Delay Discounting Clinical Implication for BED Treatment

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Abstract. Binge Eating Disorder (BED), a common eating disorder appearing in people in their late 20s, shows a symptom of consuming an unusual amount of food in a short amount of time. BED is usually defined as repeated episodes of binge eating accompanied by feelings of loss of control and distress, but unlike bulimia nervosa (BN), BED does not involve inappropriate compensatory behaviors to maintain weight, such as excessive dieting or exercise. Research has already begun to look at the neural mechanisms of overeating. This paper focuses on the finding of a new treatment for BED patient without the usage of medication. The proposed methods are using stimuli and therapy to regulate the focus of the patients' eating behavior, self-evaluation, and social behaviors. The results obtained from the research included the effect of delay discounting of each method of treatment on the patient. The findings indicated that reducing delay discounting has clinical implications for the treatment of BED.

Keywords: BED; delay discounting; treatment.

1. Introduction

Binge eating disorder (BED) is characterized by recurrent binge eating behaviors and is related to eating disorders, general psychopathology, and obesity [1]. In DSM-5, there is a clear diagnosis criterion. In this version, there is a new severity grading scale, which grades it from mild to extreme by its weekly episodes. Recently, BED, Anorexia Nervosa, and bulimia nervosa have become the most prevalent eating disorder in the world. According to the study of Hoek and van Hoeken (2003), BED has a more than 1% prevalence rate [2].

Present studies support that the causation of BED depends on the distress of subjects in life more than hunger [3]. BED patients tend to escape from the real problem through binge eating behavior. Restrain theory supports that BE behaviors come from the extreme desire for good looking that is caused by both personal factors and social factors, which lead to unachievable diet behavior. The frustration produced by failure causes individuals to BE as a compensation behavior. Escape theory supports that BE behaviors are produced for shutting self-awareness down to escape from the negative mood. Masking theory argues that BE behavior comes from the wish of individuals to attribute negative consequences in their life to BE, which helps them avoid the issue itself. In the aspect of escape theory and masking theory, behavior therapy is the most used method. In contrast, cognitive therapy is used with higher frequency when patients fit with restrain theory more.

The cognitive influence of BED on subjects on delaying gratification has been proved, but previous studies focus on the negative aspects of BED subjects' cognitive function (i.e., impairment, deficit). Since cognitive behavior therapy (CBT) has been proven as the most effective method, invention and deep study in this field are important. However, the study by Stein in 1998 also points out the importance of other factors. In conclusion, neither one of those theories that has been talked about above BED can be excluded [3]. Thus, research should not focus on cognitive therapy only, the development of behavior therapy also has significance. This study aims to explore whether interventions aimed at reducing delay discounting have clinical implications for treating BED by

reviewing the current study about delay discounting in BED patients and the influence of behavior training on it.

2. Case Description

2.1 Difficulties in emotional functioning (EmF) and cognitive functioning (CoF)

The research of Kittel studied the cognitive influence of BED on patients. It compared BED patients with healthy control groups (HC) and AN or BN groups, and non-weight (NW) and overweight groups (OW/OB), by assigning them different tasks. The result shows that BED patients represent more difficulties on both Cof and EmF (including emotions regulation and emotional awareness) than other groups.

2.1.1. Cognitive Functioning (CoF)

While these three groups are tested, BED groups have a lower score when related stimuli (food, body cues) come out. Their brain activation increased and showed selective attention. Which indicates their higher information processing bias [1]. More specifically, BED groups showed cognitive interference on both neutral and related stimuli, which indicates their deficit in working memory. They also showed more serious difficulties in inhibition on related stimuli, and more delay discounting even on unrelated stimuli, which revealed the general difficulties of their delayed gratification. Moreover, they also paid more attention to their own body picture rather than pictures of the control group. The OW group showed an opposite representation on that task.

2.1.2. Emotion Regulation (ER)

The article argues that BED groups represent higher angry expressions and less emotional acceptance. Although all eating disorder groups show difficulties in goal-directed behavior, impulsive control, and limited strategy than NW and OW groups. BED groups show fewer of these symptoms above than AN and BN. Kittel also found out that suppression led to more desire to binge eat, but re-appraisal won't.

2.1.3. Emotion Awareness (EA)

BED groups have more difficulty in identifying feelings but less in describing them. They showed better emotional clarity than AN and BN, but both BED and OB groups reported greater difficulties regarding interoceptive awareness.

The result points out the deficit in both cognitive functioning and emotional functioning, which implies the difficulty of overcoming BED without external help. Moreover, the study on EA tasks found that re-appraisal brings less calorie intake and binge eating desire than suppression, which further supports the research direction of behavioral therapy.

2.2 Present treatment on BED

2.2.1. Behavioral Therapy

Behavioral therapy focuses on binge eating behavior itself, which aims to help patients to reduce or eliminate BE behavior. The most commonly used treatment of behavioral therapy is behavioral weight loss (BWL) which helps patients on learning weight regulation gradually. Dialectical behavior therapy (DBT) is aimed at providing patients with a different health behavior to replace binge eating behavior which was used to confront emotion and stress.

2.2.2. Cognitive Therapy

By contrast with behavioral therapy, cognitive therapy aims at changing BED patients' inappropriate evaluation of themselves. Cognitive Behavior Therapy (CBT) is the most commonly used treatment and has shown the best curative effect [2]. CBT mainly focuses on helping patients realize and understand the existing cognitive problem through conferences. In the meantime, CBT will also provide correspondence therapy like BWL if necessary.

Other cognitive therapy, like art therapy and experiential cognitive therapy, is based on helping patients realize their defense mechanism caused by revealing their subconsciousness. Both of them also aimed at helping patients to build an appropriate evaluation system.

2.2.3. Therapy for Improving other Concomitant Symptoms of BED

Besides inappropriate evaluation and binge eating behavior, BED patients also represent other psychological disorders, like social maladjustment [2]. Therapies for improving other concomitant symptoms of BED, like interpersonal therapy, encourage patients to relate their emotions with social behavior, which helps patients to adjust their social relationships to reduce negative emotions.

2.3 Delay Discounting and Behavior Therapy

Delay discounting is a cognitive process that represents the tendency of how the value of people on reward changes depending on time. A higher delay discounting rate means the reward will become less valuable, dependent on time, and vice versa. Since BED patients represent general difficulty on Cof, they will have a higher delay discounting rate, which further reduces their behavior control.

This paper attempts to review deficiencies in the delay discounting of BED patients and the influence of behavior training on reducing difficulties of delay discounting of them. Which may provide a new behavior therapy method for helping BED patients to control their behavior. This attempt provides a cognitive direction of behavior therapy on clinical use.

3. Evaluation of Clinical Implications of Reducing Delay Discounting

In determining whether interventions aimed at reducing delay discounting have clinical implications for treating BED, an analysis of the delay discounting in the BED population and previous manipulations to reduce delay discounting is needed. More specifically, the first step is to examine the pattern of reward-delayed discounting in the BED population; then, the second step is to investigate the effectiveness of behavioral training and manipulations on reducing delay discounting from previous studies. The analysis provides the foundation for answering the main question of whether delay discounting interventions can be incorporated into BED treatment.

3.1 Delay discounting and BED

Previous studies have reported that individuals with BED show increased delay discounting, which refers to the depreciation of the value of a reward over time. High rates of delay discounting are found in individuals who are more inclined to choose immediate small rewards over delayed larger rewards. One study examined the delay discounting in various types of rewards using obese female participants, obese BED female participants, and normal female participants (non-obese and non-BED). The study results suggested that the BED group was significantly different from the obese non-BED group and the control group, in terms of a greater tendency to discount both probability and delayed rewards. Such results implied that BED subjects were more impatient when facing choices involving delayed rewards and more risk-averse when facing choices involving probabilistic rewards [4].

Other studies also demonstrated consistent findings that BED subjects displayed steeper delay discounting patterns. The impaired ability to delay reward gratification may play a role in influencing BED subjects' eating behaviors [5]. For example, BED subjects pursued immediate rewards by consuming a large number of high-calorie foods over considering long-term body health. Such discounting behavior is thought to reflect poor reward-related inhibitory control and impulsivity [6].

3.2 Delay discounting interventions

BED subjects show increased rates of delay discounting; then, incorporating strategies to reduce delay discounting rates might change BED subjects' maladaptive eating behaviors. Previous experimental manipulations had produced both short-term and long-term reductions in delay discounting. Short manipulations are usually done in the lab, where the effects are examined in a

single session. According to one review article, framing, episodic future thinking, and nature are the most effective momentary manipulations to reduce delay discounting. First, framing refers to describing the alternative choice by wording the choice differently, yet the content remains equivalent. For example, the date framing specifies the date on which the larger reward will be given rather than stating how long one needs to wait. The date framing shifts the individuals' attention to focus on the when aspect, which produces a reduction in delay discounting. Second, the episodic future thinking guides individuals to imagine a personal event in the future with details [7] and this manipulation has a robust effect on delay discounting with an 83% effectiveness rate [8]. Third, studies using nature exposure in which individuals are briefly exposed to nature, such as forest images, yielded a reduction in delay discounting [7,8].

Longitudinal studies have been done to investigate the lasting effects of the manipulations on reducing delay discounting. First, imprecision in timing intervals can influence individuals' delay discounting. By using time reframing manipulations or reward reframing manipulations, individuals' perceived closeness of the future rewards would appear to be more concrete and shorter, and thus, results in decreased rates of delay discounting. Time intervention can have a lasting effect of at least nine months following training in rats. Second, delay exposure training can reduce delay discounting by decreasing aversion to delay. When individuals are guided to pay attention to the magnitude of future rewards rather than the fact that they need to wait, individuals show a decrease in delay discounting [7, 8].

Several studies have demonstrated the implication of delay discounting training in individuals with substance addiction. One study examined the effectiveness of working memory training in reducing delay discounting among stimulant addicts. The study included twenty-seven participants who were receiving treatment for their stimulant use and half of the participants received working memory training, such as the sequence of recall of digits. The results showed that participants who were in the working memory training condition had significantly reduced rates of delay discounting, whereas the participants who were in the no memory training showed unchanged rates of delay discounting [9]. Another study also demonstrated that behavioral interventions affected delay discounting, which resulted in a decrease in substance use. Psychiatric individuals with histories of substance abuse (cocaine and/or alcohol) who received money management-based interventions showed significantly less delay discounting and less substance use over time [10]. Although previous studies were conducted with substance abusers, the underlying mechanisms may be applied to BED individuals as well. That is, interventions aimed at decreasing delay discounting can have implications for reducing addictive behaviors in terms of substance abuse for addicts and binge eating foods for BED individuals.

4. Suggestion

Prior research has assumed that the ratio between an impulsive and non-impulsive reward that leads individuals to select the non-impulsive option is consistent across magnitude.

The current study can be viewed as a primary step in the investigation of a new treatment for BED. However, because of the small sample size and the lack of information about the participants' characteristics, the findings of this study should be viewed with caution. And regardless of the data collected from randomly picked subjects being tested, people with various age ranges have a different reflection time. To reduce the likelihood of error of the test result, it is recommended that the picked BED patients' age should vary between ages from teen to adult.

Future research could further examine the differences in reduced delay discounting in the way of three treatment methods. It could also contribute to a deeper understanding of the effect between treatment with or without the usage of medication. Researchers could begin accounting for individual and contextual influences on discounting to better understand the causal relationships between substance use rates and delay discounting to BED patients.

5. Conclusion

The present paper aims to examine whether interventions aimed at reducing delay discounting have clinical implications for treating BED. Research have suggested that BED individuals show a greater tendency to discount delayed rewards. The increased delayed discounting rate is a characteristic of unhealthy eating behaviors that BED individuals exhibit. If a higher delay discounting rate is a behavioral marker for BED individuals, then including manipulations that can reduce delayed discounting in the treatment might reduce BED individuals' maladaptive eating behaviors. Previously mentioned studies have demonstrated the effectiveness of behavioral training and manipulations in reducing rates of discounting delayed rewards. Moreover, studies have incorporated these interventions to moderate changes in substance use. Therefore, it is appropriate to suggest that similar interventions aimed at decreasing delay discounting can be applied to BED individuals and in turn, may reduce maladaptive binge eating behaviors.

The present paper highlights the clinical implication of delayed discounting in BED treatments and suggests a potential treatment approach. Since BED individuals are more impatient in their decision-making about various rewards, treatments (i.e., CBT) can include behavioral training and manipulations to reduce BED individuals' discounting eating behaviors. However, there have been limited studies conducted in the field of delayed discounting and its implication in BED treatments. The present paper cannot provide a concrete, evidence-based answer and has only proposed a potential treatment technique. Future studies will need to design an experiment to obtain empirical evidence on whether interventions intended to reduce delay discounting can be effectively incorporated into BED therapies. Longitudinal studies can also be conducted to examine the long-term effects of the interventions on reducing binge eating frequencies. By continuing to investigate the connections between delay discounting and BED, new techniques can be developed to better support those who are suffering from BED.

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