

INTERNET ADDICTION IN ASIA: REALITY OR MYTH?

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Abstract

This paper reviews studies on Internet addiction in Asia and summarizes the research findings on the incidence, antecedents, outcomes and treatments of this phenomenon. Results reveal that, based on studies conducted in China, Hong Kong, Taiwan and Korea, there are about 12% of Asian youth that are addicted to the Internet. However, the review also raises some serious flaws and gaps in the research and highlights the need for more theoretical and rigorous research to establish a better understanding of Internet addiction in Asia.

Introduction

It has been hailed as perhaps the most important invention of the 20th century. The Internet has revolutionized the information and communication flow of people, changing the way we interact with others, gather and disseminate information, do business, express and entertain ourselves. Yet, for all its benefits, the Internet has also been identified as an accessory to issues including extra-marital affairs, pornography, and gambling. There also appears to be a growing concern, especially in Asia, for what has been labeled "Internet addiction." In particular, certain Asian countries report it as a serious public health issue. Liu Guiming, deputy secretary-general of the Chinese Society of Juvenile Delinquency Research, has been quoted as saying "the growing number of youth infatuated with unhealthy Web sites and campus violence has become an urgent social problem." A leading Beijing judge, Shan Xiuyun, also declared that 90 per cent of juvenile crime in the city was Internet-related" (Sebag-Montefiore, 2005). As a result of these concerns, governments in South Korea, Japan and China have set up boot camps, which provide therapy to deal with Internet addiction (Ransom, 2007). China has also issued a ban on new Internet cafes to clamp down on Internet addiction (Watts, 2007).

Yet, there are those who doubt whether this outcry is justified or even valid. An article in the American Psychological Association newsletter suggests that there is little empirical evidence to support the existence of Internet addiction and much of the research in this area utilizes self-selecting samples with no control groups (De Angelis, 2000).

In light of this controversy, his paper seeks to examine Internet addiction in Asia. Specifically, it reviews the academic and empirical literature to address the following questions:

- What empirical evidence is there in Asia related to “Internet addiction”?
- What actions have been taken to curb “Internet addiction” and what have been the consequences of these interventions?
- What other areas of research or research questions need to be addressed to better understand Internet addiction in Asia?

In order to better understand the answers to the above questions, this paper will begin with an overview of Internet addiction from a theoretical and methodological perspective. It will then present findings on evidence for and treatment of Internet addiction in Asia. Finally, it will highlight gaps in the research and suggest future areas for research focus.

Internet Addiction Defined

There have been numerous definitions for Internet addiction during the past decade. Widyanto and Griffiths (2006) present the most general definition of this construct as being a subset of a technological addiction, which is defined as a non-chemical or behavioral addiction that involves human-machine interaction. These addictions can either be passive, such as viewing television, or active, such as playing computer games (Widyanto and Griffiths, 2006). More specific definitions of Internet addiction include:

- An individual's inability to control his/her use of the Internet, which eventually causes psychological, social, school, and/or work difficulties in a person's life. (Davis, 2001; Shapira et al., 2000; Young, 1998)
- A psychological dependence on the Internet characterized by an increasing investment of resources on Internet-related activities, unpleasant feelings when off-line, an increasing tolerance to the effects of being online, and denial of the problematic behaviors (Kandell, 1998)

It should also be noted that there are many terms used to describe excessive Internet use: problematic Internet use, pathological Internet use, excessive Internet use, compulsive Internet, computer addiction, Internetomania (Shapira et al., 2003; Widyanto and Griffiths, 2006). The variety in the names and definitions for excessive Internet use present in the literature reflect the ongoing controversy, especially with regards to whether it can be indeed classified as a pathological. It is thus important to view Internet addiction vis-à-vis other recognized addictions.

Internet addiction vs. Other Addictions

In the past, researchers have likened Internet addiction to both substance addictions (Anderson, 1998; Brenner, 1997) and behavioral addictions (Cao et al., 2007; Young, 1996). However, because Internet use is a behavior without a physiological component (Shapira et al., 2003), the practice of using the diagnostic criteria of substance dependence to characterize Internet addiction has been largely discarded (Warden et al., 2004). Hence, in recent years,

researchers have moved primarily to models of behavioral addictions, such as impulse control disorders, to describe Internet addiction (Warden et al., 2004).

Past research on behavioral addictions has focused mostly on compulsive gambling, overeating, and compulsive sexual behavior (Young, 1996). However, Shaffer, Hall, and Vander Bilt (2000) noted that the notion of addiction has been applied to a wide variety of behaviors including exercising, consuming chocolate, running, shopping, working, and even eating carrots. Shaffer et al. (2000) coined a question that succinctly summarizes the ongoing debates regarding behavioral addictions: "even if a behavior pattern is identified as an addiction, how do we know that addiction is the best explanation for the behavior pattern?" Due to the controversy surrounding the term 'addiction', it was excluded from the DSM-IV and replaced with the terms 'dependence' and 'Impulse Control Disorders'.

Currently, the Impulse Control Disorders listed in the Diagnostic and Statistical Manual of Mental Disorders (DSM-IV) include Intermittent Explosive Disorder, Kleptomania, Pathological Gambling, Pyromania, Trichotillomania, and Impulse Control Disorder Not Otherwise Specified. More recently, the concept of behavioral addiction has been applied to the overuse of technological devices such as the television or computer. There have been similar debates to the current controversy about Internet addiction relating to the addictive potential of television viewing. Detrimental effects of television viewing have been compared to the DSM-IV criteria for both substance dependence (McIlwraith, Jacobvitz, Kubey, & Alexander, 1991) and pathological gambling (McIlwraith, 1998). A number of diagnostic questionnaires for problematic television viewing

have also been developed (Smith, 1981; Schallow & McIlwraith, 1986). Concern about the addictive potential of the Internet, however, has attracted far more public interest (Morahan-Martin, 2005).

Internet Addiction Defined by Length of Time Spent Online

Although the length of time spent on the Internet might appear to be an important consideration in the diagnosis of Internet addiction and has shown some correlation with the problem (Young, 1996), the literature has shown that it is not a reliable predictor of this problem. Griffiths (2000) notes that studies using this criterion to define Internet addiction neglect to consider the context of Internet use and, thus, overestimate dependents. For example, individuals who are required to use the Internet as a component of their job or are involved in long-distance relationships may be online significantly more than the average person without any pathological implications (Griffiths, 2000). Results of studies that have reported the amount of time spent online in samples of individuals who describe themselves as Internet addicts have varied greatly from 8.5 hours per week (Morahan-Martin & Schumacher, 2000) to 21.2 hours per week (Yang & Tung, 2007).

Internet Addiction Defined by Type of Online Activity Pursued

Research has frequently cited the type of activity pursued online as being related to the likelihood of developing Internet addiction (Li & Chung, 2006). Although a number of models have been proposed to categorize various types of online activities, a similarity across these models has been the differentiation

between interactive and information-gathering functions. The earliest of these models was proposed by Young (1996), who defined five distinct subtypes of Internet addiction based on type of online activity:

1. *Cybersexual Addiction*: compulsive use of adult websites for cybersex and cyberporn
2. *Cyber-relationship Addiction*: over-involvement in online relationships
3. *Net Compulsions*: obsessive online gambling, shopping, or day-trading
4. *Information Overload*: compulsive web surfing or database searches
5. *Computer Addiction*: obsessive computer game playing

A number of other researchers have found that interactive functions on the Internet are related to an increased risk of developing Internet addiction (Li & Chung, 2006; Morahan-Martin & Schumacher, 2000; Scherer & Bost, 1997; Yang & Tung, 2007; Young 1997). The interactive activities that have been most commonly cited by researchers as demonstrating a greater potential for addiction are those involving multiuser domains, chatrooms, bulletin boards, online games, cybersex, and gambling.

Internet Addiction Defined by Functional Impairment to Daily Life

Most existing research on Internet addiction has reported functional impairment to aspects of daily life as being an outcome of the problem.

Impairments have been noted in a wide variety of areas, ranging from disruptions in menial daily tasks to problems in occupational functioning and interpersonal relationships (Beard & Wolf, 2001; Young, 1996). Self-described Internet dependents surveyed by Young (1996) reported moderate to severe problems in their daily lives due to their inability to control their Internet use. One of the most commonly reported difficulties by Internet dependents are severely disrupted sleep patterns due to their excessive Internet use (Young, 1996). Furthermore, the sedentary nature of excessive Internet use has even been related to medical difficulties such as increased risk for carpal tunnel syndrome, back strain, and eyestrain (Young, 1996). The various criteria used today in diagnosing Internet addiction suggest that functional impairment appears to be a major determinant in distinguishing when internet use is problematic.

Diagnosis of Internet addiction

Young (1996) first modified the diagnostic criteria for pathological gambling from the DSM-IV to describe Internet addiction. She argued that Internet addiction was most akin to pathological gambling, an impulse control disorder, since many problematic Internet users demonstrated similar symptoms of addiction: preoccupation with the behavior, loss of control over the behavior, and functional impairment.

This Diagnostic Questionnaire (DQ) developed by Young (1996) used eight of the ten existing criteria for pathological gambling since two criteria were considered non-applicable to Internet addiction. In order to meet the diagnostic

criteria for Internet addiction, respondents had to answer 'yes' to five or more questions:

1. Do you feel preoccupied with the Internet (think about previous on-line activity or anticipate next on-line session?)
2. Do you feel the need to use the Internet with increasing amounts of time in order to achieve satisfaction?
3. Have you repeatedly made unsuccessful efforts to control, cut back, or stop Internet use?
4. Do you feel restless, moody, depressed, or irritable when attempting to cut down or stop Internet use?
5. Do you stay on-line longer than originally intended?
6. Have you jeopardized or risked the loss of significant relationship, job, educational, or career opportunity because of the Internet?
7. Have you lied to family members, therapist, or others to conceal the extent of involvement with the Internet?
8. Do you use the Internet as a way of escaping from problems or of relieving a dysphoric mood (e.g., feelings of helplessness, guilt, anxiety, depression?)

Beard and Wolf (2001) proposed a modification to the diagnostic criteria presented by Young (1996) stating that a diagnosis of Internet addiction required the first five criteria being met in addition to one of the last three criteria. This revision was suggested since the first five criteria could be met without an individual necessarily demonstrating functional impairment to their daily life. The last three diagnostic criteria assess the ability to cope, function, and interact with

others (Beard & Wolf, 2001). These proposed diagnostic criteria, however, have been critiqued by other researchers who argue that the direct transposition of criteria for a solitary activity (such as gambling) to a social medium such as the Internet appears arbitrary and is not based on empirical evidence (Grohol, 1999).

Researchers have also suggested that Internet addiction be assessed using the DSM-IV criteria for Impulse Disorder Not Otherwise Specified (Shapira et al., 2003). In a small study of 20 self-described Internet dependents, Shapira et al. (2003) found that all participants met the diagnostic criteria for Impulse Disorder Not Otherwise Specified. The diagnostic criteria for Internet addiction proposed by Shapira et al. (2003) are:

- A. Maladaptive preoccupation with Internet use, as indicated by at least one of the following.
 - 1. Preoccupations with use of the Internet that are experienced as irresistible.
 - 2. Excessive use of the Internet for periods of time longer than planned.
- B. The use of the Internet or the preoccupation with its use causes significant distress or impairment in social, occupational, or other important areas of functioning.
- C. The excessive Internet use does not occur exclusively during periods of hypomania or mania and is not better accounted for by other Axis I disorders.

A common weakness in the diagnostic criteria proposed by Young (1996), Beard and Wolf (2001), and Shapira et al. (2003) is that they were predominantly developed based on reviews of the literature and comparison to similar models of behavioral addiction and lack empirical evidence to support the content or cutoff points (Ko et al., 2005). Ko et al. (2005) appear to have developed the most comprehensive diagnostic criteria, incorporating symptoms of behavioral addictions, impulse control disorders, and clinical impressions of several psychiatrists with expertise in the field.

- A. Maladaptive pattern of Internet use, leading to clinically significant impairment or distress, occurring at any time within the same 3-month period
- A. Six (or more) of the following symptoms have been present:
 - 1. Preoccupation with Internet activities
 - 2. Recurrent failure to resist the impulse to use the Internet
 - 3. Tolerance: a marked increase in the duration of Internet use needed to achieve satisfaction
 - 4. Withdrawal, as manifested by either of the following:
 - i. Symptoms of dysphoric mood, anxiety, irritability, and boredom after several days without Internet activity
 - ii. Use of Internet to relieve or avoid withdrawal symptoms
 - 5. Use of Internet for a period of time longer than intended
 - 6. Persistent desire and/or unsuccessful attempts to cut down or reduce Internet use
 - 7. Excessive time spent on Internet activities

8. Excessive effort spent on activities necessary to obtain access to the Internet
 9. Continued heavy Internet use despite knowledge of having a persistent or recurrent physical or psychological problem likely to have been caused or exacerbated by Internet use
- B. Functional impairment: one (or more) of the following symptoms have been present:
1. Recurrent Internet use resulting in a failure to fulfill major role obligations at school and home
 2. Impairment of social relationships
 3. Behavior violating school rules or laws due to Internet use
- C. The Internet addictive behavior is not better accounted for by psychotic disorder or bipolar I disorder

These criteria, however, remain in need of widespread empirical testing and validation by other researchers.

Explanatory Theories on the Development of Internet Addiction

Currently, there exist two schools of thought that explain how Internet addiction develops: Davis' Cognitive-Behavioral Model of Internet addiction (Davis, 2001) and Grohol's Model of Pathological Internet Use (Grohol, 1999). Davis' model appears to be most comprehensive to date (Warden et al., 2004) and argues that it is maladaptive cognitions that guide behaviors. Similar to the cognitive-behavioral explanations of other psychological difficulties such as

depression and anxiety, Davis' model claims that it is an individual's problematic thought patterns that are the source of pathological behavior. Davis' theory also differentiates between specific and generalized Internet addiction, which relate to the type of online activities pursued by the individual (Davis, 2001). Specific Internet addiction is related to specific online content (i.e, information gathering), while generalized Internet addiction is characterized by the use of the Internet for a multitude of purposes. Davis (2001) demonstrated that generalized Internet addiction tended to be related to more interactive or social functions and lead to a greater severity of problematic Internet behavior. This conclusion echoes the previously stated findings that interactive online activities are associated with a higher risk for the development of Internet addiction (Li & Chung, 2006; Morahan-Martin & Schumacher, 2000; Scherer & Bost, 1997; Yang & Tung, 2007; Young 1997).

Grohol's Model of Pathological Internet Use (Grohol, 1999), on the other hand, describes addiction as being directly related to the recency of exposure to the Internet. According to Grohol, Internet addiction occurs in three phases. The first phase describes initial exposure to the Internet as being accompanied by obsession and enchantment. During the second phase, disillusionment with the Internet sets in and the user avoids online activity. The third phase is characterized by a balancing of the two previous phases and a pattern of normal and non-problematic use develops. This model is supported by the findings of Young (1996), who found that 82% of self-described Internet dependents had been online for less than one year. However, longitudinal studies of Internet use will be needed to further examine Grohol's model, since

the Internet has only been a widespread communication tool for the past decade and research regarding Internet addiction remains in its infancy.

Measures of Internet Addiction

The discrepancies in the measures of Internet addiction that have been developed directly reflect the inconsistencies in the proposed definitional criteria for Internet addiction. Young (1996) developed the first measure defining Internet addiction according to the diagnostic criteria for Pathological Gambling. This measure was described previously in the report. Young (1998) also developed the 20-item Internet Addiction Test (IAT; Appendix A) which is a more extensive version of the DQ. The IAT assesses Internet usage in terms of the degree of preoccupation, inability to control use, extent of hiding or lying about online use, and continued online use despite negative consequences of behavior (Young, 2007). The IAT has demonstrated good internal consistency and concurrent validity (Widyanto & McMurren, 2004) and is one of the most widely used instruments in Internet addiction research (Ha et al., 2006). There have been a number of measures of Internet addiction adapted from the IAT, such as the Chinese Internet Addiction Inventory (CIAI; Huang, Wang, Qian, Zhong, and Tao, 2007). Direct translations of the IAT have also been developed in a number of other languages such as Italian (Ferraro, Caci, D'Amico, and Di Blasi, 2007), Korean (Kim, 2000), and Chinese (Cao et al., 2007).

In addition, several measures of Internet addiction have been developed based on the DSM-IV Substance Dependence criteria such as the Internet Addiction Scale (Nichols & Nicki, 2004). However, the practice of using

Substance Dependence diagnostic criteria to characterize Internet addiction has been largely discarded in favor of models of behavioral addictions (Warden et al., 2004).

Two measures have been developed based on Davis' Cognitive-Behavioral Model of Internet addiction (Davis, 2001). Caplan (2002) developed the Generalized Problematic Internet Use (PIU) Scale that was designed to measure the degree to which an individual experiences the cognitions and behaviors associated with Davis' Generalized PIU construct. Caplan (2002) reported the GPIU as having strong internal consistency reliability and present preliminary evidence for the instrument's construct validity. Davis, Flett, and Besser (2002) created a similar measurement scale to the GPIU that was based on Davis' Cognitive-Behavioral Model of PIU and focused predominantly on problematic cognitions related to the Internet. This Online Cognition Scale (OCS) is a 36-item measure with four subscales: loneliness/depression; diminished impulse control; social comfort; and distraction. The OCS also produces an overall score of problematic Internet use. Davis et al. (2002) reported the OCS as having high internal consistency for all four subscales and highly significant item-total correlations.

A number of other measures of Internet addiction have been designed based on either one or a combination of some of the theories or definitional criteria of Internet addiction previously described. However, most of these instruments have been used in a single study and do not present any reliability or validity information for the measure. Examples of these measures are the Internet Effect Scale (IES; Suhail & Bargees, 2006), the Internet Over-use Scale (IOS;

Jenaro, Flores, Gomez-Vela, Gonzalez-Gil, & Caballo, 2007), Survey on Internet Use (Whang, Lee, & Chang, 2003), Internet Use Questionnaire (IUQ; Campbell, Cumming, & Hughes, 2006), and Internet Effects Questionnaire (IEQ; Campbell, Cumming, & Hughes, 2006).

Internet Addiction in Asia

The use of Internet in Asia has seen dramatic increases in the past decade. A recent survey by the Korean Institute for Youth Development estimates that 93% of Korean adolescents use the Internet (Jung et al 2005). In China, according to the China Internet Network Information Center, June 2003, 123 million have gone online (Cao et al, 2007). The magazine Computerworld predicts that China will become the world's largest IT market by 2010 (as cited by Lin, Kirkup & Hodgson, 2001).

The Internet serves many purposes in Asia depending on the user. A Singapore Internet project reported that teen-agers primarily used the Internet to obtain information on sports, entertainment, science and technology and hobbies. A study in Taiwan found that teens turn to the Internet for games, information searching, entertainment, and chatting (as cited in Jung et al, 2005).

Given the popularity of the Internet, it is not surprising that there is growing concern about Internet addiction in Asia. How prevalent is it? Varying rates have been reported across the different Asian countries (see Table 1).

Table 1. Summary of Findings on Internet Addiction in Asia

Author	Date	Country	Instrument	# of items	Reliability	Sample	Type	Mean Age (SD)	% Addiction
Cao, et al	2007	Hunan, China	YDQ based on Young	8	0.72	2620	HS Students	15.2 (3.5)	2.40
Geng, Su & Cao	2006	ChangSha, China	IAD based on Young	8		476	HS Students		11.34
Liu	2007	China	YDQ based on Young	8		580	HS Students	12.13 (1.28)	6.55
Li, Li & Xie	2006	Hefei, China	IAT, based on Young	20		1949	HS Students		3.50
Chen, Liu & Luo	2007	Shantou, China	IAD based on Young	8		360	College	20.56 (2.59)	9.20
Peng & Zhou	2007	Hunan, China	IAD based on Young	8		490	College	20	7.60
Nannan & Haigen	2006	China	IAD based on Young	8		370	College		8.10
Bi et al	2005	Beijing, China	IAD based on Young	8		811	College	20.82 (1.4)	12.90
Zhang et al	2006	Hangzhou, China				322	College		14.00
Tsai & Lin	2003	Taiwan	Young's IAD	8	0.88	700	HS Students	16.5	12.86
	2003	Taiwan	OAST	29	0.88	700	HS Students	16.5	12.57
Wan & Chiou	2007	Taiwan	IAT	29	0.92	416	Teenagers	17-24	34.00
			Chen Internet Addiction						
Ko et al	2007	Taiwan	Scale (CIAS)	26	.79 - .93	517	HS students	13.62 (.91)	17.70
Ko et al	2008	Taiwan	CIAS	26	.79 - .94	468	HS students	14.62	7.50
Ko et al	2006	Taiwan	CIAS	26		3662	HS students		20.69
Ha et al	2006	Korea	Young's IAS	20	0.92	455	Elementary	11 (.90)	13.80
Ha et al	2007	Korea	Young's IAS	20	0.92	836	HS Students	15.8(.80)	20.33
Yoo et al	2004	Korea	Young's IAS	20	0.92	535	Elementary	11 (1)	14.00
Kim et al	2006	Korea	Young's IAS	20	0.92	1573	HS students	15 - 16	1.60
Hur	2006	Korea	Based on Young & Goldberg	16		240	MS/HS students		2.90
Lee et al	2007	Korea	Korean Internet Addiction Test	40	0.96	627	Students	15.9(.94)	4.00
Leung	2004	Hongkong	Young's IAD	8		699	College	19.8(2.75)	37.90
Chau	2005	Hongkong	IAT Young	20		337	HS Students		3.90

Table 2. Summary of Internet Addiction by Country

Country	No. of Studies	No. of Respondent	Ave. % Addiction	Std. Deviation
China	8	7656	8.40	3.58
Taiwan	5	6463	17.55	9.26
Korea	6	4266	11.05	7.65
Hongkong	1	699	37.90	

China

In recent years, an increasing number of studies on Internet addiction have come from Mainland China. Using measures based on Young's criteria of addiction, results reveal a wide range of Internet addiction from 2.4% to 12.90%. The average addiction rate among eight studies of a total of 7,656 respondents is 7.70% with a standard deviation of 3.58. Addiction rate is higher among college students (9.45%) compared to high school students (5.95%). However, the caveat here is the study of Chen, Liu & Luo (2007) that used 4 positive items (instead of 5 as suggested by Young, 1998) as a cut-off. Thus, the figure may be slightly overestimated.

Taiwan

In the case of Taiwan, five studies published between 2003 and 2008 reveal a much higher average Internet addiction rate of 17.55% (standard deviation = 9.26). However, one caveat to this is the study of Wan & Chiou

(2007) who rather than using a cut-off score, designated those above 80% percentile as addicted. Hence, this may be an overestimate of the incidence of addiction. The studies in Taiwan tended to use 2 measures – either one based on Young's IAD or a scale by Chen. Also notable is the wide range of rates reported, suggesting major differences in sampling or measures used.

Korea

There were six studies retrieved that utilized Korean samples. The average addiction rate reported was 11.05% (standard deviation of 7.65). However, although the studies mainly used a Korean translation of Young's 20-item Internet Addiction Test, three of these six studies used a more lenient cut-off. That is, Young classified scores of 49 and below as non-addicts, 50 to 79 as a mild degree of Internet addiction and 80 and above as severe addiction. In the case of the studies of Ha et al (2006 & 2007) and Yoo et al (2004), scores of 50 and above were used as the cut-off for identifying Internet addicts. Thus, their figures are much higher than Kim et al (2006) who used the same scale but reported only 1.6% of participants as Internet addicts because the cut-off used was a score of 80 and above. This suggests that the incidence of Internet addiction may be over-estimated in the research.

Hong Kong

Two studies were found for Hong Kong with very disparate results. Leung (2004) randomly sampled 976 Net-geners (aged 16 to 24). Using Young's screening instrument for addictive Internet use, Leung found that 37.9% can be

classified as Internet addicts. On the other hand, Chau (2005) reports a 3.9% addiction rate for a sample of 337 high school students using Young's IAT scale.

In conclusion, the rates of Internet addiction in Asia have quite a large range (1.6% to 37.90%), with an average of about 12.06% (standard deviation of 9.56). This is much higher than the rates found in a 1998 study by Greenfield of 18,000 Internet users who logged into the ABC News website. This study found that only 5.7% of the sample met the criteria for compulsive Internet (as cited in DeAngelis, 2000). However, it must be noted that the Asian studies mainly focused on the young as compared to the US study that sampled adults. In addition, differences in measures and interpretation of results between studies suggest that these figures may actually be overestimated.

Groups with Higher Vulnerability to Internet Addiction

The studies reveal that there are a number of groups in Asia who may be more vulnerable or predisposed to the development of Internet addiction. This section summarizes these risk factors, that include demographic variables, personality traits, psychopathology, and family factors.

Gender

A common finding is that there are significantly more males who are addicted to the Internet than females. (Che, Liu & Luo, 2007; Ko et al, 2006; Leung, 2004; Wang, 2001; Yang & Tung, 2007; Yoo, 2004; Yu et al 2005; Zhang & Yang, 2006; Zhang, et al, 2006). This finding has been corroborated by studies in

the West (Brenner, 1997; Morahan-Martin & Schumacher, 2000; Scherer & Bost, 1997; Treuer et al., 2001). However, this may simply because more men than women use the Internet worldwide (Morahan-Martin & Schumacher, 2000).

Age

Leung's study among Hong Kong youth aged 16 to 24 showed that, compared to non-addicts, Internet addicts tended to be students and younger in age compared to non-addicts. Some explain that since adolescents are in the process of psychological maturation and solidifying their personalities, they are particularly vulnerable to developing addictive behaviors (Kaltiala-Heino, Lintonen, & Rimpela, 2004). It is especially important to attend to behavioral difficulties that develop in this population since these may develop into lifelong patterns (Kaltiala-Heino et al., 2004).

Yang & Tung (2007) defined several risk factors specific to this age group that increase the likelihood of developing Internet addiction. These issues include a strong drive to develop a sense of identity, a desire to develop meaningful and intimate relationships, often having a free and easily accessible Internet connection, and Internet use frequently being encouraged in the home and school environment. Lei and Wu (2007) highlight that developing a sense of identity and independence is one of the major goals of adolescence and the information and communication functions of the Internet offer a novel means of achieving this objective. Lei and Wu (2007) argue that it is this explanation that underlies the increasing incidence of Internet addiction in adolescents. However, it is also possible that it is psychological variables such as shyness, loneliness, self-

consciousness, anxiety, depression, and interpersonal relationship problems accompanying a search for identity that put adolescents at higher risk of developing Internet addiction. Cao et al. (2007) found that adolescents with problematic Internet use demonstrated an increase in these previously stated psychological variables.

Other authors suggest that it is the student lifestyle that makes adolescents particularly vulnerable to developing Internet addiction. Students often have easy access to the Internet and highly flexible schedules, which may explain why Internet addiction is frequently observed in this population (Widyanto & Griffiths, 2006; Nalwa & Anand, 2003).

Personality Characteristics

Personality characteristics that have most frequently been associated with the development of Internet addiction are shyness, low self-esteem, and lack of emotional and social skills (Armstrong et al., 2000; Chak & Leung, 2004; Jenaro et al., 2007; Yang & Tung, 2007; Xiao et al 2007).

Risk taking behavior also appears to be related to internet addiction. Ko et al (2006) found that in their study of Taiwan high school students that Internet addicts scored higher on novelty seeking, harm avoidance and lower on reward dependence compared to non-Internet addicts. Among these, novelty seeking was the strongest predictor of Internet addiction. Similarly, a study among high school students in China found that boredom susceptibility and sensation seeking is positively correlated to internet addiction (Shi, Zhou, & Ge, 2005).

Another common personality characteristic that is associated with internet addiction is coping style. Studies in China have revealed that adolescents who are addicted to the internet also adopt negative coping styles such as fantasy or retreat, rather than rational or problem solving approaches (Liu, 2007; Zhang & Yang, 2006).

Time management skills have also been identified as correlates of internet addiction. A study found that middle school students in China who overuse the internet have poor time management skills (Cao, Su, & Gao, 2006).

Many of these characteristics are the same ones that have been shown to put individuals at high risk for other psychological problems or disorders such as depression (Young, 1998). It has been suggested that the Internet may provide a safe haven and be used to decrease a perceived deficit in their real life social interactions due to the anonymity and lack of face-to-face interaction (Campbell et al., 2006; Ebeling-White et al., 2007).

Defining the causal pathways between personality characteristics and Internet addiction, however, is difficult because the studies have mostly been correlational in nature. Hence, it is unclear whether these characteristics promote Internet addiction or are merely being accentuated by excessive Internet use.

Social

There is research that suggests the importance of family factors in predicting Internet addiction. For example, Hur's (2006) study among Korean middle and high school students showed that Internet addiction is more

prevalent among individuals with separated parents, less school activities, poor school performance, higher sociability and closer attachment to a boyfriend or girlfriend.

Studies in China validate the relationship between parenting style, family communication and Internet addiction. A study among senior high school students in Beijing, China found that negative parental rearing styles are closely associated with computer game addiction (Wang, Gan & Li, 2006). Similarly, Li et al (2006) found that quality of family communication was significantly lower among middle school students classified in the internet overuse group as compared to those in the normal use group. Peng & Zhou (2007) found that parental over-protection, over-interference, warmth and refusal differentiate Internet addicts and non-Internet addicts.

A multi-country study in East Asia (Seoul, Taipei and Singapore) found that Internet connectedness patterns differed by social environment. The study also found that the social networks, particularly Internet use of parents and friends, also predicted the Internet connectedness of teenagers (Jung et al, 2005).

Similarly, a study by Yen et al (2007) among Taiwanese high school students revealed that Internet addiction was predicted by lower family functioning, high parent-adolescent conflict, high inter-parental conflict, alcohol abuse of family members, and perceived positive parental attitudes towards adolescent substance abuse. Interestingly, three factors - habitual alcohol use of siblings, perceived parental attitudes towards adolescent substance abuse and high-parent adolescent conflict- were also predictive of internet abuse . Citing the social context model of development, the authors suggest that ineffective

parental discipline and supervision and poor intra-family relationships may lead to problematic behaviour among adolescents such as Internet addiction and substance abuse.

Psychopathology

There are consistent findings across studies that Internet addictive behavior occurs predominantly in the context of interactive activities online. The explanation for these findings remains unclear but may have roots in the personality characteristics or psychopathology of users.

Disorders that have been most frequently cited as being comorbid with Internet addiction include Attention Deficit Hyperactivity Disorder (Ha et al, 2006), and Substance Use (Ko et al, 2006) and other addictive behaviors such as watching television and playing video games (Yoo et al, 2004).

Some of the specific studies in this area include Shapira et al. (2000), who found that all 20 individuals identified as having Internet addiction also had at least one lifetime DSM-IV Axis 1 diagnosis. Black et al. (1999) found that nearly 50% of participants reporting compulsive computer use also met the diagnostic criteria for a psychological disorder, with the most commonly reported disorders being substance use (38%), mood disorders (33%), and anxiety disorders (19%). Young (1998) found that 54% of individuals identified as having Internet addiction also had diagnoses of depression and 34% had anxiety disorders. This was validated in a study among Beijing high school students that found that online game addiction was significantly correlated to depression (Qin, Rao & Zhong, 2007).

The uncertainty in the literature about the causal pathways between Internet addiction and psychopathology may be due in part to the distinctive properties of the Internet giving rise to new expressions of preexisting problems. It is possible that the anonymity afforded by the Internet provides completely new opportunities for individuals with sexual paraphilias, compulsive behavior problems, or pathological gambling to act on these afflictions. For instance, a person who may not engage in behaviors such as secretive sexual affairs or stalking in the real world may carry out these behaviors on the Internet due to the anonymity afforded by the medium. The Internet may provide a less threatening way to express behaviors that an individual may not have acted on in the real world (Morahan-Martin, 2005).

Explanations for Internet Addiction in Asia

Internet addiction is a phenomenon that has been observed across both national and cultural boundaries (Cao et al, 2001). However, the extent to which the underlying features and presenting characteristics of Internet addiction varies between cultures remains unclear. Wang (2001) highlights the importance of considering socio-cultural explanations in relation to Internet addiction, and contend that these problematic behaviors are influenced by family, culture, and society.

Choi and Ross (2006) suggest that young people who have been raised in collectivist, hierarchical, family-focused societies are able to act and socialize independently for the first time through the Internet. They contend that it is possible that the opening up of this "new world" may put youth living in

collectivist societies at higher risk for the development of Internet addiction. Differences in Internet usage patterns have also been noted between countries, such as the Internet being used more for content oriented material in Japan (i.e., information and entertainment) versus more communicative functions in Korea (Young, 2004). However, conclusive explanations of cultural differences in Internet behavior are lacking and further research is needed in this area.

Treating Internet addiction

Perhaps as a result of the attention given to the problem of Internet addiction in Asia, there has also been an increased interest in finding effective treatments for Internet addiction. As a result of a China National Children's Center report that claimed 13% of Internet users under 18 are addicted to the Internet, the Chinese national government initiated several initiatives such as enforcing a ban on new Internet cafes. Net owners have also been required to install anti-addiction software and are asked to be extra vigilant in obtaining information on users. In addition, the government started funding "Internet boot camps" that provide a mixture of counseling, drugs and military-style discipline to Internet-addicted individuals (Aiyar, 2007).

Can Internet addiction really be eliminated? This section describes the various treatment techniques that have been proposed as well as those that have been empirically tested.

Cognitive-Behavioral Therapy

Many researchers have looked to Cognitive-Behavioral Therapy (CBT) to deal with Internet addiction (Wieland, 2005; Orzack, Voluse, Wolf, & Hennen, 2006; Chou, Condrón, & Belland, 2005). This method assists individuals to identify and modify the thoughts and feelings that feed their addiction (Wieland, 2005; Orzack et al. 2006). A study by Orzack, Voluse, Wolf, & Hennen (2006) used cognitive-behavioral group therapy to treat a group of men involved in problematic Internet-enabled sexual behavior. The method consists of moving an individual through six stages of change: pre-contemplation, contemplation, determination, action, maintenance, and relapse. The therapy also helps clients develop problem solving techniques to change their current situation (Orzack et al. 2006). After 16 sessions, the men in the group were shown to have an increased quality of life and decreased levels of depressive symptoms (Orzack et al. 2006). The level of problematic Internet use, however, failed to decrease significantly, though the authors of the study believe that this is because of the faulty manner in which problematic Internet use was measured (Orzack et al. 2006).

Young also utilized cognitive behavioral therapy with 114 clients suffering from internet addiction (2007). The longitudinal study tracked participants through 12 sessions and did a 6-month follow up assessment. Results showed participants were better able to manage their presenting problems by the 8th session and symptom management was sustained 6 months following treatment.

Reality Therapy Group Counseling

Kim (2007) recently suggested Reality Therapy Group Counseling as a way of treating Internet addiction. Reality Therapy is based on Choice Theory, which views individuals as completely responsible for their own lives. Reality Therapy is supposed to encourage individuals to choose to improve their lives by committing to changing their Internet-related behavior (Kim, 2007). The treatment includes sessions that help clients understand that addiction is a choice, aids with the learning of proper time management skills, and introduces alternative activities to the problematic behavior.

Psychopharmacology

It has been suggested that clinicians use psychopharmacology to treat Internet addiction. Selective serotonin-reuptake inhibitors (SSRIs) have been specifically suggested because of the similarity between the symptoms of Internet addiction and some obsessive-compulsive spectrum disorders for which SSRIs have been found to be effective (Wieland, 2005).

Multi-modal Approaches

Young (1999), on the other hand, suggests a multi-dimensional approach to addressing Internet addiction. She suggests eight different techniques that therapists can use to help their clients: 1) Practice the opposite, 2) External stoppers, 3) Setting goals, 4) Abstinence from certain applications, 5) Reminder cards, 6) Personal inventory, 7) Support groups, and 8) Family therapy. Practicing the opposite consists of discovering clients' patterns of Internet use and disrupting these patterns by suggesting new schedules (Young, 1999). External

stoppers are real events or activities that a client uses to prompt himself or herself to log off of the Internet (Young, 1999). Setting goals refers to the counselor helping the client come up with specific, achievable goals for himself or herself with regard to the amount of time spent online (Young, 1999). Young (1999) suggests that abstinence should only be encouraged with regard to specific applications that the client is unable to control. Reminder cards are visible cues that remind the client of the costs of his or her Internet addiction and the benefits of breaking the addiction (Young, 1999). The Personal Inventory is another tool that helps the client recognize the benefits of breaking his or her habit by showing him or her all the activities that he or she used to engage in or can't find the time for because of the Internet addiction (Young, 1999). Clinicians are also advised to help their clients find social support groups because many Internet addicts are said to use the Internet to compensate for a lack of social support (Young, 1999). Lastly, Young (1999) suggests that family therapy be used to address relational problems in the family that may have contributed to or resulted from the Internet addiction.

Yang and Hao (2005) investigated the effect of a multi-modal intervention consisting of solution-focused brief therapy combined with family therapy among 52 adolescents in China. The scores on the IAD scale, as well as length of time online significantly decreased after the 3-months of treatment. Similarly, Yang, Shao & Zheng (2005) provided cognitive and behavioral psychotherapy to a group of 23 middle school students who were diagnosed with Internet addiction. The intervention included detoxification treatment, psychosocial

rehabilitation and personality modeling over a period of 6 to 8 weeks. Results showed that internet addiction scores significantly decreased after therapy.

What is evident thus far is that, although there have been several interventions used to treat Internet addiction, there is still a dearth of evidence on the effectiveness of these treatments. Although the work of Young (2007) and Fang-ru and Wei (2005) are laudable for their longitudinal designs, neither of the studies used control groups.

Preventing Internet addiction

Given that certain family characteristics appear to be related to the development of Internet addiction in adolescents, (Yen et al., 2007; Wieland, 2005; Hur, 2006) some psychologists suggest that the family is of particular importance when considering prevention strategies. Some researchers recommend a family-based prevention approach patterned after the family-based approach used to intervene for those at risk of substance abuse (Yen et al., 2007). Such an approach would include training parents to improve their ability to communicate with their children, promoting healthy family interactions, teaching parents effective family monitoring skills, and aiding the family in reducing maladaptive family functions (Yen et al., 2007).

Oravec (2000) suggests that counselors work with families to help them decide on the degree to which they want the Internet and the computer to be a part of their family lives before families purchase or set up these technologies.

Another proposed preventive technique includes encouraging teenagers to engage in activities in the real world rather than in cyberspace (Hur, 2006). Research on the personality types of Internet addicts has also been used to come up with prevention strategies. Initial studies show that Internet addicts tend to be people with high exploratory excitability, high novelty seeking, low reward dependence, high harm avoidance, and low self-esteem (Ko et al., 2007; Ko et al., 2006). Therefore teenagers with these profiles should be encouraged to partake in activities aside from the Internet that are creative, exploratory, and healthy, to meet their personality needs (Ko et al., 2007). Researchers also suggest directly limiting the Internet use of teenagers to a certain number of hours per week in order to prevent the development of Internet addiction (Ko et al. 2007).

Though there have been many recommendations on prevention raised from studies on Internet addiction, unfortunately, none of these prevention strategies have been empirically tested empirically to date.

Research Gaps and Implications for Future Research

This review highlights the growing interest in Internet addiction in Asia and the increasing number of researchers examining this phenomenon. However, the review also reveals a number of gaps in both the content and methodology of the existing studies. This section highlights these gaps as well as possible areas for future research.

Atheoretical Studies

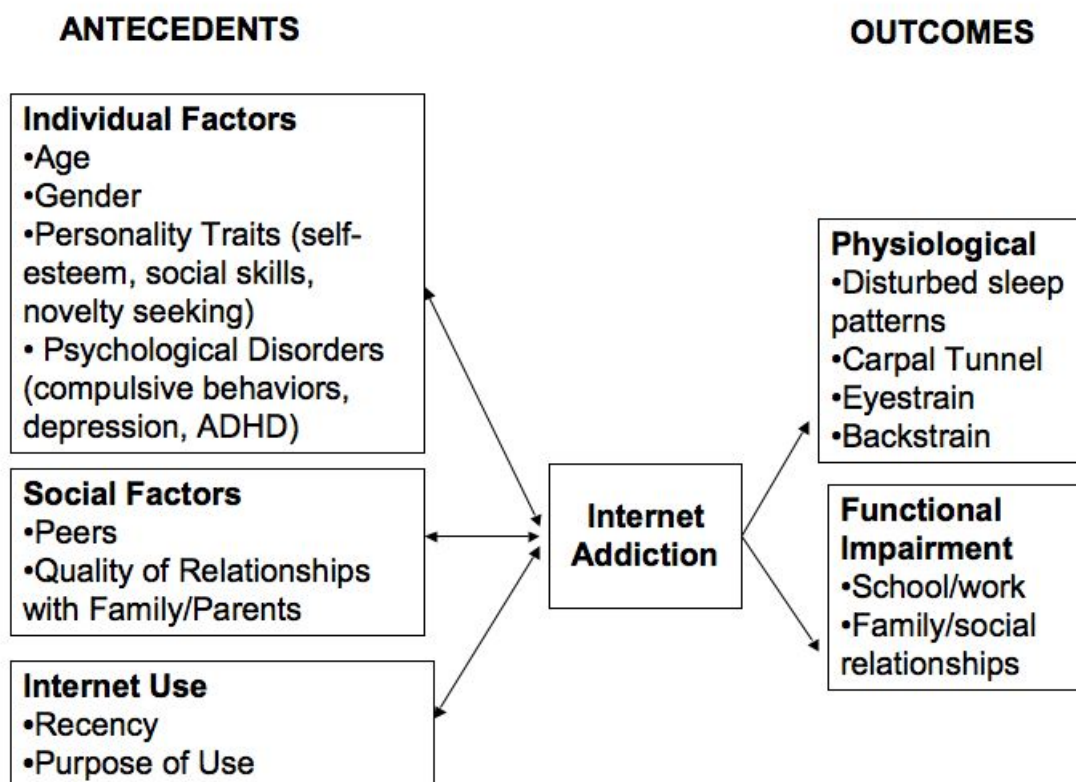
Perhaps because research on Internet addiction is still in its infancy, especially in Asia, many of the published studies lack a theoretical model or framework. The studies are generally descriptive in nature, looking at the differences in the occurrence, predictors and antecedents of Internet addiction. Figure 1 merges the results of the studies into a model that depicts the antecedents and outcomes of Internet addiction. Based on the research, it appears that Internet addiction may be influenced by individual factors such as age, gender, personality traits and psychological disorders. More specifically, it seems that Internet addiction is more prevalent among individuals who are younger male, have low self-esteem are high in novelty seeking and have poor social skills. Internet addiction also appears to frequently co-occur with psychological disorders such as other compulsive behaviours, depression, ADHD etc.

However, family systems theory suggests that dysfunctional behaviours are also caused by social factors. Thus, beyond individual factors, the model depicts the role of family and peers in the development of problematic Internet behavior. Studies have found that Internet addiction is more prevalent among those with peers who engage in problematic online behaviour and those with poor quality family relationships. The social outcomes that have been found to be associated with Internet addiction are functional impairment in school or work roles and poorer quality of family and social relationships.

In addition, Internet addiction also appears to be more prevalent among first time or recent users, as well as those who use it for more interactive purposes.

Lastly, as previously described, Internet addiction has also been found to be associated with physiological outcomes (i.e., disturbed sleep patterns, carpal tunnel, eye strain and back strain). The proposed model summarizes the antecedents and outcomes of Internet addiction. It does not, however, explain how it develops. Grohol's proposed a Model of Pathological Internet Use (previously described) attempts to explain the development of problematic online behavior (Grohol, 1999). While Grohol's model has some empirical support in the literature, more longitudinal research is needed to clearly establish the process that may lead people in (and out) of addiction.

Figure 1. Proposed Model of Internet Addiction



Inconsistencies in Assessment Measures for Internet addiction

As seen in Table 1, most of the studies in Asia utilized the criteria/tool proposed by Young (1998). However, not all the studies report reliability data or use the norms defined by Young. For example, although most studies followed Young's proposed cut-off of 5 of 8 criteria, some used a lower cut-off score or simply pegged a cut-off score at 80% with no explanation for this decision. A critical need in future studies is the validation of the reported rates of Internet addiction using standardized instruments.

In addition, another gap related to metrics is the lack of empirical evidence for the validity of cut-off scores. It is important that norms and cut-off scores be developed for Asia through methodologically sound research studies.

Self-Report Measures

All of the studies to date in this area have utilized self-report measures to assess Internet addiction, which may have elicited socially desirable responses. Future studies should explore the use of alternate sources of data (i.e., reports from family members or peers).

Sampling

Most studies in Asia utilized convenience rather than randomly drawn samples. Exceptions here were Leung's study in Hong Kong (2004) and Yen et al (2007) study. In addition, all of the studies in Asia used elementary, high school or college students as participants- populations known to be heavy users of the Internet. Future studies in Asia should tap a wider range of users.

It is also interesting to note that the existing research on Internet addiction in Asia is concentrated in East Asia. The lack of published work from South East Asia begs the question – is Internet addiction not a problem in these areas or has the research from these regions simply not been published yet?

Cross-sectional designs

One gap in the literature is studies that build our understanding of how Internet addiction develops. Most studies reviewed utilized cross-sectional designs. The only study that utilized a longitudinal design was Ko et al (2008), who traced incidence of Internet addiction over a one-year period. In the interest of understanding how 'Internet addiction' develops and, perhaps, can be treated, a number of researchers have utilized regression analysis to isolate factors that may predict Internet addiction. However, predictors are not causes and if the interest is to prevent or treat Internet addiction, more rigorous research is needed using longitudinal and experimental designs.

Lack of Rigor in Evaluation of Internet Treatment

Although there have been a number of proposed interventions to treat Internet addiction, there remains a dearth of studies that rigorously evaluate these interventions. Studies by Young (2007) and Wang-ru and Fei's (2005) evaluated the outcomes of an Internet addiction treatment over a period of time. However, no control group was used to compare outcomes. In the future, evaluation of internet addiction treatment should utilize both longitudinal as well as true experimental designs.

An Agenda for Research on Internet Addiction

Given the above gaps, there are still many areas of research needed to provide robust answers to the issue of incidence, prevention and treatment of Internet addiction in Asia. We end with the suggestion of a possible research agenda on Internet addiction in Asia.

- 1) Establishing incidence of Internet addiction using a standardized measure across cross-cultural samples
- 2) Establishing norms and validating cut-off points for the interpretation of Internet addiction scales.
- 3) Building/testing theory-based models that explain the antecedents and outcomes of Internet addiction
- 4) Exploration of alternative approaches to diagnosing Internet addiction beyond self-report measures
- 5) Utilizing a wider range of samples from other Asian countries and a wider range of respondents
- 6) Longitudinal studies that explore the addiction process
- 7) Rigorous experimental research on the efficacy of Internet treatment interventions

Conclusion

This review highlights the incidence of Internet addiction in Asia. Studies from China, Taiwan, Hong Kong and Korea reveal that, on the average, 12.15% of youth may be addicted to the Internet. The review also highlights the

influence of individual, social, and technological factors that may predispose individuals to developing Internet addiction. In addition, the possible negative physiological and social impacts of addiction are highlighted. However, as this review also points out – the existing studies on Internet addiction have many inconsistencies and gaps in the measures and research designs employed. The development of theoretically and methodologically sound experimental approaches is required to gain a deeper understanding of Internet addiction in Asia.

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APPENDIX A: Internet Addiction Test by Young (1998)

- 1) Do you find that you stay on-line longer than you intended?
- 2) Do you neglect household chores to spend more time on-line?
- 3) Do you prefer the excitement of the Internet to intimacy with your partner?
- 4) Do you form new relationships with fellow on-line users?
- 5) Do others in your life complain to you about the amount of time you spend on-line?
- 6) Do your grades or school work suffer because of the amount of time you spend on-line?
- 7) Do you check your e-mail before something else that you need to do?
- 8) Does your job performance or productivity suffer because of the Internet?
- 9) Do you become defensive or secretive when anyone asks you what you do on-line?
- 10) Do you block out disturbing thoughts about your life with soothing thoughts of the Internet?
- 11) Do you find yourself anticipating when you will go on-line again?
- 12) Do you fear that life without the Internet would be boring, empty, and joyless?
- 13) Do you snap, yell, or act annoyed if someone bothers you while you are on-line?
- 14) Do you lose sleep due to late-night log-ins?

- 15) Do you feel preoccupied with the Internet when off-line, or fantasize about being on-line?
- 16) Do you find yourself saying "just a few more minutes" when on-line?
- 17) Do you try to cut down the amount of time you spend on-line and fail?
- 18) Do you try to hide how long you've been on-line?
- 19) Do you choose to spend more time on-line over going out with others?
- 20) Do you feel depressed, moody, or nervous when you are off-line, which goes away once you are back on-line?