REASONABLE DOUBT

(Un)reasonable doubt as affective experience: obsessive–compulsive disorder, epistemic anxiety and the feeling of uncertainty

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Abstract

How does doubt come about? What are the mechanisms responsible for our inclinations to reassess propositions and collect further evidence to support or reject them? In this paper, I approach this question by focusing on what might be considered a distorting mirror of unreasonable doubt, namely the pathological doubt of patients with obsessive–compulsive disorder (OCD). Individuals with OCD exhibit a form of persistent doubting, indecisiveness, and over-cautiousness at pathological levels (Rasmussen and Eisen in Psychiatr Clin 15(4):743–758, 1992; Reed in Obsessional experience and compulsive behaviour: a cognitive-structural approach, Academic Press, Cambridge, 1985; Tolin et al. in Cogn Ther Res 27(6):657–669, 2003). I argue that the failure in OCD is of an affective nature, involving both excessive *epistemic anxiety* and hyperactive *feelings of uncertainty*. I further argue that our adaptive disposition to inquire about the right matters—that is, about propositions which are both epistemically risky and imply harmful possibilities—might depend on these affective mechanisms.

Keywords Reasonable doubt · Adaptive doubt · Obsessive–compulsive disorder · Epistemic anxiety · Feeling of uncertainty

1 Introduction

You are sitting on a plane about to take off to some exotic holiday destination, when suddenly you start wondering whether you closed the bathroom window before leaving this morning. You replay the scenes in your head, but you just cannot find a clear

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memory of *actually* closing it. Unable to settle the matter, you remain unsure. You hear the stewart's voice in the background: "In the unlikely event of…" Meanwhile, various dreadful scenarios start running through your mind: a prowler might already have intruded your apartment, destroying everything. That's it; you decide that you will call your best friend and ask him to go check as soon as you've landed. You spend the rest of the flight intermittently worrying about what *might have happened*.

How does doubt come about? What are the mechanisms responsible for the motivation to reassess propositions—such as "I have closed the windows before leaving"—and collect further evidence to support or reject them? In this paper, I approach this question by focusing on what might be considered a distorting mirror of unreasonable doubt, namely the pathological doubt of patients with obsessive–compulsive disorder (OCD).

I start by clarifying the type of doubt which will be the focus of my study: a doubt that is, like in the above example, motivated by practical interests and which acts as a reason for mental and physical action. Following Peirce (1877), I call it *real doubt*. The main objective of this paper is to propose a psychologically realistic account of the mechanisms involved in the raising of real doubt.

Drawing from Jennifer Nagel (2010), I propose a view of *epistemic anxiety* as an affective state which provides motivational power to real doubt. The fact that real doubt is motivated by an emotion which tracks possible threats allows us to conduct our inquiries in ways which serve our practical interests, and to deploy cognitively costly strategies only when stakes are high.

If epistemic anxiety typically motivates our inclinations to doubt in an adaptive manner, explaining how this emotion is itself triggered requires us to go deeper into the affective mechanisms behind doubt. One way to do this is to look at which mechanisms malfunction when individuals develop a stable tendency to doubt unreasonably, in a way which hinders the attainment of practical goals, instead of supporting it. I present some OCD symptoms as the result of such a chronically dysfunctional doubt, and I introduce two different views suggesting that dysfunctional experiences linked to subjective certainty or uncertainty underly these OCD symptoms. Expanding on Cochrane and Heaton (2017), I argue that the intrusive doubt of OCD patients suggests a chronic dysfunction of the metacognitive mechanisms underlying the feeling of uncertainty.

I further suggest that, when functioning properly, this uncertainty-detecting system forms the basis for our adaptive disposition to doubt and inquire into the right matters. The original contribution of this paper is to propose a model of the affective architecture of real doubt, based on recent hypotheses regarding the chronically dysfunctional doubt of OCD patients. The model I put forward in Sect. 7 includes both a feeling of uncertainty signaling epistemic risk, and epistemic anxiety signaling potential practical costs. This system results in our adaptive disposition to doubt and inquire about what matters pragmatically.

2 Doubt with motivation

I shall first and foremost specify that I will not be interested here in analyzing the meaning of expressions such as "having some doubts about" or "having little doubt about" *p*. My interest is rather in investigating the affective basis of the occurrent mental state of doubt. In the creeping doubt which we have when we gradually come to suspect that we did not close the bathroom window, the evidence against our having closed it is made salient to us, which motivates an intention to inquire. This mode of presentation of the evidence and this intention to inquire are characteristic of the state I identify as doubting. The doubt I shall be focusing on has many common features with what Charles Peirce has analyzed in terms of *real doubt*. I shall now expose these features.

In the 1860s and 1870s, Peirce discussed the Cartesian tradition in philosophy and attacked Descartes's methodological doubt, claiming that Descartes did not have good reasons for his doubts. For Peirce, the *Meditations* are in no way an example of genuine inquiry, but rather a waste of effort artificially directed at "paper doubts". Peirce considers philosophers who "have imagined that to start an inquiry it was only necessary to utter a question":

> But the mere putting of a proposition into the interrogative form does not stimulate the mind to any struggle after belief. There must be a real and living doubt, and without this all discussion is idle […] When doubt ceases, mental action on the subject comes to an end; and, if it did go on, it would be without a purpose (1877, IV)

As Peirce claims, the *real* and *living* doubt is tied with states of irritation, excitement and surprise, and implies a struggle after belief. Peirce claims that doubt must be *felt* and genuinely motivated. For Peirce, understanding the epistemic importance of doubt requires that the only kind of doubt we take seriously is the one which *truly* presents a proposition as demanding our attention.

Let us take an example, from which we shall draw the key criteria that distinguish real doubts from paper doubts. If I doubt that it will rain tomorrow, I concede that the information I possess does not enable me to formulate a reliable prediction concerning local weather. In normal times, being in such a state regarding tomorrow's weather will not be a source of preoccupation; it won't be accompanied by a specific phenomenology and it won't motivate me to launch any specific action plan. Now let us imagine that I doubt that it will rain tomorrow, while I am getting married tomorrow and planned an outdoor ceremony, or that I am a farmer whose crops are threatened by a terrible drought. If I find myself in one of these two situations, I am much more likely to experience negative feelings with regard to the situation, to view it as a problem which needs to be solved, and to be moved to action as a result.

What are the key criteria which in this example distinguish paper doubt from the sort of doubt in which the bride and the farmer are? We can isolate at least three criteria which can help us distinguish between real and paper doubt. These are: the role of practical interests, the phenomenology, and the motivation to action. First, real doubt seems to be tightly linked to the practical interests of the individual, while paper doubt is not. Paper doubt might be grounded in a reason, but a theoretical one

only. It is because I live on selling my crops that I become worried about the drought, and therefore about the uncertainty of rain. Real doubt is a doubt which involves the notion of a potential threat to the attainment of my current goals. Second, real doubt is underscored by a distinct phenomenology, while this is less clear in the case of paper doubt. As H. H. Price puts it: "Doubt *is* something which we feel, or at any rate it is something which we experience or 'live through'" (Price 1969, p. 285). Third, real doubt is a motivational state; it moves a subject to mental and physical activity, while paper doubt does not necessarily. Through its distinct phenomenological manifestation, real doubt motivates us to inquire further. In this sense, real doubt is also a *directional* state; it points towards a course of action.

Real doubt is thus the sort of doubt that is motivated by practical interests, underscored by a distinct phenomenology, and which in turn motivates action. This is the doubt I shall be focusing on. We may come to doubt whether *p* merely as a result of judging that our belief was formed in an epistemically risky fashion, without practical interests playing any obvious role in the process. However, more often than not in everyday life, we come to doubt a proposition when the practical costs of holding a false belief are salient. One of the main objectives of this paper is to provide a model of the affective mechanisms responsible for our everyday, natural inclination to doubt, and for the occasional instances in which it produces unreasonable doubt.

In what follows, I set up the theoretical background for my study of real doubt. In particular, I suggest that the mechanisms underlying it should be able to account for our adaptive disposition to selectively doubt those propositions which are both epistemically risky and pragmatically costly.

3 When and why we doubt: the cognitive cost of doubting

What motivates real doubt? In order to understand this, I shall first introduce a few principles which are thought to guide our everyday reasoning. More particularly, I introduce the notion of adaptive cognition, and the aversion to costly error as a motivational factor.

We can refer to *adaptive cognition* as the "broad label for the idea that agents adapt their cognitive efforts to how they represent the practical factors relevant to the task at hand" (Gerken, 2017). According to adaptive cognition theories, variations in *cognitive effort* are adaptive: we typically invest more or less resources in forming beliefs depending on the expected rewards for accuracy or costs for inaccuracy. Thus, the way in which we form and revise our beliefs is largely influenced by the *practical costs* which we associate with the possibility of forming a false belief.

According to such view, our daily cognitions are strongly driven by the motivation to *minimize costly errors* (Trope and Liberman 1996; Mele 2001). Our motivation to avoid costly errors is implemented in our belief formation processes through a system of thresholds which track the cost of mistakenly committing to or mistakenly rejecting a proposition. Consequently, the amount of evidence that we will require for forming a belief is calculated on the basis of the costs of forming a false belief, and the costs of rejecting a true belief, as well as the costs, in time and effort, of gathering further evidence. In other words, the higher the costs of mistakenly believing *p*, the more

evidence we will be motivated to gather and process before we form the corresponding belief. That is, the higher the stakes, the more motivated we will be to avoid premature closure of inquiry and extend evidence collecting.[1]

Because we are constrained by our cognitive economy, and because doubting is cognitively demanding, we should view it as adaptive for humans to doubt only when they need to. The act of doubting is typically tied in with personal goals, so that in our everyday life we tend to doubt propositions that matter to us. If this is right, the mechanisms responsible for our inclinations to doubt must involve an assessment of that proposition not only as epistemically risky but also pragmatically costly. If our sensitivity to practical factors is implemented into our belief formation processes, and if doubting is part of belief formation, then the mechanisms underlying our tendency to doubt must be sensitive to such concerns. That is they must be able to detect those propositions which present not only epistemic risk but also, and most importantly, potential practical costs. In the next section, I expose how I believe this assessment is made.

4 Epistemic anxiety

I shall argue in what follows that this assessment most often takes the form of an emotional reaction which, drawing from Jennifer Nagel (2010), I call *epistemic anxiety.*

How could an emotion be related to our disposition to doubt? Emotions—and affect more generally—guide choice, and especially risk-perceptions (Slovic and Peters 2006). Certain emotions and moods like fear and anxiety even have the specific function of rendering the dangers and risks in our environment salient. In particular, a disposition towards the emotion of anxiety is thought to underlie individual differences in the tendency to avoid risky decisions (Maner and Schmidt 2006).

I want to suggest that, in virtue of the type of objects anxiety tracks, this emotion might play a central role in the fact that our belief formation (and revision) processes are sensitive to our practical concerns and our motivation to avoid costly errors. I indeed believe that most of the doubts we engage in as part of our everyday life, and which are tied to our practical interests, are motivated by a moderate, healthy amount of anxiety. In order to see this, let us now draw a quick portrait of anxiety; its objects, its motivational tendencies, and the type of concerns with which it is typically associated.

What is anxiety? Anxiety is an emotion which apprehends some event or situation as *implying* a possible and uncertain threat or thwarting of one's goals (Miceli and Castelfranchi 2005). We can feel anxiety because we are able to project ourselves into possible scenarios and anticipate how events *could* unfold. In the case of anxiety, attention is focused specifically on ways in which negative or harmful possibilities could materialize. It is now widely acknowledged that anxiety is a valuable emotion

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[1] There might be cases where forming a false belief turns out to be the least costly solution for the subject. These might be cases where an inaccurate hypothesis functions well and allows one to pursue inquiry or other needed actions, while articulating an accurate hypothesis would involve so many resources that it would hinder further inquiry. However, here we will be concerned with cases in which the pragmatic benefits of forming a more accurate judgement offset the pragmatic costs of increased mental effort.

shaped by natural selection which grants us protection from a wide range of potential threats (Marks and Nesse 1994; Barlow 2001).

What are anxiety's potential objects? Kurth (2015, p. 5) proposes that the evaluative property which anxiety tracks—in other words, its *formal object*—can be articulated as a "problematic uncertainty". This formulation captures the two notions which are central to anxiety: the notion of an epistemic gap or lack of information, and the notion of a threat or thwarting of one's goals which renders the lack of information "problematic". Anxiety thus involves the apprehension of potential negative outcomes (implied by some particular event or situation) over which we lack information.

What is anxiety's motivational impact? Because anxiety makes salient a prospect that is appraised as harmful for the individual, it prompts a readiness to face this potential threat, as well as attempts to gain information (regarding its chances of materializing, its magnitude, specific nature, etc.). As David Barlow suggests: "If one were to put anxiety into words, one might say, 'That terrible event could happen again, and I might not be able to deal with it, but I've got to be ready to try'" (2001, p. 64). Anxiety thus also involves an evaluation of one's ability to cope with a possible threat. It has been suggested that anxiety might be best characterized as a *family of emotions* that share a common core (the sensitivity to possible and uncertain threat) but are elicited in response to different kinds of threat (threats to one's physical integrity, one's social status, etc.). Now, which kind of anxiety might be best suited to impact our motivation to doubt?

In epistemology, *epistemic anxiety* is a notion that has been put forward by some to explain why inclinations to attribute knowledge to a subject vary according to pragmatic factors. In this debate, epistemic anxiety has been associated with a motivational tendency to invest greater cognitive efforts and collect more evidence in contexts that are evaluated as bearing important practical consequences for the agent. In particular, Jennifer Nagel (2010, p. 9) proposes that epistemic anxiety is "a generic expression for the heightened need for greater evidence and more thorough processing that is characteristic of high-stakes situations". As Nagel remarks, a mechanism which makes us invest more effort in belief formation or revision in high-stakes circumstances is an adaptive mechanism: "In general, automatic variations in epistemic anxiety make our thinking more 'adaptive' so that epistemic behavior like evidence-collecting is governed in ways that tend to complement rather than hinder our other pursuits" (Nagel 2010, p. 2).

While Nagel does not commit herself to the claim that epistemic anxiety is an emotion, I believe that understanding it as an emotion helps to explain how epistemic anxiety fills such a function. That is, it does so by making the possible negative outcomes implied by the states of affairs expressed by a proposition salient. I thus define episodes of *epistemic anxiety* as emotional episodes which have as object a certain state of affairs which can be expressed by a proposition *p* such as "the bank will not be open on Saturday morning" or "the train does not stop at Foxboro", where this possibility is evaluated as implying a possible threat.[2] I suggest that through feeling anxious about *p*, I gain the understanding that *p* implies a possible threat, that is high

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[2] In this paper, I will mainly be interested in anxiety when it manifests as an occurrent *state*, or a relatively short-lived emotional episode. However, anxiety can also manifest as a *trait,* which refers to an individual's stable tendency to experience this emotion, with some consistency across situations and over time.

potential practical costs. Such an understanding is prone to motivate the engagement of the demanding cognitions (deliberation, reasoning, etc.) that are constitutive of doubt. In short, epistemic anxiety can be metaphorically thought of as a barometer of how important it is that we get things right (or how costly it would be to get things wrong)—epistemically speaking—in a given situation. The fact that real doubt is motivated by an emotion which tracks possible threats allows us to conduct our inquiries in ways which serve our practical interests, and to deploy such cognitively costly strategies as deliberation only when our stakes are high.

If epistemic anxiety typically motivates our inclinations to doubt in an adaptive manner, explaining how this emotion is itself triggered requires us to go deeper into the affective mechanisms behind doubt. One way to do this is to look at the mechanisms which dysfunction when individuals develop a stable tendency to doubt unreasonably. In what follows, I present certain symptoms of obsessive–compulsive disorder as exemplifying an instance of a chronically dysfunctional real doubt.

5 Obsessive–compulsive disorder

The reason why the doubt of OCD patients is of particular interest here is not so much that it is pathological—engendering much distress and need for treatment—but rather that it is a doubt which is both real and chronically dysfunctional. It is because the doubt of OCD patients is a real doubt which has gone wrong that I believe it can inform us on the mechanisms at work in real doubt. The rationale is that by looking at what has gone—severely and chronically—wrong in OCD, we can build an informed hypothesis about what is going well when we doubt for good reasons.

OCD is characterized by the recurrence of unwanted, objectionable thoughts, and is diagnosed when obsessions and compulsions cause marked distress and interfere with the person's functioning. Obsessions are conceived of as "intrusive, unwanted thoughts, ideas, images, or impulses that are experienced as senseless yet anxiety evoking"; and compulsions are acts taking the form of "behavioural or mental rituals according to specified 'rules' or in response to obsessions" (Abramowitz et al. 2008, p. 5). The most common subjective clinical features of the disorder are doubts and indecision (Henderson and Pollard 1988; Rasmussen and Eisen 1992). The most common compulsive acts include repetitive checking, washing, counting, the need for reassurance seeking or unnecessary confessions, and repetitive attempts to attain symmetry (Attiullah et al. 2000).

Clinicians have long considered doubt as one of the major characteristics of OCD. Pierre Janet argued that OCD symptoms are "designed to compensate for a lack of certainty" and he named the disorder "la folie du doute", highlighting the central role of doubt in its symptomatology (Janet 1919). Indeed, individuals with OCD exhibit a form of doubting, indecisiveness, and avoidance of uncertainty at pathological levels (Rasmussen and Eisen 1992; Reed 1985; Tolin et al. 2003). Nowadays, doubt is still considered a central feature of the disorder, and has been linked to an inability to "experience a sense of conviction" (Shapiro 1965), put closure on experience (Reed 1985), or generate the normal "feeling of knowing" (Szechtman and Woody 2004). It has also been suggested that compulsive behaviors themselves reflect the need for

repeated evidence gathering and represent an attempt on the part of the subject to reduce uncertainty (Rotge et al. 2008; Stern et al. 2013). Here is a case illustration of a patient with OCD (Toffolo 2015, p. 2), which might help the reader apprehend the qualities of this disorder:

> Claire, a 38-year old general practitioner, has always been concerned about other people's wellbeing […] When she read a newspaper report about a hit-and-run driver the question popped into her mind whether it would be possible for a driver to not notice a collision, which highly distressed her. Since then she has the recurrent, frightening thought that she can never be certain that she has not caused an accident while driving, and therefore, has to drive her route back and forth several times to trace the road for any signs of a crash. Additionally, she listens frantically to the local radio to check for news reports about possible accidents, and avoids driving during rush hours when roads are particularly busy. Subsequently, she has started to doubt her memory. She has recurrent intrusive thoughts such as "what if I have not turned off the gas stove?" or "what if I did not unplug the coffee machine?", because this would put her elderly neighbor at risk of an explosion or fire. Therefore, she checks potential hazards around the house thoroughly: the stove, light switches, electrical outlets, plugs of appliances and so on have to be checked 12 times before leaving the house or going to bed. Due to her time-consuming compulsions that have increased over the years, she is now unable to work, hardly leaves the house and does not see her friends and family often

One way of understanding Claire's dysfunction in epistemological terms is by evoking the notion of epistemic possibility. Claire seems to treat such propositions as "I may have caused a serious accident without noticing it" or "I may have caused an explosion with my negligence and hurt my neighbor" as *live options*, which motivate an inquiry. Planning action on the basis of such remote possibilities seems unreasonable, and this even when the potential outcomes are seen as highly detrimental. Efficient action planning requires that we dismiss such remote possibilities as irrelevant for practical deliberation. When considering the various epistemically justified possibilities regarding where I could have misplaced my phone, it is reasonable for me to only be disposed to collect more evidence about whether my phone is in my backpack, in my coat, at the office, but not about whether my phone is somewhere in Tanzania or in my neighbor's freezer (Huemer 2007). I am epistemically justified to *dismiss* those latter hypotheses, and it is therefore reasonable for me *not* to check there.

Dismissing a proposition amounts to being strongly disposed not to take it seriously in practical deliberation. An important consequence of this is that a subject who dismisses a proposition is not disposed to bother to gather additional evidence about whether it is the case. Huemer (2007) indeed suggests that a function of our judgments of how remote or close possibilities are is to help us evaluate which propositions are worthy of further inquiry.

Some dismissals intuitively appear to be epistemically justified. We have a capacity to discriminate between the propositions presenting possibilities which are worthy of further inquiry from those presenting irrelevant possibilities which should be dismissed. This capacity seems somehow impaired in patients with OCD. My interest is

on the affective mechanisms which might sustain this epistemic failure. In the next section, I argue that those tendencies of OCD patients reflect a failure of affective experience, the nature of which will be exposed in Sect. 6.

6 A failure of affective experience

How can we explain the tendency of OCD patients to consider remote (but harmful) possibilities as live options worth inquiring into?

Traditional cognitive models of psychopathology emphasize the role of dysfunctional cognitions in the etiology and maintenance of the disorder (Beck et al. 1985). According to cognitive models of OCD, the disorder stems primarily from dysfunctional beliefs and responses to these beliefs. On the most influential cognitive model, OCD begins with dysfunctional appraisals of unwanted thoughts (Salkovskis 1985). A major worry with these models is that they do not seem to address the question of the origin of the disorder. If beliefs and their appraisals are at the source of the disorder, how do those beliefs appear, and how are these appraisals generated? How can we explain that such beliefs are present in the whole OCD population, and that evidence against them repeatedly fails to disconfirm them? It is generally claimed that early life experiences explain the presence of these beliefs. However, a strict education is neither necessary nor sufficient for developing OCD, and many develop OCD without such experience (Grisham et al. 2011). Additionally, according to the DSM-5, there is an important genetic factor at play in the development of OCD, which further suggests a more basic difference in the affective and cognitive processing of OCD sufferers.

The dysfunction at work indeed does not seem to be so much a problem in higher cognition. If persons with OCD believe that they know, they fail to feel that they know. It should be emphasized that there is no evidence of delusional beliefs in subjects with OCD; rather, these patients are aware that their worries are irrational and their precautions excessive, but do not seem to be able to give up on their attempts to achieve certainty with regard to the possibilities they obsess about.

In a more recent approach, Moore (2015) proposes an account of OCD based on a predictive coding model of cognition. In this account, human cognition uses a hierarchy of "formal narratives" to predict changes in the environment. One way of predicting changes is through the simulation of possible scenarios. Moore suggests that, in response to a threat stimulus, a network of prospective narratives is generated, whose probabilities depend on past experience. However, there is inter-individual variability in narrative generation, so that some individuals will generate many narratives with a low probability of realization. Creating "unlikely narratives" can protect the individual in unpredictable circumstances, but too many narratives with a low probability can result in a dysfunction.

Moore's hypothesis is that "in OCD an abnormally high number of narratives having a low probability is generated" (2015, p. 7). This leads to an abnormal level of imprecision and uncertainty in the recognition of the threat. This does not affect the global inference, which has evolved to manage uncertain sensory data; nonetheless, when the recognition of a threat is hindered, individuals are motivated to improve that inference and to respond to the threat. This explains why patients with OCD feel the

urge to improve the precision of the recognition by focusing attention repeatedly on the pseudo threat, while they usually have a correct understanding that the door is locked and that there is no threat. The individual acknowledges that the unlikely narrative can safely be dismissed, but the subpersonal mechanisms signaling imprecision and uncertainty are highly motivating and cannot easily be overridden.

While Moore's model focuses on the dysfunctional cognitive processes at play in OCD, this paper focuses on the affective processes, in ways that I believe are compatible. Although my account is of course constrained by empirical hypotheses, it is cast at a level of generality that makes it compatible with several hypotheses such as Moore's. Indeed, the possible scenarios are not only generated, but also evaluated in terms of reward or threat. These scenarios which present possibilities considered as potentially rewarding or potentially threatening are then used as reasons to make certain decisions and plan action. It is plausible that this second part of the process, the evaluation of possible events or situations based on actual input, crucially involves affect. As scenarios are generated, they are also quickly and reliably evaluated through affect in terms of the potential rewards or threats they involve.

My contribution in this paper is exclusively focused on the role played by affect in the disorder, with the aim of clarifying the structure of ordinary (non-pathological) doubt. What kinds of affective deficits or excesses might underpin the disabling experience of persistent doubt in OCD sufferers? Let us first consider the notion of *epistemic anxiety* that we have introduced earlier. Such an emotion might well carry some explanatory power with regard to the maladaptive epistemic tendencies of OCD patients. First, anxiety is certainly an emotion which plays an important part in the disorder. Although the DSM-5 (2013) revisers have separated OCD from anxiety disorders and created a separate category for OCD and related disorders, "marked anxiety or distress" is part of the diagnostic criteria for the disorder, where it is said that compulsions are aimed at "preventing or reducing anxiety" (DSM-5). Second, the severity of the doubt in OCD patients has recently been found to be "strongly related to the number of 'anxious' personality disorder traits, neuroticism score, and prevalence of generalized anxiety disorder, suggesting that doubt may be a trait vulnerability related to anxious and neurotic personality characteristics" (Samuels et al. 2017). This suggests that the disposition of OCD patients towards anxiety might be tightly related to the tendency for persistent doubting. This tendency could thus be understood as resulting from a breakdown or malfunctioning of the psychological mechanism of epistemic anxiety.

Postulating an excessive disposition towards this emotion could perhaps explain why these patients repeatedly experience an unreasonable need to double-check. This seems to be Christopher Hookway's suggestion, when he claims (2008, p. 63): "obsessives are unable to function cognitively because of an excessive capacity for epistemic anxiety". However, a tendency to experience more epistemic anxiety more often than average does not seem sufficient to explain why OCD patients repeatedly fail to be convinced by the evidence going against their fears. If anxiety plays a central role in making possible negative outcomes salient to the subject, explaining how patients find themselves unable to silence an intense and ever recurring sense of uncertainty requires an additional underlying factor.

Given that OCD sufferers (and checkers in particular) judge their own compulsive checking as unreasonable, it is plausible that a subpersonal element is involved in generating this sense of uncertainty. In the next sections, I present two views suggesting that dysfunctional subpersonal signals are involved in keeping these subjects in a persistent state of doubt. I then propose that such signals may be part of the affective architecture of real doubt tout court.

7 The deep origins of doubt

7.1 Weak certainty

In this section, I present two hypotheses regarding the emergence of persistent doubt in OCD. Each of these hypotheses postulates the existence of a signal or feeling which functions to monitor uncertainty or certainty.

The first of these two views has been introduced by Ronald De Sousa (2008), who proposes that the persistent doubt of OCD patients reflects an inability to generate the *feeling of certainty* (or rightness) which healthy subjects normally experience after having completed a cognitive task correctly. In De Sousa's terms: **"**I lay no claim to a diagnosis or explanation of this syndrome; but at least some aspects of it invite a description in terms of a failure of the feeling of certainty or rightness to be triggered by the memory of the required action" (2008, p. 197).

The feeling of certainty or rightness is conceived as an epistemic feeling, that is, as a phenomenal experience pointing towards mental capacities and processes of the subject (Arango-Muñoz 2014). Examples of such phenomena in the literature notably include: feelings of knowing/not knowing (Koriat 1995, 2000), tip-of-the-tongue experiences (Brown 2000), feelings of competence (Bjork and Bjork 1992), feelings of familiarity (Whittlesea and Williams 2001), feelings of 'déjà vu' (Brown 2003). The content of these affective experiences is related to knowledge, ignorance, or uncertainty for instance, and they essentially tell the subject about the course of her own mental operations (de Sousa 2008; Dokic 2012). It is commonly acknowledged that we often rely on epistemic feelings in our ordinary reasoning, and that we also sometimes exploit them as premises in deliberation.

Here is how De Sousa conceives of the pathological failure of affective experience in OCD. While subjects have access to the recent piece of memory of having closed the door (or washed their hands), the memory of the action does not trigger the normal feeling of certainty linked to the awareness of having completed it: "there is some sort of disconnection of the normal feeling of certainty from the recent memory of having taken necessary precautions" (De Sousa 2008, p. 198). According to de Sousa, the failure to experience a feeling of certainty which we expect to be triggered by a certain piece of memory is sufficient to raise a persistent and disruptive doubt (on whether one actually turned off the stove, or closed the door) and hence the recurring need to check.

The role played by the absence of feeling of certainty in OCD, De Sousa suggests, can be compared to the role played by the absence of feeling of familiarity in Capgras syndrome. In Capgras syndrome the absence of affective response to close relatives or

partners raises an incongruity which leads to the inference that we are faced with an impostor who looks just like our partner (de Sousa 2008, p. 199). De Sousa suggests that a similar failure of affective experience is at work in OCD, in which the normal inference going from 'I remember turning off the gas' to 'I turned it off' is challenged by the absence of the related feeling of certainty.

Supporting this view is the idea that a weak *feeling of rightness*[3] is sufficient to trigger doubts in healthy individuals (Thompson 2009). Indeed, if a weak feeling of rightness is what ordinarily triggers doubt in subjects, then we should expect a near complete absence of it to generate an intense and unresolvable doubt like the one experienced by OCD sufferers. Valerie Thompson (2009) argues that the strength of the feeling of rightness determines the probability of an intervention of cognitive processes of a "System 2" type.[4] According to this hypothesis, if the feeling of rightness is weak, we should find a higher probability that type 2 processes will be engaged to analyse or rethink a decision.[5] As Thompson argues, we should be able to predict the type and degree of intervention of type 2 processes on the basis of the strength of the feeling of rightness. A strong feeling of rightness should be a sufficient basis to retain the solution generated by System 1, and a weak feeling of rightness a sufficient basis to engage System 2 processes.

Now, while it is plausible that a weak feeling of rightness is sufficient to trigger ordinary types of doubt, the doubt of OCD patients seems to suggest an experience of a different nature. Patients do not seem so much to wonder whether the door is closed, as we expect should be the effect of a weak feeling of certainty; rather, they seem struck by uncertainty at specific times (for instance, when locking the door). The difference between these two states can be expressed by saying that, while the first reflects a lowering of confidence, the other is a raising of doubt.

I here take confidence and doubt to be two opposing factors, which enter in tension as our degree of belief about *p* evolves: as we go from having an opinion that *p*, to suspecting that *p*, to merely wondering whether *p* is true, confidence decreases as doubt gains ground. That is because "the degree of confidence varies with the strength of the evidence we ourselves have for a proposition believed, while the degree of doubt varies with the strength of the evidence we ourselves have against the proposition" (Price 1969, p. 287). If we agree with the idea that confidence and doubt do not merely define each other by the absence of the other, but are indeed two distinct and opposing

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[3] The Feeling of Rightness (FOR) is a metacognitive experience that accompanies type 1 processing and signals whether the current output suffices or whether additional type 2 processes are needed (Thompson 2009, 2010).

[4] The central thesis of dual process theory is that there are at least two types of processes underlying human judgment, reasoning and decision making. However, most dual process theorists argue that there are many different *type 1 processes* (Stanovich 2011). These are said to be heuristic, associative, pre-reflective, effortless, automatic, independent of general intelligence and fast. Type 1 processes have also been said to be distinctive in being subconscious, inaccessible, subpersonal, and involuntary (see Evans 2008, 2010). Likewise, some dual process theorists argue that there are a number of distinct *type 2 processes*. These are said to be analytic, rule-based, deliberative, effortful, non-automatic, dependent on general intelligence and slow.

[5] System 2 processes can be engaged in various manners: it can for instance simply consist in an *explicit acceptance* of the answer produced by implicit processes, it can also intervene to *rationalize* or justify the heuristic judgment (explain why it is correct), or it can intervene to reformulate the representation of the heuristic judgment in order to produce a different solution.

factors, then the feeling of certainty which is said to weaken (giving way to doubt) seems more suitable as an underlying signal of confidence, rather than doubt.

What, then, underlies the feeling of doubt? An obvious option is to postulate the existence of a polar opposite to the feeling of certainty or rightness: the feeling of uncertainty or potential error. Explaining the more intense and intrusive kinds of doubt might require the activation of distinctive feelings of error at times in which concerns are at the forefront of the mind. In the next section, I present a similar view and assess its explanatory power with regard to OCD doubt.

7.2 Intrusive uncertainty

A similar alternative option has recently been put forward by Cochrane and Heaton (2017). They suggest that the persistent doubt in OCD sufferers results from the hyper-activation of a subpersonal *signal of uncertainty*.

This proposal is based on the observation that a sense of uncertainty is experienced among all OCD subtypes, and that it is experienced as intrusive. Cochrane and Heaton (2017, p. 196) posit the existence of "a dedicated cognitive mechanism for signaling uncertainty that is overactive in the OCD sufferer". The compulsion to check, repeat, and replay scenes mentally is thus understood as driven by a need to appease and disconfirm an underlying, constant sense of uncertainty.

The hypothesis is that a subpersonal signal with the function of monitoring uncertainty goes hyperactive in OCD and creates an intrusive sense of uncertainty, which in turn leads to an active search on the part of the subject for ways in which harms could materialize in the environment. In support of this idea, Cochrane and Heaton point to empirical evidence of an increased neural activity linked to error detection in OCD (Riesel et al. 2011). Uncertainty, they remark, can be considered equivalent to *potential error.*

The idea that a positive signal of potential error would be more efficient than merely a weak signal of certainty in triggering those type 2 processes that are typical of doubt is a plausible one. This second option also seems better able to account for the sort of doubt that patients with OCD experience. Dysfunctional signals of potential error point toward specific actions or thoughts of the subject and generate a feeling that the matter needs to be resolved, settled.[6] With regard to OCD, it seems plausible that a hyperactive signal of uncertainty is at work. But how does this inform us on real doubt tout court? If we accept that we possess something like an uncertainty-detecting system which, when overactive, triggers persistent doubt, then this system probably plays a role in our adaptive inclinations to doubt when it is working properly. Our capacity to identify propositions which are worthy of further inquiry might even depend on it.

In the final section, I specify the nature and possible role of such signals with regard to doubt, and integrate them into the dual-process theory of doubt I have started to outline.

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[6] I lay no claim in the paper as to what causes such signals to become hyperactive. A view such as the one put forward by Levy (2018) provides such an explanation, by appealing to disordered attention. The model presented here is not meant to provide an exhaustive explanation of the disorder, as I am restricted to describing the affective components of doubt, but it is compatible with and complementing of models focused on cognitive processes, such as Levy's and Moore's.

8 Back to real doubt: refining the model

What is the exact nature of such signals of uncertainty, and what might be their role with regard to our adaptive disposition to selectively doubt some propositions?

Although Cochrane and Heaton do not provide any further clarification regarding the nature of this uncertainty signal, epistemic *feelings of uncertainty* could be well suited to play such a role. Feelings of uncertainty can be conceived as metacognitive experiences aimed at monitoring the safety of a belief by tracking the fact that the method used to reach that belief produces true belief also in nearby possible worlds. According to Dokic (2014), feelings of uncertainty could have evolved to enhance the reliability of our beliefs, by tracking their safety; that is, by tracking that a margin for error[7] has been provided, so that no "small change" could produce a false belief. If feelings of uncertainty contribute to our reasoning by tracking the lack of safety of our beliefs, this explains why we are entitled to exploit them as premises in our deliberations.[8] And this also explains why, when feelings of uncertainty dysfunction, that is, when the metacognitive mechanisms underlying them inappropriately signal the absence of a margin for error, this results in an inclination of the subject to act as if the belief (that the door is well locked) were unsafe.[9]

This said, does the feeling of doubt then reduce to a mere feeling of uncertainty? In other words, is the feeling that our way of arriving at a belief might easily not have delivered a true belief sufficient to motivate a doubt? A feeling of uncertainty pointing at the fact that our belief might in fact be a lucky guess, might not be sufficient to trigger real doubt. Rather, feelings provide information regarding the reliability of our beliefs, which is exploited in various manners depending on the *practical stakes* relevant to the matter at hand. Thus, when an emotion such as curiosity (Silvia 2006; Morton 2010) appraises a proposition as implying novel but harmless possibilities, an emerging feeling of uncertainty might motivate exploration (an unconstrained and positively-valenced inquiry). When epistemic anxiety appraises that a proposition implies possible high practical costs, the information provided by the feeling of uncertainty about our belief will be taken as a reason to doubt.[10]

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[7] See Williamson (1994, 2000), Engel (2008), Dokic and Egré (2008).

[8] In his model, Pinillos (2019) instead suggests that skeptical judgements are produced by a specific metacognitive mechanism which tests beliefs for *sensitivity*. Pinillos takes the condition of sensitivity as central in explaining humans' inclination towards skeptical judgements of the "evil demon" type. These are indeed phenomena in which a subject considers possibilities of error and attempts to rule them out. If the sensitivity condition seems better suited to skeptical judgements, it does not suit everyday occurrences of doubt, which are the object of my present study.

[9] Regarding the type of stimuli which are likely to trigger the feeling of uncertainty, prominent theories point towards a mismatch between predictions about inputs generated at lower levels of cognition, and stimuli that the organism encounters in the environment. Feelings of uncertainty are conscious experiences, which take place at the personal level, but are grounded on subpersonal monitoring mechanisms that are sensitive to certain kinds of mismatches.

[10] A disorder involving solely a hyperactivation of the metacognitive mechanisms responsible for feelings of uncertainty, or solely a hyperactive epistemic anxiety, might not be sufficient to account for the behaviors we observe in OCD patients. While the former will supposedly result in a tendency to feel insecure about one's beliefs, the latter would supposedly result in a tendency to be generally over-concerned about whether p. However, patients with OCD seem both over-cautious with regard to the issues they obsess about, and over-concerned: they appraise and treat the matter as high-stakes. This might be the reason why patients are

When epistemic anxiety makes potential practical costs salient, the information provided by feelings of uncertainty spontaneously leads to a real doubt. In a low-stakes context, feelings of uncertainty can also be reflected on, so that theoretical reasoning about such feelings can lead to the (reflective) realization that there is a reason to doubt. However, the phenomena of interest here is real doubt, and the hypothesis is that when epistemic anxiety appraises the matter as implying a possible threat, and feelings of uncertainty signal that a belief is unreliable, this spontaneously triggers the intervention of type 2 processes, on which subjects in high-stakes situations rely (Kunda 1990).[11] In other words, those combined affective states mediate the deployment of the costly cognitive strategies constitutive of doubt—deliberation, reasoning, etc. about whether *p*. This explains our general tendency to doubt beliefs which are both (1) about matters of significant relevance to our goals and (2) epistemically unsafe.

The model of real doubt proposed here is thus a two-step model involving the intervention of two affective states: (1) an emotional episode of epistemic anxiety signaling that the proposition implies a possible threat, or possible negative outcomes and (2) a feeling of uncertainty signaling the lack of epistemic safety of a belief in a proposition.[12] Here is how it would work: epistemic anxiety can be viewed as a barometer of how important it is that we get things right epistemically speaking, in a given situation. When this barometer reaches a certain threshold, it sends a signal that there are significant practical interests at stake, or that the context is particularly goal-relevant, which prompts a sensitivity to uncertainty. In this context, if a feeling of uncertainty emerges, signaling the lack of safety of our belief concerning the current state of affairs, it is likely that we will start to actively doubt. That is, we will start to engage the processes of active evidence searching, memory recruitment, deliberation, reasoning, which are constitutive of doubt. This two-step mechanism results in a capacity to typically doubt only when we have good reasons to do so, that is, when our belief in a proposition is unsafe and the proposition in question implies potential practical costs or thwarting of our goals.

The model here proposed raises many questions, in particular regarding the correctness conditions of real doubt. According to this model, a matter needs to be both epistemically uncertain and potentially pragmatically costly to the subject for real

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Footnote 10 continued

unable to silence the creeping feelings of uncertainty. Feelings of uncertainty are the result of a metacognitive monitoring of underlying cognitive processing. In general, such results can then be endorsed at higher levels, or dismissed. Dismissal of the information provided by feelings of uncertainty is one way in which the process of doubt can get interrupted. However, it is much harder to dismiss such feelings when they emerge in a context that is appraised as high-stakes. Hence, the apparent failure to dismiss feelings of uncertainty in these patients points towards a disorder involving both steps.

[11] Kurth (2018, p. 115) attributes a metacognitive dimension to anxiety itself, in the sense that anxiety signals that some of our goals and desires stand in conflict with some of our current beliefs (i.e. the desire to stay safe conflicts with the belief that there is a dangerous man approaching). In the same manner, epistemic anxiety signals a conflict between our current goal to get things right epistemically, and the possibility (made salient by the feeling of uncertainty) that one's epistemic attitude be inaccurate.

[12] One might be worried about the fact that this account requires that two affective states be felt for one to experience real doubt. However, it is not uncommon to experience several affective episodes simultaneously in response to a situation. Some have even argued that "emotions are seldom felt in isolation, particularly in isolation from related emotions" (Maibom 2014, p. 7). Arguably, the ability to experience several affective episodes at once allows us to apprehend multiple relevant evaluative features of a situation concurrently, as opposed to being limited to capturing only one evaluative aspect at a time.

doubt to be justified. However, this seems to imply that doubt can be the correct attitude even in those instances in which one actively doubts about matters over which one cannot achieve epistemic control. Feeling anxious about a possible harm that I have no epistemic means to mitigate could still be reasonable if it involves the disposition to find and maintain a better epistemic position with respect to the uncertain proposition, even if we do not actually succeed. In terms of the adaptiveness of such a state, although the cost in energy of this (possibly long-lasting) state of anxiety will be high, the benefits of the readiness to react might still make this an overall adaptive state, given the potential costs of facing a completely unpredicted threat. In most agents, the model presented here results in an adaptive disposition to doubt and inquire about what matters pragmatically.

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