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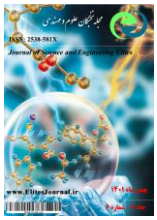
مجله نخبگان علوم و مهندسی

Journal of Science and Engineering Elites

جلد ۷- شماره۶ - سال ۱۴۰۱



Review on Investigating Decision-making Styles in Obsessive Compulsive Disorder

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Received: January 2023 Accepted: January 2023

Abstract

The diagnosis of obsessive-compulsive disorder (OCD) is based on the presence of specific symptoms and their consequence in the lives of those that exhibit them. It is likely that these symptoms emerge from a neurocognitive vulnerability in the mental life of the individual which has a basis in neurophysiology. Individuals with OCD struggle with decision making. One potentially important aspect of decision-making in relation to OCD is decision-making style, a trait-like pattern of responding that is relatively stable across a variety of decision making situations. The main results revealed that, in addition to clinical experience suggesting the importance of doubt or uncertainty in OCD, results from empirical studies support the involvement of doubt in OCD. Doubt can be construed as dysfunction in the decision-making process. There will be longer response times in OCD persons in the process of decision-making, and this will be more evident in less ambiguous decisions. Compared to healthy controls, individuals with OCD see themselves as less confident and respected decision makers and avoid decision-making. OCD patients are more impulsive than controls and demonstrate risky decision-making and biased probabilistic reasoning.

Keywords: OCD/Obsessive-compulsive disorder, Decision-making, Decision-making styles, Doubt, Impulsive, Confident

1- Introduction

In today's complex world, human faces many problems. Issues such as poverty, homelessness, unemployment, social unrest and war, rapid social changes and pressures of modern life, loneliness and personal deprivation and lack of support resources, incurable diseases, etc. Human has to deal with these issues for his life and survival and expose himself to many dangers. Among all these dangers, the emergence of psychological problems is one of the major challenges of humans in the modern era. Meanwhile, obsessive-compulsive disorder causes many problems in the fields of work, family, social, etc. and causes discomfort and distress to the sufferers of this disorder as well as their families and imposes a lot of costs on individuals and society every year. Therefore, it is important to identify, describe and investigate the influencing variables in this disorder. Obsessive-compulsive disorder is a common and curable psychiatric disease that can be seen in different clinical forms such as washing obsession, obsessive thinking, obsessive compulsive disorder and so on. Obsessions are thoughts, feelings, ideas, feelings and mental images that enter the patient's mind unintentionally and repeatedly, and resistance to them causes anxiety. The diagnosis of obsessive-compulsive disorder (OCD) is based on the presence of specific

symptoms and their consequence in the lives of those that exhibit them. It is likely that these symptoms emerge from a neurocognitive vulnerability in the mental life of the individual which has a basis in neurophysiology. The prominence of doubt/uncertainty/lack of confidence, in the clinical presentation of many patients suffering from OCD leads to our consideration of the cognitive basis for this phenomenon [1].

Obsessive-compulsive (OC) spectrum disorders are characterized by repetitive, ritualistic behaviors and obsessional or recurrent thoughts, urges, and sensations. recurrent thoughts in obsessive compulsive disorders, are experienced as intrusive or unwanted. In clinical settings, patients with OCD struggle with indecisiveness, slow decision-making, excessive doubt and distress when faced with decisions, and maladaptive decisions that result in high costs for minimal benefits. One potentially important aspect of decision-making in relation to OCD is decision-making style, a trait-like pattern of responding that is relatively stable across a variety of decision making situations [2].

We are required to make decisions at every step of our lives. The majority of these are made automatically, with- out any conscious deliberation, that is, they are implicit or associative decisions. Others are analytic, explicit or rule- based, and are made with deliberation, and perhaps some hesitation [3]. The essence of a decision is the culmination of a process in a conclusion or resolution. Sometimes we are unable to decide, and may postpone the decision, let someone else make it for us, or 'decide' not to make a choice at all. Decisions of course have consequences, and a decision is a good one if it maximizes desirable or minimizes undesirable outcomes [4]. Most decisions are made in a context that involves others, and therefore are influenced by social role and personal identity. Some decisions are inherently difficult to make, while others are difficult for some individuals in certain contexts. Decisions are embroiled with emotions in the evaluation of both experienced and expected outcomes. Whatever the complexity of decision-making, it is fundamental to cognition, and habitual indecision can be disabling. Compulsive individuals are habitually indecisive. They may take hours to select a gift, which may eventually be packaged with a 'belated' birthday card, or be unable to decide when an assignment or project is complete, resulting in its delayed submission. Such indecision reaches its pathological apex in obsessive–compulsive disorder (OCD), which is defined by the presence of obsessions and/or compulsions. The hallmark of many of these symptoms is the presence of a doubt regarding whether a particular act has been satisfactorily concluded, or a particular event may or may not occur, or even whether the consequences of action or inaction may or may not be negative. For instance, 'washers' examine their washed hands unable to decide whether they are clean and free of germs. Rather than make an immediate choice and face the consequences, they wash them repeatedly, despite being acutely aware of the fact that they are actually clean, and that further washing is absolutely unnecessary [5].

Decision-making styles are conceptualized as stable, trait-like approaches to decision-making, which may include ways an individual gathers and processes information, considers alternatives, and ultimately makes choices [6-8]. Early research on decision styles originated outside of clinical psychology. More recently, however, researchers began to study decision styles in the context of psychopathology [9-13], finding relationships between decision styles and mental health. Although decision styles are conceptualized as traits, or cognitive styles.

Which make them more akin to personality characteristics rather than symptoms of disorders, it is possible that certain disorders increase the likelihood of an individual using a particular style of set of styles or that decision styles increase vulnerability to certain disorders.

Several researchers have developed measures to assess decision making style, leading to both overlapping and competing conceptualizations of specific styles. For example, whereas the Decision Making Style Inventory includes three styles (analytical, intuitive, and regret-avoidant), the General Decision Making Style includes five styles (rational, avoidant, dependent, intuitive, and spontaneous). In order to consolidate and refine these various constructs, performed a factor analysis on 50 items taken from three existing measures, as

well as thirty-four new items developed specifically for their study. Their data best fit a 9-factor solution, including seven decisional styles (spontaneous, dependent, vigilant, avoidant, brooding, intuitive, and anxious) and two decisional self–esteem factors (confident and respected) [2].

Decision-making is a crucial process for effective adaptive functioning. A comprehensive body of recent research, based on empirical neurobiological studies in animals and humans and using developmental cognitive theories and mathematical models to interpret findings, provides the basis for understanding the neurobiology of decision-making. These provide the basis for identifying pathological variants in the process of decision making. obsessive-compulsive disorder (OCD) and related disorders are prototypic conditions that result from dysfunction in this domain [1].

Decision-making styles refer to a person's strategies when making decisions. Decision-making means choosing a solution from two or more options in a preventive behavior and in order to achieve a specific goal with the least possible risk. Therefore, decision-making forms the central core of planning, which expresses a deep intellectual activity, in the meantime, the decision-making style of each person is his personality approach in understanding the reaction to his decision-making task.

Nestad et al. (2018) in their research on doubt and the decision-making process in obsessive-compulsive disorder, showed that OCD is caused by a disorder in the decision-making process [1].

The stereotypical portrait of an obsessive–compulsive patient is an excessively self-controlled, risk aversive individual that acts in order to avoid potential loss or punishments. Although this portrait fits well with several clinical studies showing increased harm-avoidance in obsessive–compulsive disorder (OCD) [14], more recent clinical, neuropsychological and neuroimaging studies challenged this idea and described a different portrait of OCD.

A recent study demonstrated excessive self-control (the capacity to delay rewards) only in obsessive–compulsive personality disorder (OCPD) patients, but not in OCD patients [15]. In addition, several neurocognitive studies report risky decision-making (preference for an immediate reward despite negative future consequences) in both adults and children with OCD [16-26]. Also, studies on probabilistic reasoning failed to find that OCD patients had less confidence in their choices, or needed more information before reaching a decision compared to controls [27-29].

one would specifically expect individuals with OCD to endorse anxious decision-making. There is evidence individuals with OCD can also be impulsive [30]. Individuals with OCD can also be impulsive [30]. Finally, we had competing hypotheses about dependent decision making [30]. On the other hand, individuals with OCD rely more on feedback from others when making decisions [31], and this may reflect a broader tendency to use proxies because those with OCD cannot access, or do not trust, their internal states [32,33].

In fact, recent research in non-clinical samples demonstrates that this reliance on external proxies may partially explain the relationship between OC symptoms and use of a maximizing decision-making strategy [34].

Although decision-making patterns may be evident especially for disorder-related decisions, they are likely well-practiced and may function as default or automated decision styles that could influence life – and even treatment – decisions without an individual's awareness. Understanding how people with OCD make important decisions may allow clinicians to help them become aware of these patterns and make better choices [2].

Since the earliest clinical descriptions of OCD, doubt has been described as a hallmark feature of the condition. Indeed, OCD has been called the “doubting disorder” (“folie a doute”; as well as labels of a similar intent in other languages) [1]. du Saulle (1875) was possibly the first to describe clinical patients who experienced feelings of doubt [35]. William

James (1890) attributed symptoms of the "questioning mania" to a pathological excess of doubt [36]. Pierre Janet explained the "…exaggerated need for precision and perfection in perceptions and actions" in his patients as the means of "compensate(ing) for a lack of certainty." Modern clinicians have also appreciated this aspect of their patients [1]. Shapiro wrote that patients with OCD have an "inability to experience a sense of conviction, and doubt not only in their cognitions but also in other internal states [37]." Rappaport described patients as "disbelieving their senses" and thus "needing continuous reaffirmation [38]." Doubt is a central theme in the clinical appreciation of OCD and is overt in many of the typical symptoms with which patients present. For instance, "checking behaviors" involve insufficient conviction about the completion of a task, such as locking a door, despite presumed accurate information to the contrary; and contamination concerns involve insufficient conviction regarding the safety of a contacted object, despite recognition that it is truly harmless. These and other examples, burden individuals in whom there is no evidence of intellectual or memory impairment. Doubt can be defined as a lack of certitude or confidence in one's memory, attention, intuition, and perceptions, such that it is difficult to trust one's internal experiences; hence retarding satisfactory responses to cues or possibly to information in general. Doubt is the result of an aberration in the neural mechanisms involved in decision-making [1].

In addition to clinical experience suggesting the importance of doubt or uncertainty in OCD, results from empirical studies support the involvement of doubt in OCD. In a series of studies, Rueben Dar et al. provided evidence that individuals with OCD have diminished confidence in their decision-making abilities beyond their specific obsessional checking symptoms. In one study they showed that obsessional persons reported less confidence in their answers to a general knowledge test compared to non-anxious participants, despite equal accuracy [39].

Hermans et al. found that individuals with OCD distrust attention and memory [40]. Incidentally, they also demonstrated that increased checking exacerbates distrust in memory. It is of note that it is typical to engender doubt in all individuals who are involved in checking and rechecking, regardless of psychopathology [40].

In a study using the Random Dot Matrix tasks, Banca et al showed that, under conditions of high uncertainty, individuals with OCD had a delay in reaching the decision threshold, compared to healthy controls. Moreover, even under conditions of low uncertainty, they had difficult acquiring information to make decisions. Of note, the patients responded to instructions, that monetary incentives could be garnered by increasing speed, with a reduction in their previously delayed reaction times. This suggests that the speed accuracy tradeoff (SAT) described in the decision-making literature overcomes the doubting, engendered in the decision-making process, in these patients [41].

There have been investigations to identify the neural substrate of doubt/uncertainty in OCD. Stern et al. found that OCD patients rated themselves more uncertain than control subjects during a task that involved little ambiguity. They also showed that these patients activated a network of limbic/para limbic regions including ventromedial prefrontal cortex, para hippocampus, middle temporal cortex, as well as amygdala and orbitofrontal cortex/ ventral anterior insula, and that there was an increased interconnectedness between these areas in the patients compared to controls. They postulate that this is related to internally focused thought, and implicate differences in the function of the Default Motor Network (DMN) in the experience of doubt in these patients [42].

doubt is the inability to make decisions because of a lack of certainty or confidence in the information available, both external, as in the sensory inputs, and internal, as in the integration of prior information. Hence, it can be construed as dysfunction in the decision-making process. There are several elements involved in decision-making process. First is the accumulation of information necessary to establish a decision. Related to this, is the point at which a threshold is exceeded and the behavioral response is initiated, typically the "decision

threshold." The critical element in this phase is the value attributed to the choices. Most models of decision-making also include the possibility for "response or choice bias," allowing for an a priori influence on the final response. These elements include 'life story' influences, dimensions of personality, and emotional valence of the information. Together these can be construed as a metacognitive appraisal of the information and context. Finally, there is the simultaneous monitoring process, by which the organism is attuned to recognizing whether the decision was accurate or not, and when additional strategies are necessary to maximize performance. It is at the stage of information accumulation, to the point of the decision threshold, that confidence/ certainty/lack of doubt is appreciated (consciously or unconsciously). This affects the duration of the process (decision) [1].

The main and fundamental problem statements that more pay attention in these scholars are about, Compulsive individuals are habitually indecisive, and indecision reaches its pathological peak in obsessive-compulsive disorder (OCD). With the increasing interest in the neurobiology of decision-making and examining decision-making styles, it may be useful to conceptualize OCD as a disorder of decision-making.

2- Methodology

In current paper first of all try to review each the main and foremost method of each papers carefully, for this reason the method that used by each scholars are as follows:

The first research belongs to the Nestadt et al. (2018) considered that, an underlying vulnerability for the development of the symptoms of OCD and related conditions is the experience of doubt /uncertainty at the point in time when synthesis of immediate perceptual information and the a priori internal/personal knowledge prevent the fluid execution of an unfettered decision-making process. To examine this hypothesis it is fundamental to establish the presence of aberrant processing of information leading to impairment in the decision threshold among individuals with these obsessions and related symptoms compared to others. This test should investigate the properties of the decision making process; specifically, the ease and speed of acting on a choice. The hypothesis would predict that an individual suffering from the condition would take longer to arrive at the decision (act), feel uncomfortable with the decision, and that these emotional and behavioral responses will be reflected in a distinct brain activation pattern [1].

The second research is Siev et al. (2019) appraise that, extent to which people with OCD and/or HD report specific decision-making styles and low levels of decisional self-esteem. Participants who self-identified as having OCD (n = 30), HD (n = 19), both OCD and HD (n = 33), or neither (n = 78) completed a measure of how they make important decisions, as well as symptom measures [2].

As third research, Sachdev and Mali (2005), conducted a selective review of neurobiological studies of the decision-making process, and the convergence with the understanding of the neurobiology of OCD was examined [5].

The fourth scholars in this case is Grassi et al. (2015) investigated that, behavioral addiction model of OCD by assessing whether OCD patients are more impulsive, have impaired decision-making, and biased probabilistic reasoning, three core dimensions of addiction, in a sample of OCD patients and healthy controls. they assessed these dimensions on 38 OCD patients and 39 healthy controls with the Barratt Impulsiveness Scale (BIS-11), the Iowa Gambling Task (IGT) and the Beads Task [30].

The fifth but not the least one is Zhang et al. (2015) examined that, whether deficits in decision making were potential endophenotype markers for OCD considering different phases of the disease. Fifty-seven non-medicated OCD patients (nmOCD), 77 medicated OCD patients (mOCD), 48 remitted patients with OCD (rOCD) and 115 healthy controls were assessed with the Iowa Gambling Task (IGT), which measured decision making under ambiguity, and the Game of Dice Task (GDT), which measured decision making under risk [43].

3- Result and Discussion

Nestadt et al. (2018) reveals that there exists a general-purpose decision making network involved in accumulating evidence for a decision while simultaneously encoding the confidence in that decision. There appears to be simultaneous self-monitoring during the decision making process, by which the organism is attuned to recognizing whether the decision was accurate or not, in order to avail itself of additional strategies to maximize performance. There is evidence that individuals with OCD have enhanced activity in this domain, most notably evidenced in differences in the measurement of error related negativity (ERN). This has been a consistent finding in patients regardless of symptom severity or nature of the symptoms, as well as in their unaffected relatives. In fact it has been proposed as a potential endophenotype for OCD. The ACC has been implicated in this process. The basis of the relationship between confidence in decision-making and the enhanced monitoring will need to be established. They hypothesize that there is variability among individuals with respect to their confidence in their own appraisal of the information necessary to arrive at a decision. Difficulty in this process appears to be most evident in persons with OCD, but can also occur in individuals with other disorders. They hypothesize that this trait is distributed across the population and is not unique to individuals with psychopathology. There will be longer response times in OCD persons in the process of decision-making, and this will be more evident in less ambiguous decisions; that is, if a time limit is placed upon the need to respond, the distinction between cases and controls will diminish; likewise, if the decision is immensely critical the response time will differ little between cases and controls. Furthermore, value-based choice will not be a major distinguishing cases and controls [1].

In the research of Siev et al. (2019) it was observed that, compared to healthy controls, clinical groups reported their style of decision-making as more avoidant, and they tended to brood over their decisions. They further reported having low opinions of their decision making abilities, and believed that this opinion was shared by others. Perhaps not surprisingly, given their low decisional self-esteem, clinical groups tended to rely less on their intuition than did healthy controls when making choices. In many ways, these findings suggest considerable insight for individuals with OCD. Past research identified indecisiveness and decisional procrastination as features of the overall cognitive processes of both disorders (OCD & HD), and it appears that individuals readily acknowledge their decision-making difficulties. There is evidence that decisions of individuals with OCD and HD are poorer both in terms of information processing as well as the outcomes of decisions which once again suggests insight considering the comparatively lower ratings of decisional self-esteem. Individuals with OCD reported more decisional anxiety and preferred to rely on others for their decisions [2].

Abramowitz (2018) reported that in contrast to other disorders on the OC spectrum, OCD has the strongest anxiety profile; indeed, the desire to reduce anxiety might underlie the majority of compulsive behaviors. Similarly, the nature of their disorder requires individuals with OCD to be quite deliberative and thorough in regards to their behavior, which may also translate into their style of decision making [44].

they find out, compared to healthy controls, individuals with OCD see themselves as less confident and respected decision makers, avoid decision-making and brood about making bad decisions more, and rely less on intuition when making decisions. Compared to those with HD, individuals with OCD are more anxious and dependent on others and less spontaneous when making decisions, and may try to gather more information and consider more alternatives, as well [2].

Sachdev and Mali (2005) realize that, the dorsolateral, orbitofrontal and anterior cingulate cortices are engaged in multi region neural subsystems that interact with each other to retain information online, manipulate options, make choices and maintain goals. These interact with the limbic regions, especially the amygdala, in relation to history of reward and emotional

valence relating to a choice, and the basal ganglia for behavioral execution. Abnormalities in these regions also characterize OCD and related disorders, therefore leading to problems in making some decisions that are affect-laden by nature or association [5].
Grassi et al. (2015) find out, OCD patients had significantly higher BIS-11 scores than controls, in particular on the cognitive subscales. They performed significantly worse than controls on the IGT preferring immediate reward despite negative future consequences, and did not learn from losses. Finally, OCD patients demonstrated biased probabilistic reasoning as reflected by significantly fewer draws to decision than controls on the Beads Task. They reveals that, OCD patients demonstrate increased impulsivity, risky decision-making and biased probabilistic reasoning compared to healthy controls [30].
Zhang et al. (2015) find out, OCD patients had trait-related impairments in decision making under ambiguity but not under risk, and that dissociation of decision making under ambiguity and under risk is an appropriate potential neurocognitive endophenotype for OCD. The subtle but meaningful differences in decision making performance between the OCD groups require further study [43].

4- Conclusion

In terms of reviewing of each researches find out the following achievements:

- There will be longer response times in OCD persons in the process of decision-making, and this will be more evident in less ambiguous decisions; that is, if a time limit is placed upon the need to respond, the distinction between cases and controls will diminish; likewise, if the decision is immensely critical the response time will differ little between cases and controls.
- Compared to healthy controls, individuals with OCD see themselves as less confident and respected decision makers, avoid decision-making and brood about making bad decisions more, and rely less on intuition when making decisions.
- Conceptualizing OCD as a disorder of decision-making leads to new approaches for its investigation, and novel strategies for both physical and behavioral-cognitive treatments.
- OCD patients are more impulsive than controls and demonstrate risky decision-making and biased probabilistic reasoning.
- OCD patients had trait-related impairments in decision making under ambiguity but not under risk, and that dissociation of decision making under ambiguity and under risk is an appropriate potential neurocognitive endophenotype for OCD.

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