The reliability and validity of three Internet addiction instruments in the Japanese population

（日本人集団における３つのインターネット依存症尺度の信頼性と妥当性）

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ABSTRACT

Introduction: The concept of Internet Addiction (IA) had been widely debated, and the reliabilities and validities of the IA instruments in Japan were not reported. The aim of this study was to examine the validity and reliability of the existing measurements and to empirically compare the psychometric properties of the three IA instruments developed from 1990's to 2010's by proposing the conceptual model of IA in Japanese population. The three scales were Japanese Internet Addiction Test (JIAT), Compulsive Internet Use Scale (CIUS), and General Problematic Internet Use Scale 2 (GPIUS2).

Procedure: CIUS and GPIUS2 were translated into Japanese utilizing forward-back translations procedures. Subsequently, both translated scales and JIAT were used for the survey. 623 respondents were successfully recruited.

Results: All three scales demonstrated excellent internal consistency of α= .924-.943, acceptable construct validity, good concurrent validity, and clear discriminant validity. Exploratory factor analysis (EFA) and confirmatory factor analysis (CFA) were tested with cross-validation split-half sampling method. Extracted factors were stable across gender. Both JIAT and CIUS yielded a clear three factor solutions, and GPIUS2 yielded two equivalent structures, indicating four and

five factors solution. Correlations among the factors demonstrated good convergent and divergent validity with similar constructs.

Conclusions: CIUS and GPIUS2 were successfully translated in to Japanese version, where the development process of the scales along with their reliability and validity were reported in detail~~s~~. JIAT is recommended for clinical diagnosis purpose that works well on young people. CIUS is recommended for both clinical diagnosis and population screening purpose. GPIUS2 is recommended to use along with JIAT and CIUS to clarify concepts.

1. INTRODUCTION

1.1 Internet Addiction (IA)

1.1.1 Definition

The conceptualisation and definition of Internet addiction (IA) are still widely debated, while the public may refer IA as overuse of the Internet, but the medical definition is based on the compulsive act of using Internet despite of one's best interest [1]. Although there is a lack of evidence-based standardisation and clear-cut clinical assessment criteria for Internet addiction [2], Griffiths [3] operationalised Internet addiction according to six criteria, salience, mood modification, tolerance, withdrawal, conflict and relapse. Such definition has been widely adopted. In other words, IA must meet several criteria. (i) It becomes the most important activity in the person's life and dominates their thinking, feelings and behaviour, for instance the person will keep thinking about the next online session when they are offline. (ii) It is used as a coping strategy when a person experiences an arousal of "high" feelings or paradoxically tranquillizing feeling of "escape" or "numbing". iii) It is associated with increased amount of Internet use that is required to achieve the former mood modification effect. (iv) It causes the person to experience unpleasant feeling states (e.g., irritation) or physical effects (e.g., shakes) when they discontinue or reduce their Internet usage. (v) It causes conflicts to interpersonal relationship, job, social life, hobbies and interests, among others. (vi) It creates a tendency for the person to revert to earlier patterns of Internet use after periods of abstinence or control.

1.1.2 Prevalence of IA

Prevalence estimates have been reported worldwide, with Asian countries showing a steep rise in IA with the prevalence estimated from 2% to 38% indicating severe addiction. In Japan, an estimated 2% of the population is at-risk for Internet addiction [4]. About 4.6% of Japanese employees were severely addiction and 30% were mildly addicted to the Internet [5]. Another study reported that 8.1% of undergraduate students in Taiwan were Internet addicts [6]. In Hong Kong, the results of a random telephone survey indicated that 37.9% of adolescents were addicted to Internet in 2004 [7], yet another random household survey reported that 6.7% of adolescents were addicted to Internet in 2010 [8]. In China, the results from the studies conducted in middle and high schools indicated that 2.4% - 11 % of the adolescents were Internet addicts [9-11]. The surveys conducted in middle and high schools in Korea indicated that 1.6% - 10.7% of adolescents were reported to have severe addiction while 29% - 38% have mild addiction [12-14]. Another Internet survey in Korea indicated that a 3.5% of Korean Internet population experienced severe addiction and 18.4% showed increased risk [15].

On the other hand, the prevalence rates of severe IA in North America and European countries were estimated from 1% - 18%. The US online survey reported that 5.7% of online users were addicts [16] while another survey reported that 8.1% of undergraduate students were addicted to Internet [17]. Overall, 18.3% of students in the UK and 1.2% of the online users reported to have an

addiction [18]. German studies showed consistent patterns, with 3% of the population reporting IA [19], and 4.4% of students reporting computer gaming addiction [20]. Studies conducted in Switzerland reported that 10.6% of its online population had IA in 2006 [21]. Similar figure of 11.2% online gamers was reported for addiction to massive multiplayer online role-playing games [22]. Norway studies reported 1% addiction and 5.2% at-risk Internet use in a stratified probability sample study [23]. Another community sample indicated that 2% of adolescents suffer IA and 8.6% are at risk of IA[24]. Studies conducted in The Netherlands estimated that about 0.9% of the Internet using population used Internet compulsively [25]. On the other hand, Italy reported that 5.4% of the students experienced addiction problems [26].

Other regions also reported IA issues at the end of the 21st century. Online survey administered to Internet users in South Africa showed that 1.9% of the common workers who were not in computer field had IA and 37.4% showed increased risk [27]. Studies in Iran reported that 1.9% of high school students have addiction and 15.5% had increased risk [28]. Furthermore, 11% of Greek adolescents were estimated to be Internet addicts [29]. The prevalence differences could be subjected to the inconsistency of instruments used that may have actually measured different constructs as well as inconsistencies in terms of research designs, target samples, cultural and locational differences. The stated reports generally yielded higher prevalence rates for adolescents as compared to the public. However, different between Internet era in its feasibility

and functionality should not be underestimated of its attribution to the differences of prevalence found. In other words, the rapid change in Internet use patterns may have influenced the results.

1.1.3 Classification Issues of IA

1.1.3.1 Concepts

IA is nevertheless a difficult concept to interpret. The debate continues on whether people are addicted to the application itself or to the rewarding factors behind these applications as well as about the appropriateness of concepts and constructs [30]. Concern has also been given to the term of "deficient self-regulation" (DSR) defined as a state in which conscious self-control is relatively diminished [31]. The concept reflects general problematic Internet use by suggesting that DSR is a main predictor of negative outcome of Internet use [32]. The concept of IA as DSR and should not be seen as an all-or-nothing phenomenon is supported and widely used in theorizing the concepts of IA [25,31-33].

1.1.3.2 Possible physiological mechanism

Little evidence is available to support the physiological impairment of IA. Only a single case study provided preliminary evidence that points to an opiatergic component of Internet sexual addiction possibly treated with opioid receptor blockers [34]. Evidence supports the association between Internet game overuse and abnormal neurobiological mechanisms in the orbitofrontal

cortex, striatum, and sensory regions, which are implicated in impulse control, reward processing, and somatic representation of previous experiences. This supports the idea that Internet game overuse shares psychological and neural mechanisms with other types of impulse control disorders and substance/non-substance-related addiction [35]. A recent case control study reported brain structural changes in IA adolescents provides a new insight into the pathogenesis of IA [36]. More neuroimaging findings on IA are in development, and a recent study illustrated that IA is associated with dysfunctions in the dopaminergic brain systems [37,38]. However, it is still immature to conclude whether these responses are specific to IA or purely Internet sexual addiction or excessive gaming.

1.1.3.3 Subtypes

Internet by itself does contain several elements, such as speed, space, distance, competition, interaction, and privacy that are thought to be addictive components. In addition, technologies (e.g., games, devises etc.) that accompanied the Internet usage were invented intentionally with addictive components in order to attract and retain users. Interestingly, Larose and her colleagues [31] showed that there are similarities between IA and television addiction by comparing the symptoms. Reported IA subtypes are excessive gaming, sexual preoccupations, email/text messages, cyber relationship, and online gambling [39-44]. Interestingly, among all these subtypes, only Internet gaming was included in the criteria for Internet use disorder in the recent

development of DSM-V [45]. Gender differences are also reported in IA subtypes. Men are more likely to engage in problematic Internet use involving information seeking, games, becoming famous, flirting, cybersex and cyber porn. Women are more likely to use Internet to keep in touch with family; seek support, friendship and romance; and complain about their partners [42,46,47]. Some studies have suggested that men have higher problematic Internet use [6,13,17,18,23,48,49] while other studies suggest no difference between men and women [15,16,26]. it was also reported that association was found between online frequency and IA with women, but not men[50]. The inconsistency maybe relates to the bias in study design, sample recruitment, as well as selection of the instruments that maybe more sensitive to one gender than the other. It is believed that all of the abovementioned subtypes share four major components of excessive use (loss sense of time, neglect of basic drive), withdrawal (feelings of anger, tension, and/or depression when the computer is inaccessible), tolerance (the need for better computer equipment, more software, or more hours of use) and negative repercussions (arguments, lying, poor achievement, social isolation, and fatigue) [39]. Although time had always been given focus in the studies and discussions, present studies had found almost no or little correlation between time and IA scores [17,25,51,52].

1.1.3.4 Psychopathological traits

Comorbid psychopathology, such as depression, anxiety, ADHD, obsessive-compulsive symptoms, hostility and aggression are often reported to have significant correlations [53]. However, it is also argued that the correlations of IA behaviour with anxiety, depression, antisocial personality disorder, impulse control, and alcoholism may be expressions of these disorders [54]. While the greater use of the Internet is found to be associated with a significant decline in social involvement and increased depression [55], existing epidemiology evidence is still too far from establishing the behaviour as a new diagnosis.

1.1.4 Implications of IA

It is easy to lose control over the Internet use, for example, individuals may feel the compelling need to devote significant amounts of time to checking email, participating in online chat rooms, surfing the web, or gaming; even though these activities deteriorate school and work performances and even contribute to divorce [42,46]. Furthermore, anonymity and few regulations over Internet control have made it a popular tool for conducting illegal businesses in sex/porno, gambling, drug abuse, upload and download of unlicensed copyrighted products. Online games can be another form of gambling, and free online pornography can be a cover or advertisement for true sexual services. Cyber bullying becomes common because confrontation is difficult. Suicide sites with bulletin board system (BBS) inviting people to commit suicide together,

sharing suicide and self-harm strategies were all together difficult to control. Fearing the above, the excessive Internet use among youths is of particular concern, as online gaming is potentially addictive and cyber bullying is destructive, which in turn has a negative effect on academics and delays ego identity achievement [56]. Overall, IA is found to be more prevalent among younger populations [18,42,57], and similarities were also drawn between IA and a serious form of social withdrawal (hikikomori) [58] while some others debated if both are really equivalent [59]. Anyhow, IA continues to catch serious media attention. It is seen as a cause of social withdrawal and a serious threat to public health. As a result, China and Korea have called for law enforcement and extensive preventive and intervention measures [39].

1.2 Situations in Japan

In Japan, the national survey in 2011 reported that 78.2% of the population are Internet users. The mode of access to Internet were through their computers, mobile phones, game devices, and even televisions, with 68.6% of the Internet users accessing the Internet using both local computers and mobile phones. Although more than 90% of the Internet users are 13 to 49 years old, a remarkable increase had been observed among 70-79 years old compared to the year before. Almost 75% of the teenagers and 90% of the young adults access Internet using mobile phones while the elderly are least likely to do so [60]. While the use of mobile phones by teenagers and the dependency on text-messages raise consistent concern [40,41], the use of Internet among elderly

population is thought to be beneficial in filling in the loneliness and engaging them with the society; therefore it should be promoted.

A national population survey suggested 2% of the Japanese population are potential problematic Internet users. Concerns were given to social network system addiction (SNS), where a series of studies were conducted to investigate the prevalence of social network system addiction in mobile phone Internet users and PC users specifically. Both user groups yielded a different prevalence of SNS addiction. For the mobile phone Internet SNS users, 3.8 - 11% were classified as addicts [61] while in the PC SNS users group, 0.6 - 5.2% were classified as addicts [62]. While noting that the addiction referred here was only towards SNS, the findings highlighted two important issues, the results was seriously influenced by criteria set for the study, and addiction in mobile phone Internet users and PC Internet users may be different.

Another study sampled the city office employees reviewed that Internet addiction and mobile phone text messages addiction are interrelated, where relationship maintenance is the common factor, where 6.1% of men and 1.8% of women in the studied population was classified as severe addicts to Internet, while no severe addiction on mobile phone text messages was reported [5].

1.3 Scales of IA

1.3.1 Available scales of IA

1.3.1.1 Scales that adopted concepts from DSM-IV criteria

It is interesting to note that the first scale to measure IA was developed in response to pathological gambling. Young [63] was the first to empirically examine the addictive Internet use, based on which she developed a simple diagnostic tool consisting of 8 diagnostic criteria. These criteria reflected the concept of pathological gambling but excluded the criteria of committing illegal acts and relying on others to provide money to relieve a desperate financial situation caused by gambling. To fulfil the diagnostic criteria for IA, individuals need to meet 5 out of 8 criteria. The simple diagnostic tool, named Young Diagnostic Questionnaire (YDQ) received much attention later. It has been widely tested because of its simplicity. However, some scholars have criticized YDQ for the diagnosis is thought to be taken too lightly, and its inability to measure severity. Hence, its modification stated that in order to meet IA diagnosis, it is necessary to meet all of the first 5 criteria and one of the remaining 3 criteria [64]. Griffiths [65] stressed that gambling addiction differs from IA; therefore IA should be considered as technological addiction. Despite the criticism, Young [66] expanded YDQ into a 20-item questionnaire called the Internet Addiction Test (IAT), which inspired the creation of many other new study questions on problematic Internet behaviour. Aside from pathological gambling, diagnosis of IA was also

proposed in reference to substance abuse [51,67]. Among these scales, the 8-item YDQ and 20-item IAT are the most popular instruments.

1.3.1.2 Scales based on others existing instruments and adjusted to specific research objectives

Similar instruments were developed to complement the earlier concepts developed by Young [66] and Griffiths [68] and adjusted to the specific objectives of individual research. They are the 13-item Pathological Internet Use Scale (PIUS) [17], 20-item Internet Related Problematic Questionnaire (IRPQ) [69], 20-item Problematic Internet Use Questionnaire (PIUQ) [70], 33-item Problematic Internet Usage Scale (PIUS) [71], 36-item Internet Addiction Scale (IAS) [72], 10-item Internet Addiction Questionnaire (IAQ) [73], and 26-item Chen Internet Addiction Scale (CIAS) [74]. Each has different strength; however, these scales have not gained much popularity, with the exception of CIAS, which has been extensively used in Chinese IA studies; the 13-item PIUS and IRPQ, which have been used along with YDQ and IAT in the United States; and PIUQ, which has been adopted in African studies.

1.3.1.3 Scales that developed based on theory and qualitative studies

Theory based models were also developed, such as the 36-item Online Cognitive Screening (OCS) [75], General Problematic Internet Use Scale 1 & 2 (GPIUS1 & GPIUS2) [32,76], and Compulsive Internet Use Scale (CIUS) [25]. OCS was developed to measure four constructs:

loneliness/depression, diminished impulse control, distraction, and social comfort. OCS is based on the theory that psychopathology mediates maladaptive cognitions and indirectly causes pathological Internet use that leads to the expression of behavioural symptoms of IA. On the other hand, social isolation and/or lack of social support may cause generalized pathological Internet use and indirectly cause problematic behaviours [33]. Davis' theory motivated the development of GPIUS1 & 2. Derived from Davis' theory, GPIUS1 comprises seven factors, mood alteration, social benefit, negative outcomes, compulsivity, excessive time, withdrawal, interpersonal control [77], measured by 29 items assessed on a 5-point Likert scale and with references to the other existing IA scales [17,66,67,69,76]. Later, the scale was refined into 15 items measured on an 8-point Likert scale loading on five factors, preference for online social interaction (POSI), mood regulation (MR), negative outcome (NO), compulsive use (CU), and cognitive preoccupation (CP) [32]. CIUS was developed according to five criteria (withdrawal symptoms, loss of control, preoccupation, conflict, coping/mood regulation) extracted from literature review and qualitative study. The measure has been consistently adopted in national studies in the Netherlands to measure the severity of compulsive use, which is thought to be the single construct of IA [25].

1.3.2 Challenge of the concept validity of the existing scales

In most cases, all IA scales contain the elements of DSR expressed in many diagnostic criteria for IA. On the other hand, since the IA scales were developed based on pathological gambling and substance abuse, it leads to a critical question of whether the content of the IA measurement is valid. The meaning of Internet use shifted dramatically over time, although the essence of gambling and substance abuse did not change. Most importantly, Internet addiction is not accompanied with the same negative connotations that pathological gambling and substance abuse have.

The exponential growth of Internet users from 2000-2012 was associated with the changes in the features of the Internet. As such, 566.4% growth in 12 years is tremendously overwhelming, with 2.4 billion of online users today approximated by Miniwatts Marketing Group [78]. The largest user block is from Asia (44%), followed by Europe (21.5%), North and Latin American (20.8%), Africa (7%), Middle East (3.7%), and lastly Oceania and Australia (1.0%). These rates parallel the International IA prevalence claim, and provide an insight to why more studies have been conducted and reported in Asia [53].

We need to acknowledge the fact that the meaning and pattern of Internet use in the late 1990's differed significantly compared to today. No tablet computers, no mobile Internet, and no fixed

amount package for unlimited online usage existed at the time the IA properties were proposed. Online games and Internet functions have certainly changed with the advances in graphic images, increased speed, and availability of online database. Internet businesses have bloomed and lifestyles have changed. The Internet is the main means of information distribution and trend in today's business, including medical services that can offer, for instance, online counselling and online cognitive behaviour therapy. In summary, Internet has become a compulsory tool for academic and occupational settings in order to increase organizational productivity and efficacy in the present day. Most packages offer 24 hours online access and free Wi-Fi are generally available in most developed and developing countries.

1.4 Study purpose

1.4.1 Rationale to develop new Japanese IA scales

By understanding that the scales were developed in different times, with different concepts and different purpose, it will be necessary to test the validity and reliability of the scales before use, to examine how much does it fit to the current situations of Internet usage and the target population. While YDQ and IAT are used for diagnosis and survey in Japan, and there is a need to look into the possibility of adopting more recent developed instruments. The attempt of YDQ and IAT in seeking to diagnose IA in internet usage regardless of official or private purpose can be misleading because addiction symptoms that occurred along with official Internet usage may be a

reflectance of other problems, e.g. workaholic syndrome. It is important to seek an alternative scale that is designed to diagnose IA in private Internet usage. It is also important to take a further look at the concepts that underlined IA before an appropriate instrument can be decided for screening and diagnosis. Adopting existing scales into Japanese versions has two major advantages: a great saving on time and cost, as well as the feasibility of International comparison studies. Testing the validity and reliability of these scales are necessary before we can move on further in IA studies.

1.4.2 Rationale to compare the following three scales: IAT, CIUS and GPIUS2

The aim of this research was to examine the reliability and validity of the existing IA instruments, and to validate the conceptual model of IA in the Japanese population. A list of available IA scales was introduced in the earlier section <1.3>, along with the challenges that they face along the drastic change of Internet function in the last twenty years. The existing IA scales can be largely divided into two major categories: diagnostic and non-diagnostic. Within the category of diagnosis, the scales can be again divided into two types of diagnostic: yes-or-no diagnosis or dose-response-severity diagnosis. The yes-or-no diagnosis conceptualizes IA as all-or-nothing disease, in which one is either classified as “normal” or “addicted” [17,63,66,74]. The dose-response-severity diagnosis conceptualizes IA as a phenomenon that has varying degrees of DSR to indicate different degrees of addiction [25,70,71]. The non-diagnostic scales are designed to measure

concepts of IA [32,75,77]. The non-diagnostic scales are often composed by a few subscales that comprise different concepts, where the total scores of each subscale is compared with one another to seek correlations between concepts. So far, there is no existing report that verifies the similarities and differences of IA scales in different categories. This study sought to report the validity and reliability of a selected scale from each of the category, and then empirically compare the scales to verify the similarities and differences of IA scales in different categories, in hope to identify an appropriate IA scale for diagnosis and population screening purpose in Japanese population. The three selected scales were: 20-items Internet Addiction Test (IAT), 14-items Compulsive Internet Use Scale (CIUS) and 15-items General Problematic Internet Use Scale 2 (GPIUS2). IAT represents an intermediate form of the yes-or-no and dose-response-severity diagnostic scale with determined cut-off points to indicate IA severity. CIUS represents the dose-response-severity diagnostic scale without a determined cut-off point to indicate IA severity. GPIUS2 represents the non-diagnostic scale that allows comparison of concepts. No reverse item is found in any of the three scales and higher scores indicate more addictive behaviours. Both the diagnostic scales, IAT and CIUS, were compared to the non-diagnosis scale GPIUS2; to identify the specific characteristics of high IA scores. The practical usage of IAT and CIUS in diagnosis was sought by comparing one scale to another with their reliability and validity. The IA conceptual model proposed by GPIUS2 was validated along with this study. More details of the three scales and study purposes were elaborated as below.

1.4.2.1 Internet Addiction Test (IAT)

IAT was developed in 1998 as an expansion of YDQ that adopts criteria similar to pathological gambling (see more details for YDQ in 1.3.1.1). It represents one of the oldest generation of IA scales and had been widely used for study in past twenty years. The instrument was developed with an intension for diagnosis, and to provide a gradient of severity by providing several cut-off points to identify common users, potential addicts and serious addiction. The diagnosis of IAT includes both official and private use of the Internet. The concepts of the IAT were based on the concepts of YDQ where it imitates the concepts of pathological gambling. The instrument contains 20 items measured on a 5-point Likert scale (rarely, sometimes, frequently, often, always). The items were developed from these following concepts: problems of preoccupation with the Internet, having the need to spend increasingly long periods online, have repeated attempts to reduce Internet use, suffering withdrawal symptoms when reducing Internet use, time management problems, environmental distress (family, school, work, friends), deception regarding time spent online, and using Internet for mood modification. IA was proposed to contain the above mentioned concepts in Japanese Internet Addiction Test (JIAT)

Although no reports of reliability and validity were reported with the development of IAT, the scale had been widely translated from English to Chinese, Japanese, Korean, French, Italian and Turkish. Reliability were reported to be consistently > .70 [4,10,12,15,18,26,28,50]. Psychometric

properties of the French IAT indicated a one factor structure [79] in a mixed sample of undergraduate medical students and community volunteers who were interested with IA. Three factors emerged in a study conducted with college students in Hong Kong for the Chinese version [44] with both exploratory factor analysis (EFA) and confirmatory factor analysis CFA. Using only EFA, six factors were reported for the English version on a mixed sample of online volunteers and personal snowballing [80] and the same version eventually yielded three factors [50] with another sample of volunteers from Internet survey. Goodness of fit for these versions was satisfactory with RMSEAs ranging from .056 to .07 and CFI ranging from .92 to .98.

There were two existing Japanese versions (JIAT), which one was translated in 1998 [81] and the other in 2008 [4]. Psychometric properties had not been reported except for a report validating the IA cut-off values by referencing to the YDQ (where JIAT was expanded on) with Odajima version [82]. JIAT focused on the frequency with which individuals engage in the events with a total score from 20-100, measured on a 5-point Likert-scale ("rarely", "sometimes", "frequently", "often", and "always"). While the original author suggested that the total scores over 40 signified a risk and total scores over 70 signified addiction, Osada [82] reported that a valid cut-off would be 59/60 to identify a risk, with high reliability of scale (Cronbach's α = .93).

Although the IAT scale had been adopted widely, cautions should be taken as the scale was originally developed by referring to pathological gambling. As the Internet era changes tremendously after IAT was developed, the face validity seemed to be out of date. It will be interesting to test how JIAT performed in Japanese population, and how effective the instrument in capturing people with strong compulsiveness and cognitive preoccupation of Internet use comparing to the other instruments. As stated earlier in the introduction, the content of the questionnaire includes usage of Internet applications that are common today but rare in the 90's may have overestimated problem. A good example of this would be the items that indicate Internet communications (checking email) and Internet friendship (making Internet friends). Emails had turned into an indispensable tool in daily communication for three large dimensions: academic use, office use, and personal use. The obsession of checking email as first priority may indicate a workaholic. Making Internet friends is popular and trendy today, as Internet friendship has been promoted by many upbeat Internet function. In that case, a supposingly modern day lifestyle can be wrongly classified as addictive behaviour. On the other hand, as unlimited data packages are widely available to access the Internet had caused certain items to be irrelevant especially for people who stay alone (e.g. complaint by others for spending too much time on Internet), which in turn may lead to an underestimation of the IA problem.

1.4.2.2 Compulsive Internet Use Scale (CIUS)

CIUS was developed in 2002 by examining the six criteria that Griffiths (1999) formulated and the DSM-IV criteria for Dependence and Pathological Gambling. Then they conducted an explorative qualitative study among 17 self-declared 'Internet addicts' through a national newspaper advertisement. Firstly, the interviews reviewed that "loss of control" in terms of inability to limit the time spent online was the most characteristic feature of IA. Secondly, they found "preoccupation" which means people tend to look forward to the next online session, and preferred Internet use to other previously favourite social or leisure activities to be prominent in IA. Therefore the instrument was developed on these two main features, which markedly represent DSR (the original author referred it as "compulsiveness"), with additional questions to assess withdrawal symptoms and remorseful feelings. IA was proposed to fulfill the concept of DSR in CIUS.

CIUS was selected because the instrument conceptualised IA on a single construct, which is compulsiveness. In addition, the time when CIUS was designed (2002) is closer to the present use of Internet compared to when IAT was developed. At a glance, the content of CIUS seemed to address the pattern of compulsive Internet use in modern days.

The purpose of CIUS is to measure severity of compulsive Internet use especially among heavy users (>16 hours spent on private Internet use a week). The scale contains 14 items assessing the

frequency of an event, “how often…” with scores ranging from 0 -56 measured on a 5-point Likert scale (“never”, “seldom”, “sometimes”, “often”, and “very often”). Although suggested cut-off for the Netherlands population was 28, the cut-off should be validated in different population [25]. CIUS is only intended for private use of the Internet, and it had been consistently adopted in a series of national population study in the Netherlands followed by its invention [25].

CIUS was tested in a very large sample over 18 years old that used Internet for more than 16 hours a week for private purposes, which had Internet access at home more than one year [25]. The instrument had shown a good reliability with $\alpha = .89$, and good validity of its short and crisp presentation of a one factorial structure with RMSEA from .053 - .084 and CFI from .966 - .984. Then it was also tested in a huge online convenience sample and yielded a result of RMSEA = .054 and CFI = .0986 [25]. The instrument had been translated into German, French, Icelandic and Arabic. Validation of French version on college students supported the one factorial structure with a high internal consistency of Cronbach’s $\alpha = .91$, RMSEA = .08 and CFI = .92 [83].

CIUS was selected because the instrument conceptualized IA on a single dimension, “how much”, which is compulsiveness. In addition, the time when CIUS was designed (2002) is closer to the present use of Internet compared to the development of IAT, with the exceptions of no tablet computers, mobile Internet was not widely accessed, and limited accessibility to the fixed amount

unlimited data package, as compared to present time. At a glance, the content of CIUS seemed to have an updated face validity that addresses the pattern of compulsive Internet use in modern days. No Japanese version for CIUS is available yet; original developer's permission and cooperation are needed for the translation.

1.4.2.3 General Problematic Internet Use Scale 2 (GPIUS2)

GPIUS2 was derived from GPIUS1 [77] and GPIUS1 was derived from the theory proposed by Davis [33] (see more details in section <1.3.1.3>). GPIUS2 was developed to test a conceptual idea if a high scorer falls into a certain category. The scale was not designed to diagnose or to measure severity but to compare the component with one another as Caplan [32] believes that IA is multi-dimensional, and DSR was introduced into the concept of IA as one of the four dimensions which it measures.

The 15-items scale was composed by 5 sub-scales that measures "preference of online social interactions (GPIUS2-POSI)", "mood regulation (GPIUS2-MR)", "cognitive preoccupation (GPIUS2-CP)", "compulsive use (GPIUS2-CU)" and "negative outcome (GPIUS2-NO)". Each subscale represents one concept, and GPIUS2-CP and GPIUS2-CU were combined together to represent "deficient self-regulation (GPIUS2-DSR)". The concepts were that both POSI and MR

are predictors to DSR, while MR is a consequence of POSI, and DSR is the main cause for NO. The items seemed to have good face validity that matches present day's Internet use.

Each sub-scale was constructed by 3 items, which is structured with 8 Likert-scale ("definitely disagree", "mostly disagree", "somewhat disagree", "slightly disagree", "slightly agree", "somewhat disagree", "mostly agree", "definitely agree") focused on own responsibilities "I prefer/I have/I find…" and scores for each subscale from 3 - 24, and from 15 - 120 for the whole scale. The subscales appeared to have good face validity, and with a consistent reliability from α = .82 - .87. While combined as a whole scale, an adequate fit of RMSEA = .073 and CFI = .95 was observed with the validity test on a mixed sample of college students and other adult residents in the matched areas through CFA and the proposed conceptual idea was validated by structured equational modelling (SEM). Correlations between subscales were not reported.

The scale was adapted into a Spanish in a Mexican study, where choices were refined to 6-Likert (strongly disagree to strongly agree), and the original proposed model yielded a good fit on college students (RMSEA = .57, CFI = .945, and α = .90) [84]. No Japanese version for GPIUS2 is available yet; original developer's permission and cooperation are needed for the translation. It was advised that the scales could be used as a continuum, to assess where people have greater or lesser degrees of problems (personal communication with Dr. Caplan).

1.4.3 Validating the conceptual model of IA proposed by GPIUS2 by comparing the 3 IA scales

Although all the three scales were designed of different concepts and purpose, all the three scales have similar constructs: preoccupation, loss of control/compulsive use/tolerance, withdrawal, conflicts, coping and mood modification. There were two other elements that were proposed in JIAT: relapse and lying, which were not conceptualized in the other two scales. This may mark a stronger element of "negative consequences" than the other two scales [63]. CIUS has a strong focus on "compulsiveness" [25]. GPIUS2 has five equal dimensions on "preference for online social interaction (POSI)", "mood regulation (MR)", "compulsiveness (CU)", "preoccupation (CP)", "negative outcomes (NO)" [32]. Factorial structures for each scale obtained from the validity study were used to test the conceptual IA model proposed by GPIUS2 by supplementing the similar structures into the formula (fig 1). I also proposed that disturbed mental health should be taken into consideration in studying IA, where anxiety/depression and dissatisfaction would be incorporated into the formula to test the conceptual idea in the Japanese population.

1.4.4 Hypotheses and objectives

The main study purpose is to examine the reliability and validity of three selected IA instruments and empirically compare the psychometric properties to measure IA in Japanese population. Firstly, I hypothesized that a consistent IA pattern would be demonstrated with the construct validity of the three IA scales. Secondly, the three scales were predicted to have good concurrent

validity. Thirdly, CIUS and GPIUS2 that represents newer generation of IA scales would have stronger reliability and validity than IAT which its face validity seems out-of-date. Fourthly, I proposed that by supplementing the similar structures found in IAT and CIUS into the conceptual model proposed by GPIUS2 would have acceptable validity, for giving a clear picture to what extent that the conceptual model fits the Japanese population. Fifthly, I proposed that disturbed mental health should be considered in studying the concepts of IA because it would enhance validity.

2. METHODS

2.1 Translation

2.1.1 Permissions for translation and using the instruments

Permissions were sought from the original developers to respect copy rights and to develop explanation of concepts in the instrument together in producing information for the translation process so to avoid misinterpretation of items of concepts.

2.1.1.1 Communication with CIUS original author

Permission to translate CIUS into Japanese and use CIUS for the study was obtained from the original author, Dr. Gert-Jan Meerkerk in December 2011. Dr. Meerkerk also agreed to assist in the forward and backward translation process to ensure clarity of the concepts being spelled.

2.1.1.2 Communication with GPIUS2 original author

Permission to translate GPIUS2 into Japanese and use GPIUS2 for the study was obtained from the original author, Dr. Scott Caplan in December 2011. Dr. Caplan also agreed to assist in the forward and backward translation process to ensure clarity of the concepts being spelled.

2.1.1.3 Communication with IAT and JIAT original author

The face validity of the two Japanese versions of IAT (JIAT), which one was translated in 1998 by Odajima [81], and the other was translated around 2008 - 2009 by Kurihama Alcohol Addiction Centre [4], were carefully considered before the pilot study. Odajima was initially chosen for the pilot study in viewed for the availability of a validity report for IA cut-off point using the same version. Communication with the IAT original developer, Dr. Kimberly Young, was sought in June 2012 to seek clarification for questions raised in the debriefing sessions from the pilot study but the effort was in vain. Then Kurihama version was considered carefully by comparing the face validity with the Odajima version together with an expert panel composed of nurses and doctors. Before the main study began in July 2012, permission to use JIAT was obtained from Kurihama Alcohol Addiction Centre.

2.1.2 Ethical approval

Ethical approval was sought from the Research Ethics Committee of Graduate School of Medicine of The University of Tokyo. All participants gave informed consent before taking part in the study.

2.1.3 Translating procedures

CIUS and GPIUS2 were translated using the forward and backward translation procedure (fig. 2). A professional Japanese translator translated both the original scales from English to Japanese, and another two bilingual native Japanese speakers translated the scales from English to Japanese, one scale each. None of these translators were familiar with these kinds of scales. The principal investigator worked together with translators by providing a clear explanation of the basic concepts to ensure that the translations capture the conceptual meaning of the questions that would be easily understood by the general population. The two sets of completed translations were than reconciled through discussions with the original developer. Then, a bilingual medical doctor who was also a native Japanese speaker was engaged to reword the difficult questions in the reconciliation process. Subsequently, another bilingual native Japanese speaker reworded the difficult questions in the reconciliation process. After the completion of reconciled version, a bilingual native English speaker who lived in Japan and worked in IT field back translated the first version. The person had never seen the original version. The principal investigator checked

the first back translated version for its accuracy before conducting the pilot study. The final version revised from the pilot study was back-translated by engaging another bilingual American born Japanese with a sociology background that had worked and stayed in Japan for years. The second version of back translation was sent to the original scale developers for accuracy validation before commencing the main study.

2.2 Pilot study

The objectives of conducting a series of pilot studies were 1) to assess the level of comprehensibility and cognitive equivalence of the translation, 2) to test any translation alternatives that translators have not resolved, 3) to highlight any items that may be inappropriate at a conceptual level with an aim to identify any other issues that cause confusion. 4) to check the face validity of the instruments of their sensibility to the patients.

2.2.1 Participants

Newly translated measures were tested with different groups: teenagers, young adults, and adults. To increase overall acceptability, samples were recruited from campus, free-space (designed for hikikomori and futoko), and personal networks. A total number of 42 samples were tested (ranging in age from 17 to 60 years, comprising students, jobless, and fulltime workers). Eight samples were utilized for test-retest to clarify concept and examine consistency. Pilot study was

conducted in a series with small groups containing 1 - 12 people in different sessions. Sizes of the groups were depending on the preference and time of the participants to tailor to the special needs and sensitivity of their status. A total of 28 small groups were conducted for the test and debriefing sessions.

2.2.2 Procedures

The acceptability of each scale was studied item by item in the debriefing session by considering difficulties in reading and comprehension of meaning, alternative wording, and the items that may incurred negative emotions. Participants were also asked whether any word alterations and alterations in sequences of questions would affect their answers. After refining the questions, the participants were invited to complete the test and retest with an interval of 2 to 4 weeks. The sequence of the questions was altered on the retest and consistency of answers was examined.

The time needed to complete the questionnaire was noted in each session. During the debriefing session, the participants were asked about the acceptability and cultural relevance of the survey. A few questions were addressed during this process: “Do you have any difficulties in answering the questions?” “Do you have difficulties in understanding the questions?” “Do you feel being provoked by the questions?” “Do you think there are questions that were unnecessary or redundant in this questionnaire?” “Do you think there are some important items or issues that we

should explore with this questionnaire?" and "Are you fine with the current layout and the questions sequence?" The participants were also encouraged to list the other comments if not covered by the questions.

To strive for a balance for word-for-word and idiomatic translation, presentation of the items was refined after each debriefing session. Translation difficulties, cultural diversity, conceptual equivalence and vocabulary differences were highlighted in the translation process, and discussed with the original developer while refining the items presentation. Face validity after each translation was sought with a panel consist of medical doctors, nurses and licensed mental health social workers before administering for another pilot study. After a series of pilot study and debriefing sessions, the final versions of the translations were decided.

2.2.3 Results

2.2.3.1 CIUS

It was difficult to distinct the translation for item 1 (difficult to stop using internet while online) and item 2 (continue to use Internet despite your intention to stop) into Japanese; thus, these items underwent several revisions through the series of pilot studies. Item 9 (use internet to escape from your sorrows or feel relief from negative feelings) seemed to be a difficult concept to grasp by the participants. Item 12 (daily obligations: work, school, or family life) raised a little

confusion with some participants, as the three obligations did not seem to fit into one category in Japanese context. While work and school are considered as a piece of work assigned as part of one's duties in Japanese culture, family life is not. Aside from these issues, the scale was generally well accepted. The original developer recorded and validated the original version, translated version, and back translated version of CIUS (attachment 1).

2.2.3.2 GPIUS2

Two major points that were consistently brought up in the debriefing of the pilot studies were: 1. the questions seemed to be too alike and redundant; 2. 8-point Likert-scale was too much and not appropriate in Japanese culture. Clarifications were also constantly required for items 7 (used the internet to make myself feel better when I was down) and 12 (use the internet to make myself feel better when I've felt upset), suggesting that using Internet for mood regulation may be a rare concept in the Japanese population. The original developer recorded and validated the original, translated, and back translated versions of CIUS (attachment 2). Although the use of an 8-point Likert-scale may introduce an element of randomness, with too many alternatives making it difficult to clearly discriminate between the choices, I decided to remain the choices after discussing the issue with the original developer.

2.2.3.3 JIAT - Kurihama version chosen over Odajima version

The series of pilot tests were performed with the original translated version[4]; however, in the main study, Kurihama version[77] was employed instead. The major reason is that consistent critiques on cultural adaption of the original translated version of JIAT emerged throughout the series of pilot studies compared to the translation of CIUS and GPIUS2, which I intended to review for cultural validation and adaption in the pilot studies. Debriefing from the pilot study indicated that the wording of the items was confusing to participants. The main confusion comes from the word online/offline, as in Japan, phones are connected to the Internet automatically and most packages allow 24 hours online service with a fixed monthly charge, thus the term online/offline does not represent if the person is active on the Internet. A modified version used terms "using Internet/not using Internet" instead of "online/offline" in subsequent pilot studies (attachment 3).

The second confusion concerned the applicability of content with several items. Item 3 "prefer excitement of the Internet over partner" did not apply to people who do not have a partner. Items 6 and 8 referred to the connection between Internet use and its influence on work/study performance, which does not apply to people who are not studying and not working. Word to word translations of most items were also difficult to understand and irrelevant items caused confusion to the participants. The wording of the Odajiama version of the JIAT that uses 5-point

Likert-type response scale (“never”, “rarely”, “sometimes”, “frequently”, and “always”) caused major confusion, as it was found to be too diverted from the original version (original version: “rarely”, “occasionally”, “frequently”, “often”, and “always”). A few invited participants were included in the test-retest using a modified version, which the translation panel felt to be fitting the original version. The responses to the items differed by one point when using a different wording. This suggested that the choice of the wordings of the 5-point Likert response scale was important especially if a certain cut-off is suggested.

As the attempt to sought reconciliation for the original translated version with the original author was unsuccessful, it was decided to proceed with the Kurihama version. The original author licensed Kurihama version, and the items were measured on a 5-point Likert-type scale, with responses including “never”, “unlikely”, “sometimes”, “often”, and “always”. While “never” is not quite the same as “rarely”, “occasionally” is very different from “unlikely”, and “sometimes” differs from “frequently”, extra caution should be taken when interpreting the results considering the suggested cut-off point. As a total score of > 39 indicates potential risk and > 69 indicates addicts, the indicator of “at-risk” (> 39) in this current translated version could also mean a person who choose “very unlikely” for all the 20 items, this could overestimate the at-risk group. A total score of 40 obtained using the original scale indicates “occasionally” for all 20 items while it indicates unlikely when using the modified scale. With these consequences, the

ambiguity of the scores employs to the cut-off point for addicted group. These different versions are compared in attachment 3.

2.2.4 Final questionnaire for survey

The translated scales were refined after each debriefing session to accommodate cultural adaption to all categories (undergraduate students, postgraduate students, working adults, free-space users including futoko and hikikomori) that were tested in the pilot study. The other measurements applied in the main study were also refined for their contents after each debriefing session. The final questionnaire containing the revised translated CIUS and GPIUS2, Kurihama version of JIAT, and another 16 questions was finalized after 28th revision (attachment 4). The other measurements used in this study would be further elaborated in section <2.4.2>.

2.2.4.1 Considering participants' fatigue for the item sequence

Sequence for each measurement was considered carefully to avoid participants' fatigue and each time after the sequence was altered, it was tried out in the pilot study. The decision was made that the demographic questions that require fewer thoughts would be put at the back of the questionnaire to prevent participants' fatigue. The final sequence was decided with the judgment in reference to the consistency of answers, time spent on the full survey, and the feedback from qualitative interviews in debriefing sessions.

2.2.4.1 Considering the influence of the 3 IA scales on answer choice

The influence of the 3 IA scales on answer choice and participant fatigue were also considered as the three IA scales were similar in content. The sequence of the 3 IA scales was altered in three fashions: (i) JIAT, CIUS and GPIUS2; (ii) CIUS, GPIUS2 and JIAT; (iii) GPIUS2, CIUS and JIAT. It was discovered that the third fashion yielded a more stable result in the pilot study. After an examination of the purpose for each scale, and discussion with the panel of expertise, it was decided that the final scale would have the following sequences in order to measure IA:

1. A self-evaluation question on IA
2. GPIUS2 - without specification of private or official Internet use
3. Time spent on private Internet use was assessed
4. CIUS - specified on private Internet use
5. Difficulty of differentiating private and official use was assessed
6. JIAT - specified on both private and official Internet use
7. The feedback from the participants was that they felt comfortable with this sequence.

2.3 Main Study

2.3.1 Sample Recruitment

Samples were recruited from the Internet Survey Company X with a database of 1,086,904 registered users as of May 2012. To ensure a sample size of 10 cases for each item to be factor analysed, the company was asked to recruit 600 participants older than 16 years of age, pre-stratified by age and gender to reflect the weighted national Internet users in 2011 (Ministry of Internal Affairs and Communication, 2011) representing the national population. This study aimed to recruit a sample with an equal representation of men and women with age in range 16 - 19, 20 - 29, 30 - 39, 40 - 49, 50 - 59, and > 60. An invitation email, sent to a randomly selected sample by estimating approximately 8-10% response rate from each group, contained a link to the survey. The respondents opened the survey by clicking the link attached to the email. Participants were asked to read a cover letter and check a consent box before starting the survey to indicate their participation in the study. An effective sample was computed based on the completion of survey, and the entry to the online survey was on a first come first serve basis. The link to the survey was disabled once the quota for effective sample size by required gender and age was reached. Total time to complete the survey was considered during data cleaning process. The participants with complete responses were subject to data analysis by PASW 18 and AMOS 17. Considering the possibility of including working people and students in the survey, the invitation email was distributed on a Saturday morning at 9am and sampling quota was estimated to be

reached on Monday, 3 days into the survey. Successful respondents were rewarded points as token of appreciation by the Internet Survey Company X.

2.3.2 Measures

Selection of the other questions and refining of interested variables were based on the concepts that emerged from the twelve debriefing sessions. Interested variables were demographics, Internet related behaviour, and motivations for Internet use adopted from Internet us pattern among youths survey [84], K6 (6 items measured on 5-point Likert scale to measure anxiety/depression), UCLA Loneliness (20 items measured on 4-point Likert scale to measure loneliness), satisfaction with current situation and relationship, existing stress, and several questions that measured desires for autonomy, absence of social skills, decision avoidance, conflict avoidance, passions for job. As repetitive questions seemed to be burdensome and cause a number of missing values in the pilot tests, serious consideration was given to the burden of participation. The average time to complete a questionnaire was about 15 minutes. The complete questionnaires were then used in study 2 to measure the validity and the reliability of the three selected IA instruments - CIUS, GPIUS2, and JIAT. More specifically, I hoped to test the appropriateness of these existing tools for detecting IA behaviour in the Japanese population.

2.3.2.1 Self-diagnostic question

A simple three choice self-diagnosis (yes, maybe, no) question, “Do you think you are addicted to the Internet?” was also included in this section. It was predicted that more people would say yes to the self-diagnosis question, and people who self-diagnose as IA would have higher IA scores compared to those who self-diagnose as non-IA. The IA scores were expected to be generally low to moderate in severity.

2.3.2.2 Internet related behaviour and motivation

Total time per week spent on private Internet and the number of devices used for Internet access were assessed. It was predicted that time spent online and the number of devices used for Internet access would have positive low to moderate association with IA scores. Participants were asked to indicate the frequency with which they used the Internet for nine specific purposes: working and academic purpose, stress relief, kill time, communicating with friends and family, keeping in touch with Internet friends, seeking information, finding others to share interests/expanding friendship circle, finding others to share personal problems, and keeping in touch with community with local social network service (SNS). We assessed the frequency of the use of eleven specific Internet applications, online romance, pornography, one-way interactive social media (2-Channel/BBS), two-way interactive social media (e.g., blogging/homepage/Mixi/Facebook/Twitter), information release/upload, digital contents for

sound/music/videos/software, digital download (e.g., peer to peer (P2P), file transfer protocol (FTP)), online game, online survey/quiz, online banking, and Internet auction and shopping. For each motivation and application the frequency was rated on scale from 1 to 5 (1=never, 2=rarely, 3=sometimes, 4=often, 5=always). It was predicted that using Internet for official use would have lower association with IA scores compared to other motivations. Furthermore, greater frequency of accessing pornographic sites, online gaming, and interactive applications was expected to be associated with higher scores on IA.

2.3.2.3 Mental health

2.3.2.3.1 Anxiety

Anxiety and depression were assessed using the Japanese version of K6 scale. The scale contained six simple questions that probed the frequency of depressive and anxiety symptoms in the past 30 days. Total scores ranged from 0 to 24. The frequency of each symptom was measured on a scale from 0 to 4 (0 = never, 1 = rarely, 2 = sometimes, 3 = often, 4 = always). The scales demonstrated a good reliability, with Cronbach's α of .85 and a score of 5 points and above indicating the presence of depressive and anxiety symptoms [85]. It was predicted that anxiety/depression would have a positive low to moderate association with IA scores.

2.3.2.3.2 Loneliness

Loneliness was assessed using the Japanese version of UCLA Loneliness Scale [86]. The scale included 20-items measured on a 4-point Likert scale (1 = never agree, 2 = somehow disagree, 3 = somehow agree, 4 = always agree) with a total score ranging from 20 to 80 (Cronbach's α = .87 - .91). It was predicted that loneliness would have a positive low to moderate association with IA scores.

2.3.2.3.3 Satisfaction of current situations

A simple question measured on a 4-point Likert scale was adopted from previous study [87] to assess the satisfaction of the person with his/her current situation. It was structured as, "Satisfied with current situation (work/school/current environment)", and the choices were "no", "no, if I have to choose to say", "yes, if I have to choose to say", "yes". It was predicted that dissatisfaction might have a positive low to moderate association with IA.

2.3.2.3.4 Feeling of stress

A simple question adopted from previous study was used to assess the feeling of stress in the person's current situation measured on a 4-point Likert scale [87]. It was structured as, "Feeling stress in current situation (work/school/current environment)", and the choices were "no", "no, if

I have to choose to say", "yes, if I have to choose to say", "yes". Feeling of stress was predicted to have a positive low to moderate association with IA.

2.3.2.4 Romance and its satisfaction

Based on the feedback from the pilot study, I figured that satisfaction with romantic relationship could probably explain more variance in IA compared to the conventional marital status. Therefore, the questions of marital status and satisfaction with current romance relationship were summarized into one question to which participants with different relationship status, i.e., "married/cohabitating/having a relationship", "divorced/widowed/separated or departed from a relationship", "single that never had a relationship", responded as either satisfied, dissatisfied, or "chooses not to declare". It was predicted that dissatisfaction with romance situation would have higher effect on IA.

2.3.2.5 Personalities

Personal characteristics: poor people skill, decision avoidance, conflict avoidance, and wanting to be free were examined using questions adopted from existing national study on youth mental health survey [87]. Each variable contained four questions measured on a 4-point Likert scale with possible responses of "no", "no, if I have to choose to say", "yes, if I have to choose to say", "yes". Poor people skill questions included, "I have confidence that I can talk to a stranger

immediately" (reversed item), "I am worried that I am just not capable in keeping a relationship with others", "It is difficult for me to expression my feelings", "I don't know how to deal with it when I have troubles with others". Conflict avoidance was measured by, "I decide my own things just as what I think it should be" (reversed), "When I have to decide on an important issue, I feel anxious if I do not follow the advice of my parents or teachers", "I feel anxious if I have to decide an important issue by myself", "I am afraid of making a decision on my own". Conflict avoidance was assessed by, "I try to avoid fights or arguments", "I don't want to have any troubles with others", "It is better to persevere rather than to oppose others", "It is better to have a harmonious atmosphere than trying to fight my opinions across". The last variable, wanting to be free, was measured using the following questions, "I don't want others to advice on the things that I have decided", "I don't like others to force their thoughts on me on some important issues", "Even if they are parents, I wish they would not meddle with the things that I want to do", "I don't want others to interfere with my life". These personalities were predicted to have positive low to moderate association with IA scores.

2.3.2.6 Social withdrawal tendency

The tendency of social withdrawal was also measured with a question adopted from the Tokyo Metropolitan Government Field Research with revised choices [87]. The social withdrawal status was indicated by nine different lifestyle patterns in the past six months, "frequent outing besides

school/work", "seldom out besides school/work unless necessary", "no outing besides school/work", "frequent outing although no school/work", "most of the time indoor except for exceptional event, e.g., funeral, wedding", "most of the time indoor but do go out for self-interest", "most of the time indoor, but sometimes do go to the convenience stores nearby", "all of the time indoor while can walk out from the room", and "almost always in the room". The first six patterns of lifestyles were then grouped into the category of "non-hikikomori", and the latter three different patterns of lifestyles were grouped into the category of "current hikikomori". It was interesting to assess whether being a current hikikomori would have an effect on IA.

2.3.2.7 Channel for problem sharing

The participants were asked to indicate with whom they share their problems, "Who do you normally share your problems with?" Participants were able to select 13 choices grouped into five categories, (1) parents, siblings, friends, partners, and grandparents as family/friend category, (2) teachers/colleagues/supervisor as one category, (3) counsellors/psychiatrist and community centre as one category, (4) Internet counselling and Internet friends as one category, (5) others and no one as one category. The difference in the IA patterns was expected across different communication channels.

2.3.2.8 Demographic correlates

Data on demographic characteristics, including gender, age, areas of stay, was also collected for the analysis. Based on the general assumption, it was predicted younger people would have higher scores on IA, while no differences will be observed in areas of stay. I was also interested in exploring whether gender influences the IA scores in the Japanese population.

Considering the education system in Japan and the possibility of having elderly participants, the choices were set to “primary school”, “middle school”, “high school/technical college”, “vocational school”, “four years undergraduate/junior college”, “graduate school”, “others”. It was predicted that different level of education would have different effect on IA.

Choices for occupational status were categorized to reflect the current social economic situation in Japan, i.e., full employment, contracted employment, and employment that engaged with dispatched company. The status of part-timer, self-employed, freelancer, housewife/husband, student, unemployed, and others were also included in the choices. While student status was expected to have a higher influence on IA, we were also interested in investigating the effect of different employment styles on IA.

2.3.3 Statistical Analysis

Frequency distribution of demographics was examined by comparing my sample with the national sample [60], and the normality of distributions of the scale scores was assessed for the three IA scales. The normality distributions of the 3 IA scales were said to be reasonably close to normal if the range of skewness and kurtosis fall into - 1.0 to + 1.0 [88]. The conceptual constructs of the scales were tested by comparing the mean IA scores across different demographic factors (gender, age, areas of living, education level, occupational status, staying alone or with family/friends/others, people to share and discuss personal problem, self-diagnosis of IA, satisfaction with marital status, social withdrawal), and group differences were compared using student-t-test and one way ANOVA. Post-hoc Turkey HSD test was employed to find out specific differences when there are more than 2 groups in the demographic category. Effect sizes were calculated by eta squared. Pearson's correlation coefficients were also calculated to examine the relationship of IA scores with the variables of interest (age, self-diagnosis, total time spent online, motivations of Internet use, frequency of Internet applications used, anxiety and depression, loneliness, satisfaction with present romance ship, perceived stress, satisfaction with marital status, social withdrawal tendency, personal characteristics (decision avoidance, poor people skills, conflict avoidance, and wanting to be free) and the GPIUS2 subscales (preference for online social interaction, using Internet as mood regulation, cognitive preoccupation with Internet use, compulsive Internet use, and negative outcome).

2.3.3.1 Reliability

Reliability of the total scale and subscales (extracted based on factor analyses) was reported using Cronbach's alpha, together with the means, standard deviations, and item-total correlations.

2.3.3.2 Validity

Construct, concurrent, and discriminant were investigated using split-half-cross-validation sampling and employing exploratory factor analysis (EFA), confirmatory factor analysis (CFA), and inter-factors correlations.

2.3.3.2.1 Concurrent validity

Concurrent validity was evaluated by correlating the total scores of the three scales. Strong correlations were expected among three scales, and the three IA scales were expected to show similar patterns on demographic differences.

Concurrent validity of the individual items from each scale was also evaluated by correlating the score of each item with the total IA scores (JIAT, CIUS, GPIUS2), self-diagnosis question, the four concepts proposed by the GPIUS2 subscales (POSI, MR, DSR, NO), K6 and UCLA Loneliness.

2.3.3.2.2 Discriminant validity

The ability of the three IA scales to discriminate between people with mild, moderate, and severe negative outcomes related to preference for online social interaction, using Internet for mood regulation, deficient self-regulation, anxiety/depression, and loneliness were evaluated. It is anticipated that higher IA scores are accompanied by higher severity of stated consequences. It was predicted that the severity of IA scores would show consistent pattern of elevated scores for anxiety/depression, loneliness, time, negative outcome with Internet, deficient self-regulation with Internet, using Internet for mood regulation, and preference for online social interaction. The severity of JIAT followed the suggested cut-off (20 - 39 = common users, 40 - 69 = at-risk users, 70 - 100 = addiction) [81]. CIUS severity scores were averaged out by three tiers. Although GPIUS2 was not intended to measure severity, the total score was averaged out by three tiers severity scores. The GPIUS2 subscales, K6, and UCLA Loneliness scale were used here for discriminating purpose. The four concepts proposed by the GPIUS2 subscales (POSI, MR, DSR, NO), K6 and UCLA Loneliness scale were used here for discriminating purpose.

2.3.3.2.3 Cross-validation by split sample analysis

A split-half cross-validation method using EFA was employed to develop the initial model on one randomly drawn half sample and tested on the other half by using CFA. Using excel RAND ()

formula in Excel (age-stratified), the sample was randomly split into half by assigning a random number from 0 - 1. This method enables us to measure similarities in the discrete scales between two samples. It was anticipated that both samples would yield similar factorial structures.

2.3.3.2.4 Factor-based validity

EFA was performed using Maximum Likelihood Factoring Analysis and Promax rotation with Kaiser Normalization. A combination of Bartlett's test of sphericity ($p < .05$) and Kaiser-Meyer-Olkin (KMO) index > .6 was considered appropriate for factor analysis. Correlation matrix was examined for item consistency. Caution was given to item correlations that fell outside $.3 < r < .8$ range. Items with low communalities < .4, low factor loading < .3, and cross loading were also given substantial consideration for interpretation. The model is developed by considering three major techniques: (1) Kaiser's criteria defining the number of factors with an eigenvalue of 1.0 or more, (2) Catell's scree test examining the number of factors above the elbow with clear and considerably strong factor loadings, and (3) parallel analysis that compares the size of the eigenvalues with those obtained from a randomly generated data set of the same size [89-91]. Factor loadings of each item, per cent of variance explained, and goodness of fit were reported in this study. As I have a relatively large sample size, the p-value lacks power to discriminate good fitting and poor fitting models, a relative/normed chi-square ($2 < \chi 2/df < 5$) was used to examine the fit. It was anticipated that compared to CIUS and GPIUS2, JIAT would

have more problematic items that would need to be deleted in order to have a good and consistent reliability. The factorability of the data was also predicted to be stronger with CIUS and GPIUS2 compared to JIAT.

CFA was performed to confirm the goodness of fit of the model that emerged based on the EFA. Root mean square error of approximation (RMSEA) from 0.05 - 0.06 was considered a good fit, .07 - .08 indicated adequate fit, .09 - .1 was considered an indication of fair fit, and values above .10 indicated poor fit. Comparative fit index (CFI) $\geqq$ 0.95 was considered an indication of good fit. Relative/normed chi-square, $2 < \chi 2/df < 3$ indicated an adequate fit, and $3 < \chi 2/df < 5$ indicated an adequate fit [92-94]. It was predicted that the CIUS and GPIUS2 might fit the data better compared to JIAT.

2.3.3.2.5 Internal construct validity

Internal construct validity of each scale was assessed by examining the internal convergent validity. Internal convergent validity was measured by the average variance extracted (AVE) and construct reliability of each construct (latent variable) within the scale. AVE is computed as the sum of the squared standardized factor loadings divided by the number of items in each latent variable. An AVE of .5 or higher indicated adequate convergent validity [95]. Construct reliability was computed from the sum of factor loadings, squared for each construct and the sum of the

error variance terms for a construct. Cronbach's α reliability > .7 indicates high internal consistency.

2.3.3.2.6 Inter-factors correlations

External convergent validity and divergent validity were assessed on the full sample by correlating the total scores of the newly found subscales (latent variables) of the three scales that could be expected to have a converging and diverging relationship. It was predicted that the newly found subscales of each scale would have stronger correlations with related subscales (convergent) than unrelated subscales (divergent).

2.3.3.2.7 Structured equation modelling (SEM) for conceptual model validity testing

The conceptual model of general problematic Internet use was examined using structured equation modelling (SEM) by substituting the subscales to test the fit of the model in Japanese population using the full sample. The hypothesis of IA is followed by disturbed mental health which intensifies was tested by adding dissatisfaction and anxiety into the SEM equation. Root mean square error of approximation (RMSEA) of .05 - .06 indicated a good fit, .07 - .08 indicated adequate fit, .09 - .1 indicated fair fit, and values above .10 indicated poor fit [92-94]. Comparative fit index (CFI) above .95 indicated good fit. As the sample size was big (n = 623), chi-square and relative/normed chi-square were not very good indicators of goodness of fit. Hence, I replaced the

indicator with adjusted good-of-fit index (AGFI) > .80 to indicate a good fit [92-94]. As GPIUS2 was proposed as a concept rather than a diagnostic tool, the conceptual model should fit well with similar concepts (latent variables) in CIUS and JIAT, as the conceptual ideas (latent variables) should play a more important role than the specific items. It was anticipated that the conceptual model proposed for GPIUS2 would fit the data well when substituting the GPIUS-subscales with CIUS and JIAT subscales. Dissatisfaction with current situation (existing environment and romantic relations) was also anticipated to be a direct predictor of online social interaction (POSI) and the use of Internet for mood regulation (MR). These factors lead to deficient self-regulation of the Internet use, which in turn leads to negative consequences (NO) and subsequently further increases in anxiety/depression and a sense of loneliness (Disturbed mental health) that aggregate the problematic Internet use.

3. RESULTS

3.1 Participation flow

Overall, 4,886 invitation emails were sent to prospective subjects (randomization was done with a pseudo randomized number assigned to the registered users stratified by age and gender). A total of 636 respondents who completed the online survey were considered an effective sample. The company X then examined the data and retained 623 samples after data cleaning (fig 3). The sampling quota was reached 26 hours after the email invitation was sent.

3.2 Demographic characteristics of the sample

Data examination confirmed that the pre-stratification sampling represented successfully the national sample with its different demographic distributions (table 1). While age and gender were well represented, the sample appeared to over-represent people who lived alone (10% more), under-represent people who did not have access to the Internet through pc (12% less), and under-represent people who had access to the Internet through mobile phones (51% less).

3.3 Normality distributions of the 3 IA scales

The normality distributions of the 3 IA scales were reported in table 2. JIAT was not normally distributed (skewness = 1.407, kurtosis = 1.636), and the mean (33.39) was larger than median (29.0) indicating a positive skew and high IA scores were as extreme value. CIUS was considered to be normally distributed (skewness = .725, kurtosis = .209), and the mean (14.8) was close to the median (14.0) indicating that the distribution was almost symmetrical around the mean. GPIUS2 was considered to be normally distributed (skewness = .853, kurtosis = .402), however the mean (41.7) was larger than the median (38.0) indicating that the distribution was positive skewed.

3.3.1 Normality distribution of the 3 IA scales by gender

The distribution pattern of the three scales did not change when further examined by gender, yet women tend to have higher score on skewness and kurtosis compared to men.

3.3.2 Normality distribution of the 3 IA scales by age

The distribution pattern of the JIAT differed with different age group. The distributions of JIAT for age 16 - 19 and 20 - 29 fall in to normal distribution, but non-normal for other age groups. CIUS was considered to be normally distributed for all age groups. GPIUS2 was considered to be normally distributed for all age groups except for 50 - 59 (skewness = 1.356, kurtosis = 2.14) and > 60 (skewness = 1.031, kurtosis = 1.085).

3.4 Reliability

3.4.1 JIAT

The 20 items JIAT appeared to have an excellent internal consistency of $\alpha = .941$ (table 3). The mean score of item 1 (2.79) was a little higher than the other items (1.30 - 2.12). Item-total correlation of item 4 was a little lower than the other items, but the value was still larger than .3. Corrected item-total correlation indicated that all items were measuring similar ideas. Whereby deleting any item would not increase the reliability.

3.4.2 CIUS

The 14 items CIUS appeared to have an excellent internal consistency of α = .931 (table 4). The mean scores of item 1, 2, 3, 4, 7, 8, 9, 12 were in the range of 1.01 - 1.63, where the mean scores of item 5, 6, 10, 11, 13, 14 fell in the range of .62 - .91. All item-total correlation had a value was larger than .5, indicating that all items were measuring similar ideas, where deleting any item would not increase the reliability.

3.4.3 GPIUS2

The 15 items GPIUS2 appeared to have an excellent internal consistency of α = .948 (table 5-1). The mean score of item 10 (1.62) was a little lower than the other items (2.18 - 3.62). All item-total correlation had a value was larger than .5, indicating that all items were measuring similar ideas, where deleting any item would not increase the reliability. Following the full scale, the subscales of GPIUS2 were examined in detail as well.

The 3 items GPIUS2-POSI appeared to have an excellent internal consistency of α = .916 (table 5-2). The mean score of item 1, 6 and 11 were in consistence with one another (2.44 - 2.91). All item-total correlation had a value larger than .8, where deleting any item in this subscale would not increase the reliability.

The 3 items GPIUS2-MR appeared to have n good internal consistency of α = .834 (table 5-3). The mean score of item 2 (2.28) was found to be lower than item 7 and 12 (2.95 - 3.62), which is about one point lesser than the other two items. All item-total correlation had a value larger than .5, and it was found that by deleting item 2 from the GPIUS2-MR subscale, reliability would increase to α = .894.

The 3 items GPIUS2-CP appeared to have a good internal consistency of α = .883 (table 5-4). The mean score of item 13 (2.25) was found to be lower than item 3 and 8 (2.81 - 3.52), which is about one point lesser than the other two items. All item-total correlation had a value larger than .7, where deleting any item in this subscale would not increase the reliability.

The 3 items GPIUS2-CU appeared to have a good internal consistency of α = .883 (table 5-5). The mean score of item 14 (2.29) was found to be lower than item 4 and 9 (3.44 - 3.47), which is about one point lesser than the other two items. All item-total correlation had a value larger than .7, and it was found that by deleting item 14 from the GPIUS2-CU subscale, reliability would increase to α = .901.

The 3 items GPIUS2-NO appeared to have an acceptable internal consistency of α = .755 (table 5-6). The mean score of the three items were inconsistent, item 5 (3.13), item 10 (1.62), and item

15 (2.18), which is at least about one point gap from one another. All item-total correlation had a value larger than .5, and it was found that by deleting item 10 from the GPIUS2-NO subscale, reliability would increase to α = .770.

3.5 Validity

3.5.1 Construct Validity

3.5.1.1 Comparison of IA means

The shapes of the distribution for the three IA scales were examined. While all three IA scales tended to be skewed to the left (more people have total lower scores), the normality of CIUS was better compared to JIAT and GPIUS2. The distribution of IA means of different scales was examined across demographic subgroups (table 6). As predicted, more respondents diagnosed themselves as Internet dependent than not. In line with what was expected, more people tended to diagnose themselves as IA, as 35% of the people said that they do not have IA, 26% said they were probably addicted, and 43% thought they were definitely addicted. In addition, noticeable and significant differences were found in scores of the three self-diagnosis categories (no, maybe, yes), yet the IA scores for people who self-diagnosed themselves as IA were generally low to moderate. The means demonstrated a consistent increase in IA scores with self-diagnosis of Internet dependency, with those who responded “no” to the self-diagnosis question scoring low on IA.

There was no significant difference between men and women in CIUS scores. Significant difference between men and women were found in JIAT and GPIUS2 scores; however, the actual difference in the mean scores was very small. Similarly, no major differences were identified between prefectures or by the social withdrawal status. Notable and significant differences in mean scores were found for age, particularly between 16 - 19 age group and age groups above 30 (with medium effect sizes = CIUS .09, JIAT .10, GPIUS2 .08). Furthermore, 20 - 29 age group differed significantly from 50 - 59 and > 60 group only in GPIUS2 scores, from 40 - 49 age group in CIUS2 scores, and additionally from 30 - 39 age group. Moreover, 30 - 39 age group did not differ significantly from 20 - 29, 40 - 49, and 50 - 59 age groups in CIUS and GPIUS2 scores, but differed from 20 - 29 age group in JIAT scores. No significant differences was identified in scores for areas with both CIUS and GPIUS2, however a significant difference of $p < .05$ was identified with JIAT.

Having a graduate school education differed significantly from having high school education and 4-year University education with a medium to large effect sizes (CIUS .23, JIAT .17, GPIUS2 .067). Significant differences were found between graduate school and vocational school in CIUS and GPIUS2 scores. No significant difference was found between middle school education and other educational levels. Again, no significant difference was found for those who

declared other education level. Students differed significantly from full-termed and contract employee, part-timers, self-employed, freelancers, housewives/husbands, and unemployed, with higher mean scores in JIAT. For CIUS, similar results were found, except for no significant differences between students and contract employee. For GPIUS2, similar results were found as for CIUS, except for no significant difference between students and unemployed. Dispatched employee did not differ from other job groups in all the three scales. Unemployed differed significantly from housewives/husbands with a higher mean score on GPIUS2. All three scales yielded a medium-large effect sizes (CIUS .591, JIAT .065, GPIUS2 .067).

Those who lived alone had a significantly higher mean compared to those who lived with others. People who were seeing a specialist or a social worker and people who chose to discuss problems via Internet channels had higher IA scores. However, significant differences in JIAT and GPIUS2 scores were only found between those who discussed problems via Internet channels and those who discussed their problems with family and friends. In CIUS, the significant difference was only found between the family and Internet channels. The effect sizes were small (CIUS .024, JIAT .035, GPIUS2 .039).

Individuals who never had romantic relationships with others had significantly higher IA means compared to individuals in romantic relationships or separated. Those who were unsatisfied with

their current romantic relationship had a significantly higher means compared to those who were satisfied. Additional analyses were also performed on the effect of romance satisfaction on different Internet applications. The people who did not indicate their romance satisfaction had a significantly higher mean score (M = 1.49, SD = 1.14) compared to those who indicated satisfaction (M = 1.07, SD = 0.38) or dissatisfaction (M = 1.09, SD = .42) and compared to married and satisfied singles (M = 1.12, SD = 0.51) using romance site. On the other hand, dissatisfied single persons had a higher IA mean score on assessing porn site (M = 2.10, SD = 1.23) compared to the satisfied married (M = 1.5, SD = 1.01) and satisfied divorced (M = 1.39, SD = 0.74). Satisfied married/cohabitating/in a relationship individuals had a significantly lower mean score (M = 2.48, SD = 1.43) on blogging/SNS compared to satisfied (M = 3.15, SD = 1.61) and dissatisfied (M = 3.13, SD = 1.44) singles. Gender differences were also explored in the follow-up analyses. While both men and women did not differ in their satisfaction with current romance situations when assessing porn site, the mean scores on porn for women (M = 1.06 - 1.28, SD = .2-.8) were generally lower compared to those for men (M = 2.0 - 2.5, SD = .9 - 1.3). Men had higher mean scores on one-way communication (2-Channel/BBS) (men: M = 2.0 - 3.3, SD = 1.1 - 1.4; women: M = 1.6 - 2.3, SD = .9 - 1.4) and women had higher mean scores on two-way communication (blogging/SNS) (Men: M = 2.3 - 3.0, SD = 1.3 - 1.5; Women: M = 2.5 - 3.7, SD = 1.5 - 1.6). Satisfied men in a stable romantic relationship had significantly lower mean score compared to single men, regardless of their satisfaction with and frequency of using 2-

Channel/BBS. Satisfied women in a stable romantic relationship had a significant lower mean score compared to the satisfied single women in the frequency of blogging/SNS.

Staying alone was found to have a significantly higher mean than the one who stayed with others. Higher IA scores were observed with a person who was seeing a specialist or a social worker and people who chose to discuss problems via Internet channels. However significant differences were only found between the one who discussed problems via Internet channels and the one who had family and friends to discuss their problems with in JIAT and GPIUS2. In CIUS, the significant difference was only found between the family and Internet channels. The effect sizes were small (CIUS .024, JIAT .035, GPIUS2 .039).

3.5.1.2 Correlational evidence of validity

Table 7 shows that time spent online and total mode of access had positive and low correlations with IA behaviour. All tested Internet motivations had positive correlations with IA scores. The strength of the association between Internet motivation and IA scores was strongest ($.3 < r < .5$) for people who used Internet for stress release, followed by boredom, maintaining Internet friendship, sharing interest, sharing/discussing personal problems. The strength of the association was weaker ($.2 < r < .3$) for local SNS offering community activity and communication, followed by information seeking and official use ($r < .2$). Among various applications tested in the study,

the strength of the association with IA scores was observed to be the strongest in one way communication application (2Channel/BBS, r= .393 - .441), followed by two way communication applications (blogging/SNS, information release/upload and download, r = .272 - .320), then the adult site (r = .207 -. 267), romance site (r = .183 -. 226), P2P/FTP (r = .189 - .211), online game (r = .187 - .230) and online shopping (r = .189 - .208). Online survey and online banking did not have significant relationship with IA scores.

On the other hand, people who were dissatisfied with current situations had positive relationship with the IA scores and self-diagnosis. Decision avoidance, poor people skill, existing stress, loneliness, and anxiety/depression had positive and low to moderate relationship with the 3 IA scales and self-diagnosis. As expected, environmental factors played a role in IA, showing a positive association with dissatisfaction with current situation and feeling existing stress. Personal characteristics, such as poor people skills and decision-making avoidance had a positive association with IA scores. The relationship between IA scores and conflict avoidance and wanting to be free were almost negligible.

3.5.2 Concurrent and Discriminant Validity

3.5.2.1 Concurrent validity

Table 8-1 shows that there were significantly strong Pearson's correlations in between CIUS and JIAT (r = .845), CIUS and GPIUS2 (r = .809), JIAT and GPIUS2 (r = .774). While comparing the JIAT and CIUS with GPIUS2 subscales, the strongest correlations (r > .7) were found between CIUS and GPIUS2-CU, GPIUS2-CP, and GPIUS2-NO, where sequence of correlation level followed. GPIUS2-MR was also found to have very strong correlation with CIUS (r = .705), and relatively strong correlation with JIAT (r = .626). GPIUS2-POSI was found to have the lowest correlation with JIAT (r = .548) and CIUS (r = .514). GPIUS2 subscales correlate strongly with one another, as well as to the GPIUS2 whole scale. Self-diagnosis was found to have moderate association with CIUS, JIAT (r = .467 - .483) and a slight stronger relationship with GPIUS2 (r = .536).

3.5.2.1.1 Concurrent validity of JIAT items with the total IA scores and concepts

The Pearson's correlation between each item in JIAT with the total IA scores of the 3 IA scales was examined carefully (table 8-2), and the correlations were reported as below with significant level at 0.01(2-tailed). It was found that almost all items in JIAT had strong significant positive correlation with the total IA scores (r > 5) except for item 4 (r = .485). Items that had a moderate significant correlation with self-diagnosis were item 1, 12, 14, 17 (r = .322 - .336). Only item 3

was found to have significantly strong positive correlation with POSI (r = .515), where almost all the other items had moderate significant positive correlations with POSI except item 5, and 7 were found to have weak significant positive correlations with POSI (r =.261 - .284). Only item 10 was found to have significant strong positive correlation with MR (r = .665), where all the other items were found to have significant moderate positive correlation with MR (r = .326 - .490). Items that had shown strong significant positive correlations with the concepts of DSR and NO were item 1, 2, 3, 6, 8, 10, 11, 12, 14, 15, 16, 17, 18, 19, 20 (r = .502 - .639). Items that had moderate significant positive correlations with K6 were item 3, 9, 10, 11, 13, 14, 15, 16, 17, 18, 19, 20 (r = .321 - .445). Correlations between JIAT items with time were significantly positive but weak (r = .112 - .240), and correlations between JIAT items with UCLA loneliness scale were significant positively weak (r = .103 - .291), the worst was found with item 4 (r = .095) and item 7 (r = .068, not significant).

3.5.2.1.2 Concurrent validity of CIUS items with the total IA scores and concepts

The Pearson's correlation between each item in CIUS with the total IA scores of the 3 IA scales was examined carefully (table 8-3), and the correlations were reported as below with a significant level at .01(2-tailed). It was found that all items in CIUS had strong significant positive correlation with the total IA scores (r > .5). Items that had a moderate significant positive correlation with self-diagnosis were item 1, 2, 3, 4, 6 (r = .314 - .369). Almost all items were

found to have moderate significant positive correlations with POSI except item 5 and 12, were found to have weak significant positive correlations with POSI (r = .262 - .266). Almost half of the items were found to have a significant strong positive correlation with MR (r = .507 - .773), where the other half of the items were found to have a significant moderate positive correlation with MR (r = .348 - .496). Almost all items had shown strong significant positive correlations with the concepts of DSR and NO except for item 5. Items that had moderate significant positive correlations with K6 were item 6, 8, 9, 10, 14 (r = .315 - .358). Correlations between CIUS items with time were significant positive but weak (r = .118 - .226), and correlations between CIUS items with UCLA loneliness scale were also found to be significant positively weak (r = .108 - .299).

3.5.2.1.3 Concurrent validity of GPIUS2 items with the total IA scores and concepts

The Pearson's correlation between each item in GPIUS2 with the total IA scores of the 3 IA scales was examined carefully (table 8-4), and the correlations were reported as below with a significant level at .01(2-tailed). It was found that all items in GPIUS2 had strong significant positive correlation with the total IA scores (r > .5). Items that had a moderate significant positive correlation with self-diagnosis were item 3, 4, 5, 7, 8, 9, 13, 14, 15 (r = .312 - .424). Almost all items were found to have strong significant positive correlations with POSI except item 5 and 10 and 15, were found to have moderate significant positive correlations with POSI (r = .431 - .492).

Almost all of the items were found to have significantly strong positive correlation with MR (r = .522 - .922), except for item 10. All items had shown strong significant correlations with the concepts of DSR and NO. Items that had moderate significant positive correlations with K6 were item 1, 3, 4, 5, 6, 11, 12, 13, 14, 15 (r = .301 - .393). Correlations between GPIUS2 items with time were significantly positive but weak (r = .106 - .277) except for item 7 had shown no significant correlation with time. Significant moderate positive correlations between CIUS items with UCLA loneliness scale were identified with item 1, 6, 11, 13 and 15 (r = .303 - .384), where the others were found to be significant positively weak (r = .190 - .280).

3.5.2.2 Discriminant validity

Discriminant validity results are shown in table 9. JIAT was divided into 3 tiers followed the cut-off point for severity suggested by the original developer: tier 1 (common user 20 - 39), tier 2 (potential risk 40 - 69), tier 3 (addiction 70 - 100). It was identified that 21% of the sample were in the range of JIAT tier 2, and 2% of the Internet population were into the range of JIAT tier 3. The age of the samples in the tier 1 (mean = 45.3, SD = 15.4) was significantly older than the samples in tier 3 (mean = 30.0, SD = 13.5). Post-hoc comparisons using the Tukey HSD test indicated that the mean scores were significantly different among all concepts proposed by GPIUS2 subscales (POSI, MR, DSR, NO) and K6. JIAT tier 1 has a mean score less than 5 for K6, but both JIAT tier 2 and JIAT tier 3 had a mean score of more than 5 for K6.The mean scores

for UCLA loneliness, and time spent on private Internet use in JIAT tier 1 were significantly different from JIAT tier 2 and JIAT tier 3, but JIAT tier 2 and JIAT tier 3 did not differ with each other on these scores.

CIUS was divided into 3 tiers with a rough estimate by dividing the total score into three tiers: tier 1 (severity 0 0 - 18), tier 2 (severity 1 19 - 37), tier 3 (severity 2 38 - 56). It was identified that 28% of the sample were in the range of CIUS tier 2, and 3% of the Internet population were into the range of CIUS tier 3. The age of the samples in the tier 1 (mean = 45.9, SD = 15.4) was significantly older than the samples in tier 3 (mean = 32.4, SD = 11.8). Post-hoc comparisons using the Tukey HSD test indicated that the mean scores were significantly different among all concepts proposed by GPIUS2 subscales (POSI, MR, DSR, NO). CIUS tier 1 has a mean score less than 5 for K6, but both CIUS tier 2 and CIUS tier 3 had a mean score of more than 5 for K6. The mean scores for K6 in CIUS tier 1 were significantly different from CIUS tier 2 and CIUS tier 3, but CIUS tier 2 and CIUS tier 3 did not differ with each other on these scores. The mean scores for UCLA loneliness, and time spent on private Internet use in CIUS tier 1 were significantly different from CIUS tier 2, CIUS tier 3 did not differ with either CIUS tier 1 or CIUS tier 2 on these scores.

GPIUS2 was divided into 3 tiers with a rough estimate by dividing the total score into three tiers: tier 1 (severity 0 15 - 50), tier 2 (severity 1 51 - 85), tier 3 (severity 2 86 - 120). It was identified that 26% of the sample were in the range of GPIUS2 tier 2, and 4% of the Internet population were into the range of GPIUS2 tier 3. The age of the samples in the tier 1 (mean = 45.5, SD = 15.5) was significantly older than the samples in tier 3 (mean = 35.2, SD = 14.0). Post-hoc comparisons using the Tukey HSD test indicated that the mean scores were significantly different among all concepts proposed by GPIUS2 subscales (POSI, MR, DSR, NO), K6, UCLA Loneliness and time spent online. The mean scores for all the tested variables in GPIUS2 tier 1 were significantly different from GPIUS2 tier 2 and GPIUS2 tier 3, but GPIUS2 tier 2 and GPIUS2 tier 3 did not differ with each other on these scores. GPIUS2 tier 1 has a mean score less than 5 for K6, but both GPIUS2 tier 2 and GPIUS2 tier 3 had a mean score of more than 5 for K6.

Self-diagnosis (no, maybe, yes) was also analysed in the discriminant validity with the related IA variables: the four concepts proposed by the GPIUS2 subscales (POSI, MR, DSR, NO), K6 and UCLA Loneliness. As reported in the comparison of means, a larger percentage of samples would identify themselves as Internet addiction (43%). When the details were examined, the age of the samples of the “no” category (mean = 47.8, SD = 15.4) was significantly older than the samples in the “yes” category (mean = 39.4, SD = 15.5). Post-hoc comparisons using the Tukey HSD test indicated that the mean scores were significantly different among all concepts proposed by

GPIUS2 subscales (POSI, MR, DSR, NO). The mean scores for K6, UCLA Loneliness and time spent online in the “no” category were significantly different from the “maybe” category and the “yes” category, but the “maybe” category and the “yes” category did not differ with each other on these scores. Both “no” and “maybe” had a mean score less than 5 for K6, but “yes” had a mean score of equal more than 5 for K6.

3.5.3 Factorial Analysis

The original data set (n = 623) was randomly divided into two equal subsamples, one (n = 311) for EFA and the other (n = 323) for CFA. The demographic factors were examined with two new generated data sets and were found to be comparable (table 1).

3.5.3.1 JIAT

EFA

Measures of sampling adequacy were carried out on the 20-item JIAT to see whether it was suitable for factor analysis. Correlation matrix showed a wide range of correlations ($0.23 < r < 0.742$). Barlett’s test of sphericity yielded a chi-square value of 3847.2 ($p < .001$), and KMO of .938 indicated that factor analysis was considered appropriate. While examining the inter-item correlations, items 4, 5, 9, and 12 were found to be problematic, as the inter-item correlations were extremely low ($r < .3$). The basic Scree test did not review a clear break in the plots

(attachment 5), indicating that one to four factors could be retained. However, when eigenvalue > 1.0 criterion was used, four clear factors were generated from the JIAT. These four factors yielded a goodness of fit with χ^2/df = 2.4 using maximum oblique rotation in six iterations. They explained 57.8% of the variance. Item 4 was found to have very low communality (.175). Factor 1 (9 items) accounted for 46.3% of the variance (α = .920) and appeared to measure the absorption of a person in the Internet activity. Factor 2 (6 items) accounted for 4.9% of the variance (α = .867) and appeared to measure the difficulties in setting priorities. Factor 3 (3 items) accounted for 3.5% of the variance (α = .751) and appeared to measure conflicts with the use of Internet. The last factor contained only 2 items. One of them was item 4 (making new friends online), which accounted for 3% of the variance (α = .492). Factor loading for item 4 was low (.197) and reliability test showed it had the lowest item-total correlation (r = .388). These finding suggested that factor 4 was not stable.

The analyses were repeated for another three times by setting the number of extracted factors at 1, 2, and 3, as suggested by the Scree plot. All these solutions yielded an adequate to good fit (one factor, χ^2/df = 4.9; 2 factors, χ^2/df = 3.5; and three factors, χ^2/df = 3.1). The three factor solution (Table 10) had the cleanest structure with acceptable factor loadings (ranging from .269 - .924, .249 - .844, .451 - .974 on each factor) and stronger clarity in its interpretation. Correlations between factors were moderate to high ($.634 \leq r \leq .709$). Item 4 loaded on factor 1,

turning into 10 items that accounted for 46.1% of the variance (α = .912). The factor was named JIAT-Absorption. Item 5 loaded on factor 2, resulting in 7 items that accounted for 45% of the variance (α = .865). The factor was named JIAT-Priorities. Factor 3 (3 items) remained the same and accounted for 4% of the variance (α = .751). It represented JIAT-Conflicts.

CFA

The factorial structure of JIAT was then examined using CFA with maximum likelihood estimation, robust standard errors, and a mean-adjusted chi-square statistic test. The three factor solution had shown adequate convergent validity (AVE = .49 - .63), high construct reliability (α = .77 - .91), and yielded a fair fit (RMSEA = .082, CFI = .918, χ2/df = 3.1) by allowing errors of few items (item 19 with item 3 and item 20, item 11and item 15, item 20 and item 15, item 15 and item 13, item 12 and item 18, item 18 and item 8, item 13 and item 5, item 5 and item 6) to covary, as indicated by the modification indices. The covariance of these errors was justified, as the items loading on the same construct were very closely related (fig 4). Correlations between factors were found to be relatively high (r = .759 - .903). The three factor solution was also tested with full sample, men and women respectively, and showed comparable fit (RMSEA = .067 - .077, CFI = .920 - .940, χ^2/df = 2.8 - 3.8). Four-factor and one factor solution were also tested. While one factor solution indicated a relatively poor to adequate fit (RMSEA = .081 - .091, CFI = .887 - .915, χ2/df = 3.2 - 5.1), the four factor solution (RMSEA = .068 - .083, CFI = .918 - .941,

$\chi 2/df = 2.8 - 3.9$) was shown to be comparable with the three factors solution by allowing the same covariates between errors.

3.5.3.2 CIUS

EFA

Measures of sampling adequacy were carried out on the 14-item CIUS to see whether it was suitable for factor analysis. Correlation matrix showed a consistent pattern of inter-item correlations ($0.304 < r < 0.701$), with an exception of two relatively lower inter-item correlations (item 3: 10, r = .269; item 5:8, r = .264) and two inter-item correlations that were relatively high compared to others (item 1:2, r = .799, item 8:9, r = .872). Barlett's test of sphericity yielded a chi-square value of 2696.9 ($p < .001$). KMO of .915 indicated that factor analysis was considered appropriate. The basic Scree test did not indicate a clear break in the plots (attachment 6). However, when eigenvalue > 1.0 criterion was used, three factors were generated from the CIUS. These three factors yielded a good fit to the data ($\chi 2/df = 2.4$) using maximum oblique rotation in five iterations. The three factors explained 60.7% of the variance. Item communality was found to be acceptable (.315 - .901). Table 11 shows that factor 1 (6 items) accounted for 46.4% of the variance ($\alpha = .856$) and appeared to measure the absorption of a person in the Internet activity (CIUS-Absorption). Factor 2 (6 items) accounted for 7.8% of the variance ($\alpha = .877$) and appeared to measure the difficulties of the person in setting priorities (CIUS-Priorities). Factor 3

(2 items) accounted for 6.5% of the variance (α = .931) and appeared to measure the use of Internet for mood regulation (CIUS-MR). All three factors appeared to correlate moderately with one another (r = .563 - .665).

CFA

The factorial structure of CIUS was then examined using CFA utilizing maximum likelihood estimation with robust standard errors and a mean-adjusted chi-square statistic test on the second random split half sample (n = 312). The three factor solution had shown adequate convergent validity (AVE = .51 - .88), high construct reliability (α = .86 - .94), and yielded a good fit (RMSEA = .06, CFI = .973, χ2/df = 2.1) by allowing errors of few items (item 3 item 4, item 4and item 12, item 6 and item 7, item 7 and item 7) to covary, as indicated by the modification indices. The covariance of these errors was justified, as the items within construct were very closely related (fig 5), and the original developer suggested similar error covariance. Correlations between factors were found to be relatively high (r = .713 - .831). The three factor solution was also tested with full sample, men and women respectively, and showed adequate fit (RMSEA = .074 - .086, CFI = .939 - .959, χ2/df = 2.7 - 4.4). One factor solution that was suggested by the original developer was also tested to compare its model fit with the three factor solution. The one factor solution indicated an adequate fit (RMSEA = .079, CFI = .952, χ2/df = 3.0) by allowing similar errors of the items to co vary. The model was shown to have a relatively fair fit when

tested with the full sample, male sample, and female sample (RMSEA = .085 - .094, CFI = .935 - .942, $\chi 2/df = 3.7 - 5.5$).

3.5.3.3 GPIUS2

EFA

Measures of sampling adequacy were carried out on the 15-item GPIUS2 to see whether it was suitable for factor analysis. Correlation matrix showed a good consistency, showing adequate inter-item correlations ($.3 < r < .8$), except relatively high correlations between item 4 and 9 ($r = .820$), item 7 and 12 ($r = .808$), and item 13 and 14 ($r = .887$). Barlett's test of sphericity yielded a chi-square value of 8245.5 ($p < .001$). KMO of .925 indicated that factor analysis was considered appropriate. The basic Scree test did not show a sharp transition (attachment 7), indicating that between two to four factors could be retained.

When eigenvalue > 1.0 criterion was used, three factors were generated from the GPIUS2. Three factors were extracted with 3 iterations that yielded a poor fit ($\chi 2/df = 6.6$). Monte Carlo PCA parallel analysis showed that only two factors had eigenvalues exceeding the corresponding criterion values for a randomly generated data matrix of the same size (15 variables x 311 respondents, 1000 replications). The data was then set to extract a two factors solution, which again yielded a poor fit ($\chi 2/df = 8.6$). The poor fit motivated us to run the data again by setting

the factors to four, five, and six. The six factors were extracted after 20 iterations and yielded a relatively better fit (χ^2/df = 3.2), yet the factor communality estimates suggested that the resulting solution should be interpreted with caution. Factor loadings were very low for the last two factors in factor matrix, and each factor contained only one item, suggesting that the factors were unstable. Five factors were extracted after 56 iterations and yielded an adequate fit (χ^2/df = 3.5). The factorial structure was similar to the original proposed structure, yet again, the factors communality estimates suggested that the resulting solution should be interpreted with caution. The five factors were renamed as GPIUS2-POSI_r, GPIUS2-MR_r, GPIUS2-NO_r, GPIUS2-CP_r, and GPIUS2-CU_r, where _r stands for revised version of the subscales (Table 12).

Four factors were extracted in 6 iterations and yielded an acceptable fit (χ2/df = 4.3). Factor 1 (4 items) accounted for 54.4% of the variance (α = .892) and appeared to measure the compulsivity in the Internet activity. Factor 2 (4 items) accounted for 8.5% of the variance (α = .892) and appeared to measure the preference for online social interaction. Factor 3 (5 items) accounted for 4.6% of the variance (α = .899) and appeared to measure absorption in Internet use. Factor 4 (2 items) accounted for 4.0% of the variance (α = .893) and appeared to measure using Internet for mood regulation. Each factor contains at least two items with strong factor loadings. Factor correlations were moderate to high (r = .522 - .734). Table 13 shows the factorial structure of GPIUS2, four out of the five originally proposed structure remained with revised items' positions.

CFA

As GPIUS2 was originally designed as a combination of 5 subscales with 3 items each, it was decided to first test the original model, followed by the modified 5-factor model. Similar to what was proposed for the original model, a secondary factor GPIUS2-DSR_r employed for GPIUS2-CP_r and GPIUS2-CU_r in the modified 5-factor model. Lastly, the four factor model was also tested using the EFA. The factorial structure of the GPIUS2 was then explored using CFA utilizing maximum likelihood estimation with robust standard errors and a mean-adjusted chi-square statistic test to compare the three models using the second random split half sample (n = 312).

The originally proposed model allowed no covariance between errors, resulting in a bad fit (RMSEA = .162, CFI = .851, $\chi 2/df = 9.2$). Then, I tried the modified version, as suggested by the EFA, and found an adequate fit (RMSEA = .079, CFI = .967, $\chi 2/df = 3.0$) by allowing errors to covaried (fig 6). Convergent validity and construct reliability were high (AVE = .54 - .82, α = .70 - .93), and correlations between constructs were average to high (r = .65 - .897). Item errors observed were as expected (between item 3 and item 4, item 3 and item 8, item 9 and item 13, item 5 and item 15, item 2 and item 10, item 11, and item 12), as these items were originally included in the same subscale. The revised model was shown to have a relatively adequate fit

when tested with the full sample, male sample, and female sample (RMSEA = .085 - .095, CFI = .946 - .960, $\chi 2/df = 3.3 - 5.7$). In the four factor model, item errors of the two latent variables, GPIUS2-CU and GPIUS2-Absorption were allowed to be covaried, and item 11 was allowed to covary with item 12, yielding a comparable adequate fit (RMSEA = .082, CFI = .965, $\chi 2/df = 3.1$). The four factor model was shown to have a relatively adequate fit when tested with the full sample, male sample, and female sample (RMSEA = .087 - .094, CFI = .952 - .957, $\chi 2/df = 3.3 - 5.7$).

3.5.3.4 Inter-factor Correlations

After confirming the measurement models, the new subscales of JIAT three factor model (JIAT-Absorption, JIAT-Priorities, JIAT-Conflicts), CIUS three factor model (CIUS-Absorption, CIUS-Priorities, CIUS-MR), and GPIUS2 revised 5-factor model (GPIUS2-CP_r, GPIUS2-CU_r, GPIUS2-NO_r, GPIUS2-MR_r and GPIUS2-POSI_r) were tested for convergent and divergent validity (table 14). Absorption was considered similar to CP and priorities was considered similar to CU. With that consideration, absorption and priorities were grouped together to represent DSR in the conceptual model. Convergent validity was supported, as the subscales indicating absorption were found to have a stronger correlation with one another. Absorption was also found to have rather strong correlation with priorities as expected. Conversely, divergent validity was supported, as the subscales indicating the correlations between absorption and other unrelated

measures were weaker. Similarly, the subscales that indicated priorities correlated with one another but did not correlate with unrelated subscales, supporting convergent and divergent validities, respectively. CIUS-MR and GPIUS2-MR_r exhibited good convergent and divergent validities. GPIUS2-POSI_r as a standalone construct did not correlate with any of the subscales. While all of the above mentioned results were expected, the convergent validity for the subscale that supposed to indicate negative outcome was not established. The correlation coefficient between JIAT-Conflicts and GPIUS2-NO_r was only moderate (r = .566). However, JIAT-Conflicts seemed to have a relatively better divergent validity with other subscales compared to GPIUS2-NO_r.

3.5.4 Conceptual model of IA

The concepts that were employed in the equation of conceptual model of IA followed originally proposed model (POSI, MR, DSR, and NO). POSI is a direct positive predictor of DSR and MR; MR is a direct positive predictor of DSR; DSR is a direct positive predictor of NO (fig 1).The conceptual model was tested with a full-information maximum likelihood estimation procedure, with both the modified GPIUS2 structural model and a conceptual structure that represented a combination of subscales (table 15).

The modified GPIUS2 structural model yielded a moderate fit (RMSEA = .100, CFI = .960, AGFI = .892). The conceptual structure that represented a combination of subscales (4 models) yielded an adequate to good fit (RMSEA = .049 - .097, CFI = .961 - 91, AGFI= .883 - .944), with Model 1, in which CIUS-DSR replaced GPIUS2-DSR, showing the best fit to the data. This indicated that CIUS might represent the concept of DSR better. I then used model 1 as the basis to test if whether IA increases anxieties and in turn intensify IA in this sample, by adding two new variables into the equation, which became Model 5, and found that the model yielded a good fit (RMSEA = .048 - .054, CFI = .971 - .977, AGFI = .898 - .930). Figure 8 shows the estimation of regression weights on each variable. Dissatisfaction is a direct positive predictor of POSI, POSI is a direct positive predictor of MR and DSR, MR is a direct positive predictor of DSR, DSR is a positive direct predictor of elevated anxiety and depression, and disturbed mental health is a positive predictor of dissatisfaction and POSI.

4 DISCUSSIONS

The study took successive steps in translating and adapting CIUS and GPIUS2 into Japanese and provided detailed information about the psychometric properties of the translated scales along with JIAT.

4.1 Demographic Characteristics of Sample

Pre-stratified age/sex sample was successful to give a sample that was said to be almost representative to the national Internet population in age/sex/areas of living. However, large characteristic differences were thought to exist in two categories. Firstly, there is a stronger representation of people who stay alone than people who stay with others in this sample. Staying alone or with others may influence online behaviour, as those who stay alone may have more time by themselves, and less commitment to the others. As they are staying alone, they may have more freedom to access Internet longer without interference. Secondly, people who access Internet through keitai/PHS were underrepresented in this study. This phenomenon was thought to be attributed to three possible reasons: (i) The survey was designed as PC version, and no keitai/PHS version was available. (ii) The participants in this survey were not favoured to online access through keitai/PHS. (iii) Some participants in this survey did not possess a keitai/PHS. These differences found were thought to be the one of the main limitations of sample bias.

4.2 Normality Distributions

The normality distributions of the 3 IA scales suggested that CIUS had the most normal distribution. CIUS also had normal distribution for both men and women, as well as for all age groups. As suggested by the results, I will recommend CIUS as the most suitable instrument for population survey to study prevalence in Japan. I will only recommend JIAT along with CIUS for the population survey if it concerns only adolescents and young adults (< 30). I will recommend GPIUS2 along with CIUS if the population survey considers samples below age 50.

4.3 Reliability

In contrast to what was expected, JIAT yielded a high internal consistency. All the three scales had yielded high reliability ($\alpha > .9$ in Cronbach's alpha coefficient) suggesting that they were reliable for test in the Japanese population.

The reliability of GPIUS2 subscales were ranged from $.76 < \alpha < .92$ indicating high internal consistency. In the GPIUS2-MR subscale, item 2 was found to have particularly low item-total correlation compared to item 7 and 12. And the reliability test showed that by deleting item 2 from GPIUS2-MR would increase the reliability to a small extent. The similar was shown with GPIUS2-CU subscale, where item 14 was found to have lower item-total correlation compared to item 4 and 9. The reliability showed that by deleting item 14 from GPIUS2-CU would increase

the reliability to a small extent. As the reliability of GPIUS2-MR and GPIUS2-CU was in a high range of $\alpha < .8$, and the reliability would only increase to a small extent (< .05) [89], it is not necessary to remove the items from the instruments. Reliability test for GPIUS2-NO showed that the item-total correlation of item 10, 5 and 15 was in ascending hierarchical. However, it is not recommendable to remove any of the items as it would only result a small increase for the reliability. The mean scores of the three items of GPIUS2-NO were observed to be inconsistent. This observation indicates that the ability of GPIUS2-NO to stand alone as a reliable instrument is questionable.

4.4 Validity

4.4.1 Construct Validity of the IA scales

4.4.1.1 Construct validity on the mean differences of IA scales

The examination of the distribution of the three IA scales among different demographic subgroups showed that the three IA scales had similar patterns with a slight difference in their sensitivity to group differences. The similarities and differences are discussed further as below.

4.4.1.1.1 Self-diagnosis as a simple screening question

Few have studied the correlations of self-diagnosis with IA. The self-diagnosis was found to have a moderate positive association with IA, but with a tendency of over estimating IA, as

hypothesized. This finding is consistent with an earlier finding [50]. However one interesting feature was found with the simple self-diagnosis question. Those who did not think that they have IA had really low mean scores, which were at the lowest rank of the scores with all the three scales that indicate no problematic internet use behaviour in the strictest form. This result and the moderate correlation between IA and the self-diagnosed question indicated that the IA instruments have good construct validity. Subsequently, this result implicates that the self-diagnose question is useful if we would like to have a simple question to screen out item for people who have no IA in the general population screening survey. However this conclusion is nevertheless immature as there is a lack of reference to clinical threshold in this study. No difference was observed with the three IA scales on this result.

4.4.1.1.2 CIUS appears to be less gender bias

What interested us is the sensitivity of the scales to gender difference. As I have described earlier in the result section, the differences between men and women in the means on both JIAT and GPIUS2 were very small though significant. The result indicates no practical advantage but a rather gender bias. Consistent with the French validation study, no significant gender difference was found for CIUS [83], and the mean scores were almost equal between men and women. The results indicated that CIUS may perform better in epidemiological study with less gender bias. If

JIAT and GPIUS2 are used in the prevalence survey, the differences between men and women will need to be examined carefully before conclusion is made.

4.4.1.1.3 The younger ones have higher IA scores

The finding of the significant higher effect of younger age groups (16 - 19 and 20 - 29 age groups) on IA is consistent with the existing studies [18,42]. These individuals were born between 1983 and 1996; thus, this generation grew up in a rather full bloom Internet era compared to older generations. JIAT appeared to be most sensitive towards changes in age, followed by CIUS and GPIUS2.

4.4.1.1.4 JIAT may be more sensitive to area difference

Of all the three scales, only JIAT had shown sensitivity to the differences in geographical areas. Participants from Chukoku demonstrated higher mean scores on IA, yet CIUS and GPIUS2 probability test showed that the higher mean scores were by chance. As I did not expect differences in geographic areas, CIUS and GPIUS2 seemed to be more favourable in this respect.

4.4.1.1.5 The middle school and the postgraduate

It is understand that common Japanese have a high school education level to undergraduate level [96]. The higher IA scores seemed to fall on both of the extremes of the education level. Consistent

with the earlier research, people with lower education (middle school education) were more likely to have high IA scores [66]. However, in this study, it was shown that not only the middle school education level, the higher education (postgraduate level) had also demonstrated a higher IA score with all the three scales. This finding is consistent with the previous study on IA in Japan [4], that echoed with the other studies on mental health, where people with higher education level tend to have elevated mental health scores [97]. This interesting finding seemed to fit into what had been discussed in a previous mental health population survey [97], where people with lower education may have not completed their compulsory education because of high anxiety, and the people with higher education may receive larger mental stress in regards to work. As IA had demonstrated a significant correlation with anxiety/depression, it can be expected that people with higher IA scores may have higher anxiety and depression. However a larger sample on both educational groups is needed for more detailed analysis to clarify this phenomenon. Meanwhile, all the three scales did not differ with one another in the result.

4.4.1.1.6 JIAT maybe more sensitive to student than the other occupational status

Consistent with most speculations and earlier findings [42,57], students had a higher effect on IA. As the employment forms of contracted employee and dispatched employee are unique to Japan, the differences in their effect on IA had yet to be studied. The result in this study indicated that being a student influence the IA mean scores more significantly than all other occupational status

except for despatched employee, especially in JIAT. This could be explained as JIAT seemed to contain more questions that specific to adolescents and being a student for example item 5 and 6. These kinds of questions were not found in CIUS or GPIUS2. The result in this study indicated that CIUS and GPIUS2 are perhaps more sensitive to contracted employee, as no differences were found between students and contracted employee. All the three scales showed the same sensitivity to dispatched employee. For both education level and occupational differences, effect sizes were much higher for CIUS compared to JIAT and GPIUS2, indicating that CIUS provides findings that are more generalizable.

4.4.1.1.7 The singles and dissatisfied

The results showed that influence of people who never had a romance relationship with others was higher than the people who had a romance relationship with others. It was also found that the people who were unsatisfied with their romance relationship had higher influence to IA than the people who were satisfied. This finding suggested that satisfaction and romance relationship maybe one of the key factors to be explore in IA. Although the odds ratio of satisfaction and romance relationship with IA was not explored in this study, the existing hint was justifiable for taking satisfaction of current romance relationship as a variable to construct the conceptual idea of IA in Japanese population. The three scales did not differ with one another in the result.

4.4.1.1.8 Hikikomori and IA are separate phenomenon

The influence of a current hikikomori status on IA has been widely discussed [53,54]. The reason to include this variable in this study was to examine whether the status of a current hikikomori would have an effect on IA scores. No significant differences in the effect of hikikomori status on IA were identified for both JIAT and CIUS. However, a significant difference was found for GPIUS2. The POSI construct contained in the scale might have influenced this result, because the other two scales did not measure this construct. Caution needs to be taken as the results showed POSI had the least correlations with IA, interpreting the relationship of hikikomori with IA by using GPIUS2 may be misleading. The interpretation of the current result of the relationship of a current hikikomori and IA is that hikikomori and IA should be seen as a separate phenomenon. However as this is the first attempt to clarify the relationship of hikikomori and IA, more carefully designed studies would be necessary before we can generalize this finding.

4.4.1.1.9 Living alone have more freedom on Internet

This study was perhaps one of the very few that attempted to explore the relationship of living alone with IA. The result showed that staying alone had a higher impact on IA. While living alone is recognized as a risk factor for depression [98], it could be suspected that the influence of living alone with IA was probably being mediated by depression. However, it was also explainable where people who live alone could have more flexibility to access Internet anytime

without fearing the behaviour interfere their commitment with other people. And people who live alone could have more time by themselves, thus Internet maybe an easier way to fill in the gap. The three scales did not differ with one another in the result.

4.4.1.1.10 JIAT and GPIUS2 are more sensitive to vulnerable groups

It had been reported that people that have better communication with family are protected from IA [1414]. Consistent with the previous findings, the people who discussed their problems with family and friends had significantly lower IA scores compared to people who chose to discuss their problems through Internet channel. Significantly higher scores on JIAT and GPIUS2 were also observed for people who discussed their problems with mental health specialists compared to people who discussed their problems with family and friends, indicating these scales are more sensitive to people who have sought professional support for mental health or practical issues in daily living, which may also represent a more vulnerable group.

4.4.1.2 Correlation validity of IA scales

4.4.1.2.1 Time has weak relationship with IA

Time had a positive but weak relationship with IA. This finding is consistent with the results of previous studies [17,25,51,52]. It was explained that accurate frequency and time spent online were difficult to collect as Internet is designed to be multi-functional today; therefore it was very

unlikely for users to use the Internet simply for one function at one time [50]. Yet to address this problem, two questions were directed specifically on time, “How many hours do you spend in a day, and how many days in a week for the past six months in average?” and “Is it difficult for you to differentiate private and official Internet use?” The results were not different in between those who found it difficult to differentiate private and official Internet use with those who found it easy to differentiate private and official Internet use. Time was still found to have weak association with IA. These results suggest that even when time spent on Internet was limited, there is still a possibility where people may be absorbed into Internet use and become addicted. However, it was also noticed in table 8 that the mean score of time spent on private Internet use increased significantly with IA severity.

4.4.1.2.2 Number of ways for Internet access had weak relationship with IA

In this study, the first question was designed to ask the number of ways for Internet access. Five options (computer, tablet computer, smartphone, keitai/PHS, other including iPod and game devises) were given and the participants were to check the options that they used to access Internet. The most options used were expected to have an association with IA. In this study, although a significant positive correlation was observed between IA and the numbers of ways to access Internet, the associations were thought to be weak. This is the first study that sought to assess the relationship between total modes of access with IA.

4.4.1.2.3 Interactive functions in IA

Lower IA scores were also found for office Internet use compared to other motivations to use the Internet. Consistent with the previous studies, interactive channels, porno, and gaming had positive correlations with IA [6,7,24,42,43]. Interestingly, interactive applications were found to have the strongest relationship with IA compared to other applications, such as gaming, porno, and romance. In fact, as presented in Table 3, the strength of correlations was the strongest for items that indicate interactions. This finding is consistent with an earlier finding in Taiwan, which indicated that social function [99], and communication for pleasure as the core role of IA [6]. This finding suggests two possibilities: (1) perhaps the IA is probably about interaction after all in the Japanese or Asian populations and/or (2) the scales are more sensitive to applications that have interaction functions.

4.4.1.2.4 Elevated mental health and IA

Consistent to the previous findings, anxiety/depression, loneliness were found to have positive low to moderate correlations with IA [53]. A positive weak correlation between IA and feeling stress as well as dissatisfaction of current situation echoed with the previous study that established that Internet as a preferred strategy to cope with negative feeling [100]. This finding supported the use of

elevated mental health as a variable in formulating the conceptual idea of IA, which in this case, both dissatisfaction and K6 were chosen for the model testing.

4.4.1.2.5 Personalities and IA

It was suggested that personalities such as shyness [101], harm avoidance, reward dependence and novelty seeking [102] were said to be positively associated with IA. To reduce participants' burden, instead of applying personality questionnaire that contains many items, I employed a few short scales used in a previous survey [87] to match the personalities that were tested with IA in the past. The few scales that were chosen for this study were the scales that measured tendency of decision avoidance, poor people skill, conflict avoidance and desires for autonomy in the study. Similar with the previous findings, the personalities tested had significant positive but weak correlations with IA. The correlations were perhaps a little stronger in decision avoidance and poor people skill than conflict avoidance and desires for autonomy. This finding suggested that impact of personalities on IA was not very strong, yet decision avoidance and poor people skill maybe given attention in future studies on IA's construct. Understanding the influence of different personalities on IA is useful in providing hints to the therapists for tailoring their interventions.

4.4.2 Concurrent and Discriminant Validity

4.4.2.1 Concurrent validity of the three scales

As hypothesized, the three IA scales were strongly correlated, demonstrating good concurrent validity, which indicates that all three scales were probably measuring the same kind of Internet behaviours. High IA scores in JIAT and CIUS also indicates that they have higher degree of the problems in self-discipline in using Internet, having more tendencies to use Internet to escape negative feelings, and their daily schedules have been influenced by Internet usage.

4.4.2.2 Concurrent validity of individual items with the IA concepts - a practical clinical reference

Considering IA as a concept of DSR [25] and negative consequences should be included as to qualified IA (Caplan, personal communication), the concepts of DSR and negative consequences (GPIUS2-DSR, GPIUS2-NO, K6, UCLA Loneliness) were used for the main reference for the relationship between IA and the individual items in each scale. These data provided a clear indicator for clinical practice in considering the urgency of treatment by comparing the scores of individual items with the concepts, if DSR and negative consequences had occurred.

With this consideration, only three quarters of JIAT were considered to have significant strong association with IA. Items in JIAT that have very weak correlations with the negative

consequences could be possibly given less attention in clinical practice were “making new friends through Internet”, “being complaint by others for accessing the Internet for too long”, “priorities in checking emails”, “lie about online activities” and “irritated if being interrupted while accessing Internet”. In the introduction section <1.4.2.1>, these items were suspected to be out of date with current Internet situation. Although the reliability test reviewed that an inclusion of these items would not affect the internal consistency, it was also found that these mentioned items did have relatively lower item-correlation than the other items in JIAT. The table (table 8-2) is very useful if the individual item scores are to be examined for clinical decision. For example, item 10 “block out disturbing thoughts about life with soothing thoughts on Internet” in JIAT had a strong correlation with MR, DSR, NO; and a moderate correlation with POSI and anxiety/depression. A person who scores high on item 10 can be an alarm to the clinicians for setting his or her intervention plan.

With the same consideration, all items in CIUS were considered to have strong association with IA except for one item “being told by others that there is a need to reduce Internet access”. This item was foreseeable as people who lived alone would not be constrained by this item even if they spent the whole day on Internet. The table (table 8-3) is very useful if the individual item scores are to be examined for clinical decision. For example, item 9 “using Internet to escape negative feelings” in CIUS had a strong correlation with POSI, MR, DSR, NO; and a moderate

correlation with anxiety/depression. A people who scores high on item 9 can be an alarm to the clinicians for setting their intervention plan.

It would be unfair to apply the same considerations for the individual items in GPIUS2 as the scale was composed by GPIUS2-DSR and GPIUS2-NO. The strength of the association between the individual items and K6/UCLA loneliness were taken into consideration. It was found that almost two third of the items in GPIUS2 were having moderate correlations with K6 and loneliness presented by UCLA loneliness scale. As GPIUS2 was not designed as a diagnostic tool, the data of individual items provided in this section would not help to define its clinical usage. However the subscales were proposed to be used to assist in clinical assessment of IA.

4.4.2.3 Discriminant validity of the three scales - a practical clinical reference

The discriminant validity was established as the severity of IA scores had consistent pattern of elevated scores for negative consequences and disturbed mental health. The four concepts (POSI, MR, DSR, NO), anxiety/depression and loneliness were used to classified the characteristics for the two diagnostic scales, JIAT and CIUS. It was identified that JIAT diagnosed IA had a strong characteristic of DSR, MR POSI, extreme high anxiety/depression and a fairly high feeling of loneliness. Whereby CIUS diagnosed IA (tier 3) had a strong characteristic of DSR, MR and anxiety/depression. Both JIAT and CIUS did not appear to have a

strong characteristic of NO. However, cautious measures are needed about the interpretation of this result, as the cut-off point for severities were not absolute. A more stringent cut-off score may prevent false-positive but underestimating the prevalence of IA. While comparing the three scales in its effect size in predicting NO, JIAT had smallest effect size, indicating JIAT was much weaker than CIUS and GPIUS2 in generalizability. The people who diagnosed themselves as IA were characterized by a higher degree of problems in self-discipline of Internet usage with a mixture of mild anxiety/depression, preference of online communication and tendencies of using Internet to make themselves feel better.

Although the correlations between the three IA scales and total time spent on private Internet use were weak, the discriminant validity of IA severities reviewed that there were significant differences between the lowest tier (common users) and the upper tiers. The actual difference of time could be from a rough estimate of 10 - 20 hours per week. It was also noticed that for all the IA scales, anxiety/depression increased significantly with IA severity, indicating the need to take the medium level of severity into consideration of treatment. Those who self-diagnosed as IA should be considered for further examination before considering treatment. What could be assumed from this study is that the higher the score, the behaviour revealed from the items of the scales will be prevalent and influential in the Internet users' life.

4.4.3 Factorial Validity of the IA scales

For all three scales, both EFA and CFA were acceptable as it showed a good fit of structural components of each scale. CIUS had the best fit to the data, followed by GPIUS2 and JIAT. The newly found latent variables of each scale had good convergent and divergent validities except for the latent concept that indicated negative outcome. These results were strengthened by cross validation of split half sample, but the comparable fit between men and women suggested that these factorial structures were stable across gender.

4.4.3.1 JIAT

Previous studies reported six factor, three factor, and one factor structures of IAT. The six factors, which are "salience" (item 19, 13, 12, 15, 10), "excessive use" (item 2, 14, 20, 1, 18), "neglect work" (item 6, 8, 9), "anticipation" (item 11 and 7), "lack of control" (item 17, 5, 16), and "neglect social life" (item 4, 3), are reported for 92 samples recruited through Internet and personal contacts, although only the data for 86 effective respondents were analyzed after data cleaning [80]. The extraction method used was principal component analysis (PCA) with varimax rotation, which assumed the factors were not correlated. Kaiser Criteria with eigenvalue >1 was adopted. The reliability of the subscales was not particularly favourable, ranging from .54-.82. Later, the same author reported a three factor solution with another 225 Internet users recruited from the data base of a previous study, using PCA with oblimin rotation method [50]. The three

factors reported were “psychological/emotional conflict” (item 3, 5. 8, 9, 10, 11, 17, 18, 19), “time-management problems” (item 1, 2, 6, 7, 16), and “mood modification” (item 4, 12, 13, 14, 15, 20). Subscales’ reliabilities were not reported in this study. Another 30-factor solution was reported with 410 students by convenient sampling [44]. Two items were deleted from the scale (item 7 and 11) based on the indicator of factor loadings. The three factors “withdrawal and social problems” (item 3, 4, 5, 9, 13, 15, 18, 19, 20), “time management and performance” (item 1, 2, 6, 8, 16, 17), and “reality substitute” (item 10, 12, 14) were extracted by PCA with promax rotation, and CFA confirmed an adequate fit (RMSEA = .07, CFI = .98, $\chi 2/df$ = 1.86). Using MLM, the one factor solution emerged for a French version [79] administered to 246 participants (undergraduate medical students and volunteers from community participants) recruited by convenient sampling. Confirmatory factor analysis showed a relatively good fit (RMSEA = .056, CFI = .92, $\chi 2/df$ = 1.72).

Comparison of my study with the previous studies is difficult, as the sample in this study represented a national Internet users aged 16 to 86 years old, while the other studies were based on relatively small and biased samples (students and convenient sampling). Sample size, age, and cultural differences can all contribute to differences among samples. Although the factorial structures are very different, few clusters of items are found to be the same across samples (cluster 1: item 3, 18 and 19; cluster 2: item 1 and 2). My sample yielded an acceptable fit for one

factor, three factor, and four factor solutions, however it was the three factor solution (absorption in Internet activity, difficulties in setting priorities, conflicts) had the best fit and the same clusters stated above were observed. These subscales had high reliability and consistent factorial structure, as examined by the EFA and CFA. The CFA indicated an adequate fit (RMSEA = .082, CFI = .92, $\chi 2/df$ = 3.1), although the convergent validity for the factor labelled as "absorption" (AVE = .49) was supported marginally, an adequate evidence of convergent validity was provided with all the indicator items retained.

4.4.3.2 CIUS

It was understood that CIUS was developed based on five different criteria (withdrawal symptoms, loss of control, preoccupation, conflict, coping/mood regulation), and had successfully demonstrated a clear one single construct in previous studies [25,83]. This could be related to the consistency of the way that the items were being expressed, "how often", which implicates frequency. Previous longitudinal studies established adequate to good fit for the one factor solution (RMSEA = .053 - .084, CFI = .966 - .986) [25]. In this study, one factor solution yielded a satisfactory result across gender, with RMSEA of .79 - .94, CFI of .935 - .952, and $\chi 2/df$ of 3.0 - 5.5. This result is not far from the earlier French validation of one factor solution (RMSEA = .08, CFI = .92, $\chi 2/df$ = 1.84).

However, it was also discovered that a three factor solution indicates a better fit (RMSEA = .06, CFI = .973, $\chi 2/df = 2.1$). The items measuring loss of control and coping/mood regulation loaded well on their original construct, whereas the withdrawal symptoms, preoccupation, and conflicts loaded well on another construct. While "absorption" and "priorities" factors were not clearly differentiated, "mood regulation" factor was well differed from them. The correlations suggest that all three factors have adequate convergent validity when retaining the indicator items. Excellent external convergent and divergent validity between the three newfound subscales in CIUS with others suggests good construct validity of the three factors solution.

4.4.3.3 GPIUS2

GPIUS2 was proposed as a conceptual idea of general problematic Internet use with five subscales representing five concepts (POSI, MR, CU, CP, NO), each demonstrating an excellent subscale reliability, which was consistent with the previous study. However, the EFA indicated that modification of the five subscales was needed. The modified version comprises similar constructs with reallocation of items under different concept. The revised subscales had comparable consistency ($\alpha > .8$), except for the revised GPIUS2-NO_r ($\alpha = .672$). The factorial structure indicated that the factors were not very strong (fig 6). On the other hand, the four factor solution indicated that the items assessing deficient self-regulation (DSR) were probably redundant (fig 7). The items under each concept were constructed poorly. While translation

difficulties could be an attribution, as discussed in the pilot study, I suspect that the underlined concepts of deficient self-regulation are not quite the same in my study as they are in other studies (conducted in North America with younger populations [32] and in Mexico with adolescents [84]). In fact, the better fit found in the adolescent sample [84] supports that the concepts represent younger populations better.

It was also found that while deficient self-regulation comprises compulsive use and cognitive preoccupation, the revised version suggested that "absorption" was a better label for "compulsive use" and "difficulties in prioritizing" was a better concept than was "cognitive preoccupation". These concepts were clear and consistent with the concepts were extracted from JIAT and CIUS. The wording choices and meaning expressed in POSI and MR were very close, which may have added to the ambiguity of the factorial structure.

4.4.3.4 Inter-factor Correlations

As it was predicted, the factors found in JIAT and CIUS (absorption and priorities) correlated well with the revised factors found in GPIUS2 (CU_r and CP_r). The high correlations indicated that absorption and priorities could be combined to serve the concept of DSR. Similarly CIUS-MR was found to have significant strong positive correlation with GPIUS2-MR_r that suggested that these two factors could be interchanged with one another to test the model fit. The relatively

strong positive correlation between JIAT-conflicts and GPIUS2-NO_r nevertheless suggested that that the two factors fit into one concept (negative consequences), and they could be interchanged with one another to test the model fit, however the model fit of the two models was not expected to be similar. The correlations between the negative consequences with the other concepts indicated that JIAT-conflicts had less correlations with others, thus it was chosen to represent the negative consequence of IA in model testing. The unfit of GPIUS2-NO as a concept of negative consequences was not surprising as it was discussed earlier in section <4.2>, the ability of GPIUS2-NO to stand alone as an instrument was questionable. Nevertheless, GPIUS2-POSI_r clearly stood alone as an independent concept as how it was predicted.

4.5 Analysis of the Conceptual Model

The conceptual idea of IA was found to fit the Japanese population by substituting the GPIUS2-subscales with CIUS and JIAT subscales. This step had successfully validated the conceptual idea proposed by GPIUS.

4.5.1 The test of different models formulated using new found subscales

The examination of different models by comparing and inter-mixing the newfound subscales has supported the conceptual model proposed by GPIUS2. Consistent with the earlier findings, POSI predicts MR and DSR, which in turn predicts NO. It was identified that CIUS has a better presentation of deficient self-regulation, which the result was consistent with expectation, as CIUS major concepts were constructed from "loss of control" and "preoccupation" [25]. The information that was gained with this study is that, the concepts proposed by GPIUS2 [32] are helpful and usable to identify IA in Japanese population. However cautions should be taken as the items presented for the concepts were not very well validated in this study. As it was discussed that the items of GPIUS2 maybe more favourable to the adolescents, future study on the validation of the scale in Japanese adolescents is necessary before the scale can be used in the Japanese population. Nevertheless, GPIUS2-POSI remained as a unique, reliable and valid subscale to test the association of the POSI concept with other concepts in IA.

4.5.2 The conceptual validity test

The results of SEM analysis on the model by adding anxiety/depression and dissatisfaction of current situation and romance relationship into the formula had provided support for the overall conceptual constructs if problematic Internet use is followed by anxiety/depression and in turn aggregates IA because of its dissatisfaction. The model had the best fit to the data, and was

equally good for both men and women. This result indicates that anxiety/depression and dissatisfaction can be considered as the main framework in testing IA, and the validity of IA instruments. POSI was found to play a crucial role in the conceptual model testing. It was not only a direct key to activate MR and DSR, but also acted as direct and indirect result of a series of IA negative consequences. The series of IA negative consequences activated POSI, thus again activated MR and DSR, resulting a vicious cycle.

4.6 The practical application of the 3 IA scales

The results in this study suggested that all the three scales are reliable and valid instruments for the assessment of Internet addiction in Japan if we wish to employ an existing instrument as to save cost and time instead of developing a new scale, as well as for the benefit for International comparison. Based on the result of this study, the practical usage of the 3 IA scales was proposed as below.

JIAT can be used as a good instrument for diagnosis purpose, because of its clear concepts of DSR, MR, POSI, anxiety/depression and loneliness. It works well with the adolescents and the young adults below age 30. The current suggested cut-offs for potential addiction and addiction were effective in showing a higher degree of mental disturbance with high K6 and UCLA loneliness scores, indicating that potential addiction should not be denied for treatment.

CIUS can be used as a good instrument for both diagnosis and epidemiological survey for general population screening purpose. It has clear concepts of DSR, MR and anxiety/depression. For diagnosis purpose, it works well for men and women, as well as for all age groups. Similar with JIAT, when the cut-offs were divided roughly into three tiers, the two upper tiers effectively showed a higher degree of mental disturbance with high K6 and UCLA loneliness scores. For the purpose of epidemiological survey in general population screening, CIUS is more preferable for four reasons: normal distribution, excellent representation of deficient self-regulation of Internet use, less sensitive to the gender differences, and better factorability. The scale had also demonstrated a good stability in longitudinal population study in the Netherland [25]. The translations available in German, French and English have made International comparison possible.

GPIUS2 can be used as a good instrument along with JIAT and CIUS for diagnosis purpose. This scale will give a clear picture of which concept that a high score belongs to. Aside for having strong characteristics of all the four concepts (POSI, MR, DSR, NO), a very high score of GPIUS2 also represented very high anxiety/depression and feeling of loneliness. Having a clear concept is foreseen to help in making valuable clinical decision. Similar with JIAT and CIUS, when the cut-offs were divided roughly into three tiers, the two upper tiers effectively showed a

higher degree of mental disturbance with high K6 and UCLA loneliness scores. GPIUS2-POSI subscale can be used as a good instrument along with CIUS in epidemiological study; the concept will be indeed valuable especially in testing the conceptual ideal of IA.

4.7 Differences in prevalence with previous study

As the prevalence of addiction and at-risk behaviour (23%) as indicated by JIAT in this study was much higher compared to the previous study (2%) [4], it is necessary to note that this sample represents the national population of Internet users, while in the previous study, of the sample comprised the national population including non-Internet users[4]. In this study, sampling of Internet users was appropriate because it is my intention to study the reliability and validity of IA scales. Furthermore, it does not make sense if the sample included people who do not use Internet.

4.8 Strength/limitation of this study and future direction

4.8.1 Strengths

The strength of this study is in the pre-stratification of gender and age and pseudo-randomization during the process of sample recruitment; therefore, the sample is quite representative of the national population in terms of demographic distribution. Second, the sample size was considerably big overall, comprising large samples of male and female participants (N > 200), improving the results' stability. Third, the validity and reliability tests of the three scales were

strengthened by split-half cross-validation sampling method. Fourth, the factorial structures of the three scales were performed on the whole sample as well as on men and women separately, indicating that the results of this study are applicable across gender. Fifth, the recruitment was done online through a survey company, which assured anonymity of participants, reducing the chances of reporting bias associated with the attempt of the participants to try to "look good" or "look smart" in the fear of being evaluated. This study is also first to empirically compare the validity of the IA concepts developed in three different Internet eras, where JIAT represents the oldest generation of IA scales, CIUS represents the mid generation of IA scales, and GPIUS2 represents the latest generation of IA scales.

4.8.2 Limitations

Although the results reported here supported the hypotheses, there are several methodological limitations.

4.8.2.1 Sample bias

Firstly, the sample was recruited through an Internet survey company, confining the participants to people who registered with the company and limiting the generalization of the results to the general population of Internet users. The sample may represent well the people who feel comfortable completing an online study, but not those who are not. For instance, people who are

heavily addicted to excessive Internet gaming may not have registered with the Internet Survey Company X, thus reducing the chance of being recruited. Secondly, people who stay alone were overrepresented in this study which may have influenced the results, as people who stay alone may more likely have a higher degree of freedom to access Internet without being questioned. Also, choosing Internet over time with others may not be of their concerns thus may reduce the total score of IA. Thirdly, people who accessed Internet with keitai/PHS were underrepresented in this study. As it was understood from the national survey where two third of the Internet population do access Internet through keitai/PHS, this difference may also play a crucial role in preventing generalizability of the result.

4.8.2.2 Selection bias

The technology limitations in Internet Survey Company X had prevented the assess to the characteristics of non-responders and the dropouts; thereby, selection bias was not excluded.

4.8.2.3 Cognitive bias

4.8.2.3.1 Items' errors bias

Questionnaires that contained too many items could have caused respondent fatigue and resulted in items' errors. To counter this possible bias, sequence of questions was carefully considered to avoid fatigue, to attract participants' attention and to increase motivation of one complete the survey. Another concern for items' errors was considered if the possibility of participants responded without considering each option carefully could have occurred. In the effort to seek to reduce this bias to the minimum, the survey company had performed data cleaning considering total time spent in completing the survey.

4.8.2.3.2 Answer choice influenced by previous questions

When the three IA scales were administered together side by side to one another, the selected answer choice could be influenced by previous questions, although each of the scale served a slight different purpose. JIAT aims to diagnose IA in official use of Internet as well as private use of Internet; CIUS aims to diagnose IA in private use of Internet; and GPIUS2 aims to diagnose IA in general Internet use. In the beginning, altering the sequence of the scales for each participant was considered to reduce the effect of such bias, when the effect of the response to the purposes of the scales were carefully examined, it was decided to carried out in the same sequence where a few other related questions were inserted in between to lead the participant to answer the

questionnaire according to the specific purpose. The feedback from the pilot study reviewed that the participants were comfortable with the item sequence, and it was also reported that they were able to answer the questions independently.

4.8.2.4 Lack of clinical threshold

The lack of the reference to a clinical sample had also made it impossible to assess the sensitivity, specificity, positive predictive value, and negative predictive value in validation of the cut-off point. Although this study was able to demonstrate that people with high IA scores had extreme scores on K6, without a reference to the measure for criterion validity in reference to the patients under IA treatment, which did not allow verification whether the high IA scores were reflective of illness behaviour, therefore conclusion could not be made if these high IA scorers were to be classified as IA patients.

4.8.2.5 Validity was not assessed in different age groups

The sample size for different age groups was not big enough to perform a separate analysis on teenagers, young adults, adults and older people. Separate analysis of the validity of IA scales in different age groups is important as it was widely agreed that IA maybe different with age [42] [18, 53]. Examination of IA in different age groups is nevertheless crucial in Japan, as there is a growing elderly population. One of the well-known health risk factor for the elderly in Japan is social

isolation because of physical inactivity, where many of the elderly people are living alone. To fill the gap of social isolation, Internet use is encouraged [60]. Therefore the pattern of IA is expected to be different in the elderly people, and more factors may need to be considered before a diagnosis and intervention can be made.

4.8.3 Future direction

I suggest that future study should seek to sample the participants from household survey to overcome sampling and selection biases, and criterion validity for JIAT and CIUS with reference to a clinical sample should be examined. The future study should contain enough samples of different age groups for separate analysis to check if IA patterns are the same across different generations. I also suggest that longitudinal study should be performed to examine test-retest reliability and the consistency of construct and factorial validity of the scale.

4.9 Conclusion

The study was designed in hope to identify an appropriate IA scale for the generation screening purpose in Japanese population. With this, effort was sought to translate two existing well developed IA instruments, CIUS and GPIUS2, into Japanese. The two existing Japanese versions of IAT were also carefully examined through a series of pilot study and discussions with a panel

of expertise, where later, reliability and validity test were performed along with the translated CIUS and GPIUS2 in this study.

After a series of pilot study and validity tests, both CIUS and GPIUS2 were said to be successfully translated into Japanese version. This is the first study to report a detailed reliability and validity of JIAT, the Japanese version of CIUS and the Japanese version of GPIUS2. Detailed examination of each item in JIAT, CIUS and GPIUS2 was also performed to obtain an elementary data for reference in clinical practice. Nevertheless this study is the first to suggest the practical use of JIAT, CIUS and GPIUS2 in different situations and purposes for Japanese population. It is also the first attempt to clarify conceptual idea of IA in Japan.

The main study was carefully planned with consideration of the possible biases and a relatively national representable sample was successfully obtained for the study. Firstly, a consistent IA pattern was successfully demonstrated with the construct validity of the three IA scales. Secondly, the three scales had successfully shown good concurrent validity. Thirdly, all the three scales had equally strong reliability, and the validity of CIUS was stronger than both JIAT and GPIUS2. Fourthly, by supplementing the similar structures found in IAT and CIUS into the conceptual model proposed by GPIUS2 had successfully shown acceptable validity, suggesting that the conceptual model fits the Japanese population to a good extent. Fifthly, validity was found to be

enhanced by inserting disturbed mental health into the formulation of conceptual model of IA, successfully demonstrated the relationship of anxiety/depression and dissatisfaction with IA. The practical usages of the three IA scales are recommended based on the results. JIAT is recommended for clinical diagnosis purpose that works well on young people. CIUS is recommended for both clinical diagnosis and population screening purpose. GPIUS2 is recommended to use along with JIAT and CIUS to clarify concepts.

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Table 1: Frequency Distribution of Data on Subdemographics

	National Population # (n=30895)		Full Participants (n=623)		Random 1 (n=311)		Random 2 (n=312)	
Sex	N	%	N	%	N	%	N	%
Men	15993	51.8	323	51.8	171	55.0	154	49.4
Women	14902	48.2	300	48.2	140	45.0	158	50.6
Total	30895		623		311		312	
Age	N	%	N	%	N	%	N	%
16 - 19	2202	7.1	44	7.1	22	7.1	22	7.1
20 - 29	5023	16.3	100	16.1	50	16.1	50	16.0
30 - 39	6375	20.6	130	20.9	65	20.9	65	20.8
40 -49	6106	19.8	124	19.9	62	19.9	62	19.9
50 -59	5068	16.4	100	16.1	50	16.1	50	16.0
> 60	6121	19.8	125	20.1	62	19.9	63	20.2
Total	30895		623		311		312	
Area	N	%	N	%	N	%	N	%
Kanto	11957	35.6	243	39.0	125	40.2	114	36.5
Hokkaido	2193	6.5	28	4.5	12	3.9	17	5.4
Tohoku	1472	4.4	25	4.0	14	4.5	11	3.5
Chubu	6147	18.3	90	14.4	46	14.8	48	15.4
Kinki	5569	16.6	145	23.3	69	22.2	75	24.0
Chukoku	1852	5.5	27	4.3	14	4.5	13	4.2
Shikoku	903	2.7	20	3.2	9	2.9	10	3.2
Kyushu/Okinawa	3486	10.4	45	7.2	22	7.1	24	7.7
Total	33579		623		311		312	
Living with others	N	%	N	%	N	%	N	%
Lives with others	30491	93.9	523	83.9	258	83.0	260	83.3
LIves alone	1977	6.1	100	16.1	53	17.0	52	16.7
Total	32468		623		311		312	
Access mode by PC	N	%	N	%	N	%	N	%
no	5136	15.3	16	2.6	2	.6	2	.6
yes	28445	84.7	607	97.4	309	99.4	310	99.4
Total	33581		623		311		312	
Access mode by Tablet	N	%	N	%	N	%	N	%
no	31793	94.7	579	92.9	293	94.2	287	92.0
yes	1788	5.3	44	7.1	18	5.8	25	8.0
Total	33581		623		311		312	
Access mode by Smartphone	N	%	N	%	N	%	N	%
no	26705	79.5	468	75.1	236	75.9	231	74.0
yes	6876	20.5	155	24.9	75	24.1	81	26.0
Total	33581		623		311		312	
Access mode by Keitai	N	%	N	%	N	%	N	%
no	11456	34.1	532	85.4	269	86.5	265	84.9
yes	22125	65.9	91	14.6	42	13.5	47	15.1
Total	33581		623		311		312	
Access mode by Others	N	%	N	%	N	%	N	%
no	29983	89.3	598	96.0	302	97.1	295	94.6
yes	3598	10.7	25	4.0	9	2.9	17	5.4
Total	33581		623		311		312	

Data from Ministry of Internal Affairs and Communication (2011) on weighted sample of participants having Internet experience over a year (n=30895)

Table 2: Description of normality distribution of the JIAT, CIUS and GPIUS2

		JIAT		CIUS		GPIUS2	
		skewness	kurtosis	skewness	kurtosis	skewness	kurtosis
Full sample		1.4	1.6	0.7	0.2	0.9	0.4
Gender	Men	1.2	1.0	0.6	0.1	0.8	0.2
	Women	1.7	2.7	0.8	0.3	0.9	0.6
Age	16-19	0.6	-0.6	0.2	-0.3	0.3	-0.1
	20-29	0.9	0.1	0.6	-0.2	0.7	0.2
	30-39	1.1	0.5	0.5	-0.6	0.6	-0.3
	40-49	1.3	1.4	0.8	0.7	0.6	-0.2
	50-59	1.7	3.3	0.6	-0.2	1.4	2.1
	>60	1.8	4.9	0.9	0.9	1.0	1.1

The normality distribution of the 3 IA scales were reported as below by using the rule of thumb that a variable is said to be reasonably close to normal if the range of skewness and kurtosis fall into
-1.0 to +1.0 (Dusick, 2011).

Table 3 : Reliability of Japanese Internet Addiction Test (IAT) (Full sample = 623) α =0.941

		Mean	SD	Item-Total Correlation	Cronbach's Alpha if Item Deleted
JIAT-1	気がつくと思っていたより、長い時間インターネットをしていることがありますか？	2.79	1.1	.588	.940
JIAT-2	インターネットをする時間を増やすために、家庭での仕事や役割をおろそかにすることがありますか？	1.74	1.0	.692	.938
JIAT-3	配偶者や友人と過ごすよりも、インターネットを選ぶことがありますか？	1.60	0.9	.650	.938
JIAT-4	インターネットで新しい仲間を作ることがありますか？	1.57	0.9	.447	.942
JIAT-5	インターネットをしている時間が長いと周りの人から文句を言われたことがありますか？	1.43	0.8	.551	.940
JIAT-6	インターネットをしている時間が長くて、学校の成績や学業に支障をきたすことがありますか？	1.30	0.7	.667	.938
JIAT-7	他にやらなければならないことがあっても、まず先に電子メールをチェックすることがありますか？	2.09	1.1	.567	.940
JIAT-8	インターネットのために、仕事の能率や成果が下がったことがありますか？	1.46	0.8	.640	.939
JIAT-9	人にインターネットで何をしているのか聞かれたとき防御的になったり、隠そうとしたことがどれくらいありますか？	1.55	0.9	.596	.939
JIAT-10	日々の生活の心配事から心をそらすためにインターネットで心を静めることがありますか？	1.68	1.0	.737	.937
JIAT-11	次にインターネットをするときのことを考えている自分に気がつくことがありますか？	1.51	0.8	.724	.937
JIAT-12	インターネットの無い生活は、退屈でむなしく、つまらないものだろうと恐ろしく思うことがありますか？	2.12	1.2	.585	.940
JIAT-13	インターネットをしている最中に誰かに邪魔をされると、いらいらしたり、怒ったり、大声を出したりすることがありますか？	1.43	0.8	.641	.939
JIAT-14	睡眠時間をけずって、深夜までインターネットをすることがありますか？	1.87	1.1	.650	.939
JIAT-15	インターネットをしていないときでもインターネットのことばかり考えていたり、インターネットをしているところを空想したりすることがありますか？	1.34	0.7	.739	.937
JIAT-16	インターネットをしているとき「あと数分だけ」と言っている自分に気がつくことがありますか？	1.87	1.1	.728	.937
JIAT-17	インターネットをする時間を減らそうとしても、できないことがありますか？	1.79	1.0	.776	.936
JIAT-18	インターネットをしていた時間の長さを隠そうとすることがありますか？	1.41	0.8	.726	.937
JIAT-19	誰かと外出するより、インターネットを選ぶことがありますか？	1.47	0.9	.690	.938
JIAT-20	インターネットをしていないと憂うつになったり、いらいらしたりしても、再開すると嫌な気持ちが消えてしまうことがありますか？	1.38	0.8	.711	.938

Table 4: Reliability of Compulsive Internet Use Scale (CIUS) (Full sample = 623) α=0.931

		Mean	SD	Item-Total Correlation	Cronbach's Alpha if Item Deleted
CIUS-1	インターネットをしているとき、それをやめることが難しいはどれくらいありますか？	1.54	1.0	.698	.925
CIUS-2	インターネットをやめるつもりでもかなり続けてしまうことはどれくらいありますか？	1.63	1.1	.710	.925
CIUS-3	インターネットの利用により睡眠不足になってしまうことはどれくらいありますか？	1.28	1.1	.688	.925
CIUS-4	インターネット利用時間を減らそうと思ったが出来なかったことはどれくらいありますか？	1.09	1.0	.758	.923
CIUS-5	ほかの人（例えば、パートナー、子ども、両親）から、インターネット利用を減らすべきだと言われることはどれくらいありますか？	.62	0.9	.567	.929
CIUS-6	インターネットをしていないときでさえも、インターネットのことを考えてしまうことはどれくらいありますか？	.75	0.9	.720	.925
CIUS-7	次のインターネット利用を楽しみにすることはどれくらいありますか？	1.39	1.1	.643	.927
CIUS-8	気分が落ち込んでいる時に、インターネットをすることはどれくらいありますか？	1.23	1.0	.720	.924
CIUS-9	悲しみやマイナスな感情から逃れるためにインターネットをすることはどれくらいありますか？	1.02	1.1	.728	.924
CIUS-10	他の人（例：パートナー、子供、両親、友人等）と一緒に時間を過ごすよりも、インターネットをしたいと思うことはどれくらいありますか？	.91	1.0	.604	.928
CIUS-11	インターネットをしたいがために宿題（仕事）を適当に早く終わらせることはどれくらいありますか？	.72	0.9	.643	.927
CIUS-12	インターネットを利用したいがために毎日やるべき（義務。例：仕事、学校、家族等）を放置したことはどれくらいありますか？	1.01	0.9	.573	.929
CIUS-13	インターネット利用を減らそうと思うことはどれくらいありますか？	.81	0.9	.687	.925
CIUS-14	インターネットを利用できない時、落ち着かなかったり、不満だったり、イライラしたりすることはどれくらいありますか？	.81	0.9	.699	.925

Table 5-1: Reliability of General Problematic Internet Use Scale 2 (GPIUS2) (Full sample = 623) α=0.948

		Mean	SD	Item-Total Correlation	Cronbach's Alpha if Item Deleted
GPIUS2-1	私は人と直接会って話すより、インターネットで人とやりとりするほうが好きだ。	2.84	1.7	.676	.946
GPIUS2-2	私にとって人と直接会って話すより、インターネットでやり取りする方が気持ちが楽である。	2.28	1.6	.683	.946
GPIUS2-3	私はコミュニケーションを人ととる時、直接会ってやりとりするより、インターネットでやりとりするほうが好きだ。	2.81	1.9	.797	.943
GPIUS2-4	私は孤立していると感じた時、人と話すのにインターネットを使うことがある。	3.47	2.1	.757	.944
GPIUS2-5	私は気分が落ち込んでいる時、気晴らしにインターネットを使うことがある。	3.13	2.0	.671	.946
GPIUS2-6	私は気分が不安定な時、気持を立て直すためにインターネットを利用したことがある。	2.91	1.9	.725	.945
GPIUS2-7	私はしばらくインターネットを利用していないと、インターネットをすることばかり考えてしまう。	3.62	2.1	.698	.945
GPIUS2-8	私はインターネットが使えないと、落ち着かない。	3.52	2.1	.756	.944
GPIUS2-9	私はインターネットをしていないと、しつこくインターネットのことを考えてしまう。	3.44	2.2	.783	.943
GPIUS2-10	私はインターネットを使う時間を制限することが難しい。	1.62	1.2	.535	.948
GPIUS2-11	私は自身のインターネット利用を制限することが難しい。	2.44	1.8	.701	.945
GPIUS2-12	インターネットをしていない時、インターネットをしたいと思う気持ちをがまんするのが難しい。	2.95	2.0	.742	.944
GPIUS2-13	インターネット利用することは、私の生活リズムを乱している。	2.25	1.7	.834	.942
GPIUS2-14	インターネットのために、約束事や予定をすっぽかしたことがある。	2.29	1.7	.816	.943
GPIUS2-15	私のインターネットの利用は、私の人生に様々な問題が起こしている。	2.18	1.6	.681	.946

Table 5-2: Reliability of GPIUS2-POSI (Full sample = 623) α=0.916

		Mean	SD	Item-Total Correlation	Cronbach's Alpha if Item Deleted
GPIUS2-1	私は人と直接会って話すより、インターネットで人とやりとりするほうが好きだ。	2.84	1.7	.832	.879
GPIUS2-6	私は気分が不安定な時、気持を立て直すためにインターネットを利用したことがある。	2.91	1.9	.829	.883
GPIUS2-11	私は自身のインターネット利用を制限することが難しい。	2.44	1.8	.836	.874

Table 5-3: Reliability of GPIUS2-MR (Full sample = 623) α=0.834

		Mean	SD	Item-Total Correlation	Cronbach's Alpha if Item Deleted
GPIUS2-2	私にとって人と直接会って話すより、インターネットでやり取りする方が気持ちが楽である。	2.28	1.6	.558	.894
GPIUS2-7	私はしばらくインターネットを利用していないと、インターネットをすることばかり考えてしまう。	3.62	2.1	.768	.697
GPIUS2-12	インターネットをしていない時、インターネットをしたいと思う気持ちをがまんするのが難しい。	2.95	2.0	.800	.659

Table 5-4: Reliability of GPIUS2-CP (Full sample = 623) α=0.883

		Mean	SD	Item-Total Correlation	Cronbach's Alpha if Item Deleted
GPIUS2-3	私はコミュニケーションを人ととる時、直接会ってやりとりするより、インターネットでやりとりするほうが好きだ。	2.81	1.9	.808	.804
GPIUS2-8	私はインターネットが使えないと、落ち着かない。	3.52	2.1	.742	.873
GPIUS2-13	インターネット利用することは、私の生活リズムを乱している。	2.25	1.7	.789	.830

Table 5-5: Reliability of GPIUS2-CU (Full sample = 623) α=0.883

		Mean	SD	Item-Total Correlation	Cronbach's Alpha if Item Deleted
GPIUS2-4	私は孤立していると感じた時、人と話すのにインターネットを使うことがある。	3.47	2.1	.807	.803
GPIUS2-9	私はインターネットをしていないと、しつこくインターネットのことを考えてしまう。	3.44	2.2	.839	.774
GPIUS2-14	インターネットのために、約束事や予定をすっぽかしたことがある。	2.29	1.7	.701	.901

Table 5-6: Reliability of GPIUS2-NO (Full sample = 623) α=0.755

		Mean	SD	Item-Total Correlation	Cronbach's Alpha if Item Deleted
GPIUS2-5	私は気分が落ち込んでいる時、気晴らしにインターネットを使うことがある。	3.13	2.0	.604	.692
GPIUS2-10	私はインターネットを使う時間を制限することが難しい。	1.62	1.2	.505	.770
GPIUS2-15	私のインターネットの利用は、私の人生に様々な問題が起こしている。	2.18	1.6	.718	.518

Table 6: Distribution of IA means of the 3 IA scales with different demographic subgroups (n=623)

					JIAT[1]		CIUS[2]		GPIUS2[3]	
		Total		%	means	(SD)	means	(SD)	means	(SD)
All Subjects					33.4	12.9	14.8	10	41.7	21
Self-Diagnosed	no	217	623	35%	26.7	6.7	9.4	6.75	29.2	13.69
	Maybe	141	623	23%	30.8	9.8	12.9	7.99	36.6	15.09
	yes	265	623	43%	40.3	14.67	20.3	10.34	54.7	21.4
	p -value					*<.001*		*<.001*		*<.001*
Sex	Men	323	623	52%	34.5	13.36	14.8	9.65	44.1	21.94
	Women	300	623	48%	32.2	12.28	14.8	10.31	39.3	19.78
	p -value					*<.001*		*0.925*		*<.01*
Age	16- 19	44	623	7%	42.6	16.82	21.3	11.16	54.3	23.41
	20-29	100	623	16%	38.9	16.12	18.5	11.13	48.5	22.96
	30-39	130	623	21%	34.1	12.51	15.7	10.26	44.1	22.07
	40-49	124	623	20%	31.7	11.35	14.2	9.32	40.8	19.45
	50-59	100	623	16%	30.2	9.82	12.2	8.19	37.1	19.59
	>60	125	623	20%	29.2	8.74	11.4	7.9	34.2	15.77
	p -value					*<.001*		*<.01*		*<.01*
Areas	Kanto	243	623	39%	32.8	12.45	14.6	10.18	40.3	20.92
	Hokkaido	28	623	4%	32.5	11.5	14.3	8.6	41.1	16.21
	Tohoku	25	623	4%	36.8	14.84	16.8	12.07	43.2	22.81
	Chubu	90	623	14%	33.4	13.73	14	9.98	42.6	23.41
	Kinki	145	623	23%	34.1	12.73	15.5	9.66	43	20.6
	Chukoku	27	623	4%	39.4	17.35	20.1	11.56	51.1	23.61
	Shikoku	20	623	3%	28.9	6.93	11.7	7.79	37.6	16.73
	Kyushu	45	623	7%	31.6	11.81	12.9	8.21	38.9	19.34
	p -value					*<.05*		*0.300*		*0.458*
Education Level	Middle School	8	623	1%	33.5	13.0	20.9	9.9	58.3	18.5
	High School	189	623	30%	32.6	12.6	14.1	9.9	40.6	21.0
	Vocational School	80	623	13%	33.6	13.1	13.9	9.4	41.6	20.7
	4 years University/ tanki daigaku	309	623	50%	33.2	13.1	14.8	10.2	40.9	20.9
	Graduate School	31	623	5%	40.4	11.9	20.4	7.7	54.4	21.2
	Others	6	623	1%	28.3	4.3	13.3	8.3	36.3	16.0
	p-value					*0.056*		*<.05*		*<.01*
Occupation	Full Time Worker	192	623	31%	33.5	12.8	15.6	9.9	42.4	21.7
	Contracted Worker	30	623	5%	33.1	11.1	14.0	10.0	43.2	23.11
	Despatched Worker	13	623	2%	37.9	14.4	18.0	10.8	48.5	24.8
	Part-timer	68	623	11%	31.9	12.1	13.5	9.5	37.5	19.25
	Self-employed	25	623	4%	31.1	10.8	10.9	7.7	34.6	16.16
	Freeter	32	623	5%	32.0	11.9	10.6	8.5	38.8	16.05
	House wife/husband	121	623	19%	30.0	10.7	13.4	9.2	35.5	17.2
	student	58	623	9%	42.4	16.0	20.7	10.7	53.8	21.16
	jobless and others	84	623	13%	33.7	13.1	14.4	10.2	46.0	23.1
	p -value					*<.001*		*<.001*		*<.001*
Marital Status/ Romance Status	Having a relationship(married/cohabitation/having a relationship with someone)	393	623	63%	31.4	11.6	13.6	9.4	37.9	19.1
	Departed from a relationship (widowed/divorced/separated/departed)	63	623	10%	33.4	13.2	13.7	9.9	40.7	22.7
	Never have a relatioinship (single)	124	623	20%	39.3	14.8	19.2	10.7	53.6	22.2
	Unknown	43	623	7%	34.5	12.8	15.0	10.2	44.1	19.9
	p -value					*<.001*		*<.001*		*<.001*
Romance Satisfaction	Unsatisfied	195	623	31%	35.4	13.5	16.2	10.1	45.4	22.7
	Unknown	43	623	7%	34.5	12.8	15.0	10.2	44.1	19.9
	Satisfied	385	623	62%	32.2	12.5	14.1	9.8	39.6	20.1
	p-value					*<.05*		*<.05*		*<.01*
Current Hikikomori	no	596	623	96%	33.2	12.9	14.7	10.0	41.3	20.8
	yes	27	623	4%	37.4	11.9	16.6	10.3	52.6	23.2
	p -value					*0.098*		*0.332*		*<.01*
Channels for Problem sharing/ discussion	family/friends	378	623	61%	32	11.85	14.1	9.56	39.5	17.42
	teacher/colleagus	52	623	8%	31.3	9.06	13.5	8.6	36.5	18.45
	specialist/social worker	16	623	3%	39.9	16.35	20	11.12	50.8	21.51
	Internet friends/Internet	46	623	7%	39	17.92	18.7	11.88	50.6	27.35
	No One	131	623	21%	35.3	13.63	15.4	10.35	46.1	22.32
	p -value					*<.001*		*0.185*		*<.01*
Living with others	Lives with others	523	623	84%	23.7	12.59	14.4	9.83	40.5	20.43
	Lives alone	100	623	16%	36.9	13.9	17	10.45	48.5	23.0
	p -value					*<.01*		*<.05*		*<.01*

1. JIAT: Japanese version of Internet Addiction Test, developed 1998. Range of scores for JIAT (20 - 100), suggested cut off at 20-39 normal user, 40-69 potential risk, 70-100 addiction

2. CIUS: Compulsive Internet Use Scale, developed 2002. Range of scores for CIUS (0 - 56), suggested cut off at 28/29 for the people in Netherland.

3. GPIUS2: General Problematic Internet Use Scale, developed 2009. Range of scores for GPIUS2 (15 - 120), no suggested cut off point.

Table 7: Pearson Correlations between Internet Addiction Scores with Interested Variables

	Self-Diagnosed	JIAT	CIUS	GPIUS2
Technology concern (TC)				
Total time spent on private Internet use	.244**	.282**	.279**	.284**
Number of ways for Internet access	.207**	.209**	.172**	.205**
TC1- motivation				
official use	.118**	.125**	.095*	.114**
stress release	.323**	.417**	.476**	.479**
Kill Time	.316**	.363**	.408**	.399**
communication	.173**	.227**	.250**	.222**
Net-friends	.237**	.354**	.324**	.418**
Information Seeking	.113**	.141**	.135**	.152**
sharing interest	.236**	.380**	.367**	.402**
sharing/discussion of personal	.233**	.367**	.382**	.381**
local SNS	.199**	.264**	.289**	.292**
TC2- Application				
Romance Site	.159**	.226**	.183**	.217**
Porno Site	.180**	.232**	.207**	.267**
2-Channel/BBS	.368**	.430**	.393**	.441**
Blogging/SNS	.258**	.320**	.272**	.313**
Information release/upload	.227**	.288**	.266**	.311**
Digital download	.250**	.292**	.266**	.268**
P2P/FTP	.166**	.189**	.206**	.211**
Online game	.102*	.200**	.187**	.230**
Online survey	.089*	0.044	0.052	.084*
Online banking	.138**	0.068	0.047	.089*
Online shopping	.211**	.189**	.205**	.208**
Mental Health				
K6 (Anxiety/Depression)	.213**	.450**	.389**	.420**
UCLA Loneliness	.146**	.284**	.261**	.339**
Dissatisfaction of current environment	.194**	.227**	.232**	.268**
Existing stress	.160**	.185**	.251**	.239**
Personalities				
Decision avoidance	.155**	.285**	.303**	.262**
Poor people skill	.127**	.277**	.286**	.330**
Conflict avoidance	0.062	.090*	.081*	.088*
Desire for autonomy	.109**	.090*	.081*	.115**

**. Correlation is significant at the 0.01 level (2-tailed).

*. Correlation is significant at the 0.05 level (2-tailed).

1. JIAT: Japanese version of Internet Addiction Test, developed 1998.
2. CIUS: Compulsive Internet Use Scale, developed 2002.
3. GPIUS2: General Problematic Internet Use Scale, developed 2009.

Table 8-1: Pearson Correlation between Internet Addiction Scales (N=623)

	1	2	3	4	5	6	7	8
1 Self-Diagnosis[#]								
2 JIAT[1]	.467**							
3 CIUS[2]	.483**	.845**						
4 GPIUS2[3]	.536**	.774**	.809**					
5 GPIUS2-NO[4]	.449**	.725**	.740**	.819**				
6 GPIUS2-POSI[5]	.368**	.548**	.514**	.802**	.559**			
7 GPIUS2-MR[6]	.406**	.626**	.705**	.864**	.610**	.670**		
8 GPIUS2-CP[7]	.534**	.715**	.758**	.913**	.688**	.640**	.721**	
9 GPIUS2-Compulsive[8]	.547**	.734**	.777**	.905**	.737**	.578**	.701**	.864**

**. Correlation is significant at the 0.01 level (2-tailed).

*. Correlation is significant at the 0.05 level (2-tailed).

[#] Point Biserial Correlation was employed

1. JIAT: Japanese version of Internet Addiction Test, developed 1998.
2. CIUS: Compulsive Internet Use Scale, developed 2002.
3. GPIUS2: General Problematic Internet Use Scale, developed 2009.
4. GPIUS2-NO: General Problematic Internet Use Scale subscale Negative Outcome
5. GPIUS2-POSI: General Problematic Internet Use Scale subscale Preference for Online Social Interaction
6. GPIUS2-MR: General Problematic Internet Use Scale subscale Mood Regulation
7. GPIUS2-CP: General Problematic Internet Use Scale subscale Cognitive Preoccupation
8. GPIUS2-Compulsive: General Problematic Internet Use Scale subscale Compulsive Use

Table 8-2: Pearson's Correlations between JIAT individual items with the other IA related variables

		Total IA scores	Self Diagnosis	Time	POSI	MR	DSR	NO	K6	UCLA Loneliness
JIAT-1	気がつくと思っていたより、長い時間インターネットをしていることがありますか？	.641**	.328**	.226**	.364**	.463**	.584**	.473**	.254**	.103**
JIAT-2	インターネットをする時間を増やすために、家庭での仕事や役割をおろそかにすることがありますか？	.670**	.253**	.214**	.335**	.439**	.531**	.562**	.274**	.149**
JIAT-3	配偶者や友人と過ごすよりも、インターネットを選ぶことがありますか？	.647**	.275**	.135**	.515**	.427**	.523**	.525**	.321**	.286**
JIAT-4	インターネットで新しい仲間を作ることがありますか？	.485**	.192**	.235**	.448**	.431**	.368**	.391**	.179**	.095*
JIAT-5	インターネットをしている時間が長いと周りの人から文句を言われたことがありますか？	.541**	.242**	.120**	.284**	.350**	.435**	.430**	.266**	.153**
JIAT-6	インターネットをしている時間が長くて、学校の成績や学業に支障をきたすことがありますか？	.593**	.211**	.161**	.391**	.374**	.432**	.518**	.281**	.212**
JIAT-7	他にやらなければならないことがあっても、まず先に電子メールをチェックすることがありますか？	.564**	.235**	.112**	.261**	.372**	.474**	.442**	.214**	.068
JIAT-8	インターネットのために、仕事の能率や成果が下がったことがありますか？	.563**	.187**	.148**	.302**	.326**	.397**	.520**	.286**	.189**
JIAT-9	人にインターネットで何をしているのか聞かれたとき防御的になったり、隠そうとしたことがどれくらいありますか？	.559**	.233**	.178**	.402**	.394**	.417**	.448**	.363**	.247**
JIAT-10	日々の生活の心配事から心をそらすためにインターネットで心を静めることがありますか？	.742**	.274**	.120**	.482**	.665**	.592**	.539**	.445**	.270**
JIAT-11	次にインターネットをするときのことを考えている自分に気がつくことがありますか？	.694**	.256**	.187**	.459**	.490**	.564**	.503**	.374**	.245**
JIAT-12	インターネットの無い生活は、退屈でむなしく、つまらないものだろうと恐ろしく思うことがありますか？	.640**	.336**	.240**	.422**	.454**	.639**	.411**	.282**	.203**
JIAT-13	インターネットをしている最中に誰かに邪魔をされると、いらいらしたり、怒ったり、大声を出したりすることがありますか？	.607**	.250**	.161**	.398**	.409**	.496**	.471**	.338**	.223**
JIAT-14	睡眠時間をけずって、深夜までインターネットをすることがありますか？	.656**	.317**	.240**	.323**	.413**	.546**	.560**	.334**	.205**
JIAT-15	インターネットをしていないときでもインターネットのことばかり考えていたり、インターネットをしているところを空想したりすることがありますか？	.683**	.276**	.135**	.396**	.416**	.579**	.534**	.362**	.272**
JIAT-16	インターネットをしているとき「あと数分だけ」と言っている自分に気がつくことがありますか？	.691**	.268**	.141**	.323**	.462**	.550**	.544**	.341**	.167**
JIAT-17	インターネットをする時間を減らそうとしても、できないことがありますか？	.733**	.322**	.201**	.315**	.447**	.622**	.591**	.322**	.180**
JIAT-18	インターネットをしていた時間の長さを隠そうとすることがありますか？	.659**	.267**	.168**	.357**	.428**	.502**	.577**	.326**	.208**
JIAT-19	誰かと外出するより、インターネットを選ぶことがありますか？	.650**	.247**	.201**	.492**	.402**	.533**	.539**	.353**	.291**
JIAT-20	インターネットをしていないと憂うつになったり、いらいらしたりしても、再開すると嫌な気持ちが消えてしまうことがありますか？	.670**	.263**	.160**	.385**	.487**	.559**	.500**	.360**	.247**

**. Correlation is significant at the 0.01 level (2-tailed).

*. Correlation is significant at the 0.05 level (2-tailed).

Table 8-3: Pearson's Correlations between CIUS individual items with the other IA related variables

		Total IA scores	Self Diagnosis	Time	POSI	MR	DSR	NO	K6	UCLA Loneliness
CIUS-1	インターネットをしているとき、それをやめることが難しいはどれくらいありますか？	.692**	.363**	.208**	.355**	.486**	.632**	.564**	.289**	.140**
CIUS-2	インターネットをやめるつもりでもかなり続けてしまうことはどれくらいありますか？	.684**	.364**	.190**	.330**	.507**	.584**	.558**	.250**	.139**
CIUS-3	インターネットの利用により睡眠不足になってしまうことはどれくらいありますか？	.677**	.369**	.226**	.306**	.458**	.602**	.612**	.246**	.154**
CIUS-4	インターネット利用時間を減らそうと思ったが出来なかったことはどれくらいありますか？	.694**	.331**	.209**	.310**	.448**	.601**	.600**	.250**	.186**
CIUS-5	ほかの人（例えば、パートナー、子ども、両親）から、インターネット利用を減らすべきだと言われることはどれくらいありますか？	.544**	.264**	.118**	.262**	.348**	.459**	.478**	.207**	.108**
CIUS-6	インターネットをしていないときでさえも、インターネットのことを考えてしまうことはどれくらいありますか？	.755**	.314**	.194**	.489**	.549**	.721**	.584**	.326**	.257**
CIUS-7	次のインターネット利用を楽しみにすることはどれくらいありますか？	.623**	.249**	.148**	.349**	.453**	.567**	.401**	.275**	.139**
CIUS-8	気分が落ち込んでいる時に、インターネットをすることはどれくらいありますか？	.726**	.272**	.124**	.416**	.761**	.615**	.491**	.315**	.200**
CIUS-9	悲しみやマイナスな感情から逃れるためにインターネットをすることはどれくらいありますか？	.744**	.265**	.147**	.462**	.773**	.616**	.541**	.358**	.219**
CIUS-10	他の人（例：パートナー、子供、両親、友人等）と一緒に時間を過ごすよりも、インターネットをしたいと思うことはどれくらいありますか？	.669**	.239**	.189**	.550**	.510**	.590**	.517**	.349**	.299**
CIUS-11	インターネットをしたいがために宿題（仕事）を適当に早く終わらせることはどれくらいありますか？	.643**	.255**	.120**	.362**	.483**	.521**	.503**	.231**	.175**
CIUS-12	インターネットを利用したいがために毎日やるべき（義務。例：仕事、学校、家族等）を放置したことはどれくらいありますか？	.532**	.211**	.126**	.266**	.350**	.394**	.536**	.258**	.164**
CIUS-13	インターネット利用を減らそうと思うことはどれくらいありますか？	.682**	.262**	.172**	.367**	.512**	.528**	.605**	.263**	.215**
CIUS-14	インターネットを利用できない時、落ち着かなかったり、不満だったり、イライラしたりすることはどれくらいありますか？	.712**	.272**	.144**	.407**	.496**	.650**	.543**	.332**	.281**

**. Correlation is significant at the 0.01 level (2-tailed).

*. Correlation is significant at the 0.05 level (2-tailed).

Table 8-4: Pearson's Correlations between GPIUS2 individual items with the other IA related variables

		Total IA scores	Self Diagnosis	Time	POSI	MR	DSR	NO	K6	UCLA Loneliness
GPIUS-1	私は人と直接会って話すより、インターネットで人とやりとりするほうが好きだ。	.625**	.279**	.139**	.922**	.607**	.555**	.480**	.309**	.303**
GPIUS-2	私にとって人と直接会って話すより、インターネットでやり取りする方が気持ちが楽である。	.655**	.276**	.138**	.684**	.758**	.581**	.545**	.291**	.212**
GPIUS-3	私はコミュニケーションを人ととる時、直接会ってやりとりするより、インターネットでやりとりするほうが好きだ。	.787**	.404**	.277**	.609**	.631**	.870**	.626**	.317**	.257**
GPIUS-4	私は孤立していると感じた時、人と話すのにインターネットを使うことがある。	.771**	.410**	.242**	.512**	.607**	.862**	.636**	.308**	.195**
GPIUS-5	私は気分が落ち込んでいる時、気晴らしにインターネットを使うことがある。	.732**	.355**	.229**	.431**	.532**	.687**	.870**	.301**	.215**
GPIUS-6	私は気分が不安定な時、気持を立て直すためにインターネットを利用したことがある。	.682**	.289**	.154**	.930**	.631**	.614**	.546**	.363**	.384**
GPIUS-7	私はしばらくインターネットを利用していないと、インターネットをすることばかり考えてしまう。	.703**	.316**	.074	.525**	.912**	.651**	.502**	.310**	.217**
GPIUS-8	私はインターネットが使えないと、落ち着かない。	.765**	.424**	.235**	.527**	.624**	.873**	.562**	.290**	.200**
GPIUS-9	私はインターネットをしていないと、しつこくインターネットのことを考えてしまう。	.800**	.424**	.260**	.510**	.634**	.888**	.664**	.292**	.195**
GPIUS-10	私はインターネットを使う時間を制限することが難しい。	.572**	.203**	.106**	.490**	.454**	.453**	.717**	.251**	.190**
GPIUS-11	私は自身のインターネット利用を制限することが難しい。	.657**	.249**	.162**	.926**	.621**	.579**	.523**	.362**	.360**
GPIUS-12	インターネットをしていない時、インターネットをしたいと思う気持ちをがまんするのが難しい。	.753**	.282**	.129**	.568**	.922**	.682**	.553**	.393**	.280**
GPIUS-13	インターネット利用することは、私の生活リズムを乱している。	.831**	.352**	.234**	.608**	.708**	.868**	.689**	.372**	.324**
GPIUS-14	インターネットのために、約束事や予定をすっぽかしたことがある。	.833**	.350**	.238**	.555**	.667**	.876**	.708**	.332**	.279**
GPIUS-15	私のインターネットの利用は、私の人生に様々な問題が起こしている。	.729**	.312**	.237**	.492**	.522**	.655**	.881**	.333**	.321**

**. Correlation is significant at the 0.01 level (2-tailed).

*. Correlation is significant at the 0.05 level (2-tailed).

Table 9: Distribution of means of various mental health conditions in different Internet addiction behavior cutoff points and correlations between scales.

				Age (16-86)		GPIUS2 -NO[4] (3-24)		GPIUS2 -DSR[5] (6-48)		GPIUS2 - MR[6] (3-24)		GPIUS2 - POSI[7] (3-24)		Total Time Spent (0-168 hrs/week)		K6 Anxiety/ Depression (0-24)		UCLA Loneliness Scale (20-80)	
		N	%	Mean	(SD)	Mean	(SD)	Mean	(SD)	Mean	(SD)	Mean	(SD)	Mean	(SD)	Mean	(SD)	Mean	(SD)
JIAT[1]	20-39	476	76%	45.3	15.4	5.6	2.7	14.1	7.1	7.4	4.1	6.9	3.9	21.0	23.7	2.9	4.1	40.6	11.2
	40-69	133	21%	37.0	14.9	10.9	3.7	28.4	8.7	13.0	4.7	11.6	5.2	32.0	21.3	7.1	5.5	47.4	12.9
	70-100	14	2%	30.0	13.5	16.4	3.8	40.9	7.9	19.1	3.5	18.9	6.2	39.5	26.4	11.0	7.9	55.1	14.2
				F(2,620)=20.8		*F(2,620)=239.1*		*F(2,620)=260.2*		*F(2,620)=134.6*		*F(2,620)=107.0*		*F(2,620)=14.8*		*F(2,620)=61.7*		*F(2,620)=26.4*	
	p-value			*<.001*		*<.001*		*<.001*		*<.001*		*<.001*		*<.001*		*<.001*		*<.001*	
				effect size .063		*effect size .044*		*effect size .456*		*effect size .303*		*effect size .257*		*effect size .046*		*effect size .166*		*effect size .078*	
CIUS[2]	0-18	433	70%	45.9	15.4	5.3	2.7	13.3	6.6	6.9	3.9	6.8	4.1	19.8	21.8	2.9	4.4	40.8	11.9
	19-37	174	28%	37.2	14.8	10.3	3.6	27.1	8.5	12.8	4.4	11.0	5.0	32.9	26.1	6.1	5.3	45.8	11.6
	38-56	16	3%	32.4	11.8	15.2	3.8	38.9	7.9	18.1	3.4	14.6	7.6	32.4	20.8	7.8	7.7	47.4	16.1
				F(2,620)=24.9		*F(2,620)=235.1*		*F(2,620)=296.6*		*F(2,620)=175.3*		*F(2,620)=68.5*		*F(2,620)=21.3*		*F(2,620)=32.1*		*F(2,620)=12.5*	
	p-value			*<.001*		*<.001*		*<.001*		*<.001*		*<.001*		*<.001*		*<.001*		*<.001*	
				effect size .074		*effect size .431*		*effect size .489*		*effect size .361*		*effect size .181*		*effect size .064*		*effect size .094*		*effect size .064*	
GPIUS2[3]	15 - 50	437	70%	45.5	15.5	5.2	2.4	12.7	5.7	6.5	3.5	6.1	3.3	20.5	23.6	2.8	4.1	40.3	11.3
	51 - 85	162	26%	38.1	14.9	10.4	3.5	27.8	6.1	13.5	3.1	12.1	4.0	29.3	20.4	6.1	5.4	46.3	12.0
	86 - 120	24	4%	35.2	14.0	15.2	4.0	42.6	4.3	20.0	2.3	19.8	4.5	44.8	30.4	9.8	7.2	53.5	15.3
				F(2,620)=17.2		*F(2,620)=305.6*		*F(2,620)=632.7*		*F(2,620)=388.1*		*F(2,620)=303.1*		*F(2,620)=18.8*		*F(2,620)=50.7*		*F(2,620)=26.9*	
	p-value			*<.001*		*<.001*		*<.001*		*<.001*		*<.001*		*<.001*		*<.001*		*<.001*	
				effect size .053		*effect size .50*		*effect size .671*		*effect size .556*		*effect size .494*		*effect size .057*		*effect size .141*		*effect size .08*	
Self - Diagnosis	no	217	35%	47.8	15.4	5.0	2.6	11.5	6.2	6.5	3.9	6.2	3.8	16.4	19.4	2.6	4.0	39.8	10.4
	maybe	141	23%	43.0	14.8	6.1	2.9	15.2	6.8	8.0	4.1	7.3	4.0	24.0	26.0	3.9	4.5	43.5	11.2
	yes	265	43%	39.4	15.5	9.0	4.4	24.3	10.3	11.2	5.3	10.3	5.4	29.7	24.3	5.0	5.6	43.9	13.5
				F(2,620)=17.9		*F(2,620)=82.6*		*F(2,620)=150.1*		*F(2,620)=63.1*		*F(2,620)=51.3*		*F(2,620)=19.8*		*F(2,620)=14.68*		*F(2,620)=7.8*	
	p-value			*<.001*		*<.001*		*<.001*		*<.001*		*<.001*		*<.001*		*<.001*		*<.001*	
				effect size .055		*effect size .21*		*effect size .33*		*effect size .169*		*effect size .142*		*effect size .060*		*effect size .045*		*effect size .025*	

All three scales performed similarly to one another with oneway ANOVA post-hoc comparisons using the Tukey HSD test. There is a significant impact on younger age, level of anxiety and depression, level of loneliness, negative events because of Internet, deficient self-regulations on Internet, higher tendency to use Internet for mood modification, and higher preference of choosing online social interaction with a higher score of an IA scale. The effect size, calculated using eta squared, was has medium to large effect.

1. JIAT: Japanese version of Internet Addiction Test, developed 1998. Cut-off point for severity followed the suggestion of original developer: 20-39 common user, 40-69 potential risk, 70-100 addiction.
2. CIUS: Compulsive Internet Use Scale, developed 2002. Cut-off point for severity was not absolute, yet a rough estimate by dividing the total score into three tier: 0-18 tier 1 (severity 0), 19-37 tier 2 (severity 1), 38-56 tier 3 (severity 2)
3. GPIUS2: General Problematic Internet Use Scale, developed 2009. Cut-off point for severity was not absolute, yet a rough estimate by dividing the total score into three tier: 15-50 tier 1 (severity 0), 51-85 tier 2 (severity 1), 86-120 tier 3 (severity 2)
4. GPIUS2-NO: General Problematic Internet Use Scale subscale Negative Outcome
5. GPIUS2-DSR: General Problematic Internet Use Scale subscale Deficient Self-Regulation (Combination of the two subscales that indicate Cognitive Preoccupation and Compulsive Use)
6. GPIUS2-MR: General Problematic Internet Use Scale subscale Mood Regulation
5. GPIUS2-POSI: General Problematic Internet Use Scale subscale Preference for Online Social Interaction

**. Correlation is significant at the 0.01 level (2-tailed).

*. Correlation is significant at the 0.05 level (2-tailed).

Table 10: Japanese Internet Addiction Test (JIAT) Exploratory Factor Analysis and Reliability on 1st Random Split Half sample (N=311)

		Factor		
		1	2	3
Factor 1: Absorption (JIAT-Absorption)				
JIAT-19	誰かと外出するより、インターネットを選ぶことがありますか？	.924	-.137	.060
JIAT-3	配偶者や友人と過ごすよりも、インターネットを選ぶことがありますか？	.903	-.120	-.011
JIAT-13	インターネットをしている最中に誰かに邪魔をされると、いらいらしたり、怒ったり、大声を出したりすることがありますか？	.770	.045	-.068
JIAT-15	インターネットをしていないときでもインターネットのことばかり考えていたり、インターネットをしているところを空想したりすることがありますか？	.763	.151	-.052
JIAT-11	次にインターネットをするときのことを考えている自分に気がつくことがありますか？	.753	.077	.022
JIAT-20	インターネットをしていないと憂うつになったり、いらいらしたりしても、再開すると嫌な気持ちが消えてしまうことがありますか？	.639	.182	.005
JIAT-12	インターネットの無い生活は、退屈でむなしく、つまらないものだろうと恐ろしく思うことがあり	.439	.282	-.109
JIAT-10	日々の生活の心配事から心をそらすためにインターネットで心を静めることがありますか？	.413	.195	.204
JIAT-18	インターネットをしていた時間の長さを隠そうとすることがありますか？	.376	.335	.183
JIAT-4	インターネットで新しい仲間を作ることがありますか？	.269	.079	.087
Factor 2: Difficulties in Setting Priorities (JIAT-Priorities)				
JIAT-16	インターネットをしているとき「あと数分だけ」と言っている自分に気がつくことがありますか？	-.003	.844	-.010
JIAT-17	インターネットをする時間を減らそうとしても、できないことがありますか？	.023	.844	.015
JIAT-14	睡眠時間をけずって、深夜までインターネットをすることがありますか？	-.029	.752	-.034
JIAT-1	気がつくと思っていたより、長い時間インターネットをしていることがありますか？	.001	.642	.022
JIAT-2	インターネットをする時間を増やすために、家庭での仕事や役割をおろそかにすることがあります	.275	.497	-.025
JIAT-7	他にやらなければならないことがあっても、まず先に電子メールをチェックすることがあります	-.006	.409	.277
JIAT-5	インターネットをしている時間が長いと周りの人から文句を言われたことがありますか？	.245	.249	.045
Factor 3: Conflicts (JIAT-Conflicts)				
JIAT-8	インターネットのために、仕事の能率や成果が下がったことがありますか？	-.186	.086	.974
JIAT-6	インターネットをしている時間が長くて、学校の成績や学業に支障をきたすことがありますか？	.374	-.133	.544
JIAT-9	人にインターネットで何をしているのか聞かれたとき防御的になったり、隠そうとしたことがどれくらいありますか？	.228	-.027	.451
	% Variance explained	46.1	4.5	4
	Cronbach's α coefficient	.912	.865	.751
	Chi-square	408.500		
	df	133		
	p-value	.000		
	χ^2/df	3.1		

Maximum Likelihood Analysis with Promax Rotation

Table 11: Compulsive Internet Use Scale (CIUS) Exploratory Factor Analysis and Reliability on 1st Random Split Half sample (N=311)

Item	Item Wording	Factor 1	Factor 2	Factor 3
Factor 1: Absorption (CIUS-Absorption)				
CIUS-14	インターネットを利用できない時、落ち着かなかったり、不満だったり、イライラしたりすることはどれくらいありますか？	.819	-.028	-.004
CIUS-6	インターネットをしていない時でさえも、インターネットのことを考えてしまうことはどれくらいありま	.812	.022	.019
CIUS-10	ほかの人（例：パートナー、子供、両親、友人等）と一緒に時間を過ごすよりも、インターネットを利用したいと思うことはどれくらいありますか？	.808	-.174	.051
CIUS-5	ほかの人（例えば、パートナー、子ども、両親）から、インターネット利用を減らすべきだと言われることはどれくらいありますか？	.617	.195	-.223
CIUS-11	インターネットを利用したいがために宿題（仕事）を適当に早く終わらせることはどれくらいありますか?	.516	.038	.164
CIUS-7	次のインターネット利用を楽しみにすることはどれくらいありますか？	.478	.061	.213
Factor 2: Difficulties in Setting Priorities (CIUS-Priorities)				
CIUS-13	インターネットを利用したいがために毎日やるべきこと（義務。例：仕事、学校、家のこと等）を放置したことはどれくらいありますか？	.386	.209	.191
CIUS-12	インターネット利用を減らそうと思うことはどれくらいありますか？	.373	.230	.012
CIUS-2	インターネット利用時間をやめるつもりでも、かなり続けてしまうことはどれくらいありますか？	-.135	.967	.040
CIUS-1	インターネットをしている時、それをやめにくいと感じることはどれくらいありますか？	.037	.875	-.067
CIUS-3	インターネット利用により睡眠不足になってしまうことはどれくらいありますか？	-.012	.681	.092
CIUS-4	インターネット利用時間を減らそうと思ったが出来なかった事はどれくらいありますか？	.236	.643	.000
Factor 3: Mood Regulation (CIUS-MR)				
CIUS-8	気分が落ち込んでいる時、インターネットを利用することはどれくらいありますか？	-.048	.012	.973
CIUS-9	悲しみやマイナスな感情から逃れるためにインターネットを利用することはどれくらいありますか？	.054	.015	.876
	% Variance explained	46.4	7.8	6.5
	Cronbach's α coefficient	.856	.877	.931
	Chi-square	122.323		
	df	52		
	p-value	.000		
	χ^2/df	2.4		

Maximum Likelihood Analysis with Promax Rotation

Table 12: General Problematic Internet Use Scale 2 (GPIUS2) Exploratory Factor Analysis and Reliability on Random 1st Half Sample (N=311) following the conceptual model by fixing the number of factors to five.

Item	Item Wording	Factor 1	2	3	4	5
Factor 1: Compulsive Use (GPIUS2-Compulsive_r[1])						
GPIUS2-9	私は自身のインターネット利用を制限することが難しい	.895	.016	-.002	-.036	.041
GPIUS2-4	私はインターネットをする時間を制限することが難しい	.808	.079	.022	-.011	.002
GPIUS2-5	インターネットを利用することで、私の生活リズムは乱れている	.641	-.059	.042	.386	-.172
GPIUS2-8	私はインターネットが使えないと、落ち着かない	.622	.062	-.018	-.200	.397
Factor 2: Preference of Online Social Interaction (GPIUS2-POSI_r)						
GPIUS2-1	私は直接会って話すより、インターネットで人とやりとりする方が好きだ	.058	.913	-.060	-.024	-.036
GPIUS2-11	私はコミュニケーションを取る時、直接会ってやりとりするより、インターネットでやりとりするほうが好きだ	.000	.851	.002	.077	-.028
GPIUS2-6	私にとって人と直接会って話すより、インターネットでやりとりする方が気持が楽である	.094	.798	.061	.046	-.060
GPIUS2-2	私は孤立していると感じた時、人と話すのにインターネットを使うことがある	-.083	.486	.186	.082	.158
Factor 3: Mood Regulation (GPIUS2-MR_r)						
GPIUS2-12	私は気分が不安定な時、気分を立て直すためにインターネットを利用したことが	-.067	-.010	.985	.001	.051
GPIUS2-7	私は気分が落ち込んでいる時、気晴らしにインターネットを使うことがある	.138	.079	.767	-.084	-.032
Factor 4: Troubles (GPIUS2-NO_r)						
GPIUS2-15	私のインターネット利用は、私の人生に様々な問題を起こしている	.221	-.050	.010	.681	.055
GPIUS2-10	インターネットのために、約束事や予定をすっぽかしたことがある	-.189	.290	-.110	.583	.178
Factor 5: Cognitive Preoccupation (GPIUS2-CP_r)						
GPIUS2-13	私はインターネットをしていないと、しつこくインターネットのことを考えてしまう	.013	-.009	.067	.221	.760
GPIUS2-14	インターネットをしていない時、インターネットをしたいと思う気持ちをがまんするのが難しい	.202	-.134	.093	.274	.581
GPIUS2-3	私はしばらくインターネットを利用していないと、インターネットをすることばかり考えてしまう	.392	.063	-.087	.043	.551
	% Variance explained	38.236	22.785	7.895	3.961	3.063
	Subscales Cronbach's α	.892	.892	.893	.672	.923
	Chi-square	199.999				
	df	40				
	p-value	.000				
	χ^2/df	5.0				

As the scree plot reviewed a possible break after the second or fith component, further investigation was decided to both 2 factors and 5 factors solution. EFA following the conceptual model was attempted by fixing the number of extracted factors to five, using Maximum Likelihood and promax rotation. While examing the factors, the same conceptual model seemed to be applicable with the EFA results and the reallocation of a few items in the subscales was supported by a more consistent mean found in each subscale.

1. _r is used to refer a revised version of the original proposed concept

Table 13: General Problematic Internet Use Scale 2 (GPIUS2) Exploratory Factor Analysis and Reliability on 1st Random Split Half sample (N=311)

Item	Item Wording	Factor 1	Factor 2	Factor 3	Factor 4
Factor 1: Compulsive Use (GPIUS2-Compulsive_r[1])					
GPIUS2-9	私は自身のインターネット利用を制限することが難しい	.981	.010	-.077	-.020
GPIUS2-4	私はインターネットをする時間を制限することが難しい	.863	.073	-.073	.016
GPIUS2-5	インターネットを利用することで、私の生活リズムは乱れている	.660	-.028	.108	-.001
GPIUS2-8	私はインターネットが使えないと、落ち着かない	.634	.029	.142	.074
Factor 2: Preference of Online Social Interaction (GPIUS2-POSI_r)					
GPIUS2-1	私は直接会って話すより、インターネットで人とやりとりする方が好きだ	.054	.893	-.037	-.044
GPIUS2-11	私はコミュニケーションを取る時、直接会ってやりとりするより、インターネットでやりとりするほうが好きだ	.004	.844	.067	-.021
GPIUS2-6	私にとって人と直接会って話すより、インターネットでやりとりする方が気持が楽である	.086	.788	-.003	.066
GPIUS2-2	私は孤立していると感じた時、人と話すのにインターネットを使うことがある	-.099	.465	.218	.234
Factor 3: Absorption (GPIUS2-Absorption)					
GPIUS2-13	私はインターネットをしていないと、しつこくインターネットのことを考えてしまう	.041	-.011	.861	.097
GPIUS2-14	インターネットをしていない時、インターネットをしたいと思う気持ちをがまんするのが難しい	.240	-.129	.750	.076
GPIUS2-10	インターネットのために、約束事や予定をすっぽかしたことがある	-.162	.313	.642	-.157
GPIUS2-15	私のインターネット利用は、私の人生に様々な問題を起こしている	.260	-.001	.567	-.063
GPIUS2-3	私はしばらくインターネットを利用していないと、インターネットをすることばかり考えてしまう	.415	.051	.501	-.037
Factor 4: Mood Regulation (GPIUS2-MR_r)					
GPIUS2-7	私は気分が落ち込んでいる時、気晴らしにインターネットを使うことがある	.090	.034	-.150	.914
GPIUS2-12	私は気分が不安定な時、気分を立て直すためにインターネットを利用したことがある	-.051	.000	.104	.876
	% Variance explained	54.4	8.5	4.600	4.000
	Cronbach's α coefficient	.892	.892	.899	.893
	Chi-square	217.037			
	df	51			
	p-value	.000			
	χ^2/df	4.3			

Maximum Likelihood Analysis with Promax Rotation

1. _r is used to refer a revised version of the original proposed concept

Table 14: Inter-factors Pearson correlations coefficients

		1	2	3	4	5	6	7	8	9	10	11
1	JIAT-Absorption[1]											
2	CIUS-Absorption[2]	.767**										
3	GPIUS2-CP_r[3]	.736**	.776**									
4	JIAT-Priorities[4]	.760**	.720**	.642**								
5	CIUS-Priorities[5]	.648**	.720**	.620**	.831**							
6	GPIUS2-Compulsive_r6	.661**	.690**	.785**	.723**	.749**						
7	JIAT-Conflicts[7]	.708**	.546**	.474**	.634**	.558**	.486**					
8	GPIUS2-NO_r[8]	.660**	.616**	.683**	.576**	.580**	.595**	.566**				
9	CIUS-MR[9]	.643**	.681**	.628**	.614**	.629**	.590**	.449**	.479**			
10	GPIUS2-MR_r[10]	.590**	.583**	.666**	.548**	.562**	.662**	.375**	.484**	.809**		
11	GPIUS2-POSI_r[11]	.615**	.558**	.666**	.435**	.432**	.586**	.457**	.593**	.493**	.607**	

**. Correlation is significant at the 0.01 level (2-tailed).

1. JIAT-Absorption: Japanese version of Internet Addiction Test subscale Absorption
2. CIUS-Absorption; Compulsive Internet Use Scale subscale Absoprtion
3. GPIUS2-CP_r: General Problematic Internet Use Scale 2 subscale Cognitive Preoccupation revised
4. JIAT-Priorities: Japanese version of Internet Addiction Test subscale Difficulties in Setting Priorities
5. CIUS-Priorities; Compulsive Internet Use Scale subscale Difficulties in Setting Priorities
6. GPIUS2-Compulsive_r: General Problematic Internet Use Scale 2 subscale Compulsive Use revised
7. JIAT-Conflicts: Japanese version of Internet Addiction Test subscale Conflicts
8. GPIUS2-NO_r: General Problematic Internet Use Scale 2 subscale Negative Outcome revised
9. CIUS-MR; Compulsive Internet Use Scale subscale Mood Regulation
10. GPIUS2-MR_r: General Problematic Internet Use Scale 2 subscale Mood Regulation revised
11. GPIUS2-POSI_r: General Problematic Internet Use Scale 2 subscale Preference for Online Social Interaction revised

Table 15: Modelf Fit of Conceptual Model of Internet Addiction in Japanese population

	Full Sample (n=623)							Male Sample (n=323)							Female Sample (n=300)						
	$R^{2\#}$	path estimates	p	x^2/df##	RMSEA###	CFI####	AGFI#####	R^2	path estimates	p	x^2/df	RMSEA	CFI	AGFI	R^2	path estimates	p	x^2/df	RMSEA	CFI	AGFI
Figure 1																					
Modified GPIUS2[1] structural model				**7.2**	**0.100**	**0.960**	**0.892**				**5.2**	**0.114**	**0.950**	**0.861**				**3.9**	**0.098**	**0.960**	**0.872**
POSI[2]																					
GPIUS2-POSI_r[6]→ GPIUS2-MR_r[7]		0.654	0.000						0.723	0.000						0.601	0.000				
GPIUS2-POSI_r→ GPIUS2-DSR_r[8]		0.366	0.000						0.351	0.000						0.287	0.000				
MR[3]	0.43							0.52							0.36						
GPIUS2-MR_r→ GPIUS2-DSR_r		0.529	0.000						0.581	0.000						0.561	0.000				
DSR[4]	0.67							0.76							0.59						
GPIUS2-DSR_r → GPIUS2-NO_r[9]		0.781	0.000						0.811	0.000						0.743	0.000				
NO[5]	0.61							0.66							0.55						
Conceptual structure presented by intermixing the subscales with similar concepts																					
Model 1				**4.2**	**0.073**	**0.981**	**0.932**				**1.8**	**0.049**	**0.991**	**0.944**				**3.2**	**0.085**	**0.975**	**0.900**
POSI																					
GPIUS2-POSI→ CIUS-MR[10]		0.495	0.000						0.560	0.000						0.464	0.000				
GPIUS2-POSI→ CIUS-DSR[11]		0.268	0.000						0.236	0.000						0.241	0.000				
MR	0.25							0.31							0.22						
CIUS-MR→ CIUS-DSR		0.655	0.000						0.681	0.000						0.674	0.000				
DSR	0.67							0.70							0.66						
CIUS-DSR→JIAT-Conflicts[12]		0.663	0.000						0.653	0.000						0.688	0.000				
NO	0.44							0.43							0.45						
Model 2				**5.4**	**0.084**	**0.976**	**0.916**				**2.2**	**0.062**	**0.987**	**0.930**				**3.7**	**0.095**	**0.971**	**0.889**
POSI																					
GPIUS2-POSI→ CIUS-MR		0.496	0.000						0.558	0.000						0.465	0.000				
GPIUS2-POSI→ JIAT-DSR[13]		0.371	0.000						0.366	0.000						0.305	0.000				
MR	0.25							0.31							0.22						
CIUS-MR→ JIAT-DSR		0.521	0.000						0.523	0.000						0.582	0.000				
DSR	0.60							0.62							0.60						
JIAT-DSR→JIAT-Conflicts		0.771	0.000						0.757	0.000						0.777	0.000				
NO	0.59							0.57							0.60						
Model 3				**5.7**	**0.087**	**0.971**	**0.910**				**2.8**	**0.074**	**0.980**	**0.916**				**3.3**	**0.088**	**0.971**	**0.897**
POSI																					
GPIUS2-POSI→ GPIUS2-MR_r		0.634	0.000						0.699	0.000						0.584	0.000				
GPIUS2-POSI→ CIUS-DSR		0.248	0.000						0.250	0.000						0.210	0.001				
MR	0.40							0.49							0.34						
GPIUS2-MR_r→ CIUS-DSR		0.538	0.000						0.523	0.000						0.586	0.000				
DSR	0.52							0.52							0.53						
CIUS-DSR→JIAT-Conflicts		0.669	0.000						0.655	0.000						0.688	0.000				
NO	0.45							0.43							0.47						
Model 4				**6.6**	**0.095**	**0.968**	**0.900**				**3.1**	**0.080**	**0.978**	**0.911**				**3.8**	**0.097**	**0.967**	**0.883**
POSI																					
GPIUS2-POSI→ GPIUS2-MR_r		0.627	0.000						0.691	0.000						0.583	0.000				
GPIUS2-POSI→ JIAT-DSR		0.364	0.000						0.390	0.000						0.271	0.000				
MR	0.39							0.48							0.34						
GPIUS2-MR_r→ JIAT-DSR		0.423	0.000						0.390	0.000						0.523	0.000				
DSR	0.51							0.51							0.51						
JIAT-DSR→IAT-Conflicts		0.764	0.000						0.752	0.000						0.775	0.000				
NO	0.58							0.57							0.60						
Figure 8																					
Modified conceptual structure with added variables																					
Model 5				**2.8**	**0.048**	**0.977**	**0.930**				**1.6**	**0.054**	**0.971**	**0.900**				**2.3**	**0.051**	**0.974**	**0.898**
Dissatisfaction[14]	0.53							0.60							0.5						
Dissatisfaction → GPIUS2-POSI		0.411	0.000						0.471	0.000						0.335	0.002				
POSI	0.22							0.27							0.15						
GPIUS2-POSI→ CIUS-MR		0.472	0.000						0.535	0.000						0.445	0.000				
GPIUS2-POSI→ CIUS-DSR		0.245	0.000						0.213	0.000						0.224	0.000				
MR	0.25							0.32							0.22						
CIUS-MR_r→ CIUS-DSR		0.657	0.000						0.683	0.000						0.676	0.000				
DSR	0.67							0.70							0.66						
CIUS-DSR → JIAT-Conflicts		0.642	0.000						0.625	0.000						0.657	0.000				
NO	0.43							0.43							0.46						
JIAT-Conflicts→ Anxiety/Depression		0.275	0.000						0.255	0.000						0.271	0.000				
Anxiety/Depression	0.13							0.12							0.11						
Anxiety/Depression→ Dissatisfaction		0.705	0.000						0.754	0.000						0.692	0.000				

1. GPIUS2 : General Problematic Internet Use Scale 2
2. POSI: Preference of Online Social Interaction
3. MR: Mood Regulation
4. DSR: Deficient Self-Regulationi
5. NO: Negative Outcome
6. GPIUS2-POSI_r: General Problematic Internet Use Scale 2 subscale Preference for Online Social Interaction revised
7. GPIUS2-MR_r: General Problematic Internet Use Scale 2 subscale Mood Regulation revised
8. GPIUS2-DSR_r: General Problematic Internet Use Scale 2 subscale Deficient Self-Regulation revised
9. GPIUS2-NO_r: General Problematic Internet Use Scale 2 subscale Negative Outcome revised
10. CIUS-MR; Compulsive Internet Use Scale subscale Mood Regulation
11. CIUS-DSR; Compulsive Internet Use Scale subscale Deficient Self-Regulation
12. JIAT-Conflicts: Japanese version of Internet Addiction Test subscale Conflicts
13. JIAT-DSR: Japanese version of Internet Addiction Test subscale Deficient Self-Regulation
14. Dissatisfaction: Dissatisfaction of current situation and romance status

R^2: Squared multiple correlations
χ^2/df: relative/normed chi-square ($2<\chi^2/df<5$ good fit)
RMSEA: Root mean square error of approximation (<.05 excellent fit, 0.05-0.06 good fit, 0.07-0.08 adequate fit, 0.09-0.1 fair fit, >0.1 poor fit)
CFI: Comparative Fit Index (≧ .95 good fit)
AGFI: Adjusted Good-of-fit Index (>,80 good fit)

The model should yield an acceptable goodness of fit by interchanging the subscales with JIAT[1]/CIUS[2] if the model fits Japanese population.

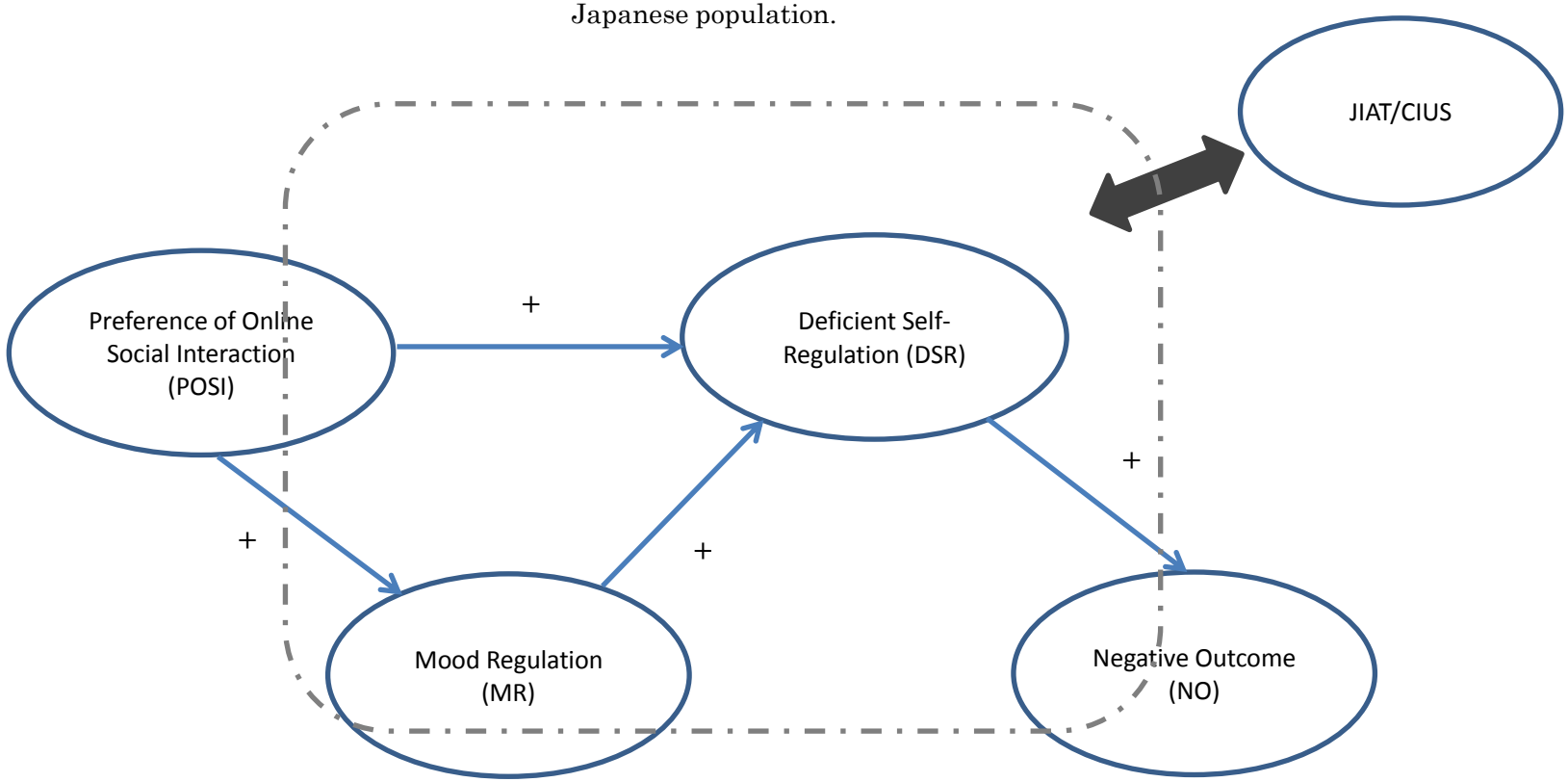


Fig 1：Conceptual Model of General Problematic Internet Use

1. JIAT: Japanese Internet Addiction Test
2. CIUS: Compulsive Inernet Use Scale

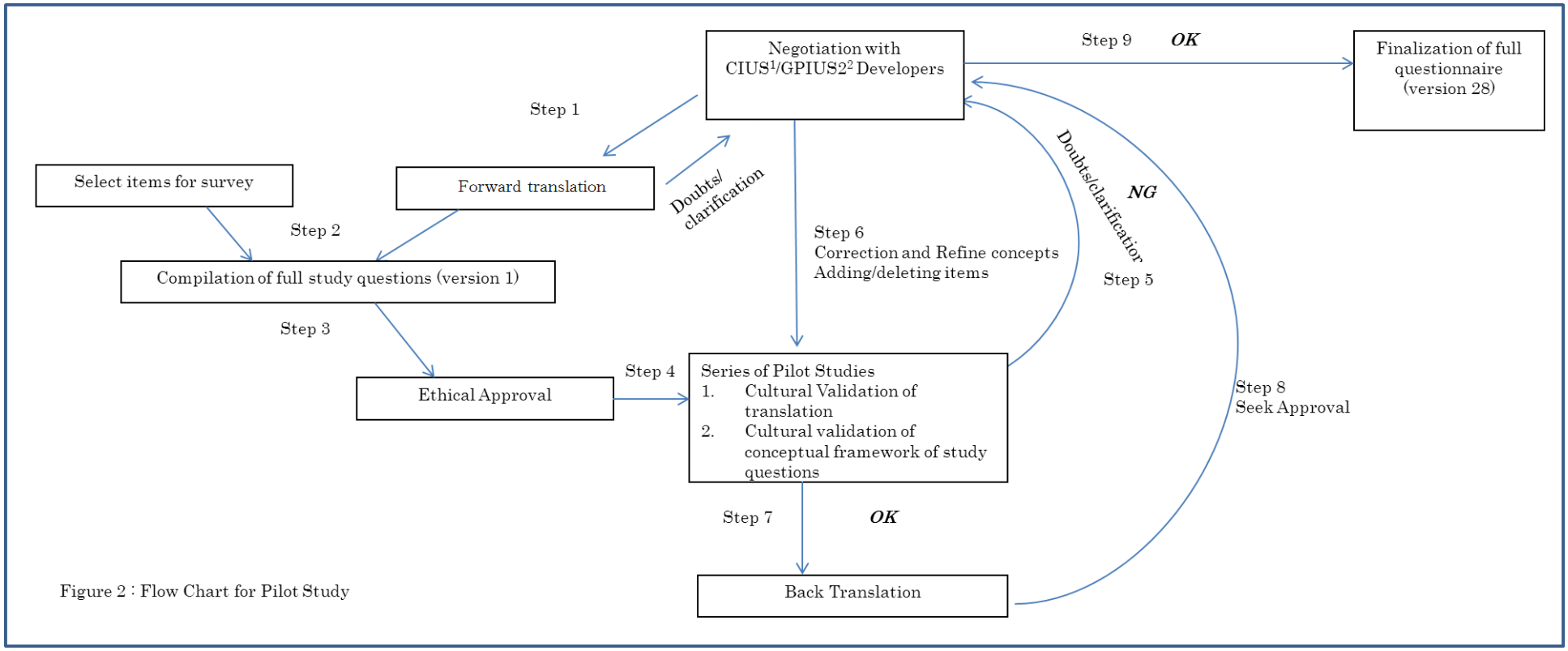
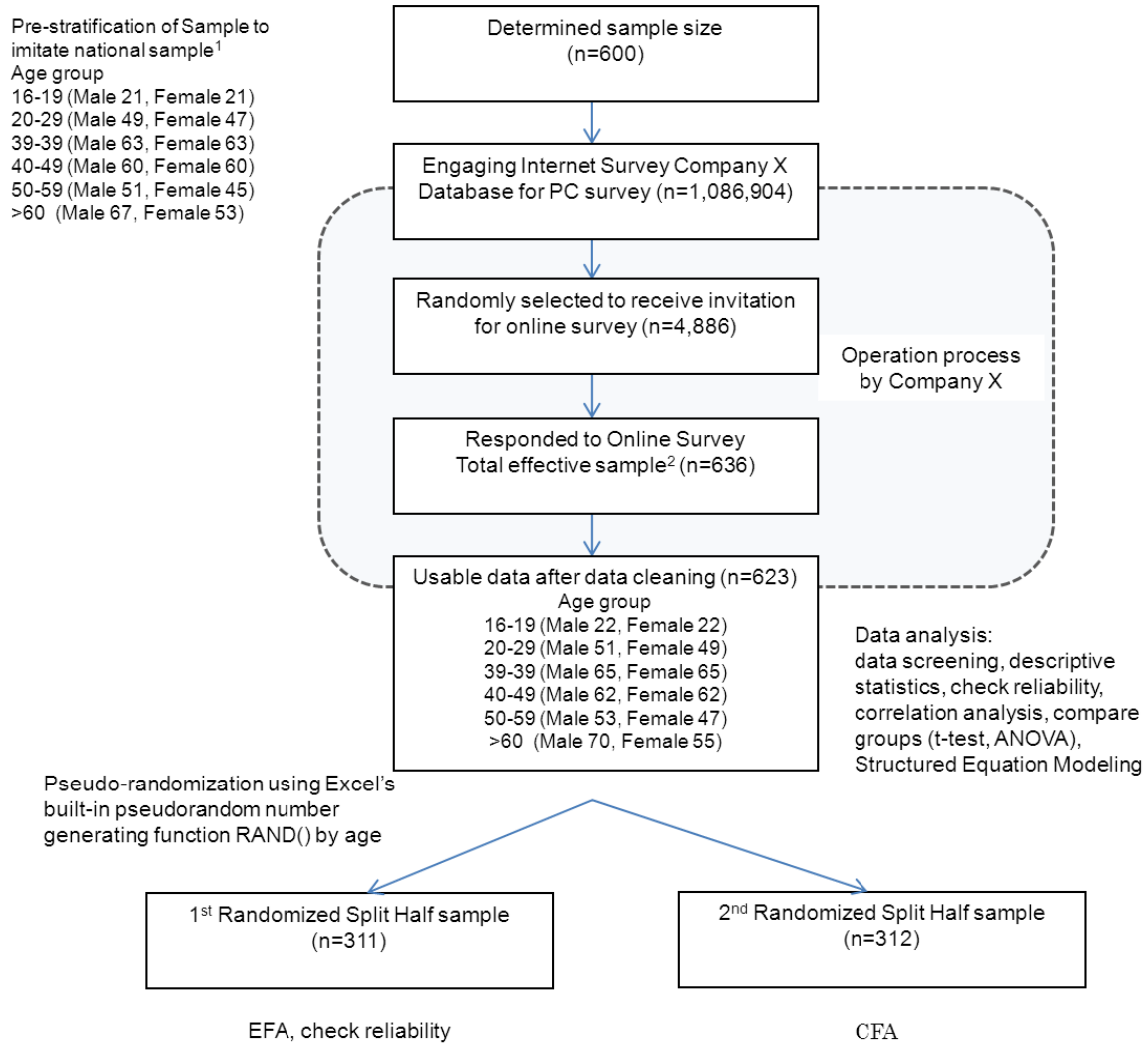


Figure 2 : Flow Chart for Pilot Study

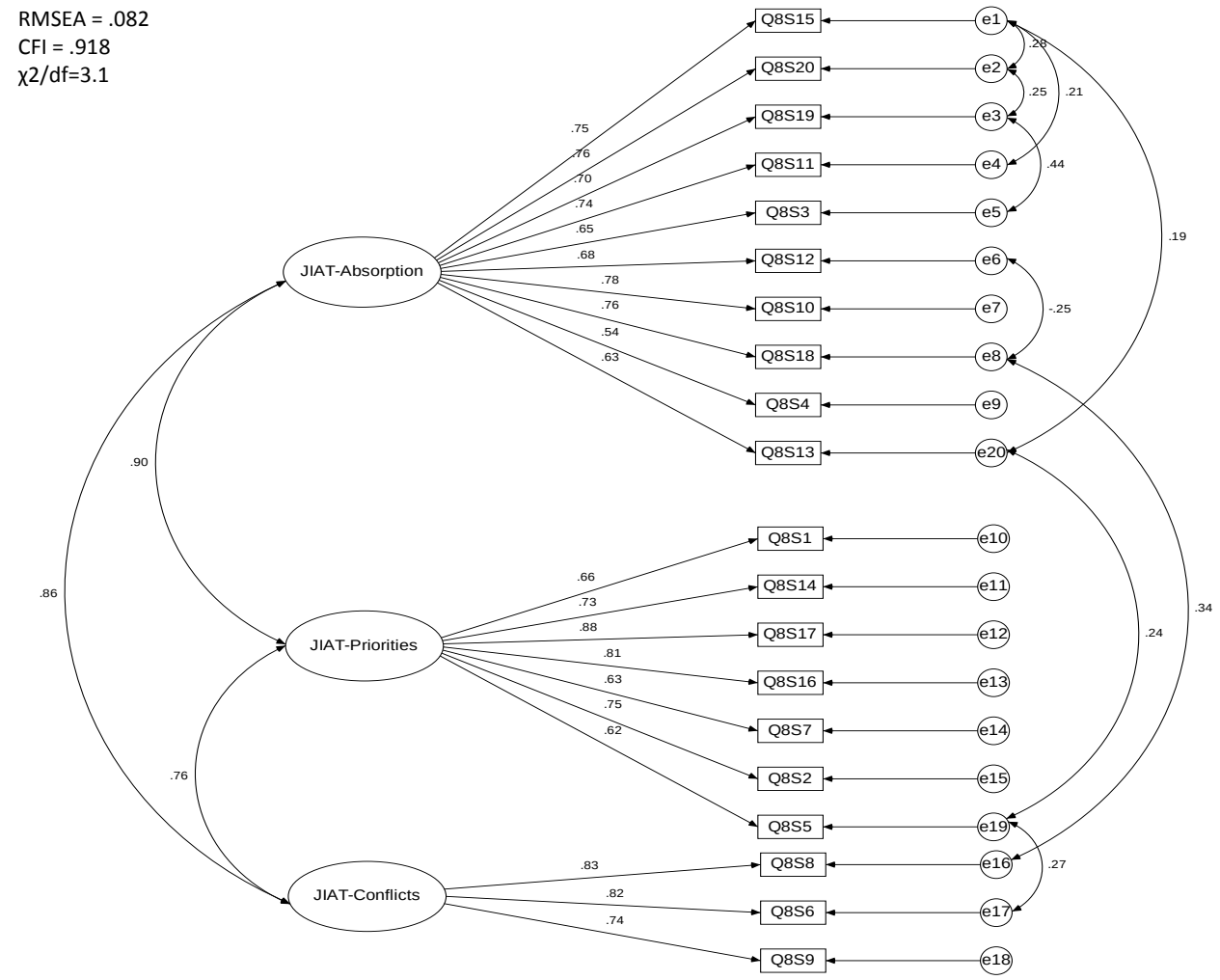
1. CIUS: Compulsive Internet Use Scale
2. GPIUS2: General Problematic Internet Use Scale 2



Note:
1. Stratified age/sex sample proportionate to the demographics of Internet users in Japan from age 15 according to survey performed by Ministry of Internal Affairs and Communication in 2011.
2. Entry to online survey is on a first come first serve basis. The link to the survey is disabled once the quota for effective sample size of the sex/age stratification is reached. An effective sample is counted by the completion of survey.

Figure 3: Participant flow

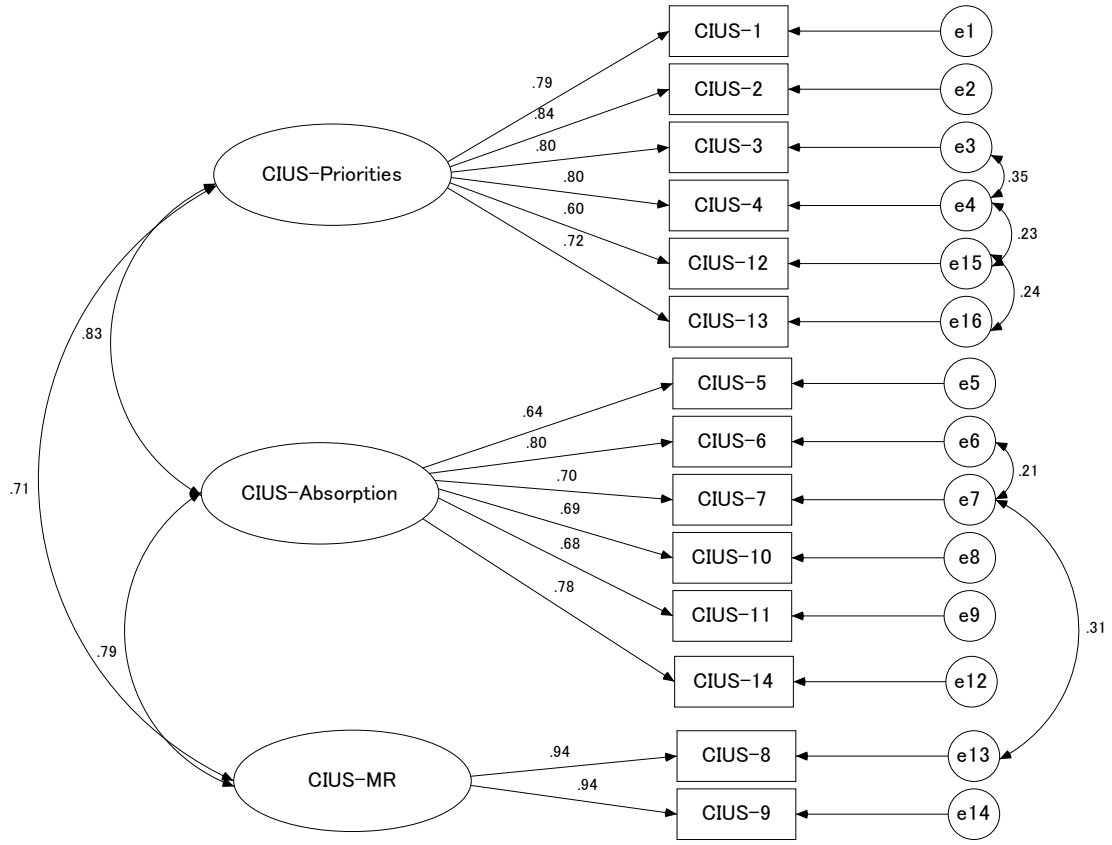
Fig 4: Confirmatory Structure analysis of Internet Addiction Test (JIAT) - 3 Factors



JIAT-Absorption: Japanese version of Internet Addiction Test subscale Absorption
JIAT-Priorities: Japanese version of Internet Addiction Test subscale Difficulties in Setting Priorities
JIAT-Conflicts: Japanese version of Internet Addiction Test subscale Conflicts
RMSEA: Root mean square error of approximation (<.05 excellent fit, 0.05-0.06 good fit, 0.07-0.08 adequate fit, 0.09-0.1 fair fit, >0.1 poor fit)
CFI: Comparative Fit Index (≧ .95 good fit)
χ^2/df: relative/normed chi-square (2<χ^2/df<5 good fit)

Fig 5: Confirmatory Structure analysis of Compulsive Internet Use Scale (CIUS)

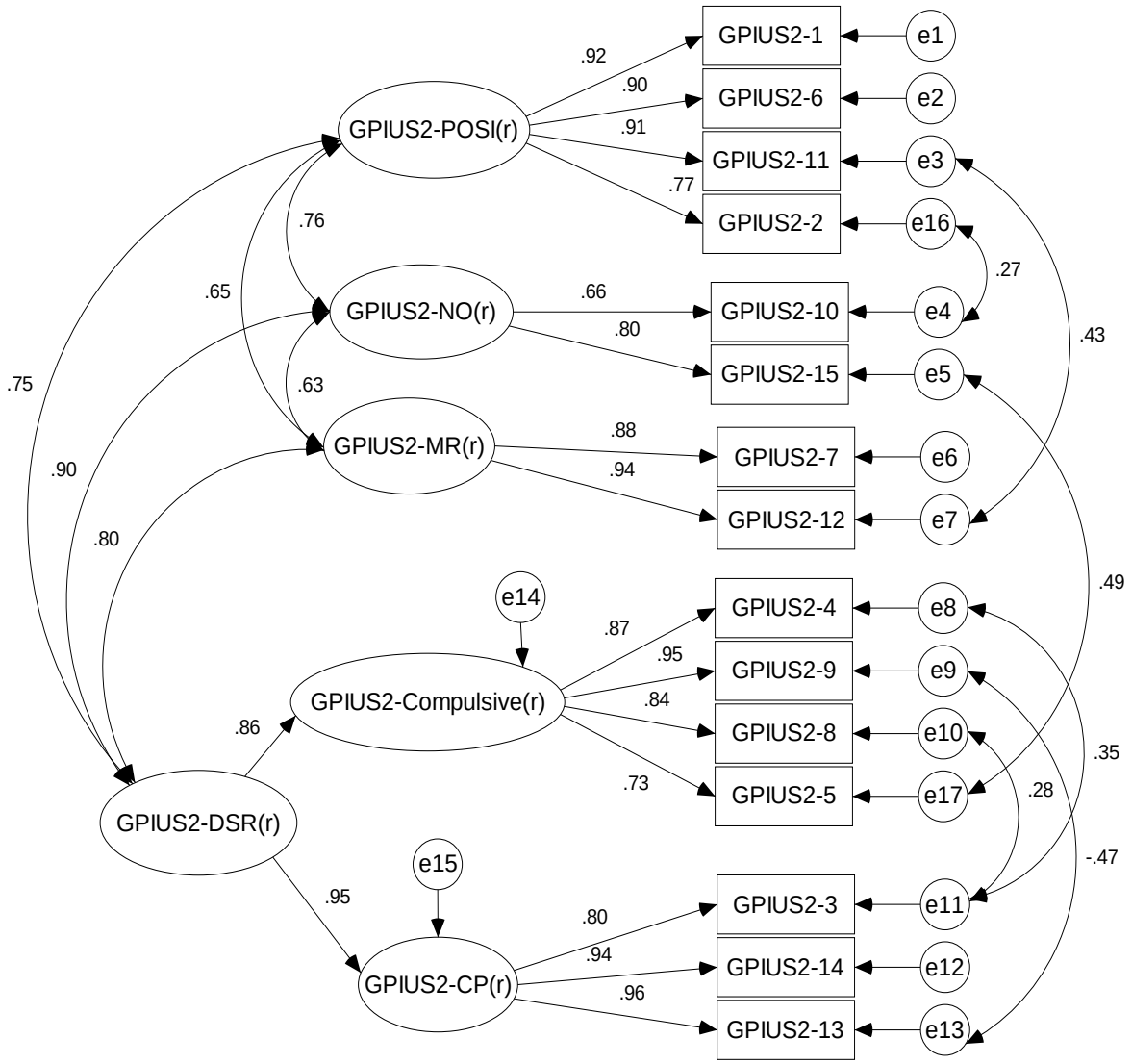
RMSEA = .060
CFI = .973
X^2/df=2.1



CIUS-Absorption: Compulsive Internet Use Scale subscale Absorption
CIUS-Priorities: Compulsive Internet Use Scale subscale Difficulties in Setting Priorities
CIUS-MR: Compulsive Internet Use Scale subscale Mood Regulation
RMSEA: Root mean square error of approximation (<.05 excellent fit, 0.05-0.06 good fit, 0.07-0.08 adequate fit, 0.09-0.1 fair fit, >0.1 poor fit)
CFI: Comparative Fit Index (≧ .95 good fit)
χ^2/df: relative/normed chi-square (2<χ^2/df<5 good fit)

Fig 6: Confirmatory Structure analysis of General Problematic Internet Use Scale (GPIUS2) - Modified Caplan Model 5 Factors

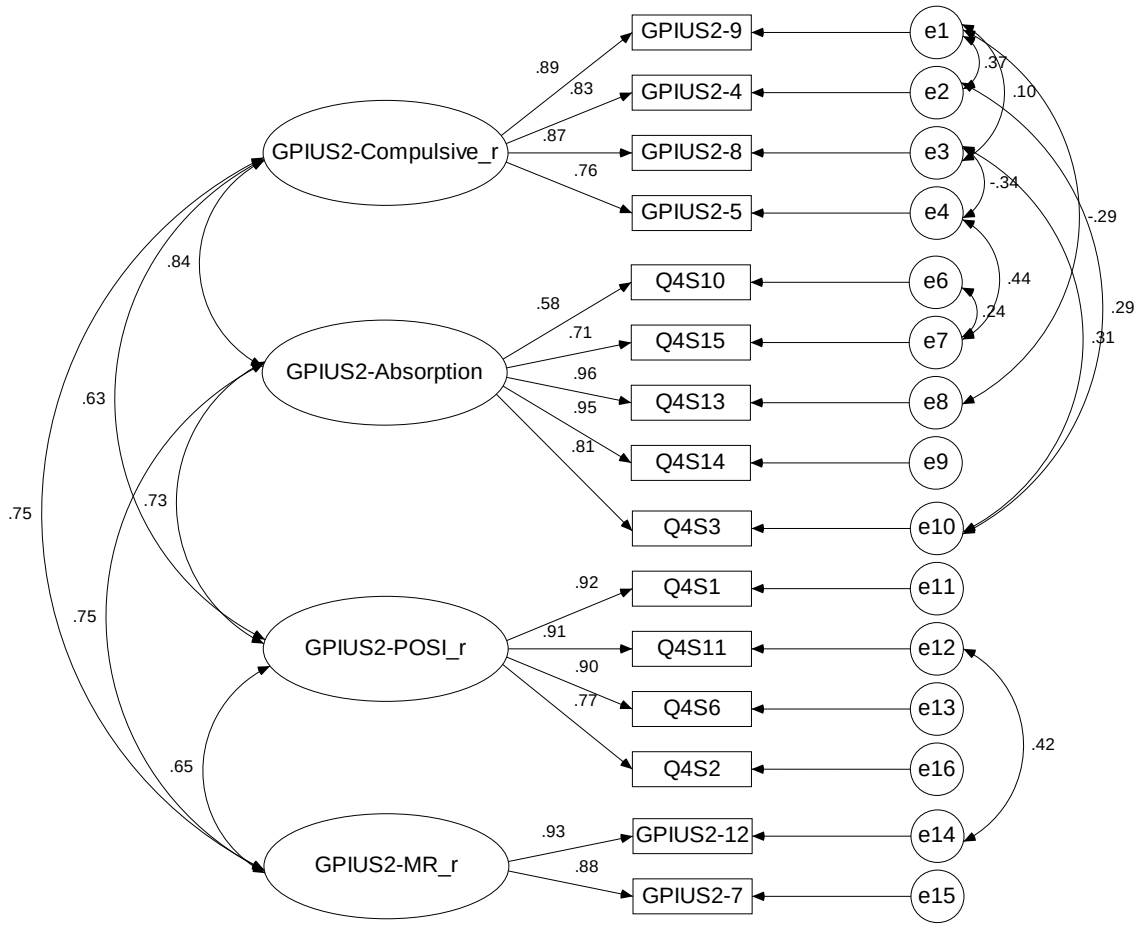
RMSEA = .079
CFI = .967
X^2/df=3.0



GPIUS2-POSI_r: General Problematic Internet Use Scale 2 subscale Preference for Online Social Interaction revised
GPIUS2-NO_r: General Problematic Internet Use Scale 2 subscale Negative Outcome revised
GPIUS2-MR_r: General Problematic Internet Use Scale 2 subscale Mood Regulation revised
GPIUS2-DSR_r: General Problematic Internet Use Scale 2 subscale Deficient Self-Regulation revised
GPIUS2-CP_r: General Problematic Internet Use Scale subscale Cognitive Preoccupation revised
GPIUS2-Compulsive_r: General Problematic Internet Use Scale subscale Compulsive Use revised
RMSEA: Root mean square error of approximation (<.05 excellent fit, 0.05-0.06 good fit, 0.07-0.08 adequate fit, 0.09-0.1 fair fit, >0.1 poor fit)
CFI: Comparative Fit Index (≧ .95 good fit)
χ^2/df: relative/normed chi-square (2<χ^2/df<5 good fit)

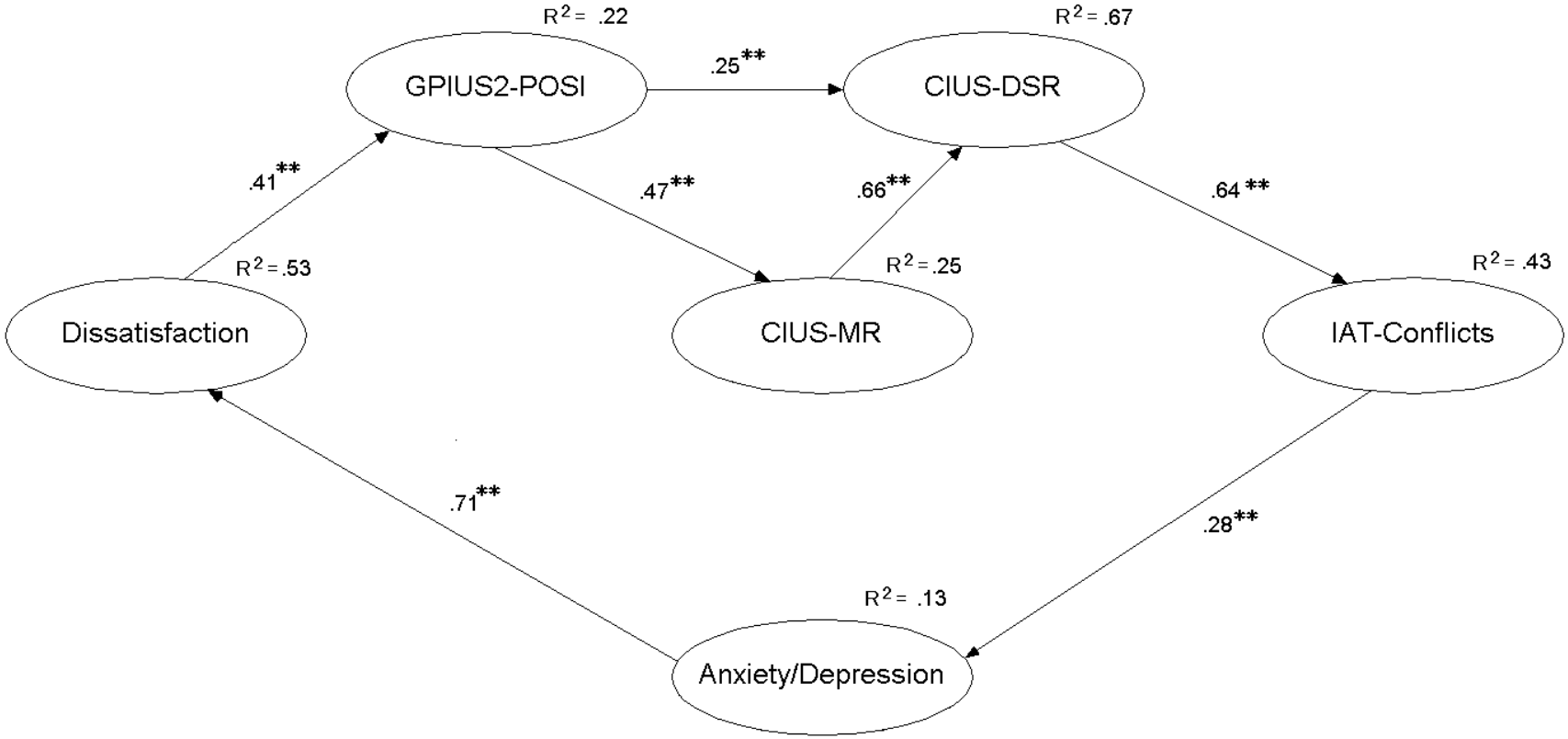
Fig 7: Confirmatory Structure analysis of General Problematic Internet Use Scale (GPIUS2) - 4 Factors

RMSEA = .088
CFI = .958
$X^2/df=3.4$



GPIUS2-Compulsive_r: General Problematic Internet Use Scale subscale Compulsive Use revised
GPIUS2-Absorption: General Problematic Internet Use Scale subscale Absorption
GPIUS2-POSI_r: General Problematic Internet Use Scale 2 subscale Preference for Online Social Interaction revised
GPIUS2-MR_r: General Problematic Internet Use Scale 2 subscale Mood Regulation revised
RMSEA: Root mean square error of approximation (<.05 excellent fit, 0.05-0.06 good fit, 0.07-0.08 adequate fit, 0.09-0.1 fair fit, >0.1 poor fit)
CFI: Comparative Fit Index (≧ .95 good fit)
χ^2/df: relative/normed chi-square ($2<\chi^2/df<5$ good fit)

Fig 8: Structural Equation Modeling of the Conceptual Model of General Problematic Internet in Japanese population



RMSEA=.048 CFI=.977 AGFI=.930 Chi-square=274.461 df=112 p=.000

GPIUS2-POSI_r: General Problematic Internet Use Scale 2 subscale Preference for Online Social Interaction revised
CIUS-MR; Compulsive Internet Use Scale subscale Mood Regulation
CIUS-DSR; Compulsive Internet Use Scale subscale Deficient Self-Regulation
JIAT-Conflicts: Japanese version of Internet Addiction Test subscale Conflicts
R^2: Squared multiple correlations
RMSEA: Root mean square error of approximation (<.05 excellent fit, 0.05-0.06 good fit, 0.07-0.08 adequate fit, 0.09-0.1 fair fit, >0.1 poor fit)
CFI: Comparative Fit Index (≧ .95 good fit)
AGFI: Adjusted Good-of-fit Index (>,80 good fit)

Attachment 1

	日本語暫定版	Back Translation to English	Original English Version
	あなたがインターネットを私用(仕事、または学校用以外）で利用するときのことについて、５段階評価（全くない、めったにない、時々ある、たびたびある、常にある）で以下の質問にお答えください。	Concerning your own private use of the internet (outside of work and school), please answer the questions below using these 5 levels of values (never, rarely, sometimes, frequently, always)	The following questions should be answered about your use of the internet for private purposes. Answers can be given on a 5-point scale: (0)Never, (1)Seldom, (2)Sometimes, (3)Often, (4)Very Often
1	インターネットをしているとき、それをやめることが難しいはどれくらいありますか？	How often do you find it difficult to stop when you are using the Internet?	How often do you find it difficult to stop using the Internet when you are online?
2	インターネットをやめるつもりでもかなり続けてしまうことはどれくらいありますか？	How often do you continue to use the Internet even when you intend to stop?	How often do you continue to use the Internet despite your intention to stop?
3	インターネットの利用により睡眠不足になってしまうことはどれくらいありますか？	How often you fall short of sleep because of Internet?	How often are you short of sleep because of internet?
4	インターネット利用時間を減らそうと思ったが出来なかったことはどれくらいありますか？	How often have you wanted to decrease how much time you spend on the internet but have not been able to do so?	How often have you unsuccessfully tried to spend less time on the Internet?
5	ほかの人（例えば、パートナー、子ども、両親）から、インターネット利用を減らすべきだと言われることはどれくらいありますか？	How often have you been told by someone else (for example, your partner, children, parents) that you should decrease your internet usage?	How often do others (e.g. partner, children, parents) say you should use the Internet less?
6	インターネットをしていないときでさえも、インターネットのことを考えてしまうことはどれくらいありますか？	How often do you think about (things on) the internet even when you're not on the internet?	How often do you think about the Internet, even when not online?
7	次のインターネット利用を楽しみにすることはどれくらいありますか？	How often do you look forward to the next time you'll be on the internet?	How often do you look forward to your next Internet session?
8	気分が落ち込んでいる時に、インターネットをすることはどれくらいありますか？	How often do you use (or, go on) the internet when you are feeling down?	How often do you go on the Internet when you are feeling down?
9	悲しみやマイナスな感情から逃れるためにインターネットをすることはどれくらいありますか？	How often do you use the internet to escape feelings of sadness or negative feelings?	How often do you use the Internet to escape from your sorrows or get relief from negative feelings?
10	他の人（例：パートナー、子供、両親、友人等）と一緒に時間を過ごすよりも、インターネットをしたいと思うことはどれくらいありますか？	How often do you feel that you want to be on the internet instead of than spending time together with someone else (for example, a partner, children, parents, friends, etc.).	How often do you prefer to use the Internet instead of spending time with others (e.g. partner, children, parents?)
11	インターネットをしたいがために宿題（仕事）を適当に早く終わらせることはどれくらいありますか？	How often do you rush through your homework (work) so that you can be on the internet?	How often do you rush through your (home) work in order to go on the Internet?
12	インターネットを利用したいがために毎日やるべき（義務。例：仕事、学校、家族等）を放置したことはどれくらいありますか？	How often do you put aside the daily routines(duties, for example, work, school, family, etc.) because you want to use the Internet?	How often do you neglect your daily obligations (work, school, or family life) because you prefer to go on the Internet?
13	インターネット利用を減らそうと思うことはどれくらいありますか？	How often have you wanted to decrease your use of the internet?	How often do you think you should use the Internet less often?
14	インターネットを利用できない時、落ち着かなかったり、不満だったり、イライラしたりすることはどれくらいありますか？	How often have you felt that you (just) couldn't settle down, you felt dissatisfied, or got irritated because you couldn't use the internet?	How often do you feel restless, frustrated, or irritated when you cannot use the Internet?

Attachment 2

	日本版暫定版	Backtranslation to English	Original English Version
	つぎの質問について、どの程度自分に当てはまるかを考え、該当する数字を〇で囲でください。(1. 全くあてはまらない、2. ほとんどあてはまらない、3. あまりあてはまらない、4. どちらかと言えばあてはまらない、5. どちらかと言えばあてはまる、6. ややあてはまる、7. かなりあてはまる、8. 非常ににあてはまる)	Please think about the following questions and think about how much they apply to you. Circle the appropriate number. 1.Does not apply 2.Mostly does not apply 3. Does not apply much 4. A slim chance of true 5.A slim chance of false 6. Applies somewhat 7. Mostly applies 8. Applies most frequently	Please rate the extent to which you agree or disagree with the following statements: 1.Definitely Disagree 2.Mostly Disagree 3.Somewhat Disagree 4.Slightly Disagree 5.Slightly agree 6.Somewhat agree 7.Mostly Agree 8.Definitely Agree.
1	私は人と直接会って話すより、インターネットで人とやりとりするほうが好きだ。	I prefer to interact with others/people by the internet rather than to meet and talk with them in person (or, directly).	I prefer online social interaction over face-to-face communication
2	私にとって人と直接会って話すより、インターネットでやり取りする方が気持ちが楽である	It is more easier for me to talk with others through Internet than meeting the person directly to talk.	Online social interaction is more comfortable for me than face-to-face interaction
3	私はコミュニケーションを人ととる時、直接会ってやりとりするより、インターネットでやりとりするほうが好きだ。	I like it more to interact through Internet than interact by meeting face-to-face when it comes to communication with people.	I prefer communicating with people online rather than face-to-face
4	私は孤立していると感じた時、人と話すのにインターネットを使うことがある。	When I feel lonely/alone, I use the internet to talk with others/people.	I have used the Internet to talk with others when I was feeling isolated
5	私は気分が落ち込んでいる時、気晴らしにインターネットを使うことがある。	When I am feeling down, I use (or, go on) the internet to relax (or, as a diversion).	I have used the Internet to make myself feel better when I was down.
6	私は気分が不安定な時、気持を立て直すためにインターネットを利用したことがある。	When I am feeling uncertain, I make use of (or, go on) the internet to make myself feel better.	I have used the Internet to make myself feel better when I've felt upset
7	私はしばらくインターネットを利用していないと、インターネットをすることばかり考えてしまう。	If I haven't used the internet for awhile then I tend to think only about using it (again).	When I haven't been online for sometime, I become preoccupied with the thought of going online
8	私はインターネットが使えないと、落ち着かない。	If I can't use the internet then I have trouble settling down.	I would feel lost if I was unable to go online
9	私はインターネットをしていないと、しつこくインターネットのことを考えてしまう。	If I am not on the internet I think about (what is on) it obsessively.	I think obsessively about going online when I am offline
10	私はインターネットを使う時間を制限することが難しい。	(I think) it is difficult to limit the amount of time one uses the internet.	I have difficulty controlling the amount of time I spend online
11	私は自身のインターネット利用を制限することが難しい。	It is difficult to limit my own use of the internet.	I find it difficult to control my Internet Use
12	インターネットをしていない時、インターネットをしたいと思う気持ちをがまんするのが難しい。	When I'm not using the internet it is difficult to suppress feelings/thoughts of wanting to use the internet.	When offline, I have a hard time trying to resist the urge to go online
13	インターネット利用することは、私の生活リズムを乱している。	My use of the internet adversely affects my daily routine (or, lifestyle rhythm).	My internet use has made it difficult for me to manage my life
14	インターネットのために、約束事や予定をすっぽかしたことがある。	I have missed appointments and planned engagements because (of)(or, I have been on) the	I have missed social engagements or activities because of my Internet use
15	私のインターネットの利用は、私の人生に様々な問題が起こしている。	My internet usage has caused many problems in my life.	My internet use has created problems for me in my life

Attachment 3

	Odajima version (1998) 全くない、めったにない、時々ある、たびたびある、常にある	Modified Odajima version (1998) used in Pilot Study 1. めったにない、時々ある、たびたびある、よくある、常にある	Kurihama version used in Main Study 全くない、まれになる、時々ある、よくある、常にある	Young (1998) 英語版 rarely, occassionaly, frequently, often, always
1	思っていたより長くオンラインにいた経験はありますか？	思っていたより長くインターネットをしている経験がありますか？	気がつくと思っていたより、長い時間インターネットをしていることがありますか？	Do you find that you stay onloine longer than you intended?
2	オンラインで長くすごしたために、家事をおろそかにしたことがありますか？	インターネットをする時間が長くすごしたために、家事をおろそかにしたことがありますか？	インターネットをする時間を増やすために、家庭での仕事や役割をおろそかにすることがありますか？	Do you neglect household chores to spend more time online?
3	パートナーと仲良くするよりも、インターネットで得られる刺激の方を求めることがありますか？	パートナーと仲良くするよりも、インターネットで得られる刺激の方を求めることがありますか？	配偶者や友人と過ごすよりも、インターネットを選ぶことがありますか？	Do you prefer the excitement of the internet to intimacy with your partner?
4	オンラインで新しく知り合いを作ることがありますか？	インターネットで新しく知り合いを作ることがありますか？	インターネットで新しい仲間を作ることがありますか？	Do you form new relationships with fellow online users?
5	周囲のだれかに、あなたがオンラインで過ごす時間について文句を言われたことがありますか？	周囲のだれかに、あなたがインターネットで過ごす時間について文句を言われたことがありますか？	インターネットをしている時間が長いと周りの人から文句を言われたことがありますか？	Do others in your life complain to you about the amount of time you spend online?
6	オンラインで費やす時間のせいで、学校(仕事)の成績や勉強に悪影響が出ていますか？	インターネットで費やす時間のせいで、学校(仕事)の成績や勉強に悪影響が出ていますか？	インターネットをしている時間が長くて、学校の成績や学業に支障をきたすことがありますか？	Does your work suffer (e.g., postponing things, not meeting deadlines, etc) because of the amount of time you spend online?
7	ほかにしなければいけないことがある時でも、電子メールをチェックしますか？	ほかにしなければいけないことがある時でも、電子メールをチェックしますか？	他にやらなければならないことがあっても、まず先に電子メールをチェックすることがありますか？	Do you check your email before something else that you need to do?
8	インターネットが原因で、仕事の能率や成果に悪影響を与えていますか？	インターネットが原因で、仕事の能率や成果に悪影響を与えていますか？	インターネットのために、仕事の能率や成果が下がったことがありますか？	Does your job performance or productivity suffer because of the internet?
9	オンラインで何をしているのかと聞かれた時、自分弁護したり、秘密主義になったりしますか？	インターネットで何をしているのかと聞かれた時、自分を弁護したり、秘密にしたりしますか？	人にインターネットで何をしているのか聞かれたとき防御的になったり、隠そうとしたことがどれくらいありますか？	Do you become defensive or secretive when anyone asks you what you do online?
10	インターネットで楽しむことを考えて、現実の生活の問題をあたらから閉め出そうとすることがありますか？	インターネットを楽しむことを考えて、現実の生活の問題を頭から閉め出そうとすることがありますか？	日々の生活の心配事から心をそらすためにインターネットで心を静めることがありますか？	Do you block disturbing thoughts about your life with soothing thoughts of the Internet?
11	次にオンラインにアクセスするのを楽しみにしている自分を意識することがありますか？	次にインターネットをするのを楽しみにしている自分を意識することがありますか？	次にインターネットをするときのことを考えている自分に気がつくことがありますか？	Do you find yourself anticipating when you will go online again?
12	インターネットのない生活は退屈で、空しく、わびしいだろうと、不安に思うことがありますか？	インターネットのない生活は退屈で、空しく、わびしいだろうと、不安に思うことがありますか？	インターネットの無い生活は、退屈でむなしく、つまらないものだろうと恐ろしく思うことがありますか？	Do you fear that life without the Internet would be boring, empty and joyless?
13	オンラインにアクセスしている最中に誰かに中断された場合、ぶっきらぼうに言い返したり、わめいたり、イライラしたりしますか？	インターネットをしている最中誰かに中断された場合、ぶっきらぼうに言い返したり、わめいたり、イライラしたりしますか？	インターネットをしている最中に誰かに邪魔をされると、いらいらしたり、怒ったり、大声を出したりすることがありますか？	Do you snap, yell, or act annoyed if someone bothers you while you are online?
14	深夜にログイン(接続）するために、睡眠不足になることがありますか？	深夜にインターネットをするために、睡眠不足になることがありますか？	睡眠時間をけずって、深夜までインターネットをすることがありますか？	Do you lose sleep due to late-night log-ins?
15	オフラインにいるときインターネットのことを考えてぼんやりしたり、オンラインにいることを空想したりしますか？	インターネットをしていないときインターネットのことを考えてぼんやりしたり、インターネットをしていることを空想したりしますか？	インターネットをしていないときでもインターネットのことばかり考えていたり、インターネットをしているところを空想したりすることがありますか？	Do you feel preoccupied with the Internet when off-line, or fantasize about being online?
16	オンラインにいるときに『あと、２，３分ぐらい』と言い訳しますか？	インターネットをしているときに『あと、２，３分ぐらい』と言い訳しますか？	インターネットをしているとき「あと数分だけ」と言っている自分に気がつくことがありますか？	Do you find yourself saying "just a few minutes" when online?
17	オンラインにいる時間を短くしようと試して失敗したことがありますか？	インターネットをしている時間を短くしようと試して失敗したことがありますか？	インターネットをする時間を減らそうとしても、できないことがありますか？	Do you cut down the amount of time you spend online and fail?
18	どれだけ長くオンラインにいたのかを人に隠そうとしますか？	どれだけ長くインターネットをしていたのかを人に隠そうとしますか？	インターネットをしていた時間の長さを隠そうとすることがありますか？	Do you try to hide how long you've been online?
19	ほかの人と出かける代わりに、もっと長い時間オンラインで過ごす方を選んだことがありますか？	ほかの人と出かける代わりに、もっと長い時間インターネットで過ごす方を選んだことがありますか？	誰かと外出するより、インターネットを選ぶことがありますか？	Do you choose to spend more time online over going out with others?
20	オフラインにいると気分が落ち込み、機嫌が悪くなって、イライラするが、オンラインに戻るとすぐに払拭できるという経験がありますか？	インターネットをしていないと気分が落ち込み、機嫌が悪くなって、イライラするが、インターネットをするに戻るとすぐに払拭できるという経験がありますか？	インターネットをしていないと憂うつになったり、いらいらしたりしても、再開すると嫌な気持ちが消えてしまうことがありますか？	Do you feel depressed, moody, or nervous when you are off-line, which goes away once you are back online?

macromill

インターネットに関するアンケート

当アンケートでは「【1】インターネットの使用、【2】現在の心の健康状態」
に関してお伺いする箇所が含まれております。
本件趣旨にご同意くださる方は、ご回答をお願いいたします。

回答をしたくないと判断された場合はお手数ですが、
「回答をやめる」ボタン、あるいはブラウザを閉じて、アンケートを終了してください。

なお、当アンケートにより取得した回答結果につきましては、
特定の個人が識別できないよう統計的に処理させていただきます。

お忙しいところ恐れ入りますが、下記アンケートにご協力お願いいたします。

当アンケートの回答者の皆様へお願い

マクロミルモニタの皆様にはモニタ規約にて「調査についての守秘義務」の徹底をお願いしています。

当アンケートの内容および当アンケートで知り得た情報については、決して第三者に口外しないよう(掲示板やホームページへの書き込みを含む)、ご協力お願いします。

▼ 以下のボタンをクリックすると別画面で画像表示されます。 ▼
必ずクリックして、別画面に表示される画像全体をよくご覧ください。

画 像 を 表 示

ここで改ページ

Q1 あなたは、普段何を使ってインターネットにアクセスしますか？(いくつでも)
【 必須入力 】

- 1. パソコンを使って
- 2. タブレット(iPad、Galaxy等)を使って
- 3. スマートフォンを使って
- 4. スマートフォン以外の携帯電話・PHSを使って
- 5. その他(iPod、ゲーム機など)

ここで改ページ

Q2 あなたは次の目的で、どれくらいインターネットを使いますか？
（どの手段でインターネットにアクセスしているかは関係なくお答えください）
【 必須入力 】

	1 全く使わない	2 あまり使わない	3 時々使う	4 たびたび使う	5 非常によく使う
1. 仕事や学校用 →	○	○	○	○	○
2. ストレス発散 →	○	○	○	○	○
3. ひまつぶし（特定の目的がない） →	○	○	○	○	○
4. もともとの知人（家族や友人など）とのコミュニケーション →	○	○	○	○	○
5. ネット上で知り合った人と付き合う・話す →	○	○	○	○	○
6. 知りたいことについて情報を探す →	○	○	○	○	○
7. 同じ趣味・嗜好を持つ人を探す、または自分の交友関係を広げる →	○	○	○	○	○
8. 同じ悩み事や相談事を持つ人を探す、または専門家や経験者に相談・質問する →	○	○	○	○	○
9. 地域 ソーシャルネットワークサービス（SNS）で住民と情報共有、地域活動に役立てる →	○	○	○	○	○
10. 出会い系 →	○	○	○	○	○

	1 全く使わない	2 あまり使わない	3 時々使う	4 たびたび使う	5 非常によく使う
11. アダルトサイト →	○	○	○	○	○
12. 掲示板、2チャンネルなど →	○	○	○	○	○
13. ブログ・ホームページ・SNS（mixi、FaceBook、Twitterなど）の閲覧、書き込み、情報発信 →	○	○	○	○	○
14. 自分の情報や作品を発表する →	○	○	○	○	○
15. デジタルコンテンツ（音楽・音声、映像、ゲームソフトなど）の入手・聴取（iTune, Youtube など） →	○	○	○	○	○
16. 電子ファイルの交換・ダウンロード（P2P、FTPなど） →	○	○	○	○	○
17. オンラインゲームの参加 →	○	○	○	○	○
18. アンケート回答／クイズ・懸賞応募 →	○	○	○	○	○
19. 金融取引（ネットバンキング、ネットトレードなど） →	○	○	○	○	○
20. インターネットオークション・ショッピング →	○	○	○	○	○

ここで改ページ

Q3 あなたご自身はインターネットに依存していると思いますか？
【 必須入力 】

- ○ 1. そう思う
- ○ 2. わからない
- ○ 3. そうだとは思わない

ここで改ページ

Q4 あなたがインターネットを使っている時の様子について、
次の各項目に、最もあてはまるものをそれぞれ1つずつお選びください。
【 必須入力 】

	1 全くあてはまらない	2 ほとんどあてはまらない	3 あまりあてはまらない	4 どちらかと言えばあてはまらない	5 どちらかと言えばあてはまる	6 ややあてはまる	7 かなりあてはまる	8 非常にあてはまる
1. 私は直接会って話すより、インターネットで人とやりとりする方が好きだ →	○	○	○	○	○	○	○	○
2. 私は孤立していると感じた時、人と話すのにインターネットを使うことがある →	○	○	○	○	○	○	○	○
3. 私はしばらくインターネットを利用していないと、インターネットをすることばかり考えてしまう →	○	○	○	○	○	○	○	○
4. 私はインターネットをする時間を制限することが難しい →	○	○	○	○	○	○	○	○
5. インターネットを利用することで、私の生活リズムは乱れている →	○	○	○	○	○	○	○	○
6. 私にとって人と直接会って話すより、インターネットでやりとりする方が気持が楽である →	○	○	○	○	○	○	○	○
7. 私は気分が落ち込んでいる時、気晴らしにインターネットを使うことがある →	○	○	○	○	○	○	○	○
8. 私はインターネットが使えないと、落ち着かない →	○	○	○	○	○	○	○	○
9. 私は自身のインターネット利用を制限することが難しい →	○	○	○	○	○	○	○	○
10. インターネットのために、約束事や予定をすっぽかしたことがある →	○	○	○	○	○	○	○	○
11. 私はコミュニケーションを取る時、直接会ってやりとりするより、インターネットでやりとりするほうが好きだ →	○	○	○	○	○	○	○	○
12. 私は気分が不安定な時、気分を立て直すためにインターネットを利用したことがある →	○	○	○	○	○	○	○	○
13. 私はインターネットをしていないと、しつこくインターネットのことを考えてしまう →	○	○	○	○	○	○	○	○
14. インターネットをしていない時、インターネットをしたいと思う気持ちをがまんするのが難しい →	○	○	○	○	○	○	○	○
15. 私のインターネット利用は、私の人生に様々な問題を起こしている →	○	○	○	○	○	○	○	○

ここで改ページ

Q5 あなたはここ半年間で、一週間に平均で何日、また、1日に平均で何時間、
私用(仕事、または学校用以外)でインターネットを使いましたか？
【 全て必須 】

[ ] 日／週 (半角数字)

[ ] 時間／日 (半角数字)

ここで改ページ

Q6 あなたが私用(仕事、または学校用以外)で、あなたがインターネットを使っている時の様子について、
次の各項目に、最もあてはまるものをそれぞれ1つずつお選びください。
【 必須入力 】

	1 全くない	2 ほとんどない	3 時々ある	4 度々ある	5 非常によくある
1. インターネットをしている時、それをやめにくいと感じることはどれくらいありますか？ →	○	○	○	○	○
2. インターネット利用時間をやめるつもりでも、かなり続けてしまうことはどれくらいありますか？ →	○	○	○	○	○
3. インターネット利用により睡眠不足になってしまうことはどれくらいありますか？ →	○	○	○	○	○
4. インターネット利用時間を減らそうと思ったが出来なかった事はどれくらいありますか？ →	○	○	○	○	○
5. ほかの人(例えば、パートナー、子ども、両親)から、インターネット利用を減らすべきだと言われることはどれくらいありますか？ →	○	○	○	○	○
6. インターネットをしていない時でさえも、インターネットのことを考えてしまうことはどれくらいありますか？ →	○	○	○	○	○
7. 次のインターネット利用を楽しみにすることはどれくらいありますか？ →	○	○	○	○	○
8. 気分が落ち込んでいる時、インターネットを利用することはどれくらいありますか？ →	○	○	○	○	○
9. 悲しみやマイナスな感情から逃れるためにインターネットを利用することはどれくらいありますか？ →	○	○	○	○	○
10. ほかの人(例:パートナー、子供、両親、友人等)と一緒に時間を過ごすよりも、インターネットを利用したいと思うことはどれくらいありますか？ →	○	○	○	○	○
11. インターネットを利用したいがために宿題(仕事)を適当に早く終わらせることはどれくらいありますか? →	○	○	○	○	○
12. インターネット利用を減らそうと思うことはどれくらいありますか？ →	○	○	○	○	○
13. インターネットを利用したいがために毎日やるべきこと(義務。例:仕事、学校、家のこと等)を放置したことはどれくらいありますか？ →	○	○	○	○	○
14. インターネットを利用できない時、落ち着かなかったり、不満だったり、イライラしたりすることはどれくらいありますか？ →	○	○	○	○	○

ここで改ページ

Q7 私用(仕事、または学校用以外)でのインターネットの利用時間と、
仕事や勉強でのインターネットの利用時間とを区別することは
あなたにとって難しいことだと思いますか？
【 必須入力 】

1 難しいと思う	2 どちらかと言えば難しいと思う	3 どちらかと言えば難しくはない(易しい)と思う	4 難しくはない(易しい)と思う
○	○	○	○

ここで改ページ

Q8 仕事や勉強と私用(仕事、または学校用以外)でのインターネットの利用時間を問わず、
あなたがインターネットを使っている時の様子について、
次の各項目に、最もあてはまるものをそれぞれ1つずつお選びください。
【 必須入力 】

	1 全くない	2 まれにある	3 時々ある	4 よくある	5 常にある
1. 気がつくと思っていたより、長い時間インターネットをしていることがありますか？ →	○	○	○	○	○
2. インターネットをする時間を増やすために、家庭での仕事や役割をおろそかにすることがありますか？ →	○	○	○	○	○
3. 配偶者や友人と過ごすよりも、インターネットを選ぶことがありますか？ →	○	○	○	○	○
4. インターネットで新しい仲間を作ることがありますか？ →	○	○	○	○	○
5. インターネットをしている時間が長いと周りの人から文句を言われたことがありますか？ →	○	○	○	○	○
6. インターネットをしている時間が長くて、学校の成績や学業に支障をきたすことがありますか？ →	○	○	○	○	○
7. 他にやらなければならないことがあっても、まず先に電子メールをチェックすることがありますか？ →	○	○	○	○	○
8. インターネットのために、仕事の能率や成果が下がったことがありますか？ →	○	○	○	○	○
9. 人にインターネットで何をしているのか聞かれたとき防御的になったり、隠そうとしたことがどれくらいありますか？ →	○	○	○	○	○
10. 日々の生活の心配事から心をそらすためにインターネットで心を静めることがありますか？ →	○	○	○	○	○

	1 全くない	2 まれにある	3 時々ある	4 よくある	5 常にある
11. 次にインターネットをするときのことを考えている自分に気がつくことがありますか？ →	○	○	○	○	○
12. インターネットの無い生活は、退屈でむなしく、つまらないものだろうと恐ろしく思うことがありますか？ →	○	○	○	○	○
13. インターネットをしている最中に誰かに邪魔をされると、いらいらしたり、怒ったり、大声を出したりすることがありますか？ →	○	○	○	○	○
14. 睡眠時間をけずって、深夜までインターネットをすることがありますか？ →	○	○	○	○	○
15. インターネットをしていないときでもインターネットのことばかり考えていたり、インターネットをしているところを空想したりすることがありますか？ →	○	○	○	○	○
16. インターネットをしているとき「あと数分だけ」と言っている自分に気がつくことがありますか？ →	○	○	○	○	○
17. インターネットをする時間を減らそうとしても、できないことがありますか？ →	○	○	○	○	○
18. インターネットをしていた時間の長さを隠そうとすることがありますか？ →	○	○	○	○	○
19. 誰かと外出するより、インターネットを選ぶことがありますか？ →	○	○	○	○	○
20. インターネットをしていないと憂うつになったり、いらいらしたりしても、再開すると嫌な気持ちが消えてしまうことがありますか？ →	○	○	○	○	○

ここで改ページ

Q9 あなたの心の健康状態についてお伺いします。
過去一カ月間に、どれくらいの頻度で次のことがあてはまりましたか。
それぞれ1つずつお選びください。
【 必須入力 】

	1 全くない	2 少しだけ	3 ときどき	4 たいてい	5 いつも
1. 神経過敏に感じましたか？ →	○	○	○	○	○
2. 絶望的だと感じましたか？ →	○	○	○	○	○
3. そわそわ、落ち着かなく感じましたか？ →	○	○	○	○	○
4. 気分が沈み込んで、何が起こっても気が晴れないように感じましたか？ →	○	○	○	○	○
5. 何をするのも骨折りだと感じましたか？ →	○	○	○	○	○
6. 自分は価値のない人間だと感じましたか？ →	○	○	○	○	○

ここで改ページ

Q10 日ごろ、あなたは人間関係についてどのように感じていますか。
最もあてはまるものをそれぞれ1つずつお選びください。
【 必須入力 】

	1 けっして感じない	2 どちらかと言えば感じない	3 どちらかと言えば感じる	4 度々感じる
1. 私は、自分の周囲の人たちと調子よくいっている →	○	○	○	○
2. 私は、人との付き合いがない →	○	○	○	○
3. 私には、頼りにできる人が誰もいない →	○	○	○	○
4. 私は、ひとりぼっちではない →	○	○	○	○
5. 私は、親しい仲間たちの中で欠くことのできない存在である →	○	○	○	○
6. 私は、自分の周囲の人たちと共通点が多い →	○	○	○	○
7. 私は、今、誰とも親しくしていない →	○	○	○	○
8. 私の興味や考えは、私の周囲の人たちとは違う →	○	○	○	○
9. 私は、外出好きの人間である →	○	○	○	○
10. 私には、親密感の持てる人たちがいる →	○	○	○	○

	1 けっして感じない	2 どちらかと言えば感じない	3 どちらかと言えば感じる	4 度々感じる
11. 私は、無視されている →	○	○	○	○
12. 私の社会的つながりはうわべだけのものである →	○	○	○	○
13. 私をよく知っている人は誰もいない →	○	○	○	○
14. 私は、他の人たちから孤立している →	○	○	○	○
15. 私は、望むときにはいつでも、人と付きあうことができる →	○	○	○	○
16. 私には、私を本当に理解してくれる人たちがいる →	○	○	○	○
17. 私は、大変引っ込み思案なのでみじめである →	○	○	○	○
18. 私には、知人はいるが、私と同じ考えの人はいない →	○	○	○	○
19. 私には、話しかけることのできる人たちがいる →	○	○	○	○
20. 私には、頼りにできる人たちがいる →	○	○	○	○

ここで改ページ

Q11 以下のことがらについて、あなた自身にあてはまるものをそれぞれ1つずつお選びください。
【 必須入力 】

	1 いいえ	2 どちらかといえば、いいえ	3 どちらかといえば、はい	4 はい
1. 現状(今の仕事や学校や状況)に満足している →	○	○	○	○
2. 現状(今の仕事や学校や状況)にストレスを感じている →	○	○	○	○
3. 収入は低くても自分のやりたい仕事に就きたい →	○	○	○	○
4. 自分の能力を生かせる仕事に就きたい →	○	○	○	○
5. 自分のことは自分の思う通りに決めている →	○	○	○	○
6. 大事なことを決める時は、親や教師の言うことに従わないと不安だ →	○	○	○	○
7. 自分のことを自分ひとりで決めてしまうのは不安だ →	○	○	○	○
8. 自分のことを自分で決めることはこわい →	○	○	○	○
9. 初対面の人とすぐに会話できる自信がある →	○	○	○	○
10. 人とのつきあい方が不器用なのではないかと悩む →	○	○	○	○

	1 いいえ	2 どちらかといえば、いいえ	3 どちらかといえば、はい	4 はい
11. 自分の感情を表に出すのが苦手だ →	○	○	○	○
12. 周りの人ともめごとが起こった時、どうやって解決したらいいかわからない →	○	○	○	○
13. けんかや言い争いは避けるようにしている →	○	○	○	○
14. もめごとは起こしたくない →	○	○	○	○
15. 人と対立するくらいなら、自分ががまんしたほうがよい →	○	○	○	○
16. 意見を戦わせるより、その場を和やかにすごした方がよい →	○	○	○	○
17. 自分の決めたことに人からとやかく言われたくない →	○	○	○	○
18. 重要なことについて、人の考えを押し付けられたくない →	○	○	○	○
19. たとえ親であっても自分のやりたいことに口出ししないで欲しい →	○	○	○	○
20. 自分の生活のことで人から干渉されたくない →	○	○	○	○

ここで改ページ

Q12 在学中の人は現在のことについて、在学していない人は、最後に通学していた頃のことについて、あてはまるものをそれぞれ1つずつお選びください。
【 必須入力 】

	1 全くそう思わない	2 そう思わない	3 あまりそう思わない	4 どちらでもない	5 少しそう思う	6 そう思う	7 強くそう思う
1. 働かない人間はなまけものになってしまうのではと思う →	○	○	○	○	○	○	○
2. 急いで仕事につく必要はないと思う →	○	○	○	○	○	○	○
3. 責任を伴う仕事がしたい →	○	○	○	○	○	○	○
4. 働くことは社会への義務なのではないかと思う →	○	○	○	○	○	○	○
5. かた苦しい仕事につくことは避けたいと思う →	○	○	○	○	○	○	○
6. 働くことの意味がなかなか見出せないと感じる →	○	○	○	○	○	○	○
7. 私生活を犠牲にしてまで仕事に打ち込む必要はないと思う →	○	○	○	○	○	○	○
8. 自分の才能を十分に発揮させるには仕事を持つことが必要だ →	○	○	○	○	○	○	○
9. 将来何をしたいのかよくわからない →	○	○	○	○	○	○	○
10. お好みの生活スタイルを優先したいので、フリーター生活の方がいいのではと思う →	○	○	○	○	○	○	○

	1 全くそう思わない	2 そう思わない	3 あまりそう思わない	4 どちらでもない	5 少しそう思う	6 そう思う	7 強くそう思う
11. 生活の基本は親に頼ることができるので、いろいろ楽しみたい →	○	○	○	○	○	○	○
12. 安定的な身分・給料を得ることはそれほど重要ではない →	○	○	○	○	○	○	○
13. 正社員の仕事は、きつくて、辛そうという印象がある →	○	○	○	○	○	○	○
14. 自分は知識・技能力が低いと思う →	○	○	○	○	○	○	○
15. 自分は人と同じくらいのことができ、社会で役に立つと思う →	○	○	○	○	○	○	○
16. 嫌いな人、苦手な人とも、うまく付き合う努力をしている →	○	○	○	○	○	○	○
17. 困ったことが起きた時、相談できる人がいる →	○	○	○	○	○	○	○
18. 勉強しておくことは将来就職した後のためにも、必要だと思う →	○	○	○	○	○	○	○
19. 社交性が低く、対人関係が苦手である →	○	○	○	○	○	○	○
20. いごこち良く過ごせる場所・人がいる →	○	○	○	○	○	○	○

	1 全くそう思わない	2 そう思わない	3 あまりそう思わない	4 どちらでもない	5 少しそう思う	6 そう思う	7 強くそう思う
21. コミュニケーションをとるのがどうしようもなく難しいと感じる →	○	○	○	○	○	○	○
22. 人付き合いはしんどいと感じる →	○	○	○	○	○	○	○
23. 自分に自信が持てない →	○	○	○	○	○	○	○
24. 将来についての見通しが立たないと感じる →	○	○	○	○	○	○	○
25. 普段一緒に遊んだり連絡する友人はあまりいない →	○	○	○	○	○	○	○
26. 自分は社会に必要とされていないのではないかと思うときがある →	○	○	○	○	○	○	○
27. 自分は基礎学力が低いと思う →	○	○	○	○	○	○	○
28. 夜更かしをし、起きるのも昼、食事も不規則といった昼夜逆転の生活をしてしまう →	○	○	○	○	○	○	○

ここで改ページ

Q13 あなたが最後に在籍した学校はどこですか。中退した場合も最後に通った学校を選んでください。
現在、在学中の場合は、その学校をお答えください。(ひとつだけ)
【 必須入力 】

- 1. 小学校
- 2. 中学校
- 3. 高等学校・高等専門学校
- 4. 専門学校
- 5. 4年制大学・短期大学
- 6. 大学院
- 7. その他

ここで改ページ

Q14 あなたは学校に通っている(通っていた)間に以下のようなことを経験したことがありますか。
在学中の人は、現在経験していますか。
「小学校」、「中学校」、「高校」、「大学」、「大学院」それぞれについて
あてはまるかどうかお答えください。(それぞれいくつでも)
※表示された学校についてお答えください。
※この質問はタテ方向にお答えください。
【 必須入力 】

	1 小学校 ↓	2 中学校 ↓	3 高校 ↓	4 大学 ↓	5 大学院 ↓
1. 友達とよく話した(話す)	□	□	□	□	□
2. 信頼できる友達がかなりいた(いる)	□	□	□	□	□
3. 友達がいたが、常に気をつかっていた(いる)	□	□	□	□	□
4. 友達はいたが、うまくつきあえなかった(つきあえない)	□	□	□	□	□
5. 友達が一人もいなかった(いない)	□	□	□	□	□
6. 友達をいじめた(いじめている)	□	□	□	□	□
7. 友達にいじめられた(いじめられている)	□	□	□	□	□
8. 不登校を経験した(している)	□	□	□	□	□
9. 学校の勉強についていけなかった(いけない)	□	□	□	□	□
10. 学校の先生との関係がうまくいかなかった(いかない)	□	□	□	□	□
11. 困ったときは、親は親身に助言をしてくれた	□	□	□	□	□
12. 親に何でも話すことができた(できている)	□	□	□	□	□
13. 親が自分によく口出ししてきた(している)	□	□	□	□	□
14. 親と自分との関係が良くなかった(よくない)	□	□	□	□	□
15. 両親の関係が良くなかった(よくない)	□	□	□	□	□
16. 両親が離婚した	□	□	□	□	□
17. 親と死別した	□	□	□	□	□
18. がまんをすることが多かった(多い)	□	□	□	□	□
19. 大きな病気をした(している)	□	□	□	□	□
20. 引越しや転校をした(している)	□	□	□	□	□
21. 経験が全くなかった(ない)・答えたくない	□	□	□	□	□

ここで改ページ

Q15 あなたは普段、悩みごとを誰に相談しますか。(いくつでも)
【 必須入力 】

- ☐ 1. 親
- ☐ 2. 兄弟姉妹
- ☐ 3. 友人・知人
- ☐ 4. 配偶者・パートナー・恋人
- ☐ 5. 祖父母
- ☐ 6. 学校の先生
- ☐ 7. 職場の同僚・上司
- ☐ 8. カウンセラー・精神科医
- ☐ 9. 地域の専門機関の人(保健所、保健センターなど)
- ☐ 10. ネット上の相談所
- ☐ 11. ネット上の知り合い
- ☐ 12. その他

- ☐ 13. 誰にも相談しない

ここで改ページ

Q16 あなたは、普段どのくらい外出していますか。
この半年ぐらいのことについてお答えください。(ひとつだけ)
【 必須入力 】

- ○ 1. 仕事や学校で外出する、それ以外もよく外出する
- ○ 2. 仕事や学校で外出する、それ以外用事があったら外出する
- ○ 3. 仕事や学校で外出するが、それ以外はでない
- ○ 4. 仕事や学校に行かないが、遊びなどで頻繁に外出する
- ○ 5. ほとんど家にいるが、人付き合いのためにときどき外出する(例:法事や結婚式など)
- ○ 6. ふだんは家にいるが、自分の興味に関する用事のときだけ外出する
- ○ 7. ふだんは家にいるが、近所のコンビニなどには出かける
- ○ 8. 自室からは出るが、家からは出ない
- ○ 9. 自室からほとんど出ない

ここで改ページ

Q17 あなたの配偶者、パートナーあるいは恋人について、現在の状況を教えてください。(ひとつだけ)
【 必須入力 】

- ○ 1. 既婚・パートナー/恋人があり、その関係について満足している
- ○ 2. 既婚・パートナー/恋人があり、その関係について満足していない
- ○ 3. 離婚・死別・パートナー/恋人と別れ、現在の状況について満足している
- ○ 4. 離婚・死別・パートナー/恋人と別れ、現在の状況について満足していない
- ○ 5. 独身・今まで恋人がいない、現在の状況について満足している
- ○ 6. 独身・今まで恋人がいない、現在の状況について満足していない
- ○ 7. 答えたくない

ここで改ページ

Q18 現在あなたは誰と同居していますか？同居している方を教えてください。(いくつでも)
※自分からみた続柄でお答えください。
【 必須入力 】

- ☐ 1. (配偶者の)父
- ☐ 2. (配偶者の)母
- ☐ 3. (配偶者の)兄弟姉妹
- ☐ 4. (配偶者の)祖父
- ☐ 5. (配偶者の)祖母
- ☐ 6. 配偶者(パートナー、親密な関係の人を含める)
- ☐ 7. 子供
- ☐ 8. 孫
- ☐ 9. 親戚
- ☐ 10. 友人
- ☐ 11. 同僚
- ☐ 12. その他

- ☐ 13. 病院や施設などで一人暮らし
- ☐ 14. 一人暮らし

ここで改ページ

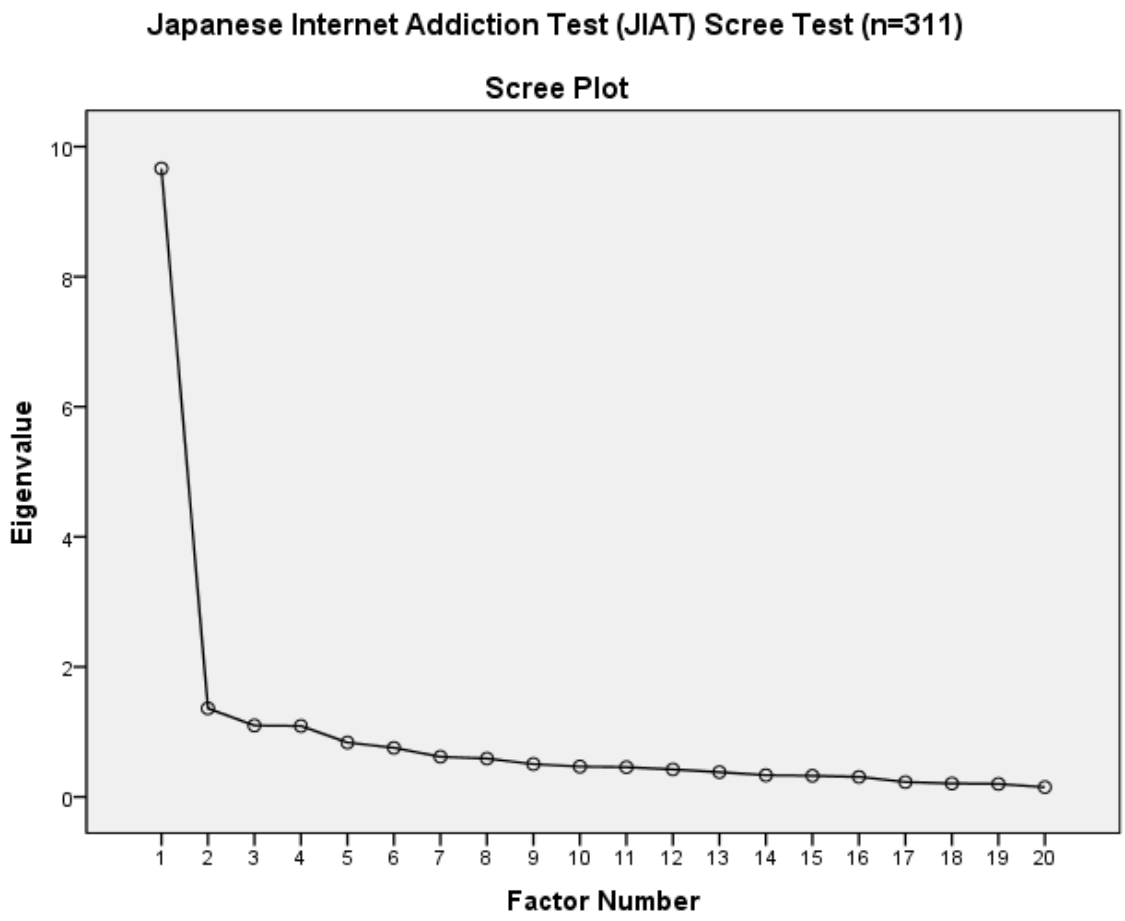
Q19 あなたは現在働いていますか。(ひとつだけ)
【 必須入力 】

- ○ 1. 勤めている(正社員／職員)
- ○ 2. 勤めている(契約社員／職員)
- ○ 3. 勤めている(派遣社員／職員)
- ○ 4. 勤めている(パート・アルバイト(学生のアルバイトは除く))
- ○ 5. 自分で店、会社を経営している
- ○ 6. 自由業(個人で専門知識や技術を生かした職業)をしている
- ○ 7. 専業主婦・主夫
- ○ 8. 学生
- ○ 9. 浪人として予備校などに通っている
- ○ 10. 派遣会社等に登録しているが、現在は働いていない
- ○ 11. 無職
- ○ 12. その他

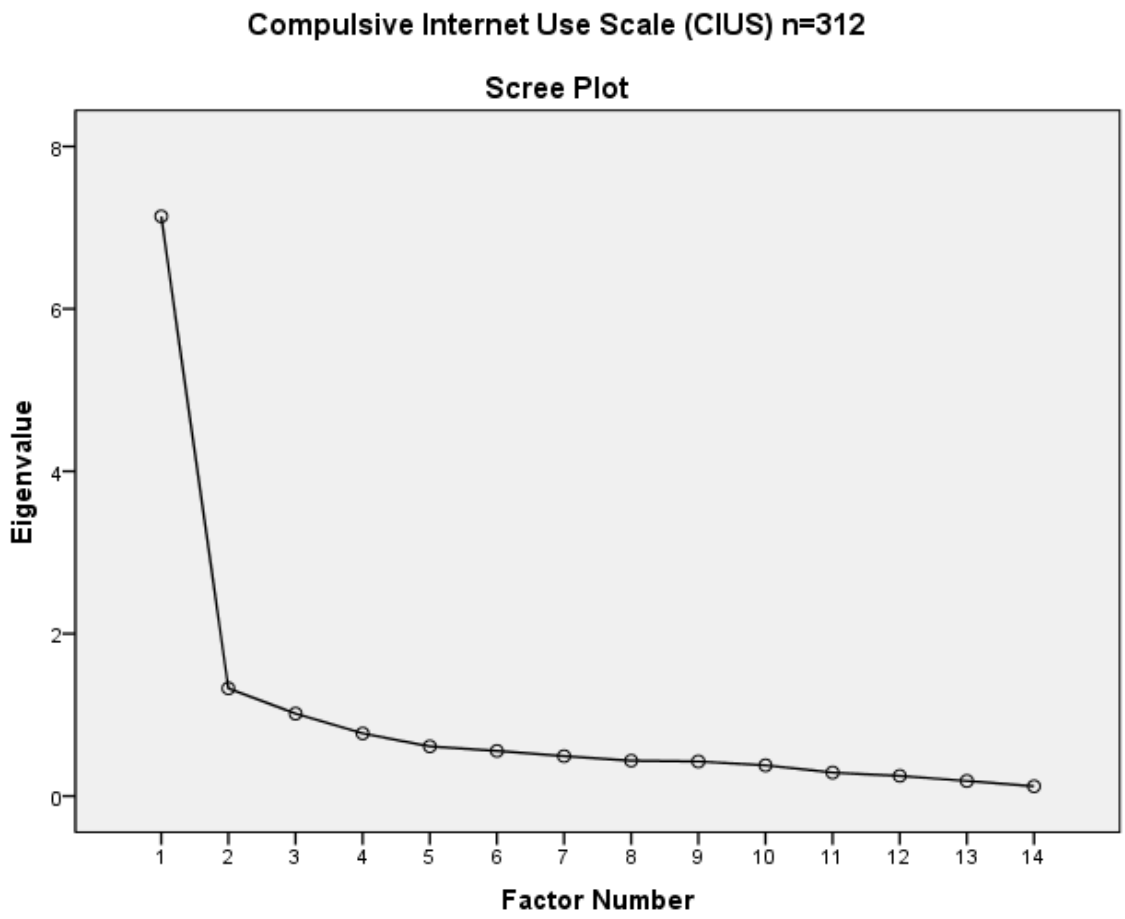
アンケートは以上で終わりです。ご協力ありがとうございました。
回答もれがないか確認し、よろしければ「送信」ボタンをクリックしてください。

送　信

Attachment 5



Attachment 6



Attachment 7