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Motivation, Time Course, and Heterogeneity in Obsessive-Compulsive Disorder: Response to Taylor, McKay, & Abramowitz (2005)

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Abstract

In response to commentary by Taylor, McKay, and Abramowitz (2005), we discuss the distinctive features of our theory of obsessive-compulsive disorder (OCD), which explains the disorder as a dysfunction of a security-motivation system. We address issues of the interrelation of emotion, cognition and behavior in the disorder; starting versus stopping as the underlying dysfunctional problem; and the origins and possible significance of symptom heterogeneity in the disorder. In addition, we suggest various ways our theory of OCD may be generative for future research.

In their commentary, Taylor, McKay, & Abramowitz (2005) drew attention to aspects of obsessive-compulsive disorder (OCD) that did not seem to be explained by our new theory of the disorder (Szechtman & Woody, 2004). They also noted that there are already many theories of OCD and questioned the need for a new one such as ours. Accordingly, in this response we will address what is distinctive about our theory and why we believe it promises to be generative in future research. After very briefly restating the theory, we will address its implications for three important issues that Taylor and colleagues raised: (1) the interrelation of emotion, cognition, and behavior in the disorder; (2) starting versus stopping as the underlying dysfunction; and (3) the nature and possible significance of symptom heterogeneity in the disorder.

Interrelation of Emotion, Cognition, and Behavior in OCD

In view of the universality of OCD symptoms across cultures and their focus on biologically primitive concerns regarding self-preservation and preservation of the species (Rapoport & Fiske, 1998; Wise & Rapoport, 1989), our theory is founded on the idea that OCD symptoms reflect the dysfunction of a special, security-motivation system. Security motivation refers to a set of biologically-based species-typical behaviors directed towards protection from danger of self and others, including behaviors characteristic of OCD, such as cleaning and checking, and also the associated thoughts. We argued that because the tasks engaged by the security motivation system are open-ended and lack consummatory stimuli, the terminator of motivated security activity is an internally generated feeling of knowing, termed yedasentience. Normally, this feeling stems directly from performance of the behaviors evoked by security motivation, and it provides not only a phenomenological sign of goal-attainment but also the mechanism

that shuts down security motivation.

Our hypothesis is that in OCD there is a breakdown in this satiety-like mechanism. Thus, compulsions and obsessions arise from failure to experience the normal feeling of knowing signaling completion of activity elicited by the security motivation system. In the absence of this terminator, OCD patients remain for an abnormal period of time in a strong motivational state having to do with primal, basic threats to existence, akin to thirst, a primal compelling emotion which can similarly dominate the stream of consciousness (Denton et al., 1999).

Motivational theories typically have a behavioral output; accordingly, our theory of OCD focuses on security-related behaviors and their role in producing yedasentience. In this way our theory draws attention toward the behavioral features of the disorder—namely, compulsions—and somewhat away from its cognitive features—namely, obsessions.

Taylor and his colleagues (2005) are skeptical of this change in focus because they believe we overstated the importance of compulsions in OCD. First, they point out that compulsions alone are a relatively rare version of the disorder. We welcome the opportunity to acknowledge that the statistic on this in Szechtman and Woody (2004) was incorrect and that the correct proportion of OCD patients who have compulsions without obsessions is 5% or less. However, the cogency of our theory never depended on a high rate of compulsions without obsessions. Rather, the fact that one phenomenon can be present without the other is an important piece of evidence suggesting that there may be separate neural circuitries for obsessions and compulsions, which is a point that is clearly incorporated in our theory. Furthermore, our theory attempts to explain mechanisms that

would yield different patterns of obsessions and compulsions—for example, obsessions alone, versus obsessions with compulsions. Our theory is not, and never was, restricted to explaining compulsions without obsessions.

A second reason Taylor and his colleagues (2005) are skeptical of the focus on compulsions in our theory is the argument that "compulsions are typically the result of—that is, evoked by—obsessions" (p. 5). Thus, they argue that obsessions are a "more fundamental problem" (p. 6) than compulsions. Of course, the aforementioned fact that there are cases of compulsions without obsessions indicates that compulsions are not always in response to obsessions. But more generally, a motivational theory sheds a different light on the issue of whether compulsions are the result of the obsessions that may precede them. Consider, for example, the parallel case of thirst. A water-deprived person experiences many thoughts about water and drinking, which can reach obsessive intensity until drinking behavior ensues. Would it be sensible, then, for someone to say, "I drink to stop my obsessions about drinking"? Such a position would appear reasonable only if one admits no underlying biology and believes that it is the appearance of thoughts in the mind that is the cause of actions. Instead, we propose that both cognitions and behaviors—obsessions and compulsions in the case of OCD—are the outputs of a coordinated underlying motivational system. The cognitions reflect the driving motivation and serve to guide behavior toward resolution of the motivational state. According to our theory, it is the motivational system that is fundamental, rather than the associated cognitions.

A third point raised by Taylor and his colleagues (2005) is that compulsive behaviors are just one type of response to obsessions, with another important class being

mental rituals. Although we believe that behavior is the primary or unconditioned response of the security-motivation system, this response would be shaped by learning, and learned, conditioned responses may come to substitute to some extent for the unconditioned response. For example, various kinds of mental simulation of checking may come to serve as a substitute for checking behavior, giving rise to mental rituals. How such rituals develop and how they may be related to overt behaviors strikes us as an important area for further research.

Despite the statement of Taylor and his colleagues (2005) to the contrary, our theory does not imply that OCD patients are "excessively motivated to seek security" (p. 13). Instead, our theory proposes that the time course or temporal dynamics of the system are different in OCD, once the system is activated. Nor is it true that our theory "offers no explanation about why episodes of obsessions and compulsions naturally come to an end" (p. 7). Instead, our theory proposes that system activation has a particular, fairly protracted half-life; that is, in the absence of performance of security-related behaviors, it runs itself down, given sufficient time. The theory proposes that what is deficient in OCD patients is the capacity to shut the system down more promptly through security-related acts. Thus we characterized OCD patients as having a problem of stopping, and explaining this inability to stop is the major focus of our theory.

Starting versus Stopping: The Affective Chronometry of An OCD Bout

One of the most interesting arguments advanced by Taylor and colleagues (2005) is that OCD is a starting problem, rather than a stopping problem, as we argue. We believe that a focus on this distinction could be highly generative in future research, along the following lines.

In any such research, there is an important and difficult problem that concerns how to define a *bout* or the relevant unit of behavior – how is its structure defined in terms of start, magnitude, and duration? For example, consider a first-person account of OCD in which after an initial careful checking of some equipment, the OCD sufferer's evening is consumed by three episodes of rechecking, the first in which the person returns to the site by foot, the second by bus, and the third by taxi (Toates & Coschug-Toates, 2002). Is each of these checkings a separate bout of behavior, each with its own distinct starting conditions, thus indicating a starting problem in OCD? Or are they one long, extended behavioral unit, tied together by an underlying, persistent motivational state, and thus indicative of a stopping problem?

To answer such questions, we need naturalistic studies that permit an ethological analysis of the morphogenesis of the relevant behavior, or unfolding of behavioral structure across time. For instance, consider the following two behavioral patterns. If the interval between the relevant behaviors is relatively short and there is a background uneasiness throughout, this pattern would suggest a persistent state driving and binding the behaviors together, consistent with a stopping problem. In contrast, if the relevant behaviors are separated by relatively long periods of time during which the motivating concerns disappear, this pattern would be more consistent with a pure starting problem. Research to reveal such microstructure of OCD behavior is a promising direction for future work.

Likewise, there is a need for more research addressing how the structure of OCD behavior changes across the course of illness. To illustrate, there are various ways that an initial, fundamental stopping problem might conceivably lead, secondarily over time, to

changes in eliciting conditions of OCD bouts. For example, experience with difficulty in shutting down security motivation might lead to the following: (1) to the tendency to avoid stimuli (such as knives) that suggest danger and potentially activate the security motivation system; and (2) to the tendency to engage in more frequent, smaller-scale security-related behaviors (such as prophylactic washing or checking) to help forestall activation of the security motivation system.

In addition to motivating such ethological studies, the starting-versus-stopping distinction suggests promising lines of experimental inquiry. Davidson (1998) has drawn attention to the concept of "affective chronometry," – the attempt to quantify the temporal dynamics of emotional phenomena in terms of such parameters as threshold, peak amplitude and recovery time (Davidson, 1998; Davidson, Jackson, & Kalin, 2000). Our theory crucially proposes that it is the recovery phase that is abnormal in OCD. Furthermore, our theory elaborates importantly on the concept of recovery time by Davidson and colleagues, in that we propose that in OCD it is the active performance of security-related thoughts and behaviors that is instrumental in the normal recovery function. If such performance were blocked experimentally, both controls and OCD patients would experience a prolonged recovery time. However, if the performance of security-related behavior is not blocked, only OCD patients should show a prolonged recovery time, reflecting the abnormally weak negative feedback effect that their behavior has on the security-motivation system. The resulting abnormally long recovery time, we propose, is experienced by the OCD patient as the inability to terminate thoughts and actions motivated by concern of harm to self or others.

The conception of OCD as involving motivation and emotion suggests experimental paradigms for such research that one might not otherwise consider. One such promising paradigm is the temporal dynamics of startle modulation. The startle reflex is highly responsive to emotional states, particularly those elicited by defense systems (Buchanan, Tranel, & Adolphs, 2004; Grillon, 2002), and it lends itself readily to the repeated-measures testing needed to capture the temporal dynamics of an emotional response (Bradley, Codispoti, Cuthbert, & Lang, 2001). Although startle reactions in OCD have begun to receive some attention (e.g., Kumari et al., 2001), existing studies do not track response across time, and it is this temporal aspect that would address the hypotheses of our theory concerning stopping deficits in OCD.

Temporal dynamics would also be a way to study the effects of treatment. Treatment could raise the threshold, lower the maximum response, or shorten the recovery time, particularly in conditions where it is possible to engage in security-related acts. A raised threshold would be consistent with the emphasis of Taylor and colleagues (2005) on starting as the problem to be fixed in OCD, and also consistent with Szechtman and Woody's (2004) proposal that exposure with response prevention works by increasing the threshold needed to activate the security motivation system. But other properties of these curves could well be affected by treatment, and they may be differentially affected by different treatments. Hence, this appears to be another promising avenue for research.

However, we do not agree with Taylor and colleagues (2005) that a new theory of underlying mechanism must explain why currently available treatments work. Consider that administering aspirin improves the symptoms of a cold, but a cold is not some kind

of aspirin deficiency, nor do a cold's viral origins explain why aspirin works. Similarly, opening windows may relieve overheating due to a dysfunctional thermostat, but focusing on the windows does not elucidate the underling problem. In short, not all the things that affect a problem are clues to the underling mechanism that produces it, and part of the role of a new theory is surely to direct attention toward factors that are different from those already recognized.

Significance of Multiple Subtypes of OCD

Taylor and colleagues (2005) briefly review important work showing that OCD patients show heterogeneous symptom subtypes (e.g., McKay et al., 2004). They argue that any single dysfunctional mechanism, such as that in our theory of OCD, is unlikely to explain all these symptom patterns, which may require different explanatory theories.

In response, we first point out that the existence of subtypes does not necessarily mean there is no common underlying mechanism. Consider, for example, broken bones: A break in a leg versus one in an arm would produce quite distinct patterns of disability (e.g., inability to walk versus inability to write), yet there is obviously a common underlying mechanism. Second, the biological underpinnings of our theory, in fact, provide a framework for understanding how subtypes may arise. Namely, the basal ganglia consist of a set of parallel, separate circuits that subserve different innate, comparatively specific behavioral programs (Alexander, Delong, & Strick, 1986; Wise & Rapoport, 1989). The symptom subtype may depend specifically on where the dysfunction is located and which circuit is affected.

However, Taylor and colleagues (2005) are undoubtedly right that these basic subtypes are elaborated cognitively in important ways. For example, as Taylor and

colleagues point out, repeated checking increases memory uncertainty (van den Hout & Kindt, 2003b; van den Hout & Kindt, 2003a). Our theory implies that checking does not work in the first place for OCD patients; this increase in uncertainty further implies that repetition of checking makes things even worse, rather than remedying the basic deficit.

Finally, there is the important problem of which symptom patterns are explained relatively well by the theory of dysfunction of a security-motivation system and which are not. Through learning, a variety of stimuli might come to be associated with security motivation, making it difficult to draw a firm boundary around the domain. Nonetheless, our theory does not explain all phenomena currently labeled as OCD. The theory applies most clearly to checking, and we believe it will prove to apply well to contamination and cleaning/washing, too. It applies less well to symptoms such as hoarding (although at least some hoarding seems related to security concerns, e.g., Frost & Gross, 1993), and it seems least applicable to phenomena such as musical obsessions, as Taylor at al. (2005) point out. How would we explain this state of affairs? One possibility is that our theory is wrong, and some other theory will eventually weld these diverse phenomena together under a common explanation. However, another possibility is that some of these phenomena with similar phenomenology have different underling mechanisms, and, to the extent that such basic mechanisms are emphasized, will eventually be considered as separate disorders.

As another illustration of these boundary issues, consider the distinction of generalized anxiety disorder (GAD) from OCD, which Taylor and colleagues (2005) characterize as a weakness of our theory. There are fairly obvious content differences between the two disorders, with the content of OCD mapping more clearly onto security-

motivation issues as we delimited them. In addition, worry, both normal and in GAD, is concerned with future events, rather than a proximal threat that may exist in the present, as in OCD (Borkovec, 1994), and in OCD there appears to be a key link of disturbing thoughts to actions that is different from GAD (Coles, Mennin, & Heimberg, 2001), another point that is emphasized in our theory. However, there is a need for further research on these kinds of distinctions, and we believe it may benefit from comparative analysis of temporal dynamics, as discussed earlier.

More generally, we agree with Taylor and colleagues (2005) that there is a need to built bridges between explanatory theories and distinguishable classes of dysfunctional behavior of these kinds. The security-motivation system is, we believe, one important such explanatory theory.

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