Inferential confusion, obsessive beliefs, and obsessive-compulsive symptoms: A replication and extension

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1. Introduction

Cognitive models of Obsessive-Compulsive Disorder (OCD) have garnered substantial attention during the past 25 years. These models derive from Beck’s (1976) cognitive specificity hypothesis in which different psychological disorders are characterized by specific dysfunctional beliefs. Salkovskis (1985, 1989) and Rachman (1997) provided early conceptualizations of OCD as stemming from an individual’s appraisal of intrusive thoughts rather than from the intrusive thoughts themselves. In this way, intrusive thoughts—which are experienced nearly universally across clinical and nonclinical samples alike (e.g., Burns, Formea, Keortge, & Sternberger, 1995; Rachman & deSilva, 1978)—are stimuli for subsequent negative automatic thoughts. By holding certain beliefs, typically those involving responsibility for feared harm to oneself or others, one places weight on these otherwise benign cognitive experiences which in turn increases susceptibility to experiencing distress. The obsessive-compulsive cognitions working group (OCCWG, 1997), in particular, has focused on identifying and measuring these beliefs. An example is the Obsessive Beliefs Questionnaire (OBQ; OCCWG, 2005) which covers three domains: responsibility/threat estimation, perfectionism/certainty, and importance/control of thoughts. These beliefs correlate moderately to strongly with OCD symptoms, even after controlling for depression and general anxiety (OCCWG, 2005) and have been shown to predict OCD symptoms prospectively (Abramowitz, Khandker, Nelson, Deacon, & Rygwall, 2006). It has been suggested that some of the OBQ beliefs may not be specific to OCD (Tolin, Woods, & Abramowitz, 2003) and research continues to refine the content and measurement of belief domains, but overall this work has the potential to be highly useful for understanding OCD.
relates to differences in comparison groups used: Against nonclinical controls, differences are more likely to be found than when non-OCD clinical participants are involved. Thus, general distress or other nonspecific psychopathology variables rather than OCD-specific variables may account for group differences. Conversely, a more consistent finding has been that individuals with OCD tend to show lower confidence in their memory, even when they perform as well as or better than comparison groups (Foa, Amir, Gershuny, Molnar, & Kozak, 1997; McNally & Kohlbbeck, 1993; Sher et al., 1983; Tolin et al., 2001; Woods et al., 2002). The basis for this reduced confidence, however, is not clear, but one possibility offered by Constans, Foa, Franklin, and Mathews (1995) is that individuals with OCD experience a disparity between their actual and preferred memory vividness. That is, in order to feel confident about their memory, individuals with OCD require a higher degree of vividness than they—or other people—actually experience, and this may foster pathological doubt.

A second approach to understanding the transition from relatively benign thoughts to obsessions is provided by an inference-based approach (IBA; O’Connor, Aardema, & Pelssier, 2005). According to the IBA, a person with OCD does not fail to correctly perceive or sense reality, but rather overestimates the likelihood of a given possibility based on purely subjective data. Aardema, O’Connor, and Emmelkamp (2006) describe the IBA as:

“a characteristic reasoning process associated with the occurrence of obsessions and, as such, is more concerned with the form and context of the obsession rather than its (ab)normal content [and] holds that the obsessional doubt finds its justification in a wide variety of idiosyncratic narratives that contain inductive reasoning processes peculiar to OCD. As such, the “intrusions” in OCD… inherit their persistence and reality value from reasoning processes associated with their occurrence rather than being the result of a specific belief” (p. 139)

A key feature of such processing is the phenomenon of inverse inference in which an individual accepts a remote, subjective possibility either in the absence of supportive evidence or even despite the presence of contradictory evidence. For example, instead of reaching a typical inference through reality-based information (e.g., my hands are discolored so they must be dirty), inverse inference relies on subjective information to arrive at a feared conclusion (e.g., I was outside where dangerous germs are so my hands must be dirty). One problem with such reasoning is that in the absence of objective criteria (e.g., visible stains), how does the individual know when his or her hands are clean and therefore when to stop washing (e.g., how can I be certain my hands are clean enough?). The answer to this question also is subjective and may contribute to one’s search for an elusive feeling of completion and eventually compulsions of increasing complexity. This description is consistent with clinical observation that it is extremely difficult to “convince” individuals with OCD to cease their irrational behavior using only psychoeducation or presentation of objective evidence.

To assess for presence/strength of such distorted inference, Aardema, O’Connor, Emmelkamp, Marchand, and Todorov (2005) developed the Inferential Confusion Questionnaire (ICQ). The original ICQ contained 15 items such as I am sometimes more convinced by what might be there than by what I actually see, Just the thought that there could be danger is proof enough for me that there is, and I often react to a scenario that might happen as if it is actually happening. The ICQ distinguished an OCD group from a comparison group and showed strong relations to delusional symptoms beyond the variance contributed by the OBQ. However, the original ICQ mainly contained items that reflect inverse inference and a distrust of the senses that lead to an invalid doubting inference (e.g., Even if I have all sorts of visible evidence against the existence of a certain danger, I still feel it will occur). The expanded version (ICQ-EV; Aardema, Wu, Careau, O’Connor, & Dennie, submitted for publication) includes additional reasoning processes hypothesized to give rise to inferential confusion, including (a) over-reliance on possibility during reasoning (e.g., Sometimes every far-fetched possibility my mind comes up with feels real to me); (b) absorption into imaginary sequences at the expense of reality (e.g., My imagination is sometimes so strong that I feel stuck and unable to see things differently); (c) irrelevant associations (e.g., I often connect ideas or events in my mind that would seem far-fetched to others or even to myself); and (d) category errors (e.g., I often confuse different events as if they were the same). The ICQ-EV replaces the original version and therefore it is necessary to examine if it performs similarly to its predecessor in terms of its relevance to OCD. Second, whereas previous research has used only one marker of OC symptoms, this study will use three measures that have shown clear convergent and discriminant correlations (see Section 2). In particular, the three measures have psychometrically strong scales assessing the core domains of checking, washing, and rituals pertaining to symmetry, ordering, and grooming (Wu & Carter, 2008b). Use of multiple symptom scales provides broader coverage of each domain and also reduces the likelihood of spurious findings resulting from idiosyncrasies of any one instrument. Third, whereas Aardema et al. (2006) examined ICQ-OCD relations after accounting for general anxiety, a recognized limitation was that it did not control for depressed mood. There is a well-known pattern of comorbidity between OCD and depression (Denys, Tenney, van Megen, de Geus, & Westenberg, 2004; Rasmussen & Eisen, 1992)—in fact, they are so consistently correlated that Richter, Cox, and Direnfeld (1994) advised that depression routinely should be assessed within OCD studies. Aardema, Radomsky, O’Connor, and Julien (2008) recently addressed this issue by replicating the Aardema et al. (2006) results after controlling for the Beck Depression Inventory (BDI; Beck, Rush, Shaw, & Emery, 1979). However, despite its common use and utility for certain applications, the BDI has been shown to contain a substantial general distress component and not simply depression (Watson, Weber, et al., 1995). This study will use a depression-specific measure as a covariate in order to examine specific associations between inferential confusion and OC symptoms. Fourth, whereas Aardema et al. (2006) included 85 individuals with OCD and Aardema et al. (2008) reported data for 130 English-speaking students, this study will use a much larger sample to allow for examination of specific patterns of correlations among target constructs.

2. Methods

2.1. Participants

Participants were 317 undergraduate psychology students at Northern Illinois University who participated in the study as
partial fulfillment of a research exposure requirement. Sample characteristics included 57% women and mean age of 19.1 years (S.D. = 1.30; range = 18–27). Whereas racial identification was not assessed, previous studies using the broader undergraduate body from which this sample was taken shows substantial racial diversity (approximately 65% White, 19% Black, 7% Asian, 5% Hispanic, 5% multi-racial or “other”; Wu & Black, 7% Asian, 5% Hispanic, 5% multi-racial or “other”; Wu & Carter, 2008b).

2.2. Measures

2.2.1. ICQ-EV

The ICQ-EV (Aardema et al., submitted for publication) is a 30-item revision of the original 15-item ICQ (Aardema et al., 2005) and already was introduced.1 As noted, a person scoring high on this domain “confuses an imagined possibility with an actual probability based in the senses, and then acts ‘as if’ the imagined possibility is real” (Aardema et al., 2005, p. 295). Responses are made on a 6-point scale ranging from strongly disagree to strongly agree. The ICQ-EV has shown good internal consistency (coefficient alpha = .97 in an OCD sample and .96 in a French community group) and 12-week retest reliability (r = .80), and distinguishes OCD patients from both students and non-OCD anxiety patients (Aardema et al., submitted for publication).

2.2.2. OBQ

The OBQ is a 44-item revision of the original 87-item instrument (OCWG, 2003, 2005) and assesses the presence of obsessive beliefs. Each item is rated on a 7-point scale ranging from not at all to very much. The scales demonstrated acceptable internal consistency (range was .77 to .88) and 6- to 7-month retest reliability (range was .61 to .84) in a large college student sample (Burns et al., 1996). This revision is used widely and offers improved discriminant validity over the original instrument in that items which showed high correlations with “worry” were removed. Again, the current study focuses on Checking, Washing, and Ordering–the core OCD symptoms noted above with respect to the SCOPI.

2.2.3. SCOPI

Schedule of Compulsions, Obsessions, and Pathological Impulses (Watson & Wu, 2005) is a 47-item questionnaire. Its three OC scales (Checking, Cleanliness, and Rituals) are related to anxiety and depression and two additional scales (Pathological Impulses and Hoarding) were developed primarily through factor analysis. Ratings are made on a 5-point scale ranging from strongly disagree to strongly agree. Its scales have demonstrated good internal consistency (coefficient alphas ranged from .85 to .89) and specific relevance to OC symptoms in a college student sample (Wu & Carter, 2008a). The uniqueness to OCD of some of it content continues to be examined (Tolin et al., 2003; Wu & Carter, 2008a).

2.2.4. OCI–R

Obsessive-Compulsive Inventory–Revised (Foa et al., 2002) with six 3-item scales: Checking, Washing, Ordering, Obsessing, Neutralizing, and Hoarding. Responses are made on a 5-point scale ranging from not at all to extremely. In a student sample, coefficient alphas ranged from .61 to .84 and 1-month retest reliabilities ranged from .54 to .77 (Huppert, Simons, & Foa, 2004). The OCI-R offers psychometric improvement over the OCI, which suffered from inconsistent support for its 7-factor structure (Foa et al., 2002; Wu & Watson, 2003). This study focuses on Checking, Washing, and Ordering–the core OCD symptoms noted above with respect to the SCOPI.

2.2.5. PI–WSUR

Padua Inventory–Washington State University Revision (Burns, Keortge, Formea, & Sternberger, 1996) is a 39-item questionnaire with five scales: Checking, Contamination, Grooming, Harm Impulses, and Harm Thoughts. Ratings are made on a 5-point scale ranging from not at all to very much. The scales demonstrated acceptable internal consistency (range was .77 to .88) and 6- to 7-month retest reliability (range was .61 to .84) in a large college student sample (Burns et al., 1996). This revision is used widely and offers improved discriminant validity over the original instrument in that items which showed high correlations with “worry” were removed. Again, the current study focuses on Checking, Washing, and Ordering–the core OCD symptoms noted above with respect to the SCOPI.

2.2.6. MASQ

Mood and Anxiety Symptom Questionnaire (Watson, Clark, 1991) contains 62-items assessing general distress, anxious arousal (which is most closely related to panic; Mineka, Watson, & Clark, 1998), and depression. Items are rated on a 5-point scale ranging from not at all to extremely. Several studies support its reliability and validity including good internal consistency (range was .78 to .93 in three student samples) and relative convergent and discriminant validity compared to other measures of anxiety and depression (Watson, Clark et al., 1995; Watson, Weber, et al., 1995). For example, in three student samples, the MASQ Anxious Arousal and Anhedonic Depression scales correlated only r = .31, .28, and .25 (Watson, Clark, et al., 1995; Watson, Weber, et al., 1995). The primary strength of the MASQ is its separate assessment of anxiety and depression: That is, whereas many comparable measures are saturated with nonspecific variance, the MASQ scales are relatively specific to each anxious arousal and depression (Mineka et al., 1998). For ease of interpretation in this study, the two MASQ general distress scales were combined to create one composite scale.

2.3. Procedure

After obtaining written informed consent for this IRB-approved protocol, students completed the battery of paper-and-pencil questionnaires in small groups (maximum of 20 students per group) in a university classroom. Administration took on average 45–60 min.

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1 The 30-item ICQ-EV was scored from a 54-item ICQ administered in this study. The 54 items were included to further development of the instrument and expand its content coverage. The final 30-item ICQ-EV was the result of a frequency analysis (that examined item endorsement) and a series of principal component analyses (Aardema et al., submitted for publication).
Table 1
Descriptive statistics and internal consistency.

<table>
<thead>
<tr>
<th></th>
<th>M</th>
<th>S.D.</th>
<th>T score</th>
<th>S.D.</th>
<th>Alpha</th>
</tr>
</thead>
<tbody>
<tr>
<td>ICQ-EV</td>
<td>75.92</td>
<td>26.64</td>
<td>–</td>
<td>–</td>
<td>.96</td>
</tr>
<tr>
<td>OBQ-44 total</td>
<td>135.28</td>
<td>37.84</td>
<td>50.90</td>
<td>8.5</td>
<td>.94</td>
</tr>
<tr>
<td>Responsibility/Threat Estimation</td>
<td>50.25</td>
<td>16.61</td>
<td>50.99</td>
<td>8.9</td>
<td>.90</td>
</tr>
<tr>
<td>Perfectionism/Certainty</td>
<td>54.03</td>
<td>15.22</td>
<td>49.27</td>
<td>7.6</td>
<td>.87</td>
</tr>
<tr>
<td>Importance/Control of Thoughts</td>
<td>31.01</td>
<td>10.58</td>
<td>53.37</td>
<td>9.1</td>
<td>.83</td>
</tr>
<tr>
<td>OC total</td>
<td>142.93</td>
<td>45.39</td>
<td>48.54</td>
<td>9.3</td>
<td>.97</td>
</tr>
<tr>
<td>Checking</td>
<td>59.94</td>
<td>22.77</td>
<td>49.10</td>
<td>9.9</td>
<td>.96</td>
</tr>
<tr>
<td>Cleanliness</td>
<td>52.96</td>
<td>17.27</td>
<td>48.57</td>
<td>8.7</td>
<td>.93</td>
</tr>
<tr>
<td>Rituals</td>
<td>30.03</td>
<td>12.08</td>
<td>48.37</td>
<td>8.9</td>
<td>.93</td>
</tr>
<tr>
<td>MASQ</td>
<td>43.97</td>
<td>15.67</td>
<td>47.56</td>
<td>9.1</td>
<td>.93</td>
</tr>
<tr>
<td>Anxious Arousal</td>
<td>27.05</td>
<td>10.17</td>
<td>49.71</td>
<td>11.7</td>
<td>.90</td>
</tr>
<tr>
<td>Anhedonic Depression</td>
<td>56.77</td>
<td>13.56</td>
<td>51.50</td>
<td>9.8</td>
<td>.88</td>
</tr>
</tbody>
</table>

Note. N = 317. All values significant at P < .0001.
ICQ-EV = Inferential Confusion Questionnaire-Expanded Version.
OBQ = Obsessive Beliefs Questionnaire.

3. Results

3.1. Descriptive data and internal consistency

Means and standard deviations are reported in Table 1. Overall, the current group scored similarly to previous groups on all measures. T scores for the OBQ-44, OC scales, and MASQ ranged from 47.56 to 53.37. Thus, all scales were within 0.5 S.D. of normative samples who previously completed these measures and increase confidence that the current group performed similarly to comparable samples. Coefficient alphas suggest that the scales were internally consistent, as evidenced by values ranging from .83 to .97. These values are consistent with those reported in previous research with these measures and support their reliability.

3.2. Zero-order correlations

Table 2 reports the zero-order correlations between the ICQ-EV and OBQ-44. The primary finding was that these two measures were strongly correlated, with all values significant at P < .0001. Specifically, the total scores correlated r = .60, reflecting 36% of the common variance; the ICQ-EV correlated between r = .48 and .62 with the individual OBQ-44 scales. Comparing among the three correlations, the ICQ-EV correlated significantly more strongly with Responsibility/Threat Estimation (r = .62) than it did with either Perfectionism/Certainty (r = .48) or Importance/Control of Thoughts (r = .50) (both comparisons significant at P < .01).3

Table 3 reports zero-order correlations between the cognitive and inference-based variables and all symptoms assessed. Results were that nearly all of the measures were strongly positively correlated (P < .0001). This was anticipated given the sample size and the fact that constructs with negative valence tend to correlate positively. However, when examining the relative strength of the correlations, both the ICQ-EV and OBQ-44 correlated significantly higher with OC symptoms than with either Anxious Arousal (P < .05) or Anhedonic Depression (P < .01). Conversely, the ICQ-EV did not correlate differently between OC and General Distress. The OBQ-44 total correlated more strongly with OC than with Anxious Arousal, Anhedonic Depression, or General Distress (all P’s < .01). This pattern of findings makes sense in that both the ICQ-EV and the OBQ-44 were developed as measures specific to OCD and not as equally relevant to conditions such as panic (to which anxious arousal is most closely aligned) or depression. By directly comparing their correlations with three related constructs (OCD, anxious arousal, depression), these findings offer one test of that specificity to OC symptoms.

3.3. Hierarchical regression

To further examine specificity of relations and for potential unique contributions provided by the ICQ-EV and OBQ-44, we performed a hierarchical regression predicting OC total score (Table 4). In step 1, we entered four nonspecific variables: sex, General Distress, Anxious Arousal, and Anhedonic Depression. Collectively, these variables substantially predicted OC symptoms, providing an R2 of .30 (F(2,310) = 32.78, P < .0001). The best predictor was General Distress with a β of .34 (t(310) = 4.01, P < .0001). Then, only Anxious Arousal provided substantive variance (β = .18; t(310) = 2.25, P < .0253). In step 2, we entered the ICQ-EV and the three OBQ-44 scales. Together, they contributed a significant amount of additional variance beyond the previous step (β = .51, F(5,306) = 14.83, P < .0001).

Table 3
Zero-order correlations between cognitive domains and symptoms.

<table>
<thead>
<tr>
<th></th>
<th>ICQ-EV</th>
<th>OBQ-44 total</th>
<th>RT</th>
<th>PC</th>
<th>ICT</th>
</tr>
</thead>
<tbody>
<tr>
<td>OC total</td>
<td>.55</td>
<td>.52</td>
<td>.51</td>
<td>.46</td>
<td>.40</td>
</tr>
<tr>
<td>Checking</td>
<td>.53</td>
<td>.45</td>
<td>.45</td>
<td>.40</td>
<td>.33</td>
</tr>
<tr>
<td>Washing</td>
<td>.43</td>
<td>.49</td>
<td>.49</td>
<td>.39</td>
<td>.41</td>
</tr>
<tr>
<td>Rituals</td>
<td>.44</td>
<td>.41</td>
<td>.37</td>
<td>.40</td>
<td>.31</td>
</tr>
<tr>
<td>MASQ</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>General Distress</td>
<td>.48</td>
<td>.35</td>
<td>.32</td>
<td>.34</td>
<td>.26</td>
</tr>
<tr>
<td>Anxious Arousal</td>
<td>.45</td>
<td>.30</td>
<td>.27</td>
<td>.28</td>
<td>.25</td>
</tr>
<tr>
<td>Anhedonic Depression</td>
<td>.27</td>
<td>.12</td>
<td>.12</td>
<td>.04</td>
<td>.17</td>
</tr>
</tbody>
</table>

Note. N = 317. All values ≥ .25 significant at P < .0001.
ICQ-EV = Inferential Confusion Questionnaire-Expanded Version.
OBQ = Obsessive Beliefs Questionnaire.

2 Means are presented as T scores to facilitate comparisons between the current group and other large normative groups who completed these measures. Normative data to calculate T scores were obtained from: OCCCWG (2005) (OBQ); Wu and Carter (2008a) (OCD); Watson, Weber, et al. (1995) and Wu and Carter (2008a) (MASQ). The mathematical equation used for conversion of each scale score was:

\[
T \text{ score} = \left( \frac{M_{\text{current group}} - M_{\text{normative group}}}{\text{S.D. normative group}} \right) \times 10 + 50
\]

Thus, T scores have a M of 50 with a S.D. of 10.

3 Significance was tested using the formula provided by Kenny (1987) for testing the strength of two correlations were compared and reported to be statistically different in this section.
with OC symptoms. Strengths of the current design included use of an expanded item pool to assess inferential confusion (i.e., the ICQ-EV), administration of multiple OC symptom measures, controlling for non-specific variance owing to anxiety and depression, and a large sample. Results supported that the ICQ-EV is a predictor of OC symptoms even after accounting for several related variables. This is a meaningful finding because the zero-order correlations between the ICQ-EV and the three continuous predictor variables entered in step 1 of the regressions were substantial ($r = .51$ with General Distress; $r = .46$ with Anxious Arousal; $r = .29$ with Anhedonic Depression). Thus, the ability of the ICQ-EV to predict unique OC variance beyond all of these is a rigorous test of its association with OC symptoms. Also of note is the finding that the ICQ-EV correlated significantly more strongly with OC symptoms than with either anxious arousal or anhedonia. This result is consistent with the cognitive specificity hypothesis in that the experiences measured by the ICQ-EV were developed to be OC-specific. Whereas non-specific distress often leads to significant associations among all manner of psychopathology symptoms, in dimensional analyses it is the relative strength of correlations that is most important. In this case, the ICQ-EV showed a stronger association with OC symptoms—particularly checking and rituals related to symmetry, ordering, and grooming—than with experiences relevant to panic (Anxious Arousal) or depression (Anhedonic Depression). The rationale for administering the MASQ was to examine relative strength of associations among these particular symptoms; that is, it may be that other anxiety or depression measures that are saturated with non-specific variance make it difficult to determine the unique relevance of the ICQ-EV with OC symptoms.

Further, consistent with Aardema et al. (2006) and Aardema et al. (2008), we found that the ICQ-EV made stronger unique contributions to overall OC prediction than did the individual OBQ-44 scales. Overall, both measures assess content that uniquely predicts certain OC symptoms. Specifically, these results suggest unique associations between the ICQ-EV and both checking and rituals, but not with contamination/washing symptoms. Regarding the OBQ-44, Perfection/Certainty also predicted rituals; Responsibility/Threat Estimation was the only cognitive domain to predict contamination/washing symptoms. One conclusion from these data is that it remains important to measure OC symptoms using a finite number of distinct dimensions. That is, global assessment of OC symptoms—although perhaps adequate in many settings—obscures in other settings potentially important specific relations between certain OC symptoms and cognitive processes such as those examined in this study. Thus, whereas the ICQ-EV was found to explain relatively more variance than the OBQ-44 when total score was predicted, finer-grained analyses revealed that this was not true across all OC symptoms: Responsibility/Threat Estimation uniquely predicted contamination/washing. This becomes relevant when presented with the clinical situation in which an individual with OCD displays only one and not several different OCD symptoms simultaneously. Just as certain beliefs measured by the OBQ-44 may relate only to certain symptoms, the reasoning processes described by the IBA may not be equally relevant to all OCD symptoms. At this time, it is important to measure these constructs with a high degree of specificity to determine if the unique associations reported in this study replicate across broader samples—particularly clinical ones.

A second conclusion is that the ICQ-EV and OBQ-44 are not redundant instruments. Despite the strong zero-order correlation between the two total scores ($r = .60$), each contains unique variance and assesses different content. In the case of the ICQ-EV, the particular reasoning process that is characterized by items such as I often cannot tell whether something is safe, because things are not what they appear to be and I can get very easily absorbed in remote

### Table 4

Table 4 presents the second and final step of each regression analysis (as was the method for predicting the OC total score, sex, General Distress, Anxious Arousal, and Anhedonic Depression were entered in step 1 to control for these four sources of nonspecific variance). Results were that whereas the combination of the ICQ-EV and three OBQ-44 scales significantly ($P < .0001$) predicted all three of the OC symptom dimensions, the strongest individual predictors were not consistent for each dimension. Specifically, for checking, only the ICQ-EV was a significant ($\beta = .26$; $t_{(310)} = 4.15$; $P < .0001$) predictor; for washing, only Responsibility/Threat Estimation was a significant ($\beta = .31$; $t_{(310)} = 3.59$; $P = .0004$) predictor; for rituals, both the ICQ-EV ($\beta = .25$; $t_{(310)} = 3.70$, $P = .0003$) and Perfectionism/Certainty ($\beta = .23$; $t_{(310)} = 3.02$, $P = .0028$) were significant predictors.

### 4. Discussion

This study replicated Aardema et al. (2006) and Aardema et al. (2008) in finding that inferential confusion has unique relations with OC symptoms. Strengths of the current design included use of an expanded item pool to assess inferential confusion (i.e., the ICQ-EV), administration of multiple OC symptom measures, controlling for non-specific variance owing to anxiety and depression, and a large sample. Results supported that the ICQ-EV is a predictor of OC symptoms even after accounting for several related variables. This is a meaningful finding because the zero-order correlations between the ICQ-EV and the three continuous predictor variables entered in step 1 of the regressions were substantial ($r = .51$ with General Distress; $r = .46$ with Anxious Arousal; $r = .29$ with Anhedonic Depression). Thus, the ability of the ICQ-EV to predict unique OC variance beyond all of these is a rigorous test of its association with OC symptoms. Also of note is the finding that the ICQ-EV correlated significantly more strongly with OC symptoms than with either anxious arousal or anhedonia. This result is consistent with the cognitive specificity hypothesis in that the experiences measured by the ICQ-EV were developed to be OC-specific. Whereas non-specific distress often leads to significant associations among all manner of psychopathology symptoms, in dimensional analyses it is the relative strength of correlations that is most important. In this case, the ICQ-EV showed a stronger association with OC symptoms—particularly checking and rituals related to symmetry, ordering, and grooming—than with experiences relevant to panic (Anxious Arousal) or depression (Anhedonic Depression). The rationale for administering the MASQ was to examine relative strength of associations among these particular symptoms; that is, it may be that other anxiety or depression measures that are saturated with non-specific variance make it difficult to determine the unique relevance of the ICQ-EV with OC symptoms.

Further, consistent with Aardema et al. (2006) and Aardema et al. (2008), we found that the ICQ-EV made stronger unique contributions to overall OC prediction than did the individual OBQ-44 scales. Overall, both measures assess content that uniquely predicts certain OC symptoms. Specifically, these results suggest unique associations between the ICQ-EV and both checking and rituals, but not with contamination/washing symptoms. Regarding the OBQ-44, Perfection/Certainty also predicted rituals; Responsibility/Threat Estimation was the only cognitive domain to predict contamination/washing symptoms. One conclusion from these data is that it remains important to measure OC symptoms using a finite number of distinct dimensions. That is, global assessment of OC symptoms—although perhaps adequate in many settings—obscures in other settings potentially important specific relations between certain OC symptoms and cognitive processes such as those examined in this study. Thus, whereas the ICQ-EV was found to explain relatively more variance than the OBQ-44 when total score was predicted, finer-grained analyses revealed that this was not true across all OC symptoms: Responsibility/Threat Estimation uniquely predicted contamination/washing. This becomes relevant when presented with the clinical situation in which an individual with OCD displays only one and not several different OCD symptoms simultaneously. Just as certain beliefs measured by the OBQ-44 may relate only to certain symptoms, the reasoning processes described by the IBA may not be equally relevant to all OCD symptoms. At this time, it is important to measure these constructs with a high degree of specificity to determine if the unique associations reported in this study replicate across broader samples—particularly clinical ones.

A second conclusion is that the ICQ-EV and OBQ-44 are not redundant instruments. Despite the strong zero-order correlation between the two total scores ($r = .60$), each contains unique variance and assesses different content. In the case of the ICQ-EV, the particular reasoning process that is characterized by items such as I often cannot tell whether something is safe, because things are not what they appear to be and I can get very easily absorbed in remote
possibilities that feel as if they are real relates to how some individuals actually come to experience everyday stimuli and events as more dangerous or uncertain than other people do, or with a blurring of the distinction between reality and imagination. Through the lens of such an approach, the daily challenges one faces must appear constant and overwhelming. High-scoring on the ICQ-EV may come to view even the most mundane tasks (e.g., turning off the stove, hand-washing) as representing burdensome possibilities that feel as if they are real. Therefore, many of the OBQ-44 items are characterized by beliefs such as In order to be a worthwhile person, I must be perfect at everything I do and Having nasty thoughts means I am a terrible person. Endorsing these items appears to reflect a self-punitive style in which individuals accept undue burden for outcomes that are difficult or impossible to control and the expectation that feelings of guilt or shame are an appropriate response should negative events ultimately happen. Consistent with Clark and O’Connor’s (2004) conceptual distinction between an inference-based versus a cognitive appraisal approach, the latter is more concerned with subjective and erroneous appraisals once a threatening stimulus is identified. The focus of the IBA as operationialized by the ICQ-EV is on the initial subjective processing of everyday encounters as possessing hidden threats to safety. Thus, it appears that the inference precedes the identification of a specific threat and subsequent appraisal of its implications. At the same time, however, there appears to be some similar content between the two measures, such as the OBQ-44 items In order to feel safe, I have to be as prepared as possible for anything that could go wrong. I often think things around me are unsafe, and if I do not take extra precautions, I am more likely than others to have or cause a serious disaster. As an unplanned item-level analysis between all OBQ and ICQ-EV items, the three OBQ-44 items named above showed the strongest three correlations, respectively, with single ICQ-EV items Even if I have all sorts of visible evidence against the existence of a certain problem, I still feel it will occur (r = .46), Sometimes every far-fetched possibility my mind comes up with feels real to me (r = .46), and Even the smallest possibility can make me lose confidence in what I know (r = .44). Consistent with the results of Table 2 in which the ICQ-EV correlated significantly stronger with Responsibility/Threat Estimation than the other two OBQ-44 scales, all three of the above items are included on Responsibility/Threat Estimation. Thus, it appears that this domain represents the closest link between these two measures. Nevertheless, in addition to the conceptual differences noted, inferential confusion has been shown to be factually distinct from overestimation of threat (Aardema et al., 2006). Combined with the current results that these two measures predict different OC symptoms, it appears that there are important differences between the two domains.

Successful with respect to primary aims, this study has limitations. First, it was conducted only on a student sample. Such samples are common for research in OCD domains; nevertheless they generally provide lower scores on symptom measures than do clinical samples. This study should be replicated in a clinical sample that provides elevated scores on general distress and OC symptoms. Until such time, these findings may be regarded as preliminary. Second, this study used only questionnaire data. Future research might extend these findings by incorporating other sources of data, including interviews, self-reported behaviors (i.e., reports of discrete acts as opposed to general tendencies), and behavioral observations performed in controlled laboratory settings. These methods are difficult due to the internal and private nature of many of the experiences queried in this study, but follow-up studies using such methods when they are available nonetheless are warranted. An immediate obstacle is that dimensional OC constructs are best measured by questionnaires at this time. Third, whereas the current data should not be minimized, a correlational analysis cannot confirm causal pathways from intrusive thoughts to obsessions and compulsions. Thus, although these data are consistent with a model in which inferential confusion is an important variable in the experience of OC symptoms, experimental methods and longitudinal data are needed to provide stronger evidence of causality. For example, particularly useful would be a prospective analysis in which OCD-at-risk individuals are assessed using both cognitive appraisal and inference-based approaches prior to the onset of clinically significant OC symptoms. Particularly interesting would be individuals who show elevated scores on only one of the two measures. This may represent a rather small percentage of any given sample since the ICQ-EV and OBQ-44 are highly correlated, but the careful study of such individuals over time may be able to provide important information regarding the relative utility of each domain for predicting OC symptom development prospectively. Perhaps more immediately practical would be experimental research that examines whether intervention targeting either the cognitive appraisal or the initial inference process—but not both—results in differential improvement of OC symptoms. As the current study suggested, such work may be complicated by the fact that different OC symptoms may relate to, and therefore respond to, appraisals and reasoning processing differently. In conclusion, these approaches to the study of OCD appear promising, and there is a great deal of work that remains to be done.

References


