DISTRUST OF THE SENSES, IMAGINED POSSIBILITIES, REASONING ERRORS AND DOUBT GENERATION IN OBSESSIONAL-COMPULSIVE DISORDER

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Abstract

The aim of this study was to test whether obsessional-compulsive narratives contain reasoning devices postulated by the inference-based approach (IBA) to generate inferential confusion (defined as distrust of the senses and on over-investment in imagined/hypothetical possibilities). Two sets of seven judges recruited as a naïve, a knowledgeable or an expert group judged whether the content of eight verification and six contamination narratives contained "thought components" of four IBA reasoning devices and four classical cognitive distortions (CCD). All judges rated IBA thought components more frequent than CCD components. There was no statistically significant difference between naïve, knowledgeable or expert judges. There was however a difference in the profile of the percentage of the four separate types of IBA components rated present in verification and contamination narratives.

Key words: obsessional-compulsive narratives, inference-based approach (IBA), inferential confusion, classical cognitive distortions

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Introduction

Obsessive-compulsive disorder (OCD) is a debilitating disorder affecting 1-2% of the population (American Psychiatric Association [APA] 2000). Characteristic features of OCD include the presence of recurrent obsessions and/or compulsions that are both time consuming (lasting at least one hour per day), and cause significant impairment or marked distress (APA 2000). Early behavioural models of OCD emphasized negative reinforcement as factor in perpetuating obsessive compulsions, so emphasizing response prevention as a therapy (Rachman and Hodgson 1980). Recent cognitive models have emphasized either the way cognitive appraisals are accorded to obsessional intrusions causing obsessional distress or the inference processes generating obsessional doubt (O'Connor et al. 2005a). In the inference-based approach (IBA) to obsessional compulsive disorder (OCD), the obsessional sequence begins with an inference of doubt (see **figure 1**).

For IBA, at this point of doubting (*"maybe the door isn't locked"; "maybe my hands are not clean"*), the person is already sucked into the OCD sequence (O'Connor et al. 2005a). Some cognitive approaches would disagree and state that since the content of a doubt is commonly experienced, so the problem comes, not with the doubt, but later with its appraisal. But the presence and validity of doubt as a psychological construct was established by Grenier et al. (2010). In this study, 115 participants were tested for identifiable obsessional doubt. The degree of belief in the OD was normally distributed with good reliability (one obsessional doubt retest at 2 weeks: r[107] = 0,85; p = 0.00).

The degree of the doubt can be strong or weak. Belief in the probability of the obsessional doubt is normally distributed and it is independent of belief in the realism of the secondary consequences (Grenier et al. 2010). There is an OCD group for whom degree of belief in doubt may be low whose focus and anxiety concerns more the secondary consequences. There is also an OCD group for whom investment in secondary consequences is very low, but for whom the strength of belief in the doubt is high. The estimate for this strong belief group is at 25% of the total OCD population. This group is likely to go unrecognized by the current cognitive analyses which considers only secondary appraisals and consequences (Grenier et al. 2010).

The appraisal model argues that initial doubts and

Figure 1. *This schema situates the inference-based approach (IBA) as addressing initial doubt in OCD alongside other techniques addressing appraisals and neutralizations*
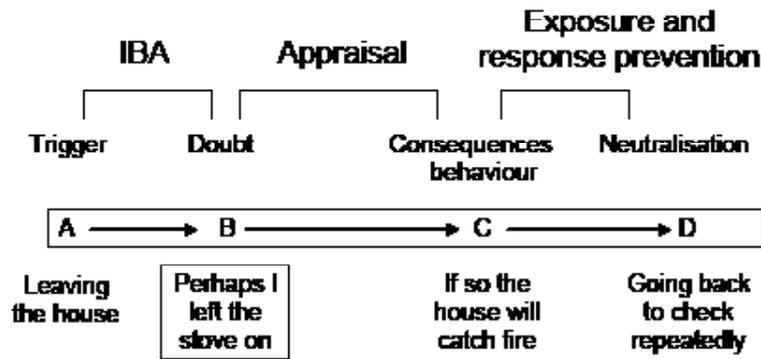
intrusions are normal because the <u>content</u> is shared with the general population (Frost and Steketee 2002). The IBA argument is that, although the <u>content</u> may be universal, the <u>context</u> in which the obsessional doubt arises is not. For people without OCD, a thought such as «*I left the stove on*» or «*Maybe the door is not closed properly*» generally follows some reality-based prompting. In OCD, the obsessional doubt generally arrives outside of any reality-based context. This distinction in context was established by Julien et al. (2009) who showed that a sample of 33 OCD reported significantly more indirect or no links between obsession onset and present context. Pathological OCD-generated doubt is distinguished from normal doubt on the basis of its contextless generation and subjective nature. In addition, the obsessional doubt arrives on a premise, trumping the person's original sensory-based conclusion (e.g. the hands look clean but the doubt questions my sense observation). Paradoxically, doubt may only arise when the person has sufficient information from reality to conclude there is no danger (O'Connor and Aardema 2012).

So where does the pathological OCD doubt come from and how is it constructed? According to IBA, the doubt is subjectively generated by an inductive narrative such as the examples in **table 1**.

The person considers that the arguments in the narrative justify the doubt since they include arguments from common sense, outside authority, prior experience and logical probability. But from a formal reasoning perspective, such arguments represent misleading devices including: category errors, misassociations, apparently comparable events, inverse inference and out of context facts (see **table 2**). So, in other words, the person finds a justification in doubting due to this prior reasoning narrative. Sometimes these inductive narratives occur spontaneously. This is especially so in contamination obsessions where the possibility of contamination seems uppermost in the mind and so avoidance of the source of possible contamination is a central activity.

However, in checking, the reasoning may be initially represented by a vague phrase such as: *«I want to be sure I'm sure», «I don't want any doubt about it»*. The narrative can be elicited by asking the person to justify: *«Why is it essential to check to be sure you're sure?», «How do you come to doubt the door could be open?»* This technique is sometimes termed "allowing the OCD to speak for itself".

One reasonable objection to this narrative elicitation process is that the narratives could simply be post-hoc justifications. The person is aware that checking the door repeatedly is abnormal. Asking for a justification puts the person on the spot and so a story is concocted ad hoc ergo propter hoc.

However, several observations argue against this post-hoc rationalization. The reasoning narrative supporting the doubt remains constant over time.

Table 1. *Narrative examples elicited to justify obsessional doubt*

Verification

Perhaps the hot plates on my stove are still turned on because…
«I heard on the television that an apartment block caught fire and I guessed it was because the occupants had forgotten to shut off the cooker. Also I was a witness once to a stove catching fire when my mother-in-law was cooking a meal. So if the cooker caught fire, I'm saying to myself that you can't leave a stove unwatched or it will catch fire. This is another proof that you need to be hypervigilant about turning off the stove after using it. Also, when I shut off the stove, I have trouble being sure since the light indicating it is off is really tiny.»

Contamination

Perhaps my hands aren't clean
«Firstly we know that microbes exist and can be found on the hands. For example, if I touch money regularly, I know the money is dirty because it's never washed and everybody touches it without washing their hands. So if I touch money, my hands will be dirty. In any case, everything I touch is likely to have been touched by another person who is likely to be careless washing their hands and whose dirt will stay on their hands. So I do well to wash my hands. I heard on the television that studies have concluded that we should wash our hands for at least 20-30 seconds to make sure they are clean».

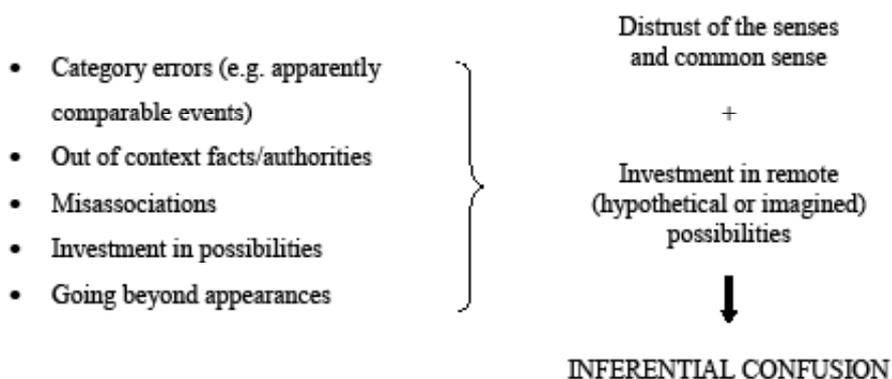**Figure 2.** *The reasoning devices found in OCD narratives*

- Category errors (e.g. apparently comparable events)
- Out of context facts/authorities
- Misassociations
- Investment in possibilities
- Going beyond appearances

Distrust of the senses and common sense

+

Investment in remote (hypothetical or imagined) possibilities

↓

INFERENTIAL CONFUSION

Table 2. *Classifying thinking components*

> **Apparently comparable events.** The person mixes up two events separate in time and place and considers them to be one and the same. The fact that one event occurred implies that the second event could occur even if they are completely distinct.
>
> **Dichotomous or black and white thinking.** The person adopts a black and white approach to thinking where, if one state or event is not present, then it is inferred that an extreme opposite must be true.
>
> **Distrusting the senses.** The person considers their five senses or their common sense could be fallible and so could be faulty in everyday verification. Hence they feel the need to be extra vigilant and re-check "just in case". The person believes it necessary to go beyond the senses to be sure of what is true.
>
> **Not tolerating uncertainty.** Typically the person cannot tolerate not knowing exactly what will happen. The person has a need to be absolutely sure of every aspect of an event or action before they are comfortable to embark. Any uncertainty makes the person anxious.
>
> **Over-responsibility.** The person expresses a responsibility for events which are way beyond control. Or the person may feel overly guilty about an event or act which they did not commit or about an omission or an unforeseen consequence of an act. The person may also feel solely responsible for an event in which they played only a minor part.
>
> **Imaginative possibilities.** The person bases conclusions on imaginary possible events rather than on what is really likely. Consequently, when the person imagines the possibility, it comes to seem and feel real.
>
> **Out of context facts or authorities.** The person quotes a remote often abstract fact or authority as a way of justifying doubting and checking in the here and now. The thought may come from a text or authority or common saying which the p0erson recites as a guide to action in the here and now.
>
> **Catastrophic thinking.** The person greatly exaggerates the consequences of an action or of a neglected action or may always jump to the worst case scenario.
>
> **Note.** There is nothing right or wrong about using these thinking categories and sometimes people can employ several categories at the same time.

The narratives across participants and even OCD subtypes contain remarkably similar reasoning devices. Recounting the narratives by themselves can produce doubt and the accompanying intense negative affect. And of course, modifying the narrative to eliminate the reasoning devices changes the strength of the obsessional belief, which forms the basis of inference-based therapy (O'Connor and Aardema 2012). Further, the narratives synchronize with a more fundamental vulnerable self-theme or feared self (e.g., *I could become a careless negligent person*) (O'Connor et al. 2007). This underlying self-theme forms the basis for understanding why a person may have obsessions and compulsions in distinct domains. For example, a person whose OCD feared self is "maybe I'm not a good mother", may perform cleaning, checking and impulsive phobic rituals.

The reasoning devices found in OCD narratives are given in **figure 2** and **table 2** and combine to encourage the person to distrust the senses and invest in remote hypothetical or imagined possibilities, a process termed inferential confusion. Inferential confusion is defined as a reasoning process whereby the person confuses possibility with reality and so crosses over from the world of the senses to imagination.

Previous studies have established the presence of these two processes of inferential confusion psychometrically (Inferential Confusion Questionnaire – ICQ), experimentally and clinically in terms of therapy outcome. The original ICQ is a 15-item questionnaire measuring the two factors of inferential confusion: distrust of the senses and overinvestment

in possibility. A more recent version (ICQ-EV) has 30 items (Aardema et al. 2010). Psychometrically, the ICQ discriminates well between OCD, anxiety and non-clinical controls (Aardema et al 2010). The ICQ is normally distributed, characterizes in different degrees all types of OCD (Wu et al. 2009), and predicts treatment outcome. Experimentally, Pélissier et al. (2009) have established that in formal reasoning tasks, people with OCD invest more in remote possibilities than controls, and this generalizes to everyday situations (Aardema and O'Connor 2012). Clinically, the inference-based approach which centres on eliminating pathological doubt, modifies all subtypes of obsessions and compulsions in OCD and OCD with overvalued ideation with large effect sizes (O'Connor et al. 2005b, 2013).

But, so far, a content analysis to verify whether these reasoning devices are detectable systematically by independent judges as separate components within the OCD narrative has not been performed. The exercise is particularly relevant since some analyses of the ICQ factors have reported the scores less predictive of checking than other subtypes (Wu et al. 2009).

Aim

So, in this study, we perform a content analysis on the reasoning narratives of people diagnosed with OCD with either predominant checking or contamination themes and which lead people with checking and contamination compulsions to doubt. The hypotheses were: (1) that IBA reasoning components would significantly characterize the narratives as opposed to classical cognitive distortion (CCD) components; (2) there would be agreement both by expert and naïve judge ratings, so showing the ratings were not just a product of training; and (3) there would be no difference in the rating of the presence of components over verification and contamination narratives.

Method

Eight checking narratives and six contamination narratives were elicited in the course of our current therapy program and selected at random from 12 participants from a total of 32 people meeting Diagnostic and Statistical Manual Version 4 (DSM-IV-R) criteria for OCD and completed a recent inference-based therapy (IBT) open trial. Participant characteristics are given in **table 3**.

Inclusion/exclusion criteria were: age, 18-65 years; No major comorbid disorder requiring treatment on DSM-IV-R Axis I & II; No recent history of substance abuse; Clinical rating on Yale-Brown Obsessional Compulsive Scale (Y-BOCS) <16; No medical problems; Stabilized on any medication for at least two months.

Judges

We recruited two sets of seven people to judge the presence of eight reasoning errors or distortions (titled: thinking components) and the extent to which they were present in each of the 14 individual narratives. The thinking components included classical cognitive distortions (CCD) such as dichotomous thinking, intolerance of uncertainty, control over thoughts, overresponsability, and IBA-based reasoning devices such as: apparently comparable events, imagined possibilities, distrust of the senses, out of context facts (see **table 2**). The judges were asked to rate both the presence of the thinking components within each of eight checking and six contamination narratives. The seven judges included: four researchers or doctoral students working in neuroscience or biomedical science who were naïve to debates on cognitive domains in OCD, and with no knowledge of CCD and IBT approaches (naïve group); three doctoral students in areas of psychology with some knowledge of CCD approaches to OCD (knowledgeable group). Two sets of seven judges were chosen as two independent groups for rating either the

Table 3. *Demographic and clinical characteristics of OCD participants for whom verification and contamination narratives were with clinical scores pre, mid and post 20 week IBT and at 6-month follow-up*

	Subject code	**Age**	**Sex**	**Y-BOCS Pre**	**Y-BOCS MI**	**Y-BOCS Post**	**Y-BOCS P6M**	**BDI Pre**	**BDI Post**	**BAI Pre**	**BAI Post**
1	1704	25	F	20	9	9	8	10	3	2	4
2	1744	29	F	39	24	18	5	13	11	22	11
3	1927	37	F	27	19	12	16	11	8	8	19
4	1942	32	H	21	16	11	9	3	1	7	9
5	1947	30	H	29	8	6	11	7	3	7	9
6	1962	58	F	35	18	17	17	20	19	18	13
7	1986	39	F	26	17	1	4	19	2	21	3
8	1595	49	F	16	8	6	3	11	3	3	0
9	2318	30	F	27	20,5	12	5	2	0	17	5
10	1785	41	F	28	14	8	12	10	13	5	4
11	2166	24	M	30	20	7	5	17	6	6	5
12	1794	42	F	20	17	2	9	0	0	3	7

contamination or checking narratives. Two clinicians trained in IBT also rated the same narratives as experts in order to compare ratings of the two groups of naïve and knowledgeable judges with expert judges and whether rating was biased by expertise. The two sets of judges were separately recruited for an independent rating of contamination and verification narratives, but one of the expert clinicians rated all sets of narratives.

Protocol

The narratives were elicited inside the IBT treatment protocol at the start of therapy. At this point, the participant would have received a basic outline of the IBT model and would be aware that subjective doubt was a key component in OCD. The narratives were elicited by asking the participant for a subjective justification of the initial doubting without further instruction.

The narratives were given in a paper and pencil version to the judges including instructions of how to rate the narratives, two practice narratives and the eight checking and six contamination clinical narratives. No information was given about the origin of the narratives. In addition to OCD narratives, we included a post-treatment narrative (supposedly free of inferential confusion reasoning) and one generalized anxiety disorder (GAD) narrative. All judges received definitions of the eight "thinking components" plus two practice narratives to ensure comprehension. A response category of "none of the above" was also provided on the judges' response grill. The practice narratives were checked for comprehension and a post-treatment IBT narrative and a GAD narrative were included as dummy items and checks on response set. After the judges completed the grill for each of the separate OCD narratives, they handed the completed form to the project coordinator.

The thinking components included classical cognitive distortions such as dichotomous thinking, intolerance of uncertainty, control over thoughts, overresponsibility, and IBA-based reasoning devices such as: apparently comparable events, imagined possibilities, distrust of the senses, out of context facts. The definition of component is given in **table 2**.

Analysis

The mean frequency with which both IBA and CCD thinking components were rated present in each OCD narrative was calculated across verification and contamination narratives separately and for each of

the three groups of judges (naïve, knowledgeable, expert). The comparative presence of IBA "thinking components" versus CCD thinking components was examined using Fisher's exact test and results are given in **table 4**. **Table 4** shows data separately for checking and contamination narratives. The analysis was performed separately for the six contamination and the eight checking narratives. A Fisher's exact test was calculated separately for each of the three groups of judges to compare the number of CCD and IBA thinking components rated present by each of the three groups. The frequency of cognitive components and IBT components was then summed across the four cognitive and four IBA thought components to give two categories of components: CCD or IBA. The three sets of judges were also asked to rate the percentage of thinking components present in each narrative (including "none of the above") to a total 100%. So the judges weighted each component they considered present in terms of a percentage, and the total of all the percentage weightings of components could not exceed 100%. The percentage that each component was rated present in each narrative was calculated across checking and contamination narratives, and separately for each group of judges. An ANOVA was calculated to see if there was a difference between naïve, knowledgeable and expert judges in their rating of which IBT components were present. Finally, a chi-square was calculated to see if there was an overall difference in the 18 judges global rating of the IBA component between the checking and contamination narratives.

Results

All three groups and two sets of seven judges rated IBA thinking components present in greater frequency than the classical cognitive distortions in both contamination and checking narratives. However, the naïve group was only near significance in their greater rating for the checking narratives.

There was however no significant difference in the ANOVA calculated to examine the percentage difference between the three groups of judges (naïve, knowledgeable, expert) in the allocation of percentage of thinking components present in the narratives $(F[3,18] = 1.56; p<0.22)$. Finally, there was a significant difference between the judges rating of the checking and contamination narratives $(X^2 [3] 22.06; p<0.000;$ Cramers V = 0.34). The contamination ratings reflected less doubting of the senses than the verification narratives and the judges rated the presence of more out of context facts in the verification narratives than

Table 4. *Frequency of "thinking components" rated as present in narratives: Scores are summed over the 8 checking narratives for each of the 3 groups of judges*

	Cognitive components	IBA components	Fisher's exact test
Naïve group (n=4)	28	69	p<0.07
Knowledgeable group (n=3)	6	56	p<0.01
Expert clinicians (n=2)	4	56	p<0.01

Frequency of "thinking components" rated as present in narratives. Scores are summed over the 6 contamination narratives for each of the 3 groups of judges

	Cognitive components	IBA components	Fisher's exact test
Naïve group (n=4)	16	47	P<0.001
Knowledgeable group (n=3)	7	45	P<0.001
Expert clinicians (n=2)	0	29	P<0.001

Table 5. *Ratings of percentage to which judges considered each IBA reasoning component were present in OCD checking narrative. Scores are averaged over the 8 checking narratives for the 3 groups of judges plus overall score*

	Apparently comparable events	Imaginary possibilities	Distrusting the senses	Out of context facts
Naïve group (n=4)	27%	27%	26%	18%
Knowledgeable group(n=3)	33%	36%	21%	10%
Expert group (n=2)	17%	34%	32%	17%
Overall	**26%**	**32%**	**26%**	**15%**

Percentage that each IBA reasoning component was rated present in each contamination narrative

	Apparently comparable events	Imaginary possibilities	Distrusting the senses	Out of context facts
Naïve group (n=4)	10%	30%	0.4%	37%
Knowledgeable group(n=3)	27%	33%	7%	26%
Expert group (n=2)	8%	49%	8%	36%
Overall	**15%**	**37%**	**5%**	**33%**

the contamination narratives. However, both types of narratives were rated to contain imagined possibilities in equal percentage.

Overall, all sets of judges were able to discriminate inferential confusion components from alternative cognitive components. There were no notable differences between naïve and experienced judges. Although one naïve judge did rate a number of cognitive components, none of the judges rated the presence of over-responsibility in the contamination narratives (**tables 4**, **5**).

Post IBT and generalized anxiety narratives

Neither the knowledgeable nor expert groups judged that any IBA or CCD components were present in the narratives elicited post-IBT. The naïve group rated the presence of two CCD components. The mean rating of the GAD narrative average across judges featured: catastrophic thinking; intolerance of uncertainty apparently compared to events; and imaginative possibilities as key thinking components. Overwhelmingly, catastrophic thinking was rated as present in the GAD narrative by all 18 judges and intolerance of uncertainty rated as present by nine judges. However, apparently comparable events and imaginative possibilities were also rated present by respectively 10 and 14 judges. Percentage wise, catastrophic thinking was rated as the most present thinking component in the generalized anxiety narrative by judges, with in a mean of 45% in each narrative. The next most frequent rating was imaginative possibilities, with mean presence of 21% in each narrative. Overall, there was no difference in the GAD narrative between the rated presence of cognitive and IBA thought components categories, with an equal frequency of 24 in each category.

Discussion

The two sets of seven separate judges ratings of reasoning in the narratives justifying checking and contamination largely supported the inference-based model. Such narratives were rated consistently to contain reasoning components taking the person away from their senses and towards remote possibilities and associations. Significant differences in frequency ratings showed that IBT reasoning components do not overlap substantially with more traditional cognitive distortions on key appraisal assumptions. Judges naïve to CBT or IBT were able to detect and discriminate cognitive distortions from IBT reasoning devices. Interestingly, there was no significant difference in ratings between judges naïve to IBT/CBT "thinking components" and ratings of knowledgeable judges and experts in IBT, either in terms of frequency or percentage of components present. So hypotheses 1 and 3 were supported. The narratives post-treatment were free of OCD reasoning devices and were more sense-based.

The results largely confirm the IBA claim that OCD narratives consistently contain the same pattern of reasoning devices which lead the person to infer doubt on the basis of inferential confusion, when their sense and common sense have concluded otherwise. Although clinical outcome did not feature as part of the current study, it can be noted from **table 3** that the majority of participants benefitted from IBT intervention maintained at follow-up. Hence, the claim that the IBA model forms a basis for treatment has some clinical validity.

There were, however, differences in the percentage of components rated present in the checking and contamination narratives. Although both sets of ratings agreed on the percentage presence of imaginary possibilities in both cases, the judges rated the use of distrust of the senses and the use of out of context facts as the least present in checking narratives, whereas the reverse was true of contamination narratives. This finding disconfirmed hypothesis 2 but does suggest the components are independent and specific even if they contribute to the same inferential confusion process.

Future research may include a wider range of thinking components could have been employed and of course there remain other subtypes of OCD besides contamination and verification whose were not tested. Narrative content remains to be indentified and whether subtypes show a distinct profile of the presence of IBA reasoning devices.

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