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Effects of Individual Differences, Awareness-Knowledge, and Acceptance of Internet Addiction as a Health Risk on Willingness to Change Internet Habits

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Abstract

This exploratory study proposes that Internet addiction is a health risk and examines the effects of individual differences (such as flexibility/rigidity, stigma tolerance, and concern with loss of face), awareness/knowledge, and acceptance of Internet addiction as a new mental illness on urban Chinese Internet users' willingness to change their maladaptive Internet habits. Data were gathered from a 2009 online survey of 497 Internet users in urban China. Based on Young's classic definition of Internet addiction, results showed that 12.3% can be classified in the high-risk group for potentially suffering from Internet addiction disorder (IAD). The high-risk group tended to be significantly more rigid in personality, more concerned with loss of face, and more aware of Internet addiction. As expected, users who were flexible, tolerant of stigma, concerned about loss of face, and in the low-risk group were found to be more willing to self-discipline their problematic Internet use. Female, nonstudent, and low-income users tended to be more determined to seek self-help to recover from Internet addiction on their own, as addiction clinics in China are still scarce and expensive. Practical health policy implications are discussed.

Keywords

awareness-knowledge, flexible/rigid personality, health risk, Internet addiction, loss of face, stigma tolerance

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Introduction

China now has the world's largest Netizen population in absolute term. The influence of Internet addiction lingers through the proliferation and development of the Internet and of online entertainment. China is struggling with a new plight: nearly 11% of its 298 million Internet users have Internet dependence China Internet Network Information Center (CNNIC) 2009, and 27.1% of the adolescent Internet users are inclined toward Internet addiction (CNNIC, 2008).

With different kinds of anecdotal stories being heavily reported, Internet addiction has become a prominent problem in China (Golub & Lingley, 2008). For example, a boy murdered his uncle to steal money to play online games (Xinhua News Agency, 2006); a teenager committed suicide after meeting his online lover in real life, only to find she was a middle-aged housewife (Xinhua News Agency, 2006); and a man killed another game player for theft of his virtual items (Watts, 2005). In light of these tragic examples, public concerns continue to mount regarding the risks of Internet use.

The increasing public concern about Internet addiction is always accompanied by questions of how to define and cope with the problem. Released in 2008, the diagnostic criteria for Internet addiction disorder (IAD) as a mental illness were regarded a breakthrough in clinical practice, though official endorsement by the Ministry of Health is still pending and the classification has aroused widespread skepticism in Chinese cyberspace (Jiang, 2009).

Despite the heated controversy over Internet addiction, there are limited academic studies that make Chinese Internet users' voice heard. As an exploratory study, this research attempts to find out how Internet addiction, as a new mental illness, is perceived by Internet users in Mainland China.

IAD as a New Mental Illness

Beck (1992) argued that there is a growing list of risks created by industrial and technological processes and "by lifestyles—rather than occurring as random or natural events" (Flynn, 2006, p. 81). A major focus has been on new and emerging health risks, including some previously undiagnosed illnesses, for example, "myalgic encephalomyelitis" (ME) or chronic fatigue syndrome (Flynn, 2006) and the potential health risks of mobile phones and mobile telecommunications (Leung, 2008; Timotijevic & Barnett, 2006).

Widely used in medical campaigns, health risk research concerns the spread of healthier lifestyles and choices, including contraception, smoking, breastfeeding, sexual health, drug abuse, safer driving, and so on. Some behaviors and lifestyles have been acknowledged as problematic, or as direct and indirect causes of illnesses such as addictive behaviors (Flynn, 2006). Concerns about possible health risks associated with the Internet and other new information communication technologies (ICT) are prevalent in more and more countries. However, attempts to understand how Internet addiction works as a health risk have been scarce. This study does not attempt to examine whether IAD exists but treats Internet addiction as a health risk.

The term Internet addiction was born in the United States in 1995, when Dr. *Ivan Goldberg* first coined *the term* as a *satirical* hoax (Young, 1998a). The first empirical study on Internet addiction was conducted in 1996 by Young, a pioneer and the leading proponent who took the problem seriously (Young, 1998a). Since then, Internet addiction has received attention from various disciplines. Researchers have explored the features of addicts, symptoms, consequences, and corresponding measurement items (Byun et al., 2009). However, Internet addiction has commonly been viewed as a broad topic with few common definitions and little guidance (Byun et al., 2009). Mainstream studies on IAD have focused on "proving" its existence, while inconsistent criteria and the lack of consensus have motivated researchers to develop new measures (Byun et al., 2009).

After 14 years of research, IAD is still not recognized internationally as a disease in clinical practice, even in the United States. China was among the earliest to set up clinics, and the diagnostic

criteria, released in 2008, put it at the forefront of this growing field. Dr. Ran Tao, who proposed the criteria, claimed that there was a sufficient sample of patients to carry out proper scientific analysis (Macartney, 2008). China even plans to lead the effort by registering IAD with the World Health Organization.

Through diagnostic interviews and other diagnostic procedures, the Chinese diagnostic criteria include four domains: symptom, severity, course, and exclusion (Tao et al., 2010). The criteria echo Young's (1998b) 8-item classic definition, based on the criteria for pathological gambling in Diagnostic and Statistical Manual of Mental Disorders, 4th Edition (*DSM-IV*); the cutoff score differentiating normal from addictive Internet use is also 5, making future comparison across study findings meaningful. In this study, we did not aim to make clinical diagnostication but to distinguish different Internet users; therefore Young's (1998b) 8-item scale was adopted.

Internet Addiction as a Health Risk: Awareness, Attitude, and Willingness to Change

The social and psychological context of risk perception has been part of the research agenda since the late 1960s (Starr, 1969). Research on health risk perception has explored the nature and process of risk perception held by people, and compared different levels of perception of health risk (Bouder, 2006; Holtgrave & Weber, 1993), usually including *awareness*, *knowledge*, and *attitudes* (both negative and positive) as its dimensions.

The process begins with risk-related awareness and factual knowledge. Awareness is mainly about attentiveness or interest, establishing a knowledge base, while awareness and knowledge usually intermingle. Awareness-knowledge means that an individual is exposed to the existence of the health risk and gains some understanding of it. Being attentive to and aware of a health risk, one may feel personally vulnerable to it, thus experiencing passion, worry, and increased fear and horror about the risk's outcome (Denscombe, 2001). One may go on to form an attitude toward the health risk, such as *acceptance* or reluctance to accept IAD as a mental illness. Another intrinsic part is a view to behavioral change. For health risks, this usually means *willingness to make changes* in behaviors and lifestyles, or to try health innovations, such as new drugs or new health care. Therefore, this exploratory study examines health risk perception among Internet users.

Stigma Tolerance of Mental Illness

Stigma has been identified by researchers, professionals, policy makers, and consumers as a key issue in the mental health field (Overton & Medina, 2008). People categorized as mentally ill may be "among the most stigmatized, discriminated against, marginalized, disadvantaged and vulnerable members of our society" (Johnstone, 2001, p. 201). When the label of mental illness is at issue, it has the notion of stigma as a loss of status (Cumming & Cumming, 1965). Stigma, as an undesirable or discrediting attribute (Goffman, 1963) toward mental health problems, usually means devaluation and discrimination.

The stigma attached to mental illness is usually associated with emotional reactions, which may lead to a behavioral response (Crisp, Gelder, Rix, Meltzer, & Rowlands, 2000). Therefore, stigma of mental illness is a significant barrier to its diagnosis and treatment, entailing such obstacles as treatment delay (Starr, Campbell, & Herrick, 2002), underutilization of behavioral services (Corrigan, 2004), and premature termination of treatment (Sirey et al., 2001).

Understanding that addiction is a treatable illness can contribute to a greater understanding of addictive disorders, help persons with addictions reduce debilitating feelings of guilt or shame regarding their condition, and reduce the stigma attached to diagnosis and treatment (Miller & Sheppard, 1999). Therefore, as for IAD, it is imperative to understand people's conceptions of this

new mental illness and its associated stigma. These perceptions and beliefs can influence their attitudes and their help-seeking decisions, especially when these conceptions originate in different cultural contexts (Lavack, 2007).

Loss of Face in the Chinese Context

Historically, mental health regimes have been centered on the Western biomedical model (O'Mahony & Donnelly, 2007), and most literature on stigma of people with mental illness is published in Western countries. However, there are some researchers trying to investigate and conceptualize stigmatization of people with mental illness in non-Western societies (e.g., Fabrega, 1991; Ng, 1997).

A construct unique to the Chinese context relating to stigmatization is "face" (Kleinman & Kleinman, 1993), similar to the notion of reputation in Western values (Cardon, 2006). Face is one of the most frequently used concepts in Chinese communication processes: it "refers to personal dignity, prestige, and status and serves to maintain harmony in social relationships and hierarchies," and "the fear of the loss of face permeates Chinese society" (Cardon, 2006, p. 439). Loss of face and stigma are interwoven in China (Yang & Kleinman, 2008).

There may be severe social consequences entailed by loss of face (Yang & Kleinman, 2008). Bond (1991) also points out the great importance of loss of face in a collectivistic social system: defined as the deterioration in one's social image (Kam & Bond, 2008), it often brings shame or disgrace to the person and his or her family (Jia, 2001). Concern about loss of face revolves around the deep fear of being embarrassed and shamed in front of others (Zane & Yeh, 2002) and can have an important influence on individual behaviors (Earley, 1997), often resulting in reducing risks or avoiding things that could cause embarrassment (Hwang, Ang, & Francesco, 2002).

Mental illness can result in a loss of face for not only the individual (Yang, 2007) but also, in a collectivistic culture, his or her family and those related to him or her (Jenni, 1999). In order to "save face," a person tends not to disclose that he or a family member has a mental illness (Furnham & Chan, 2004). The individuals who care about face are very conscious of how others view them (Lam et al., 2010); even in counseling sessions, they tend to express deep concerns about loss of face (Chen & Mak, 2008). The traditional Chinese value orientation, as well as affective responses of shame and guilt, may become a cultural barrier that reduces help-seeking intentions for mental health problems among the Chinese (Chen, Kazanjian, Wong, & Goldner, 2010). Therefore, loss of face is an important and useful concept when studying the perceptions of IAD as a new mental illness in the Chinese context.

Flexible/Rigid Personality

Rigid personality is defined as having little interest in change or difficulty adjusting to it, while flexibility as a personality trait refers to a preference for change and novelty (Masuda, Price, Anderson, Schmertz, & Calamaras, 2009). Flexible individuals are typically more assertive, responsive, attentive, and perceptive (Martin & Anderson, 1998); they are willing to experience new methods and are confident in their behavioral understanding (Bilgin, 2009). People need to be sufficiently flexible to become aware of various possible options and alternatives to deal with new circumstances and to be willing to adapt their behaviors to new situations (Martin, Anderson, & Thweatt, 1998). A number of different authors have found that flexibility facilitates adjustment as well (Martin et al., 1998).

The ability to respond to health risks requires flexibility (Downs, Kaminsky, & Lewis, 2006). It enables people to increase awareness regarding health risks, update their health risk knowledge, and search for creative solutions (Georgsdottir & Getz, 2004); it can also provide an opportunity to increase awareness of the relevance of health care, leading to behavioral changes that reduce risk exposure and improve health (Downs et al., 2006). People need to be flexible to be open to new

knowledge and understanding; flexibility is one of the keys to making appropriate health-risk decisions (Jardine et al., 2003). It is also a promising construct for conceptualizing and treating mental health stigma (Masuda et al., 2009). The present stigma studies are consistent with previous literature in finding that flexibility is negatively related to stigmatizing attitudes (Masuda et al., 2007).

Therefore, we propose the following research questions:

Research Question 1: How do high-risk and low-risk groups differ in terms of demographics, flexible/rigid personality, stigma tolerance, concern about loss of face, awareness, acceptance of IAD as a new mental illness, and willingness to change their Internet behaviors accordingly?

Research Question 2: How do demographics, high-/low-risk distinction, flexible/rigid personality, stigma tolerance, and concern about loss of face predict awareness-knowledge of IAD as a mental illness?

Research Question 3: How do demographics, high-/low-risk distinction, flexible/rigid personality, stigma tolerance, concern about loss of face, and awareness-knowledge predict acceptance of IAD as a mental illness?

Research Question 4: How do demographics, high-/low-risk distinction, flexible/rigid identification, stigma tolerance, concern about loss of face, awareness-knowledge, and acceptance of IAD as a mental illness predict willingness to change one's Internet behaviors?

Method

This exploratory study adopted an online survey as the main method of data collection. Though there are many challenges associated with online surveys, Couper (2000) argues that, if a survey targets Internet users only—as is the case in this study—it is a good decision to employ this mode. The data were collected between April 4 and May 9, 2009, through a self-administered questionnaire set up online at http://www.my3q.com and sent out with a snowball-sampling method. Participants included volunteers who responded to the postings with the URL released on the top 10 popular online forums on nationally known websites such as Tianya, Sohu, 163, Sina, Xici, and so on. They were also asked to forward the survey invitation, with the URL of the questionnaire, to others in Mainland China via e-mail.

Sample Profiles

A total of 497 valid responses were collected. Among the respondents, 43.7% were male. The largest age group was between 25 and 29 years old (49.3%); 34.8% were 18–24, 9.3% were 30–34, 4.0% were 35–39, 1.2% were 18 or younger, and the rest were 40–54. As for educational background, 48.1% had a college degree, 41.6% had attended or completed graduate school, 7.4% had a junior college degree, 1.4% had a high school diploma, and the rest had a middle school diploma or less. As for occupation, 42.1% were students. Finally, the majority (98.8%) lived in an urban area. The respondents in this study reflected the typical demographic profile of Internet users in China.1

Measures

Internet addiction distinguishment. Using Young's (1998b) classic definition of classifying high-risk Internet users, the 8-item scale as mentioned previously with reliability α .87 measuring Internet addiction, was adopted. The responses of each item, originally on a 5-point Likert scale, were recorded dichotomously as 0 (*not at all, rarely, and occasionally*) and 1 (*often and always*). The overall composite score of the 8 items, ranged from 0 to 8, with 5 as cutoff point, was used to classify 2 groups of Internet users: the high-risk group, with five 1s or more, and the lower-risk group with

four or fewer 1s in the 8-item scale. Accordingly, 12.3% of the respondents with high IAD scores were classified in the high-risk group, and 87.7% in the low-risk group.

Awareness-knowledge of IAD as a mental illness. Existing scales designed to measure awareness-knowledge of thought disorder (McGrath & Allman, 2000), HIV/AIDS (Dawson, Chunis, Smith, & Carboni, 2001), diabetes (He & Wharrad, 2007), and cancer (Su, Chen, & Kuo, 2008) were modified and adopted. Participants were asked to indicate, on a 5-point Likert-type scale, whether they agreed with the following statements: (a) "I am aware that some doctors have claimed IAD as a mental illness"; (b) "I am aware of the information about IAD as a mental illness"; (c) "I have heard of the released diagnostic criteria of IAD as a mental illness"; (d) "I have paid attention to the reports about IAD as a mental illness"; and (e) "I know that now there are some clinic centers treating Internet addicts." The reliability α was .78 for this 5-item scale.

Acceptance of IAD as a mental illness. Acceptance was used to capture the attitudes on IAD as a health risk. Based on the published acceptance scales in the area of public health (Boustani et al., 2008), the acceptance items were designed to capture acceptance of IAD as a mental illness specifically. Participants were asked to indicate on a 5-point Likert scale whether they agreed with the following statements: (a) "It is difficult to convince me that IAD is a mental illness"; (b) "It is easy for me to accept anyone being regarded as an IAD mental patient"; (c) "I cannot accept my friends being regarded as an IAD mental patient"; (d) "It is difficult for me to accept my family member being regarded as an IAD mental patient"; and (e) "It is difficult for me to accept myself being regarded as an IAD mental patient." Items 1, 3, 4, and 5 were reverse-coded. The reliability α was high at .85 for this 5-item scale.

Willingness to change Internet habits. Willingness to change Internet habits was examined based on self-help techniques from the treatment strategies of Young (1999). Participants were asked to indicate on a 5-point Likert-type scale whether they agreed with eight statements such as (a) "I will read more books and newspapers and use the Internet less"; (b) "I will ask people around me to help control my Internet use if I am online too long"; and (c) "I will set a limit to my Internet use and act accordingly." The reliability α was .83 for this 8-item scale.

Stigma tolerance of mental illness. Based on the items drawn from previous studies on mental health stigma (Crisp et al., 2000), the stigma tolerance scale of mental illness was used to assess respondents' ability to disregard the stigma associated with mental illness. The scale contains 6 items with a 5-point Likert scale from strongly disagree to strongly agree. Higher scores indicate a higher level of tolerance of the stigma associated with mental illness (Link, Mirotznik, & Cullen, 1991). The reliability α was at .68 for this subscale, which is not too far from the acceptable level of .70.

Loss of face. Three face items (Hwang, Francesco, & Kessler, 2003) were adopted to measure the fear of losing face. Respondents were asked the following questions, with 1 = *strongly disagree* and 5 = *strongly agree*: (a) "A person with mental illness fears letting others know it"; (b) "Other people take note of a person with mental illness"; and (c) "A person with mental illness usually fears that others ridicule him/her." The reliability α was exceptionally high at .84.

Flexible/rigid personality. The Flexibility scale (Fx) from the California Psychological Inventory (Rokeach, McGovney, & Denny, 1960) was adopted to examine the flexible/rigid self-identification of the respondents. A 9-item short form was substituted for the original 21-item long form. Flexibility/rigidity has traditionally been gauged with self-report measures, such as questions pertaining to the individual's reactions in various situations—changing plans, adapting to new and

Table 1. Means and Standard Deviation of Stigma Tolerance, Concern About Loss of Face, Flexible/Rigid Personality, Awareness-Knowledge, Acceptance, and Willingness for Urban Chinese Internet Users in High- and Low-Risk Groups of Internet Addictiona

	Low-Risk Group		High-Risk Group		
Variables	*M*	*SD*	*M*	*SD*	*t*
Personal factors					
Stigma tolerance	3.24	.62	3.24	.58	–.02
Concern about loss of face	3.67	.79	3.98	.68	–2.98**
Flexible/rigid personality	3.79	.69	4.07	.74	–2.97**
Awareness-knowledge	2.84	.72	3.08	.74	–2.43*
Acceptance	2.74	.81	2.62	.83	1.05
Willingness	3.34	.65	3.37	.72	–.39
Demographics					
Age	2.86	.90	2.75	.94	.90
Education	5.26	.83	5.31	.72	–.49
Income	4.94	3.61	4.39	3.77	1.10

[a] Internet user was dummy coded with high-risk group = 1, low-risk group = 0.
* $p < .05$.
** $p < .01$. $N = 497$.

unusual situations, and so on (Masuda et al., 2009). Some items, such as churchgoing, were deleted according to the Chinese context. Three degrees of agreement and three degrees of disagreement were employed in responding to the individual items. The reliability α was .70 for this subscale. For all statements, agreement was scored as rigid and disagreement as flexible. The total score on the scale is the sum of scores obtained on all items; the higher score denotes a rigid or nonflexible individual.

The demographic characteristics of respondents, including gender, age, education level, marital status, having children or not, occupational background, personal monthly income, and location (urban/rural), were also requested at the end of the questionnaire.

Results

Differences Between High-Risk and Low-Risk Groups

T and chi-square tests were conducted to examine possible group differences between the high-risk and low-risk groups classified by Young's (1998b) scale. The results in Table 1 show that Internet users in the high-risk group had more rigid personality, $t(495) = –2.97$, $p < .01$, were more concerned with face loss, $t(495) = –2.98$, $p < .01$, and had higher levels of awareness-knowledge about IAD as a new mental illness, $t(495) = –2.43$, $p < .05$. However, the two groups did not show significant differences in stigma tolerance, acceptance, or willingness to change Internet usage. However, no differences were found in age, education, and income. Based on the results of chi-square tests, no differences were found in other demographic characteristics, including gender, marital status, having children or not, occupation, and location.

Predicting Awareness-Knowledge of IAD as a Mental Illness

As shown in Table 2, multiple regression results show that high- and low-risk distinction ($\beta = .10$, $p < .05$) was the significant predictor. This indicates that the high-risk group had a higher degree of

Table 2. Regression Analysis of the Impact of Demographics, High- and Low-Risk Distinction, Flexible/Rigid Personality, Stigma Tolerance, and Concern About Loss of Face on Awareness-Knowledge, Acceptance, and Willingness to Change Internet Habits

	IAD as a New Mental Illness		Willingness to Change Internet Habits
Predictors	Awareness-Knowledge β	Accepting Attitude β	β
Demographics			
Gender (male = 1)	.05	–.01	–.12**
Age	–.02	–.03	.03
Education level	.09	–.08	–.01
Monthly personal income	–.07	.07	–.15**
Marital status (single = 1)	–.18**	–.10	–.04
Have children (yes = 1)	.01	–.01	.00
Occupation (student = 1)	–.05	.09	–.10*
Location (big city = 1)	.03	–.02	.03
Personal factors			
High- and low-risk distinction[a]	.10*	–.06	–.10*
Stigma tolerance	.08	.08	.16***
Concern about loss of face	.04	–.09	.29***
Flexible/rigid personality	.09	–.16**	–.21***
Awareness-knowledge		.16***	.10*
Acceptance			.01
R^2	.07	.09	.25
Adjusted R^2	.05	.07	.23

[a] High- and low-risk distinction was dummy coded with high-risk group = 1, else = 0.
*$p < .05$. **$p < .01$. ***$p < .001$. $N = 497$.

awareness-knowledge about IAD as a mental illness than did the low-risk group. Demographically, respondents who were married ($\beta = -.18$, $p < .01$) had a higher level of awareness-knowledge about IAD as a mental illness. The predictors explained only 5% of the total variance.

Predicting Acceptance of IAD as a New Mental Illness

Results in Table 2 show that flexible/rigid personality ($\beta = -.16$, $p < .01$) was a significant predictor for acceptance, meaning respondents with rigid personality tended to have a lower accepting attitude toward IAD as a new mental illness. In contrast, respondents with a higher degree of awareness and knowledge of IAD ($\beta = .16$, $p < .001$) held a higher degree of acceptance of it. A total of 7% of variance was accounted for in the regression equation.

Predicting Willingness to Change Internet Usage

Multiple regression analysis results also show that respondents with rigid personality ($\beta = -.21$, $p < .001$) and in the high-risk group ($\beta = -.10$, $p < .05$) tended to be less willing to change their Internet habits. In contrast, respondents, who had a higher degree of awareness-knowledge of IAD ($\beta = .10$, $p < .05$) as a mental illness, were more tolerant of the stigma of IAD ($\beta = .16$, $p < .001$), and felt more fear of face loss ($\beta = .29$, $p < .001$) caused by being seen as mentally ill were more willing to change their Internet behavior. Among the demographic variables, female ($\beta = -.12$, $p < .01$), low-income ($\beta = -.15$, $p < .01$), and nonstudent ($\beta = -.10$, $p < .05$) users were also more willing to change. A total of 25% of the variance was accounted for in the regression equation.

Discussion

Internet addiction research has become a growing field in recent years. While most research usually assumes or attempts to prove the existence of IAD, others identify related symptoms and characteristics of Internet addicts, examine the consequences, and develop measures for it. Unlike these studies, which are now facing challenges with few common definitions and little guidance (Byun et al., 2009), this study took a more neutral position by regarding Internet addiction, especially the issue of defining it, as a health risk and depicted the perceptions of Internet addiction among Chinese Internet users. This may provide clues to individuals and institutions coping with the new and emerging Internet addiction plight in China and around the world.

Using Young's classic definition, this study classified 12.3% of the Internet users in urban China in the high-risk group, echoing the percentage reported in *The 23rd Statistical Report on the Internet Development in China.* Although no significant demographic differences were found between the high- and low-risk groups, respondents in the high-risk group were more likely to be rigid, more concerned with losing face, and more aware of and knowledgeable about the health risks of IAD. This indicates that rigid people tend to find it difficult to adapt to change, especially in their maladaptive use of the Internet, despite being more aware of the health risk of Internet addiction and more concerned about losing face if they are found to have such a mental illness.

People's awareness-knowledge about a health risk tends to make them more conscious of its consequences and more willing to take preventive measures and find strategies to cope (Thaler, 1983). This study supports the notion that higher awareness-knowledge levels may lead to a higher degree of acceptance that Internet addiction is a health risk and may also positively influence willingness to self-discipline Internet behavior. Therefore, one important implication of this study is that preventive and counseling health services for people displaying Internet addiction problems may be preceded by offering relevant information and education at individual, family, school, and community levels.

Mental diseases usually have negative connotations and may cause stigma. This may be more obvious within the Chinese collectivistic social system and cultural context, where people are characteristically concerned about losing face. In the notion of IAD as a new mental illness, this study found that stigma tolerance of mental illness positively predicted willingness to change behaviors, and that concern about loss of face was the most influential as compared to other predictors in the equation. Thus, to help addicts to recover from IAD, health professionals in China may consider strategies in reducing stigma and using face loss appeal for future health promotion.

As for the individual-level correlates of health risk perceptions, higher flexibility was found to be strongly associated with a higher degree of acceptance of IAD as a mental illness and a higher degree of willingness to change maladaptive Internet behavior. Such findings support previous research that flexible individuals tend to be more assertive, responsive, attentive, perceptive, and open to new knowledge and understanding (Martin & Anderson, 1998), and thus more willing to accept creative solution to problems. Moreover, among the demographic characteristics, being married was found to be important for predicting awareness-knowledge and acceptance of IAD as a mental illness. This is probably because the spouse, as a "significant other," is usually the first to detect potentially problematic Internet use of the other half (Young, 1998b). As for willingness to change Internet habits, females were found to be more likely to adopt a strategy—with much-needed self-discipline and determination—to cope with health risks, especially in finding a self-help approach to gradually recover from the disorder (Judd, Komiti, & Jackson, 2008). This may be due to higher levels of sensitivity and consideration related to mental health problems and Internet use in women compared to men; and this may also be due to the gender role differences, for example, women as mothers and wives. Similarly, nonstudents with lower personal incomes were more willing to change their Internet behavior themselves. This can be explained by observing that IAD treatment in China is still expensive, so

respondents with less income are more willing to change their Internet habits using self-help recovery strategies, which are free. These self-help techniques may include lifestyle changes.

It is also interesting to note that no significant relationship was found between acceptance and willingness to change Internet use. This may be due to the inconsistency between attitude and behavior but might also be due to the sensitive nature of the issue. IAD, as a mental illness, is still controversial; many people in China may feel uncomfortable to go to a clinic openly to receive treatment for a mental health problem. Additionally, recovering from IAD, closely related to a healthy lifestyle, relies strongly on self-test and self-help strategies. Until now, medical centers treating IAD in China also remain scarce and very costly. When the conditions are right, such as when IAD diagnostic criteria are officially validated and IAD health care becomes affordable, Internet addicts may become clients of related health services. Thus, findings of this study may be of practical importance for health care providers in designing public campaigns to attract Internet users suffering from IAD to seek professional health services (Greenhalgh, Robert, Bate, Macfarlane, & Kyriakidou, 2005). In this way, the findings of this study may be transformed into opportunities for future expansions of IAD clinics, may bring fresh perspectives to the understanding of health risk issues in a non-Western social background, and may provide guidance for policy makers to formulate programs in the areas of regulation, prevention, and intervention in the future development of Internet-related health care services.

Limitations and suggestions for future studies

First, this study did not question the existence of IAD as a mental illness. Still, the ongoing formation of IAD as a new mental illness in Mainland China is still being shaped by government agencies. Lukes (2004) identifies that using power, the government has the ability to shape people's preferences, wants, beliefs, and perceptions through values, norms, and ideologies. Second, due to the research methods used, the participants were self-selected; therefore, respondents' views may not be representative of the whole community of Chinese Internet users. Further research, particularly longitudinal studies and qualitative methods, is needed to provide more findings or other possible directions of causality. Moreover, due to China's domestic digital divide, IAD as a mental illness is an issue mainly in urban areas and among those with Internet access (Giese, 2003). Finally, the Internet has such a critical impact on human health that can no longer be understood and analyzed in a purely national context: it needs to be observed at a regional and even global level. In addition to the globalization of potential risks, the perception of Internet addiction as a specific health risk may be subject to cultural variation, or independent of national contexts; thus, comparative studies are needed in the future.

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Notes

1. According to *The 23rd Statistical Report on the Internet Development in China* (CNNIC, 2009), until 2008, the profile of Chinese Internet users is as follows: 52.5% were male, and 47.5% were female; the largest age group was between 10 and 19, and 35.2% fell into the group, followed by 31.5% between 20 and 29, 17.6% were 30–39 years old, 9.6% were 40–49, 4.2% were 50–59, 1.5% were 60 or above, and 0.4% were below 10 years old; as for educational level, 39.4% were with high school diploma, 28.0% were with middle school

diploma, 13.9% were with junior college degree, 12.2% were with regular college degree, 5.4% were with elementary school diploma or below, 1.0% were with master degree or above; as for occupational background, 33.2% were students; and 71.6% lived in cities or towns, while 28.4% were in villages.

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