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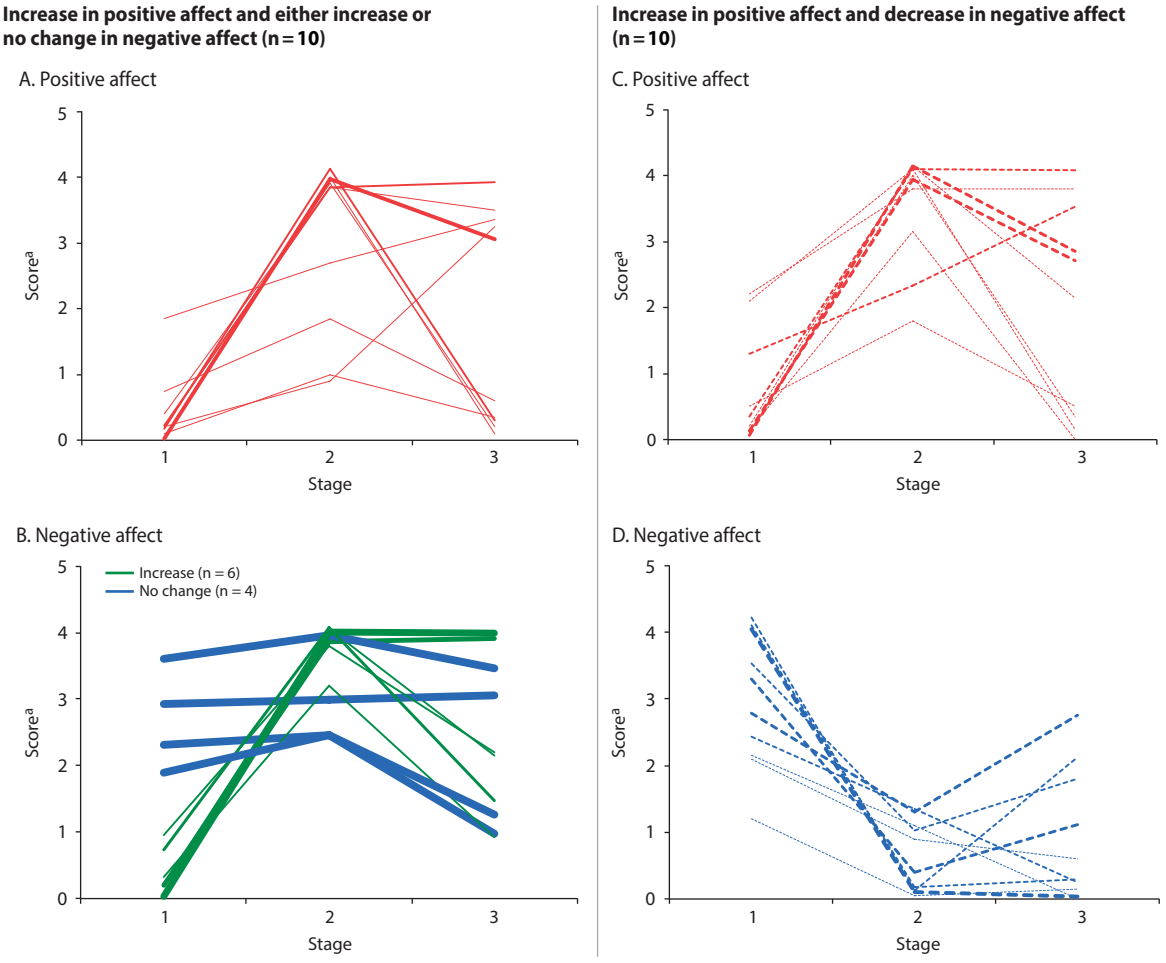
Anticipated Reward in Obsessive-Compulsive Disorder: Are Compulsions Rewarding?

To the Editor: Affect and behavior are closely linked. Researchers have investigated the influence of affective reactions to incentive outcomes on behavior. More recently, interest has shifted to the affective state that occurs during the anticipation of a behavior. Affect during this phase is best situated in time to motivate behavior and is typically associated with the expected outcomes of that behavior.[1] This notion is relevant for compulsive behavior in obsessive-compulsive disorder (OCD), which is associated with a deficit in using accurate models of prospective action-outcome scenarios.[2] This deficit may in turn influence anticipatory affect and exacerbate compulsions despite their detrimental consequences. More insight into the affective changes before and after compulsions in OCD can increase our understanding of how affect and behavior dynamically interact in this disorder. In this study, we directly investigated self-reported affect *before, in anticipation of,* and *after* OCD-related compulsions to elucidate the role of positive and negative affective states in compulsive behavior.

Method. Twenty-two consecutive and treatment-seeking patients with *DSM-IV* OCD (mean ± SD age = 39.17 ± 12.42 years, 11 males) completed the Temporal Impulsive Compulsive Scale, a self-report instrument that was developed to assess affective states over time during specific repetitive behaviors (scale is available from the authors upon request). It consists of a selection of 6 Positive Affect (cheerful, proud, determined, confident, energetic, alert) and 8 Negative Affect (guilty, lonely, nervous, sad, afraid, disgust, ashamed, irritable) items from the Positive and Negative Affective Schedule (PANAS). Participants indicated how intensely they experienced these affective states before (pre-choice phase), in anticipation of (anticipatory phase), and after (consummatory phase) their primary OCD compulsion behavior (ie, washing, checking, ordering, or hoarding). This study was approved by the local institutional review board.

Scores were calculated (in centimeters) using a visual analog scale that varied from 0 "not at all" to 10 "extremely." Mean responses were separately calculated for positive and negative affect at each temporal phase. Each participant received 1 mean score for items within the Positive Affect scale and 1 for items within the Negative

Figure 1. Affective Experiences Prior to (stage 1, pre-choice), in Anticipation of (stage 2, anticipatory), and After (stage 3, consummatory) the Primary OCD Compulsion[a]



[a]Expressed as a mean score for the Positive or Negative Affect items for each patient. Line thickness represents the number of Positive Affect or Negative Affect items that were endorsed.
Abbreviation: OCD = obsessive-compulsive disorder.

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Affect scale. We defined increase or decrease in positive or negative affect when patients showed a difference of more than 1 standard deviation shift from the pre-choice phase to the anticipatory phase.

Results. Twenty of the 22 OCD patients showed an increase in mean positive affect from pre-choice to anticipatory phase, while 2 patients showed no change in affect. Of the 20 patients, 10 additionally reported a decrease in mean negative affect (Figure 1). At the item level, when the pre-choice phase was compared to the anticipatory phase, there was increased positive affect in relation to being determined (n = 9), energetic (n = 7), confident (n = 6), cheerful (n = 5), and alert (n = 4), as well as decreased negative affect in relation to being sad (n = 6), irritable (n = 4), ashamed (n = 3), guilty (n = 2), nervous (n = 2), afraid (n = 2), disgusted (n = 1), and lonely (n = 1).

The 10 patients who showed a decrease in negative affect included 3 with washing compulsions, 3 with checking compulsions, 3 with hoarding compulsions, and 1 with symmetry symptoms. The remaining 10 patients showed either a concomitant increase (n = 6) or no change (n = 4) in negative affect during the shift from pre-choice to the anticipatory phase. These patients included 3 with washing compulsions, 3 with checking compulsions, 2 with hoarding compulsions, and 2 with symmetry symptoms. Mixed compulsive and impulsive OCD patients (ie, patients who exhibited both increases in mean positive and decreases in mean negative affect) exhibited more frequent decreases in sadness ($P = .01$; Fisher exact test) and a trend toward more frequent decreases in irritability ($P = .08$; Fisher test) than purely impulsive patients (patients who displayed only an increase in mean positive affect). Age ($Z = -0.2$; $P = .85$) and gender ($P = 1.00$; Fisher test) did not differ between mixed OCD patients with impulsive and compulsive features versus purely impulsive patients.

Discussion. It is intriguing that almost all of the OCD patients studied showed an increase in positive affect in anticipation of their compulsion. In addition, 10 of them showed a concurrent decrease in negative affect, while the remainder showed either a concurrent increase or no change in negative affect. The increase in positive anticipatory affect may indicate a rewarding aspect of compulsions, and concomitant decreases in negative affect (particularly sadness and irritability) suggest craving/addictive processes, which could contribute to the persistence of these behaviors. These findings may be particularly relevant to those OCD patients who show blunted nucleus accumbens activity during anticipation of generic rewards, which is offset by enhanced activity during anticipation of performing OCD-related compulsions. This explanation supports analogies between OCD and addiction[3] and is consistent with the co-occurrence of compulsive and impulsive symptoms in OCD[4] and addictive disorders.[5] The findings provide insights into the phenomenological and neurobiological systems that maintain, and even promote, compulsions in OCD-related behaviors.

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