Belief in the obsessional doubt as a real probability and its relation to other obsessive-compulsive beliefs and to the severity of symptomatology

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Objectives. Despite the important role of doubt in understanding obsessive-compulsive disorder (OCD), current cognitive models of OCD usually do not separate this initial doubt from the anticipated consequence of not ritualizing. The current study evaluates belief in the obsessional doubt as a real probability as an additional cognitive dimension of obsessive-compulsive (OC) beliefs.

Methods. One hundred and fifteen participants with OCD completed four clinical scales measuring different OC beliefs in: (a) the real probability of obsessional doubt; (b) the realism of anticipated consequences; (c) the degree of conviction in the need to perform rituals; and (d) the perceived ability to resist rituals. The severity of symptomatology was also evaluated.

Design. Using cross-sectional and longitudinal data, correlational analyses were performed to determine the relationship between OC beliefs as well as to observe how these beliefs may be related to the severity of symptomatology and how they fluctuated over time. Regression analyses were also employed to verify which OC beliefs better predicted the perceived ability to resist rituals.

Results. Belief in the obsessional doubt as a real probability was significantly related to other OC beliefs. Also, levels of belief for the same doubt remained stable for a period of two weeks, but different levels of belief were observed for distinct obsessional doubts measured at the same time. Finally, belief in the obsessional doubt as a real probability better predicted the perceived ability to resist rituals than other OC beliefs.

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DOI:10.1348/014466509X439531
Conclusions. Belief in the obsessional doubt as a real probability may be an important dimension to consider when evaluating OC beliefs in treatment resistant OCD, particularly in people who have low perceived ability to resist rituals.

Obsessive-compulsive disorder (OCD) affects approximately 1–3% of the adult population (Bebbington, 1998; Kario, Golding, Sorenson, & Burnam, 1988; Kessler et al., 2005). It is considered the fourth most common mental disorder, after major depressive disorder, substance abuse and panic disorder, with significant repercussions on sufferers, their family and their work (American Psychiatric Association [APA], 1994; Moritz et al., 2005). The compulsions most frequently encountered are washing, checking and ordering. Obsessions and compulsions may also take the form of impulsion phobias, scruples, hoarding and health concerns. Obsessional doubt is displayed in the form of excessive slowness, difficulty making decisions or brooding without overt compulsions. In reaction to obsessional thoughts, a covert or overt action is usually executed in order to neutralize, curb, prevent or avoid any disastrous consequences. Clinically speaking, doubt has been recognised as a key component in most types of OCD and furthermore its often on the basis of a small probability that the person neutralises ‘just in case’. Despite the importance of doubt in understanding OCD, the current cognitive models of OCD usually do not consider this component as an independent dimension of OC beliefs that may be separated from the anticipated consequence of not ritualizing. A recent review of the literature reveals that the Brown Assessment of Beliefs Scale (BABS: Eisen et al., 1998, 2001) as other beliefs instruments (e.g. the Overvalued Ideas Scale [OVIS]: Neziroglu, McKay, Tobias, Stevens, & Todaro, 1999) principally assess OC beliefs on the basis of anticipated consequences about not performing rituals (Grenier, O’Connor, & Bélanger, 2006a). In these instruments, OC beliefs are evaluated without formal distinctions between the doubt and the feared consequences of not neutralizing. For example, it is clearly stated in the OVIS’ instructions for administration that the therapist has to identify the main belief which the patient has had in the last week (see Neziroglu et al., 1999). The following examples are provided to help the therapist: ‘I will get aids if I do not wash properly after visiting the hospital, my house may burn down if I do not check the stove before leaving the house, etc.’. Here, despite the lack of distinction, it is possible to separate the obsessional doubt (e.g. maybe my hands are contaminated, maybe I did not turn off my stove, etc.) from the anticipated consequences of not ritualizing (e.g. I will get aids, my house will burn, etc). OC beliefs could than be assessed separately for these two belief components.

In line with this proposal, the Inference Based Approach (IBA) complements the current cognitive conceptualization of OCD by focusing on the dimension of doubt, and targets two core belief components: (1) belief in the probability of the primary doubt and (2) belief in the realism or likelihood of anticipated consequences. In particular, the IBA model views the obsession as an inference arrived at by a reasoning process may be separated from the subsequent appraisal of anticipated consequences (O’Connor, 2002; O’Connor, Aardema, & Pelissier, 2005; O’Connor & Robillard, 1995; O’Connor & Robillard, 1999). This reasoning process may play a significant role in obsession formation before appraisal beliefs come into play.

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1 As Eisen and colleagues (2001) stated, the BABS cannot be administered to patients who do not have underlying beliefs about the consequences of not performing their compulsions (p. 495).

2 An inference is essentially a plausible proposition about a possible state of affairs, itself arrived at by reasoning but which forms the premise for further deductive/inductive reasoning (O’Connor, 2002).
(Clark & O’Connor, 2004; O’Connor, 2002). In other words, the IBA model does not locate the origin of obsession in intrusive cognitions, nor in specific appraisals but rather in a reasoning process (inductive narrative) preceding all these phenomena (O’Connor, 2002). Even though an individual suffering from OCD reports experiencing distressing images, scenes or intrusive words, the IBA claim is that the source of distress can be traced to an initial doubting inference preceding appraisal beliefs. This doubting inference is arrived at via an inductive reasoning process, which convinces the person that they must distrust their senses and common sense by generating doubting inferences about the actual state of affairs. For the IBA model, lack of confidence in memory is thus not directly involved in the development of doubt, since people distrust their senses in the here and now. For example, even if the person with OCD sees soap suds forming on the hands and sees no dirt, s/he continues to have doubts about the cleanliness of the hands by relying on associations remote from the current context (e.g. invisible germs exist, surgeons wash their hands, s/he heard of someone getting ill after visiting a bathroom, etc., see O’Connor, Aardema, & Pélissier, 2005). By inferring that the hands may be dirty (initial inference), s/he then acts as if this initial inference was true, by washing the hands, despite the absence of visible proof, in order to prevent disastrous consequences (secondary inferences of anticipated consequences, such as contaminating others). This initial doubting inference itself then is held with a degree of conviction, which is measurable, and in for example a case of contamination would take the form of a 'maybe my hands are dirty' doubt (O’Connor, Aardema, & Pélissier, 2005). A conceptualization of doubts or obsessions as initial inferences leads to a different set of questions to those posed by an appraisal model, which locates the genesis of obsessions in appraisals of intrusive thought (see Clark & O’Connor, 2004; O’Connor, Aardema, & Pélissier, 2005). Indeed, if obsessions develop from the appraisal of intrusive cognitions then the measure of OC beliefs should focus on the evaluation of anticipated consequences following the intrusions. In contrast, if obsessions develop prior to appraisals, then measures of OC beliefs could also include problematic doubting inferences preceding appraisals of consequences. The inference-based model of obsessions can be schematically represented in Figure 1 (see also O’Connor, 2002). The conceptualization of doubting as a person generated obsessional process is distinct from stimulus driven conditions of ambivalence and uncertainty and the ability to tolerate uncertainty (Harkin & Mayes, 2008).

The aim of the present study was to test claims of the IBA model by investigating degree of belief in the obsessional doubt as a real probability among people with OCD and its relation to other OC beliefs as well as to the severity of symptomatology. In addition to the two core belief components described earlier (i.e. the probability

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**Figure 1.** Schematic representation for the study of OC beliefs using the inference-based model of obsessions.
of obsessional doubt and the realism of anticipated consequences), two more peripheral OC beliefs\(^3\) were also evaluated: (a) the degree of conviction in the need to perform compulsive rituals to prevent the consequences and (b) the perceived ability to resist rituals. In particular, four hypotheses, deriving from claims of the IBA model, were tested using scales especially developed to assess beliefs in doubt, anticipated consequences and compulsive rituals: (a) all obsessions will show an initial inference of doubt expressed as a ‘maybe’, ‘perhaps’, or a questioning about a state of affairs. Even though, for example, a person with OCD may report experiencing a distressing image, scene, word, the source of this distress can be traced to an initial doubting inference; (b) all OC beliefs will be normally distributed along a dimension graded from low to high conviction; (c) degree of the two core OC beliefs will show a satisfying test-retest reliability, suggesting that they do not fluctuate spuriously; and (d) if the obsessional doubt is the source of obsessional anxiety (i.e. the starting point of OCD), belief in doubt as a real probability should relate significantly to other OC beliefs about consequences of not performing rituals as well as to the severity of symptomatology. The results of the present study potentially could have several positive clinical implications. The division between obsessional doubt and anticipated consequences proposed by the IBA model could clarify various anomalous findings regarding appraisal belief domains and anticipated consequences: firstly, a larger proportion of people with OCD do not seem to score high on the obsessive belief domain questionnaire (Taylor et al., 2006), and secondly, some subtypes of OCD, such as the ‘just right’ obsessions do not report anticipated consequences (Summerfeldt, 2004). Current beliefs questionnaires (e.g. BABS, OVIS) then may not be applicable to people who do not have underlying appraisals about the consequences of not neutralizing. However the probability of obsessional doubt as an additional dimension of OC beliefs would be measurable. Finally, it should be noted that the current study does not attempt to validate a new measure of OC beliefs, although the results obtained might represent the first step towards a validation process. Also, this study does not attempt to compare the IBA with appraisal models of obsessions or compare the way they evaluate OC beliefs. Both models are cognitive accounts of obsession formation and are anyway not incompatible and in practice can be combined.

Method

Participants

Participants (\(N = 115\)) diagnosed with OCD were recruited at the Centre de recherche Fernand-Seguin (CRFS), a research facility affiliated with the Hôpital Louis-H. Lafontaine in Montréal, Canada. Diagnosis was based on semi-structured interview (ADIS-IV; Brown, DiNardo, & Barlow, 1994) or clinical interview by a trained psychiatrist using DSM-IV criteria (APA, 1994). The final sample was made up of 70 women and 45 men. Their sociodemographic characteristics appear in Table 1. Mean age of the participants was 38.8 years, with a mean of 14 years of education. Approximately half were single (51%) and working full-time (51%). The Yale-Brown Obsessive-Compulsive Scale (YBOCS: Goodman, Price, Rasmussen, Mazure, Fleischmann et al., 1989; Goodman, Price, Rasmussen, Mazure, Delgado et al., 1989) total scores showed

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\(^3\) The IBA model considers these beliefs as peripheral since they focus on compulsive behaviours and not on core cognitive components of OCD (i.e. obsessional doubts and anticipated consequences).
that on average, the participants suffered from moderate to severe OCD ($M = 24.15; SD = 5.55$). The subtotal scores for obsessions and compulsions were respectively $11.48 (SD = 3.55)$ and $12.67 (SD = 2.79)$. According to the revised Padua Inventory (PI-R: van oppen, Hoekstra, & Emmelkamp, 1995), the primary compulsive behaviours were the following: checking (40.0%), washing (22.0%) and ordering (8.0%). It was impossible to classify 30% of the participants in a specific category, since they had mixed symptoms. The Beck Anxiety Inventory (BAI: Beck, Epstein, Brown, & Steer, 1988) revealed that, on average, participants suffered from mild anxious symptoms ($M = 14.40; SD = 9.79$). According to the Beck Depressive Inventory (BDI: Beck, Rush, Shaw, & Emery, 1979), participants were also suffering on average from mild to moderate depressive symptoms ($M = 16.62; SD = 10.68$).

*The criteria used to assign individuals to a specific category of predominant symptoms was a mean score greater or equal to 2.0 on at least one of the PI-R subscales and a highest PI-R subscales mean score at least 0.5 greater than any other PI-R subscales mean scores (see Julien, O'Connor, Aardema, & Todorov, 2006). The 2.0 criteria ensured the inclusion of only participants whose mean score for predominant symptoms was in range between ‘quite a lot’ and ‘very much’ on the PI-R subscales (indicating more severe OCD symptoms), and the 0.5 criteria logically implies that people are in a recognizably different category in terms of the PI-R subscales.
Measures

Clinical scales addressing core OC beliefs
The probability of obsessional doubt and the realism or likelihood of anticipated consequences were first assessed transversally using clinical rating scales (see O’Connor & Robillard, 1999) that ranged from 0 (not at all) to 100 (extremely). Since the anticipated consequences follow on from the obsessional doubt, a convenient format to separate obsessional doubts (i.e. primary or initial inferences) and anticipated consequences (i.e. secondary inferences) is to use a logical template of the form, ‘If . . . then . . .’ (O’Connor, Aardema, & Pelissier, 2005). The following example involving fear of contamination will now be used to describe this logical template: ‘If the hands are dirty, then I will contaminate others’. Here, in logic, the first clause after ‘If’ is the primary inference (or premise); the clause after ‘Then’ is the secondary inference (or corollary). If the primary inference is not clear, it is possible to work back from the consequences and ask, ‘. . . and that will happen if what state of affairs (is true), or (happens). . .? ’ So, in the following example, the client (C) spontaneously volunteers a consequence to the therapist (T).

C: If I don’t wash my hands, I will contaminate others.
T: And others will be contaminated if what state of affairs is true?
C: Well, if my hands are dirty.

After having properly identified the obsessional doubt (e.g. if my hands are dirty) by differentiating it from the anticipated consequence (e.g. others will be contaminated), the therapist may now use the following scales to assess the core OC beliefs related to the this fear of contamination:

(a) The Probability of Obsessional Doubt Scale (POD) was used to evaluate degree of belief in obsessional doubt as a real probability, that is likely to be true, according to the following question: to what extent is it probable that (example: your hands may be dirty)?
(b) The Realism of Anticipated Consequences Scale (RAC) was employed to assess belief in anticipated consequences according to the following question: if your hands are, in fact, dirty, to what extent is it realistic to think that you could (example: contaminate others by not washing them)?

Self-monitoring diary addressing core OC beliefs
The probability of obsessional doubt and the realism of anticipated consequences were also assessed longitudinally using a self-monitoring diary. The probability of the doubt and the realism of anticipated consequences were rated daily using an identical rating scale (0–100).

Clinical scales addressing more peripheral OC beliefs
Beliefs focusing on behaviours were also evaluated using clinical rating scales (see O’Connor & Robillard, 1999) that ranged from 0 (not at all) to 100 (extremely). No longitudinal data were gathered for these beliefs. The following clinical scales were used:
The Degree of Conviction (DCP) scale evaluated degree of conviction in the need to perform rituals to prevent anticipated consequences according to the following question: to what extent are you convinced that you must perform your washing ritual to avoid contaminating others?

The Perceived Ability to Resist Scale (PAR) assessed how participants perceived their resistance to rituals according to the following question: to what extent do you believe that you are capable of resisting your washing ritual?

Yale-Brown Obsessive Compulsive Scale
The clinician’s version of the Yale-Brown Obsessive Compulsive Scale (Y-BOCS; Goodman, Price, Rasmussen, Mazure, Fleischmann et al., 1989; Goodman, Price, Rasmussen, Mazure, Delgado et al., 1989) was used to assess the severity of the OCD symptoms. Separate scores of severity were calculated for obsessions and compulsions. On the 10 items of the Y-BOCS, scores range from 0 (no symptom) to 4 (extreme symptoms). The original version shows excellent interrater reliability for the Y-BOCS total scores ($r = 0.98$), and good reliability ($\alpha = 0.88-0.91$) (Goodman, Price, Rasmussen, Mazure, Delgado et al., 1989). The French version (Mollard, Cottraux, & Bouvard, 1989) used in this study exhibits excellent internal consistency with satisfactory convergence and discriminant validity (Bouvard et al., 1992).

Beck Anxiety Inventory (BAI)
The Beck Anxiety Inventory (BAI; Beck et al., 1988) was used to assess the severity of anxiety. On each of the 21 items of the BAI, scores range from 0 (not at all) to 3 (severely, I could barely stand it). The original version shows high internal consistency ($\alpha = 0.91$), good test–retest reliability (0.75), moderate convergence validity ($r = 0.51$) and good discriminant validity ($r = 0.25$) (Beck et al., 1988). The French version of the BAI used in this study shows good internal consistency and satisfactory test–retest reliability, convergence and discriminant validity (Freeston, Ladouceur, Thibodeau, Gagnon, & Rheaume, 1994).

Beck Depression Inventory
The Beck Depression Inventory (BDI; Beck et al., 1979) was employed to evaluate the severity of depression symptoms. The BDI total score range is from 0 to 63. The original version shows excellent internal consistency (split-half reliability: 0.95). The French version of the BDI used in this study demonstrates excellent internal consistency and satisfactory test–retest reliability (Bourque & Beaudette, 1982).

Procedure
The data came from three separate studies that had been conducted at the CRFS in the period 1998–2002 (O’Connor, Aardema, Bouthillette et al., 2005; O’Connor et al., 2006; O’Connor et al., 2009). Data was gathered during pre-treatment, with the exception of the self-monitoring diary kept by participants throughout the therapy. The recruitment procedure was as follows: participants were initially assessed by a psychiatrist at the Hôpital Louis-H. Lafontaine. Individuals were accepted as part of a research project when they met OCD diagnostic criteria contained in the DSM-IV-R (APA, 2000). They were diagnosed with primary OCD. Participants currently taking psychotropic
drugs were accepted into the study, but with the dose of the molecule stable over the
previous three months and during treatment. Individuals presenting with a severe
comorbid personality disorder (i.e. a borderline or schizoaffective personality disorder)
or a major depressive disorder of severe intensity with suicidal thoughts were excluded
from the study.

The four clinical scales addressing core and peripheral OC beliefs according to the
IBA model were administered by a trained therapist during a clinical interview. Based
on our clinical experience, we think that interviews may be more reliable to access
OC beliefs than self-reported questionnaires. The scoring procedures for all clinical
scales were as follows: the belief in probability, likelihood of consequences, need to
perform ritual, ability to resist ritual, were assessed for each of the principal
obsessions/compulsions identified for each participant (up to a maximum of
10 obsessions/compulsions). Means were then calculated over all principal
obsessions/compulsions for each scale. As in other scales (e.g. BABS and OVIS), OC
beliefs were thus measured by a single score. It might be justifiably claimed that
calculating the mean loses idiopathic information on each separate obsession and
compulsion. In clinical practice, obsessions can be assessed and addressed individually
but IBA consider the process of obsessional doubt to be similar across all obsessions.
Hence degree of doubt across obsessions is comparable and the mean more
representative of the overall process of doubting for any one person. Clinical validity
of the scales has been established since they are sensitive to change post treat-
ment and change is associated with successful outcome (O’Connor et al., 2006).
Concerning the self-monitoring procedures, each participants had to record daily
ratings in the probability of two important obsessional doubts as well as in the realism
of two significant anticipated consequences. The participants were instructed by the
therapist in keeping the self-report diary according to a manual (Freeston & O’Connor,
1997). All other measures (i.e. Y-BOCS, BAI and BDI) were administered by an
independent psychologist blind to treatment condition.

**Overview of the statistical analyses**

Parametric tests were the principal analyses since the main study variables were
normally distributed. Correlational analyses were performed to determine the
relationship between OC beliefs as well as to observe how these beliefs may be related
to the severity of symptomatology and how core OC beliefs fluctuate over time
(self-monitoring diary). Confidence intervals (95%) for the rho (ρ) parameter were
then calculated by converting Pearson’s r values into Fisher’s Z scores (see Kline, 2004,
p. 34). The rho parameter is an estimation of the correlation hypothesized to exist
within the general population of bivariate values from which the sample was drawn.
Independent t tests were also performed to compare participants who rated the
probability of their obsessional doubt low or high. Here the independent variable
was split into groups (low and high belief in the POD). Scores obtained on the RAC, DCP
and PAR scales served as dependent variables. In all cases, variances were
homogeneous. Effect size for the t-tests was estimated by the point-biserial correlation
(ri) which indicates the strength of the association between a dichotomous variable
and a continuous variable (see Kline, 2004, p. 114). A hierarchical regression was
also performed to verify if belief in the POD significantly predicted the perceived
ability to resist neutralizing, controlling for other OC beliefs and the severity of
symptomatology.
Results
Preliminary analyses showed that the participants, who had been recruited from different studies, did not differ significantly on all measures. Furthermore, and in line with the first claim of the IBA model, it was possible to identify (based on the procedure using a logical template described earlier) in each obsession reported by each participant an initial inference of doubt about a state of affairs (e.g. If my door is unlocked . . .) despite the presence of distressing images (e.g. I see a stranger trying to open my door . . .) or subsequent appraisal of consequences (e.g. It is terrible, my house will be burgled . . .).

Distribution of scores obtained on each OC beliefs scale
Our results showed that all OC beliefs were normally distributed along a dimension graded from low to high conviction, supporting the second claim of the IBA model. Belief in POD may thus be quantified along a dimension that ranged from a small probability to a near or complete certainty with degrees of skewness and kurtosis of $-0.04$ and $-0.81$, respectively (the closer the values are to zero, the more the distribution is considered normal). This observation was confirmed by the Kolmogorov-Smirnov test ($K-S[109] = 0.74; p = .64$). Belief in RAC was also quantified along a dimension graded from not at all realistic to completely realistic with degree of skewness and kurtosis of $-0.16$ and $-0.55$, respectively ($K-S[108] = 0.50; p = .96$). Similar results were found with the DCP showing degree of skewness and kurtosis of $-0.54$ and $-0.53$, respectively ($K-S[103] = 1.07; p = .20$). Finally, the PAR was also normally distributed across subjects with respectively $0.34$ and $-0.18$ for skewness and kurtosis ($K-S[108] = 0.45; p = .99$).

Fluctuations (test–retest) of scores on both core OC beliefs scales
The self-monitoring diaries were analyzed to determine to what extent belief in POD as well as belief in RAC fluctuated at 1-month baseline period preceding therapy. Reliability was calculated by the following procedure: the means scores (i.e. representing the mean level of belief in doubt/anticipated consequences) obtained during the second week was compared to the means scores recorded during the fourth week. The second and fourth weeks were selected for practical reasons. It enabled the participants to become familiar with recording their self-monitoring diary. Results showed that the mean level of belief in POD recorded during the second week strongly correlated with respective scores obtained during the fourth week (obsessional doubt 1, $r[107] = 0.85; p = .00$; CI of $95\% = 0.78 < p < .89$ and obsessive doubt 2, $r[104] = 0.85; p = .00$; CI of $95\% = 0.78 < p < .89$). Furthermore, the correlation between the level of belief in the probability of two distinct obsessional doubts recorded during the same week was significant, $r[105] = 0.39; p = .00$; CI of $95\% = 0.21 < p < .54$, but approximately $38\%$ ($N = 40$ out of $105$) of participants who scored high on a given obsessional doubt also scored low on a different obsessional doubt at the same time. Our findings also demonstrated that the mean level of RAC measured during the second week was strongly associated with respective scores obtained during the fourth week$^5$ (anticipated consequences 1,

$^5$Correlations were estimated based on a randomly selected subsample of 33 participants since longitudinal data for anticipated consequences were not available for all 105 participants who completed a self-monitoring diary for obsessional doubts.
\[ r[33] = 0.87; \quad p = .00; \quad \text{CI of } 95\% = 0.75 < \rho < 0.93 \] and anticipated consequences, \[ r[33] = 0.84; \quad p = .00; \quad \text{CI of } 95\% = 0.70 < \rho < 0.92 \]. Furthermore, the correlation between the level of belief in the realism of two different consequences measured during the same week was significant, \[ r[33] = 0.38; \quad p = .03; \quad \text{CI of } 95\% = 0.04 < \rho < 0.64 \], but approximately 36% (\( N = 12 \) out of 33) of participants who scored high on a given anticipated consequence also scored low on another different consequence at the same time. Overall, a participant could deem one of his obsessional doubts as being probable or one of his anticipated consequences as being realistic and at the same time consider another doubt as improbable or another consequence as unrealistic. Hence within any one participant there could be a range of beliefs over distinct doubts or consequences.

**Associations between POD and other OC beliefs**

Descriptive data for each OC beliefs scales appear in Table 2. Pearson's bivariate correlations obtained between these scales are shown in Table 3. Our results indicated that there were significant positive correlations between beliefs concerning POD and RAC (\( r[108] = 0.63; \quad p = .00; \quad \text{CI of } 95\% = 0.49 < \rho < 0.73 \)), between POD and DCP (\( r[103] = 0.47; \quad p = .00; \quad \text{CI of } 95\% = 0.29 < \rho < 0.60 \)), and also between RAC and DCP (\( r[102] = 0.52; \quad p = .00; \quad \text{CI of } 95\% = 0.37 < \rho < 0.65 \)). As hypothesized, where the doubt was considered highly probable, the consequence of not acting on the doubt was considered more realistic.

Table 2. Means and standard deviations for scores obtained on the OC beliefs scales

<table>
<thead>
<tr>
<th>Scales</th>
<th>M</th>
<th>SD</th>
</tr>
</thead>
<tbody>
<tr>
<td>Core beliefs</td>
<td></td>
<td></td>
</tr>
<tr>
<td>POD ((N = 109))</td>
<td>56.59</td>
<td>22.68</td>
</tr>
<tr>
<td>‘Low belief in the POD’ group* ((N = 55))</td>
<td>37.88</td>
<td>12.72</td>
</tr>
<tr>
<td>‘High belief in the POD’ group* ((N = 54))</td>
<td>75.64</td>
<td>12.25</td>
</tr>
<tr>
<td>RAC ((N = 108))</td>
<td>54.09</td>
<td>24.39</td>
</tr>
<tr>
<td>Peripheral beliefs</td>
<td></td>
<td></td>
</tr>
<tr>
<td>DCP ((N = 103))</td>
<td>58.49</td>
<td>25.51</td>
</tr>
<tr>
<td>PAR ((N = 108))</td>
<td>36.45</td>
<td>17.19</td>
</tr>
</tbody>
</table>

*The median (\( \text{Median} = 57.5 \)) was used to assigned participants in both groups.

Participants who obtained a mean score on the POD scale below the median (\( \text{Median} = 57.5 \)) were then assigned to the ‘low belief in the POD’ group and those who obtained a mean score above the median were assigned to the ‘high belief in the POD’ group. By dividing the level of doubt into two groups, the correlation obtained between obsessional doubts rated as highly probable and RAC (\( r[53] = 0.47; \quad p = .00; \quad \text{CI of } 95\% = 0.23 < \rho < 0.66 \)) was slightly higher than the correlation recorded between obsessional doubts with low probability and RAC (\( r[55] = 0.38; \quad p = .00; \quad \text{CI of } 95\% = 0.13 < \rho < 0.58 \)). Of the 53 participants who estimated POD as high, 39 of them (74%) also rated a high belief in RAC, whereas 14 participants (26%) had inversely rated a low belief in RAC.
Table 3. Associations between belief in the obsessional doubt as a real probability (POD) and other OC beliefs

<table>
<thead>
<tr>
<th>OC beliefs scales</th>
<th>POD</th>
<th>RAC</th>
<th>DCP</th>
<th>PAR</th>
</tr>
</thead>
<tbody>
<tr>
<td>POD</td>
<td>–</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>RAC</td>
<td>0.63*; CI = 0.49; 0.73</td>
<td>–</td>
<td></td>
<td></td>
</tr>
<tr>
<td>DCP</td>
<td>0.47*; CI = 0.29; 0.60</td>
<td>0.52*; CI = 0.37; 0.65</td>
<td>–</td>
<td></td>
</tr>
<tr>
<td>PAR</td>
<td>–0.41*; CI = -0.56; -0.25</td>
<td>-0.31*; CI = -0.48; -0.13</td>
<td>-0.52*; CI = -0.65; -0.36</td>
<td>–</td>
</tr>
<tr>
<td>Low belief in the POD</td>
<td>–</td>
<td>0.38*; CI = 0.13; 0.58</td>
<td>0.48*; CI = 0.24; 0.67</td>
<td>-0.10; CI = -0.36; 0.17</td>
</tr>
<tr>
<td>High belief in the POD</td>
<td>–</td>
<td>0.47*; CI = 0.23; 0.66</td>
<td>0.43*; CI = 0.18; 0.63</td>
<td>-0.51*; CI = -0.68; -0.27</td>
</tr>
</tbody>
</table>

Note. *p < .01. It is important to note that Pearson’s r values of 0.10, 0.30, and 0.50 correspond, respectively, to small, medium and large effects (see Kline, 2004, p. 133). CI, Confidence interval (95%). Estimation of the rho parameter (ρ) between the values indicated. POD, Probability of Obsessional Doubt; RAC, Realism of Anticipated Consequences; DCP, degree of conviction in the need to perform rituals for preventing consequences; PAR, Perceived ability to resist compulsive rituals.
Our results also showed that there were significant negative correlations between PAR and POD ($r[106] = -0.41; p = .00$; CI of 95%: $-0.56 < p < -0.25$), between PAR and RAC ($r[105] = -0.31; p = .00$; CI of 95%: $-0.48 < p < -0.13$), and also between PAR and DCP ($r[100] = -0.52; p = .00$; CI of 95%: $-0.65 < p < -0.36$). However, in dividing the sample by level of POD into two groups (low and high belief), a negative correlation within the high belief in POD group between POD and PAR scales proved to be significant, ($r[52] = -0.51; p = .00$; CI of 95%: $-0.68 < p < -0.27$). The more probable an individual with OCD rated their obsessional doubts, the less s/he rated the ability to resist neutralizing behaviours.

In order to determine more precisely if participants who rated belief in POD high differed from those with low levels of POD on RAC, DCP and PAR scales, three $t$ tests were performed. By applying a Bonferroni correction (0.05/3 = 0.02), the results showed that participants who scored high on POD scored significantly higher on the RAC scale ($M = 66.67; SD = 22.94$) in comparison to participants with low levels of conviction in POD ($M = 41.97; SD = 19.17$), $t(106) = -6.08; p = .00$; $r_{pb} = 0.50$. Scores on the POD scale explained approximately 25% ($r_{bp}^2 = 0.25$) of the variance in scores recorded on the RAC scale. Participants in the high belief in POD group also obtained significantly higher scores on the DCP scale ($M = 65.43; SD = 26.34$) compared to participants in the low belief in the POD group ($M = 51.69; SD = 22.94$), $t(101) = -2.83; p = .01$; $r_{pb} = 0.27$. Furthermore, the results obtained on the PAR scale explained 7% ($r_{pb}^2 = 0.07$) of the variance in scores recorded on the DCP scale. Lastly, participants with high levels of belief in POD obtained significantly lower scores on the PAR scale ($M = 31.29; SD = 17.48$) in comparison with those who rated the POD low ($M = 41.86; SD = 15.24$), $t(105) = 3.54; p = .00$; $r_{pb} = 0.31$. The results recorded on the POD scale explained approximately 10% ($r_{pb}^2 = 0.10$) of the variance of the PAR scale.

**Associations between OC beliefs and the severity of symptomatology**

Pearson’s bivariate correlations obtained between each of the OC beliefs scale and the severity of symptomatology are presented in Table 4. Our results indicated that there were significant negative correlations between the PAR scale and the severity of anxious symptoms ($r[108] = -0.22; p = .02$; CI of 95%: $-0.39 < p < -.03$), the severity of obsessions ($r[108] = -0.24; p = .01$; CI of 95%: $-0.41 < p < -.05$), the severity of compulsions ($r[108] = -0.26; p = .01$; CI of 95%: $-0.43 < p < -.08$), the overall severity of OCD symptoms ($r[108] = -0.29; p = .00$; CI of 95%: $-0.45 < p < -.11$), as well as with the severity of depressive symptoms ($r[108] = -0.20; p = .04$; CI of 95%: $-0.37 < p < -.01$). The lower the overall severity of symptomatology, the higher an individual with OCD rated PAR. However, none of the other OC beliefs was significantly associated with the severity of symptomatology.

**Belief in POD as a predictor of PAR**

Knowing that the PAR scale was significantly related to the RAC scale and to the DCP scale, as well as to the severity of symptomatology, a hierarchical regression analysis was carried out to determine if addition of information regarding belief in POD improved prediction of PAR beyond that afforded by the other variables. Table 5 displays the standardized regression coefficients ($\beta$), the semi-partial correlations ($sr^2$), the $R^2$ as well as the adjusted $R^2$ after entry of all independent variables (IVs). $R$ was significantly
Table 4. Associations between OC beliefs and the severity of symptomatology

<table>
<thead>
<tr>
<th>Scales</th>
<th>Severity of anxious symptoms (BAI)</th>
<th>Severity of obsessions (Y-BOCS)</th>
<th>Severity of compulsions (Y-BOCS)</th>
<th>Overall severity of OCD symptoms (Y-BOCS)</th>
<th>Severity of depressive symptoms (BDI)</th>
</tr>
</thead>
<tbody>
<tr>
<td>POD</td>
<td>0.08; CI = -0.11; 0.26</td>
<td>0.08; CI = -0.11; 0.26</td>
<td>0.12; CI = -0.07; 0.30</td>
<td>0.11; CI = -0.08; 0.29</td>
<td>0.10; CI = -0.09; 0.28</td>
</tr>
<tr>
<td>RAC</td>
<td>0.09; CI = -0.1; 0.27</td>
<td>-0.02; CI = -0.21; 0.17</td>
<td>0.16; CI = -0.03; 0.34</td>
<td>0.07; CI = -0.12; 0.26</td>
<td>0.11; CI = -0.08; 0.29</td>
</tr>
<tr>
<td>DCP</td>
<td>0.06; CI = -0.14; 0.25</td>
<td>0.12; CI = -0.08; 0.31</td>
<td>0.02; CI = -0.17; 0.21</td>
<td>0.09; CI = -0.11; 0.28</td>
<td>0.07; CI = -0.13; 0.26</td>
</tr>
<tr>
<td>PAR</td>
<td>-0.22*; CI = -0.39; -0.03</td>
<td>-0.24**; CI = -0.41; -0.05</td>
<td>-0.26**; CI = -0.43; -0.08</td>
<td>-0.29**; CI = -0.45; -0.11</td>
<td>-0.20*; CI = -0.37; -0.01</td>
</tr>
</tbody>
</table>

Note. *p < .05; **p < .01. It is important to note that Pearson’s r values of 0.10, 0.30, and 0.50 correspond, respectively, to small, medium and large effects (See Kline, 2004, p. 133). CI, Confidence interval (95%). Estimation of the rho parameter (\( \rho \)) between the values indicated. POD, Probability of Obsessional Doubt; RAC, Realism of Anticipated Consequences; DCP, degree of conviction in the need to perform rituals for preventing consequences; PAR, Perceived Ability to Resist Compulsive Rituals; BAI, Beck Anxiety Inventory; Y-BOCS, Yale-Brown Obsessive-Compulsive Scale; BDI, Beck Depression Inventory.
different from zero at the end of each step. After step 1, with RAC, DCP and all severity scores (i.e. Y-BOCS, BAI and BDI) in the equation, $R^2 = 0.36$, $F(5, 94) = 10.58$; $p = .00$. After step 2, with POD scores added to the prediction of PAR by RAC, DCP and severity scores, $R^2 = 0.39$, $F(6, 93) = 9.92$; $p = .00$. Addition of POD scores to the equation with RAC, DCP and severity scores resulted in a significant increment in $R^2$ of approximately 3%. These results thus suggest that the PAR was significantly and independently predicted by belief in POD. Two other IVs also contributed significantly and independently to prediction of PAR; the overall severity of OCD symptoms ($sr^2 = 0.03$), and the degree of DCP ($sr^2 = 0.12$). An interesting finding was that belief in RAC did not significantly predict the PAR when controlling for the effect of other variables.

**Discussion and recommendations**

A principal claim of the IBA model is that all obsessions are associated with an inference of doubt about a state of affairs starting with a ‘maybe’, ‘perhaps’ or a questioning. The present study supports this assertion. Each participant in the sample was able to identify an obsessional doubt as the starting point of the obsession sequence. In our analysis, the doubt preceded the anticipated consequences of the obsession, which might be viewed as a separated source of distress. Clinically speaking, this observation implies that when a patient suffering from OCD reports distressing images or anticipated consequences of not ritualizing as the source of anxiety or as the origin of compulsive rituals, the therapist may suspect the presence of an underlying obsessional doubt that precedes all these manifestations. The initial doubt may thus be identified by using the template described earlier and cognitive interventions may later focus on the reasoning process feeding this doubt (see O’Connor, Aardema, & Pélissier, 2005).

Another claim of the IBA model is that the belief in the POD, as other OC beliefs, can be represented along a dimension graded from low to high conviction.
Our findings support this claim; the level of belief in POD was normally distributed in a representative sample of 108 participants suffering from OCD. These results suggest that belief in the POD approximates the sampling distribution of other OC beliefs about consequences of not doing rituals, which already form an item on current beliefs questionnaires (Grenier et al., 2006a). The normal distribution of POD, RAC, DCP and PAR beliefs as well as the stability over time observed for the two core OC beliefs scales (i.e. POD and RAC) represent a first step towards validation and development of these cognitive scales. Further studies are nevertheless needed to examine how peripheral OC beliefs fluctuate over time.

A further claim of the IBA model is that belief in the POD should relate significantly to other OC beliefs. Overall, the results suggest that the more a person suffering from OCD considers their obsessional doubts probable, the more the resulting anticipated consequences are considered realistic, the more s/he believes that compulsive rituals can prevent those consequences, and the less s/he think to be able to resist neutralizing. Indeed, most of the participants who rated their obsessional doubts as probable (i.e. high belief in the POD) also rated their anticipated consequences as realistic (i.e. high belief in consequences), confirming previous findings (O’Connor, Aardema, Bouthillier et al., 2005). However, approximately a quarter (26%) of the individuals who experience a high degree of conviction in obsessional doubt consider their anticipated consequences as less realistic, showing that these two cognitive components may fluctuate independently. Furthermore, the belief in PAR seems to be more strongly predicted by belief in POD than by belief in RAC. Even if an individual considers the consequences s/he anticipates as completely unrealistic (i.e. low belief in anticipated consequences), s/he may be incapable of resisting compulsions if s/he continues to rate their obsessional doubts as highly probable (i.e. high belief in the POD). The degree of PAR is also explained by other variables such as the DCP and the severity of OCD symptoms. The more an individual is convinced that rituals may prevent feared consequences, the less s/he will rate the PAR. Here, these two cognitive components could be situated at the opposite end of the same continuum; an increase in PAR is automatically accompanied by a decrease in DCP and vice-versa. Also, the more severe a person’s OCD symptoms, the less s/he will rate the PAR. These findings are in accordance with other results demonstrating that the perceived usefulness of rituals and the severity of OCD may affect the level of resistance to rituals (Catapano, Sperandeo, Perris, Lanzaro, & Maj, 2001; Eisen et al., 2001; Ito, De Araujo, Hemsley, & Marks, 1995). A potential confounding variable not measured in this study could also explain our results; the perceived severity of consequences. For example, an individual with a high degree of POD (e.g. Did I lock the door? I think I probably did not) who anticipates severe consequences (e.g. Forgetting to lock my door might be catastrophic; a robber might steal my jewels . . .) may have a low resistance to rituals even if s/he deems the RAC as low (e.g. It is not realistic to think that a robber might enter to steal my jewels . . .). Further work studying the perceived severity of consequences and it is relation to other OC beliefs are required to test this hypothesis.

In sum, a questionnaire designed to assess OC beliefs based exclusively on an assessment of anticipated consequences about not neutralizing would run the risk of concluding that an individual displays low conviction in obsessional beliefs even if s/he rates the obsessional doubts as highly probable. The results of the current study suggest that the POD is an important aspect for clinicians and researchers to consider when assessing OC beliefs and that in 26% of cases it is independent of the RAC. It would therefore appear to be important to separate belief in POD from belief in RAC when
assessing OC beliefs, especially since the PAR seems to be better predicted by the former. The results of the present study are also consistent with previous research demonstrating that appraisals about anticipated consequences or dysfunctional beliefs (e.g. inflated responsibility, tendency to overestimate threat, etc.) are not always identified in cases of OCD (Taylor et al., 2006). Individuals with a high degree of belief in their obsessional doubts and a low degree of belief in their anticipated consequences may correspond to a subtype of OCD associated with no appraisal. In previous studies, this subtype of OCD seems to be associated with specific symptoms. Indeed, some patients state that they feel compelled to perform their compulsions not because of any dysfunctional beliefs, but because of the need to attain a sensory-affective ‘feeling’ that things are ‘just right’ or complete (Summerfeldt, 2004; Taylor et al., 2006). In the present study, no specific symptoms of OCD seem to characterize participants with a high degree of belief in POD and a low level of conviction in RAC. Because only fourteen participants were included in this subgroup, further studies with a larger sample should be undertaken to verify if this subgroup is related to specific symptoms. In line with this recommendation, a study using a larger sample has shown that beliefs concerning POD were negatively and independently associated with checking symptoms whereas those concerning the RAC were positively and independently related to the fear of contamination symptoms (Grenier, O’Connor, & Belanger, 2006b). Further studies should help to better understand the association between belief in the POD and other clinical variables (see Grenier et al., 2006b).

Despite the robust results obtained, the present study shows some limitations. The findings do not indicate the direction of the relationships. Covariate relationships were found, but causal relationships were not. Consequently, it is impossible to know if an increase in the POD precedes or follows an increase in the RAC or in the DCP. It is also impossible to know if an increase in the PAR precedes or follows a decrease in the level of OC beliefs related to doubt or to anticipated consequences. A single case design study with repeated measures conducted by our research team answers some of these questions (Grenier, O’Connor, & Belanger, 2008). In this study, data about OC beliefs and the severity of symptomatology were collected during a cognitive-behaviour therapy (CBT) for OCD. Results showed that decrease in the RAC was always accompanied by a decrease in the POD suggesting that these beliefs may change in synchrony throughout a CBT. However, the contrary was not always supported; individuals with OCD could show a significant decrease in the RAC without an accompanying significant decrease in the POD. The results also demonstrated that the severity of OC symptoms (i.e. YBOCS) generally decreased in synchrony with the level of beliefs in doubt and in anticipated consequences. Even if belief in the POD seems not to be significantly related to the severity of OC symptoms in a cross-sectional design, this longitudinal design reveals that fluctuations in both components may be associated. In this study (Grenier et al., 2008) as well as in the current one, no longitudinal data was available for the DCP as well as for the PAR. Further studies are thus warranted to explore how these peripheral OC beliefs may fluctuate during a CBT for OCD.

The results of the current study as well as those of Grenier and colleagues (2008) suggest that when clinicians and researchers assess OC beliefs, it is important to separate belief in the POD from belief in the RAC because the former seems to better predict the PAR than the latter. In addition to the DCP and to the severity of OCD symptoms, the POD may be an important dimension to consider when evaluating beliefs in treatment resistance OCD, particularly with people unable to resist compulsive
behaviours. Finally, our results suggest that all four belief components proposed by the IBA model could be integrated in a new questionnaire specially designed to access beliefs in participants with OCD. The development of a new OC beliefs measure based on the IBA model is currently ongoing in our laboratory.

Acknowledgements
This study was conducted thanks to a doctoral research scholarship received by the first author from the Fonds de la Recherche en Santé du Québec (FRSQ), a Québec health research fund. This project was also funded by grant (200703HOP) to the second author from the Canadian Institutes of Health Research (CIHR).

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Received 26 June 2007; revised version received 9 March 2009