

## THERE IS A LOT MORE TO COMPULSIONS THAN MEETS THE EYE<sup>1</sup>

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### Abstract

Compulsions are often the central complaint of people with obsessive-compulsive disorder (OCD) and yet we know surprisingly little about them. One reason for this lacunae is that they are viewed as products of distress over obsessional concerns; once that distress extinguishes compulsions become obsolete. We are, however, slowly starting to learn more about the complexity of compulsive behaviour and factors in its persistence. This paper reviews developments in our understanding of compulsions, synthesizes work from several different perspectives, and presents a descriptive model for the insidious cycle of compulsions. Major conclusions are that: a) repetition of checking behaviour is clearly associated with a decline in memory, cognitive, and sensory confidence, as is staring; b) the need for perfect certainty may be the key factor that transforms a routine behaviour into a compulsion, resulting in behavioural parsing, increased tax on working memory, and use of (elusive) feeling-based criteria as a guide for stopping; c) what we are learning about compulsions can be directly applied to standard cognitive-behavioural approaches to treatment; and, d) we still have much to learn about compulsions, particularly covert and ordering/ arranging compulsions.

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The symptoms of obsessive-compulsive disorder (OCD) have been recognized throughout history, and have been written about extensively in the past century. As observed by de Haan et al. (2013), historically compulsions have been conceptualized as behaviours performed in defence against the repressed meaning of the obsessional thought (e.g., Freud), as the by-product of obsessional thoughts that prevail over all other thoughts and direct the will (e.g., Westphal), and as behaviours driven by a need for perfect certainty and/or a felt sense of satisfaction (e.g., Janet). Since the publication of the first atheoretical and empirically informed version of the *Diagnostic and Statistical Manual of Mental Disorders* compulsions have been defined by salient features of the compulsive acts themselves and their purpose. The definition in the current DSM (5<sup>th</sup> Edition, American Psychiatric Association 2013) has changed little across editions, defining them as “repetitive behaviors...or mental acts” that the person feels “driven to perform in response to an obsession, or according to rules that must be applied rigidly” and “the behaviors or mental acts are aimed at preventing or reducing anxiety or distress or preventing some dreaded event or situation; however, these behaviors or mental acts either are not connected in a realistic way with what they are designed to neutralize or prevent or are clearly excessive” (p. 237).

In structured interviews of people with OCD, harm avoidance and distress reduction are certainly identified

as the purpose of the compulsion (e.g., Parrish and Radomsky 2010, Starcevic et al. 2011). However, this definition does not take into account Janet’s emphasis on incompleteness, or “not just right experiences (NJRE). Although technically these could fall under “distress reduction”, Summerfeldt and colleagues have made the case that NJRE form a core motivational dimension of compulsions, along with harm avoidance. In a series of four studies they found support that both core dimensions contribute significantly and uniquely to OCD symptoms (e.g., Summerfeldt 2004, Summerfeldt et al. 2014). Similarly, in a meta-analysis of obsessive-compulsive symptoms, Taylor et al. (2014) found that incompleteness was correlated with all types of symptoms of OCD.

### Cognitive behavioral model of OCD

The cognitive-behavioural model of obsessive-compulsive disorder (OCD) is the leading model for understanding and treating OCD. According to the model, obsessional thoughts are appraised as signalling harm, danger, or threat that the person feels responsible for neutralizing or preventing. This evokes distress, which the compulsion in turn is enacted to ameliorate. Compulsions persist because: a) the reduction in distress to which they give rise introduces negative reinforcement for their performance; b) when distress subsides and/or the feared event does not occur it is

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attributed to the performance of the compulsion; and, c) the compulsion terminates exposure to the obsession, preventing extinction of the distress caused by the obsession. As such, there is no opportunity for new learning about the actual meaning and importance of the obsession; that is, the negative appraisal remains intact (for reviews see Purdon 2009, Purdon and Chiang 2016).

Cognitive-behaviour therapy (CBT) of OCD emphasizes exposure with response prevention (ERP) as a means of extinguishing the anxiety/distress caused by the obsession, which would render the compulsion obsolete. Treatment also addresses negative appraisal of obsessions, both to de-toxify the obsession in preparation for exposure, and to facilitate new learning about their meaning and importance *in vivo* during exposure. According to the United Kingdom National Institute of Clinical Excellence (National Institutes of Clinical Excellence 2005) and American Psychological Association (2007) guidelines, CBT that includes ERP is the psychological treatment of choice for OCD. In their meta-analysis, Öst et al. (2015) concluded that cognitive therapy alone, exposure therapy alone, or the two combined had large effect sizes that were significantly greater than antidepressant medication alone. Furthermore, whereas adding CBT to antidepressant medication lead to a better effect, adding medication to CBT did not. However, McKay et al. (2015) observed that even in efficacious treatments, we tend to see only a 45% reduction in symptoms.

The CBT model has tended to emphasize the distress over the obsession as a central target of treatment, and, certainly, there is a vast literature now devoted to identifying appraisals that lead to distress and to understanding the persistence of obsessions. There is merit, though, in examining recent advancements in our understanding of compulsions and elaborating our CBT model accordingly. In particular, there have been important advances in our understanding of self-perpetuating mechanisms in compulsions, in the need for certainty, and in our understanding of stop rules. This paper reviews these developments, presents a descriptive model of the compulsion cycle, discusses clinical implications, and comments on future directions.

### Self-perpetuating mechanisms in compulsions

Rachman (2002) proposed a model for understanding compulsive checking which elaborates upon the general cognitive model. According to his model, compulsive checking will result when people feel a strong sense of responsibility to protect others from harm and are unsure as to whether or not a threat has been properly averted. The intensity and duration of checking behaviour will increase in proportion to the perceived responsibility, and probability, severity, and seriousness of harm. Once initiated, self-perpetuating mechanisms result in difficulties in termination. First, people with checking compulsions are more likely to believe that there is a greater probability of harm occurring if they are in charge (e.g., Lopatka and Rachman 1995). Second, there is an unsuccessful search for certainty that the probability of harm to self/others has been averted. This is problematic because the harm lies in the future and it is not possible to determine that there is no danger; thus, there is no terminus for the behaviour. Third, when checking behaviour is repeated, confidence in one's memory for the check declines, evoking doubt and more repetition, as well as contributing to a general

sense that one's memory is flawed. Finally, Rachman demonstrated that the more people check, the more responsible they feel for the outcome (Lopatka and Rachman 1995).

This model has precipitated considerable interest in the impact of repetition on the person's experience of the behaviour. There is now a robust body of work which has found that individuals with OCD have less confidence in their memory, cognitive, and sensory faculties overall than do individuals with another psychiatric diagnosis or individuals with no diagnosis (Cogle et al. 2007; Hermans et al. 2003, 2008; Nedeljkovic and Kyrios 2007; Nedeljkovic et al. 2009), particularly when referencing OCD-relevant actions such as locking a door (Hermans et al. 2003). Thus, when heading into a compulsion, people with OCD already perceive themselves to be less competent to complete an action correctly, which is likely to lend any doubts that arise within the course of the compulsion greater credibility, which in turn may foster repetition. Indeed, Alcolado and Radomsky (2010) manipulated people's beliefs about their memory capacity and found that those who were given to view their memories as poor reported significantly greater urges to check than those who were given to believe that their memories were good.

Repetition appears to be insidious. In studies with nonclinical or analogue samples, repetition of a checking behaviour has consistently been found to erode memory, sensory and cognitive confidence (e.g., Linkovski et al. 2015; Radomsky et al. 2006, 2014; Toffolo et al. 2016b; van den Hout and Kindt 2003), and in as little as 2-5 repetitions (Coles et al. 2006). Van den Hout et al. (2008) also found that perseverative staring, which is a feature of checking behaviour, was associated with poorer confidence in sensory perception and appeared to induce dissociation in a nonclinical sample. In a follow up study, van den Hout and colleagues found that this effect occurred after as little as 30s (van den Hout et al. 2009).

Studies of checking behaviour in people with OCD have found that excessive checking occurs in response to even mild uncertainty (Toffolo et al. 2016a), and repeated checking has been associated with an increase in perceived responsibility for harm (Lopatka and Rachman 1995). The ironic effect of repetitive checking on memory, sensory, and cognitive confidence has been consistently observed in people with OCD, and has been found to be especially pronounced when the individual is responsible for an outcome, and when performing tasks relevant to current goals (Boschen and Vuksanovic 2007; Radomsky et al. 2001, 2014). In a recent meta-analysis of studies examining the effect of repeated checking, van den Hout et al. (in press) found that there was a large effect of repeated checking on memory confidence (greater checking is associated with poorer confidence) as well as a small effect on actual memory, such that repeated checking was associated with worse memory.

There have been fewer studies of the impact of repetition during washing. In a nonclinical sample, Fowle and Boschen (2011) found that repeated washing was associated with poorer confidence in memory for the details of the items washing, but not confidence that the dishes had been washed. Taylor and Purdon (2016) studied wash duration in people high and low in contamination fears, under conditions of high and low responsibility. They found no impact of either wash duration nor repetition of specific actions within the wash on memory confidence in those low in contamination fears. In those high in contamination

fears, greater wash duration was associated with greater certainty that the wash had been done properly, but only under the low responsibility condition; under the high responsibility condition, greater wash duration was associated with less certainty. Similarly, greater repetition of steps within the washing episode was associated with poorer sensory confidence, but again only under conditions of high responsibility.

The majority of this work has been conducted in lab settings in which the checking or washing behaviours are experimenter directed. Bucarelli and Purdon (2015) had participants with OCD keep diaries of a compulsive episode three times a day for three days. Of the compulsive episodes, 62% were washing compulsions, 23% were checking compulsions, and 14% were ordering/arranging or symmetry exactness compulsions. Consistent with laboratory findings, they found that compulsive episodes that were terminated because the person had achieved a sense of certainty or satisfaction were associated with fewer repetitions, whereas those terminated for other reasons (e.g., running late for work, interrupted) were associated with greater repetitions, poorer confidence in memory for the action, as well as poorer confidence in attention and sensory perception during the action. Furthermore, poorer overall, or, trait, confidence in memory and cognitive processes was associated with greater percentage compulsive episodes that did not yield a sense of satisfaction or certainty. Finally, more negative appraisal of obsessional thoughts was associated with fewer percentage compulsive episodes that did not produce a sense of certainty.

Van den Hout and Kindt (2003) proposed a model for understanding these ironic effects of repetition on confidence. First, they observed that when people repeat an action their familiarity with the issues that have been checked increases. As has been established in research on memory, familiarity changes how we process an event such that processing priority is assigned to the higher level, semantic aspects of the event, and lower-level, perceptual processing of the details of the event, such as colours and shapes, is inhibited. The vividness and detail of the memory for the event diminishes, which of course undermines trust in that memory. Lab-based experiments have provided strong supporting evidence for this model (e.g., Dek et al. 2015, van den Hout and Kindt 2003).

In sum, there appears to be clear evidence that people with OCD have poorer confidence in their memory. This could lead to more frequent repetitions of an action within a compulsive episode. Repeating an action erodes confidence that the action was done properly, which in turn fosters greater repetition. Greater repetition results in familiarity, which inhibits processing of the very details used to establish confidence in the memory. Lack of memory, sensory, and cognitive confidence within a specific episode may in turn contribute to a general lack of memory, sensory, and cognitive confidence. What breaks the cycle? Interestingly, there has been very little study of the actual rules, or criteria, people use when making the decision to stop.

### Stop rules, satisfaction, and certainty

Salkovskis (1999, Wahle et al. 2008) observed that there is a lot to be gained from understanding not just why a compulsion starts, but also why it stops. Their research on stop rules has provided some key elaborations of the CBT model of OCD. Salkovskis observed that when we perceive the stakes of a decision

to be high (e.g., which job offer to accept) we bring much more effortful decision-making processes to bear than for minor decisions (e.g., which socks to wear). In particular, we require more evidence before reaching that decision; that is, our evidence requirements are elevated. However, in relevant situations, negative appraisal of the meaning and importance of the obsessional concern transforms what are minor decisions for most people (e.g., deciding when a wash has sufficiently cleansed one's hands) into a major decision. People will thus require more evidence that the wash has been sufficient before making the decision to stop. Furthermore, it appears that people with OCD uniquely tend to rely on internal criteria to make that decision. Salkovskis and colleagues argued that uncertainty as to whether or not the compulsive behaviour has been done properly, sufficiently, etc. produces a "not just right" experience. The person will continue the behaviour with the express purpose of achieving an internal sense of satisfaction, completeness, or "just right" sense. The difficulty is that a "just right" feeling is not easily amenable to objective evaluation the way external information is (e.g., amount of time, soap, and scrubbing, factual knowledge of health regulations, etc.), and thus it is harder to make the decision to stop.

Wahl et al. (2008) examined stop rules in people with OCD who had washing compulsions as compared to a group of people with OCD without washing compulsions and a group of healthy controls using interview, self-report, and in vivo observation. As hypothesized, they found that people with washing compulsions uniquely reported a greater reliance on internal criteria than the other groups across all three assessment modalities. The participants with OCD all used more evidence to make the decision to stop, the perceived importance of the decision was associated with elevated evidence requirements, and the decision making was considered more effortful. Salkovskis et al. (2017) administered their interview on termination criteria to a sample of people with OCD whose compulsions were primarily checking, as compared to anxious and healthy controls. Consistent with their previous findings, people with OCD reported greater reliance on an internal, felt sense to stop, and required more evidence overall before making the decision to stop, and the decision was rated as more effortful. Finally, Kobori et al. (2012) interviewed people with OCD about reassurance seeking, which is a form of checking by proxy (Rachman 2002), and found that need for certainty was a central theme in their self-report.

In their diary study, Bucarelli and Purdon (2015) found that greater negative appraisal of obsessional thoughts was associated with fewer episodes in which people achieved a sense of satisfaction. They also found that in episodes that persisted, people reported that they relied on an escalating amount of evidence before being willing to stop. This suggests that elevated evidence is both a trait factor, but also something that increases with repetition of the compulsion. In a follow up diary study, Taylor and Purdon (2018a) had participants with OCD keep diary records of their compulsions over six days using a tablet, reporting on a wide range of factors, including termination criteria. For both washing and checking compulsions, people's verbatim responses were most likely to be "felt satisfied", "got the right feeling", and "felt certain". Taylor and Purdon (2018b) found the same pattern when people high and low in contamination fears were asked about how they knew when to stop washing their hands in a lab setting. Meanwhile, van Dis and van den Hout (2016) found

that in healthy participants, perseverative checking produced not just right experiences. Taken together, these studies offer robust support for Salkovskis' elaborations of the CBT model.

### Certainty, trust, and reliance on internal, felt sense

Two other quite different models emphasize the importance of reliance on internal criteria as a factor in the persistence of compulsions. O'Connor and Robillard (1995) argued that the obsessional state concerns what harm or danger might possibly be there, even in the absence of objective evidence that anything is amiss, thereby confusing these imagined possibilities with actual probabilities. They argued that this results from faulty inference processes whereby people revise the evidence in the face of the hypothesis, rather than revising the hypothesis in the face of the evidence. For example, a client's operating hypothesis may be that a table is "dirty" (i.e., covered in dust). Existing evidence (e.g., the table is shiny) is discounted on the basis that if the person were to probe more deeply, evidence confirming the conviction would be found (e.g., "If I had a microscope, I'm sure I would find dirt on this table"). This results in a determined effort to correct the problem (i.e., clean the table) until the individual achieves an adequate sense of certainty that the ritual is no longer necessary (e.g., there is no longer a chance of harm). In the absence of objective evidence by which to judge whether or not harm has been averted the person relies on feedback from sources irrelevant to the actual task in hand, such as anxiety reduction, as a cue for termination of rituals.

Szechtman and Woody (2004) posit quite a different model but with some interesting parallels. They begin with the observation that we all have a system dedicated to the unveiling and evaluation of partial, uncertain cues for *potential* threat. Once activated, the system drives responses that may reduce the potential risk, and engagement in these behaviours is important for returning the system to a baseline state. However, it is not possible to prove that the threat has passed; the absence of further threat cues could simply mean that the threat stimulus is lurking outside your sensory perception (e.g., behind you, or in a shadow, or is too small for you to perceive with the naked eye). According to Szechtman and Woody's model, people rely on an implicit, internal, felt sense of knowing that the threat has passed as a cue for goal attainment, which in turn shuts down the system. They liken this to our reliance on an internal, felt sense that they we are no longer thirsty in order to know when to stop drinking. They argue that in OCD the problem is a failure to achieve this sense of satiety, which, combined with a primal drive for security that dominates the stream of consciousness, results in abnormally long persistence in the safety behaviour.

Boyer and Liénard (2006) also proposed that compulsions are a product of a safety motivation system. According to their model, the possibility of potential threat triggers an arousal state which, intuitively, the person believes would be dangerous to ignore and do nothing. This is consistent with Rachman and Hodgson's (1980) observation that even if a compulsive behaviour does not reliably reduce distress, the individual feels that it results in less distress than inaction would. The person then begins to search their behavioural repertoire for an appropriate action to manage the potential threat. However, the arousal also focuses attention on low-

level properties of the safety behaviour, such that the behaviour is parsed into smaller units. For example, a hand wash is no longer one behaviour, but rather a whole sequence of micro-behaviours (pump the soap, feel the water, rub the palms, etc.). This parsing presents a tax on working memory, which, Boyer and Liénard argued, drives the intrusion from consciousness, which affords relief. In light of our previous discussion, though, another possibility is that the tax on working memory means that the safety behaviour cannot be recalled with the vividness and detail required, which in turn would undermine confidence and refresh doubt, leading to more repetition.

Observations regarding the driven need for certainty that characterize compulsions have a number of rich implications. First, in order to be certain one must identify causes to doubt, assess the credibility of each cause, and act accordingly. De Haan et al. (2013) observed that a basic foundation of trust is required in order to accept even the most basic of knowledge. If I am asked whether it is sunny out and I look out and see the sun, I trust that a) my visual system is intact; and b) the bright, glowing orb is actually the sun. That is, we rely on implicit, or tacit, knowledge even when making determinations that are objectively quite verifiable. De Haan and colleagues proposed that whereas people with OCD may have substantial knowledge regarding the objects of their fears, they do not trust the foundation of that trust. Someone with OCD may know that experts agree that salmonella bacteria last 1-4 hours on a hard surface, but is unable to trust the experts ("what if they are just saying that so as not to scare people?", "future studies may prove them all wrong?"). This helps explain why reassurance seldom "sticks" (as Salkovskis says, if it worked, we wouldn't call it *reassurance*). Once foundational knowledge is doubted the world can seem very unsafe. Furthermore, de Haan and colleagues argue that in an effort to achieve certainty people with OCD start to make tacit processes explicit, which further undermines trust. Finally, Denys (2011) observed that in their striving for certainty, people become aware of every detail of their movements because a ritual only works if it is performed perfectly. That is, people begin parsing the compulsion.

Dar and colleagues also invoke mistrust as a central factor in the persistence of compulsions. Consistent with Denys and colleagues, Lazarov et al. (2014) observed that people with washing and checking compulsions rely on explicit processing of routine tasks, which they view as compensatory for deficits in implicit processing. Lazarov et al. agree that bringing explicit processing to bear results in use of internal feeling states to signal termination of the behaviour, and that people with OCD have a deficit in this area in that they are unable to trust their own judgements of their feeling states. They elaborated these ideas by proposing that in order to compensate, people rely on objectively verifiable indicators of internal states, referred to as "external proxies". For example, someone with OCD may be unable to feel satisfied that they fully understand a chapter they have read. To compensate, they memorize the chapter, which ensures that they must know the material; the memorization is a proxy for an internal sense of satisfaction that the material has been understood. Lazarov et al. demonstrated in a series of studies that people with OCD, as compared to anxious and health controls, are more likely to rely on external information (readings from a biofeedback machine) when making judgements about their internal states (muscle tension). Meanwhile, Oren et al. (2016) conducted linguistic analyses of people's expression

of events, finding that people high in OCD symptoms exhibit a lack of agency as evidence by use of the passive voice.

### A descriptive model

Putting these components together, one can envision a self-perpetuating cycle, depicted in **figure 1**. In this figure the boxes represent events in the cycle and the circles and ovals represent the factors that influence the events. This is a purely descriptive model, and the time during the cycle in which certain factors exert influence will need to be amended in response to empirical research. For example, we do not know how many repetitions within a cycle before the behaviour becomes familiar, leading to conceptual processing. The cycle begins with the occurrence of an obsessional concern, appraisal and the distress it evokes. The person attempts to manage the distress by performing a compulsion. However, if the person mistrusts their memory, sensory, and cognitive processes, requires perfect certainty that it is done correctly, overestimates the probability and severity of harm, and is oriented as to why the compulsion may not have been done properly, it will be difficult to gain the sense of satisfaction required to terminate. The compulsion is redone, this time paying even more attention to each step (behavioural parsing). This taxes the working memory, and there is a failure to establish that the behaviour has been done properly, evoking doubt. This in turn evokes more repetition, and at this point state memory confidence may begin to decline, responsibility may increase, and the action may start to become processed conceptually, rather than perceptually. However, the person demands of themselves a rich perceptual memory for the behaviour which is not possible to attain, so again there is a not just right feeling, and the behaviour is repeated. The obsessional concern may be refreshed due to its association with the compulsion (this could of course happen at any point in the cycle, but for the sake of convenience the link is drawn here).

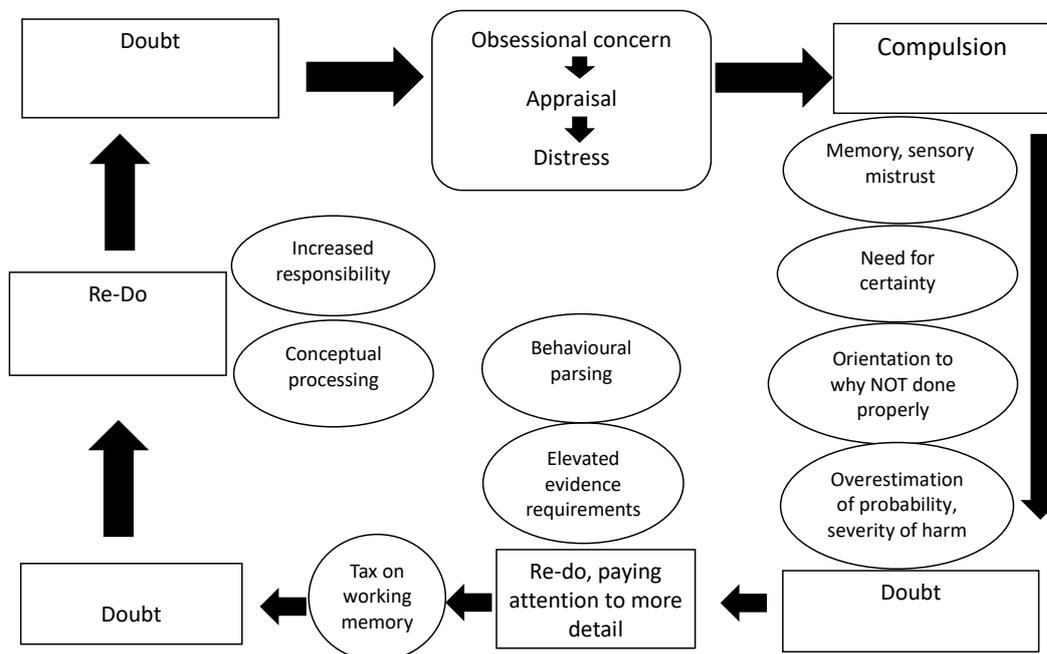
### Clinical implications

One central implication of this body of research is that numerous factors come online once the compulsion is initiated, and what happens prior to the compulsion may not be as important to the persistence of the action as what happens once it begins. Indeed, Bucarelli and Purdon (2015) found that distress over the obsession was not associated with compulsion parameters, such as length and number of repetitions. In a preliminary analysis of their follow up diary study, Taylor and Purdon (2018a) had similar findings. Therefore, it may be useful to do a careful functional analysis of compulsive episodes in order to fully identify the culprits involved in their persistence. A second obvious clinical implication of this work is that we must provide psychoeducation regarding the negative impact of repetition on the very goal the compulsion is meant to achieve. This can be readily demonstrated in the therapist's office with experiments in staring at a stimulus for varying amounts of time, and at home, experimenting with varying amounts of repetition.

A third implication is the issue of the need for perfect certainty combined with a reluctance to trust very basic knowledge. As de Haan et al. (2013) and Denys (2011) suggest, people with OCD doubt implicit knowledge, finding it hard to trust in themselves and in others that basic facts indicative of security are reliable. Given that people with OCD tend to have higher attachment anxiety (e.g., Doron et al. 2012) and that parental criticism is considered a pathway to inflated responsibility (Salkovskis et al. 1999) attachment may inform mistrust. Exploring attachment and trust relevant schema may thus be useful.

A fourth implication is that we may want to explore the goal people have in mind when they begin their compulsion. If satisfaction reflects a sense of absolute certainty that the compulsion has been done correctly, the goal may be framed in a way that makes it impossible to achieve. Taylor and Purdon (2018b) found that under conditions of high responsibility, the goal was more likely to be framed in absolute terms

Figure 1. Description of the compulsive cycle



(get rid of *all* germs, get my hands *perfectly* clean) instead of more flexible terms (get rid of dirt, get my hands clean). Of course it is not possible to verify that something is safe, so the goal itself is impossible, perhaps leading to reliance on the elusive internal felt sense as a guide. The failure to reliably attain the desired sense of certainty may cause people to feel that they are inept and more likely to cause harm, which in turn may enhance the need for certainty. Helping people recognize that the way they have framed the task makes it impossible to achieve, and that they are using an unreliable determinant of goal success can be a useful first step in lifting the burden of shame and guilt. Of course we would also do well to help people learn to tolerate uncertainty, and recognize that they actually tolerate a lot of uncertainty in domains unrelated to their obsessional concern. For example, people who are terrified that a speck of dirt may have led to the spread of fatal illness, and that they are at fault, may not think twice about driving to their appointment, a behaviour that is objectively more dangerous than failing to rid hands of all germs.

Finally, there may be some implications for conducting exposure with response prevention (ERP). Behavioural parsing is a very insidious part of the cycle, taxing working memory, and complicating what can be very straightforward behaviours. When we use ERP we typically ask people to refrain from the compulsion, as if it is one behaviour. If people are highly reluctant to engage in exposure based interventions, it may prove useful to begin with allowing the compulsion, but chunking the micro-behaviours into two or three parts (e.g., soaping the hands is one entire action, rinsing the other) and encourage refraining from any extraneous behaviours, repeated behaviours, or prolonged behaviours within that chunk. This would be but a first step towards responding to the obsessional concern differently. Secondly, ERP is often conducted to extinguish the distress over the obsession. It may be worth exposing the person to uncertainty as to whether or not the compulsion has been done properly by allowing it to be done, but prohibiting repetition while exposing to the sense of uncertainty.

### Future directions

The past two decades have led to a much greater understanding of why compulsions persist once activated. However, we could benefit from a greater understanding of what it is people are attempting to accomplish when they perform them. It is clear that distress reduction does not seem to inform the decision to terminate, but rather a feeling of “satisfaction”, the “right feeling”, or a feeling of certainty determines this. It is possible that distress reduction is a distal goal but that there are important proximal goals by which it is achieved, whose completion are signaled by the “just right” feeling. A related question is whether the feeling of satisfaction, or the “right feeling” represent a presence of certainty or an absence of doubt and are more severe compulsions associated with the former? Another area for further research concerns NJREs and incompleteness. Salkovskis argued that repetition of an action produces the not just right feeling, whereas others assume that NJREs precede the compulsion (e.g., Summerfeldt et al. 2014). Meanwhile, from their analysis of the relationship between incompleteness and NJREs, Belloch et al. (2016) concluded that incompleteness and NJRE are separate phenomena, the former reflecting a sense of inadequacy regarding

one’s own actions, thereby being tied more closely to compulsions, and the latter reflective more of an obsessional state. Phenomenological research could address this issue.

There has also been little systematic research on how a compulsion unfolds. Is the entire behaviour repeated, or are just micro-units of the behaviour repeated? Are certain behaviours prolonged rather than repeated? It is likely that this varies considerably across people with OCD, and also across episodes, as well as perhaps across compulsion type. However, understanding the frequency and positioning of stuck points within the cycle will help us better understand its persistence. Keren et al. (2013) applied an ethnographic approach to studying action sequences in people with OCD performing a compulsion in relation to healthy controls performing the same act as they typically would (e.g., locking a door, washing their hands). They examined the pattern of shared vs. unique acts and their sequencing, finding that people with OCD were distinct in the frequency of unique, unnecessary behaviours at the tail end of the task. Knowing more about where the behaviour goes awry can help us intervene in the precise problem areas of the behaviour. It is also important to note that almost all of the recent phenomenological and experimental work has been done exclusively on washing and checking behaviours. Although reassurance seeking is considered a variant of checking (Rachman 2002), there may be merit in studying parameters of both self-reassurance (e.g., scouring the internet) and seeking reassurance from others, as well as studying covert compulsions and ordering/arranging compulsions.

Finally, although the compulsion cycle as described here seems destined to keep people in a continuous loop of checking, it is important to recognize that people with OCD are often able to complete their compulsion once or twice and move on. There is almost no data on the frequency with which compulsions “work”. In their diary study of compulsions, Bucarelli and Purdon (2015) found that people achieved the “right” feeling, felt satisfied, or felt confident enough that the compulsion had been done properly 53% of the time, despite repetition. It could prove useful to better understand the circumstances in which the goal is accomplished vs. not, as this would help us help people better resist their compulsions when those circumstances are present.

In sum, it is very clear that compulsions are quite complex behaviours that, once initiated, take on a life of their own. By continuing to understand their basic phenomenology and the mechanisms of action involved in their persistence we will be able to better formulate behaviourally based interventions, which in turn may afford much better treatment results.

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