

A Brief Review of the Concept ‘Addiction’ in Psychological Perspective

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Abstract - This article briefly reviewed the previous research on the concept of addiction. Firstly, the development of the definitions of addiction was presented, and the current definition of addiction includes both the substance use disorders and behavioral addiction disorders. Secondly, the mechanisms and features of addiction were described in three aspects, which were the connection between addiction and cognition, the addiction-forming process, and the features of addiction. The third part was to categorize the common addictions based on literature. The final part is to introduce the treatments and interventions of addiction, focusing on the principles of relapse and recovery of addiction. In general, more research on addiction, especially behavioral addiction, is needed to make addiction a more integrative concept in the field.

Keywords — addiction, behavioral disorder, cognition, psychotherapy, substance use.

I. WHAT IS ADDICTION?

Nowadays, addiction has become a public health problem, directly causing excessive morbidity and mortality and a large economic burden (National Institute on Drug Abuse, 2015). Warner and the colleagues (2011) showed that the opioid epidemic had caused more deaths than automobile accidents. To better overview the vein of addiction, its definition needs to be argued. Since the concept of addiction became a research hotspot in various fields decades ago, the definition and boundary of addiction have been expanding and always on the debate.

In the early stage, addiction seems to refer in particular to drug addiction, which was clinically diagnosed as compulsive drug-seeking, drug use, and the special cravings that would last a very long time even after intervention and long-term abstinence (Gould, 2010). The clinical term of drug addiction, which is ‘substance dependence, is defined by the fourth edition of the Diagnostic and Statistical Manual (DSM-IV-TR, 1994), indicating a maladaptive pattern of euphoria producing substance use, leading to clinically significant impairment or distress manifested by 3 or more of 7 criteria, in which first two of the criteria are tolerance and withdrawal, and the other five criteria stress the conditions of compulsive behaviors and a loss of control over substance

use, occurring over a 12-month period. Also, towards drug addiction, Robinson and Berridge (2000) proposed that, ‘Addiction represents a pathological usurpation of the neural mechanisms of learning and memory that under normal circumstances serve to shape survival behaviors related to the pursuit of rewards and the cues that predict them.’ Spiga, Lintas, and Diana (2008) described addiction as a behavioral pathology characterized by obsessive-compulsive seeking, and consequently obtaining the substance of choice, with progressive loss of control of behavior, which would lead the addict to a series of negative consequences and progressive physical and psychological deterioration. Di Chiara (1998) described addiction as ‘compulsive, relapsing drug use and focusing of motivated behavior on drugs to the exclusion of alternative goals and in the face of familial, social, and medical problems.’

With more and more research into the features and mechanisms of addiction, its definition has been broadening. In the fifth Edition of the Diagnostic and Statistical Manual of Mental Disorders (DSM-5, 2013), the title of ‘Substance-Related Disorders’ has been replaced with ‘Addiction-Related Disorders’. This alteration reflects the new definition of addiction, including both substance and behavioral addiction. The so-called ‘behavioral addiction’ represents a series of maladaptive obsessive behaviors sharing similar features with traditional substance use disorders, and these behaviors were diagnosed differently and were under different names, like obsessive-compulsive disorder, impulse control disorder, sexual dysfunction, personality disorders, and so on, before they were officially diagnosed under addiction category (Kim & Seo, 2013). The recognition of non-substance-related addictions comes from more and more evidence showing that there are common impairments in both physical and psychological aspects for substance use disorders and behavioral addiction disorders (Kalivas & Volkow, 2005). The extensive examination of cognition in the individuals with behavioral addictions also provides a new perspective of diagnosis and treatment, and helps push forward the development of our understanding of the mental illness.

In general, more development in the addiction field has broadened the connotation and denotation of the concept, making more pathologic behavior been diagnosed more



accurately, thus having better treatments or interventions.

Another big point of the concept of 'addiction' is that drug-taking itself is not always equal to addiction. During a lot of experiments involving humans or animals, when exposed to numerous potentially addictive drugs, most subjects did not become addicted in the end; for instance, most patients given morphine for an emergency in the hospital did not turn to be morphine addicts. The real problem for addicted individuals is that their drug-taking behaviors show the compulsive patterns, which drug-seeking and drug-taking are at the expense of maladaptation in most daily activities, and more importantly, addicted individuals notice the problem, but are incapable of stopping drug-taking, in other words, have a continuous relapse (Edwards, 1981). Markou and the colleagues (1993) suggested that addicted individuals take addictive drugs for two reasons: To experience the positive and pleasant feelings and to avoid the aversive abstinence reactions.

II. THE MECHANISMS AND CHARACTERISTICS OF ADDICTION

A. *Addiction and Cognition*

When it comes to the mechanisms of how addiction happens, different psychologists and neurologists have various opinions. However, most of them would agree cognition plays an important role in it. To become addicted, individuals' cognitive functions, including the components of attention, imagination, memory, conscience, and ability to make decisions, would always take part as there are voluntary actions needed to take drugs, and individuals' evaluations and choices during the whole processes (Kalivas&Volkow, 2005). Then, why do individuals engage in drug-taking if they know the behavior itself is harmful? Stacy and Wiers (2010) proposed that behaviors are usually not the result of a reflection decision in which individuals would fully evaluate the pros and cons of the circumstance; instead, they are more like to be spontaneously activated at some critical moments, suggesting the effect of implicit cognition. More specifically, there are a lot of overlaps between the brain regions and neural processes regarding addiction and the ones for normal cognitive functions, like forming memories, attention, learning, impulse control, and reasoning, and some psychologists and neurologists even regard addiction as a pure cognitive disorder (Gould, 2010).

On the one hand, a lot of research investigates the acute impacts of the drugs that would cause addiction on the cognitive process, like learning and attention. Numerous studies have confirmed that the drugs like amphetamine, nicotine, and cocaine could acutely enhance the process of learning and attention, for both humans and animals (Del et al., 2007; Devonshire, Mayhew, & Overton, 2007; Kenney & Gould, 2008; Mattay, 1996; Swan & Lessov-Schlaggar, 2007). Simultaneously, some other drugs that could cause addiction to show some mixed and more complicated effects on the cognitive process. For instance, Friswell and the

colleagues (2018) found that morphine would slightly do harm to individuals' performance on a test of working memory. Bechara and their colleagues (1996) applied the Iowa Gambling Task to addicted individuals, and found that the ability to make decisions is compromised in alcoholics, cannabis abusers, and MDMA abusers. Also, Hernández, Valentine, and Powell (1986) found that low doses of alcohol could enhance the learning process, while Ryback (1971) found that high doses of alcohol would impair the cognitive process.

On the other hand, with regard to how addiction affects cognition, most previous research focused on substance use disorders, exploring how drug abuse changes a brain physically and psychologically. For a physical change, some studies found that compared to normal people, certain brain regions of addicted individuals showed significant differences, including the prefrontal cortex, hippocampus, striatum, and amygdala (Kalivas&Volkow, 2005; Le Moal&Koob, 2007), while for psychological change, some researchers argued that individuals' self-consciousness would be hard to function well due to the memory alternations because of the changes of neural processes in the brain (Cahill &McGaugh, 1998; Setlow, 1997).

Generally speaking, there are some findings of the connection between cognition and addiction, but there has not been a comprehensive understanding of the impact of addiction on cognition.

B. *Addiction-forming Process*

With regard to how addiction-forming happens, Feltenstein and See (2008) indicated a two-step process: In the first stage, individuals' occasional actions of drug-taking increasingly transform to uncontrolled and chronic behaviors, and this process involves drug-induced maladaptation of the reward system in the brain. The reward system is also known as the 'pleasure center', including the ventral tegmental area, the striatum; the substantia nigra; the hippocampus; the prefrontal cortex; and the amygdala (Kim & Seo, 2013). Normally, this reward system regulates the certain areas in the brain, like the ventral striatum and nucleus accumbens, to release different neurotransmitters, and make individuals have feelings. One of the main neurotransmitters is dopamine signaling, which creates pleasant feelings and leads individuals to perform certain actions, like eating food and having sex, while drug abuse would hijack this system, and make dopamine signaling largely and unusually released, motivating individuals to continue the drug abuse behaviors (Adinoff, 2004). The above symptoms would lead to the second stage of addiction-forming that individuals would show more clinical features, including a series of early abstinence reactions, continuous relapse, and other changes in decision-making and the relevant cognitive processes (Feltenstein & See, 2008).

In another theory, the addiction-forming process is seen as a learning process. Clinical studies indicate that for substance use disorders, the cues linked to a process of forming an addiction would induce patients' cravings for the target drug (Franklin et al., 2007). Earlier study of Bardo and Bevins (2000) found the phenomenon of conditioned place preference, showing that when animals were given two cages to choose from, they were more likely to choose the cage where they were once fed drugs like nicotine, amphetamine, cocaine, morphine, methamphetamine and so on. Also, clinicians found that addicted individuals under treatment are easy to relapse when they encounter the environment where addiction begins (Hyman, 2005; See, 2005). To better understand why this happens, some psychologists incline to regard addiction forming as a special learning process. Robinson and Berridge (2000) built the multistage model of addiction, exploring why addicted individuals show strong responses to addiction cues. They proposed that when individuals start to form addiction, they tend to link the addictive substances to the environments or circumstances when they take the drugs, and further form a mental connection between these two, like a learning process. In this case, when they meet the similar environments or circumstances in the future, they are 'programmed' to pursue the substance, like a conditioned reflex in certain ways. Volkow and the colleagues (2006) found some evidence that addicted individuals exposed to addiction cues would change the activity levels of their certain brain regions, like the orbitofrontal cortex, left insula, hippocampus, and so on, supporting the multistage model of addiction.

Involving conditioned reflex, the Skinnerian concept of positive reinforcement is often applied by some psychologists to try to explain how addiction develops. In this theory, to understand drug-taking behaviors, drugs are treated as positive reinforcers; however, some psychologists and neurologists argue that the reason that individuals take drugs because drugs motivate drug-taking behavior is like a vicious circle, which describes the behavioral effect, but does not explain the phenomenon (Berridge & Robinson, 1995).

C. The Features of Addiction

Traditional substance use disorders show some common features clinically. Considering addiction to alcohol as an example, the fourth edition of the Diagnostic and Statistical Manual (DSM-IV-TR, 1994) describes alcohol dependence based on the features of tolerance, craving, withdrawal symptoms, and social/ occupational impairment due to alcohol use. It is noteworthy that other substance use disorders share the similar features in their own ways. As for these features, tolerance indicates that the subject is unable to feel the same effect from the substance that was felt previously with taking, thus increasing intake to compensate; craving indicates that the desire for substance use is so strong that it makes a person act recklessly or

obsessively to obtain the substance, even challenging the limits of social acceptability; withdrawal symptoms indicates that stopping intake suddenly can precipitate specific symptoms, such as physical discomfort, irritability, lack of concentration, sleep disorders and so on; and social/ occupational impairment could be reflected in various aspects in personal life, like unemployment, divorce, interpersonal maladjustment and so on (DSM-IV-TR, 1994; Kim & Seo, 2013).

Broadly speaking, in the perspective of neurobiology, behavioral addiction and substance addiction share the same biological mechanism. Those potentially addictive behaviors or substance taking are engaged repeatedly by individuals, and the imbalance of the internal physiological state of the brain is caused by the external behavioral stimulation, finally leading to the emergence of an addictive state. The processes of both substance and behavioral addiction are influenced by individuals' physiological, psychological, social environment, and other factors.

It is worth mentioning that patients with mental illness are usually at high risk for all kinds of addictions, especially for the substance use disorders. This is because the side effects of the drug abuse may do more harm to patients' cognitions that have already been diagnosed as cognitive disorders, let alone the cognitive defects that would further aggravate the difficulty of continuous abstinence for the drugs or other inducements (Gould, 2010).

III. THE CATEGORIES OF ADDICTION

As discussed above, in the early stage, the concept of addiction only includes substance addiction, for instance, the addiction to alcohol and legal/ illegal drugs, and the clinical term is substance use disorders. With regard to the category of substance use disorders, based on some previous research, it is categorized in this article as (1) Prescription drug abuse, e.g., tramadol, compound licorice tablets, compound difenoxate; (2) Opioid addiction, e.g., morphine, Demerol, methadone; (3) New drug addiction, e.g., ecstasy, methamphetamine; (4) Traditional drug addiction, e.g., heroin, marijuana; (5) Sleeping drug addiction, e.g., diazepam, zolazepam, triazolam, alprazolam; (6) Addiction to alcohol and tobacco (nicotine) (Le Moal & Koob, 2007; Markou et al., 1993; National Institute on Drug Abuse, 2017; Potenza, 2008; Regier et al., 1990; Self & Nestler, 1998).

Nowadays, with more understanding of the concept of addiction, behavioral addictions have been officially added to the category of addiction disorders. Previous studies on behavioral addiction found that some symptoms of behavioral addictions are general and not unique to specific disorder categories. Current behavioral addictions include various aspects, like pathological gambling, eating addiction, shopping addiction, sex addiction, internet addiction, and so on (Haagsma, Pieterse, & Peters, 2012; Kim & Seo, 2013; Lee et al., 2012; Longabaugh & Magill,

2011; Morris & Voon, 2016).

Compared to substance use disorders, the concept, degree, and category of some behavioral addictions can be blurry. Among all the common behavioral addictions, pathological gambling was the first to be recognized as a separate disorder in the fourth edition of the Diagnostic and Statistical Manual (DSM-IV-TR, 1994). Earlier studies saw pathological gambling as obsessive-compulsive disorder, impulse control disorder, or non-pharmacological addictive disorder (Ibanez, Blanco, & Saiz-Ruiz, 2002; Potenza, 2008; Potenza, Kosten, & Rounsaville, 2001). With a lot of meta-analyses, researchers demonstrated that pathological gambling should be categorized as a behavioral addiction, and DSM-5 has put pathological gambling under Addiction-Related Disorders (DSM-5, 2013).

Besides pathological gambling, internet-related and game-related behaviors are ringing the alarms in the field. Internet addiction and game addiction have not been included in DSM-5, requiring more characterizations (DSM-5, 2013). However, Aboujaoude and the colleagues (2006) applied an epidemiological study of internet users in the US, and found that between 3.7% to 13% of the subjects met the criteria of problematic internet use.

Also, pathological game use appears to be a big issue, especially in young populations (Haagsma, Pieterse, & Peters, 2012), and the studies showed that 8% to 9.3% of adolescents in the US and Germany reached the extent of problematic game use (Grusser et al., 2005; Gentile, 2009). Lee and the colleagues (2012) found individuals with internet addiction showed the symptoms of some cognitive impairments, including decreased memory and judgment and increased impulsivity, and these symptoms could fit a lot of categories of disorders, which help explain why some behavioral addiction disorders would be diagnosed as obsessive-compulsive disorder, impulse control disorder, and personality disorders in early stage.

Apart from the above three common addictive behaviors, there are also addictions towards sex and food. Sex could activate the similar brain regions as drug abuse, making it fit for the term of addiction (Delmonico & Carnes, 1999). Food addiction emerged from binge-eating disorder, meaning rapid food intake without purging, and there has been evidence showing the connection between compulsive behavior towards food and anxiety (Voon, 2015). More features of sex and food addiction need further study.

IV. THE TREATMENTS AND INTERVENTION OF ADDICTION

Regarding the intervention of addiction, many psychologists built different models and theories. One big theory is a social learning theory, which considers addictive behavior as maintained by a biased belief system, so the purpose of the intervention is to reconstruct related cognitive processes, and the relevant interventions include motivational interviewing (Miller, 1985), and relapse

prevention (Marlatt & Gordon, 1985). It should be emphasized that both voluntary and involuntary treatments are effective; early interventions are highly recommended; the treatment of drug withdrawal alone is ineffective, and behavioral treatments should be personalized, which must cover all the possible coexisting mental illness and leave sufficient observation period, usually 90 days (National Institute on Drug Abuse, 1999)

During the treatment of addictive individuals, maybe the trickiest and the most difficult problem is relapse, which is the reappearance of the addiction process on addictive individuals after a relatively successful treatment and remission (Clay, Allen, & Parran, 2008). The emergence of one relapse could tremendously shatter the confidence of the patients and their family members, and negatively affect the further treatment of the addiction, which might lead to more relapses. Since addictive individuals have recovered from the addiction, and know the consequence of the addiction behavior, why is the relapse so common?

Self and Nestler (1998) proposed that there were three main mechanisms underlying the relapse, which were cues, stress, and drug priming: Cue-induced relapse usually happens during the first several months after the addictive behaviors ceased. During this period, certain cognitive regions in the brain are still quite sensitive to the addiction-associated cues, like people, places, and things that could be connected to addictive substances or behaviors, and exposure to these cues would produce strong cravings, which would lead to addictive individuals to relapse. Stress-induced relapse happens because the stress leads to anxiety, which would disturb the reward system that is already maladaptive, and induce individuals back to engage in addictive behaviors. Drug-induced relapse refers to that a dose of the drug the individuals got addicted to is an essential factor whether addicted individuals would relapse or not. As a powerful stimulus, even a small dose of the target drug would activate the neural pathway reconstructed by the addiction process, and lead to relapse. That is why they say 'One is too many and a thousand not enough' in the addiction recovery field. Also, it is worth mentioning that most studies towards drug-induced relapse focused on substance use disorders, and whether it is the same case for the behavioral addictions is to be tested.

As for the recovery of people with addiction disorders, the ultimate goal should be lifetime sobriety. Although the nature of the addiction involves learned associations and actions leading to the compulsive behaviors, which seem stubborn and hopeless, the data show that with proper treatment, the recovery could be as successful as other chronic diseases (National Institute on Drug Abuse, 1999). Certainly, in case of the relapse, addictive individuals would need long-term monitoring and necessary interventions, considering the common emergence of relapse as discussed above. In the current medical system, there are still a lot of misunderstandings towards addiction disorders. Some

addictive individuals could not attain enough support from the clinicians, and even get prejudiced because of the relapse (Lee et al., 2012). In this case, more research should be conducted to explore the more accurate diagnosis and better treatment for addiction. More importantly, clinicians should understand the principles of addictive behaviors, and be more patient towards addictive individuals' recovery processes. As for addictive individuals themselves, the organizations like an anonymous meeting or small support group have been proved helpful in many situations. In 1935, the first organization of Alcoholics Anonymous was founded by the patients themselves to help recover from alcohol addiction (Longabaugh & Magill, 2011). Till today, different groups and meetings have been organized to help support the addictive individuals, and the patients are encouraged to make good use of it.

V. CONCLUSIONS

This article mainly describes the concept of addiction in several aspects. Firstly, the development of the definitions of addiction is introduced. Current literature indicates that the concept 'addiction' includes both the substance use disorder and the behavioral addiction disorders. Secondly, the mechanisms and characteristics of addiction are described in three aspects. The article focuses on the findings of the connection between the addiction and cognition, analyses the addiction-forming process suggested by previous research, and depicts the core features of addiction behaviors, which are tolerance, craving, withdrawal symptoms, and social/ occupational impairment. After that, there are the categories of different addiction behaviors, and they were shown under the types of substance use addiction and behavioral addiction representatively. Finally, the article briefly describes the treatments and interventions of addiction, mainly arguing about the issues underlying the relapse and recovery of addiction.

Based on a lot of relevant research on addiction, the literature has shown that behavioral addictions are just like substance addictions, which are strongly connected to the dysfunctions in certain brain regions. At the same time, all the addiction disorders share the similar mechanisms and features, including tolerance, craving, withdrawal symptoms, and social/ occupational impairment. These findings suggest that when clinicians and psychiatrists treat addictive individuals, to reach a better therapeutic effect, the view of comprehensive care must be taken, meaning the biological treatments and various psychological interventions should be integrated into account. Certainly, there are some variations between substance use disorders and behavioral addiction disorders, and whether the variations would cause a discrepancy in diagnoses and treatments are still to be tested. Considering the profound and lasting effects of addiction on cognition, more empirical research should be conducted in the future to form a more integrative understanding of the connection.

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