometimes reported in the global-local task is the *local-interference* effect, which is the Stroop-like effect that occurs when participants attend to the global level of the hierarchical stimuli but are distracted by the small inconsistent letters at the unattended local level. Although the magnitude of this effect depends on certain features of the task (e.g., the relative salience of the two levels; cf. Yovel, Yovel, & Levy, 2001), it is typically smaller than the magnitude of the global-precedence and global-interference effects.

Therefore, this effect has rarely been reported in cognitive experiments, which usually study a relatively small number of participants (but see Paquet & Merikle, 1984). Nevertheless, the phenomenon that the local-interference effect measures, the extent to which local small details of stimuli (the trees) interfere with the processing of their global aspect (the forest), seems directly related to Shapiro's (1965) obsessive-compulsive cognitive style.

The effects observed with the global-local paradigm have been previously linked to several personality traits (e.g., Compton & Weissman, 2002; Granholm et al., 2002). For example, Granholm and his colleagues (2002) recently showed that schizotypal personality disorder is associated with global processing advantage. However, as far as we know, only Dickman (1985) and Maynard and Meyer (1996) specifically examined Shapiro's (1965) obsessive and histrionic cognitive styles using this paradigm. Both these studies used speeded card-sorting versions of the focused-attention global-local task, but neither supported Shapiro's hypotheses. One possible explanation is that the card-sorting version of the global-local task was simply not sensitive enough to detect the personality-related effects, and another possibility is that one or both of Shapiro's hypotheses is incorrect. However, a third possibility is that both these studies failed to detect the obsessive-compulsive style of visual perception because they examined only the more robust global-precedence and global-interference effects, but not the local-interference effect, which better operationalizes this style of visual perception.

Why are the global-precedence and global-interference effects nonideal measures of the obsessive-compulsive style? One reason is that they are assessed at least in part during the local phase of the task, when participants are being asked to attend to the local level of the hierarchical stimuli. It is possible that the attention of obsessive individuals is easily drawn to small details, so compared with other people, they identify the small letters more quickly but also tend to dwell on these details for a longer period of time before responding. Thus, the obsessive-compulsive cognitive style may be associated with both speeded and slowed responses to local information that cancel each other out. This issue becomes irrelevant during the global phase of the task, when the task is to identify the global big letter. Under these conditions, any process that may result from enhanced attention to the to-be-ignored small letters will increase the magnitude of interference. Thus, the local-interference effect can be regarded as an unambiguous measure of the detail-oriented obsessive-compulsive style of visual attention. Similarly, the global-interference effect, which is measured when participants need to attend to the small local letters and ignore the big letter, is the clearest operationalization of the global histrionic cognitive style. According to this logic, the global-precedence effect, which is based on performance on both the global and the local phases of the task, is not the optimal measure of either cognitive style. Thus, we predicted that scores

on OCPD-related scales would correlate with the local-interference effect, and that scores on HPD-related scales might correlate with the global-interference effect.

The personality measures we used were taken from the Schedule for Nonadaptive and Adaptive Personality (SNAP; Clark, 1993), which is a self-report inventory designed to assess maladaptive traits that are relevant to DSM personality disorders. The SNAP seemed particularly suitable for the current correlational investigation in a nonclinical population because it is based on a dimensional approach that assumes a continuum between normal and abnormal personality. The reliability and validity of the SNAP have been confirmed in both clinical and nonclinical populations (e.g., Clark, 1993; Morey et al., 2003). For example, a recent study that examined the relationships between the traits measured by the SNAP and the symptomatology of several personality disorders (including OCPD) in a large group of patients showed that the SNAP scales were significantly related to structured-interview-based diagnoses of these disorders (Morey et al., 2003). Furthermore, these scales were able to distinguish patients diagnosed with these disorders from several comparison groups, including patients with other personality disorders, depressed patients, and nonclinical individuals. On the basis of these findings, Morey and his colleagues suggested that individuals with OCPD can be portrayed as perfectionists and workaholics and that HPD is associated primarily with exhibitionism.

METHOD

Participants

Participants were 89 (56 females) undergraduate students at Northwestern University who participated in the study as part of their research participation requirement. Ten participants were excluded from the data analyses because of high error rates ($n = 5$) or extreme index scores ($n = 5$) in the cognitive tasks (see details in Results). All the analyses were based on the remaining 79 participants.

Personality Measures

The SNAP (Clark, 1993; Clark, Vorhies, & McEwen, 2002) is a 375-item self-report inventory designed to assess maladaptive traits that are related to personality disorders in the revised third edition of the DSM (DSM-III-R). The SNAP includes trait scales and diagnostic scales. Both types of scales show adequate levels of internal consistency and test-retest reliability in clinical and in nonclinical populations (Clark, 1993; Morey et al., 2003).

The SNAP trait scales assess primary trait dimensions relevant to Axis II personality disorders (Clark, 1993; Clark et al., 2002). In this study, five SNAP trait scales relevant to HPD and OCPD were administered (cf. Clark, 1993; Morey et al., 2003): *Exhibitionism* (relevant to HPD) contains 16 items and taps the

dimension of overt attention seeking versus withdrawal from the attention of other people; *Impulsivity* (relevant to HPD and inversely to OCPD) contains 19 items and reflects the tendency to act on a momentary basis, without an overall plan, versus the tendency to think and plan before acting; *Entitlement* (relevant to both HPD and OCPD in the same direction) contains 16 items and measures unrealistically positive self-regard and feelings of being someone who should be treated as a special person; *Propriety* (relevant to OCPD) contains 20 items and measures the dimension of traditional, conservative morality versus rejection of social rules and conventions; *Workaholicism* (relevant to OCPD) contains 18 items and taps individual differences in the tendency to perfectionism and self-driven motivation toward hard work and excellence versus the tendency to take a more relaxed attitude toward work and accomplishments.

The SNAP diagnostic scales are based on the criteria for the DSM-III-R Axis II personality disorders (APA, 1987), and each criterion of each disorder is measured by two or three items. Two SNAP diagnostic scales were administered, the 20-item scale that assesses HPD and the 23-item scale that measures OCPD. Clark (1993) reported that the correlations (r) of both these scales with structured-interview-based clinical ratings of these disorders in a mixed patient sample were .53 and .57, respectively. For both personality disorders, no correlation with any other SNAP scale or clinical rating score was higher. Thus, both scales show adequate convergent and discriminant validity.

A total of 107 items from the SNAP were administered in the current study (some items are included in more than one scale).

Apparatus

The cognitive task was presented using a Macintosh Performa computer and 14-in. monitor (60 Hz), running the PsyScope program (version 1.1; Cohen, MacWhinney, Flatt, & Provost, 1993). Responses were recorded through a button-pressing response apparatus (New Micros Inc., Dallas, TX).

Procedure

The first phase of the experiment was an individual session in which participants completed the computerized global-local task. They viewed the stimuli from a distance of 45 cm, which was controlled by a chin rest. The stimuli were black hierarchical letters (i.e., big letters made out of suitable arrangements of small letters; Navon, 1977) that appeared on a white background. Each of the small letters was about 3 mm wide (visual angle of 0.38°) and 3.5 mm high (0.45°), and the big letters were about 25 mm wide (3.18°) and about 38 mm high (4.83°).

A two-choice response task that included two parts was used. In each part, participants were asked to focus their attention on one of the two possible levels of the hierarchical stimuli (i.e., the global or the local) while ignoring the other level. Three types of stimuli were presented in each part of the task (see Fig. 1a): (a) In consistent stimuli, the same target letter (H or T) appeared at

both the global and the local levels; (b) in inconsistent stimuli, different target letters appeared at the global and the local levels (i.e., the global letter was T and the local letters were H s or vice versa); and (c) in neutral stimuli, the figures at the unattended level (local in the global condition and global in the local condition) were not target letters but rectangular shapes. In the global part of the task, the neutral stimuli were a big T and a big H made out of small rectangular shapes, and in the local part of the task, the neutral stimuli were rectangles made out of small H s or small T s. Thus, six different types of stimuli were presented in each part of this task.

Each trial commenced with a beep sound and a fixation cross that appeared at the center of the screen for 500 ms. The fixation cross was immediately followed by the stimulus, which was presented for 100 ms at one of four possible locations. The medial edges of the stimuli were 6 mm (0.76°) above or below the horizontal midline and 12 mm (1.53°) to the right or to the left of the vertical midline. On each trial, participants needed to identify the letter presented at the relevant level (e.g., global), while ignoring the other level (e.g., local), by pressing the suitable response key.

At the outset of each part of the task (global or local), participants performed 24 practice trials. The experimental phase consisted of 42 trials in each part (each of the six stimuli was presented seven times). The order in which the stimuli were presented and the order of the locations in which they appeared were fully randomized within each part. The order of the global and local parts of the task was counterbalanced across participants.

In the second phase of the study (1–7 days later), participants completed the questionnaires in small groups of up to 15 participants. Afterward, they were thanked and debriefed.

RESULTS

Attentional Effects Across Participants

The average reaction times (RTs) for the six conditions were the dependent measures. The mean error rate was 3.0%. The data of 5 participants whose error rates exceeded 10% were excluded from the analyses. For all participants, only trials with correct responses were included in the analyses. The first trial of each part of the task and RTs faster than 250 ms and slower than 1,500 ms were excluded (approximately 0.5% of all trials; Ratcliff, 1993). All subsequent analyses were based on these trimmed means.

Analyses across participants confirmed that the study replicated the well-established global-precedence effect (local neutral vs. global neutral), $t(78) = 11.90$, $p < .001$, $d = 1.35$, and the global-interference effect (local inconsistent vs. local neutral), $t(78) = 8.32$, $p < .001$, $d = 0.94$ (Navon, 1977; see Fig. 1b). In addition, because of the relatively large number of participants, the smaller local-interference effect (i.e., slower latencies in the global inconsistent condition than in the

global neutral condition) was significant, $t(78) = 5.71, p < .001, d = 0.65$.

Personality and Cognitive Performance

For each participant, we computed three different indices. The global-precedence effect was the difference between the local neutral and global neutral conditions; the global-interference effect was the difference between the local inconsistent and local neutral conditions; and the local-interference effect was the difference between the global inconsistent and global neutral conditions (see Fig. 1b). In order to minimize the influence of outliers on the correlational analyses, we excluded from the analyses 5 participants who had extreme index scores (i.e., more than 3 standard deviations from the average index score across participants).

Results for the local-interference index supported Shapiro's (1965) portrayal of the obsessive-compulsive cognitive style: This index correlated significantly with the SNAP diagnostic scale of OCPD ($r = .33, p < .005, d = 0.70; df = 77$ for all correlations). A closer examination of the correlation between the OCPD scale and the local-interference index suggests that this relationship followed a linear trend across the entire range of OCPD scores (see Fig. 2). In addition, the local-interference index correlated significantly with two of the SNAP trait scales: Workaholism ($r = .27, p < .02, d = 0.56$) and Entitlement ($r = .32, p < .005, d = 0.68$). These relationships between OCPD-related scales and the local-interference index indicate that participants who scored highly on these personality measures were particularly distracted by the small local details of the hierarchical letters when required to identify the big letters at the global level. None of the scales correlated significantly with the global-precedence or the global-interference index (see

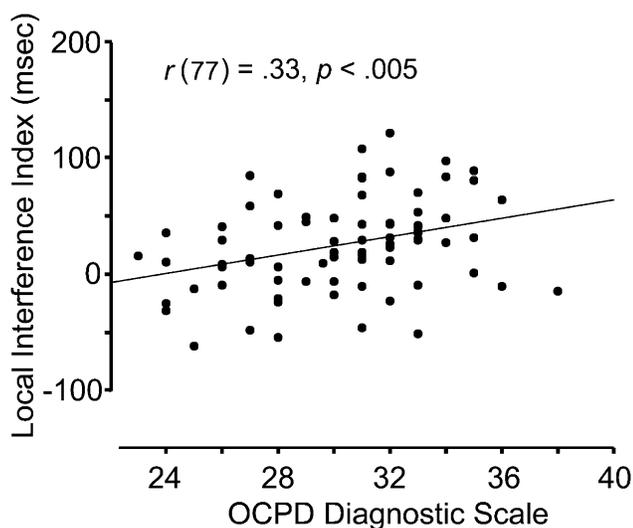


Fig. 2. Scatter plot depicting the correlation between score on the Obsessive Compulsive Personality Disorder (OCPD) diagnostic scale and the local-interference effect.

TABLE 1

Correlations Between the Personality Scales and Attentional Effects

SNAP scale	Global precedence	Global interference	Local interference
HPD	.06	.04	.19
OCPD	.16	-.11	.33**
Entitlement	.07	-.08	.32**
Exhibitionism	-.02	.08	.21
Impulsivity	.00	.06	-.13
Propriety	.12	-.11	.16
Workaholism	.15	-.03	.27*

Note. SNAP = Schedule for Nonadaptive and Adaptive Personality; HPD = histrionic personality disorder; OCPD = obsessive-compulsive personality disorder.

* $p < .05$, two-tailed. ** $p < .005$, two-tailed.

Table 1). Moreover, the current results do not provide any support for the hypothesized histrionic cognitive style.

Each personality disorder is defined in the DSM by a cluster of criteria that do not necessarily represent a meaningful and psychometrically homogeneous construct (e.g., McCrae et al., 2001; Reynolds & Clark, 2001; Widiger & Frances, 2002). In addition, two studies have recently found that OCPD criteria are particularly variable in terms of their diagnostic efficiencies (Farmer & Chapman, 2002; Grilo, in press). Thus, in order to better understand the sources of the predicted relationship between the SNAP diagnostic scale of OCPD and the local-interference index, we explored the relationships between this cognitive index and the various DSM-III-R criteria for OCPD, each measured by two or three SNAP items. Three of the eight DSM-III-R criteria for OCPD correlated significantly with the local-interference index. Most interestingly, local interference was associated with the OCPD criterion that deals with excessive perfectionism that interferes with task completion ($r = .23, p < .05, d = 0.47$). This criterion shows the best diagnostic efficiency among OCPD criteria (Farmer & Chapman, 2002; Grilo, in press), and it is directly related to the distraction measured by the local-interference effect. In addition, local interference correlated with the third and the fourth DSM-III-R OCPD criteria, which are related to inflexibility in delegating tasks to other individuals ($r = .23, p < .05, d = 0.47$) and to excessive workaholism ($r = .31, p < .01, d = 0.65$), respectively.

DISCUSSION

Personality measures related to OCPD were associated with excessive visual attention to small local aspects of stimuli. Using Navon's (1977) global-local paradigm, we showed that higher scores on OCPD-related scales were associated with local interference. In other words, obsessive participants were particularly distracted by the to-be-ignored local aspects of

hierarchical stimuli (the small letters, or the trees) when trying to identify their global aspects (the big letter, or forest). These findings provide the first empirical support for the detail-oriented obsessive-compulsive attentional style (Shapiro, 1965). In contrast, the current study failed to support Shapiro's histrionic cognitive style because HPD-related measures were not associated with global visual attention.

Previous studies using the global-local paradigm may have failed to provide support for the obsessive-compulsive cognitive style because they examined only the global-interference and global-precedence effects (Dickman, 1985; Maynard & Meyer, 1996). However, the local-interference effect, which reflects excessive attention to details that interferes with task completion, seems to be the effect that is most directly and unambiguously related to the proposed obsessive-compulsive style.

In contrast, none of the HPD-related scales correlated significantly with any of the effects of the global-local task, particularly not with the global-interference effect, even though this effect seems to unambiguously operationalize the histrionic global information processing style. On a cautionary note, these conclusions regarding both cognitive styles are limited to nonclinical populations such as the one we examined. Scoring high on traits such as workaholism or perfectionism is not a sign of any type of psychopathology, particularly not for college students. In addition, the diagnostic scales for OCPD and HPD are not significantly correlated ($r = .12$, n.s.) and so should not be regarded as opposite extremes of the same continuum (cf. McCrae et al., 2001; Reynolds & Clark, 2001). Therefore, even though the present findings indicate that individuals who score low on OCPD-related measures are less distracted by small local details of stimuli than individuals who score high on these measures, the results fail to support the hypothesized global style of visual attention that was suggested to characterize HPD.

In conclusion, by using a well-established cognitive measure of hierarchical visual attention, we showed that OCPD-related traits were associated with excessive visual attention to small details. More research into global versus local information processing in clinical populations may contribute to the understanding of the basic cognitive functions that characterize both Axis I (e.g., obsessive-compulsive disorder) and Axis II (e.g., OCPD) psychopathology (cf. Savage et al., 2000).

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