



An experimental re-examination of the inferential confusion hypothesis of obsessive–compulsive doubt



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ABSTRACT

Background and objectives: The inferential confusion hypothesis postulates that obsessive doubt is perpetuated by a subjective form of reasoning characterized primarily by a distrust of reality and an overreliance on imagined possibilities. However, experimental evidence for this hypothesis may be compromised by a potential confound between type of information (reality vs. possibility) and its valence (danger vs. safety). In the present study we aimed to untangle this potential confound.

Methods: Forty OCD and 40 non-clinical participants underwent two versions of the Inferential Processes Task (Aardema, F., et al. (2009). The quantification of doubt in obsessive–compulsive disorder. *International Journal of Cognitive Therapy*, 2, 188–205). In the original version, the reality-based information is congruent with the safety hypothesis, whereas the possibility-based information is congruent with the danger hypothesis. In the modified version incorporated in the present study, the reality-based information is congruent with the danger hypothesis, whereas the possibility-based information is congruent with the safety hypothesis.

Results: Our findings did not support the inferential confusion hypothesis: both OCD and control participants changed their estimations of the probability of unwanted events based on the type of information they received (whether it conveyed danger or safety) regardless of whether it was framed as reality or possibility.

Limitations: The design of the present study does not lend itself to examining alternative explanations for the persistence of doubt in OCD.

Conclusions: The hypothesized inferential confusion in OCD requires further validation. It is particularly important to demonstrate that findings do not reflect a prudential reasoning strategy.

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1. Introduction

Obsessive–compulsive disorder (OCD) is characterized by frequent obsessions and compulsions with a debilitating effect on overall functioning and well-being. OCD is often referred to as “the doubting disease” (Janet, 1903) because obsessions tend to take the form of a doubt, such as “I might have left the stove on” or “I might be contaminated”. In order to decrease the distress caused by the doubt, individuals with OCD employ various forms of compulsive behavior, such as checking, mental reconstruction, or obtaining

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reassurance from others. Because of its central role in OCD, researchers have examined various aspects of obsessive doubt, including its scope and its underlying mechanisms. This research shows that doubt is not limited to typical OCD concerns but may be quite general. People with OCD often doubt their memory (e.g., Brown, Kosslyn, Breiter, Baer, & Jenike, 1994; Constans, Foa, Franklin, & Mathews, 1995; Coughle, Salkovskis, & Wahl, 2007; Dar, Rish, Hermesh, Fux, & Taub, 2000; MacDonald, Anthony, MacLeod, & Richter, 1997; McNally & Kohlbeck, 1993; Tolin et al., 2001) and related capacities such as decision-making and concentration abilities (Nedeljkovic & Kyrios, 2007; Nedeljkovic, Moulding, Kyrios, & Doron, 2009). Other studies have shown that obsessive–compulsive (OC) individuals also distrust their attention, perception and senses (Aardema, O'Connor, & Emmelkamp, 2006; Hermans et al., 2008; Hermans, Martens, De Cort, Pieters, & Eelen,

2003; van den Hout, Engelhard, de Boer, du Bois, & Dek, 2008; van den Hout et al., 2009). More recent studies have shown that OC tendencies are associated with doubt in regard to internal states such as relaxation and muscle tension (Lazarov, Dar, Oded, & Liberman, 2010; Lazarov, Dar, Liberman, & Oded, 2012a, 2012b).

Research into the underlying mechanism of obsessional doubt demonstrated that compulsive behaviors, and especially checking, only increase obsessional doubt, leading to a vicious cycle of more checking and more doubting (e.g., Ashbaugh & Radomsky, 2007; van den Hout & Kindt, 2003, 2004). However, not much is known about why obsessional doubts are maintained despite ample evidence that contradicts them. For example, why does the person with OCD doubt that the door is locked even though s/he standing right in front of it? One theory which attempts to explain this striking feature of OCD is the *inference based approach* (IBA; O'Connor, Aardema, & Pélissier, 2005), which postulates that a central cognitive factor in OCD is *inferential confusion* (Aardema & O'Connor, 2003, 2007; O'Connor & Robillard, 1995, 1999). Inferential confusion represents a failure to recognize the unrealistic nature of the obsession due to a subjective form of reasoning characterized primarily by a distrust of the senses and an overreliance on possibility or imagination. According to this model, the obsessive person in the above example doubts that the door is locked due to over-reliance on possibilities that support the idea that the door might nevertheless be open (e.g., maybe I did not turn the lock sufficiently; Aardema, O'Connor, Pélissier, & Lavoie, 2009). More generally, the inferential confusion theory states that “people with OCD distrust reality—the world of the senses—and favor subjective possibilities that negate the senses” (Aardema et al., 2009, p. 189).

Aardema et al. (2009) emphasize that inferential confusion has to be distinguished from threat-related appraisals. Although obsessions often develop in relation to danger, what is specific to OCD according to the IBA is the cognitive process, i.e., the element of inferential confusion (“e.g., I might be in danger ... even though I see and sense nothing to support it;” Aardema et al., p. 189). The authors support this claim by citing studies in which inferential confusion, as assessed by the Inferential Confusion Questionnaire (Aardema, O'Connor, Emmelkamp, Marchand, & Todorov, 2005) was independently related to obsessive–compulsive symptoms while controlling for overestimation of threat and responsibility (Aardema et al., 2006; Aardema, Radomsky, O'Connor, & Julien, 2008). It is still possible, however, that the apparent failure of people with OCD to let go of doubts that concern danger (e.g., the door might not be properly locked) is not a result of a general problem in their cognitive processes but rather reflects a “better safe than sorry” policy. In other words, persistent doubt in the face of threat might reflect *prudential reasoning* rather than inferential confusion.

In general, the prudential reasoning hypothesis states that in the face of threat people tend to use a prudential reasoning strategy (e.g., de Jong, Haenen, Schmidt, & Mayer, 1998; Smeets, de Jong, & Mayer, 2000). This strategy entails focusing on and confirming the worst hypothesis, and then reiterating the testing process; thus, it

tends to lead to confirmation of the danger hypothesis and disconfirmation of the safety hypothesis (Jonson-Laird, Mancini & Gangemi, 2006; Mancini & Gangemi, 2004a). This prudential strategy is especially relevant to anxiety disorders, which are marked by intense emotional reaction to disorder-specific threats. For example, de Jong et al. (1998; de Jong, Mayer, & van den Hout, 1997; Smeets et al., 2000) found that individuals with hypochondriasis are more likely to selectively search for confirming information when asked to judge the validity of a danger conditional hypothesis in the context of health threats (e.g., If a person suffers from a headache, then that person has a brain tumor). The threat can also be related to guilt and responsibility, which are central features of OCD (Arntz, Voncken, & Goosen, 2007; Mancini & Gangemi, 2004a, 2011; Niler & Beck, 1989; Rachman, 1993; Salkovskis, 1985; Salkovskis & Forrester, 2002; Van Oppen & Arntz, 1994). Specifically, studies have demonstrated that people check safety and danger hypotheses related to the outcome for which they feel responsible more prudently than subjects who are not made to feel responsible (e.g., Mancini & Gangemi, 2004a, 2004b, 2006). The persistent doubt in OCD (e.g., is the door really locked?) could therefore result from the motivation to minimize the possibility of being responsible and/or feeling guilty, which would lead to a prudential reasoning strategy, rather than from any general disorder in inferential reasoning.

The present study aimed to re-examine the conclusions of a recent experimental study by Aardema et al. (2009) that was interpreted as supporting the inferential confusion hypothesis. The original study employed a new inference process task (IPT), in which participants were presented with two hypothetical written scenarios leading up to an inference (see Table 1). The first scenario was a semi-typical OCD-related narrative presenting the possibility that the protagonist of the story may have caused an accident while driving a car across a busy intersection (accident scenario). The second scenario was a non-OCD-related narrative presenting the possibility of a bus strike while waiting for a bus (bus strike scenario).

Participants were alternately presented with possibility- and reality-based information (Tables 2 and 3) in relation to the doubt induced by the two scenarios. Following each presentation, participants rated the probability that the event referred to in the scenario (accident, bus strike) has occurred. Aardema et al. (2009) found that participants with OCD were similarly affected by reality-based information as non-clinical controls, but more influenced by possibility-based information, leading to higher levels of doubt. However, in the original version of the IPT, reality-based information was always congruent with the idea that no accident/no bus strike had happened (i.e., the safety hypothesis), whereas the possibility-based information was always congruent with the idea that a car accident/bus strike had happened (i.e., the danger hypothesis; see Tables 2 and 3). Because of this confound, the effects of possibility on the subjective probability that the event has happened (which is the authors' operationalization of doubt) cannot be separated from the effect of danger information.

Table 1

The two scenarios of the IPT (from Aardema et al., 2009).

OCD-relevant scenario	Non OCD- relevant scenario
You're on your way to work with the car. This morning you read about an accident where a truck driver unknowingly drove over someone, and left the scene of the accident without realizing. You wonder how it is possible that someone could not notice this while driving. As you drive along, you come across an intersection and come to a halt at the stoplight. It is quite busy, with a lot of people on the other side of the intersection waiting to cross the street. You notice a group of young people, boys and girls, chasing each other, running on and off the street. As the light turns green you start to accelerate. Then, just as you pass the intersection you hear a scream and feel a bump!	You are on your way to a restaurant for an evening out with your friends. You have decided to take the bus to save some money even though the possibility of a bus strike was announced on the news yesterday. Once you arrive at the bus stop you wait for 20 min with several people standing beside you and still no bus has arrived. Then you overhear something about “a strike.” Soon afterward most of the people around you disappear.

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