MBCT-Game: An Ironic Way to Treat Internet Gaming Disorder

Jaehyun Kim, Hayoung Oh, ANDERSON SUNGMIN YOON

Submitted to: Journal of Medical Internet Research
on: August 27, 2024

Table of Contents

MBCT-Game: An Ironic Way to Treat Internet Gaming Disorder

Jaehyun Kim[1] MD; Hayoung Oh[2] PhD; ANDERSON SUNGMIN YOON[3] PhD

[1]Applied Artifical Intelligence Sungkyunkwan University Seoul KR
[2]College of Computing and Informatics Sungkyunkwan University Seoul KR
[3]Social Welfare Sungkyunkwan University Seoul KR

Corresponding Author:
Hayoung Oh PhD
College of Computing and Informatics
Sungkyunkwan University
25-1, Seonggyungwan-ro, Jongno-gu
Seoul
KR

Abstract

Conclusions: MBCT-G is necessary as a method to provide alternative emotional relief strategies for treating self-prescription disorders such as Internet Gaming Disorder.

(JMIR Preprints 27/08/2024:65786)
DOI: https://doi.org/10.2196/preprints.65786

Preprint Settings

1) Would you like to publish your submitted manuscript as preprint?

✓ **Please make my preprint PDF available to anyone at any time (recommended).**
Please make my preprint PDF available only to logged-in users; I understand that my title and abstract will remain visible to all users.
Only make the preprint title and abstract visible.
No, I do not wish to publish my submitted manuscript as a preprint.

2) If accepted for publication in a JMIR journal, would you like the PDF to be visible to the public?

✓ **Yes, please make my accepted manuscript PDF available to anyone at any time (Recommended).**
Yes, but please make my accepted manuscript PDF available only to logged-in users; I understand that the title and abstract will remain v
Yes, but only make the title and abstract visible (see Important note, above). I understand that if I later pay to participate in <a href="http

Original Manuscript

Viewpoint

Enter information for authors (including designations, affiliations, correspondence, contributions) in the online metadata form. Do not use periods after initials, and include degree designations and affiliations for all authors. Trial registration numbers are also filled in on the metadata forms online.

MBCT-Game: An Ironic Way to Treat Internet Gaming Disorder

Abstract

Internet Gaming Disorder affects 3% of the population, and with technological advancements, more individuals are at risk of developing this condition. However, there is currently no clear treatment available. Internet Gaming Disorder is not a primary disease but rather a result of "self-prescription" in response to emotional stressors. Therefore, unlike traditional mental health treatments that focus on the disorder itself, it is essential to provide alternative activities that can alleviate negative emotions. This paper introduces Mindfulness-Based Cognitive Therapy-Game (MBCT-Game) as an alternative activity. MBCT-G is a program designed to explore alternative activities through gaming, focusing on the reaction and reward processes, areas that traditional treatments have not emphasized. This paper serves as the first theoretical foundation for the development of MBCT-G.
Conclusions: MBCT-G is necessary as a method to provide alternative emotional relief strategies for treating self-prescription disorders such as Internet Gaming Disorder.

Keywords: Provide 3 to 10 author-selected keywords or short phrases separated with semicolons (;) that will assist indexers in cross-indexing the article and that may be published with the abstract.

Introduction

The prevalence of Internet gaming disorder (IGD) is known to be around 2-3%.[1] This prevalence varies depending on the region and the population studied.[2-4] In 2013, the American Psychiatric Association (APA) introduced IGD as a new disorder in the Diagnostic and Statistical Manual of Mental Disorders, Fifth Edition (DSM-5). The World Health Organization (WHO) also recognized Gaming Disorder as a disease in the International Classification of Diseases 11th Edition (ICD-11). However, although DSM-5 provides standard definitions and diagnostic criteria, systematic treatment methods for gaming disorder have not been thoroughly reviewed, and clinical evidence remains insufficient.[5] Currently, cognitive-behavioral therapy (CBT), the most frequently used treatment method, has not been proven superior to other treatments.[6]

Patients with gaming disorder tend to prioritize gaming above all else, losing control over their gaming behavior, and exhibit an inability to voluntarily stop.[7] While these clinical features are similar to those of substance use disorder, the two conditions show significant differences from a therapeutic perspective.

Moreover, the term "Internet gaming disorder" is often confused with other conditions. For instance, pathological Internet use (PIU) refers to various online activities, such as gaming, social networking, online shopping, watching videos, and reading newspapers, that interfere with daily life. Some studies on IGD often include PIU, which is not entirely identical to IGD.[8] According to one study, less than half of the IGD patients met the criteria for PIU, while only 6.67% of those who met the

criteria for PIU were classified as having IGD.[9]

IGD possesses characteristics that are difficult to explain within the existing psychiatric disorder framework. Traditional attempts to treat individuals addicted to the Internet may be ineffective or, at times, negatively impact the trust relationship with the patient. Therefore, this study proposes a hypothesis regarding the pathogenesis of IGD based on its characteristics. This hypothesis serves as a complementary system to the Interacting Cognitive Subsystems (ICS) model, which has been theoretically used to explain CBT and MBCT. Additionally, the study discusses the necessity and potential development of Mindfulness-Based Cognitive Therapy-Game (MBCT-G).

Characteristics of Internet Gaming Disorder

According to the Self-Medication Theory, gaming serves as a therapeutic method to alleviate psychiatric distress.[10] An individual's mental health conditions (such as depression, obsession, anxiety, distraction, and fear) are influenced by escape and competition as mediators, and these factors have been found to be directly and indirectly negatively associated with symptoms of Internet Gaming Disorder.[11] Therefore, considering that games are the most effective self-chosen method by adolescents with Internet Gaming Disorder to relieve psychological distress, teaching them how to use games in a positive way rather than inappropriately can be a fundamental and personalized therapeutic approach.

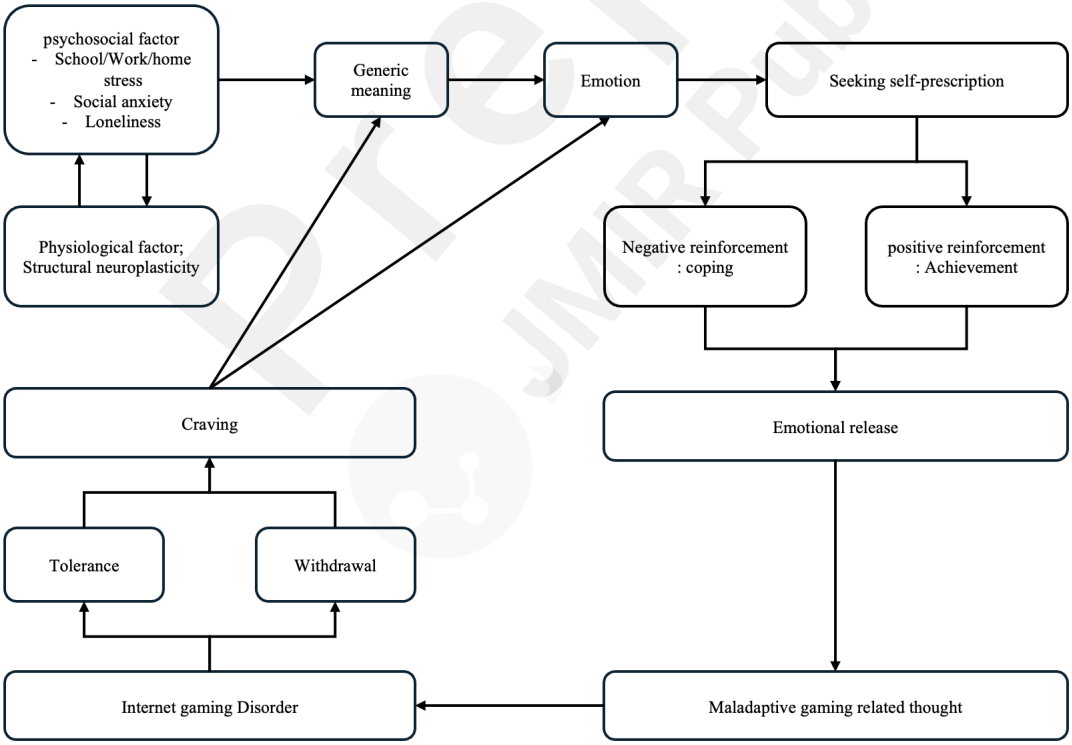


Figure 1 Development of Internet gaming disorder

Figure 1 illustrates the key elements of the process that leads to Internet Gaming Disorder. When stress occurs due to various factors, individuals seek strategies to reduce the emotional burden. This process is referred to as "seeking self-prescription." The alleviation of uncomfortable emotions is the reward of self-prescription, and when stress relief is not possible through methods other than Internet Gaming Disorder, maladaptive thoughts about gaming may arise. Furthermore, this reward, similar to substance use disorder, often features characteristics like tolerance and withdrawal, leading to a craving for the act of gaming itself.

Individuals with Internet Gaming Disorder can be distinguished based on self-esteem, achievement, and coping strategies.[12] Internet gaming offers a “negative reinforcement” reward effect by reducing stress caused by internal and external stimuli, and a “positive reinforcement” reward effect through the enjoyment provided by the gaming activity itself. Those who use gaming as a coping strategy are categorized as “unregulated escapers,” while those who use gaming for achievement are classified as “motivated by achievement.” The former group is characterized by low self-esteem, whereas the latter group typically has high self-esteem. Since each group differs in their purpose for using games and the types of rewards they seek, different therapeutic strategies are necessary.

The therapeutic principles of Self-Prescription Disorder

The characteristics and limitations of Cognitive Behavioral Therapy (CBT) and Mindfulness-Based Cognitive Therapy (MBCT), two of the most widely used treatment methods, will be examined. Following this, MBCT-G will be introduced as a therapeutic approach applicable to new mental disorders arising from the Self-Prescription hypothesis, such as Internet Gaming Disorder.

Cognitive Behavior Therapy; CBT

Cognitive Behavioral Therapy (CBT) is currently the most widely used method for treating Internet Gaming Disorder. CBT focuses on present issues and teaches techniques for modifying dysfunctional thoughts and behaviors. One of the key factors in Internet Gaming Disorder is the presence of erroneous beliefs related to gaming, such as "There are people who recognize me only in online games." Previous studies have indicated that distorted cognition about gaming leads to maladaptive behavior patterns and cravings for gaming.[13] CBT functions by correcting these erroneous beliefs that drive excessive gaming and by regulating the negative emotions that arise when gaming is discontinued.[14] Correcting cognitive distortions related to gaming has been shown to reduce the severity of Internet Gaming Disorder symptoms and the craving for gaming.[15]

The CBT manual was originally developed by Aron Beck for the treatment of depression.[16] CBT explains that emotions are expressed as a result of “automatic thoughts” that mediate responses to

external environments. The theoretical background of the interaction between emotions and cognition in CBT is explained by the associative network theory.[17] According to this theory, human memories, events, and emotions are composed of individual nodes. Each node is connected by associations, and when one node is activated, related nodes are also activated. The core idea of this theory is that current events and emotions are interpreted and associated with past events and emotions. For instance, past experiences and events used to interpret sad feelings can be more easily accessed when one is in a sad state, influencing how current experiences are interpreted. As a result, there is a higher likelihood that current experiences will be interpreted in a depressive manner.

CBT involves analyzing and treating the series of processes by which current events are interpreted through "automatic thoughts" stemming from past experiences. A particularly important aspect of associative network theory is that not only are emotions derived from the interpretation of events and experiences, but events and experiences are also interpreted through emotions. This suggests that, as illustrated in Figure 2, depression can lead to a vicious cycle where thoughts and emotions reinforce each other, resulting in uncontrollable outcomes.[18]

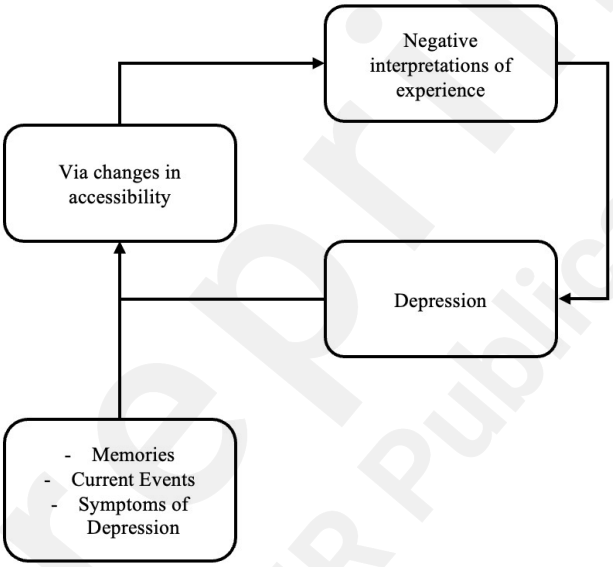


Figure 2 A vicious cycle based on the reciprocal relationship between negative interpretations of experience and depressed mood[19]

The associative network theory can explain the background and maintenance of depression, but it has some clear limitations. Specifically, the explanation that emotions and thoughts have a direct relationship has been shown to fail in interpreting certain situations. The following section will discuss alternative models to the associative network theory, focusing on the interacting cognitive subsystems and Mindfulness-Based Cognitive Therapy (MBCT).

Mindfulness-Based Cognitive Therapy (MBCT)

The associative network theory explains the theoretical background of "automatic thoughts," but it has limitations in describing the complexity of human emotions. Specifically, there are instances where a gap arises between rational beliefs and sensory beliefs. For example, if someone drops an ice cream they just bought, they can rationally conclude that the ice cream should be discarded based on the visual evidence of the ice cream on their clothes and the cold sensation on their skin. However, emotionally, they might deny reality with thoughts like "This can't be happening!" and sometimes activate distorted beliefs such as "I’m so unlucky."[19]

Additionally, according to the associative network theory, a triggering event that evokes past events and emotions is necessary for depressive symptoms to occur. However, depression often manifests not only as a result of current moods and stimuli but also alongside cognitive vulnerabilities. In a study comparing individuals who had never experienced depression in normal mood and mildly depressed environments with those who had fully recovered from depression, the two groups showed no difference in depressive symptoms in a normal mood setting. However, in a mildly depressed situation, those who had fully recovered from depression exhibited significantly higher depressive symptoms.[20,21]

To address the explanation of complex emotions and cognitive vulnerability, the Interacting Cognitive Subsystems (ICS) model has been proposed.[19,22] In the ICS model, human cognition is composed of nine subsystems: "Acoustic," "Visual," "Body-state," "Articulatory," "Limb," "Morphonolexical," "Object," "Propositional," and "Implicational." These nine subsystems are responsible for processing specific types of information, and through their interactions, cognition and emotions emerge. Figure 3 illustrates the Interacting Cognitive Subsystems.[23] Visual and auditory information input from the external environment is first interpreted semantically in an independent manner and then integrated to form a specific meaning (Propositional subsystem). This general meaning is further integrated with body-state, visual, and auditory information, developing into implicational meaning.

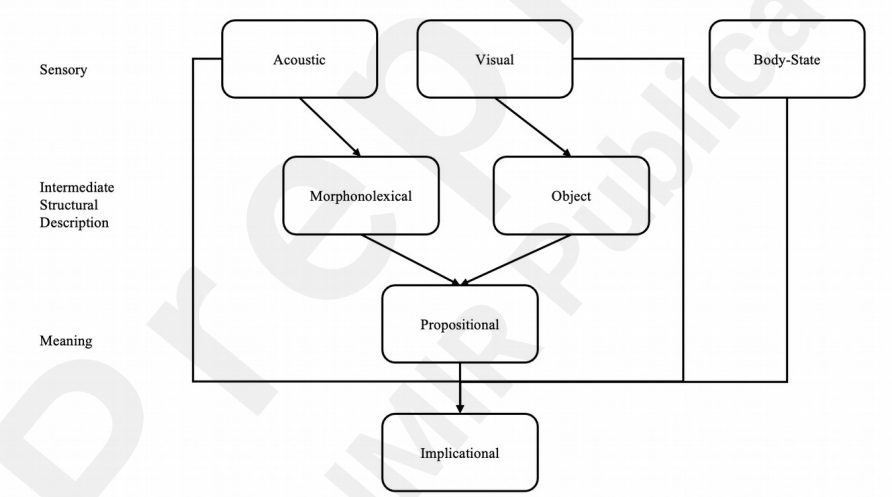


Figure 3 Interacting Cognitive Subsystems (ICS) model[23]

In Figure 3, the diagrammed interaction between cognition and emotion reveals that, unlike the associative network theory, external stimuli and emotions are indirectly connected. Therefore, emotions are not merely reactions to external stimuli but are outcomes that reflect cognitive characteristics, leading to different responses to stress depending on the individual. A particularly important aspect is that cognitive processes can create a vicious cycle that perpetuates and intensifies over time. As illustrated in Figure 4, specific meanings influence and reinforce general meanings, thereby strengthening them.[19]

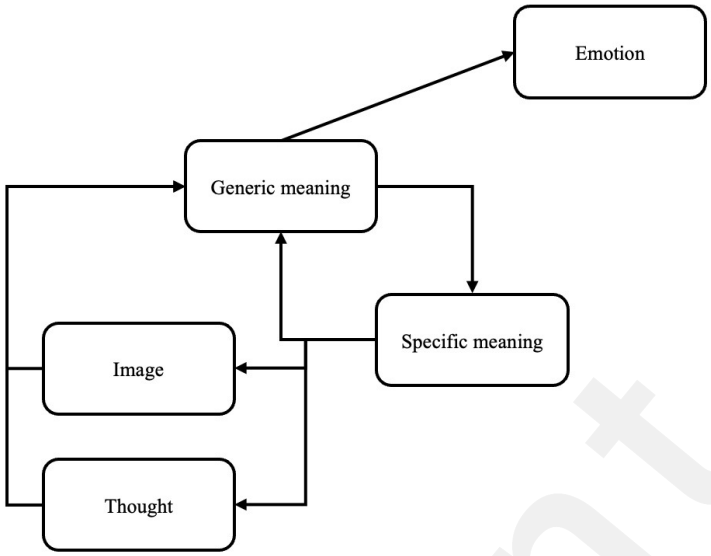


Figure 4 A vicious cycle based on Interacting Cognitive Subsystems (ICS) model[19]

Mindfulness-Based Cognitive Therapy (MBCT) combines the principles of Cognitive Behavioral Therapy with mindfulness meditation-based stress reduction techniques. The vicious cycle illustrated in Figure 4 shows how negative interpretations of situations, based on memories of similar past emotions, can alter the body state, leading to symptoms such as trembling hands, slumped posture, or frowning. This altered body state is then interpreted as proprioceptive data, forming another vicious cycle. As mentioned earlier, automatic thoughts in mental disorders such as depression tend to negatively interpret situations by reflecting on past memories. The principle of Cognitive Behavioral Therapy is to introduce alternative thoughts that challenge the negative thoughts forming the vicious cycle, thereby creating a cognitive bottleneck where the newly introduced information competes with the negative cognition. Through this process, negative thoughts are delayed in processing and are eventually replaced by alternative thoughts.[23]

The core of mindfulness meditation is not to reject thoughts but to accept them.[24] Patients can gain mental stability by acknowledging and accepting their current thoughts while redirecting their attention through meditative breathing. Additionally, by becoming aware of their upright posture, focusing on the shape, texture, and taste of a raisin in their mouth, and listening intently to faint external sounds with their eyes closed, the cognition that was previously consumed by automatic thoughts is redirected to body-state awareness and external sensory perception.

MBCT is typically delivered as an eight-week group therapy program, integrating the core principles of each treatment. MBCT was introduced in 2002 by Zindel Segal from the University of Toronto, Mark Williams from the University of Oxford, and John Teasdale from the University of Cambridge as a method to prevent the recurrence of depression. [25]It was developed based on Cognitive Behavioral Therapy by Aaron T. Beck and Mindfulness-Based Stress Reduction (MBSR) by Jon Kabat-Zinn.

MBCT was initially developed for treating recurrent depression and has demonstrated effectiveness over the past few decades.[26-29] Beyond depression, MBCT has been reported to be effective in treating various other mental disorders, including anxiety disorders[30-32], insomnia[33,34], bipolar disorder[35], panic disorder[36], chronic pain[37], cancer-related pain[38], and stress[39]. Mindfulness skills, depressogenic cognition, self-compassion, cognitive reactivity, meta-awareness, and decentering have been found to be associated with or mediate symptom reduction following MBCT treatment[40].

Moreover, MBCT has received significantly high ratings in self-assessment by patients undergoing treatment, and it has been shown to improve subscales like “concerning danger” and “controllability of thoughts.”[41]

Nevertheless, some studies have found no statistically significant difference between MBCT and CBT when compared directly.[41-43] MBCT has been found to exhibit different therapeutic effects from CBT in patients who have experienced three or more episodes of depression recurrence.[44] However, these effects also appear to be short-term.[41] Despite previous research, the theoretical mechanisms underlying MBCT are not yet fully understood.[40]

To address these limitations, this paper introduces an expanded cognitive mechanism using a modified Interacting Cognitive Subsystem model and explains MBCT-G, an adaptation of MBCT, in the following pages.

Modified interacting cognitive subsystem

The Modified Interacting Cognitive Subsystem focuses on patients' coping strategies, an area not emphasized in the original theoretical mechanism. Homeostasis refers to the body's ability to maintain a stable and constant internal environment, and it applies across various domains. Examples include maintaining a consistent body temperature and regulating blood osmolarity. When stress occurs due to internal or external stimuli, the body adjusts heart rate, respiration, blood pressure, and blood sugar levels to preserve homeostasis.[45] Additionally, individuals actively engage in strategies to reduce "uncomfortable emotions." For instance, a student with public speaking anxiety may experience sensations like "tunnel vision," "blanking out," or "a foggy mind" when required to present in front of an audience. Although these coping mechanisms may be inadequate, they represent a form of self-prescription to manage the stress of speaking in public. As a result, the student might quickly read from the script or leave the stage without any recollection of what was said. While such coping strategies may be deemed inappropriate because they reinforce the fear of public speaking and diminish self-esteem immediately after the presentation, they serve the purpose of managing anxiety and enabling speech during the presentation.

When discussing the mechanisms of cognition and emotion, it is crucial not only to consider the generation of emotions in response to external and internal stimuli but also to account for the resulting "reactions." In the previous example, the experience of public speaking is not confined to the emotions felt during the presentation but is also shaped by the memories and emotions generated through reflection afterward. If, upon reflection, the coping strategy is deemed sufficient and positive, the initial emotions may also shift positively. Therefore, the interpretation of emotions should not be viewed as influenced by a single moment in isolation but rather as affected by past experiences and emotions, which in turn influence the present emotional experience and the perceived adequacy of coping strategies. This process should consider the overall context of "distorted recollections" that are formed. Specifically, when recalling coping strategies in moments of "tunnel vision," "blanking out," or "a foggy mind," the mental focus remains fixed on the presentation moment, indicating that the psychological time is still anchored to that event.

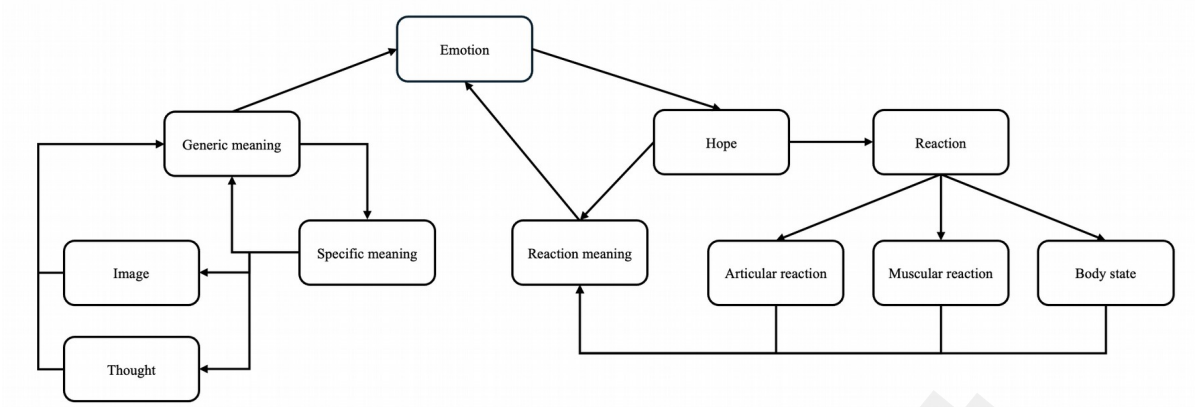


Figure 5 Modified interacting cognitive subsystem

Figure 5 expands the interacting cognitive subsystem by incorporating the principles previously discussed. The structure added on the right side in the Modified Interacting Cognitive Subsystem consists of coping strategies and recollections related to emotions. "Hope" represents the desired strategy for coping with emotions generated in response to a stimulus. For example, in a scenario where someone drops their newly purchased ice cream, they might imagine scenarios such as "time reversing to bring the ice cream back," "carefully picking up the part that didn't touch the ground," or "a kind store owner giving them a new ice cream."

"Reaction" refers to the action taken in response to the "Hope." In the earlier example, since reversing time is impossible, one might attempt to "carefully pick up the ice cream" or "look at the store owner with a sad expression." "Reaction meaning" is the individual's evaluation of their coping strategy. When reflecting on the situation where the ice cream was dropped, a person who chose the strategy of "carefully picking up the ice cream" might either succeed or fail. Even if they successfully pick up the ice cream, they may still decide not to eat it due to lingering discomfort. These outcomes are interpreted based on the fundamental "Hope" of "wanting to eat the ice cream," influencing the initial emotion. Simply put, if the "Hope" of eating the ice cream is fulfilled, the preceding "Emotion" will also be resolved. On the other hand, failure to achieve the "Hope" may intensify the negative emotion.

For example, if the strategy chosen is to "look at the store owner with a sad expression," and the person receives a new ice cream, the previously generated sadness may disappear entirely or even be replaced by a positive emotion, such as thinking, "I'm really lucky!" However, if no new ice cream is given, the sadness may persist, or the emotion might intensify with thoughts like, "I'm really unlucky."

In summary, these differences arise because the subjective interpretation of the coping strategy, or "reaction meaning," creates a vicious cycle that influences the emotions resulting from the preceding situation. Additionally, past experiences, coping strategies, and emotions, such as the thought "I'm really unlucky," are used as materials for interpreting current emotions. Therefore, as emphasized earlier, experiences, emotions, and coping strategies should be understood as a unified principle according to the mental flow of time. This interpretation can provide new therapeutic principles, especially for disorders where symptoms manifest in behavioral forms, such as Internet Gaming Disorder, Gambling Disorder, Obsessive-Compulsive Disorder, and substance use disorder.

Mindfulness-Based Cognitive Therapy-Game (MBCT-Game)

As previously mentioned, the gaming behavior of individuals with Internet Gaming Disorder can be interpreted as a form of self-prescription used to cope with stress resulting from external stimuli. According to the Modified Interacting Cognitive Subsystem introduced in this paper, these coping strategies are effective—at least in the short term—in controlling stress (commonly referred to as a reward), which is why individuals continue to engage in gaming. Therefore, simply correcting maladaptive thoughts about gaming and aiming to reduce gaming time is not effective, as it fails to provide alternative strategies for managing stress.[46] Treatments that do not offer alternative strategies may lead to symptom relapse or the development of other problematic behaviors as individuals seek to address the underlying stress.

On the other hand, mindfulness meditation can be one of the effective alternative strategies. By engaging in activities like meditation and walking instead of gaming, stress can be alleviated, thereby reducing the perceived need for gaming. However, while mindfulness meditation and walking are effective, they may not be sufficient as alternative strategies for everyone. Some individuals may not find mindfulness meditation engaging, may not perceive it as directly helpful in resolving stressful situations, or may even find it boring. Thus, three key principles for effective psychological counseling are introduced:

1. “The patient must be able to identify their automatic thoughts.” This is the fundamental principle of both CBT and MBCT, and it remains valid in MBCT-G. Automatic thoughts are the first key to identifying the source of stress and are essential to the treatment process.

2. “An alternative strategy for coping with the stressor must be provided.” As mentioned earlier, coping strategies affect the preceding emotions and can lead to various problematic behaviors in the process of alleviating stress. Therefore, without appropriate alternative strategies, mental disorders may persist, worsen, or change in form.

3. “The alternative strategy proposed during treatment must be actionable and sustainable.” In other words, the alternative strategy must be something the patient can perform. It must be effective, realistic, sustainable, and should have mindfulness benefits. For example, teaching a patient with public speaking anxiety "how to give a good presentation" may not be effective in all situations. These patients might lack confidence in their presentation skills, but their anxiety could also stem from factors like social relationships in the class, voice quality, or appearance. Repeatedly exposing such a patient to presentation environments may not always be an effective strategy. Furthermore, they may feel cognitive overload during therapy and resist the proposed alternative strategies.

“Mindfulness-Based Cognitive Therapy-Game (MBCT-G)” is a treatment approach that incorporates these three elements. Games provide a new medium that allows individuals to experience virtual environments they cannot encounter in real life. Learning alternative strategies for coping with stress in a game environment offers several advantages: repetitive practice is possible, cognitive load is lower since practice occurs in a virtual environment, a variety of scenarios tailored to symptoms and individuals can be provided, the treatment method is consistent, real-world data can be collected during the treatment process, and the enjoyment offered by games serves as a motivation for continued participation in therapy.

Several studies have explored the use of games in treating Internet Gaming Disorder[47,48],

depression[49], anxiety disorders[50], stress[51], ADHD[52], and executive functions[53]. While interest in digital therapeutics and game-based treatment methods is growing, there are still very few cases where the therapeutic effects have been recognized by regulatory agencies. Most studies on Internet Gaming Disorder have been limited to usability studies without control groups.[54]

A previous study that explored using games to treat Internet Gaming Disorder is Room2Respawn, developed using MORE.[47] MORE (Mindfulness-Oriented Recovery Enhancement) is a treatment method that combines three psychological counseling techniques: mindfulness, cognitive behavioral therapy, and positive psychology. MORE was initially developed for chronic pain patients prescribed opioid painkillers.[55] The same research team examined the effects of MORE on individuals with Internet Gaming Disorder. In a randomized controlled trial targeting patients with Internet Gaming Disorder, MORE was found to reduce the severity of the disorder indirectly by correcting maladaptive gaming-related cognitions.[15] However, while Room2Respawn, developed using MORE, was evaluated for user subjective utility, the effectiveness of implementing the MORE technique as gamified software has not been proven.

The limitations of previous studies that used games include: (1) a lack of understanding of cognition, emotion, and coping strategies, (2) the absence of a clear definition of the reward effect of games and the provision of alternative strategies, and (3) poor game design. In the final part, the treatment protocol and future directions for using MBCT-G to treat Internet Gaming Disorder will be discussed.

Principle of MBCT-Game

Digital therapeutics refer to a medical approach that utilizes software and hardware to prevent, treat, and manage physical and mental illnesses. Digital therapeutic devices offer several inherent advantages. First, they allow treatment to be conducted without requiring patients to physically visit hospitals or counseling centers, thus freeing them from the constraints of time and space. Second, the social stigma associated with mental illness often makes it difficult for patients to seek help from psychiatric facilities. Mental health treatment conducted online can remove the negative perceptions that patients might face. Third, because sessions can be conducted without direct intervention from doctors or counselors, it is easier to monitor treatment adherence, and the approach is cost-effective.[54]

Games, as a form of digital therapy, have the unique advantage of providing enjoyment, which can be particularly effective for patients who may lack motivation for treatment. This is especially relevant for the adolescent population, which shows the highest prevalence of Internet Gaming Disorder and has a high level of familiarity with games and digital devices. Therefore, using games as a treatment approach can be highly effective for this demographic. The following is an introduction to the MBCT-G protocol that can be applied to patients with Internet Gaming Disorder.

Protocol of MBCT-Game

Figure 7 illustrates the application of eight principles of MBCT-G. Based on the previously described mechanism of Internet Gaming Disorder, the MBCT-G protocol was discussed by a psychologist and a physician.:

1. Waking Up from Autopilot

In autopilot mode, individuals can easily slip into a driven-doing mode, leading to impulsive thoughts and actions that drive negative emotions, feelings of over-engagement, and compulsive gaming behavior. Conventional driven-doing modes make individuals more prone to impulsive reactions, leading to a state of over-immersion without their conscious awareness. By practicing mindfulness and becoming aware of everyday experiences—such as eating, bodily sensations, and daily moments—individuals can begin to step out of autopilot. Through this awareness, they start to observe their current state, including the thoughts, emotions, and impulses they are experiencing. This is the foundational step that must be practiced before progressing further on this journey. For example, in the first stage, activities might include: 1) a welcome and introduction to the journey, 2) psychoeducation on gaming over-immersion/addiction, 3) a raisin (or snack) eating exercise, 4) a 10-minute body scan meditation, and 5) a 10-finger gratitude exercise (recognizing gratitude by reflecting on thoughts, emotions, bodily reactions, and behavioral impulses with each finger). This process helps in observing "maladaptive gaming-related thoughts" and re-evaluating the motivation for treatment.

2. Another Way of Being

In the driven-doing mode, we often become aware of our experiences indirectly and conceptually through thoughts and language. This mode can easily lead to automatic and impulsive reactions, resulting in unconscious over-immersion/addiction to gaming. Mindfulness focused on the body offers an opportunity to learn in a more direct, intuitive, and experiential manner. This experiential awareness involves focusing on the body's current sensations, recognizing them as just sensations, and accepting emotions and thoughts as they are, without becoming centered on them. It also enables an understanding of how thoughts influence emotions and behaviors, allowing individuals to comprehend why they engage in gaming and to explore alternative strategies. For instance, activities could include: 1) a 10-minute body scan meditation, 2) overcoming relational difficulties (practicing the 50/50 grounding technique when speaking and listening), 3) thought and emotion exercises (using a walking-down-the-road scenario to understand how thoughts affect emotions and behaviors), and 4) recognizing positive events related to gaming: observing the positive and pleasant automatic thoughts that pass by just before becoming immersed in gaming (listing elements such as thoughts, emotions, bodily sensations, and impulses). Through this process, individuals understand how "emotional release" occurs through gaming and recognize that alternative methods can also be successful.

3. Gathering the Scattered Mind

The mind often becomes scattered and absorbed in thoughts because it is constantly working to complete unfinished tasks and achieve future goals. A scattered mind can lead to impulsive actions. Mindfulness practice involves intentionally stepping out of autopilot mode and returning to the present moment. Focusing on the body and breath, which are always present, helps anchor mindfulness, gather the mind, and reduce driven-doing modes. This practice reduces automatic responses that lead to avoidant behaviors, such as gaming over-immersion/addiction. Examples include: 1) mindfulness stretching (slowly stretching to the left and right, as if picking apples from a tree), and 2) practicing three-step breathing (1st step: recognizing thoughts, emotions, bodily sensations, and impulses; 2nd step: focusing on the breath and sensations in the lower abdomen; 3rd step: expanding awareness to the whole body). This process allows individuals to observe the rewards and "achievement" associated with gaming and practice stepping away from them.

4. Recognizing Reactivity

When in autopilot mode, individuals may be unaware that they are being drawn into a driven-doing mode and impulsive reactions, leading to continuous engagement in unhelpful thoughts, emotions, and behaviors. Conventional driven-doing modes can easily lead to behaviors such as gaming over-

immersion/addiction, which, in turn, can rob individuals of their potential to fully live their lives. This is because the focus on short-term pleasures provided by gaming diverts attention from more meaningful experiences. Through mindfulness practice, individuals can develop metacognitive awareness of reactive thoughts and behavior patterns. By focusing intentionally and mindfully on the embodied experience of the present moment, they can step back and observe these patterns. Through experiential learning about reactivity, individuals can develop a more conscious awareness of their thoughts, emotions, and gaming over-immersion behaviors, allowing them to recognize and respond to them more effectively. For instance, activities might include: 1) environment observation meditation (focusing on colors, shapes, movements, landscapes, sky, ground, and horizon), 2) a 10-minute sitting meditation, 3) practicing the vicious cycle (recognizing how impulsive reactions to stress, such as gaming, can have long-term negative effects, leading to increased fatigue and exhaustion), and 4) practicing self-compassion with three-step breathing (recognizing the self in gaming immersion, identifying thoughts, emotions, bodily sensations, and impulses, focusing on the lower abdomen, expanding awareness to the whole body, and offering compassion and acceptance without criticism or self-blame). This process enables individuals to step back and observe gaming-related tolerance and withdrawal, and practice controlling "craving."

5. Allowing and Letting Be

Becoming more consciously aware of unpleasant and pleasant emotions and sensations involves allowing them to exist as they are. This is a crucial method for preventing aversion and impulsive reactions. Avoidance and impulsive reactivity can worsen difficulties and discomforts in life, often leading to behaviors such as gaming over-immersion/addiction that do not alleviate the problems but instead exacerbate them. Through compassion, mindfulness awareness, and intentional allowing and letting be, these impulsive reactions can be weakened. Allowing and letting be involves accepting experiences as they are, without judgment, and without impulsively trying to change them. This attitude of acceptance and compassion helps cultivate a sense of friendliness and kindness toward oneself and one’s experiences. This can be developed through both formal mindfulness practice and informal daily mindfulness exercises. For example: 1) sitting with stress or difficult emotions (anger, anxiety, boredom, etc.) for 10 minutes, 2) imagining and recognizing unpleasant events related to gaming: identifying thoughts, emotions, bodily sensations, and impulses associated with not being able to game, 3) practicing friendliness (offering compassionate and accepting words to oneself, to neutral or difficult people, and to the self struggling with gaming and stress). This process allows patients who use gaming as a "coping strategy" to intentionally allow uncomfortable emotions, thus acquiring new alternative strategies and expanding cognitive space to find additional coping strategies.

6. Responding Skillfully

To be free from reactive driven-doing modes, it is important to clearly see negative moods and behavioral impulses as transient states of mind and recognize that negative thoughts and impulses are simply byproducts of these states. Understanding that thoughts are just thoughts, even those that claim otherwise, provides an immensely freeing experience. This clarity allows one to see situations more accurately and be less influenced by distorted thoughts or beliefs. Seeing clearly increases the opportunity to distinguish what responses are skillful and appropriate. Therefore, individuals can learn to recognize gaming over-immersion/addiction thoughts and impulses and respond in a more skillful manner. For instance: 1) meditating on enjoyable, loving, and beautiful things for 10 minutes, 2) school scenario practice (considering two scenarios where, in one, a friend who has had an argument with the patient sees them in the hallway but rushes past, and in another, after receiving a positive evaluation from a teacher/professor, the same friend rushes past in the hallway—the goal is to recognize how thoughts, emotions, bodily sensations, and impulses change based on the situation and affect perception), 3) cognitive restructuring practice: recognizing thoughts such as "I must

game," "boredom must be eliminated," and "difficult emotions must be eradicated," and creating more flexible and helpful coping thoughts, 4) skillful response three-step breathing (practicing three-step breathing just before gaming immersion/dependence, asking what response is helpful, what supports my well-being, and what supports others' well-being, and guiding toward a skillful response). This process allows for the presentation and practice of alternative strategies to resolve the specific stress situations the patient is facing, requiring a concrete and immersive scenario in the sixth session.

7) How Can I Best Take Care of Myself?
We first learn to recognize our personal mental patterns, and then deliberately practice skillful actions to manage impulses. After practicing breathing techniques, we can take care of ourselves by engaging in actions that bring joy and fulfillment, using mindfulness to clearly focus on and experience these actions. Additionally, when problematic behaviors related to gaming over-immersion or addiction arise, we can manage our impulses by identifying and practicing effective coping behaviors or techniques. For example: 1) A 10-minute meditation on discovery, joy, and impulse, sitting with these emotions and observing them mindfully. 2) Activity and mood tracking: Writing down daily activities and classifying them as nourishing (N) or depleting (D). The goal is to guide the individual to engage in more N activities and reduce D activities, planning alternative activities if gaming falls into the D category. 3) Impulse management techniques: Identifying techniques to handle the impulse to over-immerse or become addicted to gaming. 4) Three-step breathing: After practicing this technique, reflecting on what actions best care for oneself and manage gaming over-immersion. This process embodies the lessons from the previous six sessions, focusing on practicing emotional regulation. It helps individuals exercise self-control in situations involving stress and impulsive emotions related to gaming, based on their understanding of the reasons behind problematic gaming behaviors and alternative strategies.

8) Mindfulness for Life
To sustain and expand the positive changes achieved in managing gaming over-immersion/addiction, clear intent and commitment to mindfulness are essential. It is helpful to connect daily mindfulness practices and the resulting changes in thoughts and behaviors with personally meaningful values and positive reasons for self-care. For example: 1) A 10-minute body scan meditation to reinforce mindfulness and bodily awareness. 2) Reflecting on personal progress, sharing insights, and reviewing the journey so far. 3) Looking ahead: Exploring strategies to manage gaming over-immersion/addiction, minimize harm, and live a healthier, more balanced life. 4) Creating a personal toolkit: Assembling a set of skills and practices to take home for ongoing use. This final and ongoing stage ensures that MBCT-G doesn't just end with short-term therapy but leverages the advantages of digital therapeutics for repeated and convenient use in daily life.

The 5 Stages of MBCT-Game

Finally, the five stages of MBCT-G are explained. With technological advancements, new technologies such as autonomous driving, artificial intelligence, and virtual reality are emerging. MBCT-G aims to create scenarios where patients can practice alternative strategies in a virtual environment, tailored to their treatment motivation and the causes of their condition. However, technological complexity and legal regulations pose obstacles to realizing these strategies. Nonetheless, to advance MBCT-G, it is important to start small and progressively implement these strategies according to the current level of technology.

1) Stage 1: In the first stage of MBCT-G, the patient visits a hospital, receives a prescription from a psychiatrist, and begins treatment. While clinical data is collected through the MBCT-G program, the

program’s difficulty level and scenarios are adjusted by the specialist during the hospital visit.

2) Stage 2: In the second stage, the MBCT-G program generates personalized questions based on the clinical data collected in Stage 1 and asks the patient these questions. Although all patients collect the same clinical data in Stage 1, from Stage 2 onward, the program gathers tailored clinical data specific to each patient.

3) Stage 3: In the third stage, the MBCT-G program diagnoses the severity of the condition in a limited capacity and modifies the game scenarios based on the patient's choices to a restricted extent.

4) Stage 4: In the fourth stage, the MBCT-G program independently diagnoses the severity of the condition and adjusts the intensity of the program and the frequency of sessions. Patients can observe significant changes in the game scenarios based on their choices, allowing them to immerse themselves more realistically and practice alternative strategies.

5) Stage 5: In the final stage, the MBCT-G program autonomously creates or reconstructs scenarios based on the clinical data collected from the patient. The patient repeatedly trains in virtual reality to address the situations that cause gaming disorder. In Stage 5, both diagnosis and treatment are autonomously conducted by the program, with the psychiatrist intervening only in exceptional situations.

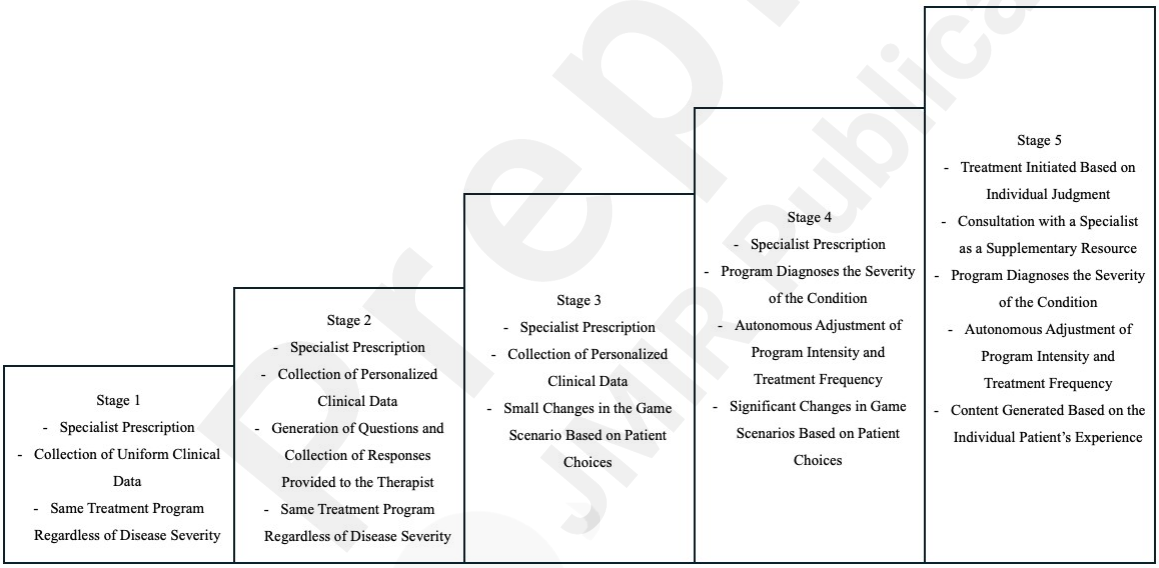


Figure 6 The 5 Stages of MBCT-Game

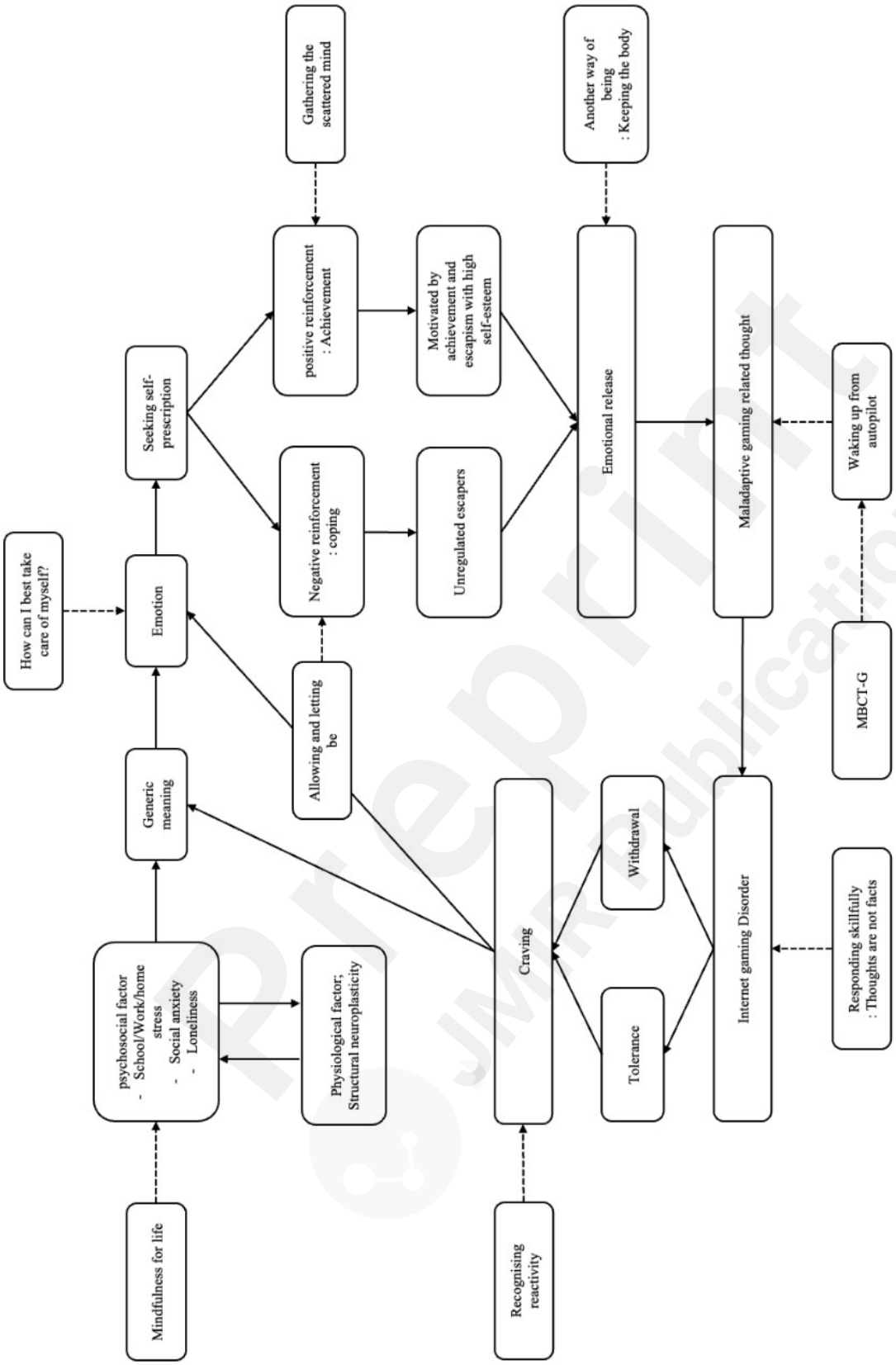


Figure 7 Protocol of MBCT-Game

Conclusions

Internet Gaming Disorder affects 3% of the population, and with technological advancements, more

individuals are at risk of developing this condition. However, there is currently no clear treatment available. Internet Gaming Disorder is not a primary disease but rather a result of "self-prescription" in response to emotional stressors. Therefore, unlike traditional mental health treatments that focus on the disorder itself, it is essential to provide alternative activities that can alleviate negative emotions. This paper introduces Mindfulness-Based Cognitive Therapy-Game (MBCT-Game) as an alternative activity. MBCT-G is a program designed to explore alternative activities through gaming, focusing on the reaction and reward processes, areas that traditional treatments have not emphasized. This paper serves as the first theoretical foundation for the development of MBCT-G. MBCT-G is necessary as a method to provide alternative emotional relief strategies for treating self-prescription disorders such as Internet Gaming Disorder.

Acknowledgements

This research was supported by Culture, Sports and Tourism R&D Program through the Korea Creative Content Agency grant funded by the Ministry of Culture, Sports and Tourism in 2024
(Project Name: Development of game-based digital Therapeutics technology for adolescent mental health(psychological and behavioral control) management, Project Number: RS-2024-00344893, Contribution Rate: 100%)

Conflicts of Interest

none declared

Abbreviations

JMIR: Journal of Medical Internet Research
IGD: Internet gaming disorder
APA: American Psychiatric Association
DSM-5: Diagnostic and Statistical Manual of Mental Disorders, Fifth Edition
WHO: The World Health Organization
ICD-11: the International Classification of Diseases 11th Edition
CBT: Cognitive-behavioral therapy
ICS: Interacting Cognitive Subsystems
PIU: Pathological Internet use
MBCT: Mindfulness-Based Cognitive Therapy
MBCT-G: Mindfulness-Based Cognitive Therapy-Game

References

1. Stevens MW, Dorstyn D, Delfabbro PH, King DL. Global prevalence of gaming disorder: A systematic review and meta-analysis. *Aust N Z J Psychiatry*. Jun 2021;55(6):553-568. doi:10.1177/0004867420962851
2. Gao Y-X, Wang J-Y, Dong G-H. The prevalence and possible risk factors of internet gaming disorder among adolescents and young adults: Systematic reviews and meta-analyses. *Journal of psychiatric research*. 2022;154:35-43.
3. Kim HS, Son G, Roh E-B, et al. Prevalence of gaming disorder: A meta-analysis. *Addictive behaviors*. 2022;126:107183.
4. Zhou R, Morita N, Ogai Y, et al. Meta-Analysis of Internet Gaming Disorder Prevalence: Assessing the Impacts of DSM-5 and ICD-11 Diagnostic Criteria. *International Journal of Environmental Research and Public Health*. 2024;21(6):700.
5. Bickham DS. Current Research and Viewpoints on Internet Addiction in Adolescents.

Curr Pediatr Rep. 2021;9(1):1-10. doi:10.1007/s40124-020-00236-3
6. Winkler A, Dorsing B, Rief W, Shen Y, Glombiewski JA. Treatment of internet addiction: a meta-analysis. *Clin Psychol Rev*. Mar 2013;33(2):317-29. doi:10.1016/j.cpr.2012.12.005
7. Saunders JB, Hao W, Long J, et al. Gaming disorder: Its delineation as an important condition for diagnosis, management, and prevention. *J Behav Addict*. Sep 1 2017;6(3):271-279. doi:10.1556/2006.6.2017.039
8. King DL, Delfabbro PH. Internet gaming disorder treatment: a review of definitions of diagnosis and treatment outcome. *J Clin Psychol*. Oct 2014;70(10):942-55. doi:10.1002/jclp.22097
9. Balhara YPS, Singh S, Saini R, Dahiya N, Singh AB, Kumar R. Should Internet gaming disorder be considered a subtype of generalized problematic internet use? Findings from a study among medical college students. *Perspect Psychiatr Care*. Jan 2021;57(1):272-278. doi:10.1111/ppc.12558
10. Khantzian EJ. The self-medication hypothesis of addictive disorders: focus on heroin and cocaine dependence. *The cocaine crisis*. 1987:65-74.
11. Király O, Urbán R, Griffiths MD, et al. The mediating effect of gaming motivation between psychiatric symptoms and problematic online gaming: An online survey. *Journal of medical Internet research*. 2015;17(4):e88.
12. Billieux J, Thorens G, Khazaal Y, Zullino D, Achab S, Van der Linden M. Problematic involvement in online games: A cluster analytic approach. *Computers in Human Behavior*. 2015;43:242-250.
13. Chen Y, Lu J, Wang L, Gao X. Effective interventions for gaming disorder: A systematic review of randomized control trials. *Front Psychiatry*. 2023;14:1098922. doi:10.3389/fpsyt.2023.1098922
14. Dong GH, Dai J, Potenza MN. Ten years of research on the treatments of internet gaming disorder: A scoping review and directions for future research. *J Behav Addict*. Mar 26 2024;13(1):51-65. doi:10.1556/2006.2023.00071
15. Li W, Garland EL, Howard MO. Therapeutic mechanisms of Mindfulness-Oriented Recovery Enhancement for internet gaming disorder: Reducing craving and addictive behavior by targeting cognitive processes. *J Addict Dis*. Jan-Jun 2018;37(1-2):5-13. doi:10.1080/10550887.2018.1442617
16. Beck AT, Rush AJ, Shaw BF, Emery G, DeRubeis RJ, Hollon SD. *Cognitive therapy of depression*. Guilford Publications; 2024.
17. Bower GH. Mood and memory. *American psychologist*. 1981;36(2):129.
18. Teasdale JD. Negative thinking in depression: Cause, effect, or reciprocal relationship? *Advances in behaviour research and therapy*. 1983;5(1):3-25.
19. Teasdale JD. Emotion and two kinds of meaning: Cognitive therapy and applied cognitive science. *Behaviour research and therapy*. 1993;31(4):339-354.
20. Miranda J, Persons JB, Byers CN. Endorsement of dysfunctional beliefs depends on current mood state. *Journal of Abnormal Psychology*. 1990;99(3):237.
21. Teasdale JD, Dent J. Cognitive vulnerability to depression: An investigation of two hypotheses. *British Journal of Clinical Psychology*. 1987;26(2):113-126.
22. Barnard PJ, Teasdale JD. Interacting cognitive subsystems: A systemic approach to cognitive-affective interaction and change. *Cognition & Emotion*. 1991;5(1):1-39.
23. Teasdale JD, Segal Z, Williams JMG. How does cognitive therapy prevent depressive relapse and why should attentional control (mindfulness) training help? *Behaviour Research and therapy*. 1995;33(1):25-39.
24. Kabat-Zinn J. Full catastrophe living: The program of the stress reduction clinic. *University of Massachusetts Medical Center*. 1990;

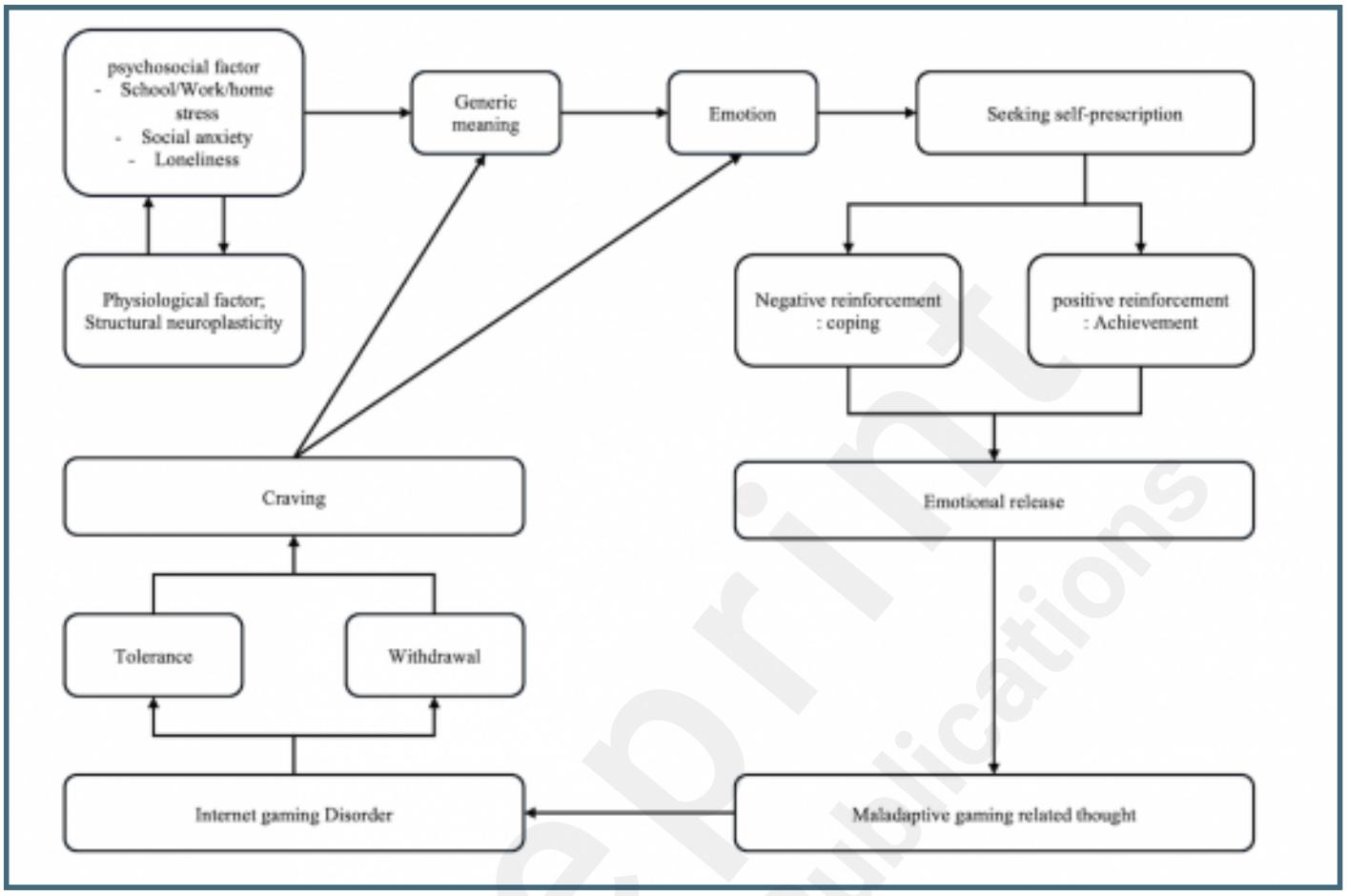
25. Segal ZV, Williams JMG, Teasdale JD. *Mindfulness-based cognitive therapy for depression*. Guilford press; 2012.
26. Manicavasgar V, Parker G, Perich T. Mindfulness-based cognitive therapy vs cognitive behaviour therapy as a treatment for non-melancholic depression. *J Affect Disord*. Apr 2011;130(1-2):138-44. doi:10.1016/j.jad.2010.09.027
27. Manicavasagar V, Perich T, Parker G. Cognitive predictors of change in cognitive behaviour therapy and mindfulness-based cognitive therapy for depression. *Behav Cogn Psychother*. Mar 2012;40(2):227-32. doi:10.1017/S1352465811000634
28. Fjorback LO, Arendt M, Ornbol E, Fink P, Walach H. Mindfulness-based stress reduction and mindfulness-based cognitive therapy: a systematic review of randomized controlled trials. *Acta Psychiatr Scand*. Aug 2011;124(2):102-19. doi:10.1111/j.1600-0447.2011.01704.x
29. Kuyken W, Byford S, Taylor RS, et al. Mindfulness-based cognitive therapy to prevent relapse in recurrent depression. *Journal of consulting and clinical psychology*. 2008;76(6):966.
30. Green SM, Bieling PJ. Expanding the scope of mindfulness-based cognitive therapy: Evidence for effectiveness in a heterogeneous psychiatric sample. *Cognitive and Behavioral Practice*. 2012;19(1):174-180.
31. Hofmann SG, Sawyer AT, Witt AA, Oh D. The effect of mindfulness-based therapy on anxiety and depression: A meta-analytic review. *Journal of consulting and clinical psychology*. 2010;78(2):169.
32. Evans S. Mindfulness-based cognitive therapy for generalized anxiety disorder. *Mindfulness-based cognitive therapy: Innovative applications*. 2016:145-154.
33. Heidenreich T, Tuin I, Pflug B, Michal M, Michalak J. Mindfulness-based cognitive therapy for persistent insomnia: a pilot study. *Psychotherapy and psychosomatics*. 2006;75(3):188.
34. Yook K, Lee S-H, Ryu M, et al. Usefulness of mindfulness-based cognitive therapy for treating insomnia in patients with anxiety disorders: a pilot study. *The Journal of nervous and mental disease*. 2008;196(6):501-503.
35. Williams JMG, Alatiq Y, Crane C, et al. Mindfulness-based cognitive therapy (MBCT) in bipolar disorder: Preliminary evaluation of immediate effects on between-episode functioning. *Journal of affective disorders*. 2008;107(1-3):275-279.
36. Kim YW, Lee SH, Choi TK, et al. Effectiveness of mindfulness-based cognitive therapy as an adjuvant to pharmacotherapy in patients with panic disorder or generalized anxiety disorder. *Depression and anxiety*. 2009;26(7):601-606.
37. Grossman P, Tiefenthaler-Gilmer U, Raysz A, Kesper U. Mindfulness training as an intervention for fibromyalgia: evidence of postintervention and 3-year follow-up benefits in well-being. *Psychotherapy and psychosomatics*. 2007;76(4):226-233.
38. Ledesma D, Kumano H. Mindfulness-based stress reduction and cancer: a meta-analysis. *Psycho-Oncology: Journal of the Psychological, Social and Behavioral Dimensions of Cancer*. 2009;18(6):571-579.
39. Chiesa A, Serretti A. Mindfulness-based stress reduction for stress management in healthy people: a review and meta-analysis. *The journal of alternative and complementary medicine*. 2009;15(5):593-600.
40. van der Velden AM, Kuyken W, Wattar U, et al. A systematic review of mechanisms of change in mindfulness-based cognitive therapy in the treatment of recurrent major depressive disorder. *Clin Psychol Rev*. Apr 2015;37:26-39. doi:10.1016/j.cpr.2015.02.001
41. Kulz AK, Landmann S, Cludius B, et al. Mindfulness-based cognitive therapy (MBCT) in patients with obsessive-compulsive disorder (OCD) and residual symptoms after cognitive behavioral therapy (CBT): a randomized controlled trial. *Eur Arch Psychiatry Clin Neurosci*. Mar 2019;269(2):223-233. doi:10.1007/s00406-018-0957-4
42. Sverre KT, Nissen ER, Farver-Vestergaard I, Johannsen M, Zachariae R. Comparing the

efficacy of mindfulness-based therapy and cognitive-behavioral therapy for depression in head-to-head randomized controlled trials: A systematic review and meta-analysis of equivalence. *Clin Psychol Rev*. Mar 2023;100:102234. doi:10.1016/j.cpr.2022.102234
43. Chiesa A, Serretti A. Mindfulness based cognitive therapy for psychiatric disorders: a systematic review and meta-analysis. *Psychiatry Res*. May 30 2011;187(3):441-53. doi:10.1016/j.psychres.2010.08.011
44. Piet J, Hougaard E. The effect of mindfulness-based cognitive therapy for prevention of relapse in recurrent major depressive disorder: a systematic review and meta-analysis. *Clinical psychology review*. 2011;31(6):1032-1040.
45. Chrousos GP, Gold PW. The concepts of stress and stress system disorders: overview of physical and behavioral homeostasis. *Jama*. 1992;267(9):1244-1252.
46. Melodia F, Canale N, Griffiths MD. The role of avoidance coping and escape motives in problematic online gaming: A systematic literature review. *International Journal of Mental Health and Addiction*. 2020:1-27.
47. Benedict R, Reinhard P. Usability and applicability of a mindfulness based online intervention developed for people with problematic internet gaming behavior. *International Journal of Psychology and Counselling*. 2022;14(2):17-25.
48. Park SY, Kim SM, Roh S, et al. The effects of a virtual reality treatment program for online gaming addiction. *Computer methods and programs in biomedicine*. 2016;129:99-108.
49. Fish MT, Saul AD. The gamification of meditation: a randomized-controlled study of a prescribed mobile mindfulness meditation application in reducing college students' depression. *Simulation & Gaming*. 2019;50(4):419-435.
50. Patnaik A, Troiano GM. Breathe and Rescue: Exploring Game-Based Breathing Therapies for Anxiety. IEEE; 2023:1-4.
51. Johnson D, Hides L, Kavanagh D, et al. Smiling Mind–Game on: A gamified mindfulness meditation program for young people. 2016;
52. Kim S-C, Lee H, Lee H-S, Kim G, Song J-H. Adjuvant therapy for attention in children with ADHD using game-type digital therapy. *International Journal of Environmental Research and Public Health*. 2022;19(22):14982.
53. Lawler JM, Esposito EA, Doyle CM, Gunnar MR. A preliminary, randomized-controlled trial of mindfulness and game-based executive function trainings to promote self-regulation in internationally-adopted children. *Development and Psychopathology*. 2019;31(4):1513-1525.
54. JaeHyun K, GeonWoo B, JiHeum H, Hayoung O. Digital Technology based Treatment for Gaming Disorder: A Review of Digital Treatment Effectiveness. *Journal of the Korea Institute of Information & Communication Engineering*. 2024;28(5)
55. Garland EL, Manusov EG, Froeliger B, Kelly A, Williams JM, Howard MO. Mindfulness-oriented recovery enhancement for chronic pain and prescription opioid misuse: results from an early-stage randomized controlled trial. *J Consult Clin Psychol*. Jun 2014;82(3):448-459. doi:10.1037/a0035798

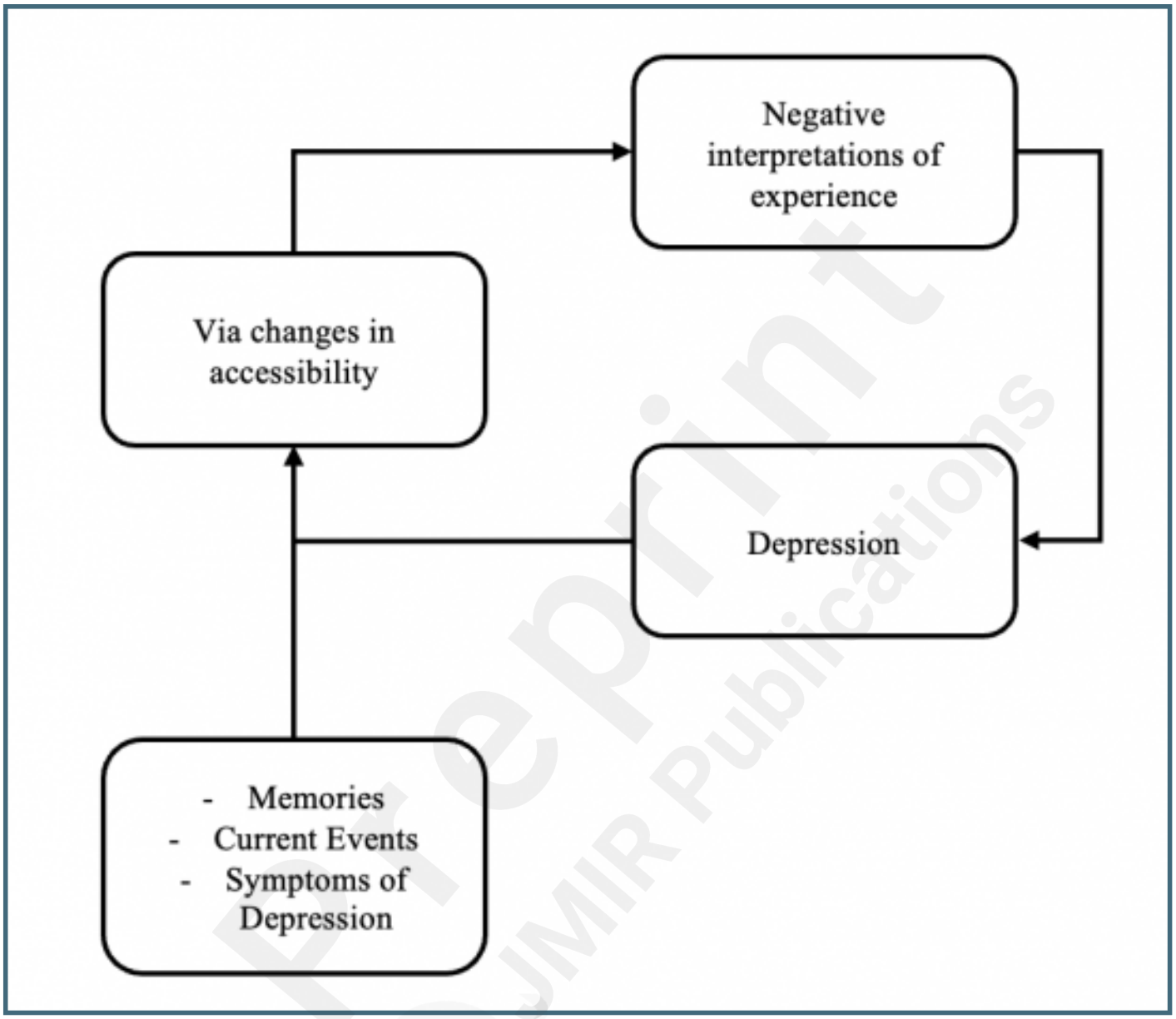
Supplementary Files

Figures

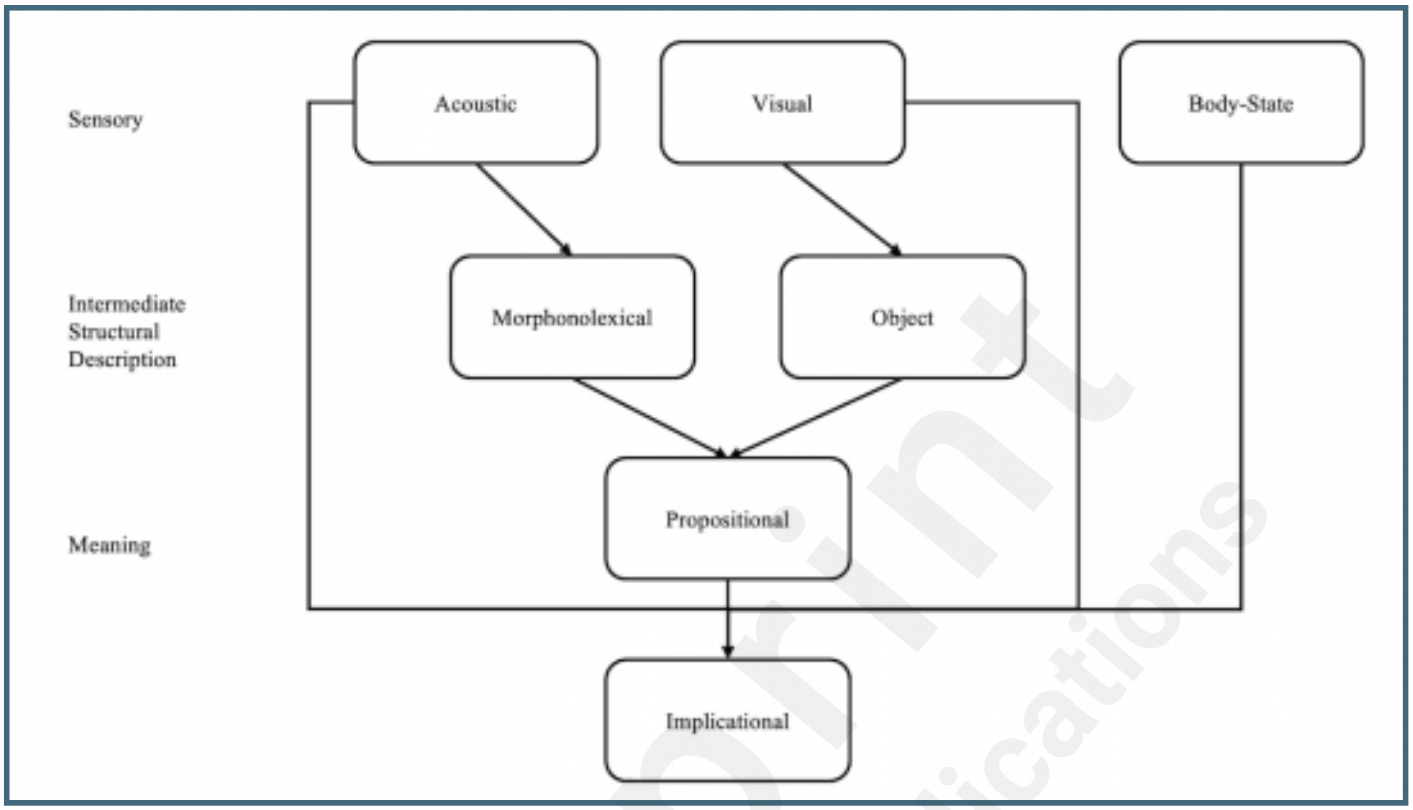
Development of Internet gaming disorder.



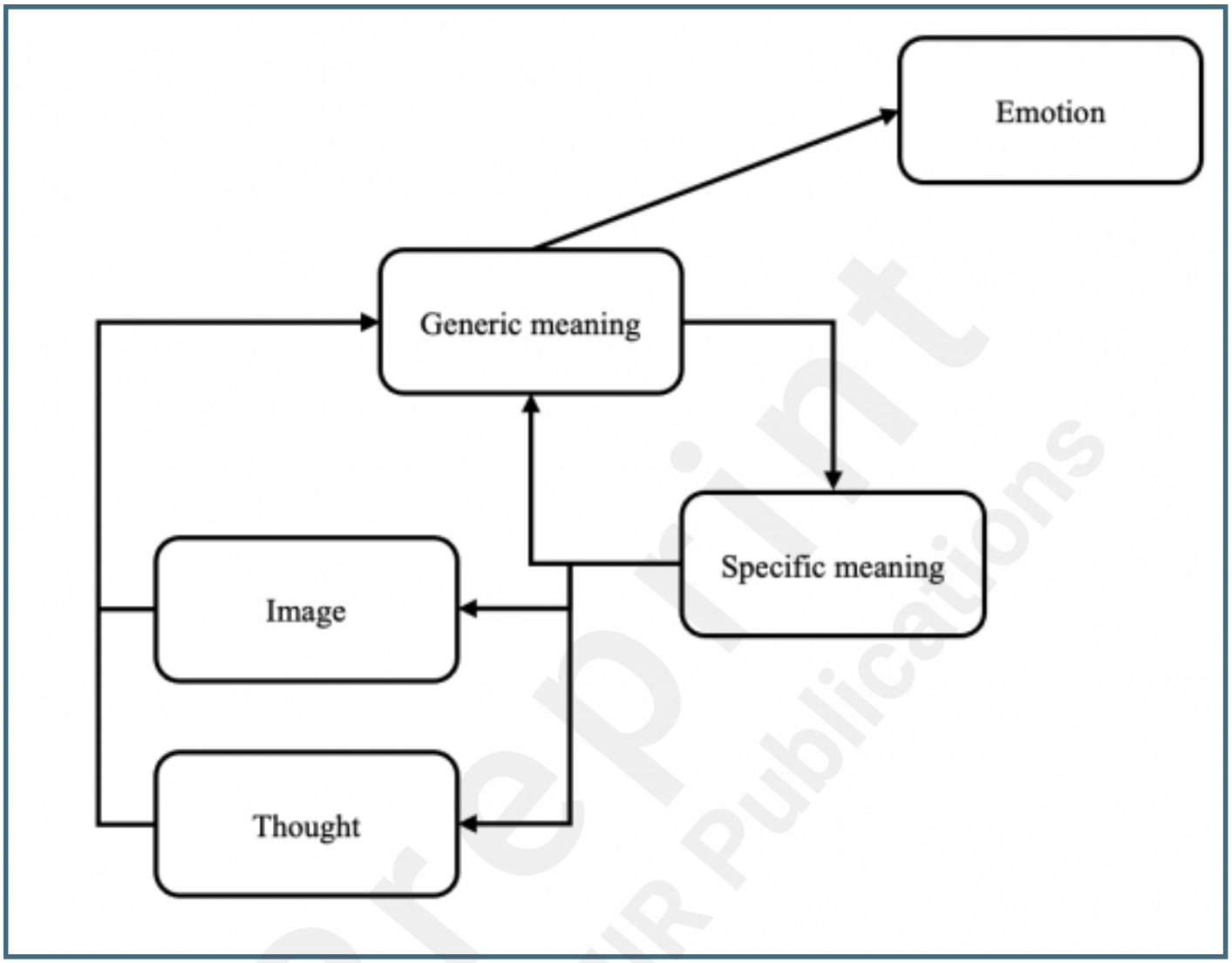
A vicious cycle based on the reciprocal relationship between negative interpretations of experience and depressed mood.



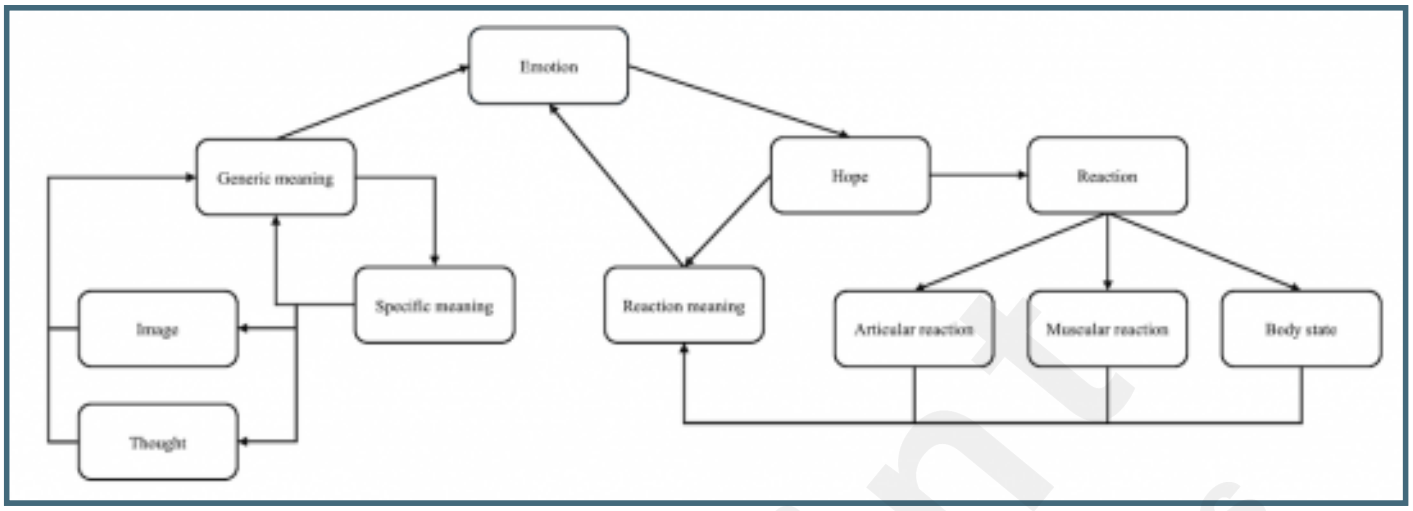
Interacting Cognitive Subsystems (ICS) model.



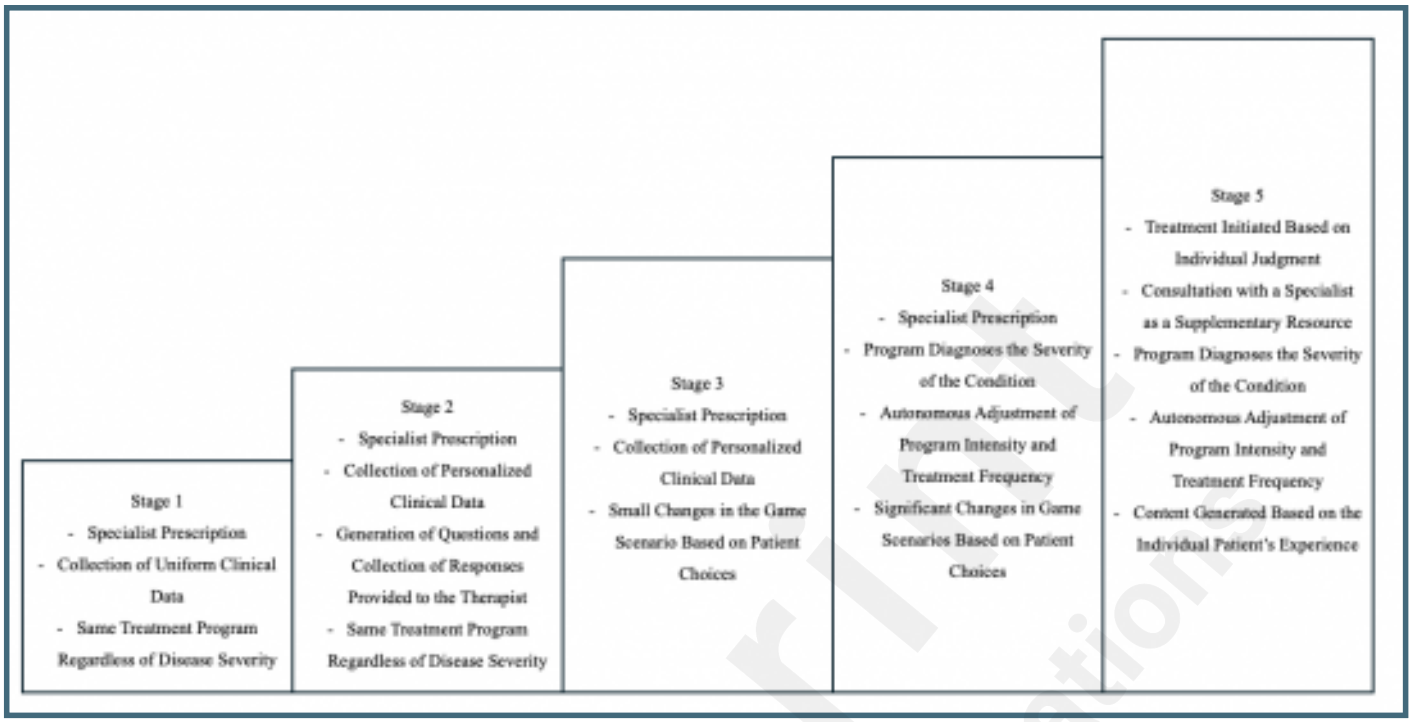
A vicious cycle based on Interacting Cognitive Subsystems (ICS) model.



Modified interacting cognitive subsystem.



The 5 Stages of MBCT-Game.



Protocol of MBCT-Game.