

論文の内容の要旨

論文題目: 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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1. Introduction

Internet Addiction (IA) is defined as compulsive Internet usage regardless of one's best interest. Scales that are developed for IA can be largely categorized into two large groups, diagnostic and non-diagnostic. The older generation diagnostic scales tend to diagnose IA in a yes-or-no fashion, and the newer generation diagnostic scales conceptualize IA as a phenomenon that has varying degrees of deficient self-regulation (DSR), where the scores give attention on dose-response-severity. 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.

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 purpose. Two diagnostic scales that were invented at different times, Japanese Internet Addiction Test (JIAT) and Compulsive Internet Use Scale (CIUS) were chose to compare with a non-diagnostic scale, General Problematic Internet Use Scale 2 (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.

2. Methods

2.1 Preparing the Scales

While JIAT was available in Japanese, CIUS and GPIUS2 were not translated into Japanese prior to this study. CIUS and GPIUS2 were translated into Japanese with forward-back translations procedures. Translation difficulties, cultural diversity, conceptual equivalence and vocabulary differences were carefully documented in the translation process and discussed with the original developer. Subsequently, the items were refined according to developer's suggestions.

2.2 Pilot Study

JIAT and both the newly translated CIUS and GPIUS2 were pilot tested with different groups, teenagers, young adults, and adults. The acceptability of each scale in terms of difficulties with reading and comprehending the meaning, clarification and suggestion of alternative words, and the items that may incurred negative emotions was studied in the debriefing session. The time needed to complete the questionnaire was noted in each debriefing session. The necessary changes were made and incorporated into the last version of the questionnaire. Together with the ideas

and feedbacks obtained from the pilot study, the construct validity of the finalized full survey questionnaire consisting of the JIAT, the two translated instruments CIUS and GPIUS2, and the other variables was examined.

2.3 Main Study

2.3.1 Sample recruitment

Samples were recruited from the Internet Survey Company X. An invitation email sent to a randomly selected sample contained a link to the survey. Approximately 8-10% response rate was expected from each group. The respondents could open the survey by clicking the link attached to the email. Prior to starting the survey, participants had to check a checkbox to indicate their agreement to participate in the survey. An effective sample included those who completed the survey. The entry to the online survey was on a first come first serve basis. The link to the survey was disabled once reaching the quota for effective sample size, considering the required gender and age. The total time to complete the survey was considered during data cleaning process.

2.3.2 Measures

Selection of other questions and refining of relevant variables were based on the concepts developed in the twelve debriefing sessions. Relevant variables assessed demographics, Internet related behaviour and motivation that were consistent with referenced report of Internet use pattern among youths survey, K6 (6 items measured on a 5-Likert scale to measure anxiety/depression), UCLA Loneliness (20 items measured on a 4-Likert scale to measure loneliness), satisfaction with current situation and relationship, existing stress, several questions that measured self-reliance associated with wanting to be free, absence of social skills, decision avoidance, and conflict avoidance. Serious consideration was given to the burden of participation to prevent participant fatigue. The average time for completing a questionnaire was about 15 minutes. The entire questionnaire was then used to measure the validity and the reliability of the three selected IA instruments, CIUS, GPIUS2 and JIAT, in the main study. Permissions to use the scales were obtained from the original developers and ethical approval was sought from the Research Ethics Committee of Graduate School of Medicine at the University of Tokyo. All participants provided informed consent before taking part in the study.

2.3.3 Analyses

Frequency distribution of demographics was examined by comparing the sample from this study with the national sample, and normality of the IA distributions was assessed with the three IA scales. The conceptual constructs of the scales were tested by comparing the mean of IA scores across different demographic factors, and group differences were compared using student's t-test and one way ANOVA. Post-hoc Tukey HSD test was employed to identify specific differences when there are more than two groups in the demographic category. The 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. Validity was examined in terms of construct validity, concurrent validity, discriminant validity, split-half-cross-validation sampling, factor analysis (EFA) and confirmatory factor analysis (CFA) and inter-factors correlations. Lastly, 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 with the full sample.

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 in their list stratified by age and gender). A total of 636 respondents comprised an effective sample. The company X then examined the data, and as a result, 623 samples remained after data cleaning. Data examination confirmed that the pre-stratification sampling reflected the national sample regarding demographic distribution.

3.1 Reliability

All three scales demonstrated excellent internal consistency (Chronbach's $\alpha = .924 - .943$), and deleting any of the items would not improve the reliability further.

3.2 Validity of the scales

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. In line with what was expected, more people tended to diagnose themselves as IA. The young people, having higher education, single, staying alone, unsatisfied, and one who preferred to discuss personal problem with Internet friends rather than family and friends had demonstrated higher effect on IA scores, showing acceptable construct validity. The three IA scales had also showed a good concurrent validity ($r > .70$), and clear discriminant validity. Exploratory factor analysis (EFA) and confirmatory factor analysis (CFA) were cross-validated using split-half sampling method, and factors extracted were stable across gender. JIAT yielded a clear three factor solution (RMSEA = .067 - .082, CFI = .918 - .940, $\chi^2/df = 2.8 - 3.1$) and CIUS had also yielded a clear three factors solution (RMSEA = .060 - .086, CFI = .939 - .973, $\chi^2/df = 2.1 - 4.4$). GPIUS2 yielded two equivalent structures, a five factors structure as proposed by the original developer (RMSEA = .079 - .095, CFI = .946 - .967, $\chi^2/df = 3.0 - 5.7$) and a four factors structure as suggested by EFA (RMSEA = .082 - .094, CFI = .952 - .965, $\chi^2/df = 3.1 - 5.7$).

3.3 Validation of the IA conceptual model

Correlations among the factors extracted demonstrated good convergent and divergent validity with similar constructs. The IA conceptual model proposed for GPIUS2 fitted the data well when substituting the GPIUS-subscales with CIUS and JIAT subscales. A new model demonstrated the relationship between dissatisfaction, anxiety/depression and IA exhibited a good fit across the gender.

Discussion

The examination of the distribution of the three IA scales among different demographic subgroups showed that the three IA scales have similar patterns that are slightly sensitive to group differences. The strong concurrent validity indicated that all the three scales were probably measuring the same type of Internet behaviours. Characteristics of each item from the questionnaires were assessed carefully, and the discriminant validity was established as the severity of IA scores had consistent pattern of elevated scores for negative consequences. Both JIAT and CIUS high scorers were identified to have problems in self-discipline of Internet usage (DSR), tendency to use Internet for mood regulation (MR). JIAT high scorers were probably at more of a clinical alarm as the high scorers reflected an extreme score on K6 and a fairly high level of loneliness. Inter-factorial correlations reviewed that the concept of "preference for online social interaction" (POSI) was the most unique concept in GPIUS2. The clarity of the factorial structure was strongest with CIUS, followed by JIAT and GPIUS2. When the conceptual ideas were tested, it was found that

the conceptual model that proposed by GPIUS2 demonstrated good fit across gender, where DSR indicated the main behavioural problem, and the concept of POSI played a key role in the process of activating IA.

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. 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 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. 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. Having a clear concept is foreseen to help in making valuable clinical decision. GPIUS2-POSI subscale is suggested to 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.

5. 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. 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.