

An addiction-prone personality: Common personality characteristics in various addictive and compulsive behaviors

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For several decades, there have been endeavors to search for and examine personality characteristics that predispose to a variety of addictive behaviors – addiction-prone personality. The purpose of this paper is to critically review and evaluate the research literature carried out thus far dealing with the addiction-prone personality. The definition of terms and the arguments for and against the addiction-prone personality together with their intellectual backgrounds are introduced. *Comorbidity across addictions section* discusses how and why the addiction occurs concurrently with another addiction and suggests possible hypotheses. Common personality characteristics that are frequently manifested in people who are addicted to substances/activities are discussed in next section. The following conclusions are drawn from the literature review. First, the trait of addiction-prone personality exists, which is characterized by its heterogeneity. Second, the trait negative emotionality or neuroticism characterizes almost all addictive and compulsive behaviors. Third, a multi-dimensional perspective is suggested in understanding this concept; each addiction or compulsive behavior can be placed onto different dimensions of certain personality traits.

Key words: addiction, personality, comorbidity, trait, multi-dimensional

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Introduction

Throughout the history of humankind, addiction has been evident in people's lives, demonstrating some of the most stigmatizing behaviors in human society. The use of the term *addiction* has brought about many arguments and heated controversies not only among professional researchers but also in the general population. Some people may feel compassion toward the victims, considering addiction as a sickness or a fatal illness such as cancer or tuberculosis; others view its victims with great condemnation, considering addiction to be a social or moral sin, a vice to which a person should not succumb.

We can readily find examples of persons with addictions or addictive behaviors among society's famous people such as artists, politicians, and entertainers. The famous Russian novelist, Dostoyevski, author of *Crime and Punishment*, had to endure a poor and miserable life because of his pathological gambling habit despite his worldwide fame. Elvis Presley, the "king of rock and roll," died in his early forties due, for the most part, to his drug abuse problem. In this manner, addictive behaviors can break down a person in a moment or over a period of time and have power to destroy normal life.

According to the Diagnostic and Statistical Manual of Mental Disorders (DSM-IV; American Psychiatric Association, 1994), the prevalence of alcohol dependence is estimated at 13%, dependence on other psychoactive substances is approximately 5–7%, and pathological gambling has an estimated prevalence of 1–3%. We ask then what the reason is for such behaviors and what motivates people to indulge in such addictive behaviors. Thousands of papers have been written on the etiology, processes, progression, and the treatment of addictive behaviors. Among the various kinds of addiction, some such as alcoholism and drug addiction are very well known in daily life, whereas other forms of addiction appear to have come to attention only in recent years. Even if the aspects and the etiologies of each addictive behavior are not the same, there tend to be similarities among different addictive behaviors. This paper explores a commonality among these behaviors, mainly focusing on alcoholism and drug addiction although it covers other addictive or compulsive behaviors.

This paper raises the following questions: alcoholics, drug addicts, pathological gamblers, and those who seem addicted to other risky behaviors have any personality characteristics in common? If they do, can we label such persons as having an *addiction-prone personality*? What kind of personality characteristics do the different addictions commonly manifest? Is there a certain association between the comorbidity across addictions and the addiction-prone personality? Hence, the purpose of this paper is (1) to critically review the literature regarding personality characteristics in various addictive behaviors previously researched, (2) to suggest the direction for further research in this field by observing and analyzing this phenomenon from diverse

angles, and at the same time, (3) to investigate the terms and methodologies used in the research.

Definition of the Terms

Definition of Addiction, Dependence, and Abuse

Despite many attempts by psychologists and psychiatrists to define the word addiction, the reality is that it is difficult to define this concept precisely and conclusively. There are various reasons for this difficulty. As Goodman(1990) points out, the term addiction has often been used both within and outside the mental health disciplines without attempts to define it, and many suggested definitions are inaccurate as well as vague, which from time to time have moralistic connotations resulting in inappropriateness for scientific inquiry. In fact, defining terms, in particular, terms such as addiction whose meaning can be interpreted subjectively, often seems to be dependent on the individual' s philosophy and world view.

More importantly, it is difficult to define addiction when considering questions such as "What kind of behaviors should be considered as addictive and what others can be regarded as non-addictive?" For example, some people may think of anything people do habitually as addictive, such as fishing, gardening, writing, golfing, cleaning, washing dishes, and so on. The majority of people, however, will be against this too-broad concept, arguing that these behaviors are routines without any harm to oneself or others. Still others may suggest that only alcohol and drugs can be addictive because only these substances can have physical withdrawal and tolerance symptoms. On the other hand, other persons will contend that the activities or substances are addictive as long as they contain the processes of salience, craving, tolerance, withdrawal, conflict, and relapse. Thus, the questions of what kind of characteristics the addiction is composed of and which behaviors should be included in the category of addiction have been and still are at the center of the controversies in this field.

Whereas the traditional point of view of addiction has only regarded physically intoxicating substances, of which alcoholism and drug addiction are the clearest examples, recent perspectives have somewhat modified this seemingly narrow criterion of addiction. In his extensive literature review, Orford(2001a, b) suggested that there are a range of appetitive activities that can become excessive, including eating, sexual activity, and gambling. When these behaviors are in moderation or within limits, they are acceptable, but meet with disapproval and can become addictive if taken to excess. line with Orford (2001a, b), Peele(1985) argued that we should include even personal relationships in the category of addiction by proposing much broader and more socially relevant concepts. He emphasized

the subjective experience of the addicts, in other words, the addicted person's experience of the combined physical, emotional, and environmental elements that make up the pathological involvement for that person. Orford' s and Peele' s concepts of addiction are broader compared with traditionally called *genuine addiction* even if each has focused on different aspects of addictive behaviors: excessive use versus subjective experience. Recently, with the rapid growth of information technology, new term, *technological addiction*, has emerged. Griffiths (1995, 2005) operationally defined this term as non-chemical(behavioral) addictions that involve human-machine interaction. They can be passive(e.g., television) or active (e.g., computer games) and generally contain inducing and reinforcing features that may contribute to the promotion of addictive tendencies(Griffiths, 2005). He described the Internet, fruit machine, and video game activities in six common components of salience, euphoria, tolerance, withdrawal, conflict, and relapse and suggested that these can be addictive like other non-technological addictions(Griffiths, 2005). In fact, it has been debated whether we need to include the category of *cyber addiction* in the upcoming DSM-V (Kim, 2002, 2006).

The term addiction seems to be more likely used by lay people rather than clinicians and psychologists, as it is not part of the recent version of the DSM-IV. Of the diagnoses referenced in the DSM-IV, substance dependence may come closest to capturing the essence of what has traditionally been called addiction. The DSM-IV requires manifesting three or more of the following seven symptoms any time during the same 12-month period to be diagnosed as substance dependence: tolerance, withdrawal, larger and more frequent ingestion of the substance than intended, persistent desire or unsuccessful efforts to cut down the substance use, great deal of activity to obtain the substances, reduction in important social, occupational, or recreational activities because of substance use, and disregard for persistent physical or psychological problems caused by the use of the substance(American Psychiatric Association, 1994, p. 181). DSM-IV(1994) also specifies that neither tolerance nor withdrawal is necessary or sufficient for the diagnosis of substance dependence. It is notable that the DSM-IV categorizes pathological gambling as one of the impulse control disorders and places compulsive sexual behavior in the category of sexual and gender identity disorders(American Psychiatric Association, 1994). The DSM-IV criteria for the diagnosis of pathological gambling are along the same lines as those of substance dependence. Based on the criteria of substance dependence and pathological gambling in DSM-IV, in this paper addiction will be defined as *a severe form of dependence*, including both physiological and psychological meanings.

There are some theories suggesting eating disorder as a form of addiction(Davis & Claridge, 1998; Krahn, 1991). In spite of the similarities of the symptoms and personality features between substance dependence and some types of eating disorders,

eating disorders are better distinguished from addictions in that both anorexia nervosa and bulimia nervosa are more likely characterized by obsessive–compulsiveness rather than addictiveness, although bulimia nervosa has some similarity to addiction in terms of behavioral features and impulsivity exhibited by the patient. Therefore, food can be abused and even be addictive in severe cases; however, eating disorder seems to be a somewhat different disorder from addiction. This paper, nevertheless, covers to some extent some types of eating disorders such as compulsive overeating and bulimia nervosa and the personality characteristics of the individuals with these problems because of some overlapping features with addiction.

In summary, defining terms such as addiction is difficult due to the imprecise criteria, overlapping diagnoses, and individual differences in viewpoints on this phenomenon. In this paper, the terms addiction and dependence will be used interchangeably including alcohol, drugs, and other chemical substances. Also, the terms, pathological gambling, compulsive sexual behavior, compulsive overeating, compulsive Internet use, and compulsive exercise will be used.

Definition of Addiction–Prone Personality

For the purpose of this paper, addiction–prone personality is defined as a cluster of personality characteristics that tend to appear in individuals with different types of substance use and compulsive behaviors. It may be a generalized predisposition to engage in various types of addictive and compulsive behaviors, different in quality and/or intensity from the characteristics observed in the general population represented by normative groups on standardized personality instruments.

Search for the Addiction–Prone Personality

There have been many arguments and controversies regarding the concept of the addiction–prone personality or addictive personality. However, in spite of pessimistic conclusions proposing its nonexistence, the search for addiction–prone personality has continued and has even expanded. In any case, it is important to take into account the role of personality in understanding addictions in that personality and psychopathology have inseparable connections. As Sadava(1978) has suggested, understanding personality in studying addictive behaviors may be "theoretically necessary, logically defensible, and empirically supportable". Without some type of addiction–prone personality construct, we may be left with the unsettling question of whether or not every individual is equally susceptible to addictive behaviors under the same circumstances. This question, without a doubt, has caused many investigators to retain the construct of addiction–prone personality, and has generated many positive findings.

As a matter of fact, theories against the construct of "addictive personality" have been suggested for several decades. In the 1940s and 1950s, relatively few studies had been carried out connecting addictive behaviors and personality. Landis(1945) and Sutherland and his colleagues(1950), from their studies of alcoholics, concluded that there was no satisfactory evidence that persons of one type were more likely to become alcoholics than persons of another type. Arguments opposing addiction-prone personality have continued through the 1960s and 1970s. These studies, however, were found to have methodological shortcomings which might have affected the outcome. For example, the methods that were used in these studies were found to be mainly case studies and projective tests, which may have limitations of generalizability and construct validity. Following 1960s, there was an important trigger that led people to take a skeptical view of the concept and in a broader sense, personality itself during the 1970s and 1980s. In his book *Personality and Assessment*, Walter Mischel(1968) mounted an attack against the current intellectual atmosphere, insisting on the term situationism as an antitrait position. Mischel's controversial idea brought about the heated person versus situation debate between personality psychologists and situationists, impacting various fields of psychology including addictive behaviors. However, in the 1990s and 2000s, due to the large body of biogenetic evidence of an addiction-prone brain, the general atmosphere in this field seemed to move towards the construct of "addictive personality." Methodological developments also contributed to the efforts to explore this notion, as will be mentioned in later sections. Let us now examine the studies and their outcomes that support the utility of the construct, addiction-prone personality.

Theories and Evidence Supporting Addiction-Prone Personality

Barnes, Cox, and alcoholic personality. Despite the opposition to and arguments against the construct of addictive personality just examined, many psychologists have supported its utility. As Cox(1979) suggested, there seem to be a number of possible applications not only in theory but also in practice. When this concept is better defined, we might be able to classify or subtype deviant populations more effectively. Such separations of people with addictions according to their personality characteristics could permit development and refinement of differential treatment strategies(Cox, 1979). Most of all, a personality-based system for predicting addictive behaviors might allow better identification of high-risk populations so that prevention and early intervention programs could be applied more effectively before problems became serious.

We can trace the early efforts to identify certain personality characteristics that distinguish alcoholics from non-alcoholics back to the work done by Gordon

Barnes(1979) and Miles Cox(1979, 1987). Barnes(1979) has proposed that an alcoholic personality concept should be broken down into two concepts –the clinical alcoholic personality and the prealcoholic personality. The term "clinical alcoholic personality"was used to describe the pattern of personality characteristics that occur in alcoholics at time of treatment and was characterized by neuroticism, weak ego, stimulus augmenting, and field dependence, which are confirmed in his later work(Barnes, Murray, Patton, Bentler, & Anderson, 2000). The term "prealcoholic personality" was used for the pattern of personality characteristics common to alcoholics prior to the onset of the disorder with a possible lack of control suggested as its dominant characteristic(Barnes, 1979). The term prealcoholic personality, which will be discussed in detail in a later section, was elaborated and extensively researched by Barnes and his colleagues(2000).

Likewise and Cox(1979) reported some alcoholic personality characteristics such as dependency, psychopathic deviation, anxiety, and depression in his extensive literature review. Of interest, he suggests the trait psychopathic deviation as one possible prealcoholic personality characteristic, which is in line with Barnes' concept of prealcoholic personality. Zuckerman(1993) later supported Cox' s and Barnes' ideas by arguing that the prealcoholic personality is characterized by extraverted, impulsive, and sensation–seeking traits. Cox indicated two subtypes of alcoholics respectively characterized by (1) psychopathic deviate features and (2) anxious, depressed features. These features are also consistent with those of Cloninger' s Type II and Type I alcoholics and with the findings of Valeithian(1998), who described the neurotic and psychopathic characteristics as an addictive personality.

Methodological development. As stated above, the person–situation debate triggered by Mischel(1968) has led many people to be skeptical of personality traits as stable, enduring, and prevalent through the whole lifetime. One of the factors from which this skepticism stemmed was the low predictability of one' s behaviors from her or his personality traits. It is now recognized that low correlations between personality and behavior may be attributable at times to unreliable measures of behavior rather than the lack of validity of personality traits. It is found that methods such as aggregation can improve the low reliabilities and increase the correlations between personality and the measures of behavior(Epstein, 1979). Also, behavior itself can be understood as a broader concept with different manifestations in different situations.

The recent growth of psychological methodology such as multivariate statistical techniques and structural equation modeling(SEM), numerous computer statistical software packages, and the development of more elaborate research designs such as longitudinal studies that replaced traditional cross–sectional studies have brought us closer to the concept of stable personality traits and addiction–prone personality. For

instance, multivariate statistics allow investigators to identify multiple factors that lead to addictive behaviors and therefore to show heterogeneous etiological factors. The use of longitudinal designs together with hierarchical linear modeling(HLM) also provides researchers with useful tools.

Studies on the stability of personality traits. Recent research has also tended to show that biologically based individual differences or temperaments are relatively stable from early childhood on(Buss & Plomin, 1984; Caspi & Silva, 1995) and personality traits are fairly stable in adulthood(Caspi & Roberts, 1999; Roberts, Caspi, & Moffitt, 2001). Longitudinal studies show that the personality trait stability coefficients are relatively high(Caspi & Roberts; Roberts et al.), taking a great deal of life changes into account. In addition to the longitudinal studies demonstrating relatively stable human personality traits, new evidence has emerged showing that there are biological correlates linking the primary personality characteristics(Cloninger, 1987; Zuckerman, 1989). The personality systems of Cloninger and Zuckerman are both based on psychobiological models of personality, focusing rather on biological temperament, which turns out to be fairly heritable.

Twin and adoption studies. There is an increasing number of results that demonstrate strong heritability of personality traits. Research on twins reared together and reared apart has shown that a substantial proportion of the variance in personality traits can be explained by a genetic component(Eysenck, 1990; Hur, McGue, & Iacono, 1998; Tellegen et al., 1988). Tellegen and his colleagues(1988) calculated the heritability estimates of personality traits by studying monozygotic twins reared together(MZT), dizygotic twins reared together(DZT), monozygotic twins reared apart(MZA), and dizygotic twins reared apart(DZA). The heritabilities of personality traits measured with the MPQ range from .39 to .58. Their study has been influential in that their attempt to investigate twins reared apart is the first and has had a considerable impact on the field of personality psychology. Besides the heritability of personality traits, many studies suggest a heritability component for alcoholism, substance dependence, binge eating, and other addictive behaviors(Bulik et al., 2003; Grove et al., 1990; Jang et al., 1995; Kendler, & Prescott, 1999; Kreek, Nielsen, Butelman, & LaForge, 2005; McGue, 1999). Together with genetics of personality characteristics, these studies also help us to understand the etiology of diverse human behaviors, including addictions.

Molecular genetics and biological evidence. In addition to the twin and adoption studies, the field of molecular genetics offers another line of evidence supporting addiction-prone personality. According to recent neurophysiological findings, drugs of abuse, regardless of the kind and their initial actions, tend to have a common molecular pathway(Blum and Payne, 1991; Nestler, 2005). Nestler(2005) suggested an intriguing

theory of effects of drug actions on the ventral tegmental area(VTA) and the nucleus accumbens (NAc). According to his theory, every drug of abuse produces some common effects on the VTA and NAc. For instance, "stimulants directly increase dopaminergic transmission in the NAc. Opiates do the same indirectly. Opiates also directly act on opioid receptors on NAc neurons, and opioid receptors, like D2 dopamine(DA) receptors; hence, the two mechanisms converge within some NAc neurons. Nicotine seems to activate VTA dopamine neurons directly via stimulation of nicotine cholinergic receptors on those neurons and indirectly via stimulation of its receptors on glutamatergic nerve terminals that innervate the dopamine cells. Alcohol, by promoting GABA receptor function, may inhibit GABAergic terminals in VTA and hence disinhibit VTA dopamine neurons."(Nestler, 2005, p. 1446). In sum, his theory indicates that all drugs of abuse increase dopaminergic transmission to the NAc after acute administration. This *dopamine hypothesis* has been supported by other colleagues such as Blum and Payne (1991). According to Blum and Payne, individuals who are vulnerable to alcohol suffer from abnormally low levels of dopamine and a lower ability to bind dopamine to its receptor site. To sum up their theory, "some individuals are born with a reduced supply of enkephalins or a reduced natural release of these neurotransmitters in the hypothalamus, the part of the brain associated with emotion."(Blum & Payne, 1991, p. 197). "The amount of serotonin is lower in this region; there is an increase in the number of opioid receptors and a reduced number of dopamine D2 receptor binding sites; and there is an enhanced binding of GABA to its receptor sites."(Blum & Payne, p. 197). They state that people cannot have feelings of well-being under these anomalies because not enough dopamine is being released, and there is not enough to bind the dopamine to its receptor sites. Due to this deficiency of dopamine, super-sensitivity develops in the nucleus accumbens, the major reward site of the brain(Blum & Payne). The reward here refers to a series of events initially activated by dopamine at the Dopamine 2 receptor, causing a burst of firing associated with strong calcium penetration into the neuron. The "DRD2 hypothesis" of addiction is also supported by Hans Eysenck, who claims that the existence of addictive personality is strongly associated with dopamine functioning, which is related to the personality dimension of Psychoticism found in a large number of addicted people(Eysenck, 1997).

Besides the findings stated above, neuropsychological studies on drug and alcohol addiction suggest that the amygdala, a part of the brain that regulates the basic emotions such as love, happiness, anger, sadness and fear is central to the addictive behaviors. Vulnerable alcoholics have a smaller right amygdala than normal subjects and the left amygdala is strongly associated with impulsivity and antisocial behavior, which is also related to a deficit in prefrontal functioning(Koob, 2000; Nestler, 2005; Volkow & Fowler, 2000). To discuss this mechanism in detail is beyond the scope of

this paper, however. In any case, these molecular genetic and neuropsychological studies pave the way for further research on the structure of the brain of people with addictions and the addiction-prone personality.

Comorbidity studies and longitudinal studies. The comorbidity phenomenon that occurs often in addicted people such as co-occurrence of alcoholism and drug addiction, gambling and drug addiction, drug and compulsive sexual behavior, and overeating and alcoholism is probably the strongest evidence supporting the idea of an addiction-prone personality. The fact that an individual who is craving for drugs is also craving for sex, gambling, or other substances/activities strongly implies a commonality in these craving behaviors, which will be discussed in detail in the *Comorbidity* section.

Longitudinal studies conducted in recent years (Barnes et al., 2000; Krueger, Caspi, Moffitt, & Silva, 1998; Leon, Fulkerson, Perry, Keel, & Klump, 1999; Sher, Bartholow, & Wood, 2000) also contribute to our understanding of predisposing personality traits that may lead to addictive behaviors. The cause-effect relationships between personality characteristics and addictive behaviors can be recognized in longitudinal studies, in contrast to cross-sectional studies where one cannot conclude about cause-effect relations. As an example, Barnes and his colleagues (2000), in their huge and ambitious longitudinal study on personality and alcohol use, constructed a 23-item prealcoholic personality (PAP) test. The items were selected from personality-relevant items on a half-dozen scales that significantly distinguish people from the general population on the basis of family history, as well as own level of drinking assessed by DSM-III R. When the PAP test, other personality inventories, and the questionnaire asking about substance use/abuse were administered to the general population and a clinical sample, both groups showed very significant correlations between PAP test score and drinking problems, drug abuse, smoking, and coffee consumption. Of major importance is the finding that elevated PAP scores are associated with a range of psychopathology including high Psychoticism, high Stimulus Reducing, high Neuroticism and anxiety, and low Ego Strength and Self-Esteem in both groups (Barnes et al.). Most importantly, in the two-year longitudinal investigation, it was found that the prealcoholic personality test (PAP) significantly predicted alcohol and drug use and problems during follow-up. High correlations between PAP scores and later drug abuse also support the utility and interpretation of the PAP test as a measuring instrument of a general underlying vulnerability to addiction rather than a specific underlying vulnerability to alcohol abuse (Barnes et al.). Further research on the association of the PAP test with other addictive behaviors such as gambling, sex, and overeating and with other personality variables will be needed to expand the utility of the PAP to a broader concept, addiction-prone personality.

In sum, this section discussed the arguments surrounding the decades of debate over the idea of addiction-prone personality or addictive personality. The early attempts to search for the addictive personality or alcoholic personality have been mentioned. The intellectual atmosphere and person-situation debate that was prevalent in 1960's, 1970's, and 1980's was discussed. How methodological developments improved the situation was also introduced. Much evidence now strongly suggests the utility of the concept of the addiction-prone personality: twin and adoption studies, molecular genetics, neuropsychology, longitudinal studies, and comorbidity studies together with sophisticated statistical programs.

Comorbidity across Addictions

This chapter discusses the comorbidity phenomenon that is commonly found in the research literature. Comorbidity of Axis I and Axis II disorders as well as of different disorders within Axis I in DSM-IV has long been noted. In the research literature and in clinical settings, much has been reported about the co-occurrence of addictive and compulsive behaviors. It is not unusual to see an individual being caught up in more than one addictive behavior simultaneously or sequentially. In fact, many argue that gambling and alcoholism, gambling and drugs, smoking and drinking, drug addiction and alcoholism, and compulsive sexual behavior and drug addiction co-occur in the majority of addicted patients (Johnson et al., 2000; Ledgerwood, & Downey, 2000; Petry, 2000; Smart & Ogborne, 2000). Other reports suggest that after full recovery from alcoholism, many people have a tendency to indulge in food, particularly sweets and fats (Yung et al., 1983). Many recovered gamblers are also said to become compulsive overeaters. Evidently, for some people, multiple addictions may occur, which suggests the possibility of a common factor that might predispose to addictive behaviors.

Even though there are controversies and different theories viewing the comorbidity phenomenon, investigating comorbidity across addictions is in many ways important in figuring out the addiction-prone personality. First, the fact that multiple addictions occur in an individual may imply a common etiology whether it consist of neurobiological or personality factors. As Krueger indicated, common disorders might be "reliable, covariant indicators of stable, underlying 'core pathological processes'" (Krueger et al., 1998, p. 216). Hence, understanding these core pathological processes across various kinds of addictions may be the key element leading to the addiction-prone personality. Second, investigating comorbidity across addictions is important in that identifying higher-order factors and higher-order personality traits may account for the covariation among addictions. Furthermore, we can investigate the latent taxa for these higher-order traits, which may play a great

role in investigating the addiction-prone personality. With these reasons, putting a comorbidity approach in this paper seems to be necessary and meaningful.

Comorbidity

There have been many studies conducted on the comorbidity of alcoholism and licit or illicit drug addictions. Johnson, Tobin, and Cellucci(1992), conducting research with cocaine and alcohol inpatients, found a high degree of similarity in the MMPI profiles of these two groups. The alcoholics showed high points on 4-2-8 Scales that corresponded to Psychopathic Deviate(Pd), Depression(D), and Schizophrenia(Sc) Scales respectively. On the other hand, cocaine addicts showed high points on Scales 4-2-9, Pd, D, and Hypomania(Ma). When we consider that elevations on Pd substantially represent antisocial personality traits, it is quite noteworthy that both alcoholics and cocaine addicts have elevations on this scale. Alcoholics and cocaine addicts commonly scored high on the D Scale, which is consistent with the findings of other studies. The co-occurrence of drug use and problem drinking has also been reported among incarcerated women(El-bassel et al., 1995) and among high school students in 36 different countries(Smart & Ogborne, 2000). Interestingly, the latter study also reported high correlations among amounts of various drugs used. For example, the high cannabis using group also had higher rates of use of amphetamines, cocaine, and ecstasy(Smart & Ogborne). Another common comorbidity found in the addiction literature is between smoking and drinking. Studies conducted to explore the relationship between cigarette smoking and drinking suggest a strong connection between adolescent cigarette and alcohol use(Johnson et al, 2000), higher rates of illicit drug use among users of alcohol, smokeless tobacco, and cigarettes in military personnel(Kao et al, 2000), and an association of tobacco use with the initiation of other addicting substances such as alcohol, opioids, and cocaine(Henningfield et al., 1990).

Relatedly, many articles report the comorbidity of pathological gambling and substance abuse(Feigelman et al., 1995; Ledgerwood & Downey, 2002). Ledgerwood and Downey(2002) reported, from their study of methadone maintenance patients, that probable pathological gamblers were more likely to produce cocaine positive urine results(53%) than non-pathological gamblers(24.5%). Many people also reported the co-occurrence of some types of eating disorders and substance/alcohol abuse problem(Bulik et al., 1994; Heather & Gilvarry, 1998; Pidcock et al., 2000; Yanovski et al., 1993; Yung et al., 1983). According to Grilo and his colleagues(1995), approximately 50 % of eating disorder patients had abused some kind of substances: alcohol(30%), nonalcohol substances(14%), and combined alcohol and nonalcohol substance use disorders(52%). From these studies, it is evident that there is a strong

association between some types of eating disorders, especially bulimia nervosa, and substance abuse.

Moreover, it is reported that individuals with comorbidity are more likely to manifest dysfunction in many areas of life compared with individuals without comorbidity (Bulik et al., 1994; Feigelman et al., 1995; Ledgerwood & Downey, 2001; Petry, 2000). For instance, Feigelman and his colleagues (1995), from their study of methadone patients receiving treatment in New York City, suggested that problem gamblers who were also drug dependent were more likely to show greater evidence of social dysfunction compared to those who were exclusively substance abusers. Their study revealed that more dually addicted respondents reported higher levels of recent heroin use, greater unemployment, more reported hallucinations and being in conflict with their close friends. Likewise, Bulik and her colleagues (1994) suggest that people who manifest a comorbidity of substance abuse and any kind of disordered eating behavior also suffer from more psychological and relational problems such as stealing, suicide attempts, and greater problems with finances, work, and family. These problems are also commonly found in individuals with comorbidity of other substances/activities (Bulik et al.). In addition to poor functioning, people with comorbid addictions manifest more psychiatric distress such as somatization, depression, anxiety, obsessive-compulsive symptoms, interpersonal sensitivity, and hostility than non-comorbid individuals (Bulik et al.; Petry, 2000; Yanovski et al., 1993). These studies altogether strongly imply that people with two or more addictions show more impairment of functioning in many areas compared to people with single addiction.

In sum, considering comorbidity across addictive and compulsive behaviors is important in approaching the addiction-prone personality in the sense that people with two or more addictions may be more predisposed to or vulnerable to addictive behaviors compared with people without comorbid addictions. Now, let us consider the perspectives that explain the comorbidity of many addictions, although none has yet been clearly confirmed.

Perspectives

Neurochemical approach. One important and intriguing approach that may account for the comorbidity of many addictions is a neurochemical orientation. According to this approach, addictions may be an effect of endorphins and other endogenous neuropeptides, binding to the same receptors in the brain that bind exogenous chemicals (Berridge & Robinson, 1995; Blum & Payne, 1991; Brady & Sinha, 2005; Eysenck, 1997; Ruden & Byalick, 2000).

The basis for this theory is that any alterations in the speed of neurotransmission across the synapses of the limbic system bring about a dramatic change in mood.

Increased dopamine neurotransmission in the nucleus accumbens part of the limbic system seems to play a major role in the reward system, which if malfunctioning may be ultimately responsible for the excessive craving that leads to addiction (Blum & Payne, 1991; Brady & Sinha, 2005). But how can diverse substances/activities all create a similar neurochemical response? Here are some examples of how this may come about. When an individual binges on carbohydrates, this increases the amount of serotonin in the hypothalamus, which in turn increases the amount of enkephalin, thus retarding release of GABA. Since GABA inhibits release of dopamine, inhibition of GABA release would promote release of dopamine, resulting in a reduction of craving (Blum & Payne, 1991; Brady & Sinha, 2005; Davis & Claridge, 1998). Drinking alcohol results in the production of an opiate-like compound called TIQ. This process in turn behaves like enkephalin to release more dopamine in a manner similar to carbohydrate ingestion. Likewise, heroin also acts very much like our own internal opioid, enkephalin, to produce a temporary increase in synaptic dopamine in the nucleus accumbens. In this manner, different overused substances achieve their effects through different neurotransmitter pathways.

The neurochemical explanation of why comorbidity occurs across many addictive behaviors is based on the basic biological mechanisms of hunger and craving. Extensive research on animals also suggests that long-term deprivation of food increases drug self-administration in animals, and in reverse, long abstinence from alcohol may increase the intake of carbohydrates and sugars (Krahn, 1991; Yung et al., 1983). If the theory can be confirmed with further studies of animals and humans, and if we can figure out the mechanisms of how abstinence from one substance induces the intake of another substance, it would be the most powerful basis for our better understanding of the addiction phenomenon. It would be used as a therapeutic tool as well in that development of medications to stimulate or inhibit certain parts of the brain seems to be plausible from this neurochemical perspective.

Behavior-genetic approach. There is another explanation for the comorbidity of addictive substances or activities, which is behavior-genetic (Bulik et al., 2003; Grove et al., 1990; Jang et al., 1995; Kendler, Davis, & Kessler, 1997). Kendler and his colleagues (1997), in their National Comorbidity Survey, investigated the family history for five major psychiatric disorders, which were major depression (MD), generalized anxiety disorder (GAD), antisocial personality disorder (ASP), alcohol abuse/dependence (AAD), and drug abuse/dependence (DAD). They found significant familial aggregation for all these disorders and suggested a two-factor model which best described the data: an "internalizing" factor (with highest loadings on MD and GAD) and an "externalizing" factor (with greatest loadings on ASP, DAD, and AAD) (Kendler et al.). This two-factor model of psychopathology seems quite intriguing in the sense

that it provides two underlying dimensions of liability, one toward internalizing disorders characterized by depression and anxiety, and the other by externalizing disorders characterized by antisocial behavior and inappropriate harmful substance use. In line with the study of Kendler et al., Krueger(1999) investigated 10 mental disorders in the National Comorbidity Survey sample to identify core psychopathological features: major depressive episode(MDE), dysthymia(DYS), generalized anxiety disorder(GAD), social phobia(SOP), simple phobia(SIP), agoraphobia(AGPH), panic disorder(PD), alcohol dependence(AD), drug dependence(DD), antisocial personality disorder(APD) with lifetime diagnoses. After many attempts at confirmatory factor analysis(CFA), he found a 3-factor model as best-fitting(Krueger, 1999). The first factor was anxious-misery on which MDE, DYS, and GAD had the highest loadings; the second factor was fear on which SOP, SIP, AGPH, and PD had the highest loadings; the third was externalizing which AD, DD, and APD had the highest loadings(Krueger, 1999). Even if Krueger's analysis is different from Kendler et al.'s in that Krueger's is not based on familial aggregation, these two studies are consistent with each other in terms of offering a clue for understanding a basic liability for common mental illnesses. However, it seems premature to conclude that there are two basic dimensions(internalizing and externalizing) of liability in common mental illnesses, since both of these studies excluded some major mental illnesses such as schizophrenia and bipolar disorder. Moreover, Krueger's report of comorbidity rates was grounded on lifetime comorbidity, which might have been confounded by age. There is also a limitation when we generalize this 2 or 3-factor model to other addictions because they do not cover addictive or compulsive behaviors other than alcohol and drug dependence/abuse. Nonetheless, it is a quite interesting and a new perspective on a commonality of mental disorders that may have a connection with a neurochemical explanation, mentioned earlier. However, there needs to be further research exploring the relationship of the 2 or 3-factor model and neurobiological mechanisms.

Same-spectrum approach. Some view the comorbidity syndromes in terms of a personality spectrum. For instance, compulsive eating, buying, sexual behavior, and obsessive-compulsive personality disorder may be components of an obsessive-compulsive personality spectrum(Davis, 1999; Davis & Claridge, 1998; Hollander & Wong, 1995; McElroy, Phillips, & Keck, 1994). More specifically, they argue, compulsive exercise and compulsive sexual behavior can be categorized on the "obsessive-compulsive"personality spectrum(McElroy et al.). There is evidence that dysregulation in central serotonergic neurotransmission plays a role in the pathophysiology of OCD spectrum disorders(Davis & Claridge; McElroy et al.). On the other hand, binge eating and pathological gambling can be seen as a spectrum of impulse-control disorder, which is associated with the cluster B personality disorder

spectrum (McElroy et al.). However, it is difficult to distinguish a pure obsessive-compulsiveness and a pure impulsiveness due to non-specific criteria. In fact, many addictions overlap and meet criteria for both traits. For example, even if there is much evidence suggesting that bulimia nervosa and binge eating are characterized by high impulsivity, recent evidence shows that obsessive-compulsiveness also characterizes individuals with these problems (Anderluh, Tchanturia, Rabe-Hesketh, & Treasure, 2003; Picot & Lilenfeld, 2003; Zaider, Johnson, & Cockell, 2000). In the same manner, pathological gambling and compulsive sexual behavior can be characterized by both impulsiveness and obsessive-compulsiveness (Black, Kehrberg, Flumerfelt, & Schlosser, 1997; Blaszczynski & Steel, 1998). Therefore, it is a matter of degree and can be regarded as a dimensional perspective.

Common Personality Features Related to Addictive Behaviors

There seems little doubt that personality plays a prominent part in relation to psychopathology, regardless of the type of pathology. The existence of stable traits is no longer a matter of great dispute among personality psychologists (Goldberg, 1993; Tellegen, 1991) in that, as stated in the *Search for the addiction-prone personality* section, much evidence has confirmed it. Such consensus has led to renewed enthusiasm regarding the possibility that identification of particular personality traits may be helpful in predicting who is likely to develop mental disorders (Krueger, 1999; Krueger et al., 1996; Watson, Clark, & Harkness, 1994).

For many years, it has been recognized among scholars that certain types of individuals are more prone to become addicts than are others. For instance, it is found that people who like new stimuli have an increased probability of getting involved in gambling and drugs and that the individual with poor self-control tends to become dependent on alcohol. Perfectionists, from time to time, may engage in compulsive exercise. Even if it is difficult to find a single personality trait that appears in all kinds of addictive behaviors, it needs to be acknowledged that there are many overlapping personality characteristics across a variety of addictions.

It is true, however, that there have been many barriers and challenges in investigating the personality characteristics in psychological disorders, including addiction. This is because the majority of studies conducted for decades are most likely cross-sectional, for which it is relatively difficult to find the direction of the relationship – whether the personality traits lead to later mental disorders or the personality traits develop through the course of mental disorders. Another important reason is that measurement and interpretation of personality traits themselves are controversial. There have been and still are many controversies over the issues: state

versus trait, dimensional versus categorical approach in measuring personality traits, how many higher-order traits make up human personality, what kind of instruments is used to measure personality, the validity of self-report measures, and so on. Measuring addiction is another controversy that frustrates researchers. From different definitions of addiction to too many different instruments and criteria to diagnose it, various procedures have brought about confusion, inconsistent results, and frustration. Despite these difficulties, several excellent longitudinal studies have been done in recent years, which have had a crucial influence on the field of addiction and personality and have even enabled the experts to argue that personality traits can predict which persons later would experience addictive disorders (Barnes et al., 2000; Krueger, 1999).

This section discusses the personality characteristics that have been commonly displayed in individuals with various addictive and compulsive behaviors. It provides specific descriptions of major personality traits that people with addictions frequently share and thus leads us to capture the core characteristics of addiction-prone personality, which is the theme of this paper. By discussing and comparing each overlapping personality characteristic commonly shown in individuals with addictions, we may better understand the components of addiction-prone personality. Investigating personality characteristics, moreover, may be useful both in predicting which persons may be likely to experience addictive disorders later in life, and in conceptualizing effective treatments for these persons. The selection criteria of personality traits that will be illustrated are based on their frequency in the literature.

Disinhibition

Behavioral disinhibition, characterized by the inability or unwillingness to inhibit behavioral impulses, has been found most strongly associated with alcoholism and drug addiction (McGue, Slutske, & Iacono, 1999; McGue, Slutske, Taylor, & Iacono, 1997). Although there is no personality test to directly measure behavioral disinhibition, the Constraint higher-order factor of Tellegen's Multidimensional Personality Questionnaire (MPQ), Novelty Seeking (NS) Scale of Cloninger's Tridimensional Personality Questionnaire (TPQ), and Impulsive Sensation Seeking (ImpSS) Scale of Zuckerman and Kuhlman's Personality Questionnaire (ZKPQ) are the most closely related constructs.

Sensation-seeking. Originally named by Marvin Zuckerman (1989), the term "sensation-seeking" refers to the need for varied, novel, and complex sensations and experiences, and the willingness to take physical and social risks for the sake of such experience. Those who have high scores on this trait tend to show impulsivity, boredom susceptibility, and behavioral disinhibition. This corresponds to Novelty

Seeking in Cloninger's Tridimensional Personality Questionnaire(CTP) and is strongly convergent with Eysenck's Psychoticism(P) dimension and Conscientiousness in the "Big Five"(Zuckerman, 1993). Both Novelty Seeking and Sensation Seeking measures have shown strong relationships with various kinds of disinhibited behaviors, criminality, antisocial personality, sexuality, alcohol and drug abuse, bipolar mood disorder, reckless or drunken driving and psychopathy(Barnes et al., 2000; Langewisch & Frisch, 1998; Sher et al., 2000; Zuckerman, 1993).

There are also many studies supporting the relationship between trait sensation seeking and pathological gambling(Kuley & Jacobs, 1988; Langewisch & Frisch, 1998). Kuley and Jacobs(1988) reported that problem gamblers scored significantly higher than social gamblers on the Zuckerman's(1980) Total Sensation Seeking Scale and its Boredom Susceptibility, Experience Seeking, and Disinhibition subscales. However, compulsive sexual behavior, compulsive eating, and compulsive exercise were not strongly associated with sensation seeking compared with alcohol and substance abuse and pathological gambling.

The very recent longitudinal study of Sher, Bartholow, & Wood(2000) has had a great role in our understanding of novelty seeking and substance use disorders. With quite an elaborate design and a moderate sample size, Sher et al. performed a 7-year prospective investigation on personality traits and alcohol, drug, and tobacco dependence. Their results indicate that the Novelty Seeking(NS) Scale of the Tridimensional Personality Questionnaire(TPQ), and the Psychoticism(P) and Neuroticism(N) Scales of the Eysenck Personality Questionnaire(EPQ) are robust cross-sectional correlates of most substance use disorders(Sher et al.). More importantly, the results of their prospective study are helpful in predicting the diagnoses of substance use disorders seven years later. Similar to the cross-sectional analyses, TPQ-NS and EPQ-P emerged as the two most important scales in predicting later substance abuse problems(Sher et al.). Specifically, high scores on TPQ-NS predict later drug use disorder and tobacco dependence, while high scores on EPQ-P are predictive of later alcohol dependence(Sher et al.). These results are consistent with those of Krueger et al.(1996), Krueger(1999), and Barnes et al.(2000), although the constructs they measure are somewhat different.

The trait sensation seeking plays a critical role in our understanding of the addiction phenomenon and addiction-prone personality in that much research has shown the strong relationship between them. As Barnes and his colleagues mention, the Stimulus-Reducing/Sensation-Seeking factor may be said to be one of a pre-alcoholic personality together with the trait of Psychoticism as measured by Eysenck's EPQ, and also may be an important component of addiction-prone personality(Barnes et al., 2000). Notably, Barnes and his colleagues support Zuckerman's contention that

sensation seeking and related traits are more important in the earlier stages of the development of the addiction problem.

Regarding the biological mechanism, together with novelty seeking in Cloninger's TPQ, the concept of sensation seeking is based on psychobiological models of personality (Zuckerman, 1980, 1993; Zuckerman & Cloninger, 1996). The trait sensation seeking is related to low levels of monoamine oxidase (MAO), the neurotransmitters norepinephrine and serotonin, and high levels of dopaminergic activity. Sensation seeking, however, seems to be more closely associated with dopamine activity in that some studies report an association between novelty seeking and DRD4 receptor variants (Kreek et al., 2005), which is consistent with Eysenck's argument about the nature of the addictive personality (Eysenck, 1997).

Constraint. Together with Positive Emotionality and Negative Emotionality, Constraint is one of the three second-order dimensions of Tellegen's MPQ and reflects a tendency to be cautious, to inhibit behavioral impulses, and to endorse conventional moral values (Tellegen & Waller, in press). Known to be the opposite of behavioral disinhibition, Constraint is composed primarily of items from subscales Control, Harm Avoidance, and Traditionalism. It has been replicated that low scores on Constraint are closely linked to various mental disorders, particularly alcoholism and substance dependence (Krueger, 1999; Krueger et al., 1996, 1998; Kwapil, 1996; McGue et al., 1997, 1999)

Besides alcoholism and substance dependence, a few studies have examined the Constraint scale in relation to other addictive behaviors. In their series exploring the role of personality in the etiology of substance use disorders, McGue and his colleagues (1997) in their first study investigated how personality features would differ between alcoholics versus non-alcoholics, males versus females, and moderate versus severe alcoholics. They found that compared with controls, alcoholics scored significantly higher on all indicators of Negative Emotionality, and consistently lower on all indicators of Constraint (McGue et al.). In addition, they identified two subgroups of male alcoholics through the cluster analysis method: severe alcoholics, who are characterized by relatively early onset of problem drinking, relatively high antisociality, and high family history of problem drinking, and moderate alcoholics. The severe alcoholics were also more extreme than moderate alcoholics on both negative emotionality and lack of constraint (McGue et al.)

In their second study, McGue and colleagues (1999) included drug use disorder as well as alcoholism in evaluations using the MPQ. The research design permitted a comparison of alcoholism and drug abuse by gender and subtype. First, among many findings, the results of the second study indicate that the significant main effect of

alcoholism is associated primarily with negative emotionality, whereas the significant drug use disorder main effect is associated primarily with lack of constraint. Even if this result seems to run counter to the result of the first study in which alcoholism was associated with both negative emotionality and constraint, it can be concluded that negative emotionality and constraint are differentially linked to alcoholism and drug addiction, when controlling for comorbid drug use disorder (McGue et al.). In other words, McGue et al.'s (1999) second study suggests that comorbid drug abuse may be the critical clinical factor differentiating the two types of alcoholism. Hence, the findings of these two studies may support Cloninger's hypothesis of the existence of two types of alcoholism and further, also may imply the possibility of different personality factors associated with the two forms of alcoholism. Type I alcoholic is thought to be specifically associated with relatively high levels of negative emotionality, whereas the Type II alcoholic is hypothesized to be associated with relatively high levels of behavioral disinhibition. This implies that the trait disinhibition is more likely to be found in severe alcoholics in the sense that it is associated with Type II and comorbid drug abuse; on the other hand, the majority of moderate alcoholics may have developed negative emotionality as a consequence of their alcoholism. If this hypothesis can be confirmed, it will play a crucial role in exploring addiction-prone personality.

Despite the use of a cross-sectional design, the studies done by McGue et al. (1997, 1999), when compared with previous research, have many advantages such as a large sample size, precise criteria for selecting subjects, and elaborate data analyses. Krueger et al.'s design of their research (1996, 1999) can make up for the limitation of cross-sectional study in the sense that their research could demonstrate a predictable relationship between personality and psychopathology. Although they did not include all kinds of mental disorders, their findings are meaningful in suggesting that some mental disorders are quite predictable from early personality traits. Consistent with Sher et al. (2000), Krueger et al. report that low constraint is powerfully predictive of substance dependence and antisocial personality disorder, regardless of whether these disorders are modeled as discrete or continuous (Krueger, 1999). This finding again is likely to confirm the probable utility of the trait behavioral disinhibition for predicting later addictive disorders, whether it is manifested as stimulus-seeking or behavioral control.

Impulsivity. Impulsivity is suggested to be proximal to the core features of disinhibition, and therefore may be a good indicator of disinhibitory processes. It is, in general, thought of in terms of spontaneous, unplanned behavior. Barratt (1985) characterizes impulsivity as a higher-order dimension encompassing the inability to plan ahead, acting without thinking, speed of response, and risk taking. Studies have shown

that impulsivity is related to constructs such as risk taking and Sensation Seeking (Zuckerman, 1980) and also one facet of Eysenck's Psychoticism dimension (O' Boyle & Barratt, 1993). Eysenck and Eysenck (1977) actually view Sensation Seeking as one component of impulsivity. As stated in the above section, *Comorbidity across many addictions*, some addictive or compulsive behaviors such as gambling, overeating, and some aspects of bulimia nervosa tend to be categorized in the same spectrum – impulse-control disorders (McElroy et al., 1994). In addition, one of the main characteristics of other addictive behaviors, including alcoholism and drug dependence, can be said to be poor impulse control. Hence, impulsivity can be understood as one important element of the addiction-prone personality in spite of its conceptual overlap with sensation seeking and constraint. Examination of the specific differences among these constructs is beyond the scope of this paper.

High impulsivity has been found in comorbid addicts such as in pathological gambling and alcoholism (Vitaro, Ferland, Jacques, & Ladouceur, 1998) and multiple substance dependent groups (O' Boyle & Barratt, 1993) as well as among singly dependent groups of alcoholics, drug addicts, pathological gamblers, and bulimics (Colder & Chassin, 1997; Ketzenberger & Forrest, 2000; Podar, Hannus, & Allik, 1999). Impulsivity also has a moderating role on the effects of positive and negative affectivity on alcohol use (Colder & Chassin, 1997).

Of interest, O' Boyle and Barratt's (1993) study on substance dependents, either multiply or singly dependent, shows that the number of substances on which subjects have been dependent is highly correlated with high scores on the Barratt Impulsivity Scale (BIS), EPQ Psychoticism scores and Neuroticism scores as well as Personality Diagnostic Questionnaire-Revised (PDQ-R) dramatic and anxious cluster scores. This implies that the comorbid addicts manifest a more pathological and disturbing pattern of their disorders than singly diagnosed addicts. This parallels conclusion in the previous section of *Comorbidity across many addictions* to the effect that, comorbid addicts have a tendency to have more pathological personality characteristics such as tendencies of psychoticism, neuroticism, and impulsivity than non-comorbid addicts. Thus, all these relationships – comorbidity, neuroticism, psychoticism, and impulsivity – enable us to infer that the comorbid addicts have a higher probability of having an addiction-prone personality (Eysenck, 1997).

We have thus far discussed the trait disinhibition, which comprises sensation seeking, constraint, and impulsivity. Although these three are often used separately, it is evident that they are closely linked to one another, together with Eysenck's term Psychoticism.

Negative Emotionality

Negative emotionality can be considered the second most important characteristic of individuals with addictive and compulsive behaviors, following disinhibition. The term *negative emotionality* refers to the tendency to experience psychological distress and negative mood states (Tellegen, 1982). MPQ scales of Stress Reaction, Alienation, and Aggression Scales load principally on this factor (Tellegen, unpublished manuscript). Among the three components, many of the items on the Stress Reaction Scale load onto the Negative Emotionality higher-order factor, to which the constructs Neuroticism in the EPQ, Neuroticism in the NEO-FFI (McCrae & Costa, 1994), and Harm Avoidance in Cloninger's TPQ are the most similar. Anxiety, depression, and somatoform symptoms are also features of negative emotionality.

Many studies report negative emotionality or the neuroticism trait as one of the most frequently shown characteristics among people with addictions. It is a consistently occurring characteristic in a variety of addictive behaviors regardless of the type and degree of addiction. For instance, neuroticism or negative emotionality is evident among alcoholics and drug addicts (Barnes, 1979; Barnes et al., 2000; Colder & Chassin, 1997; Eysenck, 1997; Krueger, 1999; Martin & Sher, 1994; McGue et al., 1997, 1999; Sher et al., 2000), pathological gamblers, individuals with compulsive sexual behavior (Austin, 1997), some types of eating disorder patients (Cervera et al., 2003; Leon, Fulkerson, Perry, & Cudeck, 1993; Leon et al., 1999; Podar et al., 1999; Stice, Akutagawa, Gaggan, & Agras, 2000), smokers (Eysenck, 1983; Haukkala, Uutela, Vartiainen, Mcalister, & Knekt, 2000). This pattern of representation among many kinds of addictive behaviors is to some extent different from other personality characteristics such as disinhibition, obsessive-compulsiveness, or dissociation.

Negative emotionality or neuroticism as a seemingly broad characteristic, in fact, is found in the early investigations in the history of the addiction field. In his literature reanalysis on alcoholics, Barnes (1979) already mentioned neuroticism as one of the four characteristics of the clinical alcoholic personality together with weak ego, stimulus augmenting, and field-dependence. As the majority of research he has reviewed was cross-sectional, he could not specifically discuss the cause-effect relationship, nor the prealcoholic personality, which is largely studied in Barnes and colleagues' longitudinal research two decades later (Barnes et al., 2000). While the cause-effect relationship, whether negative emotionality or neuroticism predicts later addictions or addiction causes negative emotionality or a third variable is responsible for both of them, has remained unclear, many researchers have made efforts to explore the exact relationship of the two.

Longitudinal studies mostly performed in the 1990s are in the same line with such efforts (Barnes et al., 2000; Krueger, 1999; Martin & Sher, 1994; Sher et al., 2000).

Martin and Sher(1994) conducted a longitudinal study on alcohol use and the five-factor model of personality by using NEO-FFI. They reported that alcohol use disorders were positively associated with neuroticism and negatively associated with agreeableness and conscientiousness. Their study, however, could not reveal the direction of personality and alcohol use because both were measured simultaneously(Martin & Sher). Regarding the cause-effect direction, Krueger(1999) and Sher et al.(2000) agree on the possibility that high negative emotionality measured by the MPQ(Krueger, 1999), TPQ-HA, and EPQ-N(Sher et al., 2000) predicts later substance dependence. In addition, Barnes and his colleagues(2000) add a line of evidence with their longitudinal study on personality traits and alcohol abuse. Not only do they confirm that high neuroticism is closely associated with later alcohol abuse, but they also specifically point out the differences between pre-alcoholic and clinical alcoholic personality traits, emphasizing that neuroticism accounts more for the clinical alcoholic personality(Barnes et al.). In other words, neuroticism may have a role in exacerbating the development of alcohol problems in the later stages of the disorder. At present, though, one cannot conclude definitely that negative emotionality or neuroticism is a predictor of later addictive behaviors.

In addition to alcohol and drug addiction, studies on compulsive sexual behavior, and eating disordered behaviors report higher neuroticism-related traits such as depression and anxiety, and lower self-esteem scores among individuals with these problems compared with controls(Austin, 1997; Cervera et al., 2003; Corcos et al., 2000; Graber, Brooks-Gunn, Paikoff, & Warren, 1994; Leon et al., 1993, 1999; Podar et al., 2000; Stice et al., 2000). Among these, some longitudinal studies found that negative emotionality or neuroticism predicts later disordered eating problems in adolescents(Cervera et al.; Leon et al.). However, negative emotionality may be a generalized predisposing factor to every psychopathology in that high neuroticism or negative emotionality is associated with both internalizing(anxiety and affective) and externalizing(substance dependence and antisocial) mental disorders as indicated by Krueger and his colleagues(1998). Moreover, the strong heritability of neuroticism or negative emotionality may add another line of evidence for investigating its relationship with general psychopathology including addictive behaviors. As Eysenck(1983) stated, neuroticism is the behavioral manifestation of inherited limbic and autonomic overreactivity and lability. It has also been estimated from twin studies that over 50% of the variance of neuroticism or negative emotionality are contributed by genes(Tellegen et al., 1988). It is hoped that more genetic studies and further comprehensive longitudinal studies will add more evidence to this premise.

Psychoticism

Defined by Eysenck, Psychoticism refers to one dispositional dimension of the EPQ, which is composed of Extraversion-Introversion (E), Neuroticism (N) and Psychoticism (P) as the basic personality structure (Eysenck & Eysenck, 1977). As it relates to a person's liability to functional psychosis, individuals with high scores on the Psychoticism dimension have been described as aggressive, cold, egocentric, impersonal, impulsive, antisocial, unempathic, creative, and tough-minded, while its opposite pole has been described as altruistic, socialized, empathic, conventional, and conformist. Psychoticism is known to be closely linked to Zuckerman's Impulsive Sensation Seeking and Aggression-Hostility factors, high scores on Openness on the NEO-PIR, and low scores on Conscientiousness and Agreeableness (Costa & McCrae, 1995).

There is much evidence in the literature for identifying the relationship between addictive behaviors and Psychoticism. Higher Psychoticism scores are reported among drug addicts (Francis, 1996; O'Boyle & Barratt, 1993; Sher et al., 2000), alcoholics (Barnes et al., 2000), smokers (Eysenck, 1983), and bulimics (Feldman & Eysenck, 1986). Most importantly, Eysenck (1997) suggests that many types of addictions are related to excessive dopamine functioning in such a way that addictive drugs share the feature of being able to increase neurotransmission in the mesolimbic dopamine system, which in turn is closely associated with the trait of Psychoticism. He argues for the construct of addictive personality, contending that addiction occurs "because the drugs involved produce stronger reinforcing effects in the brain systems of high-P (dopamine active) people than those of low-P (dopamine inactive) people." (Eysenck, 1997, p. S84). His biological explanation is supported by recent longitudinal studies of Barnes et al. and Sher et al. Both of these studies were successful in finding the possible role of the trait of Psychoticism as a predictor of later alcoholism and substance dependence. Sher et al. emphasize that the EPQ-P scale is the most consistent predictor of substance use disorders, both cross-sectionally and prospectively and Barnes et al. argue that Psychoticism is one important characteristic of the pre-alcoholic and addiction-prone personality.

Obsessive-Compulsiveness

Obsessive-compulsiveness, a tendency to be preoccupied with persistent and uncontrollable thoughts (obsession) and with repetitive acts (compulsion), is a major personality characteristic in a variety of addictive and compulsive behaviors. Obsessive-compulsiveness, however, is more likely to be found among individuals with compulsive sexual behavior and compulsive exercisers rather than alcoholics and drug addicts (Brewer, 1994; Davis, 1999; McElroy et al., 1994). Obsessive-compulsive traits

are also found among individuals with some types of eating disorders (Anderluh et al., 2003; Zaider et al., 2000). As stated in the section on *Comorbidity*, some people argue that compulsive exercise and compulsive sexual behavior can be categorized on the obsessive-compulsive personality spectrum (McElroy et al., 1994). Others argue that obsessive-compulsiveness and addictiveness should be distinguished from each other, although they share a number of common features (Brewer, 1994; Davis, 1999; Davis & Claridge, 1998). According to this viewpoint, addictiveness is associated with impulsive behaviors whereby the individual attempts to achieve a pleasurable internal state via gratification of needs. On the other hand, obsessive-compulsiveness is associated with emotionally restrained behaviors when individuals try to evade or avoid an aversive internal state (Brewer; McElroy et al.). Even if the above hypothesis seems to be reasonable, it cannot be clearly accepted as yet since many addictive behaviors show both characteristics of impulsiveness and obsessive-compulsiveness, and it is difficult to distinguish a pure compulsive state at one extreme and a pure impulsive state at the other extreme.

Dissociation

The presence of dissociative characteristics is very common in people with addictions and is well known to professionals, friends, and families of these individuals. Dissociation, defined as "the process in which a group of mental activities breaks away from the main stream of consciousness and functions as a separate unit" (Webster's, 1996, p. 424) occurs to some degree in normal individuals and is thought to be more prevalent in persons with some types of major mental illnesses (Bernstein & Putnam, 1986). Among those with addictive behaviors, it tends to be more frequently found among individuals with compulsive sexual behavior and pathological gamblers (Diskin & Hodgins, 1999; Griffin-Shelley, Benjamin, & Benjamin, 1995; Kuley & Jacobs, 1988). Alcoholics and drug addicts are also reported to show some degree of dissociation.

Griffin-Shelley and his colleagues (1995) reported that two-thirds of 31 inpatients with compulsive sexual behavior had a dissociative disorder, which is consistent with previous studies. Some researchers identify more symptoms of general dissociation in pathological gamblers than in social gamblers, as measured by the Dissociative Experiences Scale (DES), or greater dissociative experiences (Diskin & Hodgins, 1999; Kuley & Jacobs, 1988). Due to the lack of longitudinal studies, however, we cannot determine whether the trait dissociation can predict later addiction or addiction causes dissociative experiences. Also a possibility, both addiction and dissociation might be mediated by a third factor, or there may be individual differences in the direction of causality.

Other Personality Features

In summary, the most important personality characteristics in a variety of addicted people are sensation seeking, constraint, impulsivity, negative emotionality, obsessive-compulsiveness, psychoticism, and dissociation. These features frequently overlap among different addictive behaviors and are the main personality characteristics identified in addicted populations. There are however, contradictory opinions on the trait extraversion, in that some studies report that addicts are in general more extraverted (Eysenck, 1983; Martsh & Miller, 1997) than non-addicts; on the other hand, others found that addicts show lower extraversion (Podar et al., 1999; Rankin et al., 1982). Both of these contradictory findings have been shown in the longitudinal studies. Barnes and his colleagues (2000) report that Stimulus-Reducing, which corresponds to the Extraversion scale, may be a pre-alcoholic personality trait, but not a clinical alcoholic personality trait. In other words, Stimulus-Reducing may be related to the incidence of alcohol abuse and to the earlier stages of the development of an addiction problem; severe alcoholics are somewhat introverted because alcoholism might have changed aspects of their behaviors. Their arguments are consistent with Sher and his colleagues (2000), who suggest that the link between extraversion and substance use disorder is weak at best and most influential with respect to broadband alcohol use disorders. Their results demonstrate that extraversion is a reliable cross-sectional associate of alcohol use disorder but it does not relate prospectively to any substance-use disorder diagnoses (Sher et al.). It also seems to be possible to relate the arguments of Barnes et al. and Sher et al. to Type I and Type II alcoholism subtypes: Type I may be characterized by low extraversion, and high neuroticism, and Type II may be characterized by high extraversion and low neuroticism.

In relation to other personality features, low agreeableness and low conscientiousness are reported in the subjects with alcohol disorders (Martin & Sher, 1994), low ego control or weak ego among alcoholics and pathological gamblers (Barnes, 1979; Barnes et al., 2000; McCormick, Taber, Kruegelbach, & Russo, 1987), depression (Corcos et al., 2000) and low self-esteem (Cervera et al., 2003) among individuals with addictive and compulsive behaviors.

Conclusions

Thus far, this paper has reviewed the definition of addiction and addiction-prone personality, the debate between those for and against the concept of addiction-prone personality, the comorbidity of many addictive behaviors, and common personality characteristics in a variety of addictive behaviors. This paper focuses mainly on alcohol and drug addiction despite the efforts to deal with all addictive and compulsive

behaviors. The majority of research done thus far has dealt with drug and alcohol addiction and there was a relative lack of studies conducted with other addictive or compulsive behaviors. However, it is now time to draw a conclusion regarding the question, "Is there an addiction-prone personality?"

Multi-dimensional Model

As discussed in the previous section, *Common personality features related to addictive behaviors*, there are many different personality characteristics that individuals with addictions demonstrate: sensation-seeking, lack of constraint, impulsivity, negative emotionality, psychoticism, obsessive-compulsiveness, dissociation, etc. Therefore, it may be concluded that these personality traits and possibly further traits characterize people with addictions and compulsive behaviors.

----- Table 1 about here -----

First, as can be seen in Table 1, negative emotionality or neuroticism consistently has characterized individuals with addictions and compulsive behaviors in every addictive behavior studied, which is consistent with a statement that negative emotionality is a generalized vulnerability to psychopathology. Second, the profiles in Table 1 demonstrate that the identity and levels of personality variables associated with drug addiction and Type II alcoholism show a similar pattern, which is characterized by high sensation-seeking, impulsivity, negative emotionality, and psychoticism and low obsessive-compulsiveness and dissociation. Besides drug addiction and Type II alcoholism, however, other addictive or compulsive behaviors each seem to have different personality patterns. The personality profile of pathological gambling is likely to be similar to drug addiction and Type II alcoholism except on the traits of obsessive-compulsiveness and dissociation. Compulsive sexual behavior and compulsive exercise are relatively more characterized by obsessive-compulsiveness; however, we cannot ignore their differences in other traits and also individual differences that are differently manifested from person to person. Hence, addiction-prone personality is a set of addiction-prone personality configurations that can be better understood as heterogeneous and multi-dimensional. Each addictive or compulsive type of behavior may be placed on different dimensions of each personality trait. However, it is not yet clear whether the construct of addiction-prone personality is a single trait, or a cluster of certain traits, or no trait. It also seems to be important to notice the causal relationship between addiction and addiction-prone personality. In other words, it needs to be identified as to whether the addiction-prone personality is a consequence of chronic addictive behaviors or a cause of addiction. It may be possible to infer a third

variable that can cause both of these two variables. At present, further studies are needed to investigate this construct more comprehensively.

Methodology

Related to the methodology, there are many limitations and problems that have resulted in inconsistent results, confusion, and difficulty of interpretation of results. The majority of research was cross-sectional, from which one cannot infer a cause-effect relationship; in many cases, the sampling was non-representative, such as use of different samples from study to study, and lack of a control group in some cases; variety of instruments both to measure personality traits and to diagnose addictive behaviors made interpretation of the research more complicated; non-specific criteria to diagnose addiction such as lifetime prevalence rate or prevalence over other time periods was another factor that made the research results inconsistent; the issue of categorical or dimensional viewpoints of psychopathology and personality traits was one with which many researchers struggled. Fundamental questions on the statistical significance level were another issue that remains in all psychological research including research on addiction and personality. But at present, the growth of statistical programs such as Structural Equation Modeling(SEM) and Hierarchical Linear Modeling(HLM), development of taxometrics, and more elaborate multivariate statistics could aid in conducting better research in this field. In any case, further studies may confirm a set of addiction-prone personality configurations as suggested by being heterogeneous.

Unanswered Questions and future direction

There are many answered questions, however. First, regarding the conceptual definition, further study is required to distinguish the *true addiction* such as to drugs and alcohol from other compulsive behaviors such as gambling, exercise, sex, and Internet dependence. The former are relatively characterized by the lack of constraint, impulsivity, sensation seeking and psychoticism and is traditionally viewed as a "true" addiction because of its distinct pattern of physiological tolerance and withdrawal, while the latter are relatively less characterized with lack of constraint or sensation seeking and more characterized by obsessive-compulsivity. As demonstrated in Table 1, the similar profile of Type II alcoholism and drug addiction, but not other compulsive behaviors, strengthens the necessity of distinction between substance addiction versus non-substance compulsive behaviors. In addition, the similarities and differences between Type I and Type II alcoholism should be clarified in that these two indicate different profiles in personality traits despite the seemingly same alcohol use. Second, further research is also required to clarify the relationship between specific personality

traits and specific addictions. Research implies that, for instance, negative emotionality is more highly related to alcoholism, while lack of constraint is more highly related to drug addiction. Third, personality change through the course of addiction, or the presence of differing personality characteristics depending on the stage of addiction needs to be further investigated, in that some traits such as sensation seeking are more evident in the earlier stage of addiction, while other traits such as negative emotionality are more evident in the later stage (Barnes et al., 2000; Zuckerman, 1993). Finally, regarding neurobiological mechanisms and the addiction-prone personality traits stated above, further clarification is needed of the relationship between the dopamine DRD2 gene and addictive behaviors. In addition, the hypothesis that abnormalities in neurotransmitters such as serotonin and norepinephrine play a great role in abnormal personality needs to be verified.

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Table 1

Dimensional model of personality traits and addictive behaviors

<i>Addictive behaviors</i>	<i>Sensation-seeking</i>	<i>Impulsivity</i>	<i>Negative emotionality</i>	<i>Psychoticism</i>	<i>Obsessive-compulsiveness</i>	<i>Dissociation</i>
<i>Drug addiction</i>	High	High	High	High	Low	Low
<i>Alcoholism - Type I Type II</i>	Low High	Low High	High High	Low High	Low Low	Low Low
<i>Pathological gambling</i>	High	High	High	High	High	High
<i>Compulsive sexual behavior</i>	Low	Middle	High	_____	High	High
<i>Compulsive binge eating or Bulimia</i>	Low	High	High	Middle	Middle	_____
<i>Compulsive exercise</i>	Low	_____	_____	Low	High	Low

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국문초록

수십 년에 걸쳐, 연구가들은 다양한 중독행위의 소인이 될 수 있는 성격 특성들 - 중독성 성격 - 을 정의, 검토하려고 시도해 왔다. 이 논문의 목적은 지금까지 중독성 성격에 관하여 수행되어 온 선행연구들을 재검토하고 비판적으로 평가하는데 있다. 이 논문에서 다루고자 하는 내용은 다음과 같다. 첫째 항에서는, 용어의 정의와 중독성 성격이라는 구성에 관한 찬반 논쟁들이 그 논쟁을 야기한 학문적 배경과 함께 소개된다. 여러 중독행동들의 공병 항에서는, 한 사람에게서 여러 가지의 중독행위들이 왜, 그리고 어떻게 중복적으로 나타나는지를 토론하고, 가능한 가설들이 제시된다. 다음 항에서는, 여러 가지 물질이나 활동들에 중독된 사람들에게서 흔히 보이는 공통된 성격 특성들이 논의된다. 선행연구 재검토로부터 끌어낼 수 있는 결론은 다음과 같다: 첫째, 중독성 성격이라는 특질은 존재하고, 이것은 이질적인 여러 성격특성들로 개념화될 수 있다. 둘째, 부정적 정서성 혹은 신경증적 기질은 거의 모든 중독 또는 강박 행위들을 특징짓는다. 셋째, 중독성 성격이라는 개념을 이해하기 위해 다차원 모델 관점이 제시된다; 각각의 중독 혹은 강박 행동은 특정한 성격 특질들의 제각기 다른 차원에서 이해될 수 있다.

주요어: 중독, 성격, 공병, 특질, 다차원 모델