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Maintenance mechanisms in OCD: maladaptive obsessive beliefs and negative reinforcement

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Abstract. Intrusive thoughts are a common psychological phenomenon and do not necessarily lead to obsessive-compulsive symptoms. The key difference between individuals with Obsessive-Compulsive Disorder (OCD) and non-clinical individuals may lie more in how they interpret these thoughts and cope with the distress they cause. Research shows that maladaptive obsessive beliefs make individuals more likely to interpret intrusive thoughts as signals of danger, importance, or responsibility, which may lead to anxiety, guilt, and uncertainty. Compulsive behaviors such as checking, washing, reassurance seeking, and mental neutralizing can provide short-term relief. However, this relief may increase the likelihood of repetition through negative reinforcement while also preventing threat appraisals from being tested against reality. This paper uses a literature review and theoretical integration to examine the roles of maladaptive obsessive beliefs and negative reinforcement in the maintenance of compulsive behavior.

Keywords: obsession-compulsive disorder, compulsive behavior, maladaptive obsessive beliefs, appraisal of intrusive thoughts, negative reinforcement

1. Introduction

Obsessive-compulsive disorder (OCD) is a mental disorder characterized mainly by obsessions and compulsions [1]. Obsessions usually involve repeatedly occurring and distressing thoughts, images, or impulses that are difficult to get rid of. Compulsions include repeated checking, washing, reassurance seeking, ordering, and mental rituals such as repeating words or counting. Importantly, intrusive thoughts are not unique to individuals with OCD. Non-clinical individuals may also experience thoughts related to contamination, harm, taboo topics, or responsibility [2, 3]. Therefore, the key issue is not whether individuals experience unwanted thoughts, but whether they interpret these thoughts as dangerous, important, or as signals with special meaning.

This paper uses a literature review and theoretical integration. Based on cognitive theories, learning theories, and relevant empirical research, it analyzes the maintenance mechanisms of compulsive behavior. It focuses on how maladaptive obsessive beliefs influence individuals' appraisals of intrusive thoughts, how negative reinforcement promotes the repeated performance of compulsive behaviors, and how cognitive appraisal and behavioral reinforcement together form a maintenance cycle.

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2. Literature review

2.1. Maladaptive obsessive beliefs and intrusive thoughts

Intrusive thoughts are not usually a sufficient condition for the development of obsessive-compulsive symptoms. Early research by Rachman and de Silva indicates that intrusive thoughts reported by non-clinical populations are similar in content to the obsessions experienced by individuals with OCD [3]. The main difference between the two groups may not lie in the content of the thoughts, but rather in how individuals appraise them, particularly whether they perceive them as personally significant or indicative of serious consequences [4]. Non-clinical individuals may interpret sudden thoughts as accidental occurrences, whereas individuals with OCD are more likely to remain concerned about the possible danger, responsibility, or moral problems associated with them.

Cognitive models suggest that maladaptive obsessive beliefs underlie this pattern of appraisal. The Obsessive Compulsive Cognitions Working Group summarized beliefs closely related to OCD into six domains: inflated responsibility, overimportance of thoughts, overimportance of controlling thoughts, overestimation of threat, intolerance of uncertainty, and perfectionism [5]. These beliefs do not necessarily produce intrusive thoughts directly, but they may affect how individuals appraise these thoughts. For example, "The door may not be locked" may simply be a transient doubt. However, under the influence of inflated responsibility, overestimation of threat, and intolerance of uncertainty, it may be interpreted as "If I do not check repeatedly, my family may be harmed, and I must be responsible for it." At this point, an ordinary doubt is given serious meaning and may cause anxiety, fear, or guilt. The theories of Salkovskis and Rachman both suggest that it is this catastrophic interpretation of the meaning and consequences of intrusive thoughts that causes ordinary intrusive thoughts to develop into persistent and distressing obsessions [4, 6].

2.2. Negative reinforcement and compulsive behavior

Compulsive behaviors are methods individuals use to cope with distress. They include observable behaviors such as washing, checking, and repeated reassurance seeking, as well as mental rituals such as silent repetition, counting, recalling, and mentally neutralizing thoughts [1]. From a learning perspective, negative reinforcement refers to the process by which a behavior becomes more likely to occur again because it reduces or removes an uncomfortable state [7]. In OCD, intrusive thoughts and maladaptive appraisals may trigger distress, such as anxiety or guilt, which may in turn lead individuals to perform compulsive behaviors. When anxiety temporarily decreases following these behaviors, individuals may learn that compulsive behaviors can eliminate danger and distress. Recent ecological momentary assessment studies have also found that reductions in anxiety following compulsive behaviors can predict the likelihood of subsequent compulsive behaviors, providing support for this mechanism in everyday situations [8].

However, the short-term relief produced by compulsive behaviors does not mean that the underlying beliefs have been corrected. Instead, individuals tend to attribute the non-occurrence of the feared outcome to the compulsive behavior itself, rather than realizing that the danger was unlikely to occur in the first place. For example, after repeatedly checking a door lock and finding that no disaster has occurred, an individual may think, "The disaster did not happen because I checked the door." In this way, although the behavior reduces anxiety in the short term, it prevents individuals from testing whether the feared outcome would actually occur if they did not check [6]. Research on repeated checking has also found that repeated checking does not increase certainty about what has already been checked. Instead, it may reduce memory confidence and the sense of detail in memory [9]. This suggests that compulsive behaviors not only fail to eliminate uncertainty, but may also create new doubts.

3. Cognitive-behavioral maintenance mechanisms of compulsive behavior

Based on the theories above, the maintenance of compulsive behavior can be understood as a cyclic process. First, intrusive thoughts occur. Next, under the influence of maladaptive obsessive beliefs, individuals may appraise these thoughts as signals of danger, excessive importance, unacceptability, or a need for immediate control. Third, these appraisals cause anxiety, guilt, disgust, uncertainty, and a sense of responsibility [4-6]. In order to reduce distress or prevent the feared outcome from occurring, individuals perform compulsive behaviors such as checking, washing, reassurance seeking, avoidance, or mental neutralization. Fourth, the short-term relief produced by compulsive behaviors increases the likelihood that these behaviors will occur again through negative reinforcement [7, 8]. Meanwhile, compulsive behaviors prevent individuals from learning that intrusive thoughts do not necessarily indicate real danger and that anxiety can decrease naturally without performing rituals [6, 10].

In this cycle, different factors serve different explanatory functions. Maladaptive obsessive beliefs explain why individuals tend to interpret ordinary intrusive thoughts as threats; maladaptive appraisals explain why intrusive thoughts can cause intense distress; compulsive behaviors are coping responses that individuals perform to reduce distress; and negative reinforcement explains why individuals repeatedly perform these behaviors even when they know that the behaviors are unreasonable [4, 6, 8]. This process is not a one-way chain. Compulsive behaviors are influenced by maladaptive beliefs and appraisals, but the short-term relief they provide, along with the prevention of reality testing, in turn reinforces and maintains the original beliefs. Therefore, maladaptive obsessive beliefs and negative reinforcement respectively constitute the cognitive basis and the behavioral maintenance condition of the compulsive behavior cycle.

This explanation also helps account for why some individuals with OCD find it difficult to stop their compulsive behaviors, even when they recognize that these behaviors are excessive or unnecessary. For these individuals, compulsive behaviors are not simply repetitive actions, but safety strategies that have been repeatedly learned: they occur when anxiety is at its highest and quickly provide noticeable relief. Because this relief occurs so directly and rapidly, individuals are more likely to believe that the behaviors themselves have a protective function, while finding it more difficult to believe that "nothing bad may happen even if I do nothing." Therefore, the maintenance of compulsive behavior involves not only maladaptive beliefs, but also behavioral dependence developed through repeated experience [6, 8].

4. Empirical evidence for the maintenance mechanisms of compulsive behavior

4.1. Maladaptive obsessive beliefs

Recent research indicates that there is a relatively stable association between maladaptive obsessive beliefs and OCD symptoms. Abramowitz et al. found that, after controlling for general psychological distress, maladaptive obsessive beliefs could still significantly explain differences in obsessive-compulsive symptoms [11]. At the same time, different domains of obsessive beliefs are differentially associated with symptom dimensions, including contamination and cleaning, responsibility and harm, unacceptable thoughts, and symmetry and completeness [12]. These results indicate that maladaptive obsessive beliefs are not merely broad general psychological factors, but are relatively stably and specifically associated with OCD symptoms and their particular manifestations.

Furthermore, maladaptive obsessive beliefs may contribute to the maintenance of obsessive-compulsive symptoms by influencing how individuals appraise intrusive thoughts. When certain obsessive beliefs are

stronger, individuals may be more likely to make threatening appraisals of intrusive thoughts, resulting in stronger negative emotions such as anxiety and corresponding compulsive responses [4-6]. Treatment process studies have also found that reductions in maladaptive obsessive beliefs can predict subsequent symptom improvement [13]. These findings support the possibility that maladaptive obsessive beliefs are involved in the maintenance of obsessive-compulsive symptoms, rather than merely coexisting with them. However, many existing studies use cross-sectional designs or rely heavily on self-report measures. Therefore, the complete causal relationships among maladaptive obsessive beliefs, cognitive appraisals, and obsessive-compulsive symptoms have not yet been fully established [11-13].

4.2. Negative reinforcement

Evidence for negative reinforcement is also important. Ecological momentary assessment research shows that greater anxiety, intrusive thoughts, and perceived threat before compulsive behaviors are associated with more severe compulsive behaviors; reductions in anxiety after compulsive behaviors can in turn predict the likelihood of subsequent compulsive behaviors [8]. Laboratory research has shown that repeated checking may reduce individuals' confidence in their memory and increase new doubts [9]. Exposure and Response Prevention (ERP) also provides indirect support from a clinical intervention perspective. Individuals are exposed to anxiety-provoking situations while being prevented from performing or delaying their usual compulsive behaviors, thereby learning that anxiety can be tolerated and that feared outcomes do not necessarily occur [14, 15]. Randomized controlled studies have shown that ERP can significantly reduce OCD symptoms [16]. Research on treatment mechanisms has also found that changes in responsibility, threat appraisal, the importance of thoughts, and cognitive beliefs are associated with symptom improvement [17]. These findings are consistent with the negative reinforcement model: when compulsive behaviors are no longer used to obtain immediate relief, the original association among "threat–behavior–safety" may be weakened.

However, negative reinforcement cannot fully account for all compulsive behaviors on its own. Some repetitive behaviors may also be influenced by habitual processes or neurocognitive mechanisms [18]. Furthermore, the direct drivers of some compulsive behaviors may not be typical anxiety or harm avoidance, but rather a subjective sense of incompleteness or a feeling that something is "not just right" [19]. Meanwhile, perfectionism and intolerance of uncertainty are not unique to OCD; similar cognitive tendencies may also occur in other psychological problems, such as anxiety and depression [20, 21]. Therefore, maladaptive obsessive beliefs and negative reinforcement are better understood as important mechanisms for explaining the maintenance of compulsive behavior, rather than as a single model that accounts for all manifestations of OCD.

5. Discussion

This article integrates cognitive and learning theories to propose that the long-term persistence of compulsive behaviors is not directly caused by intrusive thoughts but is maintained by maladaptive evaluations and behavioral reinforcement. Mowrer's learning theory emphasizes that avoidance or safety behaviors are maintained because they reduce fear [22]. This opinion can be complemented with cognitive model. Cognitive factors explain why individuals may interpret intrusive thoughts as threats, whereas behavioral factors explain why compulsive behaviors are repeatedly performed following short-term relief. Clark and Purdon's cognitive perspective on obsessive thoughts, Abramowitz et al.'s account of the cognitive-behavioral mechanisms of OCD, and the emphasis of metacognitive theory on thought control and the significance of thoughts all

suggest that treatment should not focus solely on surface behaviors, but should also address how individuals interpret their thoughts [23-25].

This model has clear clinical implications. First, treatment should not aim to completely eliminate intrusive thoughts, as such thoughts are also quite common in the general population. A more appropriate goal is to reduce patients' excessive appraisals of the importance, danger, and responsibility associated with their thoughts and to help them understand that intrusive thoughts do not necessarily reflect real intentions or real danger. Second, treatment needs to weaken the reinforcing effect of compulsive behaviors. The key point of ERP is not simply to repeatedly expose patients to anxiety-provoking stimuli. Instead, it helps them acquire new experiences without performing compulsive behaviors: anxiety can naturally decrease, uncertainty can be tolerated, and the expected disasters may not occur [15, 26]. Therefore, effective interventions should target both cognitive appraisal and behavioral reinforcement.

6. Conclusion

This paper argues that the persistence and repeated performance of compulsive behaviors may result from the interaction among maladaptive obsessive beliefs, maladaptive appraisals of intrusive thoughts, and negative reinforcement. Maladaptive obsessive beliefs make individuals more likely to overestimate the importance and danger of intrusive thoughts, as well as their personal responsibility for them; maladaptive appraisals cause ordinary psychological events to be interpreted as threats; and the short-term relief produced by compulsive behaviors increases the likelihood that these behaviors will recur through negative reinforcement, while preventing individuals from testing their original catastrophic judgments. Therefore, the maintenance of compulsive behavior is not directly caused by intrusive thoughts themselves, but rather by a cycle involving cognitive appraisal and behavioral reinforcement. The treatment of obsessive-compulsive disorder should therefore address both cognitive and behavioral processes: changing how individuals interpret intrusive thoughts while also weakening the function of compulsive behaviors as a means of regulating distress.

This paper still has several limitations. First, it mainly employs literature review and theoretical integration and does not directly test the complete chain of "belief–appraisal–distress–compulsive behavior–relief" through original experiments. Second, existing studies differ in their definitions of variables, measurement methods, sample types, and symptom dimensions, and some conclusions still require further verification through longitudinal studies, experimental studies, and ecological momentary assessment. Finally, OCD is highly heterogeneous, and different symptom types may involve different maintenance pathways. Future research could further compare the cognitive bases and reinforcement processes across symptom dimensions such as contamination and cleaning, repeated checking, symmetry and ordering, and unacceptable thoughts, and examine whether cognitive change and reductions in negative reinforcement respectively mediate the effects of different treatment approaches.

Moreover, future research could distinguish the different functions of compulsive behaviors in greater detail. Some behaviors are mainly performed to reduce anxiety, whereas others may be intended to eliminate disgust, achieve a "just right" feeling, or avoid a vague sense of incompleteness. If research designs simultaneously record the content of intrusive thoughts, immediate appraisals, emotional changes, and behavioral outcomes, researchers may be better able to determine the strength of negative reinforcement across different symptom dimensions and provide more specific evidence for individualized treatment.

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