A Study of Adolescents' Internet Use and Internet Addiction in Shanghai, China: Implications for Social Work Practice

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Adolescents have been found to be a vulnerable group for Internet addiction. The reportedly prevalence of "Internet addicts" ranged from 4% to 14%. The major symptoms of Internet addiction are: excessive use, withdrawal, tolerance, and compulsive use. Negative consequences of Internet addiction include physical complaints, worsening performance in work or study, and relationship problems.

Despite a number of risk factors identified, prior studies were limited in two aspects. First, previous studies assumed that risk factors operate in an additive manner with increasing numbers of risk factors leading to an increasing probability of becoming internet addicted. Not enough attention has been paid to relationships among the risk factors. Second, most risk factors were either personal attributes or internet use behaviors. This might lead to the biased assertion that either the person or the internet should be blamed for becoming addicted.

This research tried to extend previous research by proposing and testing a theoretical model which argued that the some adolescents became attached to the internet as it provided an alternative way of needs satisfaction or stress coping; the needs satisfaction or stress coping was

not possible in realistic life due to some personal or contextual risk factors. The theoretical model was constructed based on outcome expectancy theory (Bandura, 1977; Jones, Corbin & Fromme, 2001; Oei & Baldwin, 1994), substitute gratification theory (Peele, 1998), and stress coping theory (Lazarus & Folkman, 1984; Abrams & Niaura, 1987) as well as some findings of previous research.

A cross-sectional survey was conducted in Shanghai, China. A non-random sample 892 adolescents (aged 12 to 18) from six secondary schools were recruited. 52(5.83%) participants were included in the high-risk group of internet addiction. Risk factors for internet addition were: male, senior secondary school students, social anxiety, stress, avoidance coping style, desirable outcome expectancy of substitute gratification (need to belong), desirable outcome expectancy of stress coping, frequency of online gaming, frequency of idling online and time spent online during weekdays. Moreover, social anxiety, stress, and avoidance coping style had both direct and indirect effects on severity of internet addiction symptoms via the mediators of desirable outcome expectancy of substitute gratification (need to belong) and desirable outcome expectancy of stress coping; the results provided preliminary support to the theoretical model proposed in this study.

Both conceptual and methodological limitations and their implications for further research were discussed. Prevention and intervention programs were proposed according to results of this study.

論文摘要

一項對上海青少年網絡使用及網絡成癮的研究：對社會工作實務的啟示

顧珉珉

哲學博士論文

香港中文大學二零一二年十一月

青少年網絡成癮已成為一個值得關註的問題。以往研究顯示，青少年網絡成癮的比例在 4%到 14%之間。網絡成癮的主要癥狀包括：過度使用，退縮反應，耐受性和強迫性。網絡成癮對青少年的健康，學業和人際關系都有負面影響。

以往對網絡成癮的研究已經發現了一些危險因素。但是以往研究存在兩方面不足。第一，多為簡單迴歸模型，較少中介模型， 較少探討危險因素之間可能的互動關係。第二，危險因素多為個人因素或網絡使用因素， 較少關注個人與環境的互動是如何提高網絡成癮風險。

為了彌補以上知識鴻溝，本研究提出了一個新的解釋網絡成癮的理論模型。這個模型中既包括個人因素又包括環境因素。這個理論模型的核心假設是當青少年認為網絡是滿足需要或者處理壓力的唯一途徑時，他們有可能會花費大量時間上網，也因此引發了較高的網絡成癮的風險。本研究進一步假設社交焦慮和缺乏親密朋友是導致青少年在現實生活中無法滿足人際交往需要的原因。本研究還假設壓力和迴避式應對壓力傾向是青少年不能在現實生活中處理壓力而將網絡視作應對壓力唯一途徑的原因。

本研究在中國上海進行。本研究是斷代式問卷研究。前測研究測量了量表的信效度，并根據結果對相關量表做進一步修正。正式研究通過非隨機抽樣方式邀請了 892 位年齡在 12 到 18 歲之間的中學生參加。結果顯示，52 位（5.83%）參加者可被看作網絡成癮高危人群。高危人群更長時間上網，也具有更高的社交焦慮，更大的壓力和更強的迴避式應對壓力傾向。此外，中介模型的統計分析結果顯示，個人期待網絡使用是滿足需要和處理壓力的唯一途徑這一中介變量，解釋了部分社交焦慮，壓力和退縮型處理壓力傾向與網絡成癮症狀之間的關聯，該結果對本研究所假設的理論模型提供了初步的支持。

文末討論了本研究的限制和進一步研究的方向，并根據研究結果提出了對社會工作實務（包括預防及干預青少年網絡成癮）的建議。

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CHAPTER ONE

THE RESEARCH PROBLEM

BACKGROUND OF THE STUDY

Internet Addiction as an Emerging Problem

Internet is one of the most important innovations and valuable assets of the 20th century. In March 1989, British physicist and computer scientist Sir Tim Bernes Lee wrote a project based on the concept of hypertext in order to facilitate sharing and updating information among researchers. On 25 December 1990, Lee, with the help of other researchers, implemented the first successful communication between a Hypertext Transfer Protocol (HTTP) client and server via the Internet. The first website was built at The European Organization for Nuclear Research where Lee worked. It was first put online on 6 August 1991. At that time, there were relatively few nodes in that network to carry digitized information from one part of the world to another; personal computer was expensive; the interface used to view, send, and receive data over the Internet was not user friendly. No one at that time expected that the Internet would change the world and the way people live in such a dramatic way. Nowadays, with cheaper personal computer, wider Internet access, and more user-friendly Internet browser software, everyone could become an active user of the Internet. Especially for adolescents, the Internet use has become an indispensable part of their lives.

As with every single innovation, Internet has its own advantages and disadvantages. There are many advantages of using the Internet, such as speedy communication, wide information

resources, versatile entertainment and convenient social networking. Nevertheless, abuse and misuse of the Internet such as hacking, disclosure of personal privacy, infringement of property and intellectual rights, cyber bullying, and Internet addiction has been reported. Among them, Internet addiction has garnered increased attention from the public as well as the academia.

The term Internet addiction was first formally introduced in 1996 at the 104th Annual Meeting of the American Psychological Association when Dr. Kimberly Young presented the paper *Internet Addiction: The emergence of a New Clinical Disorder.* In the paper, Young (1996) compared Internet addiction to pathological gambling and defined Internet addiction by adapting diagnostic criteria for pathological gambling which consist of a group of symptoms. Researchers thereafter have defined Internet addiction in a way similar to Young's (e.g. Block, 2008; Ko, Yen, Chen, Chen, & Yen, 2008; Nichols & Nicki, 2004). Overall, Internet addiction could be loosely defined by the following symptoms and problems: (1) excessive use, often associated with a loss of sense of time, (2) withdrawal, including feeling of anger, tension, and/or depression when Internet use is suddenly cut off, (3) tolerance, including the need for long time spent online, and (4) negative outcomes, including physical complaints, worsening performance in work or study, and relationship problems (though this way of defining Internet addiction has been criticized, as will be elaborated in next section and Chapter 2).

Adolescents have been a vulnerable group to Internet addiction. Kaltiala-Heino, Lintonen, & Rimpela (2004) studied a representative sample of 12-18 year-old Finns (N=7292), 4.6% of boys and 4.7% of girls fulfilled the four or more criteria of "Internet addiction". The rate of "problematic Internet use" in Italian adolescent was 5.4% (Pallanti, Bernardi, & Quercioli, 2006). Among Korean middle school students, 16% were "potential at-risk users" (Seo, Kang, &Yom, 2009). In Hong Kong, 14.7% of the 1058 youth (aged from 10 to 29 years old)

were believed to be “at-risk for Internet addiction” (Chan, 2004). A national-level survey in mainland China found that 7.05% were “addicted” in the age group of 13 to 17 (N=2417) (Chinese Association of Youth Internet Use, 2007). In Shanghai, a big city in Mainland China, 14.2% of the 2125 secondary school students (aged from 11 to 17) were considered as “Internet addicts” (DeRuiMu Research Group on Internet Addiction, 2005).

What are negative outcomes related to Internet addiction among adolescents? In Scherer’s study (1997), respondents reported that Internet use had interfered with their academic work or social lives. Chou and Hsiao (2000) found that students addicted to the Internet reported negative consequences on their studies as well as their daily routines. In addition, physical complaints such as disrupted sleep patterns and fatigue have been reported (Lin & Tsai, 1999; Young, 1998).

Knowledge Gaps in Previous Research on Internet Addiction

The prevalence of Internet addiction as well as its negative consequences has generated research interest on this topic. As illustrated in Chapter 2, empirical research on internet addiction in the past one and a half decade has suggested some risk factors possibly related to Internet addiction. Yet existing studies have been limited in two aspects.

First, studies in Mainland China and other countries or societies have reported a variety of risk factors related to internet addiction. Yet those studies test either one or multiple risk factors in a simple linear regression model. Those risk factors were supposed to operate in an additive manner with increasing numbers of risk factors leading to an increasing probability of becoming internet addicted. This research tried to extend previous research by proposing and testing the mediators that would account for the effects of some risk factors (e.g. social anxiety, lack of intimate friendship, stress) on internet addiction. The proposed mediators in this study, desirable outcome expectancies, are defined as the cognitive belief that internet

use is the only way for certain needs satisfaction or stress coping.

Second, most risk factors reported by Western or Mainland studies are either personal attributes or internet use behaviors. This might lead to the biased conclusion that either the person or the internet should be blamed for becoming addicted. The mediation models proposed in this study, on the contrary, suggest a new explanation for why some people become addicted. By combing and integrating such theories as outcome expectancy theory (Bandura, 1977; Jones, Corbin & Fromme, 2001; Oei & Baldwin, 1994), substitute gratification theory (Peele, 1998), and stress coping theory (Lazarus & Folkman, 1984; Abrams & Niaura, 1987), this study suggested that people become attached to the internet for it provides an alternative way of needs satisfaction or stress coping which was impossible in realistic life due to some personal or contextual risk factors. These hypotheses, when supported, would not only avoid stigmatizing the addicted adolescents but also have important implications for practice.

Intervention for Internet Addiction

Give the large number of empirical research on Internet addiction that has been published, reports of effective intervention are relatively sparse. In Mainland China, medication has been popular, as Internet addiction was regarded as a kind of addiction similar to substance dependence. Adolescent "Internet addicts" are kept in the hospital as patients and a package of meals, medication, psychotherapy, and physical exercise is provided (Tao & Yao, 2007). Medication could be useful if Internet addiction is related to neurobiological changes. This assumption is supported by preliminary evidences but still under contest (e.g. Ko, Liu, Hsiao, Yen, Yang, Lin, et al., 2009; Weinstein, 2010). Moreover, even this assumption is held true, the particular type of mediation effective in treating one kind of addiction does not necessarily take effect in treating another kind of addiction, not to mention possible by-

effects of mediation. Hence, mediation is not recommended unless solid research evidences has accumulated in the future.

In Western societies, Cognitive-Behavioral Therapy (CBT) has been widely implemented. The underlying rationale is that Internet addiction is caused by negative core beliefs and cognitive distortions. For instance, those who suffer from negative core beliefs might be drawn to the anonymous interaction online in order to overcome the perceived inadequacies. For another instance, rationalizations such as "Just a few more minutes won't hurt" lead to a failure in time management (Caplan, 2001; Davis, 2001; Hall & Parsons, 2001). This rationale, however, has not been examined empirically. Besides, thinking from the perspective of person-in-environment (e.g. Cairns, Bergman, & Kagan, 1998), though negative thinking and distorted belief might play a role in the development of Internet addiction, there should be other psychosocial factors involved, and interventions are needed in those aspects.

Some social work institutions in Hong Kong have developed intervention programs. Treatment groups has been designed by the Hong Kong Federation of Youth Groups (2010), targeting at students at high risk for Internet addiction as reported by teachers or parents. The group activities included lectures on pros and cons of Internet use, time management, and healthy life style, interspersed with interactive games. Counseling services are also offered (Hong Kong Christian Service, 2011; Hong Kong Federation of Youth Groups, 2010). The objectives of counseling services are not only to motivate the young people to change and enhance their self control in Internet use but also to assist parents in handling their children's problems related to Internet addiction. Besides, outreaching service and home-visits are provided for young people who had cut themselves off from the outside world and stay isolated at home. In short, these social work programs have focused on adolescents as well as their living situations. Unfortunately, this dual focus has not been supported by empirical

evidences derived from research on Internet addiction, though it is consistent with the tenet of social work professional and practice wisdom of social workers. This weakens the validity and generalizability of these programs. A related problem is that these intervention programs failed to summarize the common personal or environmental inadequacies that lead to internet addiction.

To summarize, no intervention programs have established their effectiveness with solid evidence. Based on knowledge accumulated so far, medication is not recommended and cognitive-behavioral therapy could be useful for people with negative core beliefs but not for others. Social work intervention programs with a dual focus on young people as well as their living situations could be a promising approach, yet more empirical evidences are required to support this dual focus as well as to specify particular personal or environmental inadequacies that should be the focus for intervention.

RESEARCH OBJECTIVES

This research had three objectives. First, this research aimed to update statistics on internet use behaviors and internet addiction among adolescents in Shanghai. The latest study with Shanghai was conducted in 2007 (Yu & Du, 2007). The updated statics is of interest not only for researchers but also for teachers, parents and youth policy makers, as youth internet use behaviors keep changing rapidly with evolved internet technology.

The second objective was to examine some risk factors reported by western studies but not yet examined in Mainland. The risk factors tested in this study included: social anxiety, friendship intimacy, stress and avoidance coping style (as indicative of aspects of personal incompetence or environmental inadequacies), desirable outcome expectancy (a new construct proposed in this research, defined as the belief that Internet use is an alternative way of needs satisfaction or stress coping), time spent on a variety of online activities, and

overall time spent online.

The third objective is to test a new theoretical model proposed in this study. The central theme of this theoretical model is that some individual or environmental factors lead to the belief that internet use is the only way for needs satisfaction or stress coping, which in turn, predict higher severity of internet addiction symptoms. The theoretical model was represented by several mediation models.

ORGANIZATION OF THE THESIS

This dissertation has eight chapters. In this chapter, we have discussed research background and research objectives. Chapter 2 includes three sections. The first section presents theories on defining and measuring addiction and discusses their implications for defining and measuring internet addiction in this study; the second section reviews previous findings of internet addiction research; the third section introduces new theories for understanding the occurrence and development of internet addiction. Chapter 3 illustrates how the theoretical model is developed by integrating theories and previous findings reviewed in Chapter 2; research hypotheses are also listed. Chapter 4 describes the research method. Chapter 5 reports the psychometric properties of all the measurements in a pilot study. Chapter 6 presents findings of the main study. Chapter 7 discusses major findings by linking them to previous research results. Chapter 8 assesses the limitation and contribution of this study, and points out directions for future research and practice.

CHAPTER TWO

LITERATURE REVIEW

This chapter of literature review is framed by three questions. First, how to define and measure internet addiction? After a review of existing definitions and measurements, three issues are addressed: a historical review illustrates how various symptoms are used to define addiction; a detailed examination on categorical diagnosis shows why the existing diagnostic tools for internet addiction are considered weak in validity; and an introduction on dimensional measure justifies using severity of addiction symptoms in addiction research.

Second, what have previous research found and what needs further study? The risk factors identified by previous research are presented. Limitations and knowledge gaps of prior works are highlighted.

Third, what are the new theories that could make up the knowledge gaps and further our understanding of internet addiction among adolescents? Outcome expectancy theory (Bandura, 1977; Jones, Corbin & Fromme, 2001; Oei & Baldwin, 1994), substitute gratification theory (Peele, 1998), and stress coping theory (Lazarus & Folkman, 1984; Abrams & Niaura, 1987) are introduced, which, together with some findings of previous empirical, forms the basis of the conceptual framework for this study.

DEFINITION AND MEASUREMENT OF INTERNET ADDICTION

Definition and Measurements of Internet Addiction in Previous Studies

In line with other kinds of addiction, Internet addiction has been defined by a grouping of

symptoms. Measurements developed and used in previous studies can be divided into two types: diagnostic tools aiming to define the addicted status by a specific number of symptoms and rating scales reporting frequency of addiction symptoms. Some most commonly used measurements are summarized in Table 2.1 and discussed below.

The first diagnostic tool was developed by Kimberly Young in 1998. As a modification of the diagnostic criteria for pathological gambling in DSM-IV (American Psychiatric Association, 1994a), it followed the format of defining a mental disorder by symptoms and a cut-off point. It had eight questions. Respondents' saying yes to five items or more were considered Internet addicts. The eight questions are as follows:

1. Do you feel preoccupied with the Internet?
2. Do you feel the need to use the net with increasing amounts of time to achieve satisfaction?
3. Have you repeatedly made unsuccessful efforts to control, cut back or stop net use?
4. Do you feel restless, moody, depressed or irritable when attempting to cut down or stop net use?
5. Do you stay online longer than intended?
6. Have your jeopardized or risked the loss of a significant relationship job, educational or career opportunity because of the net?
7. Have you lied to family members or others to conceal your involvement with the net?
8. Do you use the net as a way of escaping from problems of relieving moods (e.g., depression, anxiety, guilt, etc.)? (Young, 1998)

A more recent version of diagnostic criteria was developed by Ko, Yen, Chen et al. (2005a). The 10 items belonged to three sections. Section A contained nine characteristic symptoms: preoccupation, uncontrolled impulse, usage more than intended, tolerance, withdrawal, impairment of control, excessive time and effort spent on the Internet, and

impairment of decision-making ability. Section B described functional impairment secondary to Internet use: failure to fulfill role obligations at school and at home, impairment of social relationships and violating school rules or laws. Section C was the exclusive criteria to eliminate the possibility of psychotic disorder and bipolar I disorder. People who report six or more of the symptoms in Criterion A and one or more of the secondary impairment in Criterion B would be considered as addicts.

Another type of measurement is to assign each respondent a sum score of all items indicative of symptoms or negative outcomes related to Internet addiction. Each item described a symptom or negative outcome related to Internet addiction. Respondents were asked to indicate their agreement to each item in a Likert scale. Higher score indicated that the person has experienced this symptom or negative outcome more frequently. For instance, Armstrong, Philips, Saling (2000) developed the "Internet Related Problem Scale". Twenty items measured symptoms of tolerance, craving, withdrawal and negative consequences. The response category ranged from "not true at all" (scored 1) to "extremely true" (scored 10).

The Internet Addiction Scale (IA) was developed by Nichols & Nicki (2004). The 31-item scale measured nine addiction symptoms. Seven symptoms were consistent with the diagnostic criteria for substance dependence in DSM-IV. Another two symptoms (salience and mood modification) were derived from Griffth (1998)'s definition of behavioral addiction. The response format ranged from "never" (scored 1), "rarely" (scored 2), "sometimes" (scored 3), "frequently" (scored 4), to "always" (scored 5).

Chou and Hsiao (2000) developed Chinese version of Internet-Related Addictive Behavior Inventory (IRABI). The English version of IRABI was developed by Brenner (1997). Items described addiction symptoms as well as negative outcomes of addiction. The Chinese version of IRABI revised some questions to fit Taiwan's particular network environment. The Chinese version of IRABI had 40 items. Response format ranged from "strongly disagree"

(scored 1), “disagree” (scored 2), “agree” (scored 3), to “strongly agree” (scored 4).

The Chinese Internet Addiction Scale (CIAS) is a 26-item scale assessing symptoms and negative outcomes (Chen, Weng, Su, et al., 2003). Three core symptoms are compulsive use, withdrawal and tolerance. Negative outcomes are problems in interpersonal relationship, health, and time management. Response format included “strongly disagree” (scored 1), “disagree” (scored 2), “agree” (scored 3), and “strongly agree” (scored 4).

To sum up, there were two types of measurements for internet addiction: diagnostic tools defining the addicted status by a specific number of symptoms and rating scales reporting frequency of addiction symptoms.

The problem of these diagnostic tools was inadequate support for their diagnostic validity. To explain why the current diagnostic tools might lead to misdiagnosis, the next section presents what is normally required to establish reliability and validity of the diagnostic tool for a mental disorder.

The application of standardized rating scales is hindered by the unsettled issue of how to interpret the meaning of addiction symptoms. Some researchers equaled frequency of addiction symptoms to “severity of addiction” (Chen, Weng, Su et al.,2004; Nichols & Nicki, 2004) and suggested that people experiencing a limited number of symptoms (i.e. having a low sum score) was addicted in a mild level- this interpretation was problematic as people might not be addicted at all, given only a handful of symptoms reported. Others just left the confusion as it was, reporting frequency of addiction symptoms (Armstrong, Philips, Saling, 2000; Chou & Hsiao, 2000). As a response, the next section introduce another way to understand the relationship between internet addiction symptoms and the addicted status based on a discussion on the dimensional approach to mental disorder diagnosis and its relationship with the categorical diagnosis (i.e. the diagnostic tools).

Table 2.1

Measurements of Internet Addiction

Author(s)	**Measurement**	**Content**	**No. of items**	**Answer type**	**Interpretation of scores**	**Reliability & validity**
Young (1998)	Internet Addiction Test	Modification of the criteria for compulsive gambling	8	Yes/No	5 or more symptoms=addicted	NA
Ko, Yen, Chen et al. (2005a).	The diagnostic Criteria for Internet Addiction	Symptoms & functional impairment secondary to Internet addiction	9 for symptoms; 3 for impairment	Yes/No	6 or more symptoms & 1 or more impairment=addicted	NA
Chou & Hsiao (2000)	Chinese IRABI version II (C-IRABI-II)	Modification of the criteria for substance abuse & negative consequences	40	1=strong agree, 2= agree, 3=disagree, 4= strongly disagree.	Higher scores representing higher frequency of Internet Addiction symptoms	Cronbach's α=.93
Armstrong, Philips, Saling (2000)	Internet Related Problem Scale	Tolerance, craving, withdrawal & negative life consequences	20	From 1=Not true at all to 10=Extremely true.	Same as above	Cronbach's α=0.88. Criterion validity

Table 2.1 (Continued)

Measurements of Internet Addiction

Author(s)	Measurement	Content	No. of items	Answer type	Interpretation of scores	Reliability & validity
Nichols & Nicki (2004)	IAS	Modification of criteria for substance dependence, salience & mood modification	31	1=never, 2=rarely, 3=sometimes, 4=frequently, 5=always	Higher scores representing higher frequency of Internet Addiction symptoms & higher severity of addiction	Cronbach's α =.95. Construct validity
Chen, Weng, Su et al. (2004)	CIAS	Symptoms (compulsive use, withdrawal, tolerance) Related problems in interpersonal relationships, health and time management.	26	1=never, 2=rarely, 3=sometimes, 4=always	Same as above	Cronbach's α for the scale and the sub-scales ranged from 0.79 to 0.93 Criterion validity Construct validity

The Evolved Definition of Addiction

This section aimed to illustrate how the definition of addiction has evolved in order to enhance our understanding of the various addiction symptoms used to define internet addiction.

Nowadays all types of addictive disorder are characteristically defined by a group of symptoms. But at the very beginning things were quite different. The discussion of addiction in history can be seen as early as in the *Scriptures of the Bible*. Addiction was considered caused by sin and lack of spiritual understanding. Those who violate religious doctrines by excessive drinking or drug abuse are deemed as "sinners" (Thombs, 1994). Themes of addiction and resistance to temptation are scattered throughout the Bible, with passages such as "abstain from fleshly desires, which wage war against soul" (Peter 2: 11) and "the sin that so easily entangle us" (Hebrews 12:1) referring to the pressures which addiction demands of the individual (Debus, 1968).

Since the early 20th century, the disease model of addiction gradually replaced the moral model. It was the first time that symptoms such as tolerance and withdrawal were introduced to describe such a disease as addiction. In 1960, E. Morton Jellinek, a physiologist, published his influential book, *The Disease Concept of Alcoholism* after extensive research on alcoholism in various cultures for more than two decades. In the book, he described four types of alcoholism, which he labeled with letters of Greek alphabet (Jellinek, 1960, p. 113-145). According to Jellinek (1960), only Gamma and Delta alcoholism characterized by tolerance and withdrawal were considered true disease. Gamma alcoholics had developed a tolerance to alcohol, experienced withdrawal symptoms when drinking is discontinued and lost control over drinking. Delta alcoholics were similar to gamma alcoholism in terms of tolerance and withdrawal manifested, yet the delta drinkers did not lose control and get drunk, though they were seldom entirely sober for they drink regularly throughout the day

(wine with lunch, dinner).

In 1980 when the third edition of the Diagnostic and Statistical Manual of Mental disorders (DSM-III, American Psychiatric Association, 1980) was published, tolerance and withdrawal was officially acknowledged as two characteristic symptoms for alcohol dependence. Tolerance was indicated by decreased reactivity to the same dose of a substance over time or the need for a larger dose of the substance to achieve the same effects. Withdrawal was defined as the aversive disequilibrium of the body when the person is deprived of the substance after a period of sustained use. Manifestations of withdrawal symptoms included irritability, frustration or anger, anxiety, difficult concentrating, restless, decreased heart rate, and increased appetite or weight gain. Similar way of defining addictive disorders could be found in other internationally recognized manuals published in the same period of time the Ninth Version of International Classification of Disorders (ICD-9) published in 1977 (World Health Organization, 1977).

In the revision of DSM-III, known as DSM-III-R published in 1987 (American Psychiatric Association, 1987), the category of dependence was expanded to include behavioral and psychological symptoms in addition to tolerance and withdrawal. Early in the late 1970s, the World Health Organization (WHO) brought together a group of experts to address the growing difficulties inherent in the term alcoholism that did not take into account the broad spectrum of physical, psychological and behavioral symptoms (Shaw, 1982). Two members of the WHO team of experts, Griffhs Edwards and Milton M. Gross (1976) presented the term alcohol dependence syndrome (ADS). The syndrome was a cluster of seven elements; not all of the symptoms need to be present for diagnosing a person as an addict. The seven elements were:

(1) *Narrowing the drinking repertoire*: the drinking was routinely scheduled each day;
(2) *Salience of drinking-seeking behavior*: the drinking was given priority above other activities;
(3) *Increased tolerance to alcohol*: increasingly more alcohol was required to experience the same effect;
(4) *Repeated withdrawal symptom*: the common withdrawal symptoms were tremor, nausea,

sweating and mood disturbances;

(5) *Relief or avoidance of withdrawal by further drinking*: the dependent drinkers kept drinking so that they would not experience symptoms of withdrawal;
(6) *Subjective awareness of compulsion to drink*: a subjective experience of impaired control over drinking, inability to stop drinking even considering the way of drinking unreasonable, or a feeling of alcohol is a necessity when start drinking;
(7) *Reinstatement after abstinence*: a rapid return to previous levels of consumption when drinking restarted.

The concept of ADS was quickly developed into psychiatric classification systems to define psychoactive substance disorders- for all psychoactive drugs, not just alcohol. Similarly to DSM-III-R, the Tenth Revision of the International Classification of Diseases and Health Problems (ICD-10) defined dependence syndrome as being a cluster of physiological, behavioral, and cognitive phenomena in which the use of a substance or a class of substances took on a much higher priority for a given individual than other behaviors (World Health Organization, 1992). So was in DSM-IV ((American Psychiatric Association, 1994).

In line with this expanded list of symptoms, the category of addiction has been expanded to include both substance (chemical) addictions and behavioral addictions. The objects of substance addiction include alcohol, heroine, Alcohol, amphetamine, caffeine, cannabis, cocaine, hallucinogen, nicotine, etc.; the object of behavioral addiction could be gambling (Griffths, 1995), video game playing (Griffths, 2002), overeating (Orford, 2001), sex (Carnes, 1983), exercise (Terry, Szabo, & Griffths, 2004), and Internet use (Young, 1998). Marlatt, Baer, Donovan, & Kivlahlan (1988, p.224) defined addictive behavior as

> *a repetitive habit pattern that increases the risk of disease and/or associated personal and social problems. Addictive behaviors are often experienced subjectively as "loss of control" the behavior continues to occur despite volitional attempts to abstain or moderate use. These habit patterns are typically characterized by immediate gratification (short-term reward), often coupled with delayed, deleterious effects (long-term costs). Attempts to change an addictive behavior (via treatment or by self-initiation) are typically marked by high relapse rates.*

Griffths (2000) referred to six features of behavioral addiction in this discussion of problematic internet use. The six core components of addiction are: salience, tolerance, withdrawal, mood modification, conflict, and relapse:

1. Salience – this occurs when the particular activity becomes the most important activity in the person's life and dominates their thinking, feelings and behavior.
2. Mood modification- this refers to the subjective experiences that people report as a consequence of engaging in the particular activity, i.e., they experience an arousing "buzz" or a "high" or tranquilizing feel of "escape"
3. Tolerance- this is the process whereby increasing amounts of the particular activity are required to achieve the former effects.
4. Withdrawal symptoms – these are the unpleasant feeling states and/or physical effects that occur when the particular activity is discontinued.
5. Conflict – this refers to the conflicts between the addict and those around them, conflicts with other activities, or from within the individual themselves.
6. Relapse- this is the tendency for repeated reversions to earlier patterns of the particular activity to recur.

To sum up, the above section discusses the evolved definition of addiction. In line with the current practice, Internet addiction is defined in this study as a kind of behavioral addiction that is represented by symptoms such as tolerance, withdrawal, impaired control and continued use despite negative consequences.

Categorical Approach to Diagnosis for Addiction

This section describes the evolution of categorical diagnosis in mental health and to illustrate how many validations tests a diagnosis tool had gone through before it was officially acknowledged. Then it is argued that the current diagnostic tools for internet addiction did not have enough support for their reliability and validity and thus they might be better used to identify the high risk group rather than the "addicts" group.

Categorical diagnoses are set by counting the number of symptoms and assign a positive diagnosis (presence of the disorder) if certain preassigned number of symptoms (indicating a certain threshold level of severity and duration) are exceeded. For instance, DSM-IV (American Psychiatric Association, 1994) describes a person with substance dependence as someone who has at least *three of the seven symptoms* in the same 12-month period in order for the label of substance dependence to be applied.

The categorical diagnosis is praised for its reliability and validity. Reliability of diagnosis is concerned about whether different diagnosticians using the same classification

system arrive at the same diagnosis. Previously, in the first (American Psychiatric Association, 1952) and second edition (American Psychiatric Association, 1968) of the Diagnostic and Statistical Manual of Mental Disorder (DSM), the diagnosis relied on unprovable notions about the nature and causes of mental illness, and thus psychiatrists couldn't agree on who was sick and what ailed them. On the contrary, the categorical diagnosis advanced in DSM-III (American Psychiatric Association, 1980) set the standard definition of a list of symptoms and the cut-off point that ensures a consistent, replicable result on diagnosis; this practice is maintained since then.

Validity is the characteristic of the inference from the disorder to the diagnosis. A disorder is something problematic for the patient for which s/he would likely seek clinical attention, and for which clinicians might provide treatment. A diagnosis is expert's opinion on whether the disorder is present or not. Validity is difficult to establish since there is no golden standard determinant for the disorder; assigning a diagnosis to one patient based on symptoms is always laden with uncertainty (First & Spitzer, 2003).Generally, the best that can be done is to challenge validity in a variety of ways using a variety of criteria. Each challenge survived gives greater assurance of validity. Borrowing terms from psychometric theory, psychiatrists have mainly been concerned with content, predictive, and discriminant validity (Kendell & Jablensky, 2003).

Content validity of the diagnoses was achieved by requiring consensus among clinicians in that disorder. Predictive validity is the measurement's ability to predict outcome (Robin & Guze, 1970). Predictive validators could be diagnostic consistency over time, rates of relapse and recovery, and response to treatment (Kendler, 1980). Discriminant validity is established when the diagnosis for a particular disorder has been shown to be a discrete entity with natural boundary that separates it from other disorders. The discriminant validity of a new or revised diagnosis tool, or say, the precise clinical description and great delineation of the syndromes from other disorders could be established through three distinct but interactive

stages are required: comprehensive reviews of the literature, reanalyses of previously collected data sets, and diagnosis-focused field trials (Frances, First, & Pincus, 1995).

Therefore, to establish reliability and validity of the categorical diagnosis requires a standard definition, widespread expert consensus as well as a large number of expert discussions, laboratory studies, and clinical trials. Under these standards, the diagnostic tools for internet addiction could be considered moderately reliable thanks to their standardized definitions, yet their validity was called into question for (1) no expert consensus on the specific grouping of the symptoms and the cut-off point and (2) inadequate tests for its predictive and diagnostic validity despite some small-scale tests conducted by the scale developers (e.g. Armstrong, Philips, Saling, 2000; Nichols & Nicki, 2004; Ko, Yen, Chen et al. , 2005a; Young, 1998). This does not mean that these diagnostic tools are useless. Yet considering the harm from misdiagnosis, it is suggested that, for the moment, the diagnostic tools for Internet addiction might be better used to identify high-risk group rather than the internet addicts.

Dimensional Approach to Diagnosis for Addiction

As mentioned earlier, the rating scales for measuring internet addiction have been troubled by the question of how to interpret the meaning of addiction symptoms. This section introduces the dimensional approach to mental disorder diagnosis and discusses its relationship with the categorical diagnosis (i.e. the diagnostic tools). It was then argued that severity of internet addiction symptoms could be used to indicate the likelihood of being diagnosed as internet addicted.

The rating scales for internet addiction, as introduced earlier, could be compared with the dimensional approach in the diagnosis of mental disorder (Helzer, 2007; Kraemer, 2007). A

dimensional system classifies clinical presentations based on quantification of symptoms rather than the assignment to categories. A dimensional score may have as few as three values (e.g., no, ambiguous, yes), or may have many values on a continuum (e.g., the score range of 1-5) (Kraemer, Noda, & O'Hara, 2004).

The dimensional approach describes the variability not reflected by the categorical approach. A categorical approach to a diagnosis ends up in labeling each subject as either having or not having a disorder. A dimensional approach results in labeling each subject with an ordinal score. When the disorder is present in a categorical sense, patients may vary with respect to age-of-onset, severity, symptomatology, impairment, resistance to treatment and a variety of other disorder characteristics (dimensional). When the disorder is not present, subjects may vary in susceptibility to that disorder, and may well express some of its symptoms to some degree. Therefore, the dimensional measure contributes to knowledge of the severity of the symptomatic components of the syndrome and enables clinicians and researchers to measure the clinical variation in symptomatogy and sensitivity to change among those who are diagnosed positive as well as those who are diagnosed negative (Kraemer, 2007). It also avoids the problems that arise with any strict diagnostic cut-off point (e.g. borderline case) (Helzer, 2007).

Besides, researchers prefer dimensional approaches for hypothesis testing. It has long been known that when faced with a choice between an ordinal measure (here a dimensional diagnosis) and a dichotomization of that measure (here the corresponding categorical diagnosis), power of hypothesis testing is virtually always sacrificed in using the categorical diagnosis (Cohen, 1983; Mac-Callum, et al., 2002). How much power is sacrificed varies according to the chosen cut-off point. Even worse, conflicting research conclusions may be drawn from the same data depending on where the cut-off point is set. For these reasons dimensional approaches are always preferred for hypothesis generation and testing.

The dimensional measure can be converted to categorical diagnosis if needed. Higher scores of a dimensional measure could be considered indicating higher likelihood of having

the disorder (i.e. positive for the categorical diagnosis). Helzer (2007) suggested that if one stratifies the population on the dimensional diagnosis, the probability of a positive categorical diagnosis (i.e. presence of the disorder) should consistently increase as the scores of dimensional measure increases. When the cut-off point is determined, the categorical diagnosis was positive if the dimensional score is higher than the cut-off point and is negative if the dimensional score is lower than the cut-off point (Kraemer, et al., 2004).

In line with the above discussion, the scales of internet addiction could be considered dimensional measures for internet addiction. Since there was no officially acknowledged categorical diagnosis for internet addiction, scale scores were regarded as on a continuum with higher severity of internet addiction symptoms indicating higher likelihood of having the disorder(Helzer, 2007; Kraemer, et al., 2004).

Summary of the first section

To conclude, in this study, internet addiction is defined as a kind of behavioral addiction that is represented by symptoms such as tolerance, withdrawal and impaired control. Two types of measurements would be used in this study: a categorical diagnosis to identify high-risk group and a rating scale to measure severity of Internet addiction symptoms.

EMPIRICAL RESEARCH ON INTERNET ADDICTION

Empirical research on adolescent Internet addiction has been undertaken in Mainland China, in other Eastern societies (e.g. South Korea, Singapore, and Taiwan) as well as in Western societies. As mentioned earlier, different studies adopt different definitions and measurements for Internet addiction, which more or less influence the comparability of results from different studies. Nevertheless, some factors have been consistently reported; most of them are factors that personality characteristics or Internet use behaviors.

Risk Factors Identified in Mainland China

Adolescent Internet addiction has been a hot topic for investigation in the past decade. A search with the tile of "Internet addiction" in Chinese Academic Journal Database yielded 1500 records between 2000 and 2011. Despite such a large number of empirical studies, research in this area is still in its infancy. The common practice of those studies was to choose some variables and test their correlation with Internet addiction. Most of these are variables in personality characteristics or Internet use behaviors: being engaged in interactive and entertainment online activities (e.g. playing on-line games, chatting on-line with the use of MSN, ICQ or other tools, downloading music, watching on-line TV, reading entertainment news), male, living in single-parent family, easy accessibility of the Internet, etc. Table 2.2 provides some examples of such studies.

Table 2.2

Risk Factors Identified in Mainland China

Author (s)	**Sample**	**Age/Grade**	**Percentage of "addicts"**	**Risk factors**
Yu & Du (2007)	3068	Grade 7& 10	8.65%	Male, living in a single-parent family, living with grandparents, harsh parenting
Lei & Wu (2007)	712	11-19	NA	Senior high school, alienation from father
Tam, Peng, Mai, & Jing (2009)	1,639	13-18	10.8%	Male, drinking behavior, family dissatisfaction, experience of recent stressful events
Fei, Qiu, & Jiang (2006)	1193	Grade 7-12	9.2%	Single-mother family, remarriage family living with mother Place: net café Internet services: chatting, on-line game
Shi, Zhou, Ge, Qin & Zhang (2005)	307	Grade 7-12	14.87%	Boredom susceptibility in Sensation Seeking Scale
Wang, Wang & Fu (2008)	31,915	Grade 4 to 12	8.4% (Grade 7), 7.3% (Grade 8), 7.5% (Grade 9), 6.3% (Grade 10), 6.2 (Grade 11), 8.4% (Grade 12)	Rural area, general school, living at school, single-child, male

Risk Factors Identified in other Eastern Societies and Western Societies

Research on Internet addiction started earlier in Western societies as well as in Eastern societies like South Korea, Singapore, Taiwan, and Hong Kong and provided a longer list of risk factors.

Depression

Previous studies have found that scores of depression in addicts group were higher than that in non-addicts group or that scores of Internet addiction scale were positively correlated with depression scores. Researchers explained the finding by suggesting that depressed people may use the Internet to treat their depression by the pleasure of Internet use. This is

akin to the self-medication model-one traditional model in the field of substance dependence (e.g. Khantzian, 1974).

Young and Rodgers (19998) used Zung Depression Inventory (Zung, Richards & Short, 1965) and Young's DQ to assess 259 valid respondents out of a total of 312 survey responses. Their results indicated that the identified "Internet addicts"[1] on average report higher levels depression. Ceyhan & Ceyhan (2008) examined the relationship between depression and problematic Internet use using the sample of 559 university students in Turkey. Beck Depression Inventory was used to determine the degree of depression symptoms. The findings suggest that depression as well as loneliness were significant predictors of scores of Internet addiction scale. In South Korea, Ha and his colleagues (Ha, Kim, Bae et al., 2007) evaluated the relationship between depression and Internet addiction of adolescents. A total of 452 adolescents were recruited. Depressive symptoms were evaluated by Center for Epidemiologic Study for Depression (CES-D), Korean version. Internet addiction was assessed by Young's Internet Addiction Test. Scores of Internet addiction scale were significantly associated with depressive symptoms. Similar results are reported by Kim and his colleagues (Kim, Ryu, Chon, et al., 2007). The participants were 1573 high-school students. 1.6% was diagnosed as Internet addicts, while 38.0% was classified as possible Internet addicts. The levels of depression were highest in Internet-addicts group than in non-addicts group. In Taiwan, Su & Tung (2004) compared internet addicts and non-addicts among a total of 1708 high school adolescents. 236 (13.8%) were identified as addicts using the DQ developed by Young (1998). The results revealed that students with higher depression level had a stronger tendency to become addicted.

Loneliness

1 Since there could be chance of misdiagnosis due to the diagnostic tools, quotation mark was put around the term *Internet addicts*.

The “the lonely drawn to the Internet” hypothesis propose that lonely people are attracted to the Internet for intimate self-disclosure and close relationship established online. Online interaction, due to its anonymity and lack of gating features, might facilitate more self-disclosure and establishment of close friendship online (McKenna & Bargh, 1999, 2000)

Whang, Lee & Chang (2003) conducted an online survey. 3.5% of 14, 111 participants were diagnosed as “Internet addicts”. The “Internet addicts” reported more time of Internet use and higher scores in depression and loneliness. Morahan-Martin & Schumacher (2000) surveyed 277 undergraduate Internet users. Of them, 8.1% reported four or more symptoms of pathological Internet use and were considered as “pathological Internet users”. The results showed that “pathological users” had a higher level of loneliness than non-pathological users. Also, Kim, La Rose and Wei (2009)’s longitudinal study showed that individuals who were lonelier scored higher in Internet addiction scale 6 months later.

Caplan (2003) tried to explain the relationship between loneliness and Internet addiction by proposing a mediator: preference for online social interaction (POSI). POSI is a set of cognitive beliefs that one is safer, more efficacious, more confident, and more comfortable with online interpersonal interaction than with traditional face-to-face interaction. The measurement for POSI include four items: “I am more confident socializing online than offline”, “I feel safer relating to other people online rather than face-to-face”, “I prefer communication with other people online rather than face-to-face”, “Meeting and talking with people is better when done online rather than in face-to-face situations”. The hypothetically mediator role of POSI was supported by data. It suggested that lonely people are more likely to be attracted by online interpersonal interaction, and thus are more likely to become addicted to this function of Internet use. It was consistent with the research findings that people being addicted to the Internet have a preference for interpersonal interaction activities online.

Social anxiety

The "the lonely drawn to the Internet" hypothesis, however, was overthrown by Caplan himself. Caplan (2007) pointed out that situational loneliness has been confounded by dispositional loneliness in previous studies. According to Caplan (2007), it should be the dispositional loneliness (social anxiety) rather than situational loneliness (loneliness) that predicts Internet addiction. Social anxiety is defined as a state of anxiety resulting from the prospect of presence of interpersonal evaluation in real or imagined social settings (Leary, 1983a). To reduce perceived social risks, socially anxious people restrict their self-representational behaviors to situations perceived as relatively safe bets and will want to convey self images that carry little risk and will want to avoid jeopardizing their images if they can help it (Leary, 1983a). Socially anxious people should be more likely than those who are not socially anxious to prefer online social interaction because they perceive their self-presentational efficacy online to be greater than in face-to-face interaction (Shepherd & Edelmann, 2005). In Caplan (2007)'s study, the previous significant bivariate correlation between loneliness and scores of pathological Internet use decreased to insignificant when social anxiety was controlled. It was also found that preference for online social interaction-cognitive beliefs that one is safer, more efficacious, more confident, and more comfortable with online interpersonal interaction-was a significant mediator.

Low self-esteem

Low self-esteem has been found to be an important predictor for other addictive behaviors (Marlatt, Baer, Donovan, & Kivlahan, 1988; Hirschman, 1992). It is speculated that low self-esteem people may use addictive substance to withdraw or escape from these negative evaluations (Craig, 1995; Shotton, 1991). Researchers of Internet addiction explored whether

Internet is also preferred by low self-esteem people.

Armstrong et al. (2000) examined the relationship between self-esteem and pathological Internet use. 50 participants took part in the study. Internet addiction was assessed by the Internet Related Problem Scale developed by the authors, including 20 questions inquiring symptoms of tolerance, craving, withdrawal and negative consequences. Self-esteem was assessed by the Coopersmith Self-esteem Inventory (SEI), in which self-esteem was defined as "personal judgment of worthiness expressed in attitudes a person holds towards the self" (Coopersmith, 1991, p.12). It was found that poorer self-esteem predicted greater scores on the Internet Related Problem Scale.

Niemz, Griffths, & Banyard (2005) compared the psychosocial characteristics among pathological Internet user and non-pathological users. A total of 371 British students filled in the questionnaire. 18.3% of the whole sample reached the criteria for "pathological Internet user" defined by the researchers themselves. Pathological users report lower self-esteem than the normal group.

There could be other types of substitute gratification, for instance, self-esteem, substitute gratification of competence, but previous studies have been unequivocal on that, so we did not include it in this research.

Perceived stress level

One study has examined the relationship between stress and Internet addiction (Lam, Peng, Mai & Jing, 2009). Participants were recruited from high school students, aged 13 to 18 years, registered on the secondary school registry in Guangzhou city using a stratified random sampling technique. Internet addiction was assessed using the Internet Addiction Test (IAT).The majority of respondents were classified as normal users of the Internet (n=1,392,

89.2%), with 158 (10.2%) moderately and 10 (0.6%) severely addicted to the Internet. After adjusting for other variables, the odds to be addicted were 10 times greater (OR=10.0, 95% CI=6.5–12.2) for young people who had experienced a recent event and felt very stressed and 2.8 times greater (OR=2.8, 95% CI=1.8–4.4) for those who felt moderately stressed than for those who had no stressful experience or who had experienced an event but did not feel any stress at all.

Time spent online

In Young (1998)'s study, "Internet dependents" reported a striking average of 39 hours per week spent online. Chen and Chou (1999) reported that the Internet addiction "high-risk" group (n=69) spent an average of 20 hours per week online while normal group (n=1232) spent 9 hours online per week. Chou & Hsiao (2000) found that the 54 "Internet addicts" spent about 20-25 hours per week while non-addicts (n=856) spent about 5-10 hours. In Yang and Tung (2004)'s study, 236 "Internet addicts" spent approximately 21.2 hours per week on the Internet, while non-addicts (n=1572) spent around 12.1 hours.

In brief, time spent online was found to be one risk factor for Internet addiction. In other words, more time spent online, more likelihood of addiction there is. However, average time spent online per week might not depict the Internet use behavior accurately, since time spent online could fluctuate from day to day. Besides, since most existing studies are cross-sectional, the causal relationship cannot be established for sure.

Type of Internet activities and gratification of Internet use

In addition to more time spent online in general, the identified "addicts" are found to spend more time specifically on communication and entertainment activities. In Young's study (1998), "Internet dependents" used more two-way communication functions such as

chat rooms, role-playing games, newsgroups or email than non-dependents. Chou & Hsiao (1999) reported that the "Internet addicts" more frequently used the chat and talk functions of electronic Bulletin Board Systems (BBSs). Another study (Van den Eijnden, Meerkerk, Vermulst, Spijkerman, Engles, 2008) investigated the relationship between adolescents' online communication and compulsive Internet use with a longitudinal design. The sample consisted of 663 students, 318 males and 345 females, aged from 12 to 15 years old. The frequency of using real time online communications was related to compulsive Internet use 6 months after the initial assessment, that is, on average, adolescents more frequently engaged in instant messaging and chatting had a higher incidence of compulsive Internet use 6 months later.

In the above studies, no further explanation is given for the identified relationship between communication or entertainment activities and Internet addiction. Yet researchers of media and communication introduced the Use and Gratifications Theory as a possible explanation. Use and Gratifications Theory is a popular approach to understanding mass communication. The theory assumes that audiences are taking an active role interpreting and integrating media into their own lives. It also holds that audiences are free to choose media to meet their needs and fulfill specific gratifications (Katz, Blumler, & Gurevitch, 1974). Researchers of Internet addiction extend this theory by suggesting that people who obtain more gratifications from Internet use are more likely to become addicted. Though the second half sentence is not strongly supported by Use and Gratification Theory, as the theory explains media consumption rather than addiction, the hypothesized relationship between Internet gratification and addiction is supported by empirical data.

For example, in Chou and Hsiao (2000)'s study, subjects are asked to mark their gratification level on 12 items with a 5-point scale from very satisfied (5) to very dissatisfied (1). Examples of Internet gratification include pleasure of communication with other people,

having fun and searching for information. 910 college students participated in this study. It turned out that gratification level of Internet use is a significant predictor for scores of Internet addiction. Yang & Tung (2007) investigated differences of Internet gratification among a sample of high school students in Taiwan. The *Internet Usage Motivation and Gratification Scale* was designed by the researchers. Sample items included: "kill time for entertainment when bored", "learn about the latest news", "make new friends", and "play roles different from those played in real-life". Items were assessed by a 6-point Likert type scale. Exploratory factor analysis results yielded two factors: use of the Internet for social/entertainment purposes and use of the Internet to search for information. Scores for social and entertaining gratification in the "addict" group (N=236) was significantly higher than that in "non-addict group" while there is no difference in instrumental gratification for both groups.

La Rose and his colleagues (La Rose, Mastro & Eastin, 2001; Song, LaRose, Eastin and Lin, 2004) linked Use and Gratification Theory with Social Cognitive Theory. They argued that the gratification obtained through media use represents the same process of enactive learning in social-cognitive theory and that the gratifications of Internet use could be considered social-cognitively as outcome expectancy. Song, et al. (2004)'s measure for outcome expectancy of Internet use include seven categories of expected outcomes: Virtual Community, Aesthetic Experience, Diversion, Personal Integrative Needs, Relationship Maintenance, Information Seeking and Momentary Compensation. Items were collected from prior uses and gratifications studies, rephrased as outcome expectations (i.e., "using the Internet how likely are you to…") on a scale of 1-7, where 1 was very unlikely and 7 very likely, 172 Internet users completed the survey. Regression analysis showed that sub-category of Virtual Community, Aesthetic Experience, Diversion and Relationship Maintenance were significantly related to scores of an Internet addiction scale, which in total explained 28% of

the variance of the dependent variable.

To summarize, longer time spent on and more gratifications obtained from communication and entertainment activities are found to be predictors for Internet addiction. The interest on gratification of Internet use originates from Use and Gratification Theory，yet the hypothesized relationship cannot be fully accounted for by gratification theory. Some psychological researchers tried to make use of Outcome Expectancy Theory, in which the concept of outcome expectancy could be understood as gratification of Internet use, yet they still failed to explicate the relationship between outcome expectancy and addiction in the reasoning. Outcome Expectancy Theory is one of the key building blocks in the theoretical model proposed in this research. We would discuss it in the last section of this chapter.

Family factors related to Internet addiction

Only a limited number of studies have paid attention to the role of family in the development of Internet addiction. Most of these studies are not supported by sound theories. For instance, Yen, Yen, Chen et al. (2007) explores family factors such as economic status, parental marriage status, caregivers, the frequency of intra-family conflict, family habitual alcohol use, and perceived parental or caregiver attitudes toward adolescent substance use. A total of 3662 students were recruited from seven junior secondary schools in Taiwan. The results demonstrated that higher parent-adolescent conflict and poorer family functioning were significantly correlated with higher scores in Internet addiction scale. Another study with family functioning as risk factor is conducted by Ko and his colleagues (Ko, Yen, Yen, Lin, & Yang, 2007). 517 students (267 male and 250 female) were recruited from three junior secondary schools in southern Taiwan. It reveals similar results that scores family functioning is negatively related to scores of Internet addiction scale. For another instance, Park, Kim, & Cho (2008) explored the role of parenting attitude, family communication, family cohesion as

well as family violence. The participants were middle and high school students residing in Seoul. One-tenth (10.7%) of the 903 adolescents surveyed were identified as at high risk for Internet addiction according to the criteria proposed by the authors. Results showed that parenting attitudes, family communication, family cohesion were negatively related to scores of Internet addiction, while family violence exposure was positively associated with scores of Internet addiction.

Hence, research on family factors is rather limited. In addition, so far few studies pay attention to the role of peers. This is possibly because addiction is a phenomenon mostly frequently studied by psychology or medical science whose focus is on individual factors. Yet family and peer factors could be distal causes of excessive use and addiction. In this research, we shall introduce a theoretical model that might introduce more contextual factors. Meanwhile, to ensure that the theoretical model to be tested is based on empirical research, in this research, only one peer variable would be tested in this theoretical model. More research, more contextual factors will be introduced once this theoretical model that imply the importance of studying contextual factors are tested by empirical data.

Summary of the second section

Studies in Mainland China and other countries or societies have reported a variety of risk factors. One limitation of previous research was that most identified risk factors were either individual attributes or internet use behaviors. This might result in the wrong conclusion that either the person or the internet should be blamed for becoming addicted. Another limitation is that most studies are testing the two-variable associations; studies on mediation models are lacking.

This study tried to refine and extend previous research by (1) proposing and testing the mediation models that account for the effects of some identified risk factors and internet addiction; and (2) suggesting a new understanding for how the identified risk factors

influence the development of internet addiction if the mediation models are supported.
The mediators, desirable outcome expectancies, are defined as beliefs that that internet use is the only way for certain needs satisfaction or stress coping. The definition of the mediator as well as the reasoning of the mediation models were based on theories including outcome expectancy theory (Bandura, 1977; Jones, Corbin & Fromme, 2001; Oei & Baldwin, 1994) , substitute gratification theory (Peele, 1998), and stress coping theory (Lazarus & Folkman, 1984; Abrams & Niaura, 1987). These theories were introduced in detail below.

THEORIES OF ADDICTION

The Relationship between Repetitive Internet Use and Internet Addiction

Before introducing new theories, this section would first discuss the relationship between repetitive internet use (i.e., spending a lot of time online) and internet addiction.

If we take a closer look at the prior research on internet addiction, we would notice that the identified risk factors and psychosocial theories concerned were actually explaining why some people spent a lot of time online rather than why they become addicted. For instance, the main proposition of outcome expectancy theory (La Rose, Mastro & Eastin, 2001; Song, LaRose, Eastin and Lin, 2004) is that people who obtain more gratifications from Internet use would spend longer time online; yet the theory did not clarify the relationship between "spending a lot of time online" and "becoming addicted".

A lot of details remain unknown concerning the exact mechanism from repetitive use to becoming addicted. Yet based on existing findings, we can conclude with some degree of assurance that repetitive use is a precondition for becoming addicted. The arguments supporting this assertion are presented in the following steps:

1 introducing addiction as a neurobiological disorder;
(8) describing addiction symptoms as results of changes in function and structure of brain circuits;

(9) arguing that repetitive use (i.e. repeated interaction with the object of addiction) is a precondition for enduring neural changes to take place; and
(10) asserting that repetitive use is associated with occurrence and development of addiction symptoms on the basis of the argument 2 and 3.

Addiction as a neurobiological disorder

The last 20 years of research has made it clear that addiction to drugs is based on pathological changes in brain function (De Vries & Shippenberg, 2002; Everitt & Robbins, 2005; Everitt & Wolf, 2002; Hyman & Malenka 2001; Robinson & Berridge 1993, 2000; Vanderschuren & Kalivas, 2000).

In 2010, the National Institute of Drug Abuse put forward the definition of addiction as a chronic, relapsing brain disease. It further stated that addiction is considered a brain disease because drugs change the brain-they change its structure and how it works. These brain changes can be long lasting, and can lead to the harmful behaviors seen in people abusing drugs (The National Institute of Drug Abuse, 2010). Similarly, the American Society of Addiction Medicine defined addiction as a primary, chronic disease of brain reward, motivation, memory and related circuitry (American Society of Addiction Medicine, 2011).

The latest research results have suggested that behavioral addiction might share the similar neurobiological mechanism with substance addiction, in addition to the already identified similarities in psychological and behavioral symptoms (Lejoyeux & Weinstein, 2010; National Institute on Drug Abuse (NIDA), 2002). Natural rewards are found to be capable of inducing changes in addiction-related circuitry, though probably less pronouncedly than drugs do (Olsen, 2011). In some individuals, the neural changes may contribute to a state of compulsive engagement in behaviors (i.e. behavioral addiction) that resembles drug addiction. Neurobiological research on Internet addiction have provided preliminary evidences for the brain circuits involved similar to those of other kinds of addiction (e.g. Ko,

Liu, Hsiao, et al., 2009; Weinstein, 2010).

The fact that being addicted involves neural changes does not disagree with previous definition of addiction by behavioral and psychological symptoms. Addiction symptoms have been found to be closely related to neural changes, as illustrated below.

The neurobiological mechanism and the addiction symptoms

It was found that the symptoms of tolerance and withdrawal were related to the regulation of dopamine in the VTA-accumbens pathway[2]. When drugs of abuse are administered, dopamine concentrations in the nucleus accumbens rise. This is called the a-process. The a-process mediates the acute reinforcing effects of drugs yet it at the same time triggered activation of a negative b-process. The b-process was manifested as decay of the drug's high after the euphoric a-process (Koob & Le Moal, 1997). Usually the b-process served to help restore homeostasis and bring brain back to normal. However with chronic drug use, the b-process grows both in magnitude and duration and thus would gradually stifle the brain's reward circuitry. Thus *tolerance* was induced as the b-process makes the same-old dose of drug less rewarding. Meanwhile, the sudden cessation of drug use would cause dopamine neurotransmission to further drop below normal levels. The inhibited reward pathway leaves the individual depressed and unable to take pleasure in previously enjoyable activities in the drug's absence, resulting in a dysphoric state of *withdrawal* (Koob & Le Moal 1997, 2001).

Another widely explored symptom is craving. Craving is hypothesized to be related to structural brain changes that mediate the psychological function of incentive salience (Berridge & Robinson 1995, 1998; Robinson & Berridge, 1993, 2000).According to Nestler & Malenka (2004), with repeated drug administration, the neurons of nucleus accumbens

2 VTA-accumbens pathway is the brain circuit critical to addiction. It is composed by a set of nerve cells that originate in the ventral tegmental area (VTA), near the base of the brain, and send projections to the nucleus accumbens deep beneath the frontal cortex. Those VTA neurons communicate by dispatching the chemical messenger (neurotransmitter) from the terminals of their long projections to receptors on nucleus accumbens neurons.

would sprout additional buds that bolster the cell's connections to other neurons. The extra connections amplify signaling between the linked cells, or say, cause the over-sensitization of these neural substrates which are responsible for the function of attributing the *incentive salience* to the perception or representation of drug-related cues (Robinson & Berridge, 1993, 2000; Berridge & Robinson 1995, 1998).As a result, the drug-related cues become attractive and 'wanted' and is able to elicit compulsive behavior of repeated drug use. The susceptible individuals compulsively pursued drugs and experienced strong craving (Berridge & Robinson 1995, 1998; Dickinson, Smith, Mirenowicz, 2000; Robinson & Berridge, 1993, 2000).

To sum up, existing research suggested that addiction symptoms are results of pathological changes in brain structure or function. Yet the neural changes do not occur the first time a person experiments with the drug or other objects of addiction. For both substance and behavioral addiction, neural changes result from long-term, repetitive and heavy involvement, as presented below.

Repetitive use as a prerequisite for neural changes

As illustrated by Figure 2.1, for both drug and non-drug (behavioral) addiction, the changes in neural circuits could be operationally parsed into two categories: first, experimental use and relatively transient changes in neuronal function that continue for hours up to weeks of drug abstinence, and second, repetitive use and relatively stable changes lasting from weeks to being relatively permanent changes (Kalivas & O' Brien, 2008).

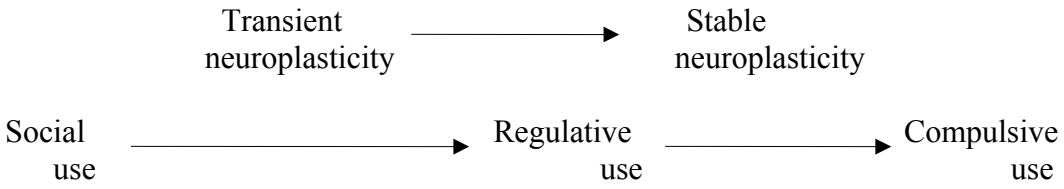


Figure 2.1 Transition to addiction. Adapted from Kalivas & O' Brien (2008), p.167

In the first stage of experimental use, addictive drugs cause many relatively short-lived changes in brain chemistry and physiology that make the drugs become particularly rewarding (Berridge & Robinson, 1998; Di Chiara, 1999; Hyman & Malenka, 2001, Kelley & Berridge, 2002).

The second stage of repetitive use is marked by the frequent and intensive interaction with the object of addiction. For instance, the persistent drug use would cause enduring changes in neural circuitry normally involved in pleasure, incentive motivation and learning, which result in addiction symptoms such as tolerance, withdrawal, and craving. Because of the enduring brain changes, the person would continue his/her pursuit of drugs, and that behavior is more compulsively driven. The enduring changes also explain a relative stable state of high vulnerability to relapse after stopping drug-taking (Aston-Jones and Harris, 2004; Kalivas and O'Brien, 2008).

Repetitive use associated with occurrence and development of addiction symptoms

Since (1) addiction symptoms are manifestations of pathological changes in brain structure or function and (2) repetitive use is a prerequisite for neural changes, it is speculated that repetitive use is associated with occurrence and development of addiction symptoms. Many details in this linkage remain mysterious. For instance, the correspondence between severity of symptoms and extent of neural changes remains unclear. Yet we might say with some degree of assurance that repetitive use is closely related to the frequency and severity of addiction symptoms.

This assertion has two important implications for this study. First, the psychosocial theories as reviewed below could be used to explain internet addiction, though the subject being explained by these theories is repetitive use, for repetitive use is a precondition for becoming

addicted. Second, severity of internet addiction symptoms (i.e. the dimensional measure for internet addiction, see the first section of this chapter) could be used as the dependent variable to represent the result of spending a large amount of time online, as repetitive use is associated with the occurrence and development of addiction symptoms.

Psychosocial Theories Explaining Repetitive Internet Use

Below several social-psychological theories that have not been widely applied in empirical research on internet addiction are discussed. For each theory, its propositions and arguments are presented, its strengths and limitations are presented, and its unique contributions to understanding repetitive internet use (and internet addiction) are highlighted.

Behavioral theory

Behavioral theory explaining repeated drug use began in the 1960s with the birth of the discipline of behavioral pharmacology (Glautier, 2004). Behavioral theory considers the repetitive use as the reinforcement process. The repeated behavior is considered as the response to the reinforcing stimulus.

According to basic principles of operant condition in behavioral theory, when the drug use is related to occurrence of positive reinforce or avoidance of negative reinforcer, the behavior would occur again. The reinforcer, in the form of environmental events, determines the forthcoming behavior. The behavior would extinct if the reinforcer related to this behavior extinct. Positive reinforcing stimuli are positive affective states, euphoria, pleasure, rewarding (e.g. McAuliffe & Gordon, 1974; McAuliffe, Rohman, Feldman, & Launer, 1985, 1985) Negative reinforcing stimuli are relief or avoidance of drug-withdrawal/aversive states (e.g. Cappell & Greeley, 1987; Edwards, 1990)

Many variables have been known to be important in influential in this reinforcement

process. Factors determining the reinforcement efficacy and influencing the behavioral control exerted by drug reinforcers include: (a) reinforcement and schedule parameters, (b) the antecedent conditions of drug delivery, (c) the individual characteristics of the organism, (d) the current schedule conditions, and (e) the history of the organism (Schuster & Johanson, 1981; Schuster, 1990). One example was the variable-ration schedule of reinforcement. It was found that gambling behavior is reinforced through intermittent schedules of reinforcement (Dickerson, 1984; Skinner, 1974). The intermittent nature of the reinforcement leads to persistence in gambling and is most resistant to extinction (Raylu & Oei, 2002). For another example, according to second-order reinforcement theory, an addict will often have to generate long consequences of behavior before a drug is obtained and used. In other words, relatively few "drug-seeking" behaviors are reinforcerd directly by drug delivery. The second-reinforcement theory explains the behavioral mechanism allowing the development of long chains of complex behavior without the need for continual reinforcement. Ferster & Skinner (1957) described a simple second-order schedule of reinforcement that two or more response may be chained together if the first produces a stimulus in the presence of which the second is reinforced. Goldberg, Spealman & Kelleher (1979) reported an experiment showing second-order behavioral control over responding based upon morphine and cocaine reinforcement.

If behavioral theory is applied to explain Internet addiction, we need to explore the reinforcer related to Internet use, schedule of reinforcement, and other variables that determine the reinforcement efficacy. However, behavioral theory has been criticized for underestimating the influence of individual motivations, emotions and other inner events. Though they acknowledge that human beings have cognitions and feelings that animals do not have, they do not think that inner events would influence human behavior. People are portrayed as passive respondents to environmental influence. This line of thinking, however,

has been widely challenged by countering evidences which testify to human being's active interaction with the environment (e.g. Bandura, 1977, 1986). Besides, behavioral theory depicts what happened in the laboratory. The 'environment' in behavioral theory is the stimuli manipulated by the researcher, not the real-life living situations. This limits the generalizablity of the behavior approach in explaining behavior outside of the lab. Hence, behavioral theory is not adopted for this research.

Outcome expectancy theory

Outcome expectancy theory is one of the most important cognitive approaches in explaining repeated substance use. Similar to behavioral theory, it also focuses on behavioral outcome, while unlike behavioral theory, it does not consider outcome as the environmental stimuli that determines behavior, but the cognitive belief of expected outcomes influence and influenced by environmental, behavioral, and other personal variables (reciprocal determinism, Bandura, 1986).

Bandura (1977, p.79) defined outcome expectancy as "a person's estimate that a given behavior will lead to certain outcomes". Within the social learning framework, outcome expectancy held about certain behavior is the result of a person's direct and indirect experiences (Jones, Corbin & Fromme, 2001). A person may learn indirectly from observation. His/her direct experiences modify or consolidate the outcome expectancies held (Oei & Baldwin, 1994). When outcome expectancy theory is applied to explain substance use and abuse, it is proposed that people's expectation of what drug or alcohol will do for them will influence their decision to engage in this behavior in a later session. People who anticipate that substance use would result in desired outcomes would continue their use of substances or even increase the amount of use, which increases the risk of becoming addicted.

Researchers have explored specific contents of outcome expectancies that are positively associated with excessive use or addiction. Brown, Christiansen & Goldman (1987) developed the Alcohol Expectancy Questionnaire (AEQ), which consisted of six dimensions: (1) global-positive change, (2) sexual enhancement, (3) physical and social pleasure, (4) increased social assertiveness, (5) relaxation and tension reduction, and (6) arousal with power. Shafter and Brown (1991) identified four outcome expectancies of marijuana and cocaine use: (1) relaxation and tension reduction, (2) social and sexual facilitation, (3) perceptual and cognitive enhancement, and (4) craving and physical effects. Wills and colleagues (Wills, Sandy, & Shinar, 1999) identified four categories of outcome expectancies related to smoking: (1) self-enhancement (e.g. 'smoking helps you concentrate on things'), (2) boredom relief (e.g. 'you smoke when there's nothing better to do'), (3) affect regulation (e.g. 'smoking helps you calm down when you're feeling tense and nervous') and (4) social (e.g. 'smoking makes it easier to be social with others'.) As reviewed above, outcome expectancies related to Internet addiction identified so far include (1) low-risk social interaction, (2) close relationship and self-disclosure, (3) relaxation and escape from stress, (4) relieving boredom and having fun, (5) sense of competence (Chou & Hsiao, 1999; Yang & Tung, 2004; Parker and Plank, 2000).

In most scales of outcome expectancy, respondents are asked to indicate the perceived likelihood (from unlikely to likely) of these outcome expectancies (Mooney, Fromme, Kivlahan, & Marlatt, 1989). The perceived likelihood of outcome expectancy indicates what kind of outcome expectancies is associated with this behavior for a particular person. Normally, a behavior is associated with various outcomes. It is the outcome perceived as highly likely to be associated with the behavior predicts future behavior. For instance, a person who believes that drinking will bring about social and physical pleasure would be more likely to drink again than those who do not.

Yet the perceived likelihood of outcome expectancy cannot explain why the behavior is repeated in high-frequency. Normally, an average person should have a wide variety of behavior repertoires, each associated with some outcomes that are perceived as highly likely to happen. Why he choose a particular behavior and the associated outcome, while ignoring other behaviors and outcomes?

As a response, some researchers proposed a construct 'desirability of outcome expectancy'. The particular outcome must be highly desirable for the person, so that the anticipated outcome become the strong motivator for future behavior, and thus this behavior becomes a priority over other behaviors (Jones, Corbin & Fromme, 2001). When likelihood and desirability of outcome expectancies were considered simultaneously, higher likelihood and more desirable expectancies were associated with greater use of alcohol, both in quantity and in frequency (Werner, Walker, & Greene, 1993; Fromme & D'Amico, 2000).

To summarize, according to outcome expectancy theory, likelihood and desirability of outcome expectancy could explain repetitive high-frequency use. When outcome expectancy theory is applied to explain Internet addiction, we need to explore the outcome expectancy related to Internet addiction (what has been done by previous empirical research), and to ask respondents indicate the likelihood and desirability of each outcome expectancy.

The limitation of outcome expectancy theory is that it did not explain the high desirability of outcome expectancy. The empirical research showed that that people differ in their scores regarding the desirability of outcome expectancy. The question is: what makes certain outcome highly desirable for a particular person?

The following two theories provide two examples regarding conditions that make particular outcome expectancy highly desirable. One is stress coping theory of addiction. Within the model, the outcome expectancy of stress coping is highly desirable when substance use or other behavior is perceived as the only way to cope with stress emotions

experienced. The other is substitute gratification theory. According to this theory, the outcome expectancy of substitute gratification is highly desirable because the substance use or other behavior was considered as the only way to satisfy some important needs that cannot be satisfied through realistic ways.

Stress coping theory of addiction

The transactional model of stress and coping (Lazarus, 1966; Lazarus & Folkman, 1984) laid the basis for the stress coping model of addiction. Within the transaction model, stressful experiences are construed as person-environment transactions. Cognition is central to this transaction, as the impact of external stressors is mediated by primary and secondary appraisal. One conducts a primary appraisal to determine the level of danger, the potential pain, loss or discomfort. If the situation is appraised as a potential threat, the secondary appraisal follows, which is an assessment of a person's coping resources and coping options. Secondary appraisals address what one can and will do about the situation. After secondary appraisal, actual coping efforts, that is, conscious cognitive or behavioral responses would be made. Figure 2.2 provides a pictorial represent of this transaction view.

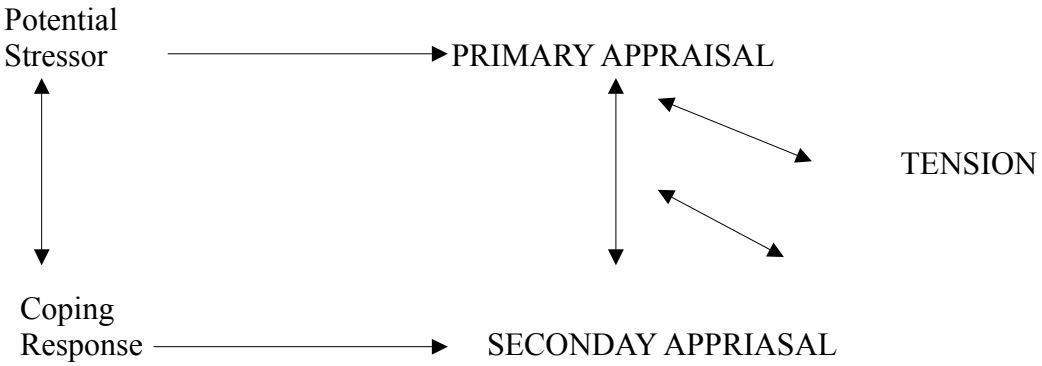


Figure 2.2 The Cognitive Appraisal Process. Adapted from Lazarus & Folkman (1984), p.107.

The stress coping theory of addiction, as a derivative of stress coping theory, considered alcohol use or other potentially addictive behavior as a kind of coping response (Abrams & Niaura, 1987). In line with the stress coping theory, how frequently alcohol use (or other potentially addictive behavior) act as a coping response depends on how much stress one is experiencing and his perception of available coping options. A person under stress might not have a drink or drink occasionally even he has learnt from his past experience that drinking could be a way of coping, if he has other preferred coping options. In contrast, a person would frequently turn to alcohol use for stress coping purpose if coping by drinking is perceived as the only way available coping option (i.e. there is lack of other coping options). This hypothesized process explains the excessive use and increases the risk of addictive involvement.

Prior works have examined the direct effects of stress and avoidance coping style. Stress has been operationally defined as the perceived stress level of potential stressors. Types of stressors include: history of negative life events, chronic physical, psychological, and environmental conditions and prevalent of daily hassles (Pearlin, Menagha, Liberman, Mullan, 1981). Evidences generally support the positive association between stress and substance use (Biafora, Warheit, Vega & Gil, 1994; Breslin, Hayward & Baum, 1995; Crum, Muntaner, Eaton & Anthony, 1995; Lipton, 1994; Roosa, Dumka & Tein, 1996). A person with avoidant coping style has the tendency to intentionally escape stressful circumstances across a variety of situations (Amirkhan, 1990; Endler & Parker, 1990a, 1990b). It is hypothesized that the appraisal of lacking other options is not based on realistic assessment but reflects a person's habitual preference for distracting himself from thinking about the problem. Empirical research has found a positive association between avoidant coping and substance abuse and dependence. In two studies (Moos, Finney. & Chan, 1981; Moos, Finney, & Gamble, 1982) among recovering alcoholics, individuals who relied on avoiding

coping strategies were more likely to drink in stressful events. Cooper et al. (1988) also found that, after controlling for outcome expectancy of stress coping, the avoidant coping style was related to alcohol consumption. Both Evans and Dunn (1995) and Cooper et al. (1995) reported similar results among college students and adolescents, respectively. Bergevin, Gupta, Derevensky, & Kaufman (2006) conducted a study with 2,156 high-school students ranging from 11 to 20 years of age. Results indicated that adolescents with gambling-related problems used less task-focused coping, and more avoidance-focused coping. A study of Internet-dependent children in Germany revealed patterns of avoidant coping strategy that differed from other children (Grusser, Thalemann, Albrecht, & Thalemann, 2005, as cited in Weinstein & Lejoyeux, 2010).

One study tested the relationship between stress and Internet addiction (Lam, Peng, Mai & Jing, 2009). Participants were recruited from high school students in Guangzhou, China. Internet addiction was assessed using the Internet Addiction Test (IAT). 158 respondents (10.2%) were identified as moderately addicted and 10 (0.6%) severely addicted to the Internet. After adjusting for other variables, the odds to be addicted were 10 times greater (OR=10.0, 95% CI=6.5–12.2) for respondents who had experienced a recent event and felt very stressed and 2.8 times greater (OR=2.8, 95% CI=1.8–4.4) for those who felt moderately stressed than for those who had no stressful experience or who had experienced an event but did not feel any stress at all.

This research would test the effect of stress and avoidance coping style on severity of Internet addiction symptoms. Furthermore, the concept *desirable outcome expectancy of stress coping* was introduced as the mediator. Desirable outcome expectancy of stress coping is defined by the author as the belief that Internet use is the only way of stress coping. It is hypothesized that adolescents with higher stress are more likely to make Internet use as the substitute way of stress coping, which in turn, predicts prolonged frequent and intensive

Internet use and higher severity of Internet addiction symptoms. Similarly, it is hypothesized that adolescents with higher tendency of avoidance coping style are more likely to make Internet use as the substitute way of stress coping, which in turn, predicts prolonged frequent and intensive Internet use and higher severity of Internet addiction symptoms.

Substitute gratification theory[3]

Stanton Peele published the book *The Meaning of Addiction: An Unconventional View of Addiction* in 1985 and a revised version in 1998. As implied by the title, Peele aimed to propose a new theory for addiction. In his book, Peele defined addiction as a kind of behavioral addiction characterized by psychological dependence that does not necessarily involve neurobiological changes, which, as mentioned above, is a view prevalent in 1980s and 1990s. However, owing to recent advances in neuroscience research, nowadays it is commonly agreed that the term addiction should be reserved to any substance use or other behaviors that involve neurobiological changes. Perhaps due to less well received definition of "addiction", Peele's theory is less known and rarely examined in empirical research. Yet Peele's theory is still of its value as it focus on some aspects that go unnoticed for researchers in this area. Besides, Peele's theory could be considered as explaining frequent and intensive use, as excessive involvement and psychological dependence could be considered as indicators of frequent and intensive use. As discussed above, social science theories introduced in this section, are all explaining frequent and intensive use which is the sufficient condition for neurobiological changes to occur. Hence Peele's theory would be applied in this study to explain Internet addiction, though not in the same way as what Peele intended to.

According to Peele (1985, 1998), human beings have some basic needs to be satisfied, like

3 Peele (1985, 1998) did not give a specific name to his theory. The author named it as "substitute gratification theory" as its main theme is about how addiction serves as an alternative way of needs satisfaction. The naming is for the purpose of mentioning the theory in a simple way.

social acceptance, competence, self-confidence, and personal autonomy. But sometimes due to personal inadequacy or environmental deficiency, these needs cannot be satisfied. Meanwhile, the drug use or other activity might provide an alternative way of needs satisfaction. Though the substitute gratification could be associated with some negative consequences, these consequences are perceived to less severe than the failure to get basic needs satisfied. Therefore, people under such conditions are likely to hang on to this substitute gratification (Alexander, 1990; Chein, Gerard, & Rosenfeld, 1964; Shaffer & Burglass, 1981). Furthermore, it is hypothesized that becoming involved in substitute experiences as a resolution for crucial but unsatisfied needs limit people's abilities to fulfill these needs through realistic means. No active efforts would be made to achieve needs satisfaction in the regular fiber of lives. The involvement becomes as an admittedly inferior but nonetheless essential source of needs gratification (Peele, 1998). The process suggested by Peele can be illustrated by figure 2.3.

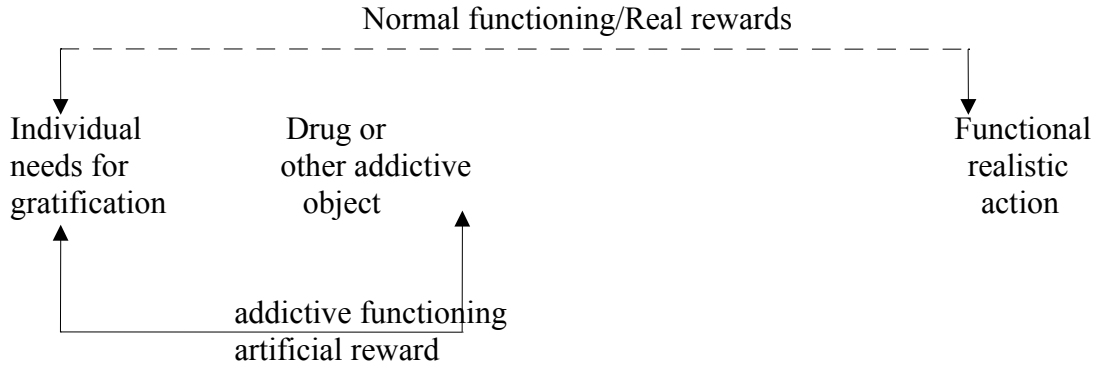


Figure 2.3 The Model of Substitute Gratification. Adapted from Peele (1998), p.265

Hence, drug use or other activity being the only way of needs satisfaction predicts excessive involvement. Peele named it as "addictive functioning" or "artificial reward". In this research, to integrate this theory with outcome expectancy theory and stress coping model, we define this "addictive functioning" or "artificial rewards" as the cognitive belief

that drug use or other activity provides a substitute way of needs satisfaction and re-name it as *desirable outcome expectancy of substitute gratification*. Similar to desirable outcome expectancy of stress coping, desirable outcome expectancy of substitute gratification provides concrete examples of how particular outcome expectancy becomes highly desirable for some people. Previous research has identified outcome expectancies associated with drug use or other activity such as increased social assertiveness, arousal with power, social and sexual facilitation, self-enhancement, boredom relief (Brown, Christiansen & Goldman, 1987; Chou & Hsiao, 1999; Shafter & Brown, 1991; Parker and Plank, 2000; Wills, Sandy, & Shinar, 1999; Yang & Tung, 2004). These outcome expectancies might imply certain needs satisfaction experience (e.g. need for achievement, for interpersonal relationship, for fun and pleasure etc.) and they would turn out to be desirable outcome expectancy if involvement in drug use or other activity is perceived as the only way of needs satisfaction.

In this research, based on previous empirical findings, we focused on desirable outcome expectancy of substitute gratification related to two interpersonal needs (the need for social interaction & need for intimacy) and factors prevent these needs from being satisfied offline (i.e. social anxiety and lack of close friends), which are hypothesized to increase severity of Internet addiction symptoms. In the below, previous findings on the effect of social anxiety and loneliness was discussed in light of the substitute gratification theory and the concept of desirable outcome expectancy of substitute gratification.

Social anxiety and substitute gratification of social interaction

Several theorists have emphasized the importance of the need for social interaction (e.g., Adler, 1927; Maslow, 1971; Murray, 1938). H.S. Sullivan (1953) argued that people need certain forms of social input or social interaction to remain happy and psychologically healthy. When viewed from a developmental perspective, it appears that there are changes

over the life course in the form and type of interpersonal interaction. While children mainly interact with parents, adolescents tend to spend increasingly substantial amounts of time with peers (Larson, Brown, & Mortimer, 2002). It was found that during a typical week, even discounting time spent in classroom instruction, middle school students spend almost about one-third of their waking hours with peers, an amount more than double that with parents and other adults (Csikszentmihalyi &Larson, 1984).

Socially anxious adolescents might have difficulty in satisfying their needs for low-risk social interaction in offline settings because their social anxiety limits their abilities and opportunities to maintain regular social interactions. Social anxiety is defined as a state of anxiety resulting from the prospect of presence of interpersonal evaluation in real or imagined social settings (Leary, 1983a). To reduce perceived social risks, socially anxious people restrict their self-representational behaviors to situations perceived as "relatively safe bets" and "will want to convey self images that carry little risk and will want to avoid jeopardizing their images if they can help it" (Leary, 1983a).

On the other hand, interaction online might provide an alternative venue of social interaction for socially anxious adolescents. Compared to face-to-face interaction, synchronous online social interaction often is perceived as a relatively safe situation. The anonymity of online social interaction enables people to exert greater control over self-representation and impression formation (Bargh, McKenna, &Fitzsimons, 2002). They can choose not only with whom and when to communicate, but also have time to compose messages (Morahan-Martin & Schumacher, 2000). As Davis, Flett, & Besser (2002) said, "For some individuals, the Internet becomes a buffer from threatening social interactions (p.332)". Morahan-Martin & Schumacher (2000) also pointed out that, "[Problematic Internet] users gained social confidence online. They are friendlier, more open and more themselves, and they report it easier to make friends when online" (p.26).

To summarize, it is hypothesized that adolescents wither high social anxiety would have more difficulty in meeting their needs for low-risk social interaction off-line, while they may find Internet use as the substitute way of satisfying the need for low-risk social interaction, which in turn, predicts prolonged frequent and intensive Internet use and higher severity of Internet addiction symptoms.

Friendship intimacy and substitute gratification of intimacy

Harry Stack Sullivan's interpersonal approach to development emphasized that it is not until adolescence that the need for intimacy arises in peer relationship (Sullivan,1953). Children's friendships are activity oriented; they are built around games and shared pastimes. Adolescents, in contrast, come to desire and need intimate confidants with whom they can share and discuss personal issues like bodily changes, sexuality, dating, and strained family relationships, many of which cannot be comfortably be discussed with parents. Adolescents also tend to know more intimate information about their friends than younger children, and act more empathically toward friends (Buhrmester, 1990; Buhrmester & Prager, 1995; Harter, 1990).

For adolescents who do not have intimate peer relationships, the Internet might provide them an alternative way to establish intimate relationship. McKenna, Green & Gleason (2002) pointed out the relative anonymity of Internet interactions greatly reduces the risks of self-disclosure, especially about intimate aspects of the self, because one can share one's inner beliefs and emotional reactions with much less fear of disapproval and sanction (McKenna & Bargh, 1999, 2000). In this way, self-disclosures with on-line acquaintances are similar to the "strangers on a train" phenomenon (Rubin, 1975), in which people sometimes share quite intimate information with their anonymous seatmates. Another reason for great self-disclosure online is the lack of the usual "gating features" to the establishment of any

close relationship, for instance, physical appearances (attractiveness) (McKenna & Bargh, 1999). Therefore, the relationship formed online has the general effect of facilitating self-disclosure and expression of the "true self" and might make it easier to establish intimate relationship online (McKenna et al., 2002).

Previous research found that the "Internet addicts" reported higher loneliness than non-addicts (Kim, La Rose & Wei, 2009; Morahan-Martin & Schumacher, 2000; Whang, Lee & Chang, 2003). Since loneliness is believed to be a result of lacking intimate friendship (Berg & Peplau, 1982; Solano, Batten, & Parish, 1982), it is speculated that lack of intimate friendship is a risk factor for Internet addiction. Based on substitute gratification theory, it is further hypothesized that lack of intimate friendship makes it difficult for adolescents to meet their needs for intimacy, while they might get their needs for intimacy satisfied through online interaction. Therefore, lack of intimacy friendship is hypothesized to predict the belief that Internet use is the only way of satisfying the need for intimacy; such belief predicts longer time spent online and higher severity of Internet addiction symptoms.

Summary of the third section

Behavioral theory considers repetitive use as the reinforcement process. Outcome expectancy as a cognitive approach explains the behavior in terms of the perceived likelihood and desirability of outcome expectancy. Two theories explicate conditions that make particular outcome expectancy highly desirable. According to stress coping theory, the stress coping outcome expectancy is highly desirable when the involvement is perceived as the only way to cope with stress emotions experienced. According to substitute gratification theory, the outcome expectancy of substitute gratification is highly desirable because the involvement is considered as the only way to satisfy some important needs that cannot be satisfied through realistic ways. Outcome expectancy theory, stress coping theory and

substitute gratification theory could be combined to form a new theory to explain frequent and intensive Internet use and thus higher severity of Internet addiction symptoms. Details of this theoretical model are presented in Chapter 3.

Summary of this chapter

The three questions put forward in the beginning of this chapter have been addressed. First, internet addiction is defined as a kind of behavioral addiction that is represented by symptoms such as tolerance, withdrawal and impaired control. Two types of measurements would be used in this study: a categorical diagnosis to identify high-risk group and a rating scale to measure severity of Internet addiction symptoms.

Second, despite a variety of risk factors identified, prior studies are limited in two aspects. For one thing, most identified risk factors were either individual attributes or internet use behaviors, which might result in the wrong conclusion that either the person or the internet should be blamed for becoming addicted. For another, most studies are testing the two-variable associations; studies on mediation models are lacking.

Third, outcome expectancy, substitute gratification theory and stress coping theory are introduced. These theories, combined with some findings of previous research, informs the conceptual framework of this study, which is presented in the next chapter.

CHAPTER THREE

CONCEPTUAL FRAMEWORK

This chapter describes and justifies the conceptual framework by referring to outcome expectancy theory (Bandura, 1977; Jones, Corbin & Fromme, 2001; Oei & Baldwin, 1994), substitute gratification theory (Peele, 1998), and stress coping theory (Lazarus & Folkman, 1984; Abrams & Niaura, 1987) as well as some prior findings (e.g. Bargh, et al., 2002; Caplan, 2007; Davis, et al., 2002; Kim, et al., 2009; Lam, et al., 2009; McKenna, et al., 2002; Morahan-Martin & Schumacher, 2000; Whang, et al., 2003). Research hypotheses are then presented.

THE CONCEPTUAL FRAMEWORK

The endogenous variable of this framework is *severity of internet addiction symptoms* (SIAS). Severity of internet addiction symptoms reflects the variability in subjects' presentation of symptoms, impairment and susceptibility to change (Helzer, 2007; Kraemer, 2007).The higher severity of internet addiction symptom corresponds to the higher likelihood of being diagnosed as addicted (Helzer, 2007; Kraemer, et al., 2004).

Severity of internet addiction symptoms is presumably associated with repetitive internet use, as (1) occurrence and development addiction symptoms are manifestations of pathological changes in brain structure or function(Berridge & Robinson 1995, 1998; Koob & Le Moal 1997, 2001; Robinson & Berridge, 1993, 2000), and (2) repetitive use is a prerequisite for neural changes (Aston-Jones and Harris, 2004; Kalivas and O'Brien, 2008).

Hence, the aim of this research is to predict the severity of internet addiction symptoms as a result of repetitive internet use.

Another key construct (and the mediator) for this framework is *desirable outcome expectancy* (DOE). It is an extension of the concept *outcome expectancy*. Outcome expectancy is defined as the belief that a given behavior will lead to certain outcome (Bandura, 1977). The likelihood of outcome expectancy indicates types of outcome expectancies for different people. The desirability of particular outcome expectancy reflects subjective evaluation of the desirable outcome expectancies. Higher likelihood and higher desirability of outcome expectancies would predict more frequent and intensive repetitive use (Bandura, 1977; Jones, Corbin & Fromme, 2001; Oei & Baldwin, 1994). Previous research have reported several outcome expectancies (rated in likelihood) related to internet addiction such as "kill time for entertainment when bored", "make new friends", "play roles different from those played in real life" (e.g. Chou & Hsiao, 2000; LaRose et al., 2001; Song, et al., 2004, for details, see the second section of Chapter Two). No research has ever examined the relationship between desirability of outcome expectancies and internet addiction.

Desirable outcome expectancy differed from outcome expectancy in that the former concertized the meaning of "desirability". Instead of asking respondents to rating the level of desirability for one outcome expectancy, this research defines desirable outcome expectancy as the belief that Internet use is an alternative way of needs satisfaction or stress coping. In other words, a person believes more strongly that internet use is the only way for substitute needs satisfaction or stress coping would scored higher in desirable outcome expectancy.

Specifying desirability as the "belief that internet use is the only way of needs satisfaction or stress coping" in this research has been inspired and supported by two theories (substitute gratification theory and stress coping theory) and some prior research findings, as briefly summarized below (for more detailed discussion, please refer to the third section of Chapter Two).

The concepts of *desirable outcome expectancy of substitute gratification I (need for social interaction)* and *desirable outcome expectancy of substitute gratification (need for intimacy)* are originated from the combination of substitute gratification theory and previous studies reporting social anxiety and loneliness as risk factors for internet addiction.

The substitute gratification theory (Peele, 1985, 1998) argued that people who cannot get their needs satisfied through realistic means might hang on to the drug use or other activity as an alternative way of needs satisfaction; though the substitute gratification could result in some negative consequences, these consequences are perceived to be less severe than that of needs dissatisfied. The belief that the object of addiction would provide the only way of needs satisfaction is termed by the researcher as *desirable outcome expectancy of substitute gratification*. Taking into account results of previous research, this research examines two types of substitute gratification.

First, social anxiety has been found to be a risk factor for internet addiction. When explaining the identified association, researchers suggested that internet might be perceived as a relative safe face for social interaction, as socially anxious adolescents can exert greater control over self presentation and impression formation and thus feel less risk of being judged (Bargh, et al., 2002; Caplan, 2007; Davis, et al., 2002: Morahan-Martin & Schumacher, 2000).

In this research, based on substitute gratification theory, the previously suggested but not examined belief that "internet use is the alternative way for low-risk social interaction" is conceptualized as the desirable outcome expectancy of substitute gratification I (need for social interaction). Along with this construct, this research hypothesizes that adolescents who have higher level of social anxiety are likely to believe more strongly that Internet use is the only way of satisfying the need for social interaction, which in turn have higher severity of Internet addiction symptoms (see Figure 3.1).

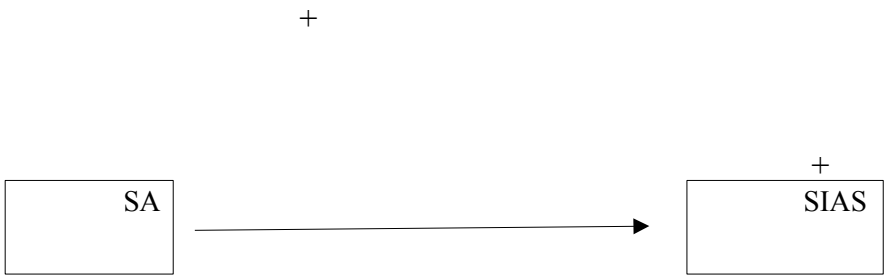


Figure 3.1 Mediation Effect of Desirable Outcome Expectancy of Substitute Gratification I (Need for Social Interaction) in Relation to Social Anxiety and Severity of Internet Addiction Symptoms.
Note. SA=Social Anxiety, DOESG I= Desirable Outcome Expectancy of Substitute Gratification I (Need for Social Interaction), SIAS=Severity of Internet Addiction Symptoms.

Second, previous research has found that adolescents who do not have intimate peer relationship or who are emotionally lonely are more likely to become internet addicted. Researchers explained the association by suggesting that the internet might provide an alternative way to establish intimate relationship, as the anonymity of internet facilitate great self-disclosure and remove more gating features (e.g. physical attractiveness) to the establishment of close relationship (Kim, et al., 2009; McKenna, et al., 2002; Morahan-Martin & Schumacher, 2000; Whang, et al., 2003). The belief that "internet use is the alternative way for close peer relationship" is thus conceptualized as the desirable outcome expectancy of substitute gratification (need for intimacy) and it is further hypothesized that lack of intimate friendship is a positive predictor for desirable outcome expectancy of substitute gratification II (need for intimacy), which in turn, predict higher severity of Internet addiction symptoms (Figure 3.2)

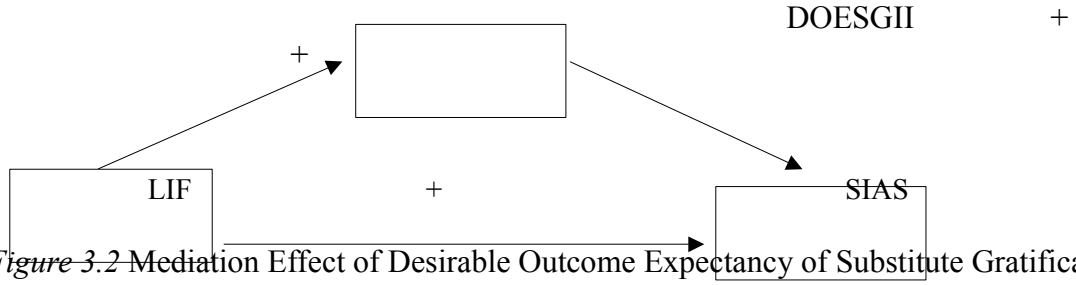


Figure 3.2 Mediation Effect of Desirable Outcome Expectancy of Substitute Gratification II

(Need for Intimacy) in Relation to Lack of Friendship Intimacy and Severity of Internet Addiction Symptoms.
Note. LIF=Lack of Intimate Friendship, DOESG II= Desirable Outcome Expectancy of Substitute Gratification II (Need for Intimacy), SIAS=Severity of Internet Addiction Symptoms.

In addition to two types of desirable outcome expectancies of substitute gratification, this research examines the mediating effect of *desirable outcome expectancy of stress coping*. It is originated from stress coping theory of addiction (Lazarus & Folkman, 1984; Abrams & Niaura, 1987) and is also backed by findings of previous empirical research (e.g. Lam, et al., 2009; Douglas, Mills, Niang, et al., 2008).

The stress coping theory of addiction (Lazarus & Folkman, 1984; Abrams & Niaura, 1987) argues that people would frequently turn to alcohol or other substances for stress coping purpose when coping by drinking is perceived as the only way available coping option. How frequently alcohol use or other potentially addictive behavior act as the only coping response depends on how much stress one is experiencing and his perception of available coping options.

The belief that internet use is the only way of stress coping is termed as desirable outcome expectancy of stress coping. It is further hypothesized that perceived stress level and avoidance coping style will positively predict severity of Internet addiction symptoms (Figure 3.3 and Figure 3.4). Adolescents who are under higher stress and have stronger tendency of avoidance coping are more likely to perceive Internet use as the only way of stress coping, and as a result, spend longer time online and have higher severity of Internet addiction symptoms.

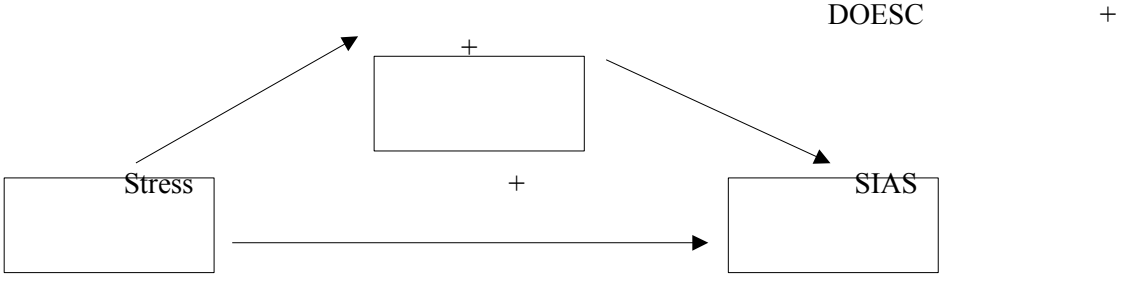


Figure 3.3 Mediation Effect of Desirable Outcome Expectancy of Stress Coping in Relation to Stress and Severity of Internet Addiction Symptoms.
Note. Stress=Stress, DOESC= Desirable Outcome Expectancy of Stress Coping, SIAS=Severity of Internet Addiction Symptoms.

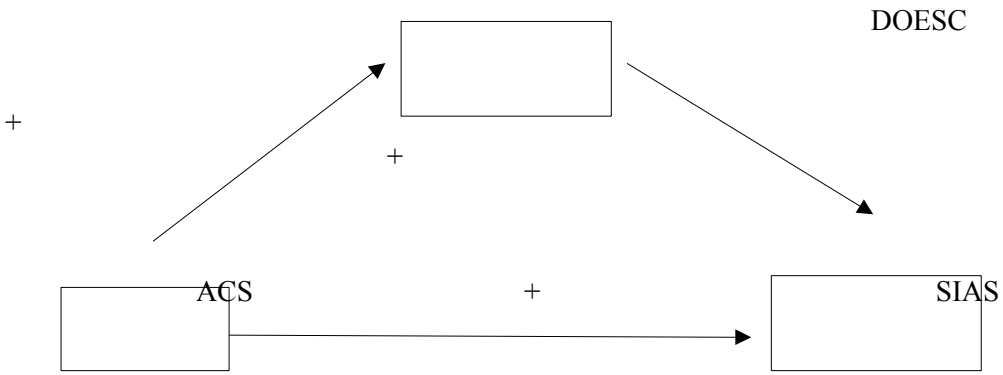
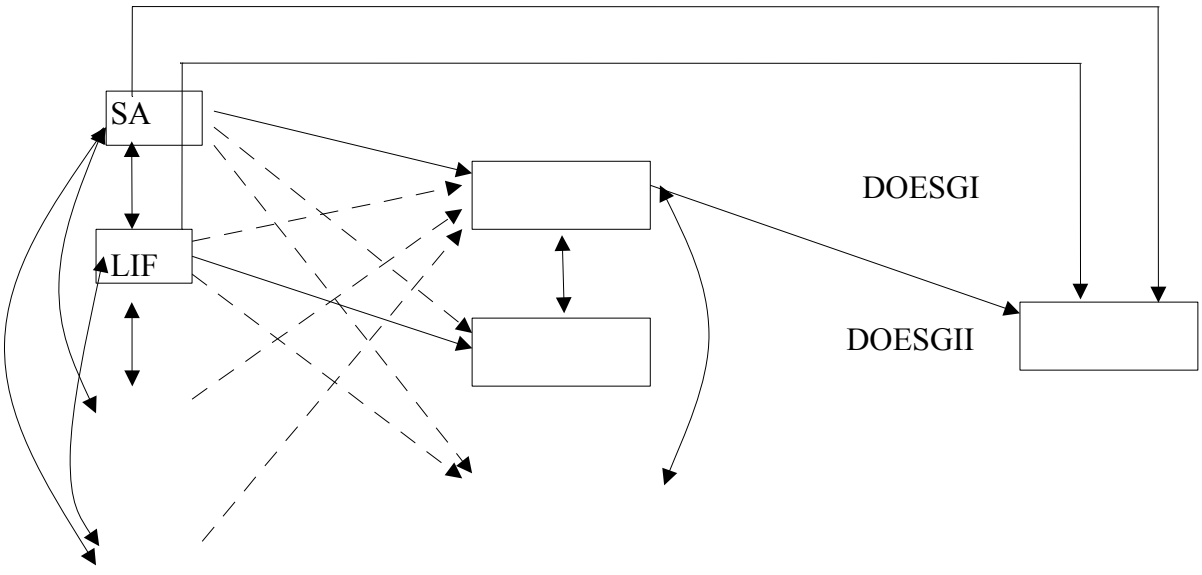


Figure 3.4 Mediation Effect of Desirable Outcome Expectancy of Stress Coping in Relation to Avoidance Coping Style and Severity of Internet Addiction Symptoms.
Note. ACS=Avoidance Coping Style, DOESC= Desirable Outcome Expectancy of Stress Coping , SIAS=Severity of Internet Addiction Symptoms.

Figure 3.1 to Figure 3.4 could be combined to form the overall model (Figure 3.5). The major proposition of this theoretical model is that people become heavily attached to the internet for it provides an alternative way of needs satisfaction or stress coping which was hard to achieve in real life because of some personal or contextual risk factors (i.e. the risk factors). The theoretical model, when supported, would avoid blaming the person or the internet applications for being addicted and highlight the importance of helping the person or changing the environment to get needs satisfied and stress coped.



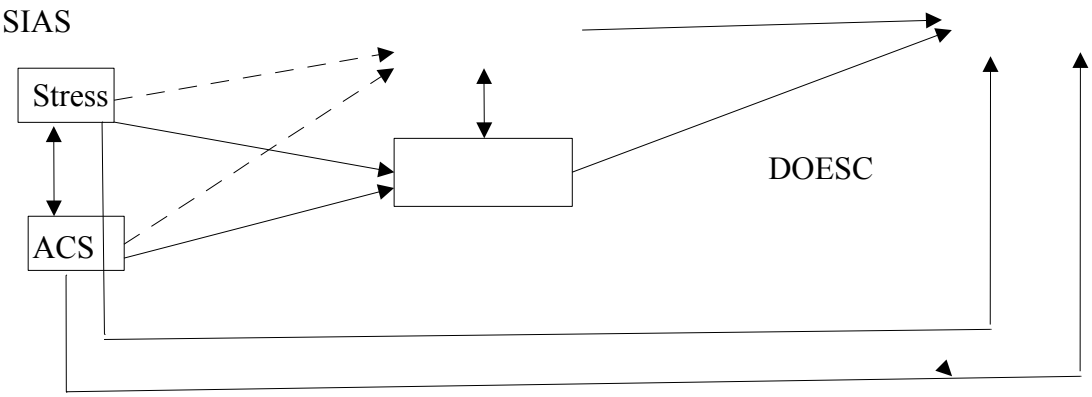


Figure 3.5 The Overall Model for Severity of Internet Addiction Symptoms
Note. SA=Social Anxiety, LFI=Lack of Intimate Friendship, Stress=Stress, ACS=Avoidant Coping Style, DOESG I= Desirable Outcome Expectancy of Substitute Gratification I (Need for Social Interaction), DOESG II= Desirable Outcome Expectancy of Substitute Gratification II (Need for Intimacy), DOESC= Desirable Outcome Expectancy of Stress Coping, SIAS=Severity of Internet Addiction Symptoms.
Dotted Lines indicate relationships that are not hypothesized based on previous theory or research but should be taken into account in estimating the mediating effect of each type of desirable outcome expectancy if they are statistically significant according to the data of this study.

One remaining methodology question concerns whether the predictor of one type of desirable outcome expectancy would have effect on the other types of desirable outcome expectancy. Methodologically, it is essential to clarify all the relationships between predictors and mediators; an omitted predictor-mediator correlation might result in biased estimates of path coefficients (Olweus, 1980). For instance, according to Figure 3.3, the direct effect of desirable outcome expectancy of stress coping on severity of internet addiction symptoms is estimated when controlling for stress and avoidance coping; however, if social anxiety is also associated with desirable outcome expectancy of stress coping while has direct effect on severity of Internet addiction symptoms, then part of what has been previously interpreted as direct effect of desirable outcome expectancy of stress coping now becomes spurious components. For another instance, the indirect effect of stress on severity of internet addiction symptoms is hypothesized to exert through desirable outcome expectancy of stress coping (Figure 3.3); however, if stress is also positively associated with desirable outcome

expectancy of substitute gratification (need to belong), then part of what has been previously interpreted as direct effects from stress now become indirect effects via the new mediator-desirable outcome expectancy of substitute gratification (need to belong).

Yet not all these relationships between predictors and mediators in this model could be determined based on current knowledge. Social anxiety might be a predictor for desirable outcome expectancy of stress coping. Previous research of alcohol use found that individuals with social anxiety may consume alcohol in order to facilitate cognitive avoidance of socially threatening information (Bacon & Ham, 2010). It was also found that adolescents scoring high on social anxiety used more emotion-oriented coping than those scoring low (Endler & Parker, 1990), which supports the assertion that behavioral and mental disengagement function in social anxiety as they do in coping (Carver & Scheier, 1986). Hence, it is possible that socially anxious adolescents would seek for cognitive avoidance of socially threatening information through Internet use and perceive Internet use as an alternative way of stress coping. In addition, stress might be a predictor for desirable outcome expectancy of substitute gratification of interpersonal needs. Adolescents with interpersonal relationships problems as stressors might use the Internet to meet people and make friends. Yet the relationships between avoidance coping style and desirable outcome expectancy of substitute gratification I and II are not clear; nor is the relationship between lack of intimate friendship and desirable outcome expectancy of stress coping.

A temporary solution for this dilemma is to mark the undetermined relationships between predictors and mediators with dotted line (see Figure 3.5). No hypotheses were proposed for these relationships marked with dotted line. The multiple-mediator model with dotted line is to suggest that the effect of other predictors should be taken into account if they are statistically correlated with the predictor or mediator in a particular mediation model (i.e. Figure 3.1-3.4). The statistically significant correlations beyond the scope of research

hypotheses could imply knowledge gaps or methodological error. Either way, replication research with rigorous methodology is needed.

RESEARCH HYPOTHESES

Based on literatures reviewed and the theoretical model proposed, the following hypotheses were formulated:

Hypothesis 1 (H1): Differences in risk factors between high-risk group and non-high-risk group

H1.1 On average, the high-risk group spends significantly longer time online than the non-high-risk group.

H1.2 On average, the high-risk group did not differ from the non-high-risk group in time spent on email.

H1.3 On average, the high-risk group did not differ from the non-high-risk group in time spent on information search.

H1.4 On average, the high-risk group spends significantly longer time on online blogging than the non-high-risk group.

H1.5 On average, the high-risk group spends significantly longer time on instant messaging than the non-high-risk group.

H1.6 On average, the high-risk group spends significantly longer time on social networking websites than the non-high-risk group.

H1.7 On average, the high-risk group spends significantly longer time idling online than the non-high-risk group.

H1.8 On average, the high-risk group spends significantly longer time watching online movie or video than the non-high-risk group.

H1.9 On average, the high-risk group spends significantly longer time downloading movie or video than the non-high-risk group.

H1.10 On average, the high-risk group spends significantly longer time on online gaming than the non-high-risk group.

H1.11 On average, the high-risk group spends significantly longer time online than the non-high-risk group.

H1.12 On average, the high-risk group has higher level of social anxiety than non-high-risk group.

H1.13 On average, the high-risk group has lesser intimate friends than non-high-risk group.

H1.14 On average, the high-risk group has experienced higher stress than non-high-risk group.

H1.15 On average, the high-risk group has stronger tendency of avoidance coping than non-high-risk group.

H1.16 On average, the high-risk group more strongly believes more strongly that Internet use is the only way of satisfying the need for social interaction than the non-high-risk group.

H1.17 On average, the high-risk group believes more strongly that Internet use is the only way of satisfying the need for intimacy than the non-high-risk group.

H1.18 On average, the high-risk group believes more strongly that Internet use is the only way of stress coping than the non-high-risk group.

Hypothesis (H2): Predictors of severity of Internet addiction symptoms

H2.1 Males are likely to have higher severity of Internet addiction symptoms than females.

H2.2 Senior secondary students are likely to have higher severity of Internet addiction symptoms than junior secondary school students.

H2.3 Adolescents who have higher social anxiety are likely to have higher severity of Internet addiction symptoms than those have lower social anxiety.

H2.4 Adolescents who have lower friendship intimacy are likely to have higher severity of Internet addiction symptoms than those with higher friendship intimacy.

H2.5 Adolescents who have higher stress level are likely to have higher severity of Internet addiction symptoms than those have lower stress level.

H2.6 Adolescents who have stronger tendency of avoidance coping are likely to have higher severity of Internet addiction symptoms than those have lower tendency of avoidance coping.

H2.7 Adolescents who believe more strongly that Internet use is the only way of stress coping are likely to have higher severity of Internet addiction symptoms than those believe less strongly.

H2.8 Adolescents who believe more strongly that Internet use is the only way of satisfying the need for social interaction are likely to have higher severity of Internet addiction symptoms than those believe less strongly.

H2.9 Adolescents who believe more strongly that Internet use is the only way of satisfying the need for intimacy are likely to have higher severity of Internet addiction symptoms than those believe less strongly.

H2.10 Adolescents who spend longer time spent online during holidays are likely to have higher severity of Internet addiction symptoms than those spend less time online during holidays.

H2.11 Adolescents who spend longer time spent online during weekends are likely to have higher severity of Internet addiction symptoms than those spend less time online during weekends.

H2.12 Adolescents who spend time spent online during weekdays are likely to have higher

severity of Internet addiction symptoms than those spend less time online during weekdays

Hypothesis 3 (H3): Mediation effect of desirable outcome expectancy of stress coping in relation to stress and severity of Internet addiction symptoms

Adolescents who had higher stress level are likely to more strongly believe that Internet use is the only way of stress coping, which in turn, have higher severity of Internet addiction symptoms.

Hypothesis 4 (H4): **Mediation effect of desirable outcome expectancy of stress coping in relation to avoidance coping style and severity of Internet addiction symptoms**

Adolescents who had stronger tendency of coping by avoiding are likely to more strongly believe that Internet use is the only way of stress coping, which in turn, have higher severity of Internet addiction symptoms.

Hypothesis 5 (H5): Mediation effect of desirable outcome expectancy of substitute gratification I (need for social interaction) in relation to social anxiety and severity of Internet addiction symptoms

Adolescents who have higher level of social anxiety are likely to believe more strongly that Internet use is the only way of satisfying the need for social interaction, which in turn have higher severity of Internet addiction symptoms.

Hypothesis 6 (H6): Mediation effect of desirable outcome expectancy of substitute gratification II (need for intimacy) in relation to lack of intimate friendship and severity of Internet addiction symptoms

Adolescents who have less intimate friendship would more strongly believe Internet use is the only way of satisfying the need for intimacy, which in turn, have higher severity of internet addiction symptoms.

CHAPTER FOUR

RESEARCH METHOD

In this chapter, research site for this study is first introduced. Research design and its justification are then explained. Specifically, this study involves two parts: a pilot study for validating the measurements and a main study for testing the hypotheses. Sampling method and sample characteristics, data collection method and data analysis method for pilot study is first elaborated, followed by the delineation of sample, data collection and data analysis for main study.

RESEARCH SITE

This study was conducted in Shanghai, China for two reasons. First, as a developed city, Shanghai has wide and low-cost Internet access. It ensures that a large number of adolescents with Internet use experience could be recruited in this study, and some them probably are at risk for Internet addiction. Second, the researcher, as a Shanghai native, has some personal networks there. By establishing personal relationships with headmasters of the participating schools, the researcher was able to sample participants and hand out questionnaires in these secondary schools. To provide some more background knowledge for this study, below introduces Shanghai's social economical development, schooling and extra-curricular activities as well as Internet use and Internet addiction among adolescents.

Social and Economical Condition of Shanghai

Shanghai is located on China's central eastern coast at the mouth of the Yangtze River. The city is one of the five cities administrated as a municipality with province-level status. Originally a fishing and textiles town, Shanghai became a multinational hub of finance and business by the 1930s. Since 1949, Shanghai turned to be an industrial center. The recent wave of rapid development of Shanghai began since 1990s, after developing and opening-up the Pudong New District. It is now the financial center of China and is fast becoming a worldwide financial capital. Actually, it has been considered the fifth biggest cosmopolitan city in the world next to London, New York, Tokyo, and Berlin (Guo, 2005).

In 2009, Shanghai's nominal gross domestic product (GDP) posted 11.3% growth to 2.1 trillion Yuan, compared to 455.155 billion Yuan in 2000. The per capital gross product was 78, 989 Yuan, 1181 times of that in 1978 (2, 485 Yuan), and 2 times of that in 2000 (34, 426 Yuan). It was also the highest in all cities of China. The average per capital annual disposable income among local urban residents reached 21, 645 Yuan, which has increased from 11, 718 Yuan in 2000. The per capital annual disposable income among rural residents reached 9,842 Yuan, which has increased from 5, 596 Yuan in 2000 (China Statistics Press, 2009)

The recent consensus conducted in 2010 reported the population of Shanghai as 23.02 million. Males accounted for 51.5%, females for 48.5% of the population (Shanghai Municipal Statistics Bureau, 2011). Age group of 14-19 was approximately 3.18 million, accounting for approximately 13.8% of the population (Shanghai Municipal Statistics Bureau, 2011).

Family size in Shanghai decreased from 2.80 persons per family in 2000 to 2.50 persons in 2010. One-generation families occupy the largest share of the total, about 49.9%, of which 57.3% consist of two persons and 39.9% one person. Two-generation families account for 39.6% of the total. Three-generation families account for 10.2% of the total/(Shanghai

Municipal Statistics Bureau, 2011).

Schooling and Extra-curricular Activities in Shanghai

In Mainland China, primary and secondary education takes 12 years to complete, divided into primary, junior secondary and senior secondary stages. Primary education lasts 5 years. Junior secondary stage lasts 4 years. The 9-year schooling in primary and junior secondary schools pertains to compulsory education. Any child reaching 6 years of age should enter the primary school and all primary school graduates should enter nearby junior secondary schools, without sitting for any entrance examinations. However, those graduates from junior secondary schools seeking to continue their education in senior secondary schools have to sit for and pass locally organized entrance examinations before admission. Senior secondary education lasts 3 years. In addition to normal schools, there are also vocational schools in senior secondary level which provide job training programs.

By the end of 2005, Shanghai had 648 primary schools and 807 secondary schools. Up to 99.99% of school-age children enrolled into the nine-year compulsory education. 99.7% of graduates of junior middle school entered high schools and vocational schools (Shanghai Municipal Statistics Bureau, 2008; Shanghai Statistical Year Book, 2007).

The school year of primary and secondary school is divided into two semesters, totaling 40 weeks. A five-day week has been implemented in primary and secondary schools. There are twelve weeks for holidays and vacations.

Throughout primary and secondary education, students are required to take end-of-term examinations and tests or check-ups at the end of each semester, school year and before graduation. Amid the mounting competition for entering a top university and, eventually, for securing a job, many children are forced to work hard as early as preschool - cramming in

English, mathematics, classic poetry and learning to sing, dance and play musical instruments. This, as many parents are convinced, is the only way for children to stand out among their peers and will help children enter top schools in the future. Therefore, school students have spent much of their spare time on learning activities. The three major activities outside of school are homework, extracurricular reading and academic training programs. Relaxed, passive leisure activity such as watching TV and video materials and surfing online occupies the spare time after being cut off by academic related activities (Chen, 2006).

Internet Use and Internet Addiction among Adolescents in Shanghai

As a modern city, Shanghai has enjoyed wide and low-cost Internet access. In 2009, the penetration rate was up to 59.7%, second only to Beijing (Information Center of Shanghai Municipality, 2009). Shanghai's net users increased to 11.1 million till the end of 2008, almost two times more than that in 2004 (Figure 4.1). It was estimated that 13-35 age group account for around 8.66 million (78%) of Internet users in Shanghai. It is speculated that adolescents should be a large proportion of that 78% (Zhang, 2011).

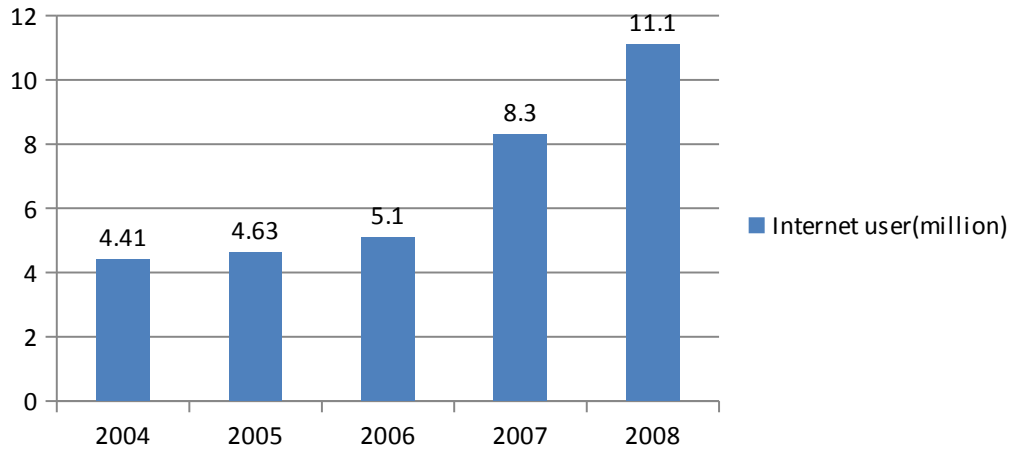


Figure 4.1 Internet users in Shanghai (Information Center of Shanghai Municipality, 2009)

Internet addiction among adolescents has been reported by previous studies. The DeRuiMu Research Group on Internet Addiction in 2005 reported that 14.2% of the 2125 secondary school students (aged from 11 to 17) were considered as “Internet addicts”. Another study (Yu & Du, 2007) in 2007 surveyed a total of 2172 students from five junior secondary, three senior secondary and two vocational schools. Using Young’s Internet Addiction Test (1998), 187 (8.65%) participants were considered as “Internet addicts”.

RESEARCH DESIGN

This study was a cross-sectional survey by questionnaires. It consisted of two parts: a pilot study and a main study. The objectives of the pilot study were to test the reliability and validity of the measuring instruments and to have a preliminary examination of the research procedures with a small sample (Monette, Sullivan, DeJong, 2002). The objectives of main study were to answer the research questions and test the research hypotheses by data collected from a larger sample.

PILOT STUDY

Samples

A convenient sample of 167 adolescents was recruited from a junior secondary school in Shanghai. Junior secondary school students were invited to participate in the pilot study because they were supposed to have lower reading and comprehending ability and thus they would encounter more problems in filling out the questionnaire than senior secondary students would do. Table 4.1 summarizes the demographic profile of the sample. Females (52.1%) were slightly more than males (47.9%). 42 came from grade one of junior secondary

school, 55 from grade two, and 70 from grade three. Grade four students did not participate in the study for they were preparing for the entrance examination for senior secondary school.

Table 4.1

Social-Demographic Characteristics of Participants in the Pilot Study (N=167)

Variables	Frequency	Percentage (%)
Sex		
Male	80	47.9
Female	87	52.1
Grade		
Junior secondary school 1	42	25.1
Junior secondary school 2	55	33.0
Junior secondary school 3	70	41.9
Family income montly(RMB)		
<=1000	11	6.6
1000-3000	51	30.5
3000-5000	44	26.3
5000-7000	33	19.8
7000-9000	18	10.8
>=9000	10	6.0
Family type		
Two-parent	150	89.8
Single-parent	14	8.3
Living with relatives or others	3	1.8
Total	167	100

Data Collection

Data collection for pilot study was undertaken in September, 2010. The questionnaires were administrated to students in the classroom. The researcher gave a short briefing on the general aims and rationale for the study. It was emphasized that participation was anonymous and voluntary. Participants were required to sign a consent form to show their willingness to participate in the survey. The researcher was present throughout the whole administration process to answer questions raised by the participants. Most of the students were able to complete the questionnaire within one class session of 40 minutes.

The questionnaire for pilot study was composed by measurements of key variables and demographic information of the participants. Measurements of key variables were introduced

as follows.

Severity of internet addiction symptoms

Severity of internet addiction symptoms was measured by Chen's Internet Addiction Scale (CIAS) (Chen, Weng, Su,Wu, Yang, 2003). The CIAS was chosen over the other scales for it has been developed and tested in Chinese societies such as Taiwan (Chen et al., 2003) and Shanghai (Shen, 2008). Though so far there is no report of cultural-specific pattern of Internet addiction, it is better to choose a scale developed and validated by data collected in the same culture.

The 26-item CIAS had two subscales: *symptom* and *related problem.* The symptom subscale was divided into three dimensions: *compulsive use, withdrawal, tolerance*. The related problem subscale was divided into two dimensions: *problems in interpersonal relationships* and *problems in health/time management*. Subjects were asked how often each of the symptom or problem had been experienced in the past month.

Response categories were none (scored 1), rarely (scored 2), sometimes (scored 3) and often (scored 4). The scores were summed to form an overall CIAS score. The overall CIAS score ranged from 26 to 104. Previously, the scores were interpreted as reflecting severity of addiction (Chen et al., 2003). However, if the scores were interpreted in this way, then a person who had a low score (i.e. a small number of addiction symptoms) would be considered as addicted with low severity, while in fact a person might not be addicted at all (i.e. a small number of symptoms occasionally experienced might be not related to neurobiological changes). Hence, in this research, the overall CIAS score would be interpreted as reflecting severity of internet addiction symptoms. The higher severity of internet addiction symptoms, the higher likelihood the respondent being diagnosed as addicted.

The internal reliability of the scale and the sub-scales in the original study ranged from 0.79 to 0.93, and correlation analyses yielded a significant positive correlation of the CIAS to the hours spent weekly on Internet activity (Chen et al., 2003).

Time spent online

Respondents were asked to write down time spent online in the past half a year in terms of three phases: during holidays (i.e. the past summer holiday), at weekends (i.e. weekends in the past and current academic term) and during weekdays (i.e. weekdays in the past and current academic term).

Desirable outcome expectancy

Desirable outcome expectancy was a construct proposed in this study. It was defined by the author as the cognitive belief that Internet use is the only way of stress coping or needs satisfaction (for details, see Chapter 2). It indicated not only the expected outcome of the Internet use, but also emphasized the subjective evaluation that this outcome was the only way of stress coping or needs satisfaction which made this outcome highly desirable. This study focused on three types of desirable outcome expectancy: desirable outcome expectancy of stress coping defined by the author as the belief that Internet use is the only way of stress coping; desirable outcome expectancy of substitute gratification I (need for social interaction) defined as the belief that Internet use is the only way of satisfying the need for regular social interaction; and desirable outcome expectancy of substitute gratification II (need for intimacy) defined as the belief that Internet use is the only way of satisfying the need for intimacy.

As a newly proposed construct, there is no measurement available. This study developed the scales for measuring the three types of desirable outcome expectancy through two steps

(DeVellis, 2012).

First, a pool of suitable items was generated. In describing the needs satisfaction obtained online, prior measurements of internet gratification (see Chapter Two for more details) were referenced (Chou & Hsiao, 1999; Yang & Tung, 2004; Papacharissi & Rubin, 2000; Parker and Plank, 2000). A clause "It is only online" was added to indicate that this needs gratification or stress coping could be achieved only through Internet use. For example, "I feel confident when I interact with others online" was modified into, "it is only online that I feel confident in interacting others". In total, each scale for measuring each type of desirable outcome expectancy included six items in the preliminary pool.

Second, an expert panel (N=4) was set up. Experts were invited if they could meet any of the following criteria: (1) extensive working experiences with adolescence; (2) substantial knowledge of adolescence development; (3) expertise in scale development. The experts were asked to evaluate (1) how relevant they think each item is to what is intended to measure (i.e. the working definition of the construct); (2) the items' clarity and conciseness and point out any awkward or confusing items; (3) whether certain areas were overrepresented or underrepresented by items; (4) cultural relevance of the items.

The finalized scales had two items for each type of desirable outcome expectancy. Items for desirable outcome expectancy of substitute gratification I (need for social interaction) were: "It is only online that I feel confident in interacting with others" and "It is only online that I feel social interaction is secure and comfortable". Items for desirable outcome expectancy of substitute gratification II (need for intimacy) were: "It is only online that I have someone to share with secrets and private feelings" and "It is only online that I have someone to talk about things that I don't wish anyone else know". Items for desirable outcome expectancy of stress coping were "It is only online that I can forget problems that bother me" and "When I feel stressed, it is only the Internet that makes me feel better".

Time frame was set as the past half a year. The response categories were: “strongly agree” (scored 5), “agree” (scored 4), “sometimes agree sometime disagree” (scored 3), “disagree” (scored 2), and “strongly disagree” (scored 1). For each scale of two items, scores were added, with higher scores indicating higher desirability of the particular outcome expectancy during the past half a year. Reliability of these self-developed scales was examined in pilot study.

Social anxiety

Social anxiety was defined as a state of anxiety resulting from the prospect of presence of interpersonal evaluation in real or imagined social settings (Leary, 1983b, p.67). It was measured by The Social Anxiety Scale for Adolescents (SAS-A) developed by La Greca & Lopez (1998). It consisted of 18 items. Based on factor analytic studies, three distinct subscales have been identified. The first subscale, *fear of negative evaluatio*n (FNE), reflected fears, concerns, or worries regarding negative evaluation from peers; it included eight items (e.g., “I worry about what other kids think of me”). SAD-New (*social avoidance and distress around new peers or in new situations*) reflected social avoidance and distress with social situations or unfamiliar peers; it included six items (e.g. “I get nervous when I meet new kids”). SAD-General (*generalized social avoidance and distress*) reflected more generalized or pervasive social distress, discomfort and inhibition; it included four items (e.g., “I feel shy even with kids I know well”).

Respondents were asked to indicate “how much the item is true for you”. In this research, time frame was set as the past year. Response format ranged from “not at all” (score 1) to “all the time” (scored 5). The scores were summed, higher scores indicating higher level of social anxiety in the past year.

Lack of intimate friendship

Friendship intimacy was defined as the self-disclosure and the accompanying feelings of being understood, validated and cared for in friendships (Buhrmester, 1990, p.1101). The measurement for friendship intimacy was adapted from the intimacy sub-scale of Furman and Buhrmester's (1985) Network of Relationships Inventory. Reliability of the Network of Relationships Inventory was high (Cronbach's alpha=0.93) (Buhrmester & Furman, 1987).

The subscale of friendship intimacy consisted of three items: How often do you share secrets and private feeling with a friend? How often do you have a friend to tell everything to? How often do you have to talk with about things that you don't want others to know? Respondents were asked to indicate their agreement with the three items considering their intimate friendships during the past year. Response format ranged from "never or hardly ever" (scored 1) to "very often or extremely much" (scored 5).

To indicate the lack of intimate friendship, sum score of the three items was reversed. Thus, higher score indicates lower level of friendship intimacy during the past year.

Stress

Stress has been operationally defined as the perceived tension caused by potential stressors through primary appraisal and secondary appraisal (Lazarus & Folkman, 1984, p.125). Previous research has measured different types of stressors: negative life events, chronic physical, psychological, and environmental conditions, or daily hassles (Pearlin, Menagha, Liberman, Mullan, 1981). This research focused on daily hassles, as life events told very little about the day-to-day events that lead to stress in daily lives (Kanner, Coyne, Schaefer, & Lazarus, 1981; Luthar &Zigler, 1991) and life events influenced stress level through daily hassles (Wagner, Compas, & Howell, 1988). Daily hassles were defined as the irritating, frustrating, distressing demands that to some degree characterize everyday transactions with

the environment (Kanner, et al., 1981, p.3).

The measurement of stress caused by daily hassles for adolescents was developed in this research. The first step was to compile items describing daily hassles. Questionnaires of daily hassles for adolescents from other countries were taken as reference, such as Inventory of Daily Hassles for (South) Korea Adolescents (Han & Yoo, 1995), Adolescent Hassles Inventory (AHI) developed by Bobo, Elmer, Snow and Schinke (1986) in the United States and Early Adolescent School Role Strain Inventory (EASRSI) developed by Fenzel (1988) in the United States. Some items were deleted because of duplication or cultural inappropriateness. The researcher also wrote some new items based on informal interviews with some secondary school teachers and students. Finally, the scale comprised 25 items describing daily hassles in five aspects*: 1) conflict with parents, (2) conflict between parents, (3) relationship problems with peers, (4) unpleasant experiences with teacher(s), and (5) study pressure.*

Respondents were asked to report whether they have experienced these hassles in the past year and to rate the perceived stress level of the hassles that have been experienced. If respondents have not experienced the particular hassle, they should circle zero and go on to the next item. If respondents have experienced the particular hassle, they should rate the perceived stress level on the 3-point scale (1=small, 2=medium, 3=large).

Reliability and validity of the scale were examined in pilot study and the measure was modified based on the results.

Avoidance coping style

Coping has been conceptualized as a response to stressful or negative events (Billings & Moos, 1981; Folkman, 1984; Folkman & Lazarus, 1980). Coping style was the habitual

preference for approaching problems; these are more general coping behaviors that the individual employs when facing stressors across a variety of situations (Menaghan, 1983). Avoidance coping style was defined as a person's habitual preference to intentionally escape potentially painful circumstances or to refocus one's attention, when faced with stressful situations (Endler & Parker, 1990b, p.845).

The measurement of avoidance coping style was composed by three subscales of a multidimensional coping inventory developed by Carver, Scheier and Weintraub (1989). The three subscales were: *denial, mental disengagement and behavioral disengagement*. Items of denial were: "I refuse to believe that it has happened"; "I pretend that it hasn't really happened'; "I act as though it hasn't even happened' and "I say to myself 'this isn't real". Items of behavioral disengagement were: "I give up the attempt to get what I want'; "I just give up trying to reach my goal'; "I admit to myself that I can't deal with it, and quit trying"; "I reduce the amount of effort I'm putting into solving the problem". Items describing mental disengagement were: "I turn to work or other substitute activities to take my mind off things"; "I go to movies or watch TV, to think about it less"; "I daydream about things other than this"; and "I sleep more than usual".

Respondents were asked to indicate what they generally do and feel when they experience stressful events in the past year. Response choices were "I usually don't do this at all" (scored 1); "I usually do this a little bit" (scored 2); "I usually do this a medium amount" (scored 3); "I usually do this a lot" (scored 4). The scores were summed while higher scores indicated stronger tendency of coping by avoiding in the past year.

Data Analysis

For reliability analysis, a measure is considered reliable if it would give us the same result

over and over again (assuming that what we are measuring isn't changing), free of random error (Rubin & Babbie, 2005, p.189). Cronbach's Alpha has been the most frequently used estimate of internal consistency reliability. It assesses the consistency of different items for the same construct within the measure. According to DeVellis (2003), a coefficient of alpha of lower than 0.60 is unacceptable, between 0.60 and 0.65 is undesirable, between 0.65 and 0.70 is minimally acceptable, between 0.70 and 0.80 is respectable, between 0.80 and 0.90 indicate a very good level of reliability, while an alpha much above .90 suggest that the researcher should consider shortening the scale.

For validity analysis, explorative factor analysis was used to explore internal structure of the measurement as evidence for construct validity. The main assumption of factor analysis is that since these indicators (items) are reflecting the same construct, these indicators should, at a minimum, "hang together", or be homogenous. If there are several factors (i.e. the construct to be measured has several dimensions), indicators having highest loading on certain factor would be grouped together. Construct validity of a measurement is reflected by: (1) the number of factors identified is the same as the dimension of the construct as conceptualized; (2) each indicator (item) is meaningfully correlated with the particular factor. Researchers often treat factor loadings exceeding .4 or .5 as meaningful. Items whose loading did not meet the criterion are revised and (3) the factors that are conceived of as dimensions of a construct are interrelated but remain distinct (Pedhazur & Schmelkin, 1991, p.67-68).

MAIN STUDY

Samples

For this research, the population is all secondary students who are studying in secondary schools in Shanghai during the interviewing period (i.e. from October to December, 2010). Currently, a total of 544 thousand students enrolled in 755 secondary schools (i.e. junior

secondary, senior secondary, and vocational schools) (Shanghai Education Bureau, 2011).

Previously with the aim to do random sampling in main study, the author selected 42 secondary schools randomly. School principles of the 42 schools were contacted by mail, e-mail or via phone call. 20 schools did not respond to the inquiry and 16 schools refused to participate. The common reasons given by the principals for not joining the study was that some of the items on the questionnaire were quite sensitive, no time could be spared for the students to fill in the questionnaire, and there were too many surveys conducted in the schools in this period. Other unspoken reasons could be that the researcher did not have any personal connections with them or that the research was not supported by local government. Finally six schools agreed to participate in the study.

Among the six participating schools, three were junior secondary schools (from grade one to grade four of junior secondary school) and three were senior secondary schools (from grade one to grade three of senior secondary school). Two classes were selected for each of the seven grade levels. As a result, 967 secondary school students from 14 selected classes filled out the questionnaire. 39 cases who reported zero hour of Internet use during all of the three time phases (holidays, weekend, and weekday) were excluded; another 36 cases were discarded due to serious missing data of the questionnaire. This yielded a valid sample of 892 adolescents.

The sample's demographic characteristics were summarized below (also see Table 4.2). Gender and family type of the sample were compared with available population parameters (or approximate figures) reported by the Shanghai Municipal Statistics Bureau, with the aim to assess the representativeness of the sample. Other sample characteristics like grade level distribution, family monthly income and parents' occupation type did not have corresponding population parameters to be compared with.

The sample had slightly more males (50.4%) than females (49.6%).This sex distribution

matched the actual sex distribution of adolescents (14-19) in Shanghai (male: female=102.1:100) (Shanghai Municipal Statistics Bureau, 2011a).

113 (12.7%) of the sample came from grade one of junior secondary school, 110(12.3%) from grade two of junior secondary school, 129 (14.5%) from grade three of junior secondary school, 108 (12.1%) from grade four of junior secondary school, 154 (17.3%) from grade one of senior secondary school, 134 (15.0%) from grade two of senior secondary school, 144 (16.1%) from grade three of senior secondary school. It was unknown whether the grade level distribution of the sample was representative, as the population parameter was unavailable.

More than eighty percent (84.6%) of the respondents lived with both parents, 11.6% of the respondents lived with mother or father only, and 3.7% lived with grandparents or other relatives. The proportion of being single parent within all the Shanghai's families having adolescents aged 12-18 was unknown. Yet it was reported that the divorce rate and bereavement rate for the 35-45 age group (which might include a majority of the respondents' parents) was 11.6% and 0.7% respectively (Shanghai Municipal Statistics Bureau, 2011b). Thus the population parameter was speculated to be around 12.3%, which was slightly higher than the sample statistic.

5.7% of the sample reported family monthly income lower than RMB 1000, 28.6% reported between RMB 1000-3000, 29.5% reported between RMB 3000-5000, 17.7% reported between RMB 5000-7000, 7.7% reported between RMB 7000-9000 and 10.7% reported more than 9000. It was not yet known whether the distribution was representative, as the Shanghai Municipal Statistical Bureau (2011c, 2011d) only reported average annual disposal income per capital was released by the author (RMB 13746 in rural and RMB 31838 in urban areas).

With regard to father's occupation, 2% were unemployed, 11.1% were peasants, 41.3% were blue-collar workers in industry or business, 17.4% were managers or senior officials in industry business, 28.2% were professionals. With regard to mother's occupation, 9.1% were

unemployed, 12.9% were peasants, 33.0% were blue-collar workers in industry or business, 19.2% were managers or senior officials in industry business, 25.8% were professionals.

Table 4.2

Social-Demographic Characteristics of Participants in the Main Study (N=892)

Variables	Frequency	Percentage (%)
Sex		
Male	450	50.4
Female	442	49.6
Grade		
Junior secondary school 1	113	12.7
Junior secondary school 2	110	12.3
Junior secondary school 3	129	14.5
Junior secondary school 4	108	12.1
Senior secondary school 1	154	17.3
Senior secondary school 2	134	15.0
Senior secondary school 3	144	16.1
Family type		
Two-parent	809	90.7
Single-parent	50	5.7
Living with relatives or others	33	3.7

Table 4.2 (Continued)

Social-Demographic Characteristics of Participants in the Main Study (N=892)

Variables	Frequency	Percentage (%)
Family income monthly(RMB)		
1000 or less	51	5.7
1000-3000	255	28.6
3000-5000	263	29.5
5000-7000	158	17.7
7000-9000	69	7.7
9000 or more	96	10.7
Father occupation		
Peasant	99	11.1
Blue-collar worker in industry and businesses	368	41.3
Managers and senior officials in industry and business	155	17.4
Professionals	252	28.2
Unemployed	18	2.0
Mother occupation		

Peasant	115	12.9
Blue-collar worker in industry and businesses	294	33.0
Managers and senior officials in industry and business	171	19.2
Professionals	230	25.8
Unemployed	82	9.1

Data Collection

Data collection for main study was conducted from October to December, 2010. The questionnaire for main study was modified based on results of pilot study. Procedures of data collection were same as that in pilot study.

Data Analysis

The first step of data analysis in main study is to present the descriptive statistics of the independent and dependent variables. In the second step, participants were divided into high risk and non-high-risk group according to their scores on severity of Internet addiction symptoms. A series of t-tests were performed to compare the group means of the risk factors between high-risk and non-high-risk group.

In the third step, various multivariate analyses were performed to test the relationships among the dependent variable (severity of Internet addiction symptoms) and risk factors (gender, grade level, time spent online, three types of desirable outcome expectancy, social anxiety, friendship intimacy, stress, and avoidance coping style). First, bivariate associations among variables were examined. Second, hierarchical regression was performed to test and compare the predictive effects of the five groups of risk factors. The demographic variables of gender and grade level were placed in the first block; four domains of personal or environmental inadequacies (social anxiety, lack of friendship intimacy, stress, and avoidance coping style) were placed in the second block; three types of desirable outcome expectancy were entered in the third block; time spent on specific online activities were entered in the fourth block; time spent online during holidays, weekends and weekdays were placed in the fifth block. The order of entry was determined by the theoretical framework of this study (see

Chapter 3).

Finally, the four mediation models (see Figure 3.1 – 3.4 Chapter 3) were tested. The predictors were social anxiety, friendship intimacy, stress, avoidance coping style, the outcome variable was severity of Internet addiction symptoms, and the mediators were desirable outcome expectancy of substitute gratification I (need for social interaction), desirable outcome expectancy of substitute gratification II (need for intimacy) and desirable outcome expectancy of stress coping. Multiple regressions were performed in line with the four steps in establishing mediation (Baron & Kenny, 1986; Judd & Kenny, 1981, illustrated by Figure 4.2 A & B in the below): (1) show that the initial variable (X) is correlated with the outcome (Y) (path c); (2) show that the initial variable (X) is correlated with the mediator (M) (path a); (3) show that the mediator (M) affects the outcome variable (Y)(path b); (4) show that the effect of X on Y controlling for M is reduced (path c'<path c, suggests partial mediation) or becomes zero (path c'=0, suggests complete mediation).

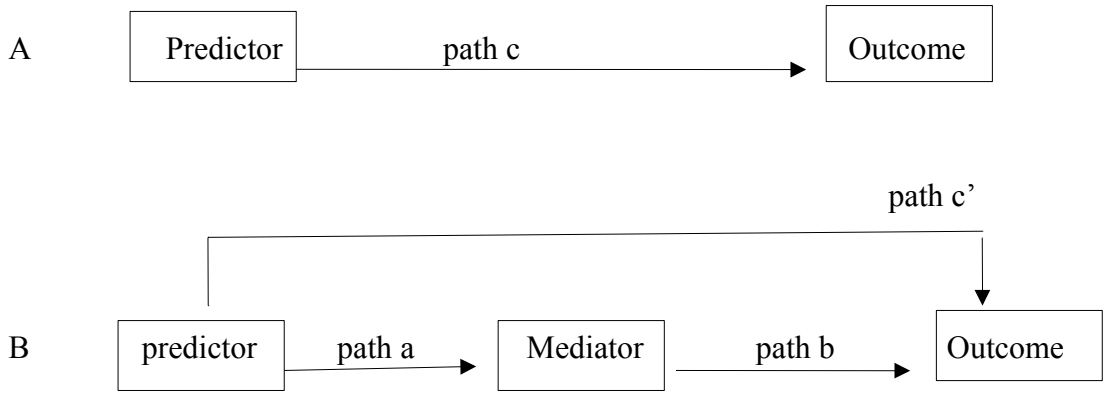


Figure 4.2 Path diagram in mediation models (Frazier, Tix & Barron, 2004)

Boothstrapping was used to test the significance of indirect effect (i.e. the product of path *a* and path *b* coefficie*nt*). Bootstrapping tests the null hypothesis that *ab*=0 instead of testing two hypotheses that both *a* and *b* are zero. Bootstrapping makes no assumptions about

the shape of the sampling distribution of the indirect effect. Instead, it involves repeatedly sampling from the data set and estimating the indirect effect in each resampled data set. By repeating this process thousands of times, an empirical approximation of the sampling distribution of *ab* is built and used to construct confidence intervals for the indirect effect. If zero is not contained in the confidence interval, the indirect effect is considered statistically significant (Preacher & Hayes, 2008; Hayes, 2009).

If there are multiple mediators (see Figure 3.5 Chapter 3), the specific indirect effect of X on Y via mediator M_1 is quantified as a_1b_1, the total indirect effect of X on Y is the sum of the specific indirect effects, $\Sigma_i (a_ib_i)$, i = 1 to j. The total effect of X on Y is the sum of the direct effect and all j of the specific indirect effects: $c = c' + \Sigma_i (a_ib_i)$, i = 1 to j (Preacher & Hayes, 2008, illustrated by Figure 4.3 below).

All the statistical analyses except bootstrapping were conducted with Statistical Package for the Social Sciences (SPSS, version 14.0). Bootstrapping was conducted by the SPSS version of macro developed by Hayes (2009).

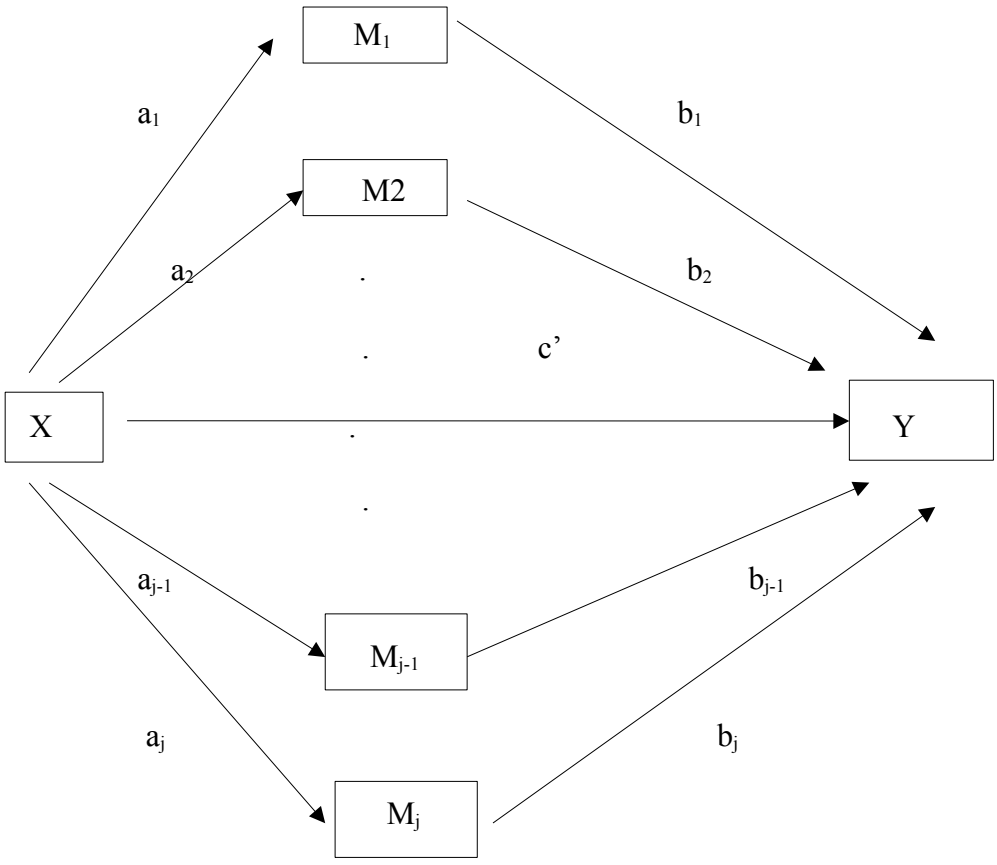


Figure 4.3 Illustration of a multiple mediation design with j mediators. X is hypothesized to exert indirect effects on Y through M_1, M_2…M_i (Preacher & Hayes, 2008, p.881)

ETHIC CONSIDERATIONS

Subjects would be assured that their participations are completely voluntary and that they could choose not to participate at any time. They would be further assured that their responses would remain confidential and would be used solely for the purpose of data analysis in an academic thesis work. Informed consent forms would be provided to and signed by subjects before the data collection. Parents' permission will be gathered by means of passive informed consent. That is, parents will receive a letter in which they are informed that their child's school is participate in a study on Internet use and that a questionnaire will be administrated during school hours. If parents do not agree with the participation of their child, they could either contact the school board or the researcher.

CHAPTER FIVE

PILOT STUDY

The pilot study aimed at examining the psychometric properties of measurements used in the main study. The measures to be examined include: Chinese Internet Addiction Scale (CIAS), Social Anxiety Scale for Adolescents (SAS-A), Passive Coping Inventory, Self-developed Measure of Addictive Reward, and Self-developed Measure of Daily Hassles for Adolescents.

There are various types of validity and reliability. In this pilot, I used exploratory factor analysis in examining construct validity and Cronbach's alpha, item-total correlation in examining internal consistency reliability. Particularly, I paid attention to items having low item-total correlation (lower than .30) and items load on at least more than one factor (factor loadings higher than .30) or items that could not meaningfully load on any of the factors (factor loadings on all factors lower than .30). These items were revised.

Results of the pilot study were summarized in Table 5.1. Detailed reports for each instrument are presented below.

Table 5.1

A Summary of Results of the Pilot Study (N=167)

Variable	SIAS	DOESG I	DOSG II	DOESC	SA	L
Scales	Chinese Internet Addiction Scale (CIAS)	Self-developed measure	Self-developed measure	Self-developed measure	Social Anxiety Scale for Adolescents (SAS-A)	Netw Relat Inver (part rever
Number of Items	**26**	**2**	**2**	**2**	**18**	**3**

Internal Consistency						
Cronbach's Alpha	.94	.75	.82	.85	.89	.86
Mean Inter-item Correlation	.38	.60	.69	.72	.31	.73
Mean Item-total Correlation	.60	.60	.69	.72	.52	.73
Factor Analysis						
Factor Structure	5	NA	NA	NA	3	NA
Decision for Main Study						
Items Deleted	0	0	0	0	0	0
Items Revised	6	0	0	0	3	0
Items Added	0	0	0	0	0	0
Number of Items for Main Study	**26**	**2**	**2**	**2**	**18**	**3**

Note: SIAS=Severity of Internet Addiction Symptoms, DOESG I=Desirable Outcome Expectancy of Substitute Gratification I (Need for Social Interaction), DOESG II = Desirable Outcome Expectancy of Substitute Gratification II (need for intimacy), DOESC = Desirable Outcome Expectancy of Stress coping, SA=Social Anxiety, LIF=Lack of Intimate Friendship, Stress=Stress, ACS=Avoidance Coping Style

CHINESE INTERNET ADDICTION SCALE (CIAS)

Internal Consistency

Result of internal consistency was shown in Table 5.3. The Cronbach's alpha of the 26-item scale was .94. The average inter-item correlation was .38. The average item-total correlation was .60. All the items had item-total correlation higher than .40 (ranging from .53 to .71)

Table 5.2

Internal Consistency of the CIAS (N=167)

Items	Corrected item-total correlation
1) I have been told more than once that I spent too much time online (RP-TM)	.56
2) I feel uncomfortable if I have been away from the Internet for a period of time (Sym-W)	.71
3) I have spent more and more time online (Sym-T)	.61
4) I feel irritable when the modem cannot connect the host or the connection is broken for unknown reasons (Sym-W)	.56

5) I always feel energized online, no matter how tried I feel before connecting to the Internet (Sym-W)	.58
6) I always spend much more time online than that I intend to (Sym-T)	.55
7) I do not reduce my time spent online despite its negative influence on my interpersonal relationship (RP-IH)	.53
8) I ever slept for less than four hours due to long time spent online (RP-TM)	.52
9) On average, I spent more and more time online since last term (Sym-T)	.56
10) I feel depressed if I cannot access from the Internet for a period of time (Sym-W)	.70
11) I cannot control my craving towards Internet use (Sym-C)	.70
12) I have focused my time and energy on the Internet and reduced interactions with friends consequently (RP-IH)	.60
13) I suffered from backache or other physical ills because of Internet use (RP-IH)	.67
14) Everyday when I wake up, the first thing I think of is going online (Sym-C)	.62
15) My Internet use has had negative effects on my academic performance (RP-IH)	.58
16) I believe I would miss something important if I have been away from the Internet for a period of time (Sym-W)	.65
17) The time I spent with family has been reduced because of my Internet use (R11P-IH)	.62
18) The time I spent on leisure activities has been reduced because of my Internet use (RP-IH)	
19) Whenever I left the Internet, I plan to do other things but end up failing to resist the craving and going online again (Sym-C)	.62
20) My life has no fun without the Internet (Sym-C)	.64
21) My Internet use has had negative effects on my physical health (RP-IH)	.52
22) I have planned to reduce time spent online but my plan always fails (Sym-C)	.67
23) I used to sleep less in order to have more time spent online (RP-TM)	.69
24) I need more and more time online to feel satisfied (Sym-T)	.65
25) I ever did eat regularly because of my Internet use (RP-TM)	.58
26) I ever stayed overnight on the Internet and felt spaced out the other day (RP-TM)	.53

Items	Corrected item-total correlation

Note. Sym-T=Symptom Tolerance, Sym-W=Symptom Withdrawal, Sym-C=Symptom Compulsive Use, RP-IH=Related Problem Interpersonal and Health Problem, RP-TM=Related Problem Time Management Problem

Factor Analysis

Chen et al. (2003) reported a 5-factor model of CIAS: (1) tolerance, (2) compulsive use, (3) withdrawal, (4) time management problem (5) interpersonal and health problem. To replicate the results of Chen et al. (Chen, Weng, Su, et al. 2003) in this study, a principal axis factor analysis with oblique rotation was employed. By the rule of eigenvlaue greater than 1.0, five factors were extracted which accounted for 53.7% of the variance. Yet the grouping of items is inconsistent with that reported by Chen et al. (2003). For instance, Factor 5 comprises one item indicating withdrawal and one item indicating time management problem.

Table 5.3

Five Factor Model of CIAS (N=167)

	Factor				
	1	2	3	4	5
10) I feel depressed if I cannot access from the Internet for a period of time (Sym-W)	**.674**	.244	.256	.084	.100
16) I believe I would miss something important if I have been away from the Internet for a period of time (Sym-W)	**.591**	.239	.199	.314	.219
11) I cannot control my craving towards Internet use (Sym-C)	**.590**	.295	.217	.286	.137
20) My life has no fun without the Internet (Sym-C)	**.530**	.248	.184	.248	.094
19) Whenever I left the Internet, I plan to do other things but end up failing to resist the craving and going online again (Sym-C)	**.413**	.228	.270	.352	.075
14) Everyday when I wake up, the first thing I think of is going online (Sym-C)	**.395**	.196	.339	.242	.204
9) On average, I spent more and more time online since last term (Sym-T)	**.386**	.248	.385	.075	.053
6) I always spend much more time online than that I intend to (Sym-T)	.210	**.695**	.142	.213	.063
5) I always feel energized online, no matter how tried I feel before connecting to the Internet (Sym-W)	.232	**.659**	.115	.115	.050

4) I feel irritable when the modem cannot connect the host or the connection is broken for unknown reasons (Sym-W)	.314	**.489**	.116	.137	.270
3) I have spent more and more time online (Sym-T)	.244	**.445**	.310	.154	.274
1) I have been told more than once that I spent too much time online (RP-TM)	.099	**.401**	.152	.242	.384
	Factor				
	1	2	3	4	5
7) I do not reduce my time spent online despite its negative influence on my interpersonal relationship (RP-IH)	.150	**.393**	.333	.135	.059
22) I have planned to reduce time spent online but my plan always fails (Sym-C)	.292	**.384**	.298	.338	.201
26) I ever stayed overnight on the Internet and felt spaced out the other day (RP-TM)	.137	.141	**.606**	.262	.105
23) I used to sleep less in order to have more time spent online (RP-TM)	.373	.103	**.523**	.306	.119
24) I need more and more time online to feel satisfied (Sym-T)	.455	.169	**.477**	.264	.031
13) I suffered from backache or other physical ills because of Internet use (RP-IH)	.180	.090	**.471**	.207	.340
8) I ever slept for less than four hours due to long time spent online (RP-TM)	.202	.183	**.430**	.077	.026
25) I ever did eat regularly because of my Internet use (RP-TM)	.160	.167	**.399**	.353	.157
21) My Internet use has had negative effects on my physical health (RP-IH)	.091	.092	**.396**	.363	.302
18) My Internet use has had negative effects on my physical health (RP-IH)	.155	.192	.170	**.654**	.127
17) My Internet use has had negative effects on my physical health (RP-IH)	.245	.123	.263	**.566**	.093
12) I have focused my time and energy on the Internet and reduced interactions with friends consequently (RP-IH)	.195	.211	.161	**.306**	.029
2) I feel uncomfortable if I have been away from the Internet for a period of time (Sym-W)	.469	.434	.104	.075	**.470**
15) My Internet use has had negative effects on my academic performance (RP-IH)	.204	.185	.273	.386	**.386**

Note. Sym-T=Symptom Tolerance, Sym-W=Symptom Withdrawal, Sym-C=Symptom Compulsive Use, RP-IH=Related Problem Interpersonal and Health Problem, RP-TM=Related Problem Time Management Problem. Factor loadings of over .30 are highlighted.

Since the five factors identified in Chen et al. (200) study can be grouped into 2

subscales: (1) symptom (i.e. compulsive use, withdrawal, and tolerance), and (2) related problem (time management problem, interpersonal and health problem), two, three, and four factor solutions were attempted. The comparison was made in two aspects: (1) variances explained by each factor solution; (2) the meaningful clustering of items that was consistent with the scale developer's conceptualization. For each factor solution, the grouping of items were tabulated with the two subscales (symptom and related problem) and five dimensions (compulsive use, tolerance, withdrawal, interpersonal and health problem, time management problem) as proposed by Chen et al. (2003). The results were presented in Table 5.3.

1. Two factor model: it explained 42.33% of the total variance. Factor 1 included a mix of items of symptom and items of related problem. So was Factor 2.
2. Three factor model: it accounted for 49.73% of the total variance. Same as the two factor model, items of symptom and items of related problems were mixed up in Factor 1 and Factor 2. Factor 3 included 6 items of related problem and 1 item of symptom.
3. Four factor model: this model explained a total of 53.70% of the total variance. Factor 1 included more items of symptom (6) than that of related Problem (2). Factor 2 included 8 items of symptom. Factor 3 included 4 items of related problem. Factor 4 included 6 items of related problem.
4. Five factor model: this model accounted for a total of 56.27% of the total variance. Factor 1 and Factor 2 included more items of symptom than that of related problem. Factor 3 and Factor 4 included more items of related problem than that of symptom. Factor 5 included one item of related problem and one item of withdrawal.

Table 5.4

Comparison of Two, Three, Four and Five Factor Solutions for CIAS (N=167)

Factor models		% of variance explained	Symptom			Related problem	
			Sym-T	Sym-C	Sym-W	TM	IH
2-factor	1	42.33%	1	4	2	3	6
	2		3	1	3	2	1
3-factor	1	49.73	1	2	2	1	
	2		2	3	3	1	1
	3		1			3	6
4-factor	1	53.70	2	1	3	1	1
	2		2	4	2		
	3					1	3
	4					3	3
5-factor	1	56.27	1	4	2		
	2		2	1	2	1	1
	3		1			4	2
	4						3
	5				1		1

Note. Sym-T=Symptom Tolerance, Sym-W=Symptom Withdrawal, Sym-C=Symptom Compulsive Use, RP-IH=Related Problem Interpersonal and Health Problem, RP-TM=Related Problem Time Management Problem

To sum up, the amount of variance explained increased as factor solutions stepped up from 2 to 5. 4-factor model demonstrated the clearest item grouping; Internet addiction symptoms comprised the first and second factor whereas related problems comprised the third and fourth factor. Hence, the four-factor model was adopted. Factor 1 included 1 item of compulsive use, 3 items of withdrawal, 2 items of Tolerance and 2 item of time management problem. This factor was labeled as *symptom I*. Factor 2 included 2 items of withdrawal, 2 items of tolerance, and 4 items of compulsive use. The suggested label for this factor was *symptom II*. Factor 3 included 1 item of time management problem and 3 items of Interpersonal and Health Problem. This factor was labeled as *related problem* I. Factor 4

included 3 items of Interpersonal and Health Problem and 3 items of time management problem. This factor was labeled as *related problem II.*

Table 5.5

Four Factor Model of CIAS (N=167)

	Factor			
	1	2	3	4
3) I have spent more and more time online (Sym-T)	**.770**	.080	.142	**.300**
4) I feel irritable when the modem cannot connect the host or the connection is broken for unknown reasons (Sym-W)	**.659**	**.332**	.057	.098
2) I feel uncomfortable if I have been away from the Internet for a period of time (Sym-W)	**.653**	.278	.264	-.093
6) I always spend much more time online than that I intend to (Sym-T)	**.644**	.183	.079	.266
7) I do not reduce my time spent online despite its negative influence on my interpersonal relationship (RP-IH)	**.595**	.066	**.309**	.107
5) I always feel energized online, no matter how tried I feel before connecting to the Internet (Sym-W)	**.509**	**.462**	.164	-.051
1) I have been told more than once that I spent too much time online (RP-TM)	**.448**	.108	.179	**.372**
22) I have planned to reduce time spent online but my plan always fails (Sym-C)	**.423**	.264	**.378**	.088
24) I need more and more time online to feel satisfied (Sym-T)	.170	.748	.214	.081
19) Whenever I left the Internet, I plan to do other things but end up failing to resist the craving and going online again (Sym-C)	.248	.683	.175	.218
10) I feel depressed if I cannot access from the Internet for a period of time (Sym-W)	.394	.567	.235	.064
11) I cannot control my craving towards Internet use (Sym-C)	.304	.565	.222	.113
16) I believe I would miss something important if I have been away from the Internet for a period of time (Sym-W)	.317	**.504**	**.449**	.066
	Factor			
	1	2	3	4
20) My life has no fun without the Internet (Sym-C)	.431	**.436**	.244	-.046
9) On average, I spent more and more time online since last term (Sym-T)	.548	**.386**	.282	.095
14) Everyday when I wake up, the first thing I think of is going online (Sym-C)	.283	**.352**	.288	.251
17) The time I spent with family has been reduced because of my Internet use (RP-IH)	.099	.141	**.717**	**.398**

18) The time I spent with family has been reduced because of my Internet use (RP-IH)	.246	.181	**.635**	.165
12) I have focused my time and energy on the Internet and reduced interactions with friends consequently (RP-IH)	.174	.281	**.534**	.089
8) I ever slept for less than four hours due to long time spent online (RP-TM)	.296	.210	**.408**	.153
21) My Internet use has had negative effects on my physical health (RP-IH)	.075	.153	.141	**.670**
15) My Internet use has had negative effects on my academic performance (RP-IH)	.251	.113	.231	**.527**
26) I ever stayed overnight on the Internet and felt spaced out the other day (RP-TM)	.034	**.452**	.079	**.522**
13) I suffered from backache or other physical ills because of Internet use (RP-IH)	.229	.172	.225	**.444**
25) I ever did eat regularly because of my Internet use (RP-TM)	.076	.217	.148	**.349**
23) I used to sleep less in order to have more time spent online (RP-TM)	.166	**.287**	.110	**.341**

Note. Sym-T=Symptom Tolerance, Sym-W=Symptom Withdrawal, Sym-C=Symptom Compulsive Use, RP-IH=Related Problem Interpersonal and Health Problem, RP-TM=Related Problem Time Management Problem. Factor loadings of over .30 are highlighted.

Areas for Revision and Refinement

Cronbach alpha of this scale was high (.94) and all item-total correlations were acceptable. Results of factor analysis suggested a 4-factor model, which was different from the 5-dimension scale in the previous conceptualization (Chen et al., 2003). Nevertheless, the 4-factor model succeeded in dividing the 26 items into two broad categories (symptoms and related problems), each represented by two factors (i.e. factor 1, symptom I; factor II, symptoms 3; factor 3, related problem I; factor 4, related problem II). In other words, the 4-factor model identified by pilot study reflected the construct of Internet addiction previously conceptualized by Chen et al. (2003) in terms of the two broad categories: symptoms and related problems. This led some support to the construct validity of CIAS.

Besides, factor analysis is a technique that requires a large sample. Generalizable or replicable results are unlikely if the sample is too small. Researchers have not yet agreed on

what is the minimum requirement for performing factor analysis. Some suggested that the number of subjects should be at least 5 times the number or variables, or more than 100 (e.g Hatcher, 1994). Others thought that a sample of 100 was poor, 200 was fair and 300 was good; they recommended a sample more than 300, or with subject-item ratio more than 20:1 (Hair, Anderson, Tatham, &, 1995; Hogarty, Hines, Kromrey, Ferron, & Mumford, 2005; MacCallum, Widaman, Zhang & Hong, 1999). In this research, the pilot study had a sample size considered poor to fair (n=167) and subject-item ratio only acceptable (around 6.5:1). It seems that a larger sample is required in order to evaluate CIAS's factor structure and construct validity. Considering that the development of CIAS was based on strong rationale and that it has been widely used in previous studies in Taiwan (e.g. Li & Chung, 2006; Ko et al., 2005; Yen et al., 2007) and Mainland China such as Shanghai (Shen, 2008), CIAS was used in main study despite some doubt on its validity.

Seven items with ambiguous meanings or other mistakes in questionnaire design (e.g. double-barreled questions) were examined and revised. Table 5.5 summarized results of revision. The revised scale comprised 26 items.

Table 5.6

Revision of CIAS after Pilot Study

No.	Item	Revised item	Rea
1	I have been told more than once that I spent too much time online (RP-TM).	My Internet use has negative influence on my time management (RP-TM).	Cou com man
7	I do not reduce my time spent online despite its negative influence on my interpersonal relationship (RP-IH).	My Internet use has negative influence on my interpersonal relationship (RP-IH).	Cou com inte
16	I believe I would miss something important if I have been away from the Internet for a period of time (Sym-W).	I feel restless when I have been away from the Internet for a period of time (Sym-W).	An with
23	I used to sleep less in order to have more time spent online (RP-TM).	I sleep less because of my Internet use (RP-TM).	Cou com man
25	I ever stayed overnight on the Internet and felt spaced out the other day (RP-TM).	I ever stayed overnight on the Internet (RP-TM).	A do

SELF-DEVELOPED MEASURE OF DESIRABLE OUTCOME EXPECTANCY

Internal Consistency

Three scales were developed for three types of desirable outcome expectancy: desirable outcome expectancy of substitute gratification I (need for social interaction), desirable outcome expectancy of substitute gratification II (need for intimacy), and desirable outcome expectancy of stress coping.

The internal consistency of the measure for desirable outcome expectancy of substitute gratification I (Need for Social Interaction) was .75. Corrected item-total correlations of the two items were .60 (Table 5.7).

The internal consistency of the measure for desirable outcome expectancy of substitute gratification II (need for intimacy) was .82. Corrected item-total correlations of the two items were .69 (Table 5.8).

The internal consistency of the measure for desirable outcome expectancy of stress coping was .85. Corrected item-total correlations of the two items were .73(Table 5.9).

Areas for Revision and Refinement

No revision was needed. The measures were used in the main study.

Table 5.7

Internal Consistency of the Self-Developed Measure for Desirable Outcome Expectancy of Substitute Gratification (Need for Social Interaction) (N=167)

Item	Item description	Corrected item-total correlation
1	It is only online that I feel confident in interacting with others	.60
2	It is only online that I feel social interaction is secure and comfortable	.60

Table 5.8

Internal Consistency of the Self-Developed Measure for Desirable Outcome Expectancy of Substitute Gratification (Need for Intimacy) (N=167)

Item	Item description	Corrected item-total correlation
1	It is only online that I have someone to share with secrets and private feelings	.69
2	It is only online that I have someone to talk about things that I don't wish anyone else know	.69

Table 5.9

Internal Consistency of the Self-Developed Measure for Desirable Outcome Expectancy of Stress Coping (N=167)

Item	Item description	Corrected item-total correlation
1	It is only online that I can forget problems that bother me	.73
2	When I feel stressed, it is only the Internet that makes me feel better	.73

SOCIAL ANXIETY SCALE FOR ADOLESCENTS (SAS-A)

Internal Consistency

Reliability analysis showed that the 18 items were highly consistent internally (Cronbach's alpha =.89). The average inter-item correlation was .31. The average item-total correlation was .52. Two items had item-total correlation lower than .30 (item 4, item 12). Other items have moderate to good item-total correlation, ranging from .42 to .70.

Table 5.10

Internal Consistency of SAS-A (N=167)

Items	Corrected item-total correlation
1) I worry about doing something new in front of others (SA-NEW)	.47
2) I worry about being teased (FNE)	.62
3) I feel shy around people I don't know (SA-NEW)	.47
4) I only talk to people I have known very well (SA-NEW)	.26
5) I feel that peers talk about me behind my back (FNE)	.42
6) I worry about what others think of me (FNE)	.51
7) I am afraid that others will not like me (FNE)	.60
8) I get nervous when I talk to peers I don't know very well (SA-NEW)	.58
9) I worry about what others say about me (FNE)	.66
10) I get nervous when I meet new people (SA-NEW)	.61
11) I worry that others don't like me (FNE)	.63
12) I am quiet when I am with a group of people (SA-G)	.26
13) I feel that others make fun of me (FNE)	.53
14) If I get into an argument, I worry that the other person will not like me (FNE)	.58
15) I'm afraid to invite others to do things with me because they might say so (SA-G)	.51
16) I feel nervous when I'm around certain people (SA-NEW)	.70
17) I am quiet even with peers I know very well (SA-G)	.47
18) It's hard for me to ask others to do things with me (SA-G)	.40

Note FNE=Fear of negative evaluation, SAD-New= Social anxiety and distress in new situations, SAD-General=Social anxiety and distress in general.

Factor Analysis

A principal-axis factor analysis with varimax rotation was conducted with the 15 items (item 4, 12 were excluded before factor analysis because of their low item-total correlation). Three factors were extracted, each with eigenvalue greater than 1.0, that together accounted for 47.91% of the total variance in the SAS-A.

Table 5.11

Three Factor Model of SAS-A (N=167)

Items		Factor		
		1	2	3
9)	I worry about what others say about me (FNE)	**.788**	.138	.208
7)	I am afraid that others will not like me (FNE)	**.761**	.232	.179
6)	I worry about what others think of me (FNE)	**.738**	.263	.263
2)	I worry about being teased (FNE)	**.578**	.130	.223
11)	I worry that others don't like me (FNE)	**.511**	.295	.177
13)	I feel that others make fun of me (FNE)	**.484**	.260	.142
5)	I feel that peers talk about me behind my back (FNE)	**.446**	.268	.103
14)	If I get into an argument, I worry that the others will not like me (FNE)	**.368**	.101	.244
15)	I'm afraid to invite others to do things with me because they might say so (SAG)	.117	**.652**	.143
17)	I am quiet even with peers I know very well (SAG)	.285	**.647**	.103
18)	It's hard for me to ask others to do things with me (SA-G)	.151	**.577**	.133
1)	I worry about doing something new in front of others (SA-NEW)	.170	.104	**.722**
16)	I feel nervous when I'm around certain people (SA-NEW)	.230	.292	**.620**
10)	I get nervous when I meet new people (SA-NEW)	.246	.395	**.414**
8)	I get nervous when I talk to peers I don't know very well (SA-NEW)	.158	.204	**.395**
3)	I feel shy around people I don't know (SA-NEW)	.277	.277	**.360**

Note FNE=Fear of negative evaluation, SAD-New= Social anxiety and distress in new situations, SAD-General=Social anxiety and distress in general. Factor loadings of over .30 are highlighted.

The three factor model was consistent with the three factor solution demonstrated by the scale developer (La Greca & Lopez, 1998). The factor structure was clear with no cross-

factor loadings. Factor 1 was labeled as *fear of negative evaluation (FNE)*. Factor 2 was labeled as *social anxiety and distress in general (SAD-General)*. Factor 3 was labeled as *social anxiety and distress in new situations (SAD-New)*.

Scores for FNE, SAD-New and SAD-General were computed by summing the items comprising each subscale. Cronbach's alpha of the three subscales were .85 (FNE), .75 (SAD-New), and .63 (SAD-General). Inter-scale correlations revealed that the subscales were significantly interrelated, but distinct. The correlations were .52 (FNE and SAD-General), .43 (SAD-General and SAD-New), and .46 (FNE and SAD-New) (all p <.01) (Table 5.12)

Table 5.12

Inter-correlation Matrix of the Three Factors (N=167)

	SA-New	SA-G
FNE	.46**	.52**
SA-New		.43**

Note FNE=Fear of negative evaluation, SAD-New= Social anxiety and distress in new situations, SAD-General=Social anxiety and distress in general.

** p<.01

Areas for Revision and Refinement

The reliability coefficient of the scale was high (Cronbach's alpha =.89). Factor analysis results suggested a three-factor solution that was consistent with previous reports (La Greca & Lopez, 1998). Two items (item 4, item 12) had item total correlation lower than .30. Item 4 was revised from "I only talk to people I have known very well" to "I felt anxious when talking to people I do not know well", since people who only talk to those they knew well does not necessarily feel anxious when dealing with strangers. Item 12 was revised from "I am quiet when I am with a group of people" to "I feel nervous when I am with a group of people", since people who are quiet does not necessarily feel nervous.

FRIENDSHIP INTIMACY (ADAPTED FROM THE NETWORK OF RELATIONSHIP INVENTORY)

Internal Consistency

The Cronbach alpha of the three-item of friendship intimacy was .86. Corrected item-total correlations of the two items were .74, .76 and .70 (Table 5.13).

Table 5.13

Internal Consistency of the Measure for Friendship Intimacy Adapted from Network of Relationships Inventory (N=167)

Items		Corrected item-total correlation
1	I share secrets and private feeling with the friend	.74
2	I tell the friend everything	.76
3	I talk with the friend to about things that I don't want others to know	.70

Areas for revision and refinement

The three-item scale was quite reliable. No revision is mande. The measure would be used in the main study.

SELF-DEVELOPED MEASURE OF STRESS FOR ADOLESCENTS

Internal Consistency

The Cronbach's alpha was .85. The average inter-item correlation was .20. The average item-total correlation was .40. Items 1, 6 had item-total correlations lower than .30. The item-total correlation for other items ranged from .32 to .57 (Table 5.14).

Table 5.14

Internal Consistency of Self-Developed Measure of Daily Hassles (N=167)

Items	Corrected item-total correlation
1) Parents urge me to study	.22
2) Parents are too sensitive about my school mark	.38
3) Parents expect me to do well in almost everything	.35
4) Parents have no respect for my ideas and opinions	.50
5) Parents intervene in my affairs	.55
6) Parents do not allow me to spend time with friends	.24
7) Parents don't trust me	.56
8) I had arguments with parents	.48
9) Being punished by parents physically	.41
10) Parents fight with each other	.49
11) Parent(s) speak ill of the other in front me	.57
12) Parent(s) threatens that they would get divorced	.40
13) Parents get divorced	.32
14) I do not get along with my friends well	.41
15) I am not welcomed by peers	.44
16) I am not being part of the group I want to be in	.35
17) I am being treated badly by peers in school	.39
18) School teacher(s) show(s) favoritism toward a few students	.39
19) I am criticized by a teacher	.38
20) I don't like the teaching method of my teacher in class	.36
21) There is a large amount of homework	.38

Factor Analysis

Item 1 and item 6 were excluded before conducting factor analysis. Using principal axis factoring and promax rotation, four factors were extracted. The four factor model explained 48.45% of total variance (Table 5.15).

Table 5.15

Four Factor Model of the Self-Developed Measure of Daily Hassles

Note. Factor loadings of over .30 are highlighted.

Items	Factor			
	1	2	3	4
7) Parents don't trust me	**.750**	.069	.127	.295
4) Parents have no respect for my ideas and opinions	**.740**	.232	.250	.096
5) Parents intervene in my affairs	**.720**	.257	.041	.190
9) Being punished by parents physically	**.719**	.102	.020	.284
8) I had arguments with parents	**.654**	.047	.183	.271
2) Parents are too sensitive about my school mark	**.614**	.049	.133	.270
3) Parents expect me to do well in almost everything	**.581**	.272	.132	.021
16) I am not being part of the group I want to be in	.005	**.801**	.014	.118
17) I am being treated badly by peers in school	.057	**.756**	.015	.125
15) I do not get along with my friends well	.017	**.722**	.267	.097
14) I am not welcomed by peers	.206	**.692**	.051	.054
12) Parent(s) threatens that they would get divorced	.068	.038	**.806**	.010
10) Parents fight with each other	.041	.213	**.739**	.107
13) Parents get divorced	.082	.051	**.732**	.186
11) Parent(s) speak ill of the other in front me	.078	.083	**.701**	.078
20) I don't like the teaching method of my teacher in class	.205	.030	.028	**.794**
19) I am criticized by a teacher	.014	.037	.117	**.784**
18) School teacher(s) show(s) favoritism toward a few students	.016	.083	.046	**.712**
21) There is a large amount of homework	.185	.086	.043	**.558**

Factor 1 includes 7 items describing various types of conflict with parents. For example, Item 9 is "I have arguments with parents", Item 7 is "my parents do not trust me". This item is labeled as *conflict with parents.*

Factor 2 included 4 items. Subjects who scored high on these items are more likely to have relationship problems with peers. For example, item 16 is "I am not being part of the group I want to be in", item 18 is "I am being treated badly by peers in school". The suggested label for this factor is *relationship problems with peer*s.

Factor 3 included 4 items of conflict between parents. For example, item 12 is "parents threatened that they would divorce". This factor is labeled as *conflict between parents.*

Factor 4 included 4 items. 3 items are about unpleasant feelings towards the teacher. For example, item 20 is "I do not like the way of teaching." 1 item， item 21, "There is a large amount of homework", is about study burden. This factor is labeled as *distress related to*

teacher and study.

Cronbach's alpha of the four subscales were .80 (conflict with parents), .83 (conflict between parents), .75 (relationship problem with peers), and .78 (distress related to teacher and study). Inter-scale correlations revealed that the subscales were significantly interrelated, but distinct (Table 5. 16)

Table 5.16

Inter-Correlation Matrix of the Four Factors (N=167)

	Conflict between parents	Relationship problem with peers	Distress Related to Teacher and Study
Conflict with parents	.09*	.41**	.12*
Conflict between parents		.41**	.37**
Relationship problem with peers			.27**

Note. ** p<.001, *p<.05

Areas for Revision and Refinement

The internal consistency of the scale was high (Cronbach alpha=.85). Item 1 and item 6 had item-total correlation lower than .30 and thus were deleted. Six new items were added based on informal interviews with students and teachers in pilot study (Table 5.17). The revised scale for main study comprised 25 items.

Table 5.17

New Items for the Self-Developed Measure of Daily Hassles

Item	Reasons
I was hit, kicked, pushed, or bumped by other students.	New items for school violence by peer students replacing the item "I was treated badly by peers".
I was deliberately left out of things by peers.	
Peers spread rumor about me.	
I was teased by others in a way I do not like.	
I was hit, kicked, pushed, or bumped by teacher(s).	New items for school violence by teacher(s)

I was criticized in a harsh way by teacher(s).	
Homework and examinations are difficult for me.	An addition item for study burden

AVOIDANCE COPING STYLE (ADAPTED FROM COPE INVENTORY)

Internal consistency

The Cronbach alpha for the scale was .75. The average inter-item correlation was .53. The average item-total correlation was .55. All items had moderate to high item-total correlation (Table 5.18).

Table 5.18

Internal Consistency of Avoidance Inventory (N=167)

Items	Corrected item-total correlation
1) I refuse to believe that it has happened (Denial)	.44
2) I pretend that it hasn't really happened (Denial)	.47
3) I act as though it hasn't even happened (Denial)	.50
4) I say to myself 'this isn't real (Denial)	.48
5) I give up the attempt to get what I want (behavioral disengagement)	.42
6) I just give up trying to reach my goal (behavioral disengagement)	.52
7) I admit to myself that I can't deal with it, and quit trying (behavioral disengagement)	.56
8) I reduce the amount of effort I'm putting into solving the problem (behavioral disengagement)	.58
9) I turn to work or other substitute activities to take my mind off things (cognitive disengagement)	.70
10) I go to movies or watch TV, to think about it less (cognitive disengagement)	.55
11) I daydream about things other than this (cognitive disengagement)	.70
12) I sleep more than usual (cognitive disengagement)	.62

Factor analysis

Using principal axis factoring and promax rotation, two factors were extracted. The two factor model explained 63.58% of the total variance. Since previous research suggested that the three scales should reflect the same avoidance coping style, one factor solution was attempted. The one-factor model explained 52.47% of the variances. All factors were reasonably loaded on the factor (Table 5.19). So one-factor model was adopted.

Table 5.19

One-factor model of the Avoidance Coping Inventory (N=167)

Items	Factor
9) I turn to work or other substitute activities to take my mind off things (cognitive disengagement)	**.77**
1) I refuse to believe that it has happened (Denial)	**.74**
4) I say to myself 'this isn't real (Denial)	**.70**
5) I give up the attempt to get what I want (behavioral disengagement)	**.62**
6) I just give up trying to reach my goal (behavioral disengagement)	**.55**
7) I admit to myself that I can't deal with it, and quit trying (behavioral disengagement)	**.54**
12) I sleep more than usual (cognitive disengagement)	**.42**
2) I pretend that it hasn't really happened (Denial)	**.42**
8) I reduce the amount of effort I'm putting into solving the problem (behavioral disengagement)	**.40**
3) I act as though it hasn't even happened (Denial)	**.38**
10) I go to movies or watch TV, to think about it less (cognitive disengagement)	**.35**
11) I daydream about things other than this (cognitive disengagement)	**.33**

Note. Factor loadings of over .30 are highlighted.

Areas for Revision and Refinement

Reliability analysis showed moderate to high internal consistency coefficients. Factor analysis revealed a one-factor model. No items had cross-factor loadings. Most items were easy to read and did not cause difficulties in understanding. Hence no items were deleted or revised.

Summary of this chapter

Based on results of the pilot study, decisions concerning the measurement to be used in the main study were made. Measurements that would be used in main study without revision were: self-developed measures for desirable outcome expectancy, subscale of friendship intimacy adapted from the Network and Relationship Inventory and the subscale of avoidance coping style from the COPE Inventory. Measurements that have been revised before putting into use are: the Chinese Internet Addiction Scale (CIAS), the Social Anxiety Scale for Adolescents (SAS-A), and the self developed measure of daily hassles for adolescents. English and Chinese version of the questionnaire used in pilot and main study could be found in Appendix A-D.

CHAPTER SIX

MAIN STUDY

The first section of this chapter reports psychometric properties of the measurements based on main study data. The second section describes descriptive statistics of all the variables that were entered into further analysis. The third section compares high-risk group with non-high-risk group in terms of time spent online, preference for online activities and hypothesized individual or contextual risk factors. In the fourth section, severity of internet addiction symptoms was regressed in a hierarchical manner on demographic variables, desirable outcome expectancies, risk factors, time spent on particular online activity and the overall time spent online. The fifth section tests the partial mediations models which hypothesized that desirable outcome expectancies mediate the effect of risk factors such as social anxiety,

lack of intimate friends, stress, and avoidance coping style on severity of internet addiction symptoms.

PSYCHOMETRIC ANALYSES

Reliability and validity of measurements were assessed based on main study data. As Table 6.1 illustrates, Cronbach's alpha of these measurements ranged from .75 to .94, suggesting moderate to high reliability; results of factor analysis in main study were consistent with those in pilot study, which lend support to these measurements' validity.

Table 6.1
Psychometric Properties of Measurements in Main Study (N=892)

Variables	SIAS	DOESG I	DOSG II	DOESC	SA	LIF	St
Scales	Chinese Internet Addiction Scale (CIAS)	Self-developed measure	Self-developed measure	Self-developed measure	Social Anxiety Scale for Adolescents (SAS-A)	Network of Relationship Inventory (part & reversed)	Se de me
Number of Items	26	2	2	2	18	3	25
Internal Consistency							
Cronbach's Alpha	.95	.75	.82	.85	.89	.86	.8
Mean Inter-item Correlation	.38	.54	.62	.68	.31	.29	.2
Mean Item-total Correlation	.60	.54	.62	.68	.52	.73	.4
Factor Analysis							
Factor Structure	4	NA	NA	NA	3	NA	4

Note: SIAS=Severity of Internet Addiction Symptoms, DOESG I=Desirable Outcome Expectancy of Substitute Gratification I (Need for Social Interaction), DOESG II = Desirable Outcome Expectancy of Substitute Gratification II (need for intimacy), DOESC = Desirable Outcome Expectancy of Stress coping, SA=Social Anxiety, LIF=Lack of Intimate Friendship, Stress=Stress, ACS=Avoidance Coping Style

Special attention was paid to the factor structure of Chinese Internet Addiction Scale (CIAS). Results of pilot study were replicated in main study (Table 6.2). With the criterion of

eigenvalue higher than 1.0, four factors were identified. The item grouping is similar to the 4-factor model identified in pilot study. The factor structure was clear with minimal cross factor loading. Therefore, despite the inconsistencies with the scale developer (Chen et al., 2003), the 4-factor model was adopted in this study.

Table 6.2

Four Factor Model of CIAS (N=892)

Items	Factor			
	1	2	3	4
6)I always spend much more time online than that I intend to (Sym-T)	**.655**	.212	.188	.139
5) I always feel energized online, no matter how tried I feel before connecting to the Internet (Sym-W)	**.631**	.223	.092	.122
4) I feel irritable when the modem cannot connect the host or the connection is broken for unknown reasons (Sym-W)	**.561**	.283	.182	.124
2) I feel uncomfortable if I have been away from the Internet for a period of time (Sym-W)	**.554**	.402	.189	.146
3) I have spent more and more time online (Sym-T)	**.511**	.211	.216	.221
1)I have been told more than once that I spent too much time online (RP-TM)	**.488**	.072	.330	.151
22) I have planned to reduce time spent online but my plan always fails (Sym-C)	**.423**	.284	.375	.277
7) I do not reduce my time spent online despite its negative influence on my interpersonal relationship (RP-IH)	**.384**	.140	.143	.233
10) I feel depressed if I cannot access from the Internet for a period of time (Sym-W)	.287	**.660**	.090	.266
11) I cannot control my craving towards Internet use (Sym-C)	.237	**.588**	.292	.202
16) I believe I would miss something important if I have been away from the Internet for a period of time (Sym-W)	.210	**.580**	.246	.185
20) My life has no fun without the Internet (Sym-C)	.277	**.532**	.249	.167
Items	Factor			
	1	2	3	4
19)Whenever I left the Internet, I plan to do other things but end up failing to resist the craving and going online again (Sym-C)	.238	**.421**	.253	.243
24) I need more and more time online to feel satisfied (Sym-T)	.167	**.457**	.278	.258
14) Everyday when I wake up, the first thing I think of is going online (Sym-C)	.249	**.385**	.201	.223

9) On average, I spent more and more time online since last term (Sym-T)	.259	**.375**	.084	.267
18) The time I spent on leisure activities has been reduced because of my Internet use (RP-IH)	.206	.183	**.632**	.122
17)The time I spent with family has been reduced because of my Internet use (RP-IH)	.131	.269	**.566**	.211
15) My Internet use has had negative effects on my academic performance (RP-IH)	.284	.191	**.480**	.251
21) My Internet use has had negative effects on my physical health (RP-IH)	.158	.087	**.466**	.261
25) I ever did eat regularly because of my Internet use (RP-TM)	.185	.166	**.414**	.267
12) I have focused my time and energy on the Internet and reduced interactions with friends consequently (RP-IH)	.206	.205	.290	**.457**
26) I ever stayed overnight on the Internet and felt spaced out the other day (RP-TM)	.137	.138	.233	**.445**
23) I used to sleep less in order to have more time spent online (RP-TM)	.120	.375	.159	**.442**
13) I suffered from backache or other physical ills because of Internet use (RP-IH)	.176	.166	.237	**.390**
8) I ever slept for less than four hours due to long time spent online (RP-TM)	.173	.196	.100	**.332**

Note. Sym-T=Symptom Tolerance, Sym-W=Symptom Withdrawal, Sym-C=Symptom Compulsive Use, RP-IH=Related Problem Interpersonal and Health Problem, RP-TM=Related Problem Time Management Problem.

Factor loadings of over .30 are highlighted.

DESCRIPTIVE STATISTICS

Severity of Internet Addiction Symptoms

The dependent variable *severity of internet addiction symptoms* (SIAS) was measured by the Chinese Internet Addiction Scale (CIAS) scored within the possible range of 26-104. In this study, the lowest score was 26, the highest score was 104, the median was 44, the mean was 46.82 and the standard deviation was 15.81. Distribution was skewed to the left side (skewness=0.91, SD=0.08), implying that a small proportion of the total respondents (N=892) reported disproportionately more symptoms and should be considered high risk group.

Analysis on the amount and features of the high-risk group is presented in the next section.

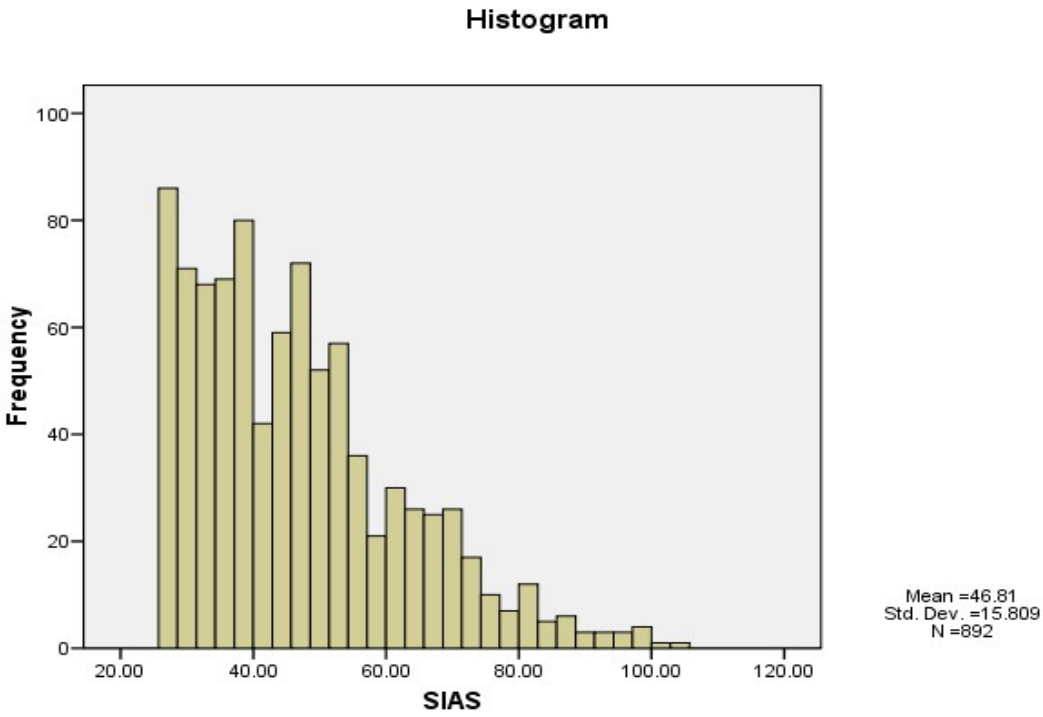


Figure 6.1 Distribution of Severity of Internet Addiction Symptoms

Time Spent Online during Holidays, Weekends, and Weekdays

Table 6.3 shows length of Internet use in three different periods of time: the recent last summer holiday (i.e. July to August, 2010), weekends in the academic term at time of investigation (i.e. September to December, 2010), and weekdays in academic term at time of investigation (i.e. September to December, 2010).

Average daily hours of Internet use during holidays was 4.36 hours, SD 3.83. During the recent last summer holiday (i.e. July to August, 2010), an average participant spent one-fourth of his waking hours (supposing he slept for eight hours a day) on Internet activities. Eleven cases reported staying online for 24 hours per day.

Average daily hours of Internet use during weekends was 3.09 hours, SD 3.13. Eight

participants reported staying online for 24 hours per day during weekends. This indicated that Internet use has been one major activity for an average participant on Saturday and Sunday, though the length of time was slightly lower than that during holidays.

Participants spent less time online during schooldays than weekends and holidays. The average daily hours of Internet use during weekdays was 1.05 hours, SD 1.45. The maximum score for time spent online during weekdays was 4.6 hours per day.

Table 6.3

Mean, Standard Deviation of Time Spent Online during Holidays, Weekends and Weekdays (N=892)

	Min.(h)	Max.(h)	Mean (h)	SD
Time Spent Online During Holidays	.0	24.0	4.36	3.83
Time Spent Online During Weekends	.0	24.0	3.09	3.13
Time Spent Online During Weekdays	.0	4.6	1.15	1.45

Zero Hour User in the Three Time Phases

Ten participants reported zero hour of internet use during the summer holiday (i.e. July to August 2010). Two were male and eight were female. Seven were junior secondary school students and three were senior secondary school students. None of them had internet access at home, three had visited internet cafe, and eight had used internet at school. While the ten participants had used internet during weekends and weekdays of the academic term (i.e. September to December 2010), the group (n=10) spent less time online than the remaining (n=882) during weekends (M_{zero}=1.45, SD_{zero}=1.01, $M_{non\text{-}zero}$=3.11, $SD_{non\text{-}zero}$=3.13, $p<.001$) and weekdays (M_{zero}=0.4, SD_{zero}=0.91, $M_{non\text{-}zero}$=1.01, $SD_{non\text{-}zero}$=1.45, $p<.05$) (Table 6.4).

39 participants did not use internet during weekends of the academic term (i.e. September to December 2010). 17 were male, 22 were female. 25 were junior secondary school students and 14 were senior secondary school students. 28 had internet access at home, three had

visited Internet cafe and 30 had used Internet at school. Compared with the non zero hour users, the zero hour group (n=39) spent less time online on weekdays (M_{zero}=0.27, SD_{zero}=0.68, $M_{non\text{-}zero}$=1.10, $SD_{non\text{-}zero}$=1.46, p=.001) yet no difference was found in time spent online during holidays (M_{zero}=4.27, SD_{zero}=3.70, $M_{non\text{-}zero}$=4.44, $SD_{non\text{-}zero}$=3.87, P=.052) (Table 6.5).

256 participants reported zero hour of internet use during weekdays of the academic term (i.e. September to December 2010). 128 were male, 128 were female. 178 were senior secondary school students, 78 were senior secondary school students. 212 had Internet access at home, 27 had visited internet cafe, 225 had used internet at school. The group (n=256) did not differ from the remaining (n=636) in terms of time spent online during holidays (M_{zero}=3.80, SD_{zero}=3.17, $M_{non\text{-}zero}$=4.02, $SD_{non\text{-}zero}$=3.90, p>.05) and weekends (M_{zero}=3.34, SD_{zero}=3.07, $M_{non\text{-}zero}$=3.39, $SD_{non\text{-}zero}$=3.09, p>.05) (Table 6.6).

Table 6.4
Compare Time Spent Online on Weekends and Weekdays between the Zero Hour Users and the Non-zero Hour Users during Holidays

		M	SD	T	P
Weekend	Zero (n=10)	1.45	1.01	-4.911	<.001
	Nonzero (n=882)	3.11	3.13		
Weekday	Zero (n=10)	0.4	0.91	-2.015	.044
	Nonzero (n=882)	1.01	1.45		

Table 6.5
Compare Time Spent Online during Holidays and Weekdays between the Zero Hour Users and the Non-zero Hour Users on Weekends

		M	SD	T	P
Holiday	Zero (n=39)	4.27	3.70	-1.914	.052
	Nonzero (n=853)	4.44	3.87		
Weekday	Zero(n=39)	0.27	0.68	-3.465	.001
	Nonzero (n=853)	1.10	1.46		

Table 6.6
Compare Time Spent Online during Holidays and Weekends between the Zero Hour Users Weekday and the Non-zero Hour User on Weekdays

		M	SD	T	p
Holiday	Zero (n=256)	3.80	3.17	-1.347	

						>.05
	Nonzero (n=636)	4.02	3.90			
Weekend	Zero (n=256)	3.34	3.07		-1.5	
				64		>0.5
	Nonzero (n=636)	3.39	3.09			

Time Spent on Various Online Activities

Respondents were invited to indicate their time spent on the following online activities: email, online forum, online blogging, instant messaging, social networking websites, idling online, information search, watching music or video online, downloading music or video, and online gaming. For each activity four response categories were provided: zero, less than one hour per day, one to two hours per day, and more than two hours per day[4].

Table 6.7summarizes the frequency and percentage of response within each category. Ranked by percentage within the category of more than two hours per day, the five most frequently used online activities were: instant messaging (31.8% used for more than two hours), online music and video (30.2% used for more than two hours), online gaming (24.8% used for more than two hours), idling online (19.6% used for more than two hours) and downloading movie or music (16.7% used for more than two hours). Ranked by percentage within the category of never or less than one hour, the five least frequently used activities were: online forum (63.6% never, 29.5% less than one hour), email (53.2% never, 42.8% less than one hour), online blogging (51.1% never, 38.2% less than one hour), social networking websites (37.5% never, 41.2% less than one hour), and information search (6.5% never, 64.8% less than one hour).

4 People online tend to be multitasking (e.g. chatting with friends while listening to music) and thus it is difficult to estimate the exact length of time spent on each activity.

Table 6.7

Frequency and Percentage by Time Spent on Each Internet Activity (N=892)

	0	< 1h	1-2 h	> 2h
Email	474(53.2%)	381(42.8%)	20 (2.2%)	16 (1.8%)
Information Search	58 (6.5%)	577 (64.8%)	157 (17.6%)	100 (11.1%)
Online Forum	567 (63.6%)	263 (29.5%)	38 (14.3%)	24 (2.6%)
Online Blogging	455 (51.1%)	340 (38.2%)	70 (7.9%)	27 (2.9%)
Instant Messaging	80 (9%)	305 (34.2%)	223 (25%)	284 (31.8%)
Social Networking Websites	334 (37.5%)	367 (41.2%)	112 (12.6%)	79 (8.8%)
Idling Online	82 (9.2%)	443 (49.7%)	191 (21.4%)	176 (19.6%)
Online Movie or Video	97 (10.9%)	285 (32%)	249 (26.9%)	270 (30.2%)
Downloading Movie or Video	220 (24.7%)	365 (41%)	157 (17.6%)	150 (16.7%)
Online Gaming	237 (26.6%)	299 (33.6%)	134 (15%)	222 (24.8%)

Risk Factors

In this study, risk factors hypothesized to predict severity of Internet addiction symptoms included: social anxiety, low friendship intimacy, stress, avoidance coping style, desirable outcome expectancy of substitute gratification I (need for social interaction), desirable outcome expectancy of substitute gratification II (need for intimacy), and desirable outcome expectancy of stress coping. All the variables were in ordinal level, as Likert scales were used in the measurements of these variables. Mean and standard deviation of these variables are presented in Table 6.8.

For three types of outcome desirable outcome expectancy, higher score indicated higher desirable outcome expectancy. The average scores were: 6.13 (SD 2.16) for desirable outcome expectancy of stress coping, 5.32 (SD 2.37) for desirable outcome expectancy of substitute gratification II (need for intimacy), and 4.83 (SD 2.38) for desirable outcome

expectancy of substitute gratification I (need for social interaction). The score range for measurement of social anxiety was 18-90, higher scores indicating higher social anxiety. The average score of social anxiety in this sample was 44.29 (SD 14.33). Lack of intimate friendship is indicated by reversing the score for scale of friendship intimacy. The reversed score range was 3-15. The mean reversed score was 5.80 (SD 3.32). Higher scores indicated stronger lack of intimate friendship. The score range for scale of stress was 0-75, higher scores indicating higher stress. In this sample, an average participant scored 26.96 (SD 16.40). Finally, higher scores indicated higher tendency of avoidance coping style. The score range was 12-48. In this sample, the average score was 22.91 (SD 10.37).

Table 6.8

Mean, Standard Deviation of Risk Factors (N=892)

	Possible Range	Min	Max	Mean	SD
Desirable Outcome Expectancy of Substitute Gratification I (Need for Social Interaction)	2-10	2	10	4.83	2.16
Desirable Outcome Expectancy of Substitute Gratification II (Need for Intimacy)	2-10	2	10	5.32	2.37
Desirable Outcome Expectancy of Stress Coping	2-10	2	10	6.13	2.38
Social Anxiety	18-90	18	90	44.29	14.33
Lack of intimate friendship	3-15	3	15	5.80	3.32
Stress	0-75	0	73	26.96	16.40
Avoidance Coping Style	12-48	12	48	22.91	10.37

Note. Higher score indicate higher social anxiety, stronger lack of intimate friendship, higher stress, stronger tendency of avoidance coping and stronger desirable outcome expectancies.

COMPARISON OF HIGH-RISK GROUP AND NON-HIGH-RISK GROUP

High-Risk Group

The high risk group was identified thanks to the cut-off point of the CIAS (63/64) suggested by Ko and his colleagues (2005b). Ko et al. (2005b) reported the diagnostic cut-off point by comparing the diagnostic results of CIAS with those of the diagnostic criteria for Internet addiction developed by Ko et al. (2005a). The diagnostic accuracy of 87.6% indicated that the cut-off point classified 87.6% of the participants (N=454) correctly. Given that more replication studies are needed to establish a commonly agreed and well grounded cut-off point (which has been argued in chapter two), participants in this study who scored 64 or above was considered high risk group instead of internet addicts. Thus 52 cases were included in the high-risk group (5.83%) while 840 cases (94.17%) belonged to the non-high-risk group.

In the high-risk group, 37 were boys and 15 were girls; 44 were senior secondary school students while 8 were junior secondary school students. Hence in this sample boys were more likely to be included in the high-risk group (8.37%) than girls (3.33%); senior secondary school students were more likely to be included in the high risk group (10.19%) than the junior secondary school students (1.74%).

Group Differences in Time Spent Online during Holidays, Weekends and Weekdays

The high-risk group and non-high-risk group were compared in terms of time spent online during holidays, weekends and weekdays. A series of t-tests were performed. Table 6.9 shows the results. As predicted, the high-risk group ($M_{high\text{-}risk}$=6.70 hours, SD=4.54) spent longer time online during holidays than the non-high-risk group did ($M_{non\text{-}high\text{-}risk}$=4.15 hours, SD=3.70); the difference was statistically significant (t=-4.658, p<.001). They also spent

significantly longer time online during weekends ($M_{high\text{-}risk}$=4.79 hours, SD=4.45, $M_{non\text{-}high\text{-}risk}$ hours =2.94, SD=3.03, t=-3.523, p<.001) and weekdays ($M_{high\text{-}risk}$=1.92 hours, SD=2.26, $M_{non\text{-}high\text{-}risk}$=0.98 hours, SD=1.33, t=-3.43, p<.001)

Table 6.9

Means Comparison between High-Risk Group and Non-High-Risk Group in Time Spent Online during Holidays, Weekends, and Weekdays (N=892)

	Mean (h)	SD (h)	t	P
Time Spent Online during Holidays				
High-Risk (52)	6.70	4.54	-4.57	<0.001
Non-High-Risk (840)	4.15	3.70		
Time Spent Online during Weekends				
High-Risk (52)	4.79	4.45	-3.49	<0.001
Non-High-Risk (840)	2.94	3.03		
Time Spent Online during Weekdays				
High-Risk (52)	1.92	2.26	-3.52	<0.001
Non-High-Risk (840)	0.98	1.33		

Group Differences in Time Spent on Various Online Activities

The categorical variables of time spent on each online activity were transformed[5] into the binary variables with zero representing never or less than one hour and one representing one hour or more. A series of logistic regressions were conducted; time spent on each online activity (email, online forum, online -blogging, instant messaging, social networking websites, web surfing, information search, watching music or video online, downloading

5 The transformations were to meet the assumption of logistic regression. Logistic regression was chosen since chi-square test is not applicable as expected frequencies in some cells were less than five.

music or video, and online gaming) was the independent variable while the high-risk-group status as the dependent variable.

Results of the logistic regressions were summarized in Table 6.10. Overall, instant messaging, watching online movie or video, downloading movie or video, online gaming and idling online significantly predict the high risk group status. Time for idling online reported the highest odds ratio (odds ratio=2.117, p<.001); that is, respondents who on average idle online for one hour or more everyday were 2.896 times as likely as those who idle online for one hour or less every day to be included in the high-risk group. The odds ratio for downloading movie or video was 1.749 (p<.001), 1.709 for instant messaging (p=.001), 1. 688 (p<.001) for online gaming and 1.593 (p=.003) for watching online movie or video.

In contrast, high-risk and non-high-risk group did not differ in time spent on email (odds ratio=1.203, p=.388), information search (odds ratio=1.329, p=.104), online forum (odds ratio=1.256, p=.253), online blogging (odds ratio=.96, p=.924) and social networking websites (odds ratio=1.201, p=.391)

Table 6.10

Logistic regressions of High-Risk Group Status by Time Spent on Each Online Activity (N=892)

	B	Exp (B)	Confidence interval		p
			Lower end	Higher end	
Email	.185	1.203	.791	1.829	.388
Information Search	.285	1.329	.943	1.873	.104
Online forum	.202	1.256	.867	1.854	.253
Online blogging	-.041	.960	.441	2.226	.924
Social networking websites	.183	1.201	.789	1.940	.391
Instant Messaging	.536	1.709	1.246	2.343	.001
Online Movie or Video	.466	1.593	1.172	2.165	.003
Downloading Movie or Video	.599	1.749	1.331	2.298	<.001
Online Gaming	.524	1.688	1.302	2.189	<.001
Idling Online	.750	2.117	1.548	2.896	<.001

Group Differences in Risk Factors

Table 6.11 shows results of comparing group means for hypothesized risk factors. The high-risk group ($M_{high\text{-}risk}$=5.82, SD=2.34) had a higher level of desirable outcome expectancy of substitute gratification I (need for social interaction) than the non-high-risk group ($M_{non\text{-}high\text{-}risk}$=4.74, SD=2.12). The difference between high-risk group and non-high-risk group was statistically significant (t=-3.84, p<.001). The high-risk group also had higher desirable outcome expectancy of substitute gratification I (need for intimacy) ($M_{high\text{-}risk}$=6.03, SD=2.44, $M_{non\text{-}high\text{-}risk}$=5.25, SD=2.34, t=-2.62, p<.01) and higher desirable outcome expectancy of stress coping ($M_{high\text{-}risk}$=7.37, SD=2.04, $M_{non\text{-}high\text{-}risk}$=6.02, SD=2.38, t=-5.32, p<.001).

High-risk group also had a statistically significant higher level of social anxiety ($M_{high\text{-}risk}$ =56.47, SD=14.96, $M_{non\text{-}high\text{-}risk}$ =40.06, SD=13.67, t=-7.88, p<.001), stress ($M_{high\text{-}risk}$=35.66, SD=17.21, $M_{non\text{-}high\text{-}risk}$ =29.44, SD=16.25, t=-2.93, p<.01), avoidance coping Style ($M_{high\text{-}risk}$ =25.06, SD=12.17, $M_{non\text{-}high\text{-}risk}$ =22.77, SD=10.34, t=-6.49, p<.001) than non-high-risk group. In addition, the reversed score of friendship intimacy was higher in high-risk group than non-

high-risk group (($M_{high\text{-}risk}$ =6.94, SD=2.89, $M_{non\text{-}high\text{-}risk}$ =3.96, SD=2.35, t=2.34, p<.05), indicating that high-risk group had less friendship intimacy than non-high-risk group.

Summary of this section

To summarize, the higher-risk group of Internet addiction not only reported longer internet usage overall, but also spent longer time on entertainment and social interaction activities such as instant messaging, online gaming, watching or downloading movie or video and idling online; other online activities like email, online forum, social networking websites, online blogging and information search did not significantly predict the high-risk group status. In addition, the high-risk group had higher desirable outcome expectancies, had higher social anxiety, lower friendship intimacy, higher stress, and stronger tendency of avoidance coping. Thus, Hypotheses 1.1-1.18 were supported.

Table 6.11
Means Comparison between High-Risk Group and Non-High-Risk Group in Psychosocial Risk Factors (N=892)

	Mean	SD	t	P
Social Anxiety				
High-Risk (58)	56.47	14.96	-7.88	< .001
Non-High-Risk (834)	40.06	13.67		
Lack of Intimate Friendship				
High-Risk (58)	6.94	2.89	2.34	<.05
Non-High-Risk (834)	3.96	2.35		
Stress	10			
High-Risk (58)	35.66	17.21	-2.93	<.01
Non-High-Risk (834)	29.44	16.25		
Avoidance Coping Style				
High-Risk (58)	25.06	12.17	-6.49	<.001
Non-High-Risk (834)	22.77	10.34		
Desirable Outcome Expectancy of Substitute Gratification I (Need for Social Interaction)				
High-Risk (58)	5.82	2.34	-3.84	<.001
Non-High-Risk (834)	4.83	2.16		
Desirable Outcome Expectancy of Substitute Gratification II (Need for Intimacy)				
High-Risk (58)	6.03	2.44	-2.62	<.01
Non-High-Risk (834)	5.25	2.34		
Desirable Outcome Expectancy of Stress Coping				
High-Risk (58)	7.37	2.04	-5.32	<.001
Non-High-Risk (834)	6.02	2.38		

Note. Higher score indicate higher social anxiety, stronger lack of intimate friendship, higher stress, stronger tendency of avoidance coping and stronger desirable outcome expectancies.

PREDICTORS FOR SEVERITY OF INTERNET ADDICTION SYMPTOMS

This section aimed to explore predictors for severity of internet addiction symptoms. The dependent variable, severity of internet addiction symptoms, was an interval variable. The independent variables include demographic variables (gender, grade, family type, family monthly income, father occupation, and mother occupation), time spent online in general and on each online activity respectively, desirable outcome expectancies, and individual or

environmental risk factors such as social anxiety, lack of intimate friendship, stress, and avoidance coping style. Hierarchical regression was performed to test and compare the effects of those risk factors on severity of internet addiction symptoms. After that, the hypothesized mediation models were tested in line with the four steps in establishing mediation proposed by Barron and Kenny (1986).

Correlation of Dependent and Independent Variables

The correlation matrix is presented in Table 6.12. Time spent online during holidays, weekends and weekdays were positively associated with severity of Internet addiction symptoms ($r=.337$, $p<.01$; $r=.348$, $p<.01$; $r=.280$, $p<.01$).

Desirable outcome expectancy of substitute gratification I (need for social interaction) and desirable outcome expectancy of substitute gratification II (need for intimacy) were highly correlated ($r=.712$, $p<.001$). Such a high correlation would cause multicollinearity problem if the two variables were entered into a regression equation. The solution is either to remove variables from the analysis or to create a composite variable of the highly correlated variables if it is supported by theory (Marcus, 2006). In this research, the raw scores of two variables were added to form a new variable: desirable outcome expectancy of substitute gratification (need to belong). According to Baumeister and Leary (1995), interpersonal needs of regular contact and emotional bond are inherently linked. The interpersonal need characterized by regular contact and emotional bond is termed as the need to belong. The new variable-desirable outcome expectancy of substitute gratification (need to belong) – had a moderate association with desirable outcome expectancy of stress coping ($r=.312$, $p<.01$). Both desirable outcome expectancy of substitute gratification (need to belong) and desirable outcome expectancy of stress coping positively predict severity of Internet addiction symptoms ($r=.409$, $p<.01$; $r=.315$, $p<.01$)

Social anxiety was positively associated with severity of Internet addiction symptoms ($r=.409$, $p<.001$), desirable outcome expectancy of substitute gratification (need to belong) ($r=.313$, $p<.01$) as well as with desirable outcome expectancy of stress coping ($r=.218$, $p<.01$). In contrast, the correlation between lack of intimate friendship and severity of Internet addiction symptoms is significant but low in effect size ($r=.083$, $p<.05$). Lack of intimate friendship did not have significant effect on either desirable outcome expectancy of substitute gratification (need to belong) ($r=.063$, $p>.05$) or desirable outcome expectancy of stress coping ($r=.057$, $p>.05$).

Stress and voidance coping style were positively associated with severity of Internet addiction symptoms ($r=.194$, $p<.01$; $r=.288$, $p<.01$). Stress and avoidance coping style also positively predict desirable outcome expectancy of stress coping ($r=.314$, $p<.01$; $r=.391$, $p<.01$). An unexpected finding is that stress and avoidance coping were positively associated with desirable outcome of substitute gratification (need to belong) ($r=.227$, $p<.01$; $r=.326$, $p<.01$)

To summarize, most of the bivariate associations were in line with the hypotheses. Four unexpected findings were worth noting. First, desirable outcome expectancy of substitute gratification I (need for social interaction) and desirable outcome expectancy of substitute gratification II (need for intimacy) were combined to form desirable outcome expectancy of substitute gratification (need to belong). Second, lack of intimate friendship was not significantly associated with desirable outcome expectancies and has weak correlation with severity of Internet addiction symptoms. Third, social anxiety was positively associated with desirable outcome expectancy of stress coping. Forth, stress and avoidance coping style are positively associated with desirable outcome expectancy of substitute gratification (need to belong). These results impacted the estimate of mediation models, as elaborated below.

Table 6.12

Correlation Matrix of All the Variables (N=892)

	1	2	3	4	5	6	7	8	9	10	11
1.Social Anxiety	-	-	-	-	-	-	-	-	-		
2.Lack of Intimate Friendship	.069*	-	-	-	-	-	-	-	-		
3.Stress	.229**	.010	-	-	-	-	-	-	-		
4.Avoidant coping	.243**	.064	.196**	-	-	-	-	-	-		
5.Desirable outcome expectancy of substitute gratification I (Need for Social Interaction)	.156**	.147**	.117**	.146**	-	-	-	-	-		
6.Desirable outcome expectancy of substitute gratification II (need for intimacy)	.154**	.190**	.111**	.189**	**.712****	-	-	-	-		
7.Desirable outcome expectancy of stress coping	**.218****	**057**	**.314****	**.391****	.505**	.476**	-	-	-		
8.Desirable outcome expectancy of substitute gratification (need to belong)[a]	**.313****	**.063**	**.227****	**.326****	.907**	.887**	.312**	-	-		
9.Time Spent Online during holidays	.101**	.178**	.109**	.208**	.297**	.343**	.326**	.385**			
10. Time Spent Online during weekends	.125**	.004	.083**	.153**	.280**	.225**	.226**	.283**	.658**		
11. Time Spent Online during weekdays	.045	.008	.084*	.036	.132**	.112**	.086*	.136**	.367**	.470**	
12. Severity of Internet addiction symptoms	.409**	.083*	.194**	.288**	.243**	.326**	.409**	.315**	.337**	.348**	.280**

Note. [a] Desirable Outcome Expectancy of Substitute Gratification (Need to Belong) is a composite variable for Desirable Outcome Expectancy of Substitute Gratification I (Need for Social Interaction) and Desirable Outcome Expectancy of Substitute Gratification II (Need for Intimacy).

***p<.001,**P<.01， * P<.05

Hierarchical Regression Predicting Severity of Internet Addiction Symptoms via Demographic Variables, Personal or Environmental Inadequacies, Desirable Outcome Expectancy, Preference for Online Activities and Time Spent Online

Table 6.13 summarizes the results of the hierarchical regression analysis. In the first step of hierarchical regression analysis, six demographic variables (gender, grade, family type, family monthly income, father occupation, and mother occupation) were entered into the equation. The six variables taken as a group produces a regression coefficient of R = 0.182, or variance explained of 0.033 (adjusted R^2 = 0.026), F (6, 886) = 4.594, p<.001. Gender (β=.131, p<.001) and Grade (β=.081, p<.05) were significant predictors for severity of internet addiction symptoms. Family type, family monthly income, father occupation and mother occupation did not have significant effects.

After controlling for the demographic factors, four domains of personal or environmental inadequacies (social anxiety, lack of intimate friendship, stress and avoidance coping style) accounted for an additional of 21.10% of the total variance in severity of internet addiction symptoms, F_{change} (4, 882) =56.030 (p<.001). Social anxiety (β=.339, p<.001), stress (β=.193, p<.001) and avoidance coping style (β=.174, p<.001) were significant predictors for severity of internet addiction symptoms. Yet lack of intimate friendship had no significant effect (β=.014, p=.089).

Two types of desirable outcome expectancy were entered in the third step. The two types of desirable outcome expectancy accounted for an additional of 11.8% of the total variance in severity of internet addiction symptoms, F_{change} (2, 880) =74.301 (p<.001). Desirable outcome expectancy of substitute gratification (need to belong) (β=.197, p<.001) and desirable outcome expectancy of stress coping (β=.291, p<.001) had positive and significant effects on severity of

internet addiction symptoms.

Time spent on instant messaging, watching online movie and video, downloading movie and video, online gaming and idling online were entered in the fourth step. The five variables increased the explained variance by 5.4%, F_{change} (5, 875) =14.617 (P<.001). Online gaming (β=.144, p<.01) and idling online (β=.107, p<.01) were positive and significant predictors for severity of internet addiction symptoms. In contrast, instant messaging (β=.067, p=.413), watcahing online Movie and Video (β=.017, p=.854) and downloading movie and video (β=.016, p=.913) did not have significant effects.

In the final step, time spent online in general during the three time phases (holiday, weekend, weekday) were entered. This step increased the explained variance by 3.1%, F_{change} (3, 872) =14.981 (P<.001). Time spent online during weekdays was significant (β=.152, p<.001). Yet time spent online during holidays (β=.064, p=.077) and time spent online during weekends (β=.040, p=.287) turned out to be insignificant predictors. Overall, the final regression model with twenty independent variables explained 44.7% of the total variance in the prediction of severity of Internet addiction symptoms, F (20, 872) =32.068, p<.001.

Table 6.13

Results of Hierarchical Regression Analyses for Severity of Internet Addiction Symptoms [a] (N=892)

	Step1[b]			Step 2			Step 3			Step 4			Step 5		
	B	SE	β	B	SE	B	B	SE	β	B	SE	B	B	SE	B
Gender	1.218***	.297	.131***	.713**	.269	.080**	.834**	.249	.094***	-1.089*	1.019	-.031*	-1.012*	.993	-.029*
Grade	2.869*	1.183	.081*	3.248**	1.072	.091**	-2.517*	.993	.071*	.638*	.246	.072*	.370*	.245	.042*
SA				.399***	.037	.339***	.366***	.035	.310***	.360***	.033	.306***	.356***	.032	.303***
LIF				.047	.102	.014	-.111	.095	-.033	-.156	.092	-.046	-.122	.090	-.036
Stress				.281***	.034	.193***	.220***	.032	.174***	.263***	.030	.158***	.257***	.029	.153***
ACS				.815***	.147	.174***	.527***	.138	.113***	.569**	.131	.122**	.545**	.128	.117**
DOESG							.853**	.291	.197**	.839**	.288	.127**	.812**	.281	.111**
DOESC							1.503***	.172	.291***	1.201***	.170	.233***	1.185***	.165	.230***
TimeIM										1.195	.602	.067	.486	.594	.027
TimeOG										2.265**	.510	.144**	1.966***	.500	.125**
TimeOMV										.300	.617	.017	.111	.601	.006
TimeDMV										.275	.600	.016	.064	.584	.004
TimeIO										2.072**	.645	.107**	1.839**	.632	.105**
THday													.298	.169	.064
TWknd													.271	.157	.040
TWday													1.863**	.361	.152***

Table 6.13(Continued)

Results of Hierarchical Regression Analyses for Severity of Internet Addiction Symptoms [a]

	Step1	Step 2	Step 3	Step 4	Step 5

R	.182	.494	.601	.644	.668
R^2	.033	.244	.362	.415	.447
Adjusted R^2	.026	.234	.352	.403	.433
R^2 **change**	.033	.211	.118	.054	.031
F **(Sig.)**	4.594 (<.001)	25.918(<.001)	37.915(<.001)	33.332(<.001)	32.068 (<.001)
F **change (Sig.)**	4.594(<.001)	56.030(<.001)	74.301(<.001)	14.617(<.001)	14.981(<.001)

Note. [a] Gender=Gender, Grade=Grade Level, SA=Social Anxiety, LIF=Lack of Intimate Friendship, Stress=Stress, ACS=Avoidance Coping Style, DOESG= Desirable Outcome Expectancy of Substitute Gratification (Need to Belong), DOESC= Desirable Outcome Expectancy of Stress Coping,
TimeIM=Time Spent on Instant Messaging, TimeOG=Time Spent on Online Gaming, TimeOMV= Time Spent on Online Movie or Video, TimeDMV= Time Spent on Downloading Movie or Video, TimeIO=Time of idling online, THday=Time Spent Online during Holidays, TWKnd=Time Spent Online during Weekends, TWKday=Time Spent Online during Weekdays, SIAS=Severity of Internet Addiction Symptoms
[b] Regression results of family monthly income, family type, mother occupation, and father occupation are not presented here due to limited space.
*p<.05, **P<.01, ***p<.001

Summary of this section

To summarize, gender, grade level, social anxiety, stress, avoidance coping style, desirable outcome expectancy of substitute gratification (need to belong), desirable outcome expectancy of stress coping, frequency of online gaming, frequency of idling online and time spent online during weekdays were significant predictors for severity of internet addiction symptoms. Insignificant predictors included: family type, family monthly income, mother occupation, father occupation, lack of intimate friendship, frequency of instant messaging, frequency of watching online movie and video, frequency of downloading online movie and video, time spent online during holidays and time spent online during weekends.

Mediation Effects of Desirable Outcome Expectancies

Revised mediation models

Results of correlation and regression analysis conducted above suggested following revisions to the hypothesized mediation models (see Figure 3.3-3.6 in Chapter 3). First, the hypothesized mediation model of lack of intimate friendship (see Figure 3.6 & H6 in Chapter 3) was rejected, as lack of intimate friendship did not have significant effect neither on desirable outcome expectancy of substitute gratification (need to belong) nor on severity of Internet addiction symptoms. Second, two instead of three mediators were tested, as the proposed two mediators [desirable outcome expectancy of substitute gratification I (need for social interaction) and desirable outcome expectancy of substitute gratification II (need for intimacy)] were combined into one [(desirable outcome expectancy of substitute gratification (need to belong)]. Third, some unexpected indirect paths were added, as the exogenous variables (social anxiety, stress, avoidance coping style) were associated with both mediators [desirable outcome expectancy of

substitute gratification (need to belong) and desirable outcome expectancy of stress coping]. The revised mediation models were depicted in Figure 6.3, 6.4 and 6.5.

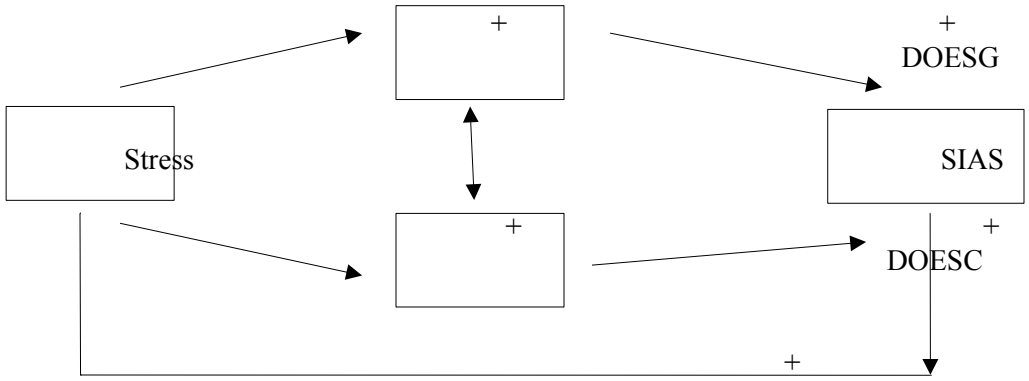


Figure 6.2 Hypothesized Mediation Model of Stress

Note. Stress=Stress, DOESG= Desirable Outcome Expectancy of Substitute Gratification (Need to Belong), DOESC= Desirable Outcome Expectancy of Stress Coping, SIAS=Severity of Internet Addiction Symptoms.

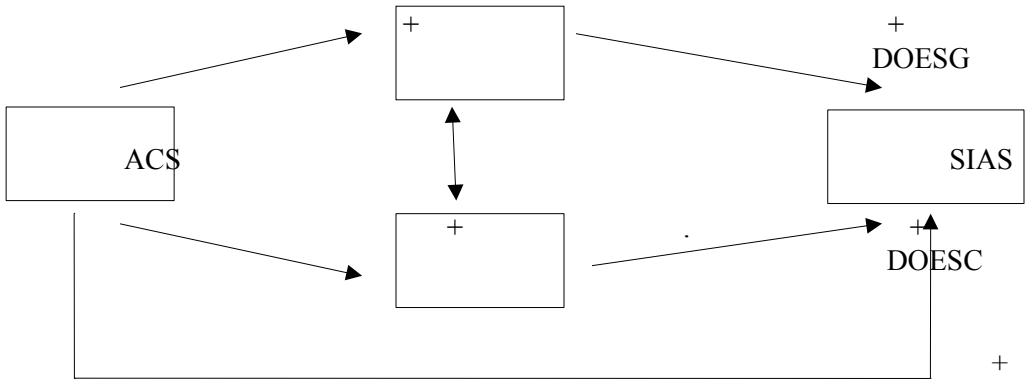


Figure 6.3 Hypothesized Mediation Model of Avoidance Coping Style

Note. ACS= Avoidance Coping Style, DOESG= Desirable Outcome Expectancy of Substitute Gratification (Need to Belong), DOESC= Desirable Outcome Expectancy of Stress Coping, SIAS=Severity of Internet Addiction Symptoms.

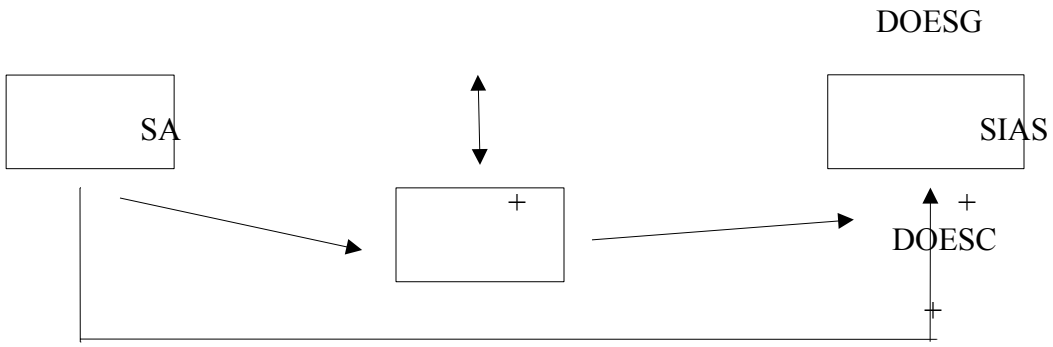


Figure 6.4 Hypothesized Mediation Model of Social Anxiety

Note. SA=Social Anxiety, DOESG= Desirable Outcome Expectancy of Substitute Gratification (Need to Belong), DOESC= Desirable Outcome Expectancy of Stress Coping, SIAS=Severity of Internet Addiction Symptoms.

Mediating effect of desirable outcome expectancy of stress coping on stress and severity of internet addiction symptoms

To test H3, three multiple regressions were performed to test the mediating effect of desirable outcome expectancy of stress coping (DOESC) in relation to stress and severity of Internet addiction symptoms (SIAS):

(1) SIAS was regressed on stress (path c) while controlling for social anxiety and avoidance coping style;

(2) DOESC was regressed on stress (path a_1) while controlling for social anxiety and avoidance coping style;

(3) SIAS was regressed on stress (path c') and DOESC ($b_{1)}$ while controlling for social anxiety, avoidance coping style and desirable outcome expectancy of substitute gratification (DOESG).

In addition, as stress is also positively associated with DOESG, the indirect effect of stress via DOESG was estimated:

(4) DOESG was regressed on stress (path a_2) while controlling for social anxiety and avoidance coping style;

(5) SIAS was regressed (path b_2) on DOESG while controlling for social anxiety, stress, avoidance coping style and DOESC.

Results of multiple regression analyses were summarized in Table 6.14 and Figure 6.6. The indirect effect of stress on severity of internet addiction symptoms via DOESC was 0.037(a_1b_1). The 95 percent bias corrected boostrap confidence interval (5000 trials) was from 0.0106 to 0.0635. Because zero is not in the confidence interval, it is concluded that the indirect effect is statistically significant. Thus the hypothesized mediator role of DOESC was supported by data.

The data also reported the partial mediation effect of DOESG. The indirect effect of stress on severity of internet addiction symptoms via DOESG was equal to 0.017(a_2b_2). The indirect effect was statistically significant as zero is not included in the 95 percent bias corrected boostrap confidence interval (from 0.0053 to 0.0340).

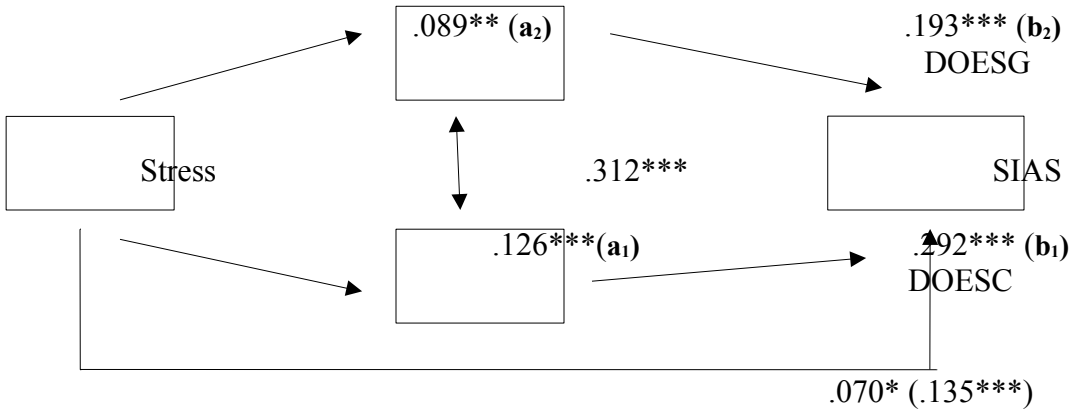


Figure 6.5 Mediation effects of DOESC and DOESG on the Relationship between Stress and Severity of Internet Addiction Symptoms

Note. Stress=Stress, DOESG= Desirable Outcome Expectancy of Substitute Gratification (Need to Belong), DOESC= Desirable Outcome Expectancy of Stress Coping, SIAS=Severity of Internet Addiction Symptoms

Table 6.14

Results of Mediation Tests: DOESG and DOESC as Mediators of the Relationship between Stress and Severity of Internet Addiction Symptoms

Step	B (Sig.)	95% CI for B		β (Sig.)	F (Sig.)	R^2
		Lower	Higher			
SIAS. [a,b]						
Stress (path c)	**.128*** **	**.817**	**.198**	**. 135*** **	42.934***	.225
SA	.398***	.326	.470	.372***		
ACS	.639	.373	.906	.211***		
DOESC						
Stress (path a_1)	**.082***	**.040**	**.124**	**.126*** **	9.895***	.063
SA	.018*	.002	.033	.077*		
ACS	.139	.079	.200	.154***		
DOESG						
Stress (path a_2)	**.011** **	**.003**	**.019**	**.089** **	10.115***	.064
SA	.050***	.025	.075	.129***		
ACS	.078	.042	.114	.145***		
SIAS						
Stress (path c')	**.076***	**.015**	**.137**	**.070***		
DOESC (path b_1)	**1.504*** **	**1.172**	**1.836**	**.292*** **	56.726***	.339
DOESG (path b_2)	**.809*** **	**.246**	**1.371**	**.193*** **		
SA	.364***	.297	.432	.310***		
ACS	.545***	.278	.812	.117***		

Note. [a] Endogenous variables are underlined.
[b] SA=Social Anxiety, Stress=Stress, ACS=Avoidance Coping Style, DOESG= Desirable Outcome Expectancy of Substitute Gratification (Need to Belong), DOESC= Desirable Outcome Expectancy of Stress Coping, SIAS=Severity of Internet Addiction Symptoms.
**P<.01, ***p<.001

Mediating effect of desirable outcome expectancy of stress coping on avoidance coping style and severity of internet addiction symptoms

To test H4, three multiple regressions were performed to test the mediating effect of desirable outcome expectancy of stress coping (DOESC) in relation to avoidance coping style and severity internet addiction symptoms (SIAS):

1 SIAS was regressed on avoidance coping style (path c) while controlling for social anxiety

and stress;

(11) DOESC was regressed on avoidance coping style (path a_1) while controlling for social anxiety and stress;

(12) SIAS was regressed on avoidance coping style (path c') and DOESC (b_1) while controlling for social anxiety, stress and desirable outcome expectancy of substitute gratification (DOESG).

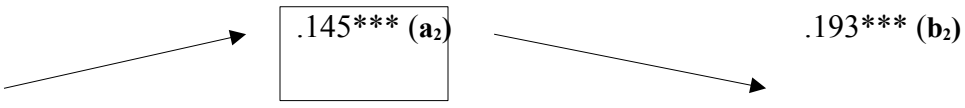
In addition, since avoidance coping style is positively associated with DOESG, the indirect effect of avoidance coping style via DOESG was estimated by two regressions:

(13) DOESG was regressed on avoidance coping style (path a_2) while controlling for social anxiety and stress;

(14) SIAS was regressed on DOESG (path b_2) while controlling for social anxiety, stress, avoidance coping style and DOESC.

Results of multiple regression analyses were summarized in Table 6.15 and depicted in Figure 6.7. The indirect effect of avoidance coping style on severity of internet addiction symptoms via DOESC was 0.045 (a_1b_1). The 95 percent bias corrected boostrap confidence interval (5000 trials) was from 0.0248 to 0.0752. The indirect effect was statistically significant as zero is not in the confidence interval. Thus the hypothesized mediator role of DOESC was supported by data.

The data suggested that DOESG also played a role in mediating the relationship between avoidance coping style and severity of internet addiction symptoms. The indirect effect via DOESG was equal to 0.028 (a_2b_2) and was statistically significant (the 95 percent bias corrected boostrap confidence interval: 0.0037 to 0.0370).



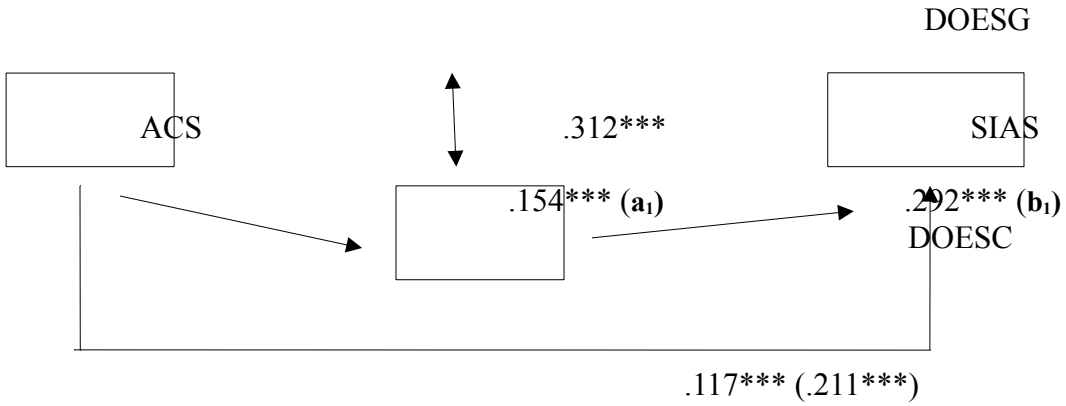


Figure 6.6 Mediation effects of DOESC and DOESG on the relationship between Avoidance Coping Style and Severity of Internet Addiction Symptoms.

Note. ACS= Avoidance Coping Style, DOESG= Desirable Outcome Expectancy of Substitute Gratification (Need to Belong), DOESC= Desirable Outcome Expectancy of Stress Coping, SIAS=Severity of Internet Addiction Symptoms.

Table 6.15

Results of Mediation Tests: DOESG and DOESC as Mediators of the Relationship between Avoidance Coping Style and Severity of Internet Addiction Symptoms

Step	B (Sig.)	95% CI for B		β (Sig.)	F (Sig.)	R^2
		Lower	Higher			
SIAS [a,b]						
ACS (path c)	.639	.373	.906	.211***	42.934***	.225
SA	.398***	.326	.470	.372***		
Stress	**.128*** **	**.817**	**.198**	**. 135*** **		
DOESC						
ACS (path a_1)	**.139**	**.079**	**.200**	**.154*** **	9.895***	.063
SA	.018*	.002	.033	.077*		
Stress	.082*	.040	.124	.126***		
DOESG						
ACS (path a_2)	**.078**	**.042**	**.114**	**.145*** **	10.115***	.064
SA	.050***	.025	.075	.129***		
Stress	.011**	.003	.019	.089**		
SIAS						
ACS (path c')	**.545*** **	**.278**	**.812**	**.117*** **		
DOESC (path b_1)	**1.504*** **	**1.172**	**1.836**	**.292*** **	56.726***	.339
DOESG (path b_2)	**.809*** **	**.246**	**1.371**	**.193*** **		
SA	.364***	.297	.432	.310***		
Stress	.076*	.015	.137	.070*		

Note. [a] Endogenous variables are underlined.

[b] SA=Social Anxiety, Stress=Stress, ACS=Avoidance Coping Style, DOESG= Desirable Outcome Expectancy of Substitute Gratification (Need to Belong), DOESC= Desirable Outcome Expectancy of Stress Coping, SIAS=Severity of Internet Addiction Symptoms.

**P<.01, ***p<.001

Mediating Effect of Desirable Outcome Expectancy of Substitute Gratification (Need to Belong) on Social Anxiety and Severity of Internet Addiction Symptoms

A new hypothesis (H7) was proposed for the new mediator desirable outcome expectancy of substitute gratification (need to belong): adolescents who have higher level of social anxiety are

likely to believe more strongly that Internet use is the only way of satisfying the need to belong, which in turn, have higher severity of internet addiction symptoms.

To test H7, three multiple regressions were performed to test the mediating effect of desirable outcome expectancy of substitute gratification (need to belong) (DOESG) in relation to social anxiety and severity of internet addiction symptoms (SIAS):

1 SIAS was regressed on social anxiety (path c) while controlling for stress and avoidance coping style;

(15) DOESG was regressed on social anxiety(path a_1) while controlling for stress and avoidance coping style;

(16) SIAS was regressed on social anxiety (path c') and DOESG ($b_{1)}$ while controlling for stress, avoidance coping style and desirable outcome expectancy of stress coping (DOESC).

In addition, the indirect effect of social anxiety via DOESC was estimated by two regressions:

(17) DOESC was regressed on social anxiety (path a_2) while controlling for stress and avoidance coping style;

(18) SIAS was regressed (path b_2) on DOESC while controlling for social anxiety, stress, avoidance coping style and DOESG.

Results of multiple regression analyses were summarized in Table 6.16 and depicted in Figure 6.8. The indirect effect of social anxiety on severity of internet addiction symptoms via DOESG was 0.025 (a_1b_1). The 95 percent bias corrected boostrap confidence interval (5000 trials) was from 0.0029 to 0.0559. Because zero is not in the confidence interval, it is concluded that the indirect effect is different from zero. Hence, the hypothesized mediator role of DOESG was supported by data

DOESC were found to mediate the relationship b1etween social anxiety and severity of internet addiction symptoms in addition to DOESG. The indirect effect via DOESC was 0.025

(a_2b_2) and was statistically significant (the 95 percent bias corrected boostrap confidence interval: 0.0026 to 0.0449).

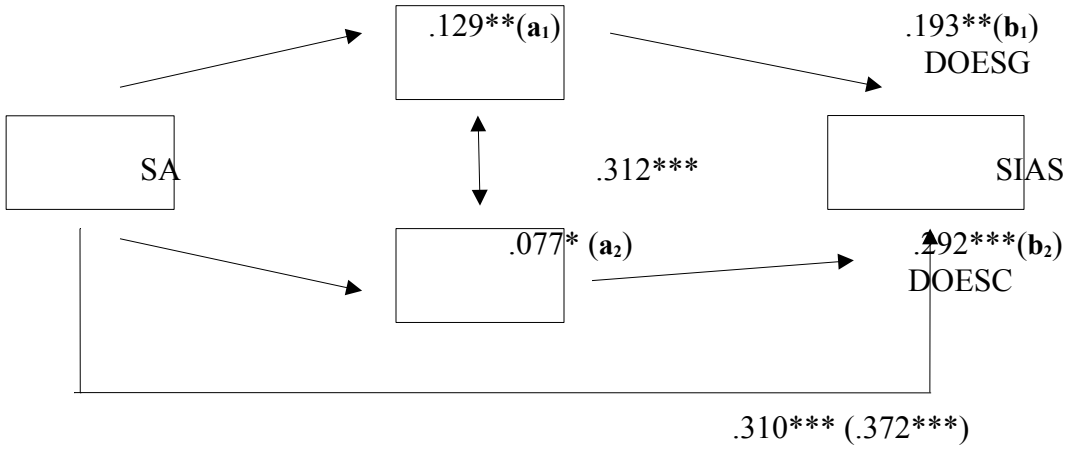


Figure 6.7 Mediation effects of Desirable Outcome Expectancy of Substitute Gratification (Need to Belong) and Desirable Outcome Expectancy of Stress Coping in Relation to Social Anxiety and Severity of Internet Addiction Symptoms

Note. SA=Social Anxiety, DOESG= Desirable Outcome Expectancy of Substitute Gratification (Need to Belong), DOESC= Desirable Outcome Expectancy of Stress Coping, SIAS=Severity of Internet Addiction Symptoms.

Table 6.16

Results of Mediation Tests: DOESG and DOESC as Mediators of the Relationship between Social Anxiety and Severity of Internet Addiction Symptoms

Step	B (Sig.)	95% CI for B		β (Sig.)	F (Sig.)	R^2
		Lower	Higher			
SIAS [a,b]						
SA (path c)	**.398*** **	**.326**	**.470**	**.372*** **	42.934***	.225
Stress	.128***	.057	.198	. 135***		
ACS	.839	.573	1.106	.211***		
DOESG					10.115***	.064
SA (path a_1)	**.050*** **	**.025**	**.075**	**.129*** **		
Stress	.011**	.003	.019	.089**		

ACS	.078	.042	.114	.145***		
DOESC						
SA (path a_2)	**.018***	**.002**	**.033**	**.077***	9.895***	.063
Stress	.082*	.040	.124	.126***		
ACS	.139	.079	.200	.154***		
SIAS						
SA (path c')	**.364*****	**.297**	**.432**	**.310*****		
DOESG (path b_1)	**.809*****	**.246**	**1.371**	**.193*****		
DOESC (path b_2)	**1.504*****	**1.172**	**1.836**	**.292*****	56.726***	.339
Stress	.076*	.015	.137	.070*		
ACS	.545***	.278	.812	.117***		

Note. [a] Endogenous variables are underlined.

[b] SA=Social Anxiety, Stress=Stress, ACS=Avoidance Coping Style, DOESG= Desirable Outcome Expectancy of Substitute Gratification (Need to Belong), DOESC= Desirable Outcome Expectancy of Stress Coping, SIAS=Severity of Internet Addiction Symptoms.

**P<.01, ***p<.001

Summary of this section

The three hypothesized partial mediation models were supported by data. Social anxiety, stress, and avoidance coping style had both direct and indirect effects on severity of internet addiction symptoms via the mediators of desirable outcome expectancy of substitute gratification (need to belong) and desirable outcome expectancy of stress coping.

Summary of Chapter Six

Results of hypothesis testing are summarized in Table 6.17. The major results are discussed in Chapter Seven by linking them with previous findings. The overall discussion on limitations and implications of these results are presented in Chapter Eight.

Table 6.17

Results of Hypothesis Testing in This Study

Hypotheses in this study		Result
H1.1	The high-risk group spends significantly longer time online than the non-high-risk group.	√
H1.2	The high-risk group does not differ from the non-high-risk group in time spent on email than the non-high-risk group.	√
H1.3	The high-risk group does not differ from the non-high-risk group in time spent on information search than the non-high-risk group.	√
H1.4	The high-risk group spends significantly longer time on online blogging than the non-high-risk group than the non-high-risk group.	×
H1.5	The high-risk group spends significantly longer time on online forum than the non-high-risk group than the non-high-risk group.	×
H1.6	The high-risk group spends significantly longer time on instant messaging than the non-high-risk group than the non-high-risk group.	√
H1.7	The high-risk group spends significantly longer time on social networking websites than the non-high-risk group.	×
H1.8	The high-risk group spends significantly longer time idling online than the non-high-risk group.	√

Table 6.17 (continued)
Results of Hypothesis Testing in This Study

Hypotheses in this study		Result
H1.9	The high-risk group spends significantly longer time watching online movie or video than the non-high-risk group.	√
H.10	The high-risk group spends significantly longer time downloading movie or video than the non-high-risk group.	√
H1.11	The high-risk group spends significantly longer time on online gaming than the non-high-risk group.	√
H1.12	The high-risk group had higher social anxiety than non-high-risk group.	√
H1.13	The high-risk group had lower friendship intimacy than non-high-risk group.	√
H1.14	The high-risk group had higher stress than non-high-risk group.	√
H1.15	The high-risk group had stronger tendency of avoidance coping than non-high-risk group.	√
H1.16	The high-risk group had higher Desirable Outcome Expectancy of Substitute Gratification I (Need to Social Interaction) than the non-high-risk group.	√
H1.17	The high-risk group had higher Desirable Outcome Expectancy of Substitute Gratification II (Need to Intimacy) than the non-high-risk group.	√
H1.18	The high-risk group had higher Desirable Outcome Expectancy of Stress Coping than the non-high-risk group.	√
H2.1	Males are likely to have higher severity of Internet addiction symptoms than females.	√
H2.2	Senior secondary students are likely to have higher severity of	√

	Internet addiction symptoms than junior secondary school students.	
H2.3	Adolescents who have higher social anxiety are likely to have higher severity of Internet addiction symptoms than those have lower social anxiety.	√

Table 6.17 (continued)
Results of Hypothesis Testing in This Study

Hypotheses in this study		**Result**
H2.4	Adolescents who have lower friendship intimacy are likely to have higher severity of Internet addiction symptoms than those with higher friendship intimacy.	×
H2.5	Adolescents who have higher stress level are likely to have higher severity of Internet addiction symptoms than those have lower stress level.	√
H2.6	Adolescents who have stronger tendency of avoidance coping are likely to have higher severity of Internet addiction symptoms than those have lower tendency of avoidance coping.	√
H2.7	Adolescents who believe more strongly that Internet use is the only way of stress coping are likely to have higher severity of Internet addiction symptoms than those believe less strongly.	√
H2.8	Adolescents who believe more strongly that Internet use is the only way of satisfying the need for social interaction are likely to have higher severity of Internet addiction symptoms than those believe less strongly.	NA
H2.9	Adolescents who believe more strongly that Internet use is the only way of satisfying the need for intimacy are likely to have higher severity of Internet addiction symptoms than those believe less strongly.	NA
H2.10	Adolescents who spend longer time spent online during holidays are likely to have higher severity of Internet addiction symptoms than those spend less time online during holidays.	√
H2.11	Adolescents who spend longer time spent online during weekends are likely to have higher severity of Internet addiction symptoms than those spend less time online during weekends.	×

Table 6.17 (continued)
Results of Hypothesis Testing in This Study

Hypotheses in this study		**Result**
H2.12	Adolescents who spend time spent online during weekdays are likely to have higher severity of Internet addiction symptoms than those spend less time online during weekdays	√
H2.13	Adolescents who believe more strongly that Internet use is the only way of satisfying the need to belong are likely to have higher severity of Internet addiction symptoms than those believe less strongly	√

H3	Adolescents who had higher stress level are likely to more strongly believe that Internet use is the only way of stress coping, which in turn, have higher severity of Internet addiction symptoms.	√
H4	Adolescents who had stronger tendency of coping by avoiding are likely to more strongly believe that Internet use is the only way of stress coping, which in turn, have higher severity of Internet addiction symptoms.	√
H5	Adolescents who have higher level of social anxiety are likely to believe more strongly that Internet use is the only way of satisfying the need for social interaction, which in turn, have higher severity of Internet addiction symptoms.	NA
H6	Adolescents who have less intimate friendship would more strongly believe Internet use is the only way of satisfying the need for intimacy, which in turn, have higher severity of Internet addiction symptoms.	×
H7	Adolescents who have higher level of social anxiety are likely to believe more strongly that Internet use is the only way of satisfying the need to belong, which in turn, have higher severity of Internet addiction symptoms.	√

Note. √=Hypothesis Supported, × =Hypothesis Rejected, NA=Not Applicable

CHAPTER SEVEN

DISCUSSION OF FINDINGS

This chapter evaluates how the major results fit in with the previous findings. For results that agree with prior works, contributions of pioneer researchers are acknowledged. For results that contradict previous findings, possible explanations are discussed. Explanations are also offered for the results that have not been addressed by previous research.

ZERO-HOUR USER IN THREE DIFFERENT TIME PHASES

This study is the first to examine the internet use behaviors of zero hour users in one phase but not in the other two phases, as this study is the first to ask respondents to report time spent online

in three different phases (i.e. holidays, weekends, and weekdays).

For those did not use the Internet during holidays (n=10), none of them had home access; eight of them had reported using the internet at school during weekdays, as most secondary schools in Shanghai had computer classes. Besides, the zero hour users might show less interest on the internet, as they spent less time online than non-zero-hour group during weekends (M_{zero}=1.45, SD_{zero}=1.01, $M_{non\text{-}zero}$=3.11, $SD_{non\text{-}zero}$=3.13, p<.001) and weekdays (M_{zero}=0.4, SD_{zero}=0.91, $M_{non\text{-}zero}$=1.01, $SD_{non\text{-}zero}$=1.45, p<.05). Yet the causal direction between limited internet access and the low interest on the internet remains unclear.

For those who did not use the internet during weekends (n=39), 28 had home internet access. Thus the limited access hypothesis was not qualified. Further analysis found that the zero-hour users spent less time online than non-zero-hour users during weekdays (M_{zero}=0.27, SD_{zero}=0.68, $M_{non\text{-}zero}$=1.10, $SD_{non\text{-}zero}$=1.46, p=.001) yet no difference was found in time spent during holidays (M_{zero}=4.27, SD_{zero}=3.70, $M_{non\text{-}zero}$=4.44, $SD_{non\text{-}zero}$=3.87, P=.052). One possible explanation arising from the above analysis is that parents restrict participants' internet use on weekdays but not holidays.

Finally, 256 (28.68%) cases reported zero hour of Internet use during weekdays. 212 of the 256 cases had internet access at home, which disqualified the limited access hypothesis. The zero-hour group did not differ from non-zero group in terms of time spent during holidays (M_{zero}=3.80, SD_{zero}=3.17, $M_{non\text{-}zero}$=4.02, $SD_{non\text{-}zero}$=3.90, p>.05) and weekdays (M_{zero}=3.34, SD_{zero}=3.07, $M_{non\text{-}zero}$=3.39, $SD_{non\text{-}zero}$=3.09, p>.05). The parental restriction hypothesis may apply, as the parents restrict internet use on weekdays but not holidays and weekends. Another possible explanation is that those adolescents have less time at disposal during weekdays due to the heavier burden of coursework and/or extra-curricular tutorials.

To summarize, different reasons (e.g. convenient internet access, parental restriction, subjective interest, time at disposal) might account for different phases' zero-hour internet use, as speculated from the results of comparing the zero hour group with non zero hour group in time spent online during the other two phases. Further research is needed to directly test these hypotheses.

HIGH RISK GROUP OF INTERNET ADDICTION

52 (5.83%) participants were included in the high-risk group of internet addiction. The percentage of high-risk group in this study (5.83 %) was higher than those in Western studies in 2000s (e.g., 4.65% by Kaltiala-Heino, Lintonen, & Rimpela, 2004; 5.4% by Pallanti, Bernardi, & Quercioli, 2006). This lends support to Grohol (1999)'s enchantment theory. In other words, adolescents in western societies in 1990s who had been enchanted by the internet might have been disillusioned and manifested in 2000s a decline in usage and addiction statistics in the population level. In contrast, in mainland China, only the last few years have witnessed a sharp increase in internet-access rate. For instance, the Internet access rate increased from 16.0% in December 2007 to 36.2% in June 2011 (China Internet Network Information Center, 2011). Hence, the higher prevalence of internet addiction reported by Mainland studies might reveal a group of adolescents who are enchanted by their recent encounter with the internet, an environment that is much larger and with much more services than anything they've seen before.

This explanation may also apply to the finding that the percentage of this study (5.83%) was slightly lower than other studies conducted in earlier years in Mainland China (e.g., 7.05% by Chinese Association of Youth Internet Use, 2007; 8.65% by Yu and Du, 2007). It is possible that some adolescents have transitioned from the enchantment stage to the disillusionment stage the

same way as their peers did in Western societies. Another possible explanation for the reduced rates of internet addiction is that parents and schools in Mainland China have been alerted by the high rate of internet addiction and have taken measures to limit the teens' time online. For instance, regulations have been passed to ban youths under age 18 from Internet cafes and control programs that could kick teens off networked games after five hours have been developed and recommended to parents (Cha, 2007).

It should be noted that those percentages are of limited comparability since different studies used different diagnostic tools and few studies recruited a representative sample. Hence, results of comparison should be taken as a reference.

GENDER DIFFERENCE IN RATE OF INTERNET ADDICTION AND SEVERITY OF INTERNET ADDICTION SYMPTOMS

Among the high-risk group of internet addiction identified by this study, 15 were girls while 37 were boys. Additional analyses by one-way analysis of variance (ANOVA) revealed that the average severity of internet addiction symptoms was 48.81 for male students (SD=15.39) and 42.78 for female students (SD=14.95). The difference was statistically significant, $F(1,890) = 13.303$, $p < .001$).

The gender difference in the incidence rate of internet addiction and/or severity of internet addiction symptoms have been reported by previous studies. The male-to-female ratio for "internet addicted" students was 4.8:1 (53 males and 11 males) in Cao & Su's (2006) study. Only three were female among the 54 identified "internet addicts" in Chou & Hsiao (2000)'s study. In Yu and Du (2007)'s study, among the identified 187 "internet addicts", males (130) were over two times of the female (57).

Few previous studies have discussed the possible explanations for the gender difference.

Below several possible explanations are proposed, based on either the theoretical model of this research or theories for the gender difference in rate of substance abuse. Subsequent research will benefit by examining these explanations with a representative sample.

First, according to the theoretical model of this study, adolescents spend longer time online when they believe that Internet use is an alternative way of needs satisfaction or stress coping. This research examined two types of desirable outcome expectancy. Gender difference in these two types of desirable outcome expectancy was explored. No gender difference was found regarding desirable outcome expectancy of substitute gratification (need to belong) [$F(1, 890) = 2.21$, $p > .05$], yet boys scored higher in desirable outcome expectancy of stress coping [$F = (1, 890) = 6.03$, $p < .01$] and avoidance coping style than female [$F(1, 890) = 5.61$, $p < .01$]. This suggests that boys might used the internet more often as an alternative way of stress coping.

Second, it is possible that some kind of desirable outcome expectancy not examined in this study might contribute to the identified gender difference. One candidate could be d*esirable outcome expectancy for substitute gratification (need for achievement),* which might be closely related to online gaming. In this study, boys spent longer time on online gaming than girls [$\chi^2(1, 891) = 14.98$, $p < .01$]. Similar findings are reported by previous studies (e.g. Gross, 2004; Ko, Yen, Chen, Chen, Yen, 2005). The desirable outcome expectancy of substitute gratification (need for achievement) should be included in the future research.

Another theory suggested that alcohol consumption is part of the male gender role, but is discouraged as part of the female gender role (White & Huselid, 1997). Huselid and Cooper (1992) found that gender-role attributes and ideologies substantially mediated the relationship between gender and measures of alcohol use. This research did not investigate the attitude towards Internet use and Internet addiction. Future research might investigate whether adolescent

girls perceive more social sanctions against excessive Internet use.

Finally, it was reported that male generally score higher on ratings of impulsivity, sensation-seeking, or behavioral undercontrol than female, which was related to alcohol consumption and alcohol-related problems (Petry, Kirby & Kranzler, 2002; Zuckerman & Kuhlman, 2000). Future research might investigate whether boys at high risk for Internet addiction score higher ratings of impulsivity, sensation-seeking, and behavioral undercontrol than girls.

GRADE DIFFERENCE IN SEVERITY OF INTERNET ADDICTION SYMPTOMS

This research found that senior secondary students had higher severity of Internet addiction symptoms (M=35.59, SD=11.58) than junior secondary students (M=29.26, SD=12.35). The difference was statistically significant [$F(1,890) = 8.963$, $p<.01$]. So far, few studies have examined the age or grade difference in severity of Internet addiction symptoms. This finding should be replicated in more methodologically adequate research to make sure that the grade difference is not due to sampling error.

One possible explanation for the identified grade difference could be that senior secondary school students are more likely to use the Internet for stress coping so that they spent much longer time online and had higher severity of Internet addiction symptoms. In this study, on average, senior secondary school students had higher desirable outcome expectancy of stress coping (M=6.47, SD=2.24) than junior secondary students (M=6.03, SD=2.16). The difference was statistically significant [$F(1, 890) = 7.72$, $p<.01$].

Another reason might be that senior secondary school students, on average, had less restricted access to internet and higher internet competency. Chi-square tests suggested that senior

secondary school students spent longer time on instant messaging, χ^2 (1, 891) = 13.83, p<.01, online music and video, χ^2 (1, 891) =10.96, p<.01, online gaming, χ^2 (1, 891) =12.27, p<.01, social networking website, χ^2 (1, 891) =8.87, p<.05 and web surfing, χ^2 (1, 891) =14.05, p<.01.

PREFERENCE FOR ONLINE ACTIVITIES AND HIGH-RISK GROUP OF INTERNET ADDICTION

The five most frequently used activities identified in this study were instant messaging, online music and video, online gaming, idling online and downloading movie or music. All but idling online were related to social interaction and entertainment online, which was consistent with previous findings (Chou & Hsiao, 2000; Lei, Yang & Liu,2006; Van den Eijnden, et al., 2008; Weiser, 2001).

One unique finding is idling online. It was defined in this study as wandering from this web page to that web page without particular purposes in this study. A possible explanation is that internet is not an environment with endless entertainment; there might be times when a user cannot find any more things that interest him, yet he still lingers and keeps opening new websites with the hope of finding something interesting. In this way, the internet is used to kill time when the internet user might hold the belief that internet is nevertheless more interesting than the realistic life.

This study further compared the preference for online activities between high risk group and non-high risk group of internet addiction. It turned out that high-risk group spent longer time on applications related to social interaction and entertainment (i.e. instant messaging, online music and video, online gaming, idling online and downloading movie or music), while no difference was found between internet use that was related to study or project demands (i.e. email, information search). This echoes the previous finding that internet use for online communication

and entertainment could be a possible risk factor (Davis, 2001; Weiser, 2001; Young, 1998; Lei, Yang & Liu, 2006).

It should be noted that no group difference was found in time spent on online forum, online blogging, and social networking websites, though these are also applications for communication, and has been reported to be risk factor for internet addiction (e.g. Chou, Chou & Tyan, 1999; Chou & Hsia, 2000; Young, 1998). This suggests the rapidly changing user preferences and reminds that the researchers should pay attention to specific online applications when exploring the risk factors for internet addiction.

DESIRABLE OUTCOME EXPECTANCY OF SUBSTITUTE GRATIFICATION (NEED TO BELONG)

Three types of desirable outcome expectancy were examined in this research: desirable outcome expectancy of stress coping, desirable outcome expectancy of substitute gratification I (need for social interaction) and desirable outcome expectancy of substitute gratification II (need for intimacy). Contrary to our expectation, desirable outcome expectancy of substitute gratification I (need for social interaction) and desirable outcome expectancy of substitute gratification II (need for intimacy) were highly correlated ($r=.712$, $p<.001$). In other words, if an adolescent who perceives Internet use as the only way for maintaining regular interaction, it is very likely that he would perceives the Internet as a place for satisfying his need for intimacy relationship. Thus the two types of outcome expectancy were combined to form a new variable called desirable outcome expectancy of substitute gratification (need to belong).

The term “need to belong” was derived from Baumeister and Leary’s (1995) theory. According to Baumeister and Leary (1995), frequent contacts with stranger or acquaintance only are not enough to satisfy the need for relationship; similarly, relationships characterized by

strong feelings of intimacy but lacking regular contact will also fail to satisfy the need. People need relationships characterized by both regular contact and an ongoing bond. Baumeister and Leary (1995) argued that relationships characterized by both of these features have greater survival and reproductive value than would relationships characterized by only one.

SOCIAL ANXIETY, DESIRABLE OUTCOME EXPECTANCY OF SUBSTITUTE GRATIFICATION (NEED TO BELONG) AND SEVERITY OF INTERNET ADDICTION SYMPTOMS

First, consistent with the hypothesis, social anxiety is positively and significantly associated with severity of Internet addiction symptoms. This is in line with the previous research which found that social anxiety is an important risk factor for Internet addiction (Caplan, 2007; Liu & Kuo, 2007). Caplan (2007) pointed out online interaction is perceived to be more attractive for people who are socially anxious, as Internet provides a safe environment in which they can carry little risk in conveying self-images and avoid jeopardizing their images as they can help it.

Also, in support of the hypothesis, the relationship between social anxiety and severity of Internet addiction symptoms was mediated by the desirable outcome expectancy of substitute gratification (need to belong). To our knowledge, no one has investigated the mediator between social anxiety and severity of Internet addiction symptoms. This research is the first to try to explain why socially anxious adolescents have higher severity of Internet addiction symptoms.

It should be noted, however, the relationship between social anxiety and severity of Internet addiction symptoms is not fully mediated. Social anxiety remains a significant predictor for severity of Internet addiction symptoms when desirable outcome expectancy of substitute gratification (need to belong) and time spent online are controlled. In other words, the effect of

social anxiety on severity of Internet addiction symptoms does not take place solely through desirable outcome expectancy of substitute gratification (need to belong) and time spent online.

One possible explanation is that the measurement for desirable outcome expectancy of substitute gratification (need to belong) in this study might not adequately represent substitute needs satisfaction for socially anxious adolescents. In this study, desirable outcome expectancy of substitute gratification (need to belong) is measured by four items, two items about the availability and extent of self-disclosure ("It is only online that I have someone to share with secrets and private feelings", "It is only online that I have someone to talk about things that I don't wish anyone else know"), another two items describing the reduction of social distress during social interaction online ("It is only online that I feel confident in interacting with others" and "It is only online that I feel social interaction is secure and comfortable"). Yet social anxiety has another important component, the fear of negative evaluation. Fear of negative evaluation is defined as the degree to which people experience apprehension at the prospect of being evaluated negatively (Waston & Friend, 1969). People with high fear of negative evaluation attempt to avoid potentially threatening social comparison information to a greater degree; high FNE individuals are also more concerned with making good impressions on others and try harder to do so (Leary, 1983a). The measurement for desirable outcome expectancy of substitute gratification (need to belong) in this study did not include items concerning how interaction online reduce the fear of negative evaluation. Hence, items such as "it is only online that I do not worry what kind of impression I make when I am talking to someone online,", "it is only online that others are less likely to notice my shortcomings when I am talking to someone online", I feel that I am making a good impression on the one I talk to" added to measurement of desirable outcome expectancy of substitute gratification (need to belong) in future research.

Another possible explanation for the direct effect is the comorbidity of social anxiety and Internet addiction. Ko, Yen, Chen et al. (2008) investigated two hundred sixteen college students (132 males, 84 females) Internet addiction and social anxiety was diagnosed based on psychiatric diagnostic Interview. The Internet addicts were more likely to have social anxiety compared to non-addicts. However, social anxiety was no longer associated with Internet addiction in the logistic regression model when depressive disorders and adult attention-deficit/hyperactivity disorder (ADHD) were entered. The authors suggested that depressive disorders and adult ADHD were more proximal correlates of Internet addiction than social anxiety. Since depressive disorders and ADHD were not examined in this study, we do not know for sure that whether the reported direct effect of social anxiety on severity of Internet addiction symptoms might be accounted for by depressive disorders and adult AHD. Nevertheless, results of this study as well as Ko et al. (2008) suggested the existence of cormobidity, and further research is needed to identify evaluate cormorbid psychiatric disorders of Internet addiction.

To summarize, hypotheses were supported that adolescents who are more socially anxious would more strongly believe that Internet use is the only way of satisfying the need for social interaction, which in turn, would be more likely to spend longer time online， and therefore would have higher severity of Internet addiction symptoms. The lack of evidence for a fully mediated model in this study does not rule out the possibility that social anxiety influences severity of Internet addiction symptoms via desirable outcome expectancy of substitute gratification (need to belong); Instead, it raises more possibilities about the relationship between social anxiety and Internet addiction.

FRIENDSHIP INTIMACY, SOCIAL ANXIETY, DESIRABLE OUTCOME EXPECTANCY OF SUBSTITUTE GRATIFICATION (NEED TO BELONG) AND SEVERITY OF INTERNET ADDICTION SYMPTOMS

Contrary to our hypothesis, lack of intimate friendship did not have significant effect on either desirable outcome expectancy of substitute gratification (need to belong) or severity of Internet addiction symptoms. One possible explanation could be that adolescents did not seek close relationships online. Previous research has found that the lack of visual and aural cues cause communication in on-line settings to be more impersonal than that in face-to-face settings (Sproull & Kiesler, 1991). Other challenges for the development of close online relationship include lack of physical proximity, frequent interaction, information about physical appearance, information about the broader social context (Parks & Floyd, 1995). On-line communications, therefore, are generally assumed to lack of many things emphasized in traditional discussions of relationship development. That's why relationship formed online is called weak ties, in contrast to the strong ties that involve local community and close family and friends (Kraut, Mukhopadhyay, Szczypul, Kiesler, & Scherlis, 1998).

Another possible explanation involves the measurement for lack of intimate friendship used in this study. This research used the reverse score of measurement for friendship intimacy to indicate lack of intimate friendship. It was based on the belief that the inverse of something that is helpful or beneficial is risk factor. For instance, high intelligence is protective, low intelligence connotes vulnerability. However, some researchers warned that this is not necessarily true for all variables. In a study of children of mothers with major mental illness, it was found that high closeness with mother was not particularly protective yet low maternal closeness connoted

significant vulnerability (Luthar, Sawyer, & Brown, 2006). Hence, it is possible that reversed score for measurement of friendship intimacy does not connote lack of intimate friendship. Future research should use more direct assessment on alienated peer relationships. For instance, the construct of peer rejection has been construed as an attitudinal variable that reflects the collective valence of group members' disliking toward individuals in the group (Buhs & Ladd, 2001). Thus, when administered in classrooms, measures of peer group rejection yield information about how well disliked an adolescent is, on average, by classmates. Peer rejection has been consistently linked with indicators of school disengagement (Ladd, Kochenderfer, & Coleman, 1997), and appears to be one of the strongest predictors of academic readiness and achievement (Ladd, Herald-Brown, & Reiser, 2008). Future research might explore whether peer rejection is a predictor for risk kof Internet addiction.

STRESS, DESIRABLE OUTCOME EXPECTANCY OF STRESS COPING AND SEVERITY OF INTERNET ADDICTION SYMPTOMS

Results of this study suggested that perceived stress level had a positive effect on desirable outcome expectancy of stress coping, which in turn, predicted higher severity of Internet addiction symptoms. The effect of perceived stress level on desirable outcome expectancy of stress coping could be explained by Lazarus and Folkman's (1984) appraisal theory. According to Lazarus and Folkman (1984), primary appraisal determines whether the potential stressor is appraised as a stress while secondary appraisal determines what kind of coping resources are available and what coping response should be adopted; secondary appraisal could be influenced by primary appraisal, that is, perceiving the environmental demand as highly stressful might limit one's ability to think of available coping options. Hence, the higher perceived level of

stress, the more likely that an adolescent would turn to the internet as the only way of stress coping.

The fact that stress direct and indirectly influences severity of internet addiction symptoms is consistent with previous research (e.g. Lam et al., 2009). Adolescence could be a stressful period for some adolescents as they confront a range of biological changes (e.g. puberty and increase in physical size), psychosocial tasks (e.g. fostering intimate relationships with significant others and make career path decisions), and environmental shifts (e.g., transitions from junior to senior secondary school) (Newcomb, Huba, and Bentler, 1981), though the adequacy of the storm-and-stress metaphor to characterize adolescent development has been criticized on the basis of its overgeneralization from clinical samples (e.g. Douvan & Adelson, 1966). In the past, adolescents may turn to cigarettes, alcohol, or drugs as a means of coping with stresses, Nowadays, the advent of new media technologies, such as the Internet, mobile phones, mp3 players, has dramatically changed the choice of mood-management devices. Qualities of the Internet such as control, ease of use, immediate feedback, interactivity, and access to entertainment make the Internet us an extremely pleasurable experience and thus effective for self-medication (Hoffman & Novak, 1996). It should not be surprising that some adolescents experiment with, and turn to, internet use to relieve negative emotions (Chen, Wigand, & Ni--lan, 1999; Wan & Chiou, 2006a). More empirical studies are needed to explore the role of perceived stress level in predicting likelihood of internet addiction.

AVOIDANCE COPING STYLE, DESIRABLE OUTCOME EXPECTANCY OF STRESS COPING AND SEVERITY OF INTERNET ADDICTION SYMPTOMS

Avoidance coping style had had a positive effect on desirable outcome expectancy of stress coping, which in turn, predicted higher severity of Internet addiction symptoms. In other words,

adolescents who have stronger tendency of coping by avoiding would more strongly believe that Internet use is the only way of stress coping, which in turn, would be more likely to spend longer time online, and therefore would have higher severity of Internet addiction symptoms.

The relationship between avoidance coping style and desirable outcome expectancy of stress coping, however, might be influenced by coping resources. Previous research has found that it is only when there is lack of coping resources that avoidant coping style is closely associated with a person's fully involved in certain activity without any attempts to tackle facing problems (Bergevin, Gupta, Derevensky, & Kaufman, 2006). Hence, to better explain desirable outcome expectancy of stress coping, we might take into account the role of coping resources.

Further research could explore the direct and moderating effect of coping resources on severity of Internet addiction symptoms. Coping resources are social and personal characteristics upon which people may draw when dealing with stressors (Pearlin & Schooler, 1978). One common coping resource is self-esteem, defined as personal judgment of worthiness expressed in attitudes a person holds towards the self (Coopersmith, 1991). A negative correlation has been found between self-esteem and Internet addiction (e.g. Kim and Davis, 2008; Niemz, Griffths, & Banyard, 2005). Further research could examine whether self-esteem influences the relationship between avoidance coping style and severity of Internet addiction symptoms.

Problem-focused coping skills are also important coping resources. Previous research reported that individuals with fewer problem-solving coping skills were more likely to use alcohol (Cooper, Russell, & George, 1988; Copper, Russell, & Skinner, 1992) or cigarettes (Frone & Windle, 1997) to deal with stresses. In addition, adult pathological gamblers in treatment who learn problem-solving techniques have greater success in completing therapy and avoiding relapse (Sylvain, Ladouceur, & Boisvert, 1997). No empirical research has ever

conducted regarding the role of problem-focused coping skills in development of Internet addiction. Future research is needed in this aspect.

CHAPTER EIGHT

LIMITATIONS AND IMPLICATIONS

This chapter proceeds as follows. The first section briefly revisits the most important findings of this research. The second section points out the limitations and implications of the theoretical model proposed in this study. The third section presents methodological limitations and recommendations for future research. The fourth section discusses theoretical contribution of this research. The final section suggests intervention and prevention programs based on the results of this study.

SUMMARY OF MAJOR FINDINGS

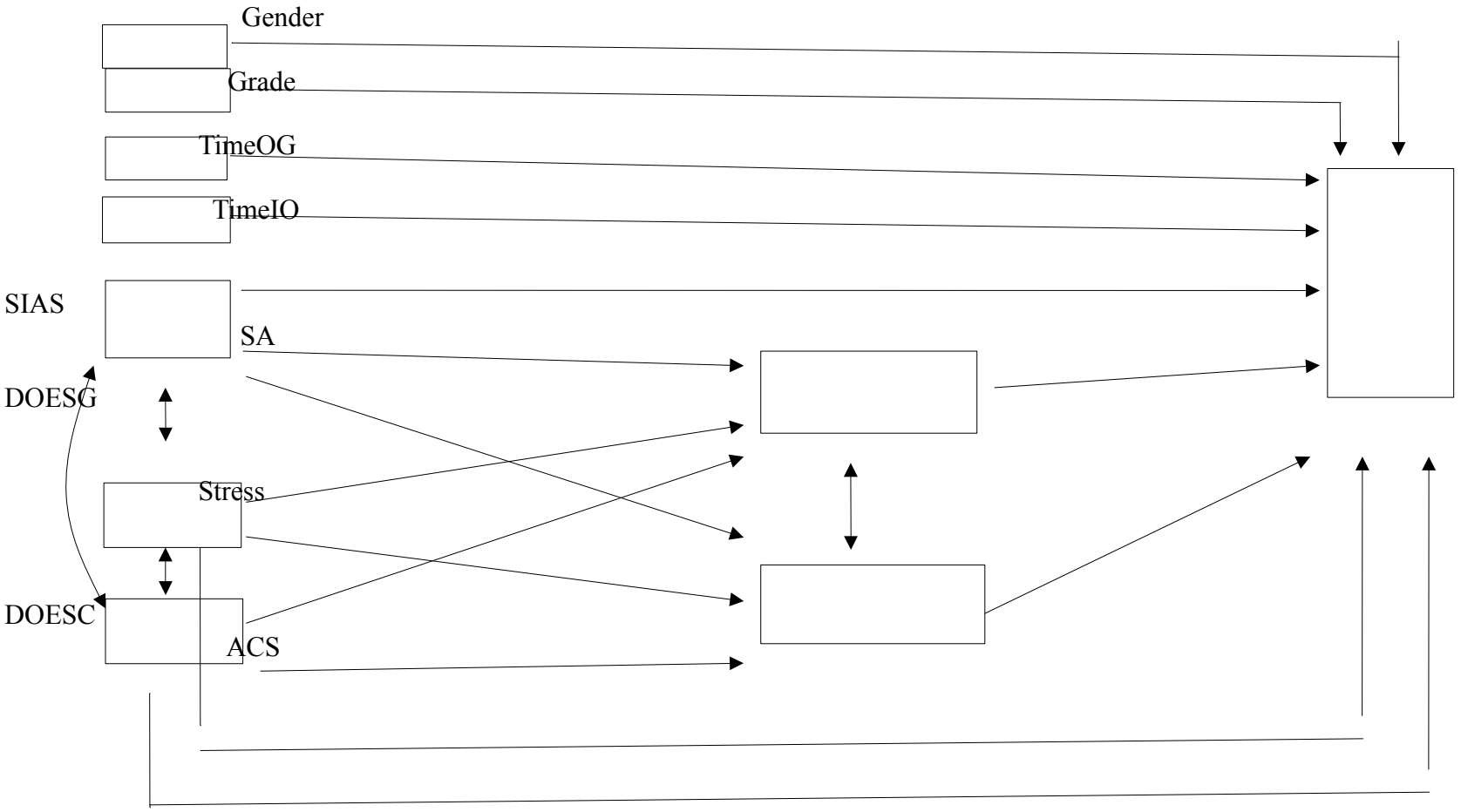
This study has investigated internet use and internet addiction with a sample of adolescents in Shanghai, China. The most important findings were summarized below:

(1) A sample of 892 secondary school students (aged from 12 to 18) participated in this study. 450 were female, 442 were male. 460 were junior secondary school students, 432 were senior secondary school students.
(2) The average time spent online were 4.36 hours (SD=3.83) during the holidays, 3. 09 hours (SD=3.13) during the weekends, and 1.05 hours (SD=1.45) during the weekdays.
(3) The five most frequently used online activities were: instant messaging, online music and video, online gaming, idling online and downloading movie or music. The five least frequently used activities were: online forum, email, online blogging, social networking websites, and information search.

(4) 52 (5.83%) participants were included in the high-risk group of internet addiction. 15 were girls, 37 were boys; 8 were junior secondary school students, 44 were senior secondary school students.
(5) When all the independent variables were put in a regression equation, the statistically significant risk factors were: gender, grade level, social anxiety, stress, avoidance coping style, desirable outcome expectancy of substitute gratification (need to belong), desirable outcome expectancy of stress coping, frequency of online gaming, frequency of idling online and time spent online during weekdays. The insignificant predictors included: family type, family monthly income, mother occupation, father occupation, lack of intimate friendship, frequency of instant messaging, frequency of watching online movie and video, frequency of downloading online movie and video, time spent online during holidays and time spent online during weekends.
(6) Social anxiety, stress, and avoidance coping style had both direct and indirect effects on severity of internet addiction symptoms via the mediators of desirable outcome expectancy of substitute gratification (need to belong) and desirable outcome expectancy of stress coping.

These findings can be briefly illustrated by Figure 8.1.

Figure 8.1
Summary of Research Findings



Note. Gender=Gender, Grade=Grade Level, TimeOG=Time Spent on Online Gaming, TimeIO=Time of idling online, SA=Social Anxiety, Stress=Stress, ACS=Avoidance Coping Style, DOESG= Desirable Outcome Expectancy of Substitute Gratification (Need to Belong), DOESC= Desirable Outcome Expectancy of Stress Coping, SIAS=Severity of Internet Addiction Symptoms

LIMITATIONS OF THE THEORETICAL MODEL AND SUGGESTIONS FOR FUTURE RESEARCH

This study constructed a theoretical model by integrating concepts from outcome expectancy theory, substitute gratification theory, stress coping theory and some empirical research findings and tested it in a Chinese context. Despite its theoretical and practical contributions (as stated later in this chapter), the theoretical model has several limitations and unexplored areas that deserve future research.

Unexplored Other Types of Desirable Outcome Expectancies

This research tested two types of desirable outcome expectancies: desirable outcome expectancy of substitute gratification (need to belong) and desirable outcome expectancy of stress coping. There could be other types of desirable outcome expectancies, especially related to substitute gratification obtained online.

One candidate could be desirable outcome expectancy of substitute gratification (need for achievement). This study found that time spent on online gaming was significantly related to severity of internet addiction symptoms, and that significant association was not accounted for by the desirable outcome expectancies tested in this study. This implies that some adolescents might use the internet as an alternative way to feel competent and achieved through playing online games. During online gaming, the successful completion of quests enables gamers to be rewarded with experience points, higher levels and the admiration or acknowledgement from playing gals- all these could reward the user a sense of achievement(Douglas, Mills, Niang, et al., 2008; Griffths, 1998; Lu, 2007; Wan & Chiou, 2006). Lu (2007) suggested that in a society that adolescents are judged in terms of their academic performance, those with poor academic

record would feel low self-esteem and self-worth, and thus they might be attracted by the sense of achievement through online gaming.

Researchers could also explore other types of desirable outcome expectancies through qualitative research and test them with representative sample quantitatively.

Unexplored Other Psychosocial Risk Factors

The regression model in total explained 44.7% of the total variance of severity of internet addiction symptoms, which suggested that there should be other psychosocial risk factors unexamined. Particularly, future research is expected to focus more on contextual risk factors.

This research has introduced and tested one peer variable (i.e. lack of intimate friendship) and one that reflects environmental stress but measured in individual level (i.e. perceived stress level). Other variables tested in this study are either individual attributes or internet use behaviors that have been tested by previous research, since the aim of quantitative research is replicate and extend previous research.

Yet the theoretical model of this study, as has been supported by empirical data, lend support to the belief that both individual and contextual factors could be risk factors of internet addiction, as they influence different types of desirable outcome expectancies, which later predict heavy internet use and higher likelihood of being addicted. Hence, future research would include more contextual variables that might be related to particular type of desirable outcome expectancy.

Reciprocal Relationship between Risk Factors and Severity of Internet Addiction Symptoms

This research has formulated unidirectional hypotheses treating the variables at the individual and peer levels as the antecedents for internet addiction. This is in accordance with the practice of previous research in which these variables are taken as risk factors of internet

addiction. Yet except the ascribed traits such as age and gender, the reverse causation cannot be ruled out. Variables like social anxiety, lack of intimate friendship, stress, avoidance coping style might be caused or enhanced by the heavy internet use. In other words, heavy internet use could lead to more socially isolation, enhance the avoidance coping style, cause more problems to the realistic life and thus increase perceived stress level. Previous research has reported a lot of negative outcomes of heavy internet use (Chou & Hsiao, 2000; Lin & Tsai, 1999; Scherer, 1997; Young, 1998).

Hence, it is expected that when time and resource permit, longitudinal research would be conducted to test the reciprocal effects between the individual or environmental variables and severity of internet addiction symptom.

A New Population of Interest: College Students

The theoretical model should be applied to the study on other populations in addition to secondary school students. For instance, college students could be a population of interest. Previous research had reported a moderate to high prevalence of internet addiction among college students. For instance, 246 of 2453 college students (12.3%) were classified as the internet addiction group in Taiwan (Yen, Ko, Yen, Chen, & Chen, 2009). For another instance, 6.44% (n=229) of the 3557 first year students in an university of northwest China was considered internet addicted with Young's 20-item Internet Addiction Test (IAT) (Ni, Yan, Chen, & Liu, 2009).

Yet research on college students population is rather limited, compared to that on secondary school students. Future research on college students could apply the theoretical model and check whether or not earlier research findings are reproducible in a sample of college students and whether any substitute gratification obtained from internet use among addicted are different from secondary school students.

METHODLOGICAL LIMITATIONS AND SUGGESTIONS FOR FUTURE RESEARCH

The Limitations of Cross-sectional Design and Recommendation for Longitudinal Research

The cross-sectional design of this research had several limitations. First, a cross-sectional study collects data only once and thus the confounding factors related to time cannot be controlled (Rubin & Babbie, 2008).

Second, a cross-sectional study is unable to establish the causal relationship between variables because there is no time-series dimension. Therefore findings of this study should be considered evidences that the correlational pattern found in the data was consistent with the theoretical model which provide moderate support to the assumed causal directions among the variables (Laura, 1995; Olobatuyi, 2006).

Third, the cross-sectional data cannot used to test the recursive relationships between variables. Some of the important recursive paths might be overlooked, as prior research has reported many negative effects on the person and his/her relationships caused by heavy internet use (e.g. Chou & Hsiao, 2000; Lin & Tsai, 1999; Schere, 1997; Young, 1998).

In view of the limitations of cross-sectional design, longitudinal study is recommended for future research if time and resource permit. A longitudinal study would help control the confounding factors, ascertain the casual relations as well as examine the possible recursive relationships among variables.

The Limitations of Non-random Sampling and Recommendations for Random Sampling

This study recruited participants through non-random sampling as the researcher failed to secure the support from local education bureau. The sample size (N=892) was large enough so

that relationships between variables can be detected reliably by statistical tests (Rubin & Babbie, 2008) and several strategies were adopted to improve and evaluate the representativeness of the sample (e.g. recruiting respondents from different types of schools, comparing the sample with population in key demographic characteristics).

Despite all these efforts, the external validity of the research results was threatened due to an unrepresentative sample. Findings of this study should be considered portraying a partial picture of internet use and internet addiction among adolescents in Shanghai, and providing only preliminary support to the theoretical model proposed in this research. For this reason, the utilization of the research findings in advocacy and service provision should be done with caution.

The limitations of non-random sampling highlight the importance of conducting random sampling in future research. The key issue is to get the cooperation from local government in order to obtain the complete list of secondary schools and randomly select participating schools from the list.

The limitations of Self-report Data and Recommendations for Data Collection from Multiple Sources

Despite the advantage of being easy and quick to administrate the questionnaire and obtain answers (Groves, et al., 2009; Nardi, 2003), self-report questionnaire might contain several potential sources of bias that should be noted as limitations of this research.

First, the self-report data cannot be independently verified; the researcher has to take what people say at face value. Second, problems in questionnaire design and administration (e.g. incomplete questions, questions being misunderstood, and unwillingness to provide information) might reduce the accuracy of the data. Third, the participants' bias (e.g. selective memory or memory loss, social desirability, inappropriate attribution or exaggeration) might influence the

data quality (Groves, et al., 2009; Nardi, 2003).

It is recommended that future research could adopt multiple data collect strategies to overcome shortcomings of self-report data. In addition to asking adolescents to fill in the questionnaire, the researcher can also invite parents and/or teachers to rate participants' mental well-being and behaviors. The discrepancy among different data collection strategies could be assessed by calculating inter-rater reliabilities (Chan, 2009).

The Limitations of Quantitative Research and Recommendations for Qualitative Research

This study adopted quantitative research methods. The advantages of quantitative research are to test hypotheses with a large sample and thus extend existing research and theories (Rubin & Babbie, 2008). On the other hand, qualitative research has several that quantitative research does not have, which might be particularly useful for internet addiction research.

First, qualitative research is appropriate to explore under-studied area (Flick, von Kardoff, & Steinke, 2004), due to the flexibility in study design (e.g. participant responses affecting how and which questions researchers ask next; data collection and research questions being adjusted according to what is learned). For instance, qualitative research could be used to explore other types of desirable outcome expectancies. The desirable outcome expectancy can be taken as a 'sensitizing concept' (Blumer 1969) when researchers learn from the participants' individual experiences. The unique and common types of desirable outcome expectancies could then be identified. The information would permit the formulation of hypotheses for subsequent test quantitatively.

Second, qualitative research could provide in-depth, rich and complex descriptions of the phenomenon (Bernard, 1995; Denzin & Lincoln, 2000). During the qualitative research process, researchers have the flexibility to probe initial participant responses – that is, to ask why or how. The researcher must listen carefully to what participants say, engage with them according to their

individual personalities and styles, and use "probes" to encourage them to elaborate on their answers. Participants are free to respond in their own words, and these responses tend to be more complex than simply "yes" or "no." Therefore, by using qualitative research, future research could identify risk factors unidentified by prior works, describe the processes for the occurrence and development of internet addiction symptoms, and provide more complex stories for the relationship among risk factors.

THEORTICAL CONTRIBUTIONS

The cross-sectional design and non-probability sample has limited the theoretical contributions of this study. A non-probability sample prevents generalizing the results of this study to the population. The cross-design studies are unable to establish the causal relationship between variables because there is no time-series dimension; hence results of this study should be considered evidences of correlation rather than causation of variables (Laura, 1995; Nardi, 2003; Olobatuyi, 2006). Therefore, the theoretical contributions discussed below should be taken with caution.

Replicating and Extending Previous Empirical Research on Internet Addiction

This study has replicated previous research by re-testing the predictive power of previously identified risk factors such as social anxiety (Caplan, 2007; Shepherd & Edelmann, 2005), lack of close friend (McKenna & Bargh, 1999, 2000; Morahan-Martin & Schumacher, 2000; Whang, Lee & Chang, 2003), preference for communication and entertainment activities (Chou & Hsiao, 1999; Young, 1998). For quantitative research with positivist philosophy, replicating same variables in different contexts with different samples could be considered unsuccessful tests to

falsify the theory (Rosenthal 1990). Hence, findings of this study imply that the risk factors identified in western societies might also be applicable in Mainland China.

This study also extends the previously hypothesized causal interpretation by testing the mediators of the relationships between some risk factors and internet addiction. The mediator proposed in this research, desirable outcome expectancy, was defined as the cognitive belief that internet use is an alternative way of needs satisfaction or stress coping. The mediator role of desirable outcome expectancy was supported by data.

Applying Outcome Expectancy Theory to Internet Addiction Research

This study could be considered an attempt to apply outcome expectancy theory to research on internet addiction. Previously, a lot of qualitative researchers have suggested that some people become highly attached to the internet because internet provides an alternative way of needs satisfaction (e.g. Douglas, Mills, Niang, Stepchenkova, Byun, Ruffini, et al., 2008; Griffths, 1998; Wan & Chiou, 2006).

With the help of outcome expectancy theory, this research transformed the above idea into a series of empirically measurable and testable constructs (i.e. different kinds of desirable outcome expectancies). The outcome expectancy theory claims that desirability of outcome expectancy reflects people's subjective evaluation on behavioral outcomes and that the desirability of outcome expectancy be positively related to behavioral frequencies.

The mediating role of desirable outcome expectancy was supported by data. This implies potential of outcome expectancy theory to guide internet addiction research. Nevertheless, the incapability of establishing causal relationships and the limited generalizability of this study remind us that more sound methodological study is needed.

Applying of Stress Coping Theory to Internet Addiction Research

Stress coping theory has been an important theory in addiction research. The hypothesis that alcohol use or other potentially addictive behavior is a kind of coping response has received widespread support (Biafora, Warheit, Vega & Gil, 1994; Breslin, Hayward & Baum, 1995; Crum, Muntaner, Eaton & Anthony, 1995; Lipton, 1994; Roosa, Dumka & Tein, 1996).

In contrast, in internet addiction research, only one study examining the predictive role of stress has been published (Lam, Peng, Mai & Jing, 2009). This study provided additional support for the explanatory power of stress coping theory. Stress and avoidance coping style have been two significant predictors for severity of internet addiction symptoms; in addition, the associations were found to be mediated by the belief that internet use is the only way of stress coping (i.e. desirable outcome expectancy of stress coping).

Further research with longitudinal design and representative sample are required to establish the potential of stress coping theory to guide internet addiction research

Applying Substitute Gratification Theory to Internet Addiction Research

This study has contributed by suggesting empirically testable variables of substitute gratification theory; and the results of this study lent support for the potential of substitute gratification theory to guide internet addiction research. Yet due to the methodological limitations of this study, the results of this study could be taken with caution. More well-designed research is required.

The substitute gratification theory (Peele, 1995, 1998) was appreciated for its systematical description on how needs unsatisfied in real life combined with needs satisfied from the object of addiction leads to addictive behavior. Unfortunately, this theory has rarely been applied to guide empirical research. This deprives this theory from a good quality of theory: testability. Testability

is related to falisifiability. According to Karl Popper (1959), a theory which is not refutable by any conceivable event is non-scientific.

This research tried to make the substitute gratification theory empirically testable in three steps. First, based on previous research findings, this research used risk factors (social anxiety and lack of intimate friendship) as preconditions for needs for social interaction and intimacy unmet in real life. Second, based on outcome expectancy theory, this research used the concept of desirable outcome expectancy of stress coping to indicate the belief that internet use was perceived as the only way to meet the need for low-risk social interaction and friendship intimacy. Third, this research hypothesized that desirable outcome expectancy would mediate the association between risk factors (social anxiety and lack of intimate friendship) and severity of internet addiction symptoms.

The hypothesized mediation models were supported by the data, which suggested that the claims of substitute gratification might reveal some important facets for some adolescents' becoming internet addicted.

PRACTICAL IMPLICATIONS

Finding of this research, taken together, set the stage for designing intervention and prevention programs for social workers in school settings. Family social workers might also find them useful when they come across parents complaining about their children's excessive Internet use. Regards working method, casework and group work are more likely to be used during intervention, while prevention programs are more focused on school or community as a whole. Details are presented below. Further research is needed to evaluate effectiveness of proposed intervention and prevention programs.

Intervention Programs

Phase I

When adolescents come to ask for help or referred by teachers or parents, the first phase of intervention should include activities such as risk assessment, diagnostic evaluation, and nurture therapeutic alliance (Hepworth, Rooney, & Larsen, 2010).

First, a detailed examination of Internet addiction symptoms and negative outcomes would be conducted with the clients. Chen's Chinese Internet Addiction Scale (CIAS) could be taken as a reference. Though no diagnosis would be made, the number and frequency of addiction symptoms and negative outcomes would help assess the severity of Internet addiction symptoms. Also, an assessment of adolescents' general mental health would be recommended, to determine whether some addition symptoms might be attributed to other mental disorders, like depressive or anxious disorder.

Second, risk factors would be explored with clients who are considered as with high severity of Internet addiction symptoms. According to findings from this research, adolescents who have higher social anxiety, lower friendship intimacy, higher stress and higher tendencies of avoidance coping are likely to have higher severity of Internet addiction symptoms. Special attention would be paid to these characteristics.

Furthermore, the assessment would be made with the aims to identify psychological needs satisfied through online use experiences as well as personal or environment factors that prevent needs satisfaction in real life. Example questions include: what type of online activities he/she spent most time; in what aspects he/she is attracted; what kinds of needs satisfaction he/she has obtained from the involvement?

Phase II

The identified psychological need and psychosocial risk factors guide the direction of intervention. The objectives of intervention are to change personal factors or environmental contingencies and thus promote a lifestyle that is more rewarding than Internet use. To match each client and thus maximize the efficiency of service delivery, individual treatment goals are developed by social worker and client together and specific types of counseling or training programs are provided on an as-needed basis, depending on each client's profile of desirable outcome expectancy and risk factors. In the below, four modules for intervention are introduced. There might be some additional modules, corresponding to type of desirable outcome expectancy and risk factors not addressed in this study. More research is needed in this aspect.

Module I: reducing social anxiety and building close friendship

Results of this study supported the hypothesis that higher social anxiety and lower friendship intimacy predicted longer time spent online and higher severity of Internet addiction symptoms. Thus, reducing social anxiety should be an intervention focus.

Social Skills Training has been commonly used in Western societies for this purpose. Spence (1995) developed Social Skills Training: Enhancing Social Competence in Children and Adolescents (SST) involved social skills training, relaxation techniques, social problem-solving, positive self-instruction, cognitive challenging, and graded exposure to social situations. The social skills training teaches adolescents micro-skills such as eye-contact, posture, facial expression, skills of conversation and listening such as asking question to show others that he is interested in as well as friendships skills such as sharing, offering help, joining in, inviting others, and giving compliments. The 12-week program consists of weekly hour-long group

sessions, followed by a 30-min practice of learned social skills in a simulated environment (Spence, Donovan, & Brechman-Toussaint).

Masia and her colleages developed the Skills for Academic and Social Success (SASS) (Masia, Beidel, Albano, et al., 1999; Masia-Warner, Klein, Dent et al., 2004). It consisted of 12 weekly group sessions (approximately 40 min each), including one psycho-education session, one session on realistic thinking, four social skills training session (i.e., initiating conversations, maintaining conversations and establishing friendships, listening and remembering, and assertiveness), five sessions of exposure and one session on relapse prevention. Additionally, four weekend social events (90 min) that provide real-world exposure and opportunities for skills generalization.

These programs could be applied in working with adolescents who spent much time online for satisfying their interpersonal needs. A six or eight-session group, for example, would be provided to them. In addition to the training mentioned above, social workers could discuss with these adolescents how to transfer the social skills (meet people, maintain relationship, deal with interpersonal conflicts) learned from online social interaction to off-line social interaction. Adolescents are also encouraged to participate in various kinds of leisure activities, such as interest groups, so that they could get to know someone who shares the same interest with them.

Module II: coping skills training

In support of the hypotheses, stress level and tendency of avoidance coping predicted longer time spent online and higher severity of Internet addiction symptoms. Hence, the focus of intervention is to help adolescents manage stress level and develop effective coping skills.

Coping skills training has a history in the treatment of addictive problems dating to 1965

(Lazarus, 1965).Coping skills training include training of coping skills in general and specific coping skills in high-risk situations.

For training of coping skills in general, the aim is to teach individuals use alternative methods of coping with the demands of living without using maladaptive addictive substances (Monti et al., 1989). D'Zurilla and Nezu (2007) designed a comprehensive manual for conducting problem-focused coping training. The manual consisted of 14 training modules that focused on different aspects of problem-solving skills such as setting realistic problem-solving goals, producing a wide range of potential solutions and carrying out a solution plan effectively. A new coping skill is introduced and modeled by the trainer. Then, the client is invited to role-play the skill with the trainer or with a peer if it is a group setting. At the end of each session, clients should be given a written reminder of the skill(s) they just learned for future reference. A homework exercise should be developed in conjunction with the client, to practice the new skill (s) in his/her particular life circumstances (D'Zurilla & Nezu, 2007, 2010; Monti, Abrams, Kadden, & Conney, 1989).

For training of specific coping skills in high-risk situation, methods developed in preventing relapse in substance abuse could be taken as reference (Marlatt, Baer, Kivlahan, Dimeff, Larimer, Quigley, Somers, & Williams, 1998; Marlatt, 2005). First, a functional analysis should be conducted with the client to identify the types of situations in which he or she is likely to be online for longer time than normal (e.g. the people he/she is with, the place, the hour or the day, how he/she is feeling). These situations are called risk situations, or triggers, and become important targets for intervention. Then, therapist and client would develop self-management plans for the various triggers identified in the functional analysis. The therapist can ask the client to pick out one trigger and discuss potential strategies for avoiding the risky situations, such as

rearranging the environment so that the trigger does not occur or identifying a new coping method for dealing with the trigger when it does occur. After considering all the potential strategies, their consequences, and their perceived difficulties, one strategy should be selected. New plans will be developed throughout treatment whenever initial plans fail or new triggers are found.

The training of coping skills could be conducted in both case and group work. For case work, social worker could discuss with client various aspects of problem solving skills and encourage him or her to practice the skills learned in session through homework exercises. The advantage of group would be that it allows for the modeling and practice of skills with peers. Peers are natural candidate for role-playing. Different members' experiences provide a host of examples to provide scenes for role-playing and illustrate the applicability of skills, and that peer support is very important asset in treatment (Monti, et al., 1989).

It is also important to validate the client's experience and recognize that using substances can be a means of coping with diffi cult times and emotions, but oftentimes substance use is a temporary solution that may cause more problems. One of the main goals of RP is to develop effective means for coping with risky situations, craving, and difficult emotions.

Phase 3

The final stage of the social work intervention is called termination. Usually termination occurs when the needs of the clients are met and the goals are attained. During the termination phase, social workers and clients summarize what has been done to solve the problem, discuss measures and procedures to tackle the problem without the worker's help, identify family and community resources useful for coping with the problem, and explore goals and resources for

future growth. These would help stabilize the change and promote future growth (Hepworth, Rooney, & Larsen, 2010).

Relapse prevention is an additional focus in termination phase, especially in treating addictive behaviors. Relapse Prevention model in treating addictive behaviors is grounded in cognitive behavioral theory, and was originally described by Marlatt & Gordon (1980, 1985) as a technique to manage alcohol and drug abuse. Multiple studies have described its efficacy in treating these behaviors in adults (e.g., Carroll, 1996;Irvin, Bowers, Dunn & Wang, 1999) as well as in adolescents (Ramo, Myers, & Brown, 2007).Of course, distinctive features of Internet addiction should take into account if we apply relapse prevention in treating Internet addiction. Here we just provide a sketch of RP. The goal of RP is to help those with substance abuse problems on the road to recovery to maintain that recovery process without (or despite) the interruptions that tend to occur throughout. The first step of RP is to identify and discuss high risk situations for lapse and relapse. Often this will necessitate some psychoeducation regarding the lapse process and assessment of prior lapse/relapse episodes. Working in collaboration the therapist and client should identify potential triggers and attempt to make connections between the triggers (e.g., is the client primarily triggered by affective, social, or physical stimuli). After high-risk situations are identified it is critical to examine each situation paying special attention to related triggers and potential strategies for coping with the situation. Details of strategies/emergency procedures to be used in case a lapse occurs are presented in detail in Witkiewitz & Marlatt (2007).

Prevention Programs

The aim of prevention programs is to promote healthy use of the Internet and to develop

extra-curricular activities that promote adolescents' positive development.

A variety of activities could be organized with the purpose of fostering a healthy Internet culture among children and youth. Schools and social service orgnizations could work in a corroprated manner.

First, educational talsk and workshops would be provided for students and teachers and parents. The seminar for students focus on how to use the Internet approrpriately and safely. The seminar for teachers and parents would introduce the online culture and share experiences regarding how to regulate adolescents' time spent online. The seminiar could be conducted by social workers or clinical psychologists; moreover, adolescents who once report a lot of addiction symptoms would be invited to share his or her experience of Internet use and Internet addiction.

Second, social service orgnaizations could cooperate with communities to organize canivals, fun day or other activities in community level. Exhibition vehicles would be displayed, singing, dancing, games and other entertainment activities would be organized to deliver the meassage of Internet safety to students in a fun and dynamic way.

Finally, social service organizations could collaborate with some informational technology companies to design lively and entertaining games online that advocate proper and responsible Internet behavior. In this way, adolescents are invited to reflect the value of the Internet as well as their behavior online.

References

Abrams, D. B. & Niaura, R. S. (1987). Social Learning Theory. In Howard T. Blane &Kenneth E. Leonard (Eds.) *Psychological Theories of Drinking and Alcoholism* (pp. 55-89). New York/London: The Guilford Press.

Adler, A. (1927). *Practice and Theory of Individual Psychology.* New York: Harcourt, Brace, & World.

Alexander, B. K. (1990). The empirical and theoretical bases for an adaptive model of addiction. *Journal of Drug Issues,* 20 (1), 2-10.

American Psychiatric Association (1965). *Diagnostic and Statistical Manual of Mental Disorders-II* (2nd ed.). Washington D.C.: American Psychiatric Association.

American Psychiatric Association (1980). *Diagnostic and Statistical Manual of Mental Disorders -III* (3rd ed.).Washington D.C.: American Psychiatric Association.

American Psychiatric Association (1987). Diagnostic *and Statistical Manual of Mental Disorders-III-R* (3rd ed. Rev.). Washington D.C.: American Psychiatric Association.

American Psychiatric Association (1994a). *Diagnostic and Statistical Manual of Mental Disorders-IV (4*th ed.). Washington D.C.: American Psychiatric Association.

American Psychiatric Association (1994b). *DSM-IV Source book*. Washington D.C.: American Psychiatric Association.

American Psychological Association (1996). *Standards for Educational and Psychological Tests and Manuals.* Washington, DC, APA.

American Society of Addiction Medicine (2011). Public policy statement: definition of addiction. Retrieved from: http://www.asam.org/research-treatment/definition-of-addiction.

Amirkhan, J. H. (1990). A factor analytically derived measure of coping: The Coping Strategy Indicator. *Journal of Personality and Social Psychology*, 59, 1066-1074.

Armstrong, L., Phillips, J. G., and Saling, L. (2000). Potential determinants of heavier Internet usage. *International Journal of Human-Computer Studies*, 53, 537-550.

Aston-Jones, G., Harris, G.C., 2004. Brain substrates for increased drug seeking during protracted withdrawal. *Neuropharmacology,* 47 (Suppl. 1), 167-179.

Bacon, A.K. & Ham, L. S. (2010). Attention to social threat as a vulnerability to the development of comorbid social anxiety disorder and alcohol use disorders: An avoidance-coping cognitive model. *Addictive Behaviors,* 35, 925-939.

Balleine, B. W., Dickinson, A. (1998). Goal-directed instrumental action: contingency and incentive learning and their cortical substrates. *Neuropharmacology* 37:407–19

Bandura, A. (1977). Social Learning Theory. Englewood Cliffis, NJ: Prentice-Hall.

Bandura, A. (1986). *Social Foundations of Thought and Action: A Social Cognitive Theory.* Englewood Cliffis, NJ: Prentice-Hall.

Bargh, J. A., McKenna, K. Y. A., & Fitzsimons, G. M. (2002). Can you see the real me? Activation and expression of the "true self" on the Internet. *Journal of Social Issues*, 59 (2), 33-48.

Baron, R. M., & Kenny, D. A. (1986). The moderator-mediator variable distinction in social psychological research: Conceptual, strategic and statistical considerations. *Journal of Personality and Social Psychology,* 51, 1173-1182.

Baumeister, R. F. & Leary, M. R. (1995). The need to belong: Desire for interpersonal attachments as a fundamental human motivation. *Psychological Bulletin*, 117 (3), 497-529.

Bartholow, B. D., Sher, K. J. & Strathman, A. (2000). Moderation of the expectancy-alcohol use relation by private self-consciousness data from a longitudinal study. Pe*rsonality and Social Psychology Bulletin,* 26 (11), 1409-1420.

Bechara, A., Damasio, H., Damasio, A. R. (2000). Emotion, decision making and the orbitofrontal cortex. *Cerebral Cortex,* 10, 295–307.

Bernard, H.R (1995). *Research Methods in Anthropology, Second Edition*. London: Sage Publications.

Berg, J. H., & Peplau, L. A. (1982). Loneliness: The relationship of self-disclosure and androgyny. *Personality and Social Psychology Bulletin*, 8, 624-630,

Bergevin, T., Gupta, R., Derevensky, J., Kaufman, F. (2006). Adolescent gambling: Understanding the role of stress and coping. *Journal of Gambling Studies*, 22: 195-208.

Berridge, K.C (1999). Pleasure, pain, desire and dread: hidden core processes of emotion. In D. Kaheneman, E. Diener, N. Schwarz (Eds.) Well Being: *The Foundations of Hedonic Psychology* (pp. 527–59). New York: Sage

Berridge, K. C. & Robinson, T. E. (1995). The mind of an addicted brain: neural sensitization of wanting versus liking. *Current Directions in Psychological Science*, 4 (3), 71–76.

Berridge, K. C. & Robinson, T. E. (1998). What is the role of dopamine in reward: hedonic impact, reward learning, or incentive salience? *Brain Research Reviews,* 28, 309–369.

Biafora, F. A., Warheit, G. J., Vega, W. A., & Gil, A. G. (1994). Stressful life events and changes in substance use among a multiracial/ethnic sample of adolescent boys. *Journal of Community Psychology*, 22, 296-311.

Biggins, C. A., MacKay, S., Clark, W., & Fein, G.(1997). Event-related potential evidence for frontal cortex effects of chronic cocaine dependence. *Biological Psychiatry*, 42, 472–485.

Billings, A. G. & Moos, R. H. (1981). The role of coping responses and social resources in attenuating the impact of stressful life events. Journal of Behavioral Medicine, 4, 139-157.

Block, J. L. (2008). Issues for DSM-V: Internet addiction. *American Journal of Psychiatry*, 165 (3), 306-307.

Bobo, J. K., Elmer, J. F., Snow, W. H., Schinke, S. P. (1986). Hassles, role strain, and peer relations in young adolescents. *Journal of Early Adolescence*, 6 (4), 339-352.

Bolla, K. I., Cadet, J. L., & London, E. D. (1998). The neuropsychiatry of chronic cocaine abuse. *The Journal of Neuropsychiatry & Clinical Neurosciences*, 10, 280–289.

Botvin, G. J. & Griffin, K. W. (2004). Life skills training: empirical findings and future directions. *The Journal of Primary Prevention*, 25 (2), 211-232.

Breiter, H. C., Aharon, I., Kahneman, D., Dale, A., Shizgal, P. (2001). Functional imagining of neural responses to expectancy and experience of momentary gains and losses. *Neuron,* 30, 619-639.

Breslin, F. C., Hayward, M., & Baum, A. S. (1995). Stress and alcohol: The moderating effect of chronic stress on the acute stress-intoxication relationship. *Journal of Studies on Alcohol*, 56, 546-552.

Brown, S.A., Christiansen, B.A., & Goldman, M.S. (1987). The alcohol expectancy questionnaire: An instrument for the assessment of adolescent and adult alcohol expectancies. *Journal of Studies on Alcohol*, 48, 483-491.

Bucholz ,K.K., Heath, A.C., Reich, T., Hesselbrock, V.M., Kramer, J.R., Nurnberger, J.I. Jr, Schuckit, M.A (1996). Can we subtype alcoholism? A latent class analysis of data from relatives of alcoholics in a multicenter family study of alcoholism. *Alcoholism: Clinical & Experimental Research,* 20: 1462–1471.

Budney, A., & Higgins, S. T. (1994). A community reinforcement plus vouchers approach: treating cocaine addiction (NIDA Publication No. 98-4309 ed.). Retrieved from: http://archives.drugabuse.gov/TXManuals/CRA/CRA4.html#Lifestyle

Buhrmester, D. & Furman, W. (1987). The development of relationship and intimacy. *Child Development*, 58, 1101-1113.

Buhrmester, D. (1990). Intimacy of Friendship, Interpersonal Competence, and Adjustment during Preadolescence and Adolescence. *Child Development*, 61, 1101-1111.

Buhrmester, D., & Prager, K. (1995). Patterns and functions of self-disclosure during childhood and adolescence. In K. J. Rotenberg (Ed.), *Disclosure processes in children and adolescenc*e (pp. 11-56). Cambridge: Cambridge University Press.

Buhs, E. S., & Ladd, G. W. (2001). Peer rejection in kindergarten as an antecedent of young children's school adjustment: An examination of mediating processes. *Developmental Psychology,* 37, 550–560.

Cao, F, & Su, L (2006). Internet addiction among Chinese adolescents: Prevalence and psychological features. *Child: Care, Health and Development*, 33 (3), 275-281.

Caplan, S. E. (2002). Internet use and psychosocial well-being: Development of a theory-based cognitive behavioral measurement instrument. *Computers in Human Behavior,* 18, 553-575.

Caplan, S. E. (2003). Preference for online social interaction: A theory of problematic Internet use and psychosocial well-being. *Communication Research*, 30 (6), 625-648.

Caplan, S. C. (2007). Relations among loneliness, social anxiety, and problematic Internet use. *CyberPsycholgoy & Behavior,* 10 (2), 234-242.

Cappell, H. & Greeley, J. (1987). Alcohol and tension reduction: an update on research and theory. In Blane, H. R. & Leonard, K. E. (Eds.). *Psychological Theories of Drinking and Alcoholism* (pp. 15-54). New York: Guilford Press.

Carlsson, A,, Waters, N., Holm-Waters, S., Tedroff, J., Nilsson, M., Carlsson, M. L. (2001). Interactions between monoamines, glutamate, and GABA in schizophrenia: new evidence. *Annual Review of Pharmacology and Toxicology*, 41, 237–260.

Carnes, P. (1983). *Out of the Shadows: Understanding Sexual Addiction*. Minneapolis, MN: CompCare.

Carroll, K.M. (1996). Relapse prevention as a psychosocial treatment: A review of controlled clinical trials. *Experimental and Clinical Psychopharmacology*, 4: 46-54.

Carver, C. S., & Scheier, M. E (1986). Analyzing shyness: A specific application of broader self regulatory principles. In W. H. Jones, J. M. Cheek, & S. R. Briggs (Eds.), *Shyness: Perspectives on research and treatment* (pp. 73-185). New York: Plenum Press.

Carver, C. S., Scheier, M. F., & Weintraub, J. K. (1989). Assessing coping strategies: A theoretical approach. *Journal of Personality and Social Psychology*, 56 (2), 267-283.

Cehyan . A. & Cehyan. C. (2008). Loneliness, Depression, and Computer Self-Efficacy as Predictors of Problematic Internet Use. *CyberPsychology & Behavior,* 11(6), 699-701.

Cha, A.E. (2007 February 22). *In China, Stern Treatment For Young Internet 'Addicts'*. Washington Post Foreign Service. Retrieved from: http://www.washingtonpost.com/wp-dyn/content/article/2007/02/21/AR2007022102094.html

Chan, D. (2009). So why ask me? Are self report data really that bad? In Charles E. Lance and Robert J. Vandenberg (Eds.), *Statistical and methodological myths and urban legends: Doctrine, verity and fable in the organizational and social sciences* (pp309-335). New York, NY: Routledge.

Chan, T (2004). The crisis of youth in the development of Internet. *Journal of Youth Research*, 7, 155-168 (in Chinese).

Chein, I., Gerard, D. L., Lee, R.S., & Rosenfeld, E. (1964). *The road to H: Narcotics, delinquency, and social policy*. New York: Basic Books.

Chen, S. H., and Chou, C. (1999, August). *Development of Chinese Internet addiction scale in Taiwan.* Poster presented at the 107th American Psychology Annual convention, Boston,USA.

Chen, H., Wigand, R. & Nilan, M. S. (1999). Optimal experiences of web activities. *Computers in Human Behavior,* 15, 585-608.

Chen, S. H., Weng, L. C., Su, Y. J., Wu, H. X., Yang, P. F. (2003). Development of Chinese Internet Addiction Scale and its psychometric study. *Chinese Journal of Psychology*, 2003, 45, 279-294 (in Chinese).

Chen, W. (2006). Chinese children's leisure. In J. Xi, Y. Sun, J. J. Xiao (Eds.), *Chinese Youth in Transition* (pp. 101-129). Aldershot, England ; Burlington, VT : Ashgate.

China Internet Network Information Center (2011 July).*The 28st Statistical Survey Report on the Internet Development in China.* Retrieved from: http://www.china.org.cn/business/2011-08/03/content_23129540.htm

Chinese Association of Youth Internet Use (2007). *Report on Internet Addiction among Adolescents in Mainland China.* Retrieved from: http://campus.chinaren.com/20080118/n254748895.shtml

Chou, C., Chou, J., & Tyan, N. N.(1999). An exploratory study of Internet addiction, usage and communication pleasure - The Taiwan's case. International Journal of Educational Telecommunications, 5, 47-64.

Chou, C., & Hsiao, M. C. (2000). Internet addiction, usage, gratification, and pleasure experience: The Taiwan college students' case. *Computers & Education*, 35 (1), 65-80.

Chou, C. (2001). Internet heavy use and addiction among Taiwanese college students: An online interview study. *Cyberpsychology & Behavior*, 4 (5): 573-585.

Cohen, J (1983). The cost of dichotomization. *Applied Psychological Measurement,*7(3):249–53.

Costello, A. B., & Osborne, J. W. (2005). Best practices in exploratory factor analysis: Four recommendations for getting the most from your analysis. *Practical Assessment, Research & Evaluation*, 10 (7), 1-9.

Craig, R. J. (1995). The role of personality in understanding substance abuse. *Alcoholism Treatment Quarterly,* 13, 17–27.

Crum, R. M., Muntaner, C., Eaton, W. W., & Anthony, J. C. (1995). Occupational stress and the risk of alcohol abuse and dependence. *Alcoholism,* 19, 647-655.

Csikszentmihalyi, M., & Larson, R. (1984). *Being Adolescent*. New York: Basic Books.

Cooper, M.L., Russell, M. & George, W.H. (1988). Coping, expectancies, and alcohol abuse: A test of social learning formulations. *Journal of Abnormal Psychology*, 97, 2, 218-230.

Coopersmith, S. (1991*). Self-Esteem Inventories*. CA: Consulting Psychologists Press, Inc.

Cooper, M. L., Russell, M., Skinner, J. B., Frone, M. R. & Mudar, P. (1992). Stress and alcohol use: Moderating effects of gender, coping, and alcohol expectancies. *Journal of Abnormal Psychology*, 101 (1), 139-152.

Cooper, M. L. Frone, M. R., Russell, M. & Mudar, P. (1995). Drinking to regulate positive and negative emotions: A motivational model of alcohol use. *Journal of Personality and Social Psychology,* 69, 990-1005.

Davis, R. A. (2001). A cognitive-behavioral model of pathological Internet use. *Computers in*

Human Behavior, 17, 187-195.
Debus, A. G. (1968). *World Who's Who in Science: A Biographical Dictionary of Notable Scientists from Antiquity to the Present.* Chicago: Marquis.
Denzin, N.K. & Lincoln, Y.S. (2000) *Handbook of Qualitative Research*. London: Sage Publications.
DeVellis，R. F. (2012). *Scale Development: Theory and Applications*. Thousand Oaks, Calif.: SAGE
De Vries, T. J. & Shippenberg, T. S. (2002). Neural systems underlying opiate addiction. *Journal of Neuroscience,* 22, 3321–3325.
Di Chiara, G. (1999). Drug addiction as dopamine-dependent associative learning disorder. *European Journal of Pharmacology,* 375, 13–30.
Dickerson, M. (1984*). Compulsive gamblers.* London: Longman.
Dickinson, A., Smith, J., & Mirenowicz, J. (2000). Dissociation of Pavlovian and instrumental incentive learning under dopamine antagonists. *Behavioral Neuroscience*, 114, 468–483.
Donner, A. & Eliasziw, M (1994). Statistical implications of the choice between a dichotomous or continuous trait in studies of interobserver agreement.Biometric, 50: 550–555.
Douglas, A.C., Mills, J. E., Niang, M. , Stepchenkova, S., Byum, S., Ruffini, C., Lee, S.K., Davis, R. A., Flett, G. L., & Besser, A. (2002). Validation of a new scale for measuring Internet use: Implications for pre-employment screening. *Cyberpsychology & Behavior,* 5, 331-345.
Douglas, A.C., Mills, J.E., Niang, M., Stepchenkova,S., Byun, S., Ruffini, B., Ruffini, C., Lee, S.K., Loutfi, J., Lee, J., Atallah, M., & Blanton (2008). Internet addiction: Meta-synthesis of qualitative research for the decade 1996-2006. *Computers in Human Behavior*, 24, 3027-3044.
Douvan, E., & Adelson, J. (1966). *The Adolescent Experience.* New York: Wiley.
DeRuiMu Research Group on Internet Addiction (2006). Report on Internet addiction among adolescents in Shanghai. In Shanghai Youth Federation, Hong Kong Federation of Youth Group, & People's Association Youth Movement Constitution (Eds.), *Research and Intervention of Adolescent Internet Addiction*. Shanghai: East China University of Technology and Science Press (in Chinese).
Edwards, G. & Gross, M.M. (1976). Alcohol dependence: Provisional description of a clinical syndrome. *British Medical Journal*, 1(6017), 1058–1061.
Edwards, G, (1977). The alcohol dependence syndrome: usefulness of an idea. In G Edwards, M Grant (eds.) *Alcoholism, Medicine, and Psychiatry: New Knowledge and New Responses*. London: Croom Helm.
Edwards, G. (1990). Withdrawal symptoms and alcohol dependence: Fruitful mysteries. British Journal of Addiction, 85, 447-461.
Endler, N.S. & Parker, J.D.A. (1990a). *Coping Inventory for Stressful Situations (CISS): Manual.* Toronto: Multi-Health Systems.
Endler, N.S. & Parker, J.D.A. (1990b). The multidimensional assessment of coping: A critical evaluation. *Journal of Personality and Social Psychology,* 58, 844-854.
Endler, N.S. & Parker, J.A. (1990c). State and trait anxiety, depression and coping styles. *Australian Journal of Psychology,* 42 (2), 207-220.
Evans, D.M. & Dunn, N.J. (1992). Alcohol expectancies, coping responses and self-efficacy judgments: A replication and extension of Cooper et al.'s 1988 study in a college sample. *Journal of Studies on Alcohol and Drugs*, 56 (2), 186-193.

Everitt B, Robbins T.W(2005). Neural systems of reinforcement for drug addiction: from actions to habits to compulsion. *National Neuroscience*, 8:1481–1489.
Everitt, B.J & Wolf, M.E. (200). Psychomotor stimulant addiction: a neural systems perspective. *Journal of Neuroscience,* 22:3312–20
Fei, L., Qiu, S., & Jiang, Q. (2006). Research on Internet use behavior and Internet addiction among secondary school students. *Chinese School Health*, 27 (5), 441-442 (in Chinese).
Feltenstein, M. W., & See, R. E.(2008).The neurocircuitry of addiction: An overview. British *Journal of Pharmacology,* 154 (2), 261-274.
Fester, C. B., & Skinner, B. F. (1957*). Schedules of Reinforcement.* Massachusetts: Copley Publishing Group.
Fenzel, L.M. (1989). Role strain in early adolescence: A model for investigating school transition stress. *Journal of Early Adolescence,* 9 (1-2), 13-33.
Flick, U.,von Kardoff, E.,& Steinke, I. (2004). What is qualitative research? An introduction to the field. In U. Flock, E. von Kardoff, & I. Steinke (Eds.). *A Companion to Qualitative Research.* SAGE Publications.
Folkman, S., Lazarus, R. S. (1980). An analysis of coping in a middle-aged community sample. *Journal of Health and Social Behavior*, 21 (3), 219-239.
Folkman, S. (1984). Personal control and stress and coping processes: A theoretical analysis. *Journal of Personality and Social Psychology*, 46, 839-852.
Frances, A.J., First, M., & Pincus, H. (1995). *DSM-IV Guidebook.* Washington, DC, American Psychiatric Press.
Frances, A. J. (2010, March 24). DSM5 suggests opening the door to behavioral addictions. Retrieved from: http://www.psychologytoday.com/blog/dsm5-in-distress.
Frazier, P. A., Tix, A. P., & Barron, K. E. (2004). Testing moderator and mediator effects in counseling psychology research. *Journal of Counseling Psychology*,51(1), 115-134.
Fromme, K. & D'Amico, E. J. (2000). Measuring adolescent alcohol outcome expectancies. *Psychology of Addictive Behaviors*, 14, 206-212.
Frone, M. R. & Windel, M. (1997). Job dissatisfaction and substance use among employed high school students: The moderating role of active and avoidant coping styles. *Substance Use & Misuse,* 32 (5), 571-585.
Frone, M. R., Russell, M., & Cooper, M. L. (1993). Relationship of work–family conflict, gender, and alcohol expectancies to alcohol use/abuse. *Journal of Organizational Behavior*, 14, 545–558.
Glautier, S. (2004). Measures and models of nicotine dependence: positive reinforcement. *Addiction,* 99, 30—50
Goldberg, S. R., Spealman, R. D., & Kelleher, R. T. (1979). Enhancement of drug-seeking behavior by environmental stimuli associated with cocaine or morphine injections. *Neuropharmacology,* 18, 1015-1017.
Grella, C. E., Hser, Y., Joshi, V., Rounds-Bryant, J. (2001). Drug treatment outcomes for adolescents with comorbid mental and substance use disorders. T*he Journal of Nervous and Mental Disease,* 189, 384-392.
Griffths, M. D. (1995). *Adolescent Gambling.* Lodon: Routledge.
Griffths, M. D. (1998). Internet addiction: does it really exist? In J. E. Gackenbach (Ed.), *Psychology and the Internet: Intrapersonal, Interpersonal and Transpersonal Implications* (pp. 61-75). New York: Academic Press.
Griffths, M. D. (2000). Does Internet and computer "addiction" exist? Some case study evidence.

Cyberpsychology and Behavior, 3 (2), 211-218.
Griffths, M. D. (2002). *Gambling and Gaming Addiction in Adolescence.* Leicester: British Psychological Society/Blackwell.
Grohol, J, M. (1999). *Internet addiction guide*. Retrieved from: http://psychcentral.com/netaddiction/.
Gross, E.F. (2004). Adolescents internet use: what we expect, what teens report. *Applied Developmental Psychology*, 25, 633-649.
Groves, R.M., Fowler, F.J., Couper, M. P., Lepkowski, J.M., Singer, E., & Tourangeau, R. T. (2009). *Survey Methodology*. John Wiley & Sons.
Goldberg, S. R., Spealman, R. D., & Kelleher, R. T. (1979). Enhancement of drug-seeking behavior by environmental stimuli associated with cocaine or morphine injections. *Neuropharmacology*, 18, 1015-1017.
Guo, D. P. (Ed.). (2005*). Governance and democracy in Shanghai.* Chong Qing: Chong Qing Publishing House (In Chinese).
Ha, J. H., Kim, S.Y., Bae, S. C., Bae, S., Kim, H., Sim, M., Lyoo, I. K., Cho, S. C. (2007). Depression and Internet addiction in adolescents. *Psychopathology,* 40. 424-430.
Halls, A. S. & Parsons, J. (2001). Internet addiction: College student case study using best practices in cognitive behavioral therapy. *Journal of Mental Health Counseling*, 23 (4), 312-327.
Hair, J. F. J., Anderson, R. E., Tatham, R. L., & Black,W. C. (1995). *Multivariate data analysis* (4th ed.). Saddle River, NJ: Prentice Hall.
Han, M. H. & Yoo, A. J. (1995). Development of Daily Hassles Scale for Children in Korea. *Journal of Korean Home Economics Association*, 33 (4), 49-64.
Hatcher, L. (1994). *A Step-by-Step Approach to Using the SAS® System for Factor Analysis and Structural Equation Modeling.* Cary, NC: SAS Institute, Inc.
Harter, S. (1990). Self and identity development. In S. S. Feldman & G. R. Elliot (Eds.), A*t the Threshold: The Developing Adolescent* (pp.61-80). Cambridge: Harvard University Press.
Hayes, A. F. (2009). Beyond Baron and Kenny: Statistical Mediation Analysis in the New Millennium. *Communication Monographs,* 76:4, 408-420
Hepworth, D.H., Rooney, R.H., Larsen, J.A. (2010). *Direct Social Work Practice: Theory and Skills* (8th ed.). Belmont, Calif. : Brooks/Cole Cengage Learning.
Helzer, J.E. (2007). A dimensional option for the diagnosis of substance dependence in DSM-V. *International Journal of Methods in Psychiatric Research*, 16 (S1), 24-33.
Hirschman, E. C. (1992). The consciousness of addiction: toward a general theory of compulsive consumption. *Journal of Consumer Research,* 19 (2), 155-179.
Hoffman, D. L., & Novak, T. P. (1996). Marketing in hypermedia computer-mediated environments: Conceptual foundations. *Journal of Marketing,* 610, 50-68.
Hogarty, K. Y., Hines, C. V., Kromrey, J. D., Ferron, J. M., & Mumford K. R. (2005). The quality of factor solutions in exploratory factor analysis: The influence of sample size, communality, and overdetermination. *Educational and Psychological* Measurement, 65, 202-226.
Holden, C. (2001). Behavioral' Addictions: Do They Exist? *Science.* 5544, 980-982.
Holder, M. D., Coleman, B., Sehn, Z.L. (2009). The contribution of active and passive leisure to children's well-being. *Journal of Heath Psychology,* 14, 378-386.
Huselid, R. F., & Cooper, M. L. (1992). Gender roles as mediators of sex differences in adolescent alcohol use and abuse. *Journal of Health and Social Behavior,* 33, 348–362.

Hyman, S. E. & Malenka, R. C. (2001). Addiction and the brain: the neurobiology of compulsion and its persistence. *Nature Reviews Neuroscience*, 2, 695–703.
Hyman, S.E. (2007). The neurobiology of addiction: Implications for voluntary control of behavior. *The American Journal of Bioethics,* 7 (1), 8-11.
Information Center of Shanghai Municipality (2009). Comparison of the Internet development between Shanghai and developed Countries. Retrieved from http://222.66.64.160:8080/sheinet/2_7.jsp?artid=1275 (in Chinese).
Irvin, J.E., Bowers, C.A., Dunn, M.E., Want, M.C. (1999). Efficacy of relapse prevention: A meta-analytic review. *Journal of Consulting and Clinical Psychology* 67: 563-570.
Jackson, M. E., Frost, A. S., Moghaddam, B. (2001). Stimulation of prefrontal cortex at physiologically relevant frequencies inhibits dopamine release in the nucleus accumbens. *Journal of Neurochemistry,78*, 920–923.
Jellinek, E.M. (1960). *The Disease Concept of Alcoholism.* New Haven, CT, Hillhouse Press.
Jentsch, J. D., & Taylor, J. R. (1999). Impulsivity resulting from frontostriatal dysfunction in drug abuse: implications for the control of behavior by reward-related stimuli. Psychopharmacology, 146, 373–390.
Jones, B.T., Corbin, W., & Fromme, K.(2001). A review of expectancy theory and alcohol consumption. *Addiction,* 96, 57-72.
Jones, P. J. & Dembo, M. H. (1989). Age and sex role differences in intimate friendships during childhood and adolescence. *Merrill-Palmer Quarterly*, 35:445–462.
Kalivas, P.W. & O'Brien, C. (2008).Drug addiction as a pathology of staged neuroplasticity. *Neuropsychopharmacology Reviews*, 33, 166-180.
Kaltiala-Heino, R., Lintonen, T. & Rimpela, A. (2004). Internet addiction? Potentially problematic of the Internet in a population of 12-18 year-old adolescents. *Addiction Research and Theory,* 12 (1), 89-96.
Kaminer, Y., Burleson, J. A., Goldberger, R. (2001). Psychotherapies for adolescents with alcohol and other substance abuse: three and nine month post treatment outcomes. *Alcohol: Clinical and Experimental Research,* 25, 90.
Kanner, A. D., Coyne, J. C., Schaefer, C., & Lazarus, R. S. (1981). Comparison of two modes of stress measurement: Daily Hassles and uplifts versus major life events. *Journal of Behavioral Medicine,* 4, 1, 1-39.
Katz, E., Blumler, J. G., & Gurevitch, M. (1974). Utilization of mass communication by the individual. In J. G. Blumler, & E. Katz (Eds.), *The Uses of Mass Communications: Current Perspectives on Gratifications Research* (pp. 19–32). Beverly Hills: Sage.
Kelley, A. E. & Berridge, K. C. (2002). The neuroscience of natural rewards: relevance to addictive drugs. *Journal of Neuroscience,* 22, 3306–3311.
Kendell, R. & Jablensky, A. (2003) Distinguishing between the validity and utility of psychiatric diagnoses. *American Journal of Psychiatry,* 160, 4-12
Kendler, K. S. (1980). The nosologic validity of paranoia (simple delusional disorder): a review. *Archives of General Psychiatry*, 37: 699–706.
Kim, H. K. & Davis, K. E. (2008). Toward a comprehensive theory of problematic Internet use: Evaluating the role of self-esteem, anxiety, flow and the self-rated importance of Internet activities. *Computers in Human Behavior,* 25, 490-500.
Kim, K., Ryu, E., Chon, M. Y., Yeun, E. J., Choi, S. Y., Seo, J. S., Nam, B. W. (2006). Internet addiction in Korean adolescents and its relation to depression and suicidal ideation: A questionnaire survey. *International Journal of Nursing Studies*, 43, 185-192.

Kim, J., La Rose, R. & Wei, P. (2009). Loneliness as the cause and the effect of problematic Internet use: The relationship between Internet use and psychological well-Being. *CyberPsychology & Behavior,* 12(4): 451-455.

Ko, C.H., Yen, J. H., Chen, C. C., Chen, S. H., Yen, C. F. (2005a). Gender differences and related factors affecting online gaming addiction among Taiwanese adolescents. *The Journal of Nervous and Mental Disease*, 193 (4), 14-21.

Ko, C.H., Yen, J.Y., Yen, C.F., Chen, C.C., Yen, C.N., Chen S.H. (2005b). Screening for Internet addiction: An empirical study on cut-off points for the Chen Internet Addiction Scale. Kaohsiung Journal of Medical Science, 21, 545-551.

Ko, C. H., Yen, J. Y., Yen, C. F., Lin, H. C., & Yang, M. J. (2007). Factors predictive for incidence and remission of Internet addiction in young adolescents: A prospective study. *Cyberpsychology & Behavior,* 10 (4), 545-551.

Ko, C. H., Yen, J. Y., Chen, C. S., Chen, C. C., Yen, C. F. (2008). Psychiatric comorbidity of Internet addiction in college students: An interview study. *CNS Spectrums,* 13 (2), 147-153.

Ko, C.H., Liu, G.C., Hsiao, S., Yen, J.Y., Yang, M.K., Lin, W.C., Yen, C.F., Chen, C.S. (2009). Brain activities associated with gaming urge of online gaming addiction. *Journal of Psychiatric Review,* 43 (7), 7399-747.

Koob, G. F & Le Moal, M. (1997). Drug abuse: hedonic homeostatic dysregulation. *Science,* 278, 52–58.

Koob, G. F. & Le Moal, M. (2001). Drug addiction, dysregulation of reward, and allostasis. *Neuropsychopharmacology,* 24, 97–129.

Kraemer, H.C., Noda, A., O' Hara, R. (2004). Categorical versus dimensional approaches to diagnosis: methodological challenges. *Journal of Psychiatric Research*, 38, 17-25.

Kraemer, H.C. (2007). DSM categories and dimensions in clinical and research contexts. *International Journal of Methods in Psychiatric Research*, 16 (S1): 8-15.

Kraut, R., Mukhopadhyay, T., Szczypula, J., Kiesler, S., & Scherlis, W. (1998). Communication and information: Alternative uses of the internet in households. *In Proceedings of the CHI 98* (pp. 368-383). New York: ACM.

Ladd, G. W., Kochenderfer, B. J., & Coleman, C. C. (1997). Classroom peer acceptance, friendship, and victimization: Distinct relational systems that contribute uniquely to children's school adjustment? *Child Development,* 68, 1181–1197.

Ladd, G.W., Herald-Brown, S.L., & Reiser, M. (2008). Does chronic classroom peer rejection predict the development of children's classroom participation during the grade school years? *Child Development,* 79 (4), 1001-1015.

Lam, T.L., Peng, Z., Mai, J., & Jing, J. (2009). Factors associated with Internet addiction among adolescents. *Cyberpsychology & Behavior,* 12 (5), 551-555.

La Greca, A.M. & Lopez, N. (1998). Social anxiety among adolescents: Linkages with peer relations and friendships. *Journal of Abnormal Child Psychology,* 26, 83-94.

LaRose, R., Mastro, D., & Eastin, M. (2001). Understanding Internet usage: A social-cognitive approach to uses and gratifications. *Social Science Computer Review,* 19, 4, 395-413.

Larson, R. W., Brown, B. B., & Mortimer, J. T. (2002). *Adolescents' preparation for the future; Perils and promise- A report of the study group on adolescence in twenty-first century.* London: Blackwell.

Laura, K. (1995). Path Analysis. In Grimm, L.G. & Yarnold, P.R. (Eds.) *Reading and Understanding Multivariate Statistics. W*ashington DC: American Psychological

Association.
Lazarus, R.S. & Folkman, S. (1984). *Stress, appraisal, and coping*. New York: Springer.
Lazarus, R.S. (1966). *Psychological Stress and the Coping Process*. New York: McGraw-Hill.
Leary, M. R. (1983a). *Understanding Social Anxiety: Social, Personality, and Clinical Perspective.* Newbury Park, CA: Sage.
Leary, M. R. (1983b). Social anxiousness: The construct and its measurement. *Journal of Personality Assessment, 47* (1), 66-75.
Lei, L. & Wu, Y. (2007). Adolescents' paternal attachment and Internet use. *Cyberpsychology & Behavior*, 10 (5), 633-639.
Lei, L., Yang, Y., Liu, M. (2006). The relationship between neuroticism, online use preference and internet addiction. Acta Psychologica Sinica, 38 (3), 375-381.
Lejoyeux, M.,Weinstein, A., 2010. Compulsive buying. *American Journal of Drug Alcohol Abuse* 36, 248-253.
Leon, D. & Rotunda, R. (2000). Contrasting case studies of frequent internet use: Is it pathological or adaptive? *Journal of College Student Psychotherap*y, 14, 9-17.

Liddle, H. A., Rodriguez, R. A., Dakof, G. A., Kanzki, E., & Marvel F. A (2005). Multidimensional family therapy: a science-based treatment for adolescent drug abuse. In: J. Lebow (ed.), *Handbook of Clinical Family Therapy* (pp: 128-163). New York: John Wiley and Sons.
Liddle, H. A. (2008). Multidimensional family therapy for adolescent drug abuse. In J. Bray & M. Stanton (Eds.) *Blackwell Handbook of Family Psychology.* London: Blackwell
Lin, S. S. J., & Tsai, C. C. (1999, August). *Internet Addiction among High Schoolers in Taiwan.* Poster presented at the 107th American Psychology Association (APA) Annual Convention, Boston, USA.
Lipton, R. I. (1994). The Effect of moderate alcohol use on the relationship between stress and depression. *American Journal of Public Health,* 84, 1913-1917.
Liu, C. Y. & Kuo, F. Y. (2007). A study of Internet addiction through the lens of the interpersonal theory. *Cyberpsychology & behavior,* 10.6.799-804.
Loutfi, J., Lee, J. K., Atallah, M., & Blanton, M. (2008). Internet addiction: Meta-synthesis of qualitative research for the decade 1996-2006. *Computers in Human Behavior*, 24, 3027-3044.
Lu, H. Q. (2007). The psychological analysis of and strategies for dealing with adolescents' Internet enchantment. *Journal of Community Development*, 119, 206-221.
Luthar, S.S. & D' Avanzo, K. (1999). Contexutal factors in substance use: A study of suburban and inner-city adolescents. *Developmental Psychopathology*, 11, 845-867.
Luthar, S. S. & Zigler, E. (1991). Vulnerability and competence: A review of research of resilience in childhood. *American Journal of Orthopsychiatry*, 61, 6-22.
Lynskey, M.T., Nelson, E.C., Neuman, R.J., Bucholz, K.K., Madden, P.A.F., Knopik, V.S., Slutske, W., Whitfield, J.B., Martin, N.G., Heath, A.C. Limitations of DSM-IV operationalizations of alcohol abuse and dependence in a sample of Australian twins. *Twin Research and Human Genetics,* 8: 574–584.
MacCallum, R.C., Zhang, S., Preacher, K.J., Rucker. D.D. (2002). On the practice of dichotomization of quantitative variables. *Psychological Methods*, 7(1):19–40.
Marlatt, G. (2005). R*elapse Prevention: Maintenance Strategies in the Treatment of Addictive Behaviors.* New York: Guilford Press.

Marlatt, G.A., Baer, J. S., Donovan, D. M., & Kivalahan, D. R. (1988). Addictive behaviors: Etiology and treatment. *Annual Review of Psychology*, 39, 223-52.

Marlatt, G., Baer, J. S., Kivlahan, D. R., Dimeff, L. A., Larimer, M. E., Quigley, L. A., Somers, J. M., & Williams, E. (1998). *Screening* and brief intervention for high-risk college student drinkers: Results from a 2-year follow-up assessment. *Journal of Consulting and Clinical Psychology,* 66(4), 604-615.

Marlatt, G.A., Gordon, J.R. (1980). Determinants of relapse: Implicati,ons for the maintenance of behavior change. In Davidson, P., Davidson, S.M. (eds.), *Behavioral medicine: Changing health lifestyles* (pp. 411—452). Elmsford, NY: Pergamon.

Marlatt, G.A., Gordon, J.R. (1985). *Relapse prevention: Maintenance strategies in the treatment of addictive behaviors.* New York: Guilford Press.

Marcus, B. (2006). Composite measurement. In V. Jupp (Ed.), t*he Sage Dictionary of Social Research Methods* (pp. 34-35). London: Sage.

Masia, C., Beidel, D. C., Albano, A. M., Rapee, R. M., Turner, S. M., Morris, T. L., et al. (1999). *Skills for Academic and Social Success*. Available from Carrie Masia-Warner, PhD, New York University School of Medicine, Child Study Center, 215 Lexington Avenue, 13th floor, New York 10016

Masia-Warner, C., Klein, R. G., Dent, H. C., Fisher, P. H., Alir, J., Albano, A. M., Guardino, M. (2004). School-based interventions for adolescents with social anxiety disorder: Results of a controlled study. *Journal of Abnormal Child Psychology,* 33 (6), 707-722.

McAuliffe, W. E. & Gordon, R. A. (1974). A test of Lindesmith's theory of addiction: The frequency of euphoria among long-term addicts. *American Journal of Sociology*, 79, 795-840.

McAuliffe, W. E., Rohman, M., Feldman, B., & Launer, E. K. (1985). The role of euphoric effects in the opiate addictions of heroin addicts, medical patients, and impaired helath professionals. *Journal of Drug Issues*, 15, 203-224.

McKenna, K. Y. A., & Bargh, J. A. (1999). Causes and consequences of social interaction on the Internet: A conceptual framework. *Media Psychology*, 1, 249-269.

McKenna, K. Y. A., & Bargh, J. A. (2000). Plan 9 from cyberspace: The implications of the Internet for personality and social psychology. *Personality and Social Psychology Rev*iew, 4, 57-75.

McKenna, K. Y. A., Green, A. S. & Gleason, M. E. J. (2002). Relationship formation on the Internet: What's the big attraction? *Journal of Social Issues,* 58 (1), 9-31.

McMurran, M. (1994). The Psychology of Addiction. London; Bristol, PA: Taylor & Francis, 1994.

Meerkerk, G. J., Van Den Eijnden, R. J., Vermulst, A. A., & Garretsen, H. F. (2009). The Compulsive Internet Use Scale (CIUS): Some psychometric properties. Cyberpsychology &Behavior, 12(1), 1-6.

Menaghan, E. G. (1983). Individual coping efforts: Moderators of the relationship between life stress and health outcome. In H.B. Kaplan (Ed.), *Psychosocial Stress: Trends in Theory and Research*. New York: Academic Press.

Mesch, G. S. (2003). The family and the Internet: The Israeli case. *Social Science Quarterly*, 84, 1039-1050.

Meyers, R. J., Smith, J. E. (1995). *Clinical Guide to Alcohol Treatment: The Community Reinforcement Approach.* Guilford Press, New York, USA.

Meyers, R. J., & Miller, W. R. (2001). A *community reinforcement approach to addiction treatment (International Research Monographs in the Addictions*).UK: Cambridge University Press.

Monti, P. M., Abrams, D. B., Kadden, R. M., & Cooney, N. L. (1989). T*reating Alcohol Dependence: A Coping Skills Training Guide.* New York: Guilford Press.

Mooney, D. K., Fromme, K., Kivlahan, D. R. & Marlatt, G. A. (1987). Correlates of alcohol consumption: Sex, age, and expectancies relate differentially to quantity and frequency. *Addictive Behaviors,* 12, 235-240.

Moos, R. H., Finney, J. W., & Chan, D. A. (1981). The process of recovery from alcoholism.I. Comparing alcoholic patients and matched community controls. *Journal of Studies on Alcohol,* 42, 383-402.

Moos, R.H., Finney, J.W., & Gamble, W. (1982). The process of recovery from alcoholism. II. Comparing spouses of alcoholic patients and matched community controls. *Journal of Studies on Alcohol,* 43, 888-909.

Morahan-Martin, J., & Scumacher, P. (2000). Incidence and correlates of pathological Internet use among college students. *Computers in Human Behavior*, 13-29.

Morahan-Martin, J., & Schumacher, P. (2003). Loneliness and social uses of the Internet. *Computers in Human Behavior,* 19: 659-671.

Murray, H.A. (1938). *Explorations in personality.* New York: Oxford University Press.

National Institute on Drug Abuse (NIDA) (2002). Reward and decision making: opportunities and future directions. *Neuron*, 36, 189-192.

National Institute on Drug Abuse (June, 2008). Understanding drug abuse and addiction. Retrieved from: http://www.drugabuse.gov/infofacts/understand.html.

Nardi, P. M. (2003). *Doing survey research: A guide to quantitative methods.* Boston: Allyn and Bacon.

Nestler, E.J. & Malenka, R.C. (February 09, 2004). The addicted brain. *Scientific American* (February 9, 2004) Retrieved from: http://www.scientificamerican.com/article.cfm?id=the-addicted-brain

Ni, X., Yan, H., Chen, S., & Liu, Z. (2009) factors influencing internet addiction in a sample of freshmen university students in China. *Cyberpsychology & Behavior*, 12 (3), 327-330.

Nichols, L. A & Nicki, R. (2004). Development of a psychometrically sound Internet Addiction Scale: A preliminary step. *Psychology of Addictive Behaviors*, 18 (4), 381-384.

Niemz, K., Griffths, M. & Banyard, P. (2005). Prevalence of pathological Internet use among university students and correlations with self-esteem, the general health questionnaire (GHQ), and disinhibition. *Cyberpsychology & Behavior*, 8 (6), 562-570.

Newcomb, M. D., Huba, G. J., & Bentler, P. M. (1981). A multidimensional assessment of stressful life events among adolescents: Derivation and correlates. *Journal of Health and Social Behavior,* 22, 400-415.

Nolen-Hoeksema, S., & Harrell, Z. A. T. (2002). Rumination, depression, and alcohol use: Tests of gender differences. *Journal of Cognitive Psychotherapy: An International Quarterly*, 16, 391–404.

Oei, T. P. S. & Baldwin, A. R. (1994). Expectancy theory: A two-process model of alcohol use and abuse. *Journal of Studies on alcohol,* 525-534.

Oei, T. P. S & Newett, A. (1987). The relationship of alcohol-related self-statements and consumption in a public bar. *British Journal of Addiction*, 82, 1125-1131.

Olobatuyi, M.E. (2006). *A User's Guide to Path Analysis*. Lanham, MD: University Press of America.
Olsen, C.M.(2011). Natural rewards, neuroplasticity, and non-drug addictions. *Neuropharmacology,* 61, 1109-1122.
Orford, J. (2001). *Excessive Appetites: A Psychological View of the Addictions* (2nd Ed.). Chichester: Wiley.
Pallanti, S., Bernardi, S., & Quercioli, L. (2006). The Shorter PROMIS Questionnaire and the Internet Addiction Scale in the assessment of multiple addictions in a high-school population: Prevalence and related disability. *CNS Spectr,* 11(12), 966-974.
Papacharissi, Z. & Rubin, A.M. (2000). Predictors of Internet use. *Journal of Broadcasting & Electronic Media,* 44 (2), 175-196.
Park, C. L., & Levenson, M. R. (2002). Drinking to cope among college students: Prevalence, problems and coping processes. *Journal of Studies on Alcohol*, 63, 486–497.
Park, S. K., Kim, J. Y. & Cho, C. B. (2008*). Prevalence of Internet addiction and correlation with family factors among South Korean Adolescents*. Adolescence (San Diego): an international quarterly devoted to the physiological, psychological, psychiatric, sociological, and educational aspects of the second decade of human life, 43, 895-910.
Parker, B. J. & Plank, R. E. (2000). A uses and gratifications prerspective on the Internet as a new information source. *American Business Review*, 18, 2, 43-49.
Parker, J., & Gottman, J. M. (1989). Social and emotional development in a relational context: Friendship interaction from early childhood to adolescence. In T. J. Berndt & G. W. Ladd (Eds.), *Peer Relationships in Child Development* (pp. 95-131). New York: Wiley.
Parks,M.R.& Floyd, K. (1995). Making friends in cyberspace. *Journal of Communication*, 46 (1), 80-97.
Pearlin, L. I. & Schooler, C. (1978). The structure of coping. *Journal of Health and Social Behavior*, 19, 2-21.
Pearlin, L.I., Menagha, E. G., Liberman, M. A., Mullan, J.T. (1981). The stress process. *Journal of Health and Social Behavior*, 22 (4). 337-356.
Pedhazur, E. J. & Schmelkin, L. P. (1991). *Measurement, Design, and Analysis: An Integrated Approach.* Hillsdale, N.J.: Lawrence Erlbaum Associates.
Peele, S. (1985). *The Meaning of Addiction: Compulsive Experience and its Interpretation*. Lexington, MA: Lexington Books.
Peele, S. (1998). *The Meaning of Addiction: An Unconventional View.* San Francisco, Calif.: Jossey Bass Publishers
Petry, N. M., Kirby, K. N., & Kranzler, H. R. (2002). Effects of gender and family history of alcohol dependence on a behavioral task of impulsivity in healthy subjects. *Journal of Studies on Alcohol,* 63, 83–90.
Petraitis, J., Flay, B.R., & Miller, T.Q. (1995). Reviewing theories of adolescent substance use: Organizing pieces in the puzzle. *Psychological Bulletin*, 117 (1), 67-86.
Popper, K. (1959) *The Logic of Scientific Discovery*. Basic Books, New York, NY.
Potenza, M. N.(2008).The neurobiology of pathological gambling and drug addiction: an overview and new findings. *Philosophical Transactions of the Royal Society of London. Series B, Biological Sciences,* 363(1507): 3181–3189.
Potenza M. N., Steinberg, M. A., Skudlarski, P., Fulbright, R. K., Lacadie, C. M., Wilber M. K., (2003). Gambling urges in pathological gambling: a functional magnetic resonance imaging study. *Archive of General Psychiatry,* 60: 828–36.

Ramo, D.E., Myers, M.G. & Brown, S.A. (2007). Relapse prevention for adolescent substance abuse: Overview and case examples. In K.A. Witkiewitz, G.A. Marlatt, eds. *Therapist's guide to evidence-based relapse prevention* (pp. 293-311). Amsterdam ; Boston : Elsevier Academic Press

Raylu, N., & Oei, T.P.S. (2002). Pathological gambling: A comprehensive review. *Clinical Psychology Review,* 22, 1009-1061.

Robin, T. E., & Berridge, K.C. (2001). Incentive-sensitization and addiction. *Addiction*, 96 (1), 103-114.

Robins, E. & Guze, S.B. (1970). Establishment of diagnostic validity in psychiatric illness: Its application to Schizophrenia. *American Journal of Psychiatry*, 126: 983-987.

Robinson, T. E., & Berridge, K. C. (1993). The neural basis of drug craving: an incentive-sensitization theory of addiction. *Brain Research Reviews*, 18, 247–291.

Rosenthal, R. (1990) Replication in Behavioral Research, in Neuliep, J.W. (Ed.*) Replication Research in the Social Sciences (*p.1-30*)*. Sage Publications: London.

Roth, J. L. & Brooks-Gunn, J. (2003). What exactly is a youth development program? Answers from research and practice. *Applied Developmental Science,* 7 (2), 94-11.

Rubin, A., & Babbie, E. (2005). *Research methods for social work* (5th edition). Pacific Grove, CA: Brooks/Cole.

Rubin, A. & Babbie, E. R. (2008). *Research methods for social wo*rk (6th edition.). Belmont, CA.: Thomson Brooks Cole.

Schafer, J., & Brown, S. A. (1991). Marijuana and cocaine effect expectancies and drug use patterns. *Journal of Consulting and Clinical Psychology,* 59 (4), 558-565.

Scherer, K. (1997). College life online: Healthy and unhealthy internet use. *Journal of College Student Development*, 38, 655-665.

Schuster, C.R. (1990). Drug seeking behavior: Implications for theories of drug dependence. In: Edwards, G., & Lader, M. (Eds.). *The Nature of Drug Dependence* (pp. 171-194). Oxford: Oxford University Press.

Schuster, C.R & Johanson, C.E. (1981). An analysis of drug-seeking behavior in animals. *Neruoscience and Biobehavioral Reviews*, 5, 315-323.

Seo, M., Kang, H.S., & Yom, Y.H. (2009). Internet addiction and interpersonal problems in Korean Adolescents. *Computer, Informatics, Nursing*, 27 (4), 226-233.

Shaffer, H. & Burglass, M.E. (1981). Epilogue: Reflections and perspectives on the history and the future of the addictions. In H. Shaffer and M. E. Burglass (eds.) *Classic Contributions in the Addictions*. New York:Bruner/Mazel.

Shaffer, H. J., LaPlante, D. A., LaBrie, R. A., Kidman, R. C., Donato, A. N., & Stanton, M. V. (2004). Toward a syndrome model of addiction: Multiple Expressions, Common Etiology. *Harvard Review Psychiatry,* 12, 367-374.

Shanghai Municipal Statistics Bureau (2011a). *Demographic trends for adolescents in Shanghai.* Retrieved from: http://www.stats-sh.gov.cn/fxbg/201112/236881.html (in Chinese).

Shanghai Municipal Statistics Bureau (2011b). *Recent trends in marriage patterns in Shanghai.* Retrieved from: http://www.stats-sh.gov.cn/fxbg/201110/234457.html (in Chinese)

Shanghai Municipal Statistics Bureau (2011c). *Shanghai rural area's annual disposable income per capital and trends.* Retrieved from: http://www.stats-sh.gov.cn/tjnj/nj11.htm?d1=2011tjnj/C0922.htm (in Chinese).

Shanghai Municipal Statistics Bureau (2011d). *Shanghai urban area's annual disposable income per capital and trends*. Retrieved from: http://www.stats-sh.gov.cn/tjnj/nj11.htm?

d1=2011tjnj/C0913.htm (in Chinese).
Sharabany. R., Gershoni, R., Hofman. J. A. (1997). Girl friend, boyfriend: Age and sex differences in intimate friendship. *Development Psychology,* 17, 800–808.
Shaw, S. (1982). What is problem drinking? In M. A. Plant (Ed.) *Drinking and Problem Drinking.* London, Junction Books.
Shen, L. (2008). An empirical Research on Internet addiction of adolescents in Internet cafe in Shanghai. *Frontier of Youth Research,* 3, 33-46 (in Chinese).
Shepherd, R. & Edelmann, R.J. (2005). Reasons for Internet use and social anxiety. *Personality and Individual differences,* 39, 949-958.
Shi, Q., Zhou, R., Ge, Y., Qin, X., & Zhang, K. (2005). The relationship between sensation seeking and Internet addiction among secondary school students. *Chinese Mental Health Journal*, 19 (7), 453-456.
Smith, E. E & Jonides, J. (1999). Storage and executive processes in the frontal lobes. *Science, 283*:1657–61
Shotton, M. A. (1991). The costs and benefits of computer addiction. *Behavior and Information Technology*, 10, 219-230.
Solano, C.H., Batten, P. G., & Parish, E. A. (1982). Loneliness and patterns of self-disclosure. *Journal of Personality and Social Psychology,* 43, 524-531.
Solomon, R. L., Corbit. J. D. (1973). An opponent process theory of motivation. II. Cigarette addiction. *Journal of Abnormal Psychology,* 81, 158–171.
Solomon, R. L. (1977). Addiction: an opponentprocess theory of acquired motivation: the affective dynamics of addiction. In J. D. Maser (Ed.). *Psychopathology: Experimental Models (*pp. 66–103). San Francisco: Freeman
Song, I., La Rose, R., Eastin, M. S., & Lin, C.A. (2004). Internet gratifications and Internet addiction: on the uses and abuses of new media. *Cyberpsychology &Behavior,* 7, 4, 384-393.
Spence, S.H. (1995). *Social skills training: Enhancing social competence with children and adolescents.* Windsor, UK.: NFER-Nelson.
Sproull, L., & Kiesler, S. (1991). *Connections: New Ways of Working in the Networked Organization.* Cambridge, MA: MIT Press
Sullivan, H.S. (1953). *The Interpersonal Theory of Psychiatry.* New York: Norton.
Sylvain, C., Ladoceur, R. & Boisvert, J. (1997). Cognitive and behavioral treatment of pathological gambling: A controlled study. *Journal of Consulting and Clinical Psychology,* 65(5), 727-732.
Tao, R. & Yao, S. L. (2007). The current condition of Internet addiction among adolescents in Mainland China and the treatment model. *Journal of Youth Research,* 10 (1), 89-100. (in Chinese).
Terry, A., Szabo, A., & Griffths, M. (2004). The exercise addiction inventory: A new brief screening tool. *Addiction Research and Theory,* 12, 489-499.
The National Institute of Drug Abuse (2010). Drugs, brains, and behavior: the science of addiction. Retrieved from: http://www.drugabuse.gov/ScienceofAddiction/sciofaddiction.pdf
Thombs, D.L. (2006). *Introduction to Addictive Behaviors* (2nd edition). New York: The Guilford Press.
Tsai, C.C. & Lin, S.J. (2003). Internet addiction of adolescents in Taiwan: An interview study. *Cyberpsychology & Behavior,* 6 (6), 649-652.

Robbins, T. W. & Everitt, B. J. (1999). Interaction of the dopaminergic system with mechanisms of associative learning and cognition: implications for drug abuse. *Psychological Science,* 10:199–202.

Robinson, T. E. & Berridge, K.C.(1993). The neural basis of drug craving: an incentivesensitization theory of addiction. *Brain Research Reviews,* 18, 247–291.

Robinson, T. E. & Berridge, K. C. (2000). The psychology and neurobiology of addiction: an incentive-sensitization view. *Addiction,* 95(Suppl. 2), 91–117.

Robinson, T. E. & Berridge, K. C. (2003). Addiction. *Annual Review of Psychology*, 54, 25–53.

Roosa, M. W., Dumka, L., & Tein, J. Y. (1996). Family characteristics as mediators of the influence of problem drinking and multiple risk status on child mental health. *American Journal of Community Psychology,* 2, 607-624.

Rubin, Z. (1975). Disclosing oneself to a stranger: Reciprocity and its limits. *Journal of Experimental Social Psychology*, 11, 233-260.

Van den Eijnden, R. J. J. M., Meerkerk, G.-J., Vermulst, A. A., Spijkerman, R., & Engels, R. C. M. E. (2008). Online communication, compulsive Internet use and psychosocial well-being among adolescents: a longitudinal study. *Developmental Psychology*, 44, 655-665.

Vanderschuren, L. J., Kalivas, P. W. (2000). Alterations in dopaminergic and glutamatergic transmission in the induction and expression of behavioral sensitization: a critical review of preclinical studies. *Psychopharmacology,* 151:99–120

Wagner, B.M., Compas, B.E., & Howell, D.C.(1988), Daily and major life events: A test of an integrative model of psychosocial stress. *American Journal of Community Psychology*, 16 (2), 189-205.

Wan, C. & Chiou, W. (2006a). Why are adolescents addicted to online gaming? An interview study in Taiwan. *Cyberpsychology & Behavior*, 9(6), 762-766.

Wan, C.S. & Chiou, W.B. (2006b). Psychological motives and online gaming addiction: A test of flow theory and humanistic needs theory for Taiwanese adolescents. *Cyberpsychology & Behavior,* 9, 317-324.

Wang, Y., Wang, J., & Fu, D. (2008). An epidemiological study on Internet addiction among primary and secondary school students. *School Mental Health*, 22 (9), 678-682 (in Chinese).

Waston, D., & Friend, R. (1969). Measurement of social-evaluative anxiety. *Journal of Consulting and Clinical Psychology,* 33, 448-457

Weinstein, A.M. (2010). Computer and video game addiction-A comparison between game users and non-game users. *The American Journal of Drug and Alcohol Abuse,* 36:268–276.

Weinstein, A.,M., & Lejoyeux, M. (2010). Internet addiction or excessive Internet use. *The American Journal of Drug and Alcohol Abuse*, 36, 277-283.

Weiser, E. B. (2001). The functions of Internet use and their social and psychological consequences. *CyberPsychology and Behavior,* 4, 723-743.

Werner, M. J., Walker, L. S. & Greene, J. W. (1993). Alcohol expectancies, problem drinking, and adverse health consequences. *Journal of Adolescent Health,* 14, 446-452.

Wills, T. A, Sandy, J. M. & Shinar, O. (1999). Cloninger's constructs related to substance use level and problems in late adolescence. A meditational model based on self-control and coping motives. *Experimental and Clinical Psychopharmacology,* 7, 122-134.

Witkiewitz, G. & Marlatt, A. (2007). Overview of relapse prevention. In K.A. Witkiewitz, G.A. Marlatt, eds. *Therapist's guide to evidence-based relapse prevention* (pp. 3-15). Amsterdam ; Boston : Elsevier Academic Press

Whang, L. S. M., Lee, S., & Chang, G. (2003). Internet over-users psychological profiles: A behavior sampling analysis on Internet Addiction. *Cyberpsychology & Behavior,* 6 (2), 142-150.

White, F. J., & Kalivas, P. W. (1998). Neuroadaptations involved in amphetamine and cocaine addiction. *Drug and Alcohol Dependence,* 51, 141–153.

White, H. R., & Huselid, R. F. (1997). Gender differences in alcohol use during adolescence. In R. W. Wilsnack, & S. C. Wilsnack (Eds.), *Gender and alcohol: Individual and social perspectives* (pp. 176–198). Piscataway, NJ7 Rutgers Center of Alcohol Studies.

World Health Organization (1965). *International Classification of Disease (8th Rev.).* Geneva: World Health Organization.

World Health Organization (1977*). International Classification of Disease (9th Rev.).* Geneva: World Health Organization.

World Health Organization (1992). *International Classification of Disease (10th Rev.).* Geneva: World Health Organization.

Yang, S. C., & Tung, C. J. (2004). Comparison of Internet addicts and non-addicts in Taiwanese high school. *Computers in Human Behavior,* 23, 79-96.

Yen, J. Y., Yen, C. F., Chen, C. C., Chen, S. H., & Ko, C. H. (2007). Family factors of Internet addiction and substance use experience in Taiwanese adolescents. *Cyberpsychology & Behavior*, 10 (3), 323-239.

Yen, J.Y., Ko, C.H., Yen, C.F., Chen, C.S. & Chen, C.C. (2009). The association between harmful alcohol use and Internet addiction among college students: Comparison of personality. *Psychiatry and Clinical Neuroscience,* 63, 218-224.

Young, K. S. (1996 August). *Internet addiction: the emergence of a new clinical disorder.* Poster presented at the 104th Annual Meeting of the American Psychological Association, Toronto.

Young, K. S. (1998*). Caught in the net*. New York: Wiley.

Young, K. S. and Rodgers, R. C. (1998). The relationship between depression and Internet addiction. *Cyberpsychology & Behavior,* 1 (1), 25-28.

Yu, Y. M. & Du, Y. S. (2007) An investigation on mental health status of internet addicted middle school students in *Shanghai. Shanghai Psychiatry,* 19 (1), 1-13 (In Chinese).

Zhang, G. L. (2001). The Internet use of adolescents in Shanghai. Paper presented at Annual Conference of Chinese Communication Association. Retrieved from: http://ccs.nccu.edu.tw/UPLOAD_FILES/HISTORY_PAPER_FILES/490_1.pdf (in Chinese).

Zuckerman, M., & Kuhlman, D. M. (2000). Personality and risk-taking: Common biosocial factors. *Journal of Personality,* 68, 999–1029.

Zung, W. M. ., Richards, C. B., & Short, M. J. (1965). Self-Rating Depression Scale in an Outpatient Clinic. *Arch Gen Psychiatry,* 13(6):508-515

Appendix I Questionnaire for Pilot Study

Adolescents' Internet Use Behavior in Shanghai

Dear Participants:

I am a Ph.D. candidate in the Department of Social Work at the Chinese University of Hong Kong. This research is set out to explore adolescents' Internet use behavior in Shanghai. We hope to offer some practical implications on healthy use of the Internet.

I sincerely hope that you can share with use of your views by finishing this questionnaire. It will last about forty minutes. Please make sure that ALL the questions are answered. The questionnaire is anonymous; please do not write your name or any identification on it. Your participation is voluntary. You are free to withdraw from the survey at any time. Your decision would be well respected and would not be related to any punishment or loss. If you are willing to participate in the survey you could sign this consent form.

If you have any questions, you can contact me through email at mmgu@swk.cuhk.edu.hk, or mobile phone: (852-61488124). Please allow me to thank you again for your kind participation!

Department of Social Work, the Chinese University of Hong Kong

1. Please think about how much time you spent online:

During last summer holiday, about _____ hours every day

During weekdays in this academic term, about_____hours every day

During weekends in this academic term, about_____hours every day

2. Below is a list of online activities. Please indicate your frequency of use for each activity **within the past half a year**.

	Never	**Less than one hour every day**	**One to two hours every day**	**More than two hours every day**
Email	①			
Online Forum				
Online Blogging				
Instant Messaging				
Social Networking				
Web Surfing				
Information Search				
Online Movie or Video				
Downloading Movie or Video				
Online Gaming				

3. Here are some statements describing experiences related to Internet use. Have you ever had similar experiences **within the past month**, and how frequent? Please indicate with each item the frequency of particular experience happened in your life. 1= none, 2 =rarely, 3 = sometimes, 4 = often.

	Never (1)	**Rarely （2）**	**Sometimes (3)**	**Often (4)**
1) I have been told more than once that I spent too much time online (RP-TM)				
2) I feel uncomfortable if I have been away from the Internet for a period of time (Sym-W)				
	Never	**Rarely**	**Some-times**	**Often**

	(1)	（2）	(3)	(4)
3) I have spent more and more time online (Sym-T)				
4) I feel irritable when the modem cannot connect the host or the connection is broken for unknown reasons (Sym-W)				
5) I always feel energized online, no matter how tried I feel before connecting to the Internet (Sym-W)				
6) I always spend much more time online than that I intend to (Sym-T)				
7) I do not reduce my time spent online despite its negative influence on my interpersonal relationship (RP-IH)				
8) I ever slept for less than four hours due to long time spent online (RP-TM)				
9) On average, I spent more and more time online since last term (Sym-T)				
10) I feel depressed if I cannot access from the Internet for a period of time (Sym-W)				
11) I cannot control my craving towards Internet use (Sym-C)				
12) I have focused my time and energy on the Internet and reduced interactions with friends consequently (RP-IH)				
13) I suffered from backache or other physical ills because of Internet use (RP-IH)				
14) Everyday when I wake up, the first thing I think of is going online (Sym-C)				
15) My Internet use has had negative effects on my academic performance (RP-IH)				
	Never **(1)**	**Rarely** （2）	**Some -times** **(3)**	**Often** **(4)**
16) I believe I would miss something important if I have been away from the Internet for a period of time (Sym-W)				
17) The time I spent with family has been reduced				

because of my Internet use (R11P-IH) 18) The time I spent on leisure activities has been reduced because of my Internet use (RP-IH)				
19) Whenever I left the Internet, I plan to do other things but end up failing to resist the craving and going online again (Sym-C)				
20) My life has no fun without the Internet (Sym-C)				
21) My Internet use has had negative effects on my physical health (RP-IH)				
22) I have planned to reduce time spent online but my plan always fails (Sym-C)				
23) I used to sleep less in order to have more time spent online (RP-TM)				
24) I need more and more time online to feel satisfied (Sym-T)				
25) I ever did eat regularly because of my Internet use (RP-TM)				
26) I ever stayed overnight on the Internet and felt spaced out the other day (RP-TM)				
1) I have been told more than once that I spent too much time online (RP-TM)				

4**. Some adolescents have their daily routine disrupted due to excessive use of the Internet.** In the past year, have you ever found yourself in the similar situation?

☐（1）Yes ☐（2） No

5. When you find yourself spent too much time online, to whom would you turn to ask for help? (Multiple choice)

☐ (1) Teacher ☐ (2) parent(s) ☐ (3) peers and friends

☐ (4) Others, please specify_____

6. Here are some statements about one's needs satisfaction through involvement in online activities. Please think about your experiences **in the past year** and evaluate how the statements relate to you by checking the degree to which you agree or disagree with each item. *Please tick one box for each line.*
1= strongly disagree, 2= disagree, 3 =neutral, 4 =agree, and 5 =strong agree.

	(1) Strongly agree	**(2)**	**(3)**	**(4)**	**(5) Strongly agree**
(1) It is only online that I feel confident in interacting with others					
(2) It is only online that I feel social interaction is secure and comfortable					
(3) It is only online that I have someone to share with secrets and private feelings					
(4) It is only online that I have someone to talk about things that I don't wish anyone else know					
(5) It is only online that I can forget problems that bother me					
(6)When I feel stressed, it is only the Internet that makes me feel better					

7. Here are some statements about one's feelings during social interactions. Please think about your experiences **in the past year**, and evaluate how the statements relate to you by checking the degree to which you agree or disagree with each item.

	(1) Strongly disagree	**(2)**	**(3)**	**(4)**	**(5) Strongly agree**
(1) I worry about doing something new in front of others					
(2) I worry about being teased					
(3) I feel shy around people I don't now					
(4) I only talk to people I have known very well					

(5) I feel that peers talk about me behind my back					
(6) I worry about what others think of me					
(7) I am afraid that others will not like me					
(8) I get nervous when I talk to peers I don't know very well					
(9) I worry about what others say about me					
(10) I get nervous when I meet new people					
(11) I worry that others don't like me					
(12) I am quiet when I'm with a group of people					
(13) I feel that others make fun of me					
(14) If I get into an argument, I worry that the other person will not like me					
(15) I'm afraid to invite others to do things with me because they might say so					
(16) I feel nervous when I'm around certain people					
(17) I am quiet even with peers I know very well					
(18) It's hard for me to ask others to do things with me					

8. Here are some statements about one's relationship with a close friend. If you have more than one friend, please choose one of them, and evaluate how the statements apply to your relationship with him/her. Please check the degree or disagree with each item. *Please tick one box for each line.*

	(1) Strong disagree	**(2)**	**(3)**	**(4)**	**(5) Strongly Agree**
(1) I share secrets and private feeling with the friend					
(2) I tell the friend everything					
(3) I talk with the friend to about things that I don't want others to know					

9. Here are some statements that describe some demands that characterize some adolescents' daily life.

With each item, if this situation never happened in your life **within the past year**, please tick the box indicating zero; if the situation has once happened **within the past year**, please indicate how stressful it is: 1=slightly stressful, 2=moderately stressful, 3=highly stressful.

	It never happened (0)	**It has happened and is slightly stressful (1)**	**It has happened and is moderately stressful (2)**	**It has happened and is highly stressful (3)**
(1) Parents urge me to study				
(2) Parents are too sensitive about my school mark				
(3) Parents expect me to do well in almost everything				
(4) Parents have no respect for my ideas and opinions				
(5) Parents intervene in my affairs				
	It never happened (0)	**It has happened and is slightly stressful (1)**	**It has happened and is moderately stressful (2)**	**It has happened and is highly stressful (3)**
(6) Parents do not allow me to spend time with friends				
(7) Parents don't trust me				
(8) I had arguments with parents				
(9) Being punished by parents physically				
(10) Parents fight with each other				
(11) Parent(s) speak ill of the other in front me				
(12) Parent(s) threatens that they would get divorced				

(13) Parents get divorced				
(14) I do not get along with my friends well				
(15) I am not welcomed by peers				
(16) I am not being part of the group I want to be in				
(17) I am being treated badly by peers in school				
(18) School teacher(s) show(s) favoritism toward a few students				
(19) I am criticized by a teacher				
(20) I don't like the teaching method of my teacher in class				
(21) There is a large amount of homework				

10. Here are some statements about one's way of coping with stress. Please think about your experiences **in the past year**, and evaluate how the statements relate to you by checking the degree to which you agree or disagree with each item. *Please tick one box for each line.*

1=never, 2=occasionally, 3=sometimes, 4=usually

	Never (1)	**Occasion -ally (2)**	**Some -times (3)**	**Usually (4)**
(1) I refuse to believe that it has happened				
(2) I pretend that it hasn't really happened				
(3) I act as though it hasn't even happened				
(4) I say to myself 'this isn't real				
(5) I give up the attempt to get what I want				
(6) I just give up trying to reach my goal				
(7) I admit to myself that I can't deal with it, and quit trying				
(8) I reduce the amount of effort I'm putting into solving the problem				
(9) I turn to work or other substitute activities to take my mind off things				
(10) I go to movies or watch TV, to think about it less				

(11) I daydream about things other than this				
(12) I sleep more than				

11.Where do you have access to the Internet? (Multiple Choice)

☐ (1) Home

☐ (2) Internet cafe

☐ (3) School

☐ (4) Public library

☐ (5)Others, Please specify _____

12. How wealthy do you think your family is?

☐ (1) Very wealthy

☐ (2) Quite wealthy

☐ (3) Average

☐ (4) Quite poor

☐ (5) Very Poor

13. Your gender is?

☐ (1) Male ☐ (2) Female

14. Your age is?

☐ (1) 12 or below ☐ （2）13 ☐ (3) 14 ☐ (4) 15

☐ (5) 16 ☐ (6) 17 ☐ (7) 18 or above

15・Your academic performance is?

☐ (1) Lower than average ☐ (2) Average ☐ (3) Higher than average

16. With whom are you living with? Please indicate all the people you are now living with.

☐ (1) Mother

☐ (2) Father

☐ (3) Step father or father's girlfriend

☐ (4) Step mother or mother's boyfriend

☐ (5) Grandmother

☐ (6) Grandfather

☐ (7) Siblings

End of the questionnaire.

Thanks for your participation!

上海市中學生網絡使用調查問卷

親愛的同學:

你好。我是香港中文大學社會工作學系的博士研究生。本研究旨在探索上海青少年學生的網絡使用行爲，希望通過研究結果就青少年如何健康使用網絡提出建議。

希望您能夠如實回答這份問卷。完成問卷約時 40 分鍾。請確定回答所有應該要回答的問題。這份問卷採用不記名方式，所得的資料會用於整體的資料分析，你的資料和其他幾百名中學生的資料一樣不會被公開，敬請放心。參與研究是自願的。如果你決定不參加這項調查，請退回這份問卷，你不會受到處罰或有任何權益損失。

關于研究如果你有何任何疑問，歡迎致電（852-61488124）或電郵至 mmgu@swk.cuhk.edu.hk 與我聯絡。

再次感謝你參加本次調查。

香港中文大學社會工作學系博士候選人　顧珉珉

1. 請你回憶，

最近一个暑假，你平均**每天**上網_____小時？

这个学期，週一到週五，你平均**每天**上網_____小時？

这个学期，週六和周日，你平均**每天**上網_____小時？

2． 下面是一些常見的網絡服務項目。請根據你**最近半年內**的使用頻率做出選擇。在每個項目後有 4 個數字選項，分別代表不同的使用頻率，請從中選出一個最符合你的真實情況的答案。

	零	少于一小时	一到两小时	大于两小时
1)電子郵箱				
2）論壇／BBS				
3）網上日記／BLOG				
4）即時聊天工具（MSN, QQ 等）				
5）校內網，開心網等互動網站				
6）瀏覽網頁				
7）搜索資訊				
8）在綫聽音樂，看電影				
9）下載音樂和電影				
10）網絡遊戲				

3．以下的一些描述，是否和你**最近一个月內**的情況相符合呢？請根據符合的程度勾選最適合形容你的答案。

	非常不同意(1)	**不同意（2）**	**同意(3)**	**非常同意(4)**
1）曾不只一次有人告訴我，我花了太多時間在網路上				
2）我只要有一段時間沒有上網，就會覺得心裏不舒服				
3）我發現自己的上網時間越來越長				
	非常不同意(1)	**不同意（2）**	**同意(3)**	**非常同意(4)**

4）網路斷綫或接不上時，我覺得自己坐立不安				
5）不管再累上網時總覺得很有精神				
6）其實我每次都只想上網待一下子，但常常一待就待很久不下來				
7）雖然上網對我的日常人際關係造成負面影響，我仍未減少上網				
8）我會不只一次因爲上網的關係而睡不到四小時				
9）上學期以來，平均而言我每週上網的時間比以前增加許多				
10）我只要有一段時間沒有上網就會情緒低落				
11）我不能控制自己上網的衝動				
12）我發現自己投注在網路上而減少與身邊朋友的互動				
13）我曾因爲上網而腰酸背痛，或有其他身體不適				
14）我每天早上醒來，第一件想到的事就是上網				
15）上網對我的學業或工作已造成一些負面的影響				
16）我只要有一段時間沒有上網，就會覺得自己好像錯過什麼				
17) 因爲上網，我和家人的互動減少了				
18) 因爲上網，我平常休閑活動的時間減少了				
19）我每天下網後，其實要去做別的事情，卻又忍不住再次上網看看				
20）沒有網路，我的生活就毫無樂趣可言				
21）上網對我的身體健康造成負面的影響				
22）我曾試過想花較少的時間在網路上，但卻無法做到				
	非常不同意(1)	**不同意（2）**	**同意(3)**	**非常同意(4)**
23）我習慣減少睡眠時間，以便能有更多時間上網				
24）比起以前，我必須花更多的時間上網才能感到滿足				

25）我曾因爲上網而沒有按時進食				
26）我會因爲熬夜上網而導致白天精神不濟				

4.有一些青少年會因為過度使用網路而影響正常的學習生活。最近一个月内，你是否發現自己出現過類似的情況？

☐（1）有　　（2）沒有

5. 當你發現自己過度使用網路的時候，你會向誰求助？

☐（1）老師　　（2）家長　　（3）同學/朋友　　（4）其他_____

6.以下的句子描述了網路可以帶來的需要的滿足。請閱讀這些句子，考慮自己**最近半年内**上網時是否有類似經驗，如果一直都有，請給 5 分，如果完全沒有，請給 1 分，如果程度介乎中間，請在 2，3，4 當中選擇一個你認為合適的分數。

	(1) 完全沒有	**(2)**	**(3)**	**(4)**	**(5) 一直都有**
1）只有在网上与人交往时，我才感到自信。					
2）只有在网上与人交往时，我才感到安全和舒适。					
3）只有在网上，我才与人分享秘密和私人感受。					
4）只有在网上，我可以与人谈论一些我不想其他人知道的事情。					
	(1) 完全沒有	**(2)**	**(3)**	**(4)**	**(5) 一直都有**
5）只有在网上，我才能忘记烦扰我的问题。					
6）当我感到压力时，上网会让我感觉好些。					

7.以下所問的是你在人際互動中 **(僅指在生活中與他人的互動，不包括在網上與他人的互動)**的感受。請根據你最近一年內的情況，選擇這些描述和你的情況的符合程度， 1 表示一點都不符合，5 分表示非常符合，如果程度介於中間，請在 2，3，4 分中選擇一個你認為合適的分數。

	(1) 完全不符合	**(2)**	**(3)**	**(4)**	**(5) 完全符合**
1）在不熟悉的人面前嘗試一些新的東西會讓我感到緊張					
2）我擔心會被別人嘲笑					
3）當我和不認識的人在一起的時候，我會害羞					
4）我只和熟悉的人聊天					
5）我覺得有朋友在我背後說的壞話					
6）我很擔心別人是怎麼想我的					
7）我害怕其他人都不會喜歡我					
8）當我和不怎麼熟悉的人聊天時，我感到緊張					
9）我很擔心別人會怎麼說我					
10）當我認識新朋友的時候，我感到緊張					
11）我擔心其他人不喜歡我					
12）當我和一群人在一起時，我會是比較安靜的那一個					
	(1) 完全不符合	**(2)**	**(3)**	**(4)**	**(5) 完全符合**
13）我覺得其他人會拿我開玩笑					
14）如果我和其他人有爭執，我擔心對方會不喜歡我					
15）我不敢請求別人為我做事，因為他們可能會說“不”					
16）當我和某些不認識的人在一起的時候，我感到緊張					

17）即使和熟悉的人在一起，我還是怕羞的那一個					
18）對我來說請人別人為我做什麼是件困難的事。					

8.以下問題詢問你和好朋友的關係。**如果你有一個以上的好朋友，請選擇一個好朋友**，就你和他/她的關係做答。

	(1) **完全不符合**	**(2)**	**(3)**	**(4)**	**(5)** **完全符合**
1）我會和這個朋友分享我的秘密和私人感受					
2）我會告訴這個朋友每件事情					
3）我會和這個朋友談論除他/她之外不想任何其他人知道的事情					

9. 以下詢問的是**最近一年內，你所遇到的讓你覺得有壓力的事情**。當你閱讀以下的每一條時，如果這件事情**沒有在你生活中發生過**，請選擇 **0**，**如果有，請根據它對你的影響程度程度給分，1=稍微有點嚴重，2=比較嚴重，3=很嚴重**

	過去一年內從未發生過 **(0)**	**過去一年內有發生，程度輕微** **(1)**	**過去一年內有發生，程度中等** **(2)**	**過去一年內有發生，程度嚴重** **(3)**
1）父母要求我讀書。				
2) 父母很緊張我的學習成績。				
3）父母希望我每件事情都做好。				
4）父母不尊重我的想法和意見。				
5）父母干涉我的事情。				
6）父母不允許我花時間和朋友在一起。				
7）父母不信任我。				

8）和父母有爭吵。				
9）我被父母體罰。				
10）父母之間經常爭吵。				
11）父/母在我面前說另一個方的壞話。				
12）父/母一方威脅要離婚。				
13）父母離婚。				
14）我和朋友們處得不好。				
15）我不受人欢迎。				
16）我不能進入我想要進入的朋友圈子。				
	過去一年內從未發生過 (0)	**過去一年內有發生，程度輕微 (1)**	**過去一年內有發生，程度中等 (2)**	**過去一年內有發生，程度嚴重 (3)**
17）我在學校被其他同學欺負。				
18）老師們偏愛某一些學生(不是我)。				
19）我被老師批評。				
20）我不喜歡老師上課的方式。				
21）作业量很大。				

10. 以下列出了一些人們常用的面對壓力的方法。請根據你最近一年的情況回答，你是否會用這些方法來處理壓力。**0 表示你從來不用這個方法減壓，1 表示偶爾會，2 表示比較多的時候會，3 表示用得很頻繁**

	從不 (1)	**偶爾 (2)**	**較多 (3)**	**很頻繁 (4)**
1）我拒絕相信已經發生的事情。				
2）我假装这件事情没有发生过。				
3) 我的行为看起来就好像这件事情没有发生过。				
4) 我告訴自己，這不是真的。				
5) 我通過酒精或者藥物幫自己度過難關。				
6) 我放棄嘗試解決這個問題的努力。				
7) 我承认我不能处理，然后放弃努力。				

8) 我减少尝试解决问题的努力。				
9) 我通過學習或者其他活動來不去想這件事				
10) 我去看電影，看電視，看書，睡覺，逛街，好不想這件事				
	從不 (1)	**偶爾 (2)**	**較多 (3)**	**很頻繁 (4)**
11) 我去想别的事情，好不想这件事。				
12) 我睡得比以前多，好不想这件事。				

11.你通常在哪裏上網？

☐ (1)家裏

☐ (2) 網吧

☐ (3)學校

☐ (4)公共圖書館

☐ (5)其他，請註明_____

12.你認為你的家庭有多富裕？

☐ (1)非常富裕

☐ (2)相當富裕

☐ (3)一般

☐ (4)不太富裕

☐ (5)一點也不富裕

13. 請問你的性別是？

☐ (1) 男 ☐ (2) 女

14. 請問你的年齡？

☐ (1) 12 歲及以下 ☐ (2) 13 歲 ☐ (3)14 歲

(4)15 歲

☐ (5)16 歲 ☐ (6)17 歲 ☐ (7)18 歲及以上

15・請問你的學習成績

☐（1）低於平均分　☐（2）平均分左右　☐（3）高於平均分

16. 請問你與誰同住？**請選擇所有現在和你同住的人。**

☐ (1) 媽媽

☐ (2) 爸爸

☐ (3)後母（或爸爸的女朋友）

☐ (4)後父（或媽媽的男朋友）

☐ (5) 外婆或奶奶

☐ (6) 外公或爺爺

☐ (7) 兄弟姐妹

問卷結束

謝謝你的參與！

Appendix II Questionnaire for Pilot Study

Adolescents' Internet Use Behavior in Shanghai

Dear Participants:

I am a Ph.D. candidate in the Department of Social Work at the Chinese University of Hong Kong. This research is set out to explore adolescents' Internet use behavior in Shanghai. We hope to offer some practical implications on healthy use of the Internet.

I sincerely hope that you can share with use of your views by finishing this questionnaire. It will last about forty minutes. Please make sure that ALL the questions are answered. The questionnaire is anonymous; please do not write your name or any identification on it. Your participation is voluntary. You are free to withdraw from the survey at any time. Your decision would be well respected and would not be related to any punishment or loss. If you are willing to participate in the survey you could sign this consent form.

If you have any questions, you can contact me through email at mmgu@swk.cuhk.edu.hk, or mobile phone: (852-61488124). Please allow me to thank you again for your kind participation!

Department of Social Work, the Chinese University of Hong Kong

Ph.D. Candidate GU Minmin**:**

1. Please think about how much time you spent online

During last summer holiday, about _____ hours every day

During weekdays in this academic term, about_____hours every day

During weekends in this academic term, about_____hours every day

2. Below is a list of online activities. Please indicate your frequency of use for each activity **within the past half a year**.

	Never (1)	Less than one hour every day (2)	One to two hours every day (3)	More than two hours every day (4)
Email				
Online Forum				
Online Blogging				
Instant Messaging				
Social Networking				
Web Surfing				
Information Search				
Online Movie or Video				
Downloading Movie or Video				
Online Gaming				

3. 4 Below are some statements describing experiences related to Internet use. Have you ever had similar experiences **within the past month**, and how frequent? Please indicate with each item the frequency of particular experience happened in your life. 1= never, 2 =rarely, 3 = sometimes, 4 = often

	Never (1)	**Rarely (2)**	**Some-times (3)**	**Often (4)**
1) My Internet use has negative influence on my time management (RP-TM)				
2) I feel uncomfortable if I have been away from the Internet for a period of time (Sym-W)				
	Never (1)	**Rarely (2)**	**Some-times (3)**	**Often (4)**
3) I have spent more and more time online (Sym-T)				

4) I feel irritable when the modem cannot connect the host or the connection is broken for unknown reasons (Sym-W)				
5) I always feel energized online, no matter how tried I feel before connecting to the Internet (Sym-W)				
6) I always spend much more time online than that I intend to (Sym-T)				
7) My Internet use has negative influence on my interpersonal relationship (RP-IH)				
8) I ever slept for less than four hours due to long time spent online (RP-TM)				
9) On average, I spent more and more time online since last term (Sym-T)				
10) I feel depressed if I cannot access from the Internet for a period of time (Sym-W)				
11) I cannot control my craving towards Internet use (Sym-C)				
12) I have focused my time and energy on the Internet and reduced interactions with friends consequently (RP-IH)				
13) I suffered from backache or other physical ills because of Internet use (RP-IH)				
14) Everyday when I wake up, the first thing I think of is going online (Sym-C)				
15) My Internet use has had negative effects on my academic performance (RP-IH)				
16) I feel restless when I have been away from the Internet for a period of time (Sym-W)				
17) The time I spent with family has been reduced because of my Internet use (R11P-IH)				
	Never (1)	**Rarely (2)**	**Some-times (3)**	**Often (4)**
18) The time I spent on leisure activities has been reduced because of my Internet use (RP-IH)				
19) Whenever I left the Internet, I plan to do other things but end up failing to resist the craving and going online again (Sym-C)				
20) My life has no fun without the Internet (Sym-C)				

21) My Internet use has had negative effects on my physical health (RP-IH)					
22) I have planned to reduce time spent online but my plan always fails (Sym-C)					
23) I sleep less because of my Internet use (RP-TM)					
24) I need more and more time online to feel satisfied (Sym-T)					
25) I ever did eat regularly because of my Internet use (RP-TM)					
26) I ever stayed overnight on the Internet (RP-TM)					

4. Here are some statements about one's needs satisfaction through involvement in online activities. Please think about your experiences **in the past year** and evaluate how the statements relate to you by checking the degree to which you agree or disagree with each item.

Please tick one box for each line.

1= strongly disagree, 2= disagree, 3 =neutral, 4 =agree, and 5 =strong agree.

	(1) Strong disagree	**(2) Disagree**	**(3) Neutral**	**(4) Agree**	**(5) Strongly Agree**
(1) It is only online that I feel confident in interacting with others					
(2) It is only online that I feel social interaction is secure and comfortable					
	(1) Strong disagree	**(2) Disagree**	**(3) Neutral**	**(4) Agree**	**(5) Strongly Agree**
(3) It is only online that I have someone to share with secrets and private feelings					
(4) It is only online that I have someone to talk about things that I don't wish anyone else know					
(5) It is only online that I can forget problems that bother me					
(6)When I feel stressed, it is only the Internet that makes me feel better					

5. Here are some statements about one's feelings during social interactions. Please think about your experiences **in the past year**, and evaluate how the statements relate to you by checking the degree to which you agree or disagree with each item. *Please tick one box for each line.*

1= strongly disagree, 2= disagree, 3 =neutral, 4 =agree, and 5 =strong agree.

	(1) Strong disagree	**(2) Disagree**	**(3) Neutral**	**(4) Agree**	**(5) Strongly Agree**
(1) I worry about doing something new in front of others					
(2) I worry about being teased					
(3) I feel shy around people I don't know					
I felt anxious when talking to people I do not know well					
(4) I feel that peers talk about me behind my back					
(5) I worry about what others think of me					
	(1) Strong	**(2) Disagree**	**(3) Neutral**	**(4) Agree**	**(5) Strongly Agree**
(6) I am afraid that others will not like me					
(7) I get nervous when I talk to peers I don't know very well					
(8) I worry about what others say about me					
(9) I get nervous when I meet new people					
(10) I worry that others don't like me					
(11) I feel nervous when I am with a group of people					
(12) I feel that others make fun of me					
(13) If I get into an argument, I worry that the other person will not like me					

(14) I'm afraid to invite others to do things with me because they might say so					
(15) I feel nervous when I'm around certain people					
(16) I am quiet even with peers I know very well					
(17) It's hard for me to ask others to do things with me					

6. Here are some statements about one's relationship with a close friend. If you have more than one friend, please choose one of them, and evaluate how the statements apply to your relationship with him/her. Please check the degree or disagree with each item. *Please tick one box for each line.*

	(1) Strong disagree	**(2) Disagree**	**(3) Neutral**	**(4) Agree**	**(5) Strongly agree**
(1) I share secrets and private feeling with the friend					
(2) I tell the friend everything					
(3) I talk with the friend to about things that I don't want others to know					

7. Here are some statements that describe some demands that characterize some adolescents' daily life. With each item, if this situation never happened in your life **within the past year**, please tick the box indicating zero; if the situation has happened for at least once **within the past year**, please indicate how stressful it is (1=slightly stressful, 2=moderately stressful, 3=highly stressful).

	It never happened （0）	**It happened at least once**		
		Slightly stressful (1)	**Moderately stressful (2)**	**Highly Stressful (3)**
(1) Parents are too sensitive about my school mark				
(2) Parents expect me to do well in almost everything				
(3) Parents have no respect for my ideas and opinions				
(4) Parents intervene in my affairs				
(5) Parents do not allow me to spend time with friends				
(6) Parents don't trust me				
(7) I had arguments with parents				
	It never happened （0）	**It happened at least once**		
		Slightly stressful (1)	**Moderately stressful (2)**	**Highly Stressful (3)**
(8) Being punished by parents physically				
(9) Parents fight with each other				
(10) Parent(s) speak ill of the other in front me				
(11) Parent(s) threatens that they would get divorced				
(12) Parents get divorced				
(13) I do not get along with my friends well				
(14) I am not welcomed by peers				
(15) I am not being part of the group I want to be in				
(16) I was hit, kicked, pushed, or bumped by other students				
(17) I was deliberately left out of things by peers				
(18) Peers spread rumor about me				
(19) I was teased by others in a way I do not like				

(20) School teacher(s) show(s) favoritism toward a few students				
(21) I was hit, kicked, pushed, or bumped by teacher(s)				
(22) I was criticized in a harsh way by teacher(s)				
(23) I don't like the teaching method of my teacher in class				
(24) There is a large amount of homework				
(25)Homework and examinations are difficult				

8. Here are some statements about one's way of coping with stress. Please think about your experiences **in the past year**, and evaluate how the statements relate to you by checking the degree to which you agree or disagree with each item. *Please tick one box for each line.*

1=never, 2=occasionally, 3=sometimes, 4=usually

	Never (1)	**Occasion - ally (2)**	**Some- times (3)**	**Usually (4)**
(1) I refuse to believe that it has happened (Denial)				
(2) I pretend that it hasn't really happened (Denial)				
(3) I act as though it hasn't even happened (Denial)				
(4) I say to myself 'this isn't real (Denial)				
(5) I give up the attempt to get what I want (behavioral disengagement)				
(6) I just give up trying to reach my goal (behavioral disengagement)				
(7) I admit to myself that I can't deal with it, and quit trying (behavioral disengagement)				
(8) I reduce the amount of effort I'm putting into solving the problem (behavioral disengagement)				
(9) I turn to work or other substitute activities to take my mind off things (cognitive disengagement)				
(10) I go to movies or watch TV, to think about it less (cognitive disengagement)				
(11) I daydream about things other than this (cognitive disengagement)				

(12) I sleep more than usual (cognitive disengagement)				

9. Where do you have access to the Internet? (Multiple Choice)

☐ (1) Home

☐ (2) Internet cafe

☐ (3) School

☐ (4) Public library

☐ (5)Others, Please specify _____

10. Your gender is?

☐ (1) Male ☐ (2) Female

11. Your age is?

☐ (1) 12 or below ☐ （2）13 ☐ (3)14 ☐ (4)15

☐ (5)16 ☐ (6)17 ☐ (7)18 or above

12. Your grade is?

☐ (1) Junior, Grade One

☐ (2) Junior, Grade Two

☐ (3) Junior, Grade Three

☐ (4)Junior, Grade Four

☐ (5) Senior, Grade One

☐ (6) Senior, Grade Two

☐ (7) Senior, Grade Three

13. Your academic performance is?

☐ (1) Lower than average ☐ (2) Average ☐ (3) Higher than average

14. Your family income is?

☐ (1) Less than RMB 1000

☐ (2) RMB 1000-3000

☐ (3) RMB 3000- 5000

☐ (4) RMB 5000- 7000

☐ (5) RMB 7000- 9000

☐ (6) RMB 9000 or above

15. With whom are you living with? Please indicate all the people you are now living with.

☐ (1) Mother

☐ (2) Father

☐ (3) Step father or father's girlfriend

☐ (4) Step mother or mother's boyfriend

☐ (5) Grandmother

☐ (6) Grandfather

☐ (7) Siblings

☐ (8) Other relatives (like uncles, aunts), please specify _____

☐ (9) I live alone.

16. Your father's occupation is?

☐ (1) Farming, Fishing, and Forestry Occupations

☐ (2) Engineering, manufacturing and production

☐ (3) Mining and land surveying

☐ (4) Construction and property

☐ (5) Information services and information technology

☐ (6) Retaining, buying and selling, management and logistics

☐ (7) Healthcare, sport and social welfare

☐ (8) Education, arts, media and broadcasting

☐ (9)Scientific services

☐ (10)Financial management, accountancy and insurance

☐ (11)Public sectors

☐ (12)Others, please specify _____

17. Your mother's occupation is?

☐ (1) Farming, Fishing, and Forestry Occupations

☐ (2) Engineering, manufacturing and production

☐ (3) Mining and land surveying

☐ (4) Construction and property

☐ (5) Information services and information technology

☐ (6) Retaining, buying and selling, management and logistics

☐ (7) Healthcare, sport and social welfare

☐ (8) Education, arts, media and broadcasting

☐ (9)Scientific services

☐ (10)Financial management, accountancy and insurance

☐ (11)Public sectors

☐ (12)Others, please specify _____

End of the questionnaire.

Thanks for your participation!

上海市中學生網絡使用調查問卷

親愛的同學:

你好。我是香港中文大學社會工作學系的博士研究生。本研究旨在探索上海青少年學生的網絡使用行爲，希望通過研究結果就青少年如何健康使用網絡提出建議。

希望您能夠如實回答這份問卷。完成問卷約時 40 分鍾。請確定回答所有應該要回答的問題。這份問卷採用不記名方式，所得的資料會用於整體的資料分析，你的資料和其他幾百名中學生的資料一樣不會被公開，敬請放心。參與研究是自願的。如果你願意參與，請簽署以下研究同意書。如果你決定不參加這項調查，請退回這份問卷，你不會受到處罰或有任何權益損失。

關于研究如果你有何任何疑問，歡迎致電（852-61488124）或電郵至 mmgu@swk.cuhk.edu.hk 與我聯絡。

再次感謝你參加本次調查。

香港中文大學社會工作學系博士候選人　顧珉珉

1. 请你回忆 ，

最近一个暑假，你平均**每天**上网_____个小时？请写一个数字，可以带小数点。

这个学期，周一到周五，你平均**每天**上网_____个小时？请写一个数字，可以带小数点。

这个学期，周六和周日，你平均**每天**上网_____个小时？请写一个数字，可以带小数点。

2. 下面是一些常见的网络活动，请估计你在**最近半年内，平均每天**花在以下各个活动上的时间。

	从不（1）	1 小时以内（2）	1 小时以上到 2 小时（3）	2 小时以上（4）
1）电子邮箱				
2）论坛／BBS				
3）网上日记／BLOG				
4）实时聊天工具(QQ,MSN)				
5）校内网，开心网等社交网站				
6）浏览网页				
7）搜索信息				
8）在线听音乐，看电影				
9）下载音乐和电影				
10）网络游戏				

3.请考虑**最近半年内**你上网时的经验，**你上网的时候会获得以下这些结果吗？1 表示从来没有，2 表示很少时间有，3 表示有时有，4 表示很多时间有，5 表示所有时间都有。**请在最符合你的情况的格子里打勾。

	(1) 从来没有	**(2) 很少时间有**	**(3) 有时有**	**(4) 很多时间有**	**(5) 所有时间都有**
1）只有在网上与人交往时，我才感到自信。					
2）只有在网上与人交往时，我才感到安全和舒适。					
	(1) 从来没有	**(2) 很少时间有**	**(3) 有时有**	**(4) 很多时间有**	**(5) 所有时间都有**
3）只有在网上，我才与人分享秘密和私人感					

受。					
4）只有在网上，我可以与人谈论一些我不想其他人知道的事情。					
5）只有在网上，我才能忘记烦扰我的问题。					
6）当我感到压力时，上网会让我感觉好些。					

4．以下的一些描述，是否和你**最近一个月内**的情况相符合？**1 表示完全不符合，2 表示大部分情况下都不符合，少数情况下符合，3 分表示符合，不符合的情形各占一半，4 分表示大部分情况下符合，少数情况下不符合，5 表示完全符合。**请在最符合你的情况的格子里打勾。

	(1) 完全不符合	**(2)** 大部分情况下不符合	**(3)** 有时符合，有时不符合	**(4)** 大部分情况下符合	**(5)** 完全符合
1）因为上网，我的时间管理变差了					
2）我只要有一段時間沒有上網，就會覺得心裏不舒服					
3）我發現自己的上網時間越來越長					
4）網路斷綫或接不上時，我覺得自己坐立不安					
5）不管再累上網時總覺得很有精神					
6）其實我每次都只想上網待一下子，但常常一待就待很久不下來					
7）因为上网，我与朋友的关系变差了					
	(1) 完全不符合	**(2)** 大部分情况下不符合	**(3)** 有时符合，有时不符合	**(4)** 大部分情况下符合	**(5)** 完全符合
8）我會不只一次因爲上網的關係而睡不到四小時					
9）上學期以來，平均而言我每週上網的時間比以前增加許多					

10）我只要有一段時間沒有上網就會情緒低落					
11）我不能控制自己上網的衝動					
12）我發現自己投注在網路上而減少與身邊朋友的互動					
13）我曾因爲上網而腰酸背痛，或有其他身體不適					
14）我每天早上醒來，第一件想到的事就是上網					
15）上網對我的學業或工作已造成一些負面的影響					
16）我只要有一段時間沒有上網，就會覺得心神不定					
17) 因爲上網，我和家人的互動減少了					
18) 因爲上網，我平常休閑活動的時間減少了					
19）我每天下網後，其實要去做別的事情，卻又忍不住再次上網看看					
20）沒有網路，我的生活就毫無樂趣可言					
21）上網對我的身體健康造成負面的影響					
	(1) **完全不符合**	**(2)** **大部分情况下不符合**	**(3)** **有时符合，有时不符合**	**(4)** **大部分情况下符合**	**(5)** **完全符合**
22）我曾試過想花較少的時間在網路上，但卻無法做到					
23）因为上网，我的睡眠时间减少了					
24）比起以前，我必須花更多的時間上網才能感到滿足					
25）我曾因爲上網而沒有按時進食					
26）我曾经熬夜上網					

5. 以下所问的是你在人际互动中 **(仅指在生活中与他人的互动，不包括在网上与他人的互动)** 的感受。1 表示完全不符合，2 表示大部分情况下都不符合，少数情况下符合，3 分表示有时符合，有时不符合，4 分表示大部分情况下符合，少数情况下不符合，5 表示完全符合。请根据你**最近一年内**的情况，在最符合你的情况的格子里打勾。

	(1) 完全不符合	**(2)** 大部分情况下不符合	**(3)** 有时符合，有时不符合	**(4)** 大部分情况下符合	**(5)** 完全符合
1）在不熟悉的人面前尝试一些新的东西会让我感到紧张					
2）我担心会被别人嘲笑					
3） 当我和不认识的人在一起的时候，我会害羞					
4）当我和不熟悉的人谈话时，我感到焦虑					
	(1) 完全不符合	**(2)** 大部分情况下不符合	**(3)** 有时符合，有时不符合	**(4)** 大部分情况下符合	**(5)** 完全符合
5）我觉得同学在背后议论我					
6）我很担心别人是怎么想我的					
7）我害怕其他人都不会喜欢我					
8）當我和不認識的人聊天時，我感到緊張					
9）我很担心别人会怎么说我					
10）当我认识新朋友的时候，我感到紧张					
11）我担心其他人不喜欢我					
12）当我和一群人在一起时我感到紧张					
13）我觉得其他人会拿我开玩笑					
14）如果我和他人有争执，我担心对方会					

因此不喜欢我					
15）我不敢请求别人和我一起做事，因为他们可能会说“不”					
16）当我和某些不认识的人在一起的时候，我感到紧张					
17）即使和熟悉的人在一起，我还是怕羞的那一个					
18）请别人和我一起做事对我来说是件难事					

6. 以下問題詢問你和好朋友的關係。**如果你有一個以上的好朋友，請選擇一個好朋友**，就你和他/她的關係做答。

	(1) 完全不符合	**(2)** 大部分情况下不符合	**(3)** 有时符合，有时不符合	**(4)** 大部分情况下符合	**(5)** 完全符合
1）我會和這個朋友分享我的秘密和私人感受					
2）我會告訴這個朋友每件事情					
3）我會和這個朋友談論除他/她之外不想任何其他人知道的事情					

7. 以下列出了一些青少年通常会在日常生活中碰到的可能会让他们觉得有压力的事件，这些事件并不一定只发生一次，有可能在日常生活中反复发生。比如，第一题，“我父母要求我读书”，如果**最近一年内，该事件未曾发生在你的生活里，请选择 0，如果这件事情有发生过，请根据该事件给你的压力程度给分，在 1（一点点压力），2（一定程度的压力），3（很大压力）中选择一个。**

	没有压力（0）	有压力		
		一点点压力 (1)	一定程度的压力 (2)	很 大压力 (3)
1) 父/母很紧张我的学习成绩				
2) 父/母希望我每件事情都做好				
3) 父/母不尊重我的想法和意见				
4) 父/母干涉我的事情 新增				
5) 父/母不信任我				
6) 我和/父母有争吵				
7) 我被父/母打、踢、推、撞等				
8) 父/母之间争吵				
	没有压力（0）	有压力		
		一点点压力 (1)	一定程度的压力 (2)	很 大压力 (3)
9) 父/母在我面前说另一方的坏话				
10) 父/母一方威胁要离婚				
11) 父/母离婚				
12)父/母或其他重要亲人过世				
13) 我和朋友们处得不好				
14) 我不受人欢迎				
15)我不能进入我想要进入的朋友圈子				
16) 我被其他学生打、踢、推、撞等				
17) 我被其他学生刻意排挤或者忽略				
18) 其他学生散布关于我的谣言				
19) 其他学生用恶意的字眼来称呼我				
20) 老师们偏爱某一些学生(不是我)				
21）我被老师打、踢、推、撞等				
22）我被老师 用恶意的字眼责骂				
23) 我不喜欢老师上课的方式				
24) 作业量很大				
25) 作业和考试对我来说是件困难的事				

8. 以下列出了一些人們常用的面對壓力的方法。請根據你最近一年的情況回答，你是否會用這些方法來處理壓力。**0 表示你從來不用這個方法減壓，1 表示偶爾會，2 表示比較多的時候會，3 表示用得很頻繁**

	從不	偶爾	較多	很頻繁

	(1)	**(2)**	**(3)**	**(4)**
1）我拒絕相信已經發生的事情。				
2）我假装这件事情没有发生过。				
	從不 (1)	**偶爾 (2)**	**較多 (3)**	**很頻繁 (4)**
3) 我的行为看起来就好像这件事情没有发生过。				
4) 我告訴自己，這不是真的。				
5) 我通過酒精或者藥物幫自己度過難關。				
6) 我放棄嘗試解決這個問題的努力。				
7) 我承认我不能处理，然后放弃努力。				
8) 我减少尝试解决问题的努力。				
9) 我通過學習或者其他活動來不去想這件事				
10) 我去看電影，看電視，看書，睡覺，逛街，好不想這件事				
11) 我去想别的事情，好不想这件事。				
12) 我睡得比以前多，好不想这件事。				

9.你通常在哪裏上網？

☐ (1)家裏

☐ (2) 網吧

☐ (3)學校

☐ (4)公共圖書館

☐ (5)其他，請註明_____

10. 請問你的性別是？

☐ (1) 男 ☐ (2) 女

11. 請問你的年齡？

☐ (1) 12 歲及以下 ☐ （ 2）13 歲 ☐ (3)14 歲

(4)15 歲

☐ (5)16 歲 ☐ (6)17 歲 ☐ (7)18 歲及以上

12.请问你的年级是

☐（1）预备班 ☐（2）初一 ☐（3）初二 ☐（4）初三

☐（5）高一 ☐（6）高二 ☐（7）高三

13・請問你的學習成績

☐（1）低於平均分 ☐（2）平均分左右 ☐（3）高於平均分

14. 請問你與誰同住？**請選擇所有現在和你同住的人。**

☐ (1) 媽媽

☐ (2) 爸爸

☐ (3)後母（或爸爸的女朋友）

☐ (4)後父（或媽媽的男朋友）

☐ (5) 外婆或奶奶

☐ (6) 外公或爺爺

☐ (7) 兄弟姐妹

15. 请问你的家庭月收入是？

☐ (1) 1000 元及以下

☐ (2) 1000 元以上至 3000 元

☐ (3) 3000 元以上至 5000 元

☐ (4) 5000 元以上至 7000 元

☐ (5) 7000 元以上至 9000 元

☐ (6) 9000 元以上

问卷结束　谢谢