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# VALIDATION of SMARTPHONE ADDICTION SCALE –SHORT VERSION on NIGERIAN UNIVERSITY UNDERGRADUATES

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**Abstract:** Research shows that Nigerians are ranked among the top 20 users of smartphones, of which a good number are maladaptive. There is however to the best of our knowledge no indigenous instruments designed to measure this phenomenon. This study is a validation of Smartphone Addiction Scale –Short Version (SAS-SV) developed by Kwon and his colleagues. 854 undergraduates (352 male and 512 females) purposively drawn from four universities in Osun state Nigeria. These students responded to Internet addiction Test (IAT), Smartphone Addiction Scale- Short Version (SAS-SV) The Bergen Facebook Addiction Scale (BFAS). Overall cronbach's alpha correlation coefficient of 0.82 was obtained for the SAS-SV. The corrected item-total correlations ranged from .54 to .71. The correlation between SAS-SV and IAT showed a concurrent validity score of .509, and .558 for BFAS. Significant positive correlation was equally observed between the SAS-SV and the factors of BFAS, ranging from conflict ( $r = .316, p < .001$ ) to salience ( $r = .410, p < .001$ ). Significant gender differences in pathological cut off values (norm) were observed. Determined new norm for SAS-SV was  $\geq 43.2$  for pathological Smartphone Addiction (SA) among males. While the norm for female sample was  $\geq 41.8$ . Based on the findings of this study, we conclude that SAS-SV is gender sensitive and has acceptable psychometric properties for Nigerian population.

**Keywords:** Validation, smartphone addiction, scale, undergraduates, Nigerian.

## I. INTRODUCTION

Smartphone Addiction (SA) is a phenomenon related to maladaptive mobile phone use, which could present a pattern of dependency involving negative consequences Estimated smartphone addiction prevalence varies between 0% and 38% (Pedrero Pérez, Rodríguez Monje, & Ruiz Sánchez De León, 2012) due to the use of different scales with their own methods for extracting cut-off points to classify users (Lopez-Fernandez, Honrubia-Serrano & Freixa-Blanxart, 2012).

There is no solid theoretical framework to understand how SA develops and why it persists (Billieux 2012). The addictive symptomatology of SA has been subjected to researches. Yen et al. (2009) affirmed that obtaining at

least four of seven symptoms facilitated the detection of SA (e.g., withdrawal, tolerance, and use for a longer period than intended). Billieux *et al.* (2015) views withdrawal as one of the main symptoms reported in epidemiological studies (Lopez-Fernandez, Honrubia-Serrano, Freixa-Blanchart & Gibson, 2014). Adolescents are more predisposed to experiencing problematic use of smartphones as they are referred to as the digital natives, i.e. born in the age of technology and communication virtual/digital (Techopedia.com 2017).

Smartphones provide users with internet-based communication, business trading, education, entertainment media, and even clinical applications. The number of estimated global users of smartphones in early 2012 was more than 1.08 billion (Jung-Yeon, Sam-Wook, Dia-Jin, Jung-Seok, Jaewon, Heejune, Eun-Jeun, & Won-Young, 2014), and it is increasing with great speed., smartphones can be problematic when used excessively (Jung-Yeon *et al.*, 2014). About 72% of Americans own a Smartphone, and worldwide ownership averaged 43% (Poushter, 2016). Many individuals engage in SA which involves excessive use accompanied by symptoms similar to substance-related dependence, withdrawal when not using their phones, and associated functional impairment (Billieux, Maurage, Lopez-Fernandez, Kuss, & Griffiths, 2015). Excessive smartphone use can cause maladaptive behavioral difficulties seen in impulse control disorders in general or pathological gambling; it can interfere with school or work (Sim & Kim 2011), decrease real-life social interaction, decrease academic ability, cause relationship problems (Kuss & Griffiths, 2012), and cause physical health-related problems including blurred vision and pain in the wrists or the back of the neck (Kwon, Lee & Won *et al.*, 2013).

There is a growing debate among researchers on the excessive attachment of people to the internet and smartphone use and the consequent somatic, psychological and social health implications the overuse of these technologies portends for the general population. Aside from social issues such as alienation from immediate social interaction associated with the overuse of internet and mobile phone, recent research findings have revealed the potential for long term health risks such as physiological strains and musculoskeletal disorders (Lin & Peper, 2009).

Vast majorities of Nigerian students are users of the internet and many more use Smartphones both for academic and social purposes. This assertion is based on reports on the rate of internet use in Nigeria (The Punch online Newspaper 2017) which stated that about 45.04 million people use the internet in Nigeria, and that this made Nigeria to be included among the 20 top countries that use the internet in the world. The report further affirmed that on a population penetration of 170.2 million people Nigeria has an internet penetration ratio of 26.5 percent. According to the report on Premium Times Newspaper (2017) the Nigerian Communication Commission affirms that internet users in Nigeria increased to 98.3 million in November 2017 and by February 2018 the number of subscribers on the internet in Nigeria stands at 100.9 million (Techpoint.ng, 2018). Also young adults are seen as the most active users of the internet (Christakis, Moreno, Jelenchick, Myaing, & Zhou, 2011). As reported by Okwaraji, Aguwa, Onyebueke, & Shiweobi-Eze (2015) most of these youths are compulsive in the way they use the internet, causing some of them to exhibit symptoms of addictive behavior similar to alcoholism, substance addiction and pathological gambling (Ha, Yoo, Cho, Chin, Shin & Kim, 2006; Petry 2006).

Studies on internet use, Smartphone and human behaviours is relatively new the world over with a pocket of researches on the phenomenon in the western as well as Asian nations. There is however scarce literature on African population (Okwaraji *et al.* 2015). One of the major reasons for this is as a result of lack of indigenous or cultural sensitive scale that measures smartphone addiction. Also most of the existing scales developed in the western nations to measure smartphone usage and addiction have not been validated to obtain acceptable psychometric properties for the Nigerian samples.

Smartphone Addiction Scale –Short Version (SAS-SV) developed by Kwon *et al.* (2013) have been validated and used in many communities in the western nations, including Italy, Spain, Belgium, Turkey. SAS-SV showed acceptable psychometric properties for the various populations in the communities mentioned above (De Pasquale, Sciacca & Hichy, 2015). To the best of our knowledge, however, no validation study have been carried out on the Nigerian sample despite the fact that there is no known indigenous or equivalent scale that is available to screen / differentiate adolescents suffering from smartphone addiction and normal smartphone users

The focus of this study is to validate the SAS-SV (Kwon *et al.*, 2013). To achieve this, using a Nigerian sample, acceptable psychometric properties of the SAS-SV was obtained for Nigerian sample. The new psychometric properties include new norms, reliability and concurrent validity coefficients.

## II. MATERIALS AND METHODS

### A. Participants

A cross sectional survey design was employed in the study. The population comprised of University undergraduates from two public and two privately owned Universities in Osun state Nigeria. A random sampling technique was used to select the four institutions while a purposive sampling technique was adopted to select participants across the colleges, programmes, levels of study and gender. A total of 854 undergraduates participated

in the study. Of these, 352 (40%) were male while 512 (60%) were females. 350(41%) were  $\leq 19$  years while 504(59%) were  $\geq 20$  years old. The mean ( $\pm$  SD) age of the participants is  $20.48 \pm 2.82$ .

#### *B. Ethical Considerations*

This study carried out investigations that involved human elements hence ethics of research for human subjects were observed. The researcher reviewed online regulatory and informational documents on human-subject protection and passed the examination on responsible conduct of human studies and was issued a Certificate for Bioethics and Research by the Nigerian National Code of Health Research Ethics. Moreover, the research intention and proposed procedures for carrying the research was subjected to scrutiny by the Internal Research Ethic Committee (IREC) of Redeemer's University, Ede, Osun State Nigeria. Also the approval of research committees of Osun State University, and Bowen University, was sought before the research was embarked upon.

Judging that the average age of respondents was eighteen years and therefore can make decisions of this magnitude for themselves, they were approached individually and explanation of what the study is all about was made to them and their willingness to participate was obtained. Thus participant's informed consent was obtained before the instruments were administered.

#### *C. Measurements*

Smartphone Addiction Scale-Short Version (SAS-SV) by Kwon, Lee, Won, Park, Min, and Hahn, (2013) is a revised version of the Smartphone Addiction Scale (SAS). SAS-SV examines smartphone addiction and yields a total score that is indicative of the severity of smartphone addiction; higher scores indicate more severe addictions. It consists of 6 factors (daily-life-disturbance, positive-anticipation, withdrawal, overuse, tolerance, and cyberspace-oriented relationship) which are accessed through 10 items, based on self-reporting six-point Likert scale (1: "strongly disagree", 2: "disagree", 3: "weakly disagree", 4: "weakly agree", 5: "agree", and 6: "strongly agree"). The scores are to total up to be measured. The cut-off value for males was 31 and 33 for females (Kwon, Kim, Cho, & Yang, 2013). Those who scored higher than the cut-off values are considered as high-risk for smartphone addiction.

#### *D. Existing Psychometric Properties of SAS-SV*

In the validation studies of Smartphone Addiction Scale and the development of the Short Version for adolescents by Kwon et.al (2013), the score derived for the SAS-SV was 24 in boys and 28 in girls, which according to him showed significant difference by gender. Also the internal consistency reliability of the SAS-SV showed a mean score of 25.26. A Cronbach's alpha correlation coefficient of 0.91 was obtained on the Korean sample, while the corrected item total correlation coefficients ranged from 0.50 to 0.80 on the SAS-SV found to be well within the acceptable range (Nunnally & Bernstein, 1994). The concurrent validity found that SAS-SV to be significantly and positively correlated with SAPS ( $r = .762^{**}$ ), and KS-Scale ( $r = .421^{**}$ ) (Kwon et.al, 2013).

#### *E. Statistical Analysis*

Descriptive statistics including mean and standard deviation were used to determine the new norms for the instrument.

To determine the internal consistency / reliability of SAS-SV, Cronbach's alpha, Spearman-Brown coefficient and Guttman Split-Half coefficient was calculated and obtained.

Using Pearson's correlation analysis, SAS-SV was correlated with Internet Addiction Test (IAT) Young (1998) and Bergen Facebook Addiction Scale (2012) in order to determine the concurrent validity of SAS-SV.

The items total correlations were also obtained to test the relationship between each item and the composite / total item score.

### **III. RESULTS**

#### *A. Norms*

The cut off values (norms) for the male students was  $\geq 43.2$  and that of the female students was  $\geq 41.8$ . By implication, any score above the norm is considered to be problematic smartphone usage and therefore have tendency for smartphone addiction.

This implies that scores of  $\geq 43.2$  and  $\geq 41.8$  for males and females respectively on the SAS=SV reflects pathological smartphone usage.

**B. Internal Reliability of SAS-SV**

Details of the item- total correlations is shown in table 1

**Table 1: CALCULATION of SAS-SV INTERNAL RELIABILITY**

		(N = 846)			
Items		Item mean	Standard deviation	Corrected item/total	Cronbachs alpha if item is deleted
1	Missing planned work due to smartphone use	2.95	1.54	.593**	.808
2	Having a hard time concentrating in class, while doing assignments, or while working due to smartphone use	2.99	1.47	.623**	.804
3	Feeling pain in the wrists or at the back of the neck while using a smartphone	3.21	1.48	.606**	.807
4	Won't be able to stand not having a smartphone	3.50	1.64	.630**	.805
5	Feeling impatient and fretful when I am not holding my smartphone	3.23	1.52	.706**	.795
6	Having my smartphone in my mind even when I am not using it	3.34	1.59	.696**	.797
7	I will never give up using my smartphone even when my daily life is already greatly affected by it.	2.87	1.51	.650**	.803
8	Constantly checking my smartphone so as not to miss conversations between other people on Twitter or Facebook	3.28	2.25	.540**	.823
9	Using my smartphone longer than I had intended	3.68	1.48	.598**	.809
10	The people around me tell me that I use my smartphone too much.	3.21	1.93	.542**	.820

- Cronbach alpha = .82
- Spearman-Brown coefficient = .76
- Guttman Split-Half coefficient = .76
- The corrected item total correlations range from .54 to .71.

**C. Concurrent Validity of the SAS-SV:**

To ascertain the concurrent validity of SAS-SV the correlations between SAS-SV, Internet Addiction Test (IAT) and Bergen Facebook Addiction Scale (BFAS) were investigated. The result found significant positive correlation between each couple.

**Table 2: CONCURRENT VALIDITY of the SAS-SV**

(N=846)		
	IAT	BFAS
SAS-SV	.509**	.558**

\*\* Significant at p<.001

As summarized in table 2 the correlations between SAS-SV and IAT as well as SAS-SV and BFAS report the following concurrent validity scores.

- SAS-SV and IAT (r = .509, P < .001)
- SAS-SV and BFAS (r = .558, P < .001)

This result proved that the SAS-SV is valid for Nigerian samples.

**D. Correlation between SAS-SV and the sub factors of BFAS**

The results summarized in table 4 further revealed significant positive correlations between the SAS-SV and the factors of BFAS, ranging from conflict (r = .316, p < .001) to salience (r = .410, p < .001).

**Table 4: CONCURRENT VALIDITY of the SAS-SV and SUB SCALES of BFAS**

	N= 836					
	Salience	Tolerance	Mood Modification	Relapse	Withdrawal	Conflict
SAS-SV	.401**	.388**	.366**	.389**	.380**	.316**

\*\* Significant at  $p < .001$ 

The results demonstrate that between the SAS-SV and the individual factors of BFAS there is a significant correlation

- SAS-SV and Salience ( $r = .401$ ,  $P < .001$ )
- SAS-SV and Tolerance ( $r = .388$ ,  $P < .001$ )
- SAS-SV and Mood modification ( $r = .366$ ,  $P < .001$ )
- SAS-SV and Relapse ( $r = .389$ ,  $P < .001$ )
- SAS-SV and Withdrawal ( $r = .380$ ,  $P < .001$ )
- SAS-SV and Conflict ( $r = .316$ ,  $P < .001$ )

#### IV. DISCUSSIONS

The participants of this study were adolescents. This is justified by the fact that previous authors reported that adolescent population has the tendency to concentrate while using the media which can also develop into problematic usage and habitual problems than do the adult population (Kim, Lee, Lee, Kim, Keum, 2012). Also adolescents are found to be more vulnerable to smartphone addiction compared to adults (Kwon et.al, 2013) and more readily to accept and switch new type of media introduced to the market than adults (Kim et al 2012). The SAS-SV cut off score was  $\geq 43.2$  for males and  $\geq 41.8$  for female adolescents.

The SAS-SV in the Nigerian version showed Cronbach alpha of .82, Spearman-Brown coefficient correlation of .76, and Guttman Split-Half reliability coefficient .76. This figure is slightly lower than the original Cronbach alphas of .91 obtained among the South Korean adolescents (Kwon et.al, 2013), Spain .88, Belgium .90 (Lopez-Fernandez, 2015), Turkey .88 and .795 found among the Italian study (De Pasquale, et.al 2015).

#### V. CONCLUSIONS AND RECOMMENDATIONS

Based on the findings of this study we conclude that SAS-SV has acceptable psychometric properties for Nigerian population. We also derived a new norm of  $\geq 43.2$  for males and  $\geq 41.8$  for females which is higher than the original cut-off value of 31 for males and 33 for females by the author (Kwon, Kim, Cho, & Yang, 2013). Accordingly, it can be said that the SAS-SV fits well to the Nigerian culture and has acceptable psychometric properties. Further validation studies using a larger sample, as well as on other geopolitical regions of Nigeria is recommended.

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