# The importance of measuring problematic smartphone use in children with attention deficit hyperactivity disorder

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Technological advances within the last decade have led to a significant increase in the ownership of smartphones. The convenience in social connectivity, entertainment, and accessing information of the smartphone has made it a daily necessity for the majority of the population. However, smartphones are double-edged swords. Smartphones are accessible anytime and anywhere, leading to problematic smartphone use (PSU) in adolescent and children. PSU is associated with the increased risks of poor sleep quality, depression, and anxiety, and becomes a serious problem that warrants prevention and intervention.[1] PSU refers to the excessive use of the smartphone in daily life, accompanied by daily dysfunction and symptoms similar to substance use disorder. PSU has also been labeled cellphone addiction, smartphone overuse, and smartphone dependency. To date, there is no universal consensus on its definition. Although neither *Diagnostic and Statistical Manual of Mental Disorders* (5th ed.; DSM-5) nor *International Classification of Diseases*' (11th Revision; ICD-11) draft has mentioned PSU, growing empirical research generally supports the concept of PSU as type of non-chemical behavioral addiction involving human–machine interaction. In recent years, there has been a significant increase in research on PSU prevalence with an estimated range from between just above 0% and 35%, and between 10% and 20% being the most frequent range, in screening studies.[2,3]

Proxy measures of usage with high scores are often adopted by self-report instruments used to assess smartphone addiction to provide evidence of behavioral addiction and to correlate smartphone usage with negative outcomes and is the most frequently utilized variable in terms of assessing behaviors of PSU.[2] Smartphone Addiction Proneness Scale (SAPS) is a self-report scale developed based on the existing Internet and cellular phone addiction scales to screen adolescents for risk of smartphone addiction.[4] The aim of the Huang et al[5] study was the Chinese version establishment of SAPS. In their study, several modifications were made to SAPS including deleting one of the questions and adding two new ones so that its usefulness in screening in both the medical units and in community may be enhanced. In addition, as SAPS is based on user response rather than their behavior, it is unreliable and burdensome, answering questions are required from the user. In their study, Huang et al[5] replaced the word "I" with "my child" in each item and asked family members of the users to fill out the questionnaire. Therefore, they renamed the questionnaire as the "modified SAPS-Chinese version."[5] The modified SAPS-Chinese version was tested in the parents of 249 healthy students from a local school and 70 attention deficit hyperactivity disorder (ADHD) subjects. The modified version showed high reliability and validity that has satisfactory properties suitable for use in research and clinics.[5] However, it should be noted that current self-report measures of PSU, including SAPS, sometimes do not correlate or predict simple objectively measured behaviors.[2] Recently, some passive objective measures have been developed to assess PSU. For example, gathering of sustained and precise data on smartphone behaviors and monitoring of user behavior in real time can be done by direct collection of data from smartphone devices in smartphone-based assessments.[2] While defining of behaviors associated with PSU may benefit from passive monitoring, it cannot assess the impaired daily functions of the users. Thus combination of PSU self-report measures and passive objective measures of smartphone use may provide a more comprehensive way for clinical assessment and research use.

Early detection or screening of potential PSU risk cases is important in that effective intervention could be carried out earlier to prevent PSU-related functional impairment. Huang et al[5] found that two major impacts and signs identified in children with PSU were irritable mood and quarrels with family. They suggested that inquiring about the experience of arguments with the family, irritability, emotion dysregulation, and anger might be critical to detecting possible PSU in children.[5]

ADHD is the most common childhood mental health disorder characterized by inattention, impulsive, and hyperactive behaviors. Evidence suggested that the factors antecedent to drug addiction development are impulsivity and addictive behaviors.[6] In a total of 2114 students, Yen et al[7] found subjects with Internet addiction had higher ADHD symptoms. By using the modified SAPS-Chinese version, Huang et al demonstrated the prevalence rate of PSU (34.4% vs 15.4%) and total score of SAPS were significantly higher in the ADHD group that in the non-ADHD group. The ADHD group also has more associated disturbed behaviors and impaired daily function.[5] The findings suggested that ADHD is a risk factor of PSU and may associate with more severe PSU-related daily dysfunction. Recently, Hsieh et al[8] have investigated the parents' self-efficacy and engagement in managing children's smartphone use studies in a sample of parents of adolescents with ADHD. They found parents who

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scored lower on reactive management were more likely to have children with PSU and functional impairments. Furthermore, the key elements for successful PSU prevention were found to be high levels of affection, reasoning around smartphone use behaviors with ADHD adolescents, and effective communication.[8] These findings provide parents with important targets for prevention and intervention of PSU in their ADHD children. Previous meta-analysis of six stimulant-treatment outcome studies found pharmacotherapy for ADHD in childhood actually reduced the likelihood of later problem drug and alcohol use than are their undiagnosed, untreated counterparts.[9] It would be of interest to explore whether ADHD treatment can decrease PSU risk or its associated dysfunction.

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## REFERENCES

1. Yang J, Fu X, Liao X, Li Y. Association of problematic smartphone use with poor sleep quality, depression, and anxiety: a systematic review and meta-analysis. *Psychiatry Res* 2020;**284**:112686.
2. Ryding FC, Kuss DJ. Passive objective measures in the assessment of problematic smartphone use: a systematic review. *Addict Behav Rep* 2020;**11**:100257.
3. Chen B, Liu F, Ding S, Ying X, Wang L, Wen Y. Gender differences in factors associated with smartphone addiction: a cross-sectional study among medical college students. *BMC Psychiatry* 2017;**17**:341.
4. Kim D, Lee Y, Lee J, Nam JK, Chung Y. Development of Korean Smartphone Addiction Proneness Scale for youth. *PLoS One* 2014;**9**:e97920.
5. Huang YC, Hu SC, Shyu LY, Yeh CB. Increased problematic smartphone use among children with attention-deficit/hyperactivity disorder in the community: the utility of Chinese version of Smartphone Addiction Proneness Scale. *J Chin Med Assoc* 2020;**83**:411–6.
6. Jupp B, Dalley JW. Convergent pharmacological mechanisms in impulsivity and addiction: insights from rodent models. *Br J Pharmacol* 2014;**171**:4729–66.
7. Yen JY, Ko CH, Yen CF, Wu HY, Yang MJ. The comorbid psychiatric symptoms of Internet addiction: attention deficit and hyperactivity disorder (ADHD), depression, social phobia, and hostility. *J Adolesc Health* 2007;**41**:93–8.
8. Hsieh YP, Yen CF, Chou WJ. Development and validation of the Parental Smartphone Use Management Scale (PSUMS): parents' perceived self-efficacy with adolescents with attention deficit hyperactivity disorder. *Int J Environ Res Public Health* 2019;**16**:1423.
9. Wilens TE, Faraone SV, Biederman J, Gunawardene S. Does stimulant therapy of attention-deficit/hyperactivity disorder beget later substance abuse? A meta-analytic review of the literature. *Pediatrics* 2003;**111**:179–85.