



## Psychological Distress and Smartphone Addiction: Does Perceived Social Support Make a Difference

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### Abstract

The smartphone is a double-edged sword for university students; it is a necessary tool for communication which also brings along negative consequences if used excessively. This cross-sectional study was conducted to identify the prevalence rate of smartphone addiction among the undergraduates, to determine psychological distress as a significant predictor of smartphone addiction, and to examine perceived social support as a significant mediator in psychological distress and smartphone addiction. A total of 112 (61 females, 51 males) undergraduates in Kuala Lumpur, Malaysia, aged 18 to 24 years were selected through the purposive sampling method. Participants completed a set of questionnaires via Google Form consisting of Kessler Psychological Distress Scale, Smartphone Addiction Scale-Short Version, and Multidimensional Scale of Perceived Social Support. SmartPLS (Partial Least Squares) which is based on the principles of path modeling and bootstrapping was employed to build the causal model. Results revealed that 66.10% of undergraduates were addicted to smartphones. Also, psychological distress significantly predicted smartphone addiction, with  $t$ -value = 7.423,  $p < 0.001$ . However, perceived social support did not mediate the relationship between psychological distress and smartphone addiction, with  $t$ -value = -0.939,  $p > 0.05$ . These findings imply that smartphones have become indispensable for undergraduates and the psychological distress of undergraduates should be given priority in reducing smartphone addiction. Suggestions are made for higher learning institutions to design intervention plans to reduce the psychological distress and smartphone addiction amongst university students.

### Keywords:

Psychological distress  
Smartphone addiction  
Perceived social support  
Undergraduates.

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## 1. Introduction

In line with technological developments, smartphones have become indispensable to adults due to the convenience that comes with using a smartphone (Fu, Chen, & Zheng, 2021). The broad functions such as rapid internet access, virtual communication, photo shooting, and video recording have attracted the younger generation, hence, making it a popular and necessary gadget for college students (Lian, You, Huang, & Yang, 2016; Mahapatra, 2019). Previous research revealed that more than 85% of college students owned a smartphone, and the number of people with smartphones is expected to rise (Anderson & Jiang, 2018). Several researchers have raised concerns about university students' increased dependence on smartphones and the large amount of time they spend using their phones (Fu et al., 2021; Saadeh et al., 2021). Fook, Narasuman,

Abdul Aziz, and Tau Han (2021) indicated that most university students spent three to six hours a day on their smartphones. Another recent study revealed that during the Covid-19 pandemic, 42% of university students used their smartphones for more than six hours per day (Saadeh et al., 2021). This is worrying as university students' prolonged time smartphone use may lead them to develop smartphone addiction (Mahapatra, 2019). Although smartphone addiction is yet to be considered as a diagnostic category in DSM-IV (Lin et al., 2016) such behavioral addiction is of concern for psychologists, parents, and educators as it might lead to withdrawal symptoms, significant impairment in daily activities, and deterioration in interpersonal relationships and mental health (Kumcagiz & Gündüz, 2016; Kuss & Pontes, 2018; Lin et al., 2016). University students with smartphone addiction may spend at least five hours on smartphones daily and this would result in feeling nervous whenever they are away from their smartphones (Kuss & Pontes, 2018). Previous research conducted by Ching et al. (2015) signified that 46.90% of Malaysian university students are addicted to their smartphones. Another similar research revealed that the prevalence of smartphone addiction was 40.60% among medical students in Universiti Sains Malaysia (Lei, Ismail, Mohammad, & Yusoff, 2020). Due to a lack of recent local statistics on smartphone addiction of undergraduates during the Covid-19 pandemic, the researchers would like to ascertain the prevalence rate of smartphone addiction among undergraduates in Malaysia, during the Covid-19 pandemic.

### *1.1. Psychological Distress as a Predictor of Smartphone Addiction*

Students in higher education institutions seem to experience greater psychological distress over time (Delara & Woodgate, 2015). In view of the prevalence and interference in daily functioning, depression, anxiety, and stress have become the gold standard in assessing psychological distress (García-Manglano, López-Madriral, Sádaba-Chalezquer, Serrano, & Lopez-Fernandez, 2021; Hou et al., 2020). During the Covid-19 pandemic, the transition to online learning which has presented many challenges might be the potential cause of anxiety for Malaysian university students (Kamaludin et al., 2020). A cross-sectional study done by Kalok, Sharip, Abdul Hafizz, Zainuddin, and Shafiee (2020) indicated that over half of the clinical undergraduates reported symptoms of psychological distress during the Covid-19 pandemic. Such phenomena are worrying as the long-term psychological distress among university students has been linked to undesirable outcomes such as poor academic performance, self-injury, and suicidal behavior (Tang, Byrne, & Qin, 2018). Concerning the role of psychological distress in predicting smartphone addiction, the recent correlational studies indicated that there was a significant positive relationship between psychological distress and smartphone addiction. Such finding was discovered among secondary school students in Shangqiu and Wuhan, China (Lian et al., 2021) medical students in Universiti Sains Malaysia (Lei et al., 2020) and young adults from different countries including Spain, Argentina, Chile, Colombia, Ecuador, México, Perú, and Uruguay (García-Manglano et al., 2021). In terms of predictive study, Aker, Sahin, Sezgin, and Oguz (2017) revealed that depression and anxiety significantly predicted smartphone addiction in university students at Samsun School of Health, Ondokuz Mayıs University. Namwawa and Chiluba (2020) and Oraison, Nash-Dolby, Wilson, and Malhotra (2020) found that smartphone addiction significantly predicted the psychological distress of university students and working adults. It has been revealed that people with mental health issues attempt to alleviate their negative emotions with an overuse of the smartphone. However, such a coping strategy can be deemed to be detrimental as problematic use of technology can relate to psychopathology (Alhassan et al., 2018). Past studies have been carried out to identify the correlation between psychological distress and smartphone addiction, the role of smartphone addiction in predicting psychological distress, and the role of depression and anxiety in predicting smartphone addiction. However, there is not much knowledge on the role of psychological distress in predicting smartphone addiction, which warrants a study.

### *1.2. Perceived Social Support as a Mediator in the Relationship between Psychological Distress and Smartphone Addiction*

Perceived social support refers to the individual perception of the extent to which he/she is socially bonded and continually receiving support from his/ her family members, friends, and significant others. Social support could be considered a significant resource to alleviate the negative effects of stressors (Delaney, 2017) it can enhance psychological resilience, hopeful thinking, academic performance, and life satisfaction (Sati & Girgin, 2016; Xiang, Teng, Li, Chen, & Guo, 2020). Numerous past studies have shown that university students with low perceived social support demonstrated high smartphone usage (Celik & Konan, 2019; Konan, Durmuş, Bakır, & Türkoğlu, 2018). In terms of the association between psychological distress and perceived social support, the vulnerability of undergraduates to depressive and anxiety symptoms is closely related to perceived social support (Zhang, Zhang, Zhang, Zhang, & Feng, 2018). Students appeared to rely on their phones to ease their worries, which in turn led to a reduction in social support, creating a vicious cycle that makes the students more susceptible to anxiety (Xiang et al., 2020). The clinical undergraduates who received high social support demonstrated reduced depression and stress (Kalok et al., 2020). Perceived social support was found to be significantly and negatively correlated with smartphone addiction among university students (Akturk & Budak, 2019; Konan et al., 2018). The relationship between social support and

smartphone addiction is cyclical and complex as not only that social support predicted later smartphone addiction; but smartphone addiction also reduced social support over time (Herrero, Urueña, Torres, & Hidalgo, 2019). Pertaining to the mediating effect of perceived social support, the results of structural equation modeling signified that perceived social support significantly mediated the relationship between psychological well-being and health-risk behaviors (Lai & Ma, 2016) and loneliness and life satisfaction (Yildiz & Karadas, 2017) among university students. Amid the Covid-19 pandemic, Zhao et al. (2021) revealed that online social support partially mediated the relationship between perceived stress and problematic smartphone usage among Chinese undergraduates. To date, there is a lack of research in investigating the mediating effect of perceived social support in psychological distress and smartphone addiction, which is of the researchers' interest in this study. This study will shed light on the mediating role of perceived social support to reveal the direct and indirect effects of psychological distress on smartphone addiction.

Parallel with the three research objectives of this study, three research questions have been formulated: (1) What is the prevalence rate of smartphone addiction among undergraduates in Malaysia? (2) Is psychological distress a significant predictor of smartphone addiction? And (3) Does perceived social support mediate the relationship between psychological distress and smartphone addiction?

## **2. Methods**

### *2.1. Participants*

The target population of this study consisted of undergraduates in Kuala Lumpur, Malaysia. 112 undergraduates who were in the age range of 19 to 24 participated in the study. Purposive sampling, a non-probability sampling method, was adopted in this study. This sampling approach enables the researchers to recruit the sample from a population that expressed the desired characteristics. The researchers approach the respondents through social media such as Whatsapp, Facebook, and Instagram.

Of the 112 undergraduates, 54.50 percent were female undergraduates and 45.50 percent were male undergraduates. In terms of the educational background, the majority of the undergraduates, 86.60% pursued their studies in bachelor's degree while the rest of the undergraduates were in diploma studies (13.40%). Undergraduates from different majors and races were included in this study.

### *2.2. Instruments*

*Kessler Psychological Distress Scale (K10)* The Kessler Psychological Distress Scale (K10) developed by Kessler et al. (2003) was adopted to measure the psychological distress of undergraduates. The scale consisted of 10 questions. Each question was rated by a five-point Likert scale ranging from 1– None of the time to 5– All of the time. The scale is high in internal consistency, 0.91 (Pereira et al., 2019) and demonstrates convergent validity (Sampasa-Kanyinga, Zamorski, & Colman, 2018). The higher the score indicates the greater the psychological distress.

*Smartphone Addiction Scale-Short Version (SAS-SV)* The Smartphone Addiction Scale-Short Version (SAS-SV) established by Kwon, Kim, Cho, and Yang (2013) was utilized to assess the smartphone addiction of undergraduates. The scale consisted of 10 items, in which each item was rated by a six-point Likert scale ranging from 1– Strongly Disagree to 6– Strongly Agree. According to the validation study, this scale shows good concurrent validity and excellent internal consistency, 0.91 (Kwon et al., 2013). To determine smartphone addiction, the cut-off score for males and females is 31 and 33 respectively, out of a total score of 60.

*Multidimensional Scale of Perceived Social Support (MSPSS)* The Multidimensional Scale of Perceived Social Support (MSPSS) developed by Zimet, Dahlem, Zimet, and Farley (1988) was adopted to determine the perceived social support from different sources, namely family, friends, and significant others. The scale consisted of 12 statements. Each statement was rated by a seven-point Likert scale ranging from 1– Very Strongly Disagree to 7– Very Strongly Agree. The scale shows high internal consistency,  $\alpha = 0.92$  (Ermis-Demirtas et al., 2018) and demonstrates convergent validity. The higher the score indicates the greater the perceived social support.

### *2.3. Procedure*

This study has been approved by the Ethics Review Committee. Upon obtaining approval, a set of questions within an online questionnaire were created using Google form and distributed to undergraduates in Kuala Lumpur, Malaysia. The participants were approached by sharing the google form link through social media such as Facebook, WhatsApp, and Instagram. Participants were asked to check the box after reading the informed consent to indicate their willingness to take part in the study, before proceeding to respond to the items in the questionnaire. Data collected were entered in Statistical Package for the Social Sciences (SPSS) Statistics version 22. The model was built using SmartPLS 2.0.

### *2.4. Data Analysis*

SmartPLS 2.0 which was developed by Ringle, Wende, and Will (2005) was employed to build the causal model. SmartPLS which is based on the principles of path modeling and bootstrapping is robust for testing

theoretical models (Ringle, Sarstedt, & Straub, 2012) and is becoming more recognised within the Social Sciences realm (Henseler, Hubona, & Ray, 2016). The PLS model comprises two models, namely the measurement model and the structural model. To verify the psychometric properties, the measurement model was analyzed using factor analysis. The structural model was then analysed to depict the relationships between the constructs.

Concerning the psychometric properties of the measurement model, the construct validity was assessed using convergent validity and discriminant validity. The factor loadings, Average Variance Extracted (AVE), and Composite Reliability (CR) were utilized to assess the convergent validity (Hair, Hult, Ringle, & Sarstedt, 2017). As a rule of thumb, the factor loadings and AVE need to exceed 0.50 (Bagozzi & Yi, 1988). It is necessary for the composite reliability to exceed 0.70 (Chin, 1998). The discriminant validity was then assessed using the Fornell-Larcker criterion (Fornell & Larcker, 1981). It is satisfied if the square root of AVE exceeded the correlations with other latent variables (Hair et al., 2017).

With regards to the structural model, the path between psychological distress and smartphone addiction was tested with the bootstrapping of 1000 samples. The path is significant if the *t*-value exceeded 1.96, *p* < 0.05 (Hair et al., 2017). To assess the mediating role of perceived social support, the Sobel test statistic was used to calculate the mediation effect. It is crucial for the *t*-value to exceed 1.96, *p* < 0.05 to demonstrate a significant mediation effect (Hair et al., 2017).

### 2.5. Assessment of Measurement Model

Table 1 displays the indicators for the measurement model. As can be seen in table, the measurement model portrayed adequate convergent validity as the factor loadings exceeded 0.50 (0.57 to 0.86), the AVE exceeded 0.50 (0.51 to 0.63), and the composite reliability exceeded 0.70 (0.91 to 0.94).

**Table 1.** Indicators for measurement model.

Latent Variables	Label	Indicator
Psychological Distress	PD_Q1	In the past 4 weeks, how often did you feel tired out for no good reason?
	PD_Q2	In the past 4 weeks, how often did you feel nervous?
	PD_Q3	In the past 4 weeks, about how often did you feel nervous that nothing could calm you down?
	PD_Q4	In the past 4 weeks, about how often did you feel hopeless?
	PD_Q5	In the past 4 weeks, about how often did you feel restless or fidgety?
	PD_Q6	In the past 4 weeks, about how often did you feel so restless you could not sit still?
	PD_Q7	In the past 4 weeks, about how often did you feel depressed?
	PD_Q8	In the past 4 weeks, about how often did you feel that everything was an effort?
	PD_Q9	In the past 4 weeks, about how often did you feel so sad that nothing could cheer you up?
	PD_Q10	In the past 4 weeks, about how often did you feel worthless?
Smartphone Addiction	SA_Q1	Missing planned work due to smartphone use.
	SA_Q2	Having a hard time concentrating in class, while doing assignments, or while working due to smartphone use.
	SA_Q3	Feeling pain in the wrists or at the back of the neck while using a smartphone.
	SA_Q4	Won't be able to stand not having a smartphone.
	SA_Q5	Feeling impatient and fretful when I am not holding my smartphone.
	SA_Q6	Having my smartphone in my mind even when I am not using it.
	SA_Q7	I will never give up using my smartphone even when my daily life is already greatly affected by it.
	SA_Q8	Constantly checking my smartphone so as not to miss conversations between other people on Twitter or Facebook.
	SA_Q9	Using my smartphone longer than I had intended.
	SA_Q10	The people around me tell me that I use my smartphone too much.
Perceived Social Support	PSS_Q1	There is a special person who is around when I am in need.
	PSS_Q2	There is a special person with whom I can share joys and sorrows.
	PSS_Q3	My family really tries to help me.
	PSS_Q4	I get the emotional help & support I need from my family.
	PSS_Q5	I have a special person who is real source of comfort to me.
	PSS_Q6	My friends really try to help me.
	PSS_Q7	I can count on my friends when things go wrong.
	PSS_Q8	I can talk about my problems with my family.
	PSS_Q9	I have friends with whom I can share my joys and sorrows.
	PSS_Q10	There is a special person my life who cares about my feelings.
	PSS_Q11	My family is willing to help me make decisions.
	PSS_Q12	I can talk about my problems with friends.

One indicator of psychological distress (PD\_Q8) and one indicator of perceived social support (PSS\_Q11) were deleted due to low factor loadings. The deletion of the indicators resulted in adequate convergent validity. Figure 1 illustrates the measurement model.

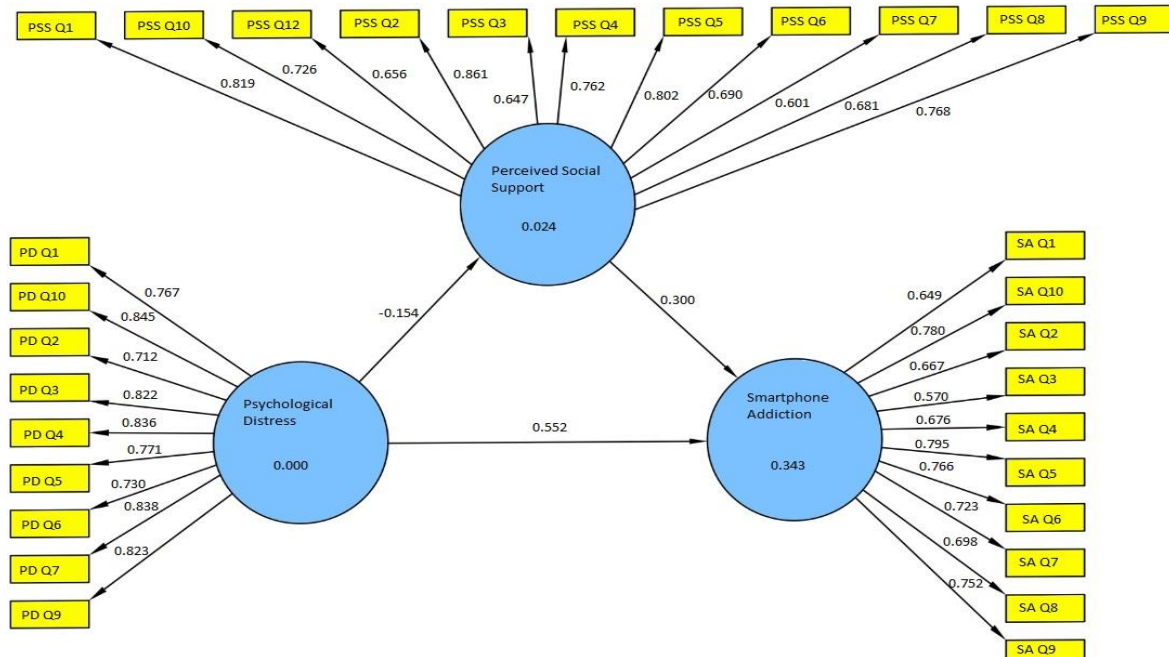


Figure 1. Measurement model.

Table 2 presents the summary for the measurement model. The discriminant validity was considered satisfactory as the square roots of AVE (0.71 to 0.79) exceeded the intercorrelations of the latent variables (-0.15 to 0.51) (Table 3).

Table 2. Results summary for measurement model.

Latent Variables	Indicator	Factor Loading	AVE	Composite Reliability	Discriminant Validity
Psychological Distress	PD_Q1	0.767	0.632	0.939	Yes
	PD_Q2	0.712			
	PD_Q3	0.822			
	PD_Q4	0.836			
	PD_Q5	0.771			
	PD_Q6	0.730			
	PD_Q7	0.838			
	PD_Q9	0.823			
	PD_Q10	0.845			
	Smartphone Addiction	SA_Q1			
SA_Q2		0.667			
SA_Q3		0.570			
SA_Q4		0.676			
SA_Q5		0.795			
SA_Q6		0.766			
SA_Q7		0.723			
SA_Q8		0.698			
SA_Q9		0.752			
SA_Q10		0.780			
Perceived Social Support	PSS_Q1	0.819	0.537	0.927	Yes
	PSS_Q2	0.861			
	PSS_Q3	0.647			
	PSS_Q4	0.762			
	PSS_Q5	0.802			
	PSS_Q6	0.690			
	PSS_Q7	0.601			
	PSS_Q8	0.681			
	PSS_Q9	0.768			
	PSS_Q10	0.726			
	PSS_Q12	0.656			

For the bootstrapping of measurement model, the indicators were significantly related to the particular latent variable as the *t*-value exceeded 1.96 (4.24 to 32.41). The measurement model was reliable as the composite reliability exceeded 0.70 (0.91 to 0.94).

Table 3. Square roots of AVE and intercorrelations of the latent variables.

Latent Variables	Psychological Distress	Smartphone Addiction	Perceived Social Support
Psychological Distress	<b>0.795</b>		
Smartphone Addiction	0.505	<b>0.711</b>	
Perceived Social Support	-0.154	0.215	<b>0.733</b>

Note: Diagonals (in bold) represent the square root of AVE while other values represent the correlations.

### 3. Results

The first research question formed is “What is the prevalence rate of smartphone addiction among undergraduates in Malaysia? The results indicated that 66.10% (n = 74) of undergraduates were addicted to the smartphone, based on the cut-off score of 31 for males and 33 for females (Kwon et al., 2013). This implies that more than half of the undergraduates were addicted to their smartphones.

In relation to the second research question— “Is psychological distress a significant predictor of smartphone addiction?”, the results showed that psychological distress significantly predicted smartphone addiction (*t*-value = 7.423, *p* < 0.001). The explanatory power was  $R^2 = 0.259$ , which means that psychological distress accounted for 25.90 percent of the variance in smartphone addiction. The explanatory power is considered substantial (Cohen, 1988). Figure 2 displays the *t*-statistic of psychological distress in predicting smartphone addiction.

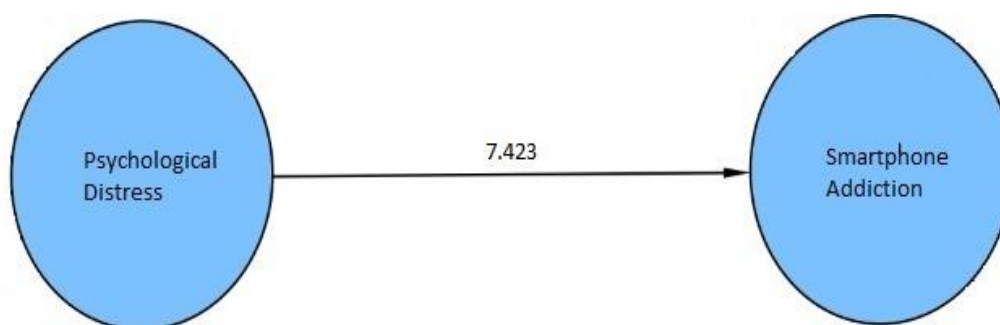


Figure 2. *t*-statistics of psychological distress and smartphone addiction.

Concerning the third research question— “Does perceived social support mediate the relationship between psychological distress and smartphone addiction?”, the results indicated that perceived social support did not mediate the relationship between psychological distress and smartphone addiction, with *t*-value = -0.939, *p* > 0.05. Table 4 exhibits the data of perceived social support mediating the relationship between psychological distress and smartphone addiction. Figure 3 and Figure 4 illustrate the path coefficients and bootstrapping of the PLS structural model respectively.

Table 4. Perceived social support mediating the relationship between psychological distress and smartphone addiction.

The Path	Path Coefficient
Direct effect with no mediator	0.509
Direct effect with the mediator	0.552
Independent variable to mediator (Beta)	-0.1544
Mediator to dependent variable (Beta)	0.3004
Independent variable to mediator (Standard Error)	0.1552
Mediator to dependent variable (Standard Error)	0.1057

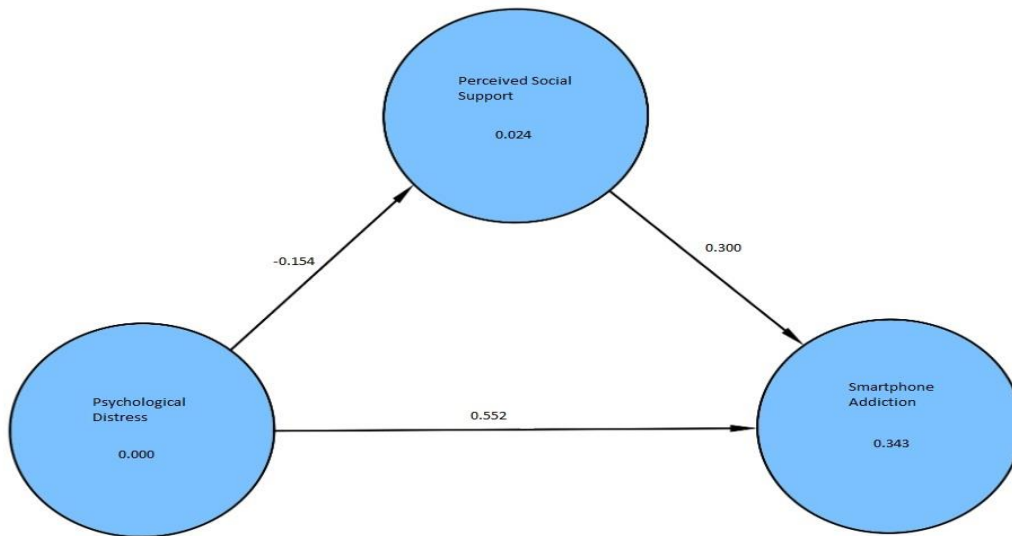


Figure 3. Structural model.

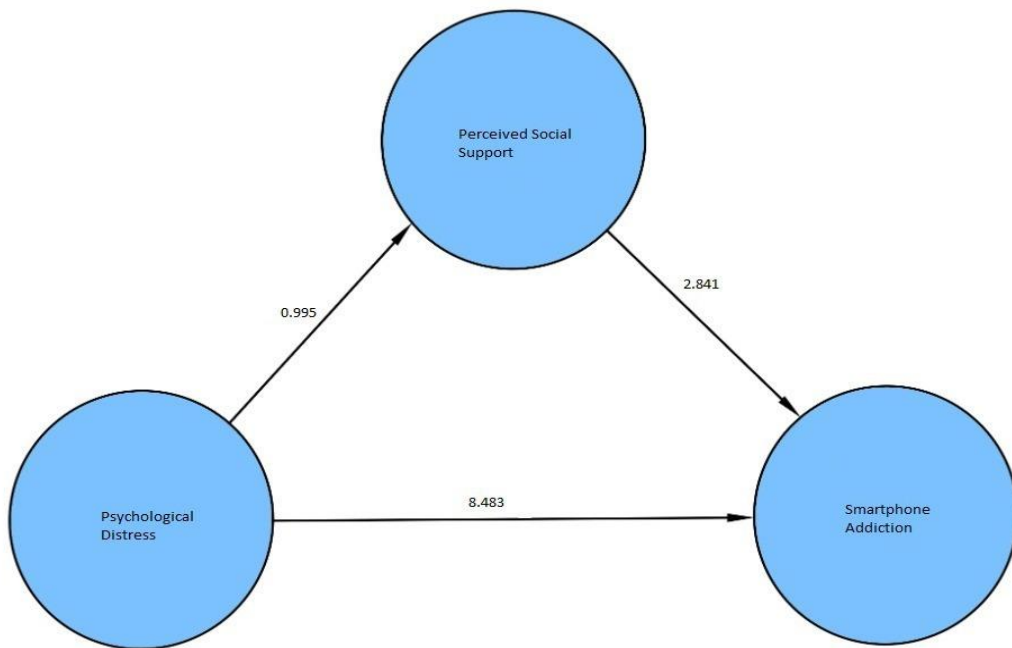


Figure 4. Bootstrapping of the structural model.

#### 4. Discussion

This paper attempted to examine psychological distress as a significant predictor of smartphone addiction with the perceived social support of undergraduates as a significant mediator. The first finding of this study indicated that 66.10% of undergraduates were addicted to smartphones. This result supported the finding of [Nasser et al. \(2020\)](#) that 60.70% of undergraduates in Universiti Putra Malaysia had problematic tendencies where the usage of smartphones are concerned. Similarly, [Namwawa and Chiluba \(2020\)](#) found that 60.60% of the Public Health undergraduates were addicted to their smartphones. [Saadeh et al. \(2021\)](#) also signified that 62.40% of the undergraduates at University of Jordan were addicted to their smartphones. The current finding of a high prevalence rate of smartphone addiction among undergraduates can be explained due to the Covid-19 pandemic. During this period, most countries executed lockdowns to prevent the spread of the virus. In the education sector, classes were being conducted online. The undergraduates used smartphones to attend online classes and conduct discussions with assignment members. The physical distancing as well as the restrictions of social gatherings have triggered loneliness among university students ([Prowse et al., 2021](#)). Hence, smartphones are utilized to maintain social connections with family members, friends, and significant

others. During the pandemic, both male and female university students were vulnerable to smartphone addiction (Zhang, Chen, Tong, Yu, & Wu, 2021). Due to the inability to socialize with friends physically, male students used smartphones to play online games while female students used smartphones to communicate with others (Zhang et al., 2021). The university students tend to interact with others by using text messaging, voice or video calls, and social media during the lockdown.

The second finding of this study reported that psychological distress significantly predicted smartphone addiction in undergraduates. This is consistent with past studies that depression and anxiety, the subscales of psychological distress significantly predicted smartphone addiction in university students (Aker et al., 2017). A previous study showed that depression played a significant role in smartphone addiction and that smartphone addiction increased with depression (Kim et al., 2015). During the Covid-19 pandemic, the immediate transition to online learning which has presented many challenges and the inability to interact with family members and friends physically are the potential sources of psychological distress for undergraduates. As people with mental health issues attempt to alleviate their negative emotions with an overuse of the smartphone, the undergraduates might overuse their smartphones to alleviate their psychological distress. To distract themselves from the psychological distress, they might be spending long hours interacting with their family members, friends, and significant others using the immediate gratification apps, namely WhatsApp, Instagram, and Facebook. Although communication through smartphones provides social support to relieve stress and loneliness (Karsay, Schmuck, Matthes, & Stevic, 2019) such a coping strategy often turns out to be detrimental as a previous study found that problematic use of technology can relate to psychopathology (Alhassan et al., 2018).

The last finding of this study found that perceived social support did not mediate the relationship between psychological distress and smartphone addiction. This finding contradicts past studies that perceived social support significantly mediated the relationship between psychological well-being and health-risk behaviors (Lai & Ma, 2016) and loneliness and life satisfaction (Yildiz & Karadas, 2017) among university students. As we mark two years of the Covid-19 pandemic, there might be other effective strategies adopted by the undergraduates to better cope with their emotional issues, namely depression, anxiety, and stress. These constructive coping strategies might mediate the relationship between psychological distress and smartphone addiction in undergraduates. Instead of constantly seeking external support, undergraduates might have started to adopt emotional self-regulation skills in dealing with their psychological distress (Hussien, Elkayal, & Shahin, 2020). Individuals with high emotional self-regulation skills tend to have high emotional intelligence to recognize and regulate their own emotions (Abdel-Fattah, 2020). However, the current study is unable to ascertain the mediating role of emotional self-regulation due to the fact that the construct is not being measured in this study.

## **5. Limitations**

The first limitation of this study is the lack of generalizability, which may not represent the entire population. Due to the online learning mode, non-probability sampling is deemed an ideal choice in this study. It is unavoidable to adopt the purposive sampling method to seek the respondents who fulfill the characteristics required by the researchers, although the findings might not reflect the whole population. Secondly, all the instruments adopted in this study are self-reported measures. It is undeniable that self-reported measures might be subject to response bias, to the extent that they might affect the validity of the results. Thirdly, this study adopted a cross-sectional quantitative design in ascertaining the predicting role of psychological distress and the mediating role of perceived social support in psychological distress and smartphone addiction. As psychological distress and perceived social support are multidimensional and complex constructs, the cross-sectional quantitative design might not be sufficient to provide a comprehensive understanding of the constructs involved in this study.

## **6. Recommendations**

To counter the limitations of this study, the future study should employ the probability sampling method to obtain a representative sample. A mixed-method design should be adopted to gain a comprehensive understanding of psychological distress, perceived social support, and smartphone addiction. Future research might want to delve into the direct and mediating relationship between psychological distress, emotional self-regulation, and smartphone addiction where at present, it is still unclear whether emotional self-regulation will mediate the relationship between psychological distress and smartphone addiction. Future research framework might also be expanded to include other psychological constructs such as character strengths, resilience, and loneliness.

## **7. Conclusion**

The structural equation model drawn from this study relates to a better understanding of the predicting role of psychological distress and the mediating role of perceived social support in psychological distress and smartphone addiction. The GoF value which was 0.419 implied that the present model has above satisfactory explaining power. This study shows that smartphones are indispensable for undergraduates due to their wide



functions. However, undergraduates are at risk of smartphone addiction due to the long hours spent when using a smartphone. There is urgency in ensuring the university management team should emphasize on the importance of utilizing smartphones wisely and provide various effective ways to assist university students in coping with their psychological distress. It is pivotal for the undergraduates to practice self-help strategies and regulate their emotions constructively. The registered counselors and mental health professionals should also initiate psychological distress management programmes on campus in addition to the implementation of conventional health promotion programmes that educate university students on the negative impacts of smartphone addiction on their health.

## References

- Abdel-Fattah, H. (2020). Emotional intelligence and emotional stability in crises. *Journal of Psychiatry and Psychiatric Disorders*, 4(2), 56-62. Available at: <https://doi.org/10.26502/jppd.2572-519x0090>.
- Aker, S., Sahin, M. K., Sezgin, S., & Oguz, G. (2017). Psychosocial factors affecting smartphone addiction in university students. *Journal of Addictions Nursing*, 28(4), 215-219. Available at: <https://doi.org/10.1097/JAN.0000000000000197>.
- Akturk, U., & Budak, F. (2019). The correlation between the perceived social support of nursing students and smartphone addiction. *International Journal of Caring Sciences*, 12(3), 1825-1836.
- Alhassan, A. A., Alqadhib, E. M., Taha, N. W., Alahmari, R. A., Salam, M., & Almutairi, A. F. (2018). The relationship between addiction to smartphone usage and depression among adults: A cross sectional study. *BMC Psychiatry*, 18(1), 1-8. Available at: <https://doi.org/10.1186/s12888-018-1745-4>.
- Anderson, M., & Jiang, J. (2018). Teens, social media & technology 2018. *Pew Research Center*, 31(2018), 1673-1689.
- Bagozzi, R., & Yi, Y. (1988). On the evaluation of structural equation models. *Journal of the Academy of Marketing Sciences*, 16, 74-94. Available at: <http://dx.doi.org/10.1007/BF02723327>.
- Celik, O. T., & Konan, N. (2019). The mediator role of interaction anxiety in the relationship between social support perception and smartphone addiction. *Journal of Education and Future*(15), 63-75. Available at: <https://doi.org/10.30786/jef.397445>.
- Chin, W. W. (1998). The partial least squares approach for structural equation modeling. In GA Marcoulides (ed.), *Modern Methods for Business Research* (pp. 295-336). London: Lawrence Erlbaum Associates.
- Ching, S. M., Yee, A., Ramachandran, V., Sazilly Lim, S. M., Wan Sulaiman, W. A., Foo, Y. L., & Hoo, F. K. (2015). Validation of a Malay version of the smartphone addiction scale among medical students in Malaysia. *PLoS one*, 10(10), e0139337. Available at: <https://doi.org/10.1371/journal.pone.0139337>.
- Cohen, J. (1988). *Statistical power analysis for the behavioral sciences*. Hillsdale, NJ: L. Erlbaum Associates.
- Delaney, M. E. (2017). The relationship between counseling, social support, and depression in mothers of fragile families. *Journal of Mental Health Counseling*, 39(4), 320-334. Available at: <https://doi.org/10.17744/mehc.39.4.04>.
- Delara, M., & Woodgate, R. L. (2015). Psychological distress and its correlates among university students: A cross-sectional study. *Journal of Pediatric and Adolescent Gynecology*, 28(4), 240-244. Available at: <https://doi.org/10.1016/j.jpjag.2014.08.012>.
- Ermis-Demirtas, H., Watson, J. C., Karaman, M. A., Freeman, P., Kumaran, A., Haktanir, A., & Streeter, A. M. (2018). Psychometric properties of the multidimensional scale of perceived social support within Hispanic college students. *Hispanic Journal of Behavioral Sciences*, 40(4), 472-485. Available at: <https://doi.org/10.1177/0739986318790733>.
- Fook, C. Y., Narasuman, S., Abdul Aziz, N., & Tau Han, C. (2021). Smartphone usage among university students. *Asian Journal of University Education*, 7(1), 282-291.
- Fornell, C., & Larcker, D. F. (1981). Evaluating structural equation models with unobservable variables and measurement error. *Journal of Marketing Research*, 18(1), 39-50. Available at: <https://doi.org/10.1177/002224378101800104>.
- Fu, S., Chen, X., & Zheng, H. (2021). Exploring an adverse impact of smartphone overuse on academic performance via health issues: A stimulus-organism-response perspective. *Behaviour & Information Technology*, 40(7), 663-675. Available at: <https://doi.org/10.1080/0144929x.2020.1716848>.
- García-Manglano, J., López-Madrigal, C., Sádaba-Chalezquer, C., Serrano, C., & Lopez-Fernandez, O. (2021). Difficulties in establishing "truth" conditions in the assessment of addictive smartphone use in young adults. *International Journal of Environmental Research and Public Health*, 19(1), 358. Available at: <https://doi.org/10.3390/ijerph19010358>.
- Hair, J. F., Hult, G. T., Ringle, C. M., & Sarstedt, M. (2017). *A primer on partial least squares structural equation modeling* (2nd ed.). Thousand Oaks: Sage.
- Henseler, J., Hubona, G. S., & Ray, P. A. (2016). Using PLS path modeling in new technology research: Updated guidelines. *Industrial Management & Data Systems*, 116(1), 1-19. Available at: <https://doi.org/10.1108/imds-09-2015-0382>.
- Herrero, J., Uruña, A., Torres, A., & Hidalgo, A. (2019). Socially connected but still isolated: Smartphone addiction decreases social support over time. *Social Science Computer Review*, 37(1), 73-88. Available at: <https://doi.org/10.1177/0894439317742611>.
- Hou, W. K., Liu, H., Liang, L., Ho, J., Kim, H., Seong, E., & Hall, B. J. (2020). Everyday life experiences and mental health among conflict-affected forced migrants: A meta-analysis. *Journal of Affective Disorders*, 264, 50-68. Available at: <https://doi.org/10.1016/j.jad.2019.11.165>.
- Hussien, R. M., Elkayal, M. M., & Shahin, M. A. H. (2020). Emotional intelligence and uncertainty among undergraduate nursing students during the COVID-19 pandemic outbreak: A comparative study. *The Open Nursing Journal*, 14(1), 220-231. Available at: <https://doi.org/10.2174/1874434602014010220>.
- Kalok, A., Sharip, S., Abdul Hafizz, A. M., Zainuddin, Z. M., & Shafiee, M. N. (2020). The psychological impact of movement restriction during the COVID-19 outbreak on clinical undergraduates: A cross-sectional study.

- International Journal of Environmental Research and Public Health*, 17(22), 8522. Available at: <https://doi.org/10.3390/ijerph17228522>.
- Kamaludin, K., Chinna, K., Sundarasan, S., Khoshaim, H. B., Nurunnabi, M., Baloch, G. M., & Hossain, S. F. A. (2020). Coping with COVID-19 and movement control order (MCO): Experiences of university students in Malaysia. *Heliyon*, 6(11), e05339. Available at: <https://doi.org/10.1016/j.heliyon.2020.e05339>.
- Karsay, K., Schmuck, D., Matthes, J., & Stevic, A. (2019). Longitudinal effects of excessive smartphone use on stress and loneliness: The moderating role of self-disclosure. *Cyberpsychology, Behavior, and Social Networking*, 22(11), 706-713. Available at: <https://doi.org/10.1089/cyber.2019.0255>.
- Kessler, R. C., Barker, P. R., Colpe, L. J., Epstein, J. F., Gfroerer, J. C., Hiripi, E., & Walters, E. E. (2003). Screening for serious mental illness in the general population. *Archives of General Psychiatry*, 60(2), 184-189. Available at: <https://doi.org/10.1001/archpsyc.60.2.184>.
- Kim, M.-O., Kim, H., Kim, K., Ju, S., Choi, J., & Yu, M. (2015). Smartphone addiction: (Focused depression, aggression and impulsion) among college students. *Indian Journal of Science and Technology*, 8(25), 1-6. Available at: <https://doi.org/10.17485/ijst/2015/v8i25/80215>.
- Konan, N., Durmuş, E., Bakır, A. A., & Türkoğlu, D. (2018). The relationship between smartphone addiction and perceived social support of university students. *International Online Journal of Educational Sciences*, 10(5), 244-259. Available at: <https://doi.org/10.15345/iojes.2018.05.016>.
- Kumcagiz, H., & Gündüz, Y. (2016). Relationship between psychological well-being and smartphone addiction of university students. *International Journal of Higher Education*, 5(4), 144-156. Available at: <https://doi.org/10.5430/ijhe.v5n4p144>.
- Kuss, D. J., & Pontes, H. M. (2018). *Internet addiction* (Vol. 41): Hogrefe Publishing.
- Kwon, M., Kim, D. J., Cho, H., & Yang, S. (2013). The smartphone addiction scale: Development and validation of a short version for adolescents. *PLOS ONE*, 8(12), 1-7. Available at: <https://doi.org/10.1371/journal.pone.0083558>.
- Lai, C. C. W., & Ma, C. M. S. (2016). The mediating role of social support in the relationship between psychological well-being and health-risk behaviors among Chinese university students. *Health Psychology Open*, 3(2), 1-11. Available at: <https://doi.org/10.1177/2055102916678106>.
- Lei, L. Y. C., Ismail, M. A., Mohammad, J. A., & Yusoff, M. S. B. (2020). The relationship of smartphone addiction with psychological distress and neuroticism among university medical students. *BMC Psychology*, 8(97), 1-9. Available at: <https://doi.org/10.1186/s40359-020-00466-6>.
- Lian, L., You, X., Huang, J., & Yang, R. (2016). Who overuses smartphones? Roles of virtues and parenting style in smartphone addiction among Chinese college students. *Computers in Human Behavior*, 65, 92-99. Available at: <https://doi.org/10.1016/j.chb.2016.08.027>.
- Lian, S. L., Sun, X. J., Niu, G. F., Yang, X. J., Zhou, Z. K., & Yang, C. (2021). Mobile phone addiction and psychological distress among Chinese adolescents: The mediating role of rumination and moderating role of the capacity to be alone. *Journal of Affective Disorders*, 279, 701-710. Available at: <https://doi.org/10.1016/j.jad.2020.10.005>.
- Lin, Y.-H., Chiang, C.-L., Lin, P.-H., Chang, L.-R., Ko, C.-H., Lee, Y.-H., & Lin, S.-H. (2016). Proposed diagnostic criteria for smartphone addiction. *PloS one*, 11(11), e0163010. Available at: <https://doi.org/10.1371/journal.pone.0163010>.
- Mahapatra, S. (2019). Smartphone addiction and associated consequences: Role of loneliness and self-regulation. *Behaviour & Information Technology*, 38(8), 833-844. Available at: <https://doi.org/10.1080/0144929x.2018.1560499>.
- Namwawa, S., & Chiluba, B. C. (2020). Health implications of smartphone addiction among students of University of Lusaka, Zambia. *MJP Online Early*. Retrieved from [https://www.researchgate.net/publication/342388011\\_Health\\_Implications\\_of\\_Smartphone\\_Addiction\\_among\\_Students\\_of\\_University\\_of\\_Lusaka\\_Zambia#fullTextFileContent](https://www.researchgate.net/publication/342388011_Health_Implications_of_Smartphone_Addiction_among_Students_of_University_of_Lusaka_Zambia#fullTextFileContent).
- Nasser, N. S., Loh, J., Rashid, A. A., Sharifat, H., Ahmad, U., Ibrahim, B., & Suppiah, S. (2020). A survey on smartphone dependence and psychological effects among undergraduate students in a Malaysian University. *The Medical Journal of Malaysia*, 75(4), 356-362.
- Oraison, H., Nash-Dolby, O., Wilson, B., & Malhotra, R. (2020). Smartphone distraction-addiction: Examining the relationship between psychosocial variables and patterns of use. *Australian Journal of Psychology*, 72(2), 188-198. Available at: <https://doi.org/10.1111/ajpy.12281>.
- Pereira, A., Oliveira, C. A., Bártolo, A., Monteiro, S., Vagos, P., & Jardim, J. (2019). Reliability and factor structure of the 10-item Kessler psychological distress scale (K10) among Portuguese adults. *Science and Public Health*, 24(3), 729-736. Available at: <https://doi.org/10.1590/1413-81232018243.06322017>.
- Prowse, R., Sherratt, F., Abizaid, A., Gabrys, R. L., Hellemans, K. G., Patterson, Z. R., & McQuaid, R. J. (2021). Coping with the COVID-19 pandemic: Examining gender differences in stress and mental health among university students. *Frontiers in Psychiatry*, 12, 650759. Available at: <https://doi.org/10.3389/fpsy.2021.650759>.
- Ringle, C. M., Wende, S., & Will, A. (2005). *SmartPLS 2.0 M3*. Hamburg: University of Hamburg.
- Ringle, C. M., Sarstedt, M., & Straub, D. W. (2012). Editor's comments: A critical look at the use of PLS-SEM in MIS quarterly. *MIS Quarterly*, 36(1), 3-14. Available at: <https://doi.org/10.2307/41410402>.
- Saadeh, H., Al Fayez, R. Q., Al Refaei, A., Shewaikani, N., Khawaldah, H., Abu-Shanab, S., & Al-Hussaini, M. (2021). Smartphone use among university students during COVID-19 quarantine: An ethical trigger. *Frontiers in Public Health*, 9, 600134. Available at: <https://doi.org/10.3389/fpubh.2021.600134>.
- Sampasa-Kanyinga, H., Zamorski, M. A., & Colman, I. (2018). The psychometric properties of the 10-item Kessler psychological distress scale (K10) in Canadian military personnel. *PloS one*, 13(4), e0196562. Available at: <https://doi.org/10.1371/journal.pone.0196562>.
- Sati, D. Í. L., & Girgin, B. A. (2016). The examination of the relationship between anger, stress, hopelessness and perceived social support in nursing students. *Journal of Psychiatric Nursing*, 7(3), 121-128. Available at: <https://doi.org/10.5505/phd.2016.49379>.

- Tang, F., Byrne, M., & Qin, P. (2018). Psychological distress and risk for suicidal behavior among university students in contemporary China. *Journal of Affective Disorders, 228*, 101–108. Available at: <https://doi.org/10.1016/j.jad.2017.12.005>.
- Xiang, G., Teng, Z., Li, Q., Chen, H., & Guo, C. (2020). The influence of perceived social support on hope: A longitudinal study of older-aged adolescents in China. *Children and Youth Services Review, 119*, 1–31. Available at: <https://doi.org/10.1016/j.chidyouth.2020.105616>.
- Yildiz, M. A., & Karadas, C. (2017). Multiple mediation of self-esteem and perceived social support in the relationship between loneliness and life satisfaction. *Journal of Education and Practice, 8*(3), 130–139.
- Zhang, M., Zhang, J., Zhang, F., Zhang, L., & Feng, D. (2018). Prevalence of psychological distress and the effects of resilience and perceived social support among Chinese college students: Does gender make a difference? *Psychiatry Research, 267*, 409–413. Available at: <https://doi.org/10.1016/j.psychres.2018.06.038>.
- Zhang, M. X., Chen, J. H., Tong, K. K., Yu, E. W.-y., & Wu, A. (2021). Problematic smartphone use during the COVID-19 pandemic: Its association with pandemic-related and generalized beliefs. *International Journal of Environmental Research and Public Health, 18*(11), 5724. Available at: <https://doi.org/10.3390/ijerph18115724>.
- Zhao, C., Xu, H., Lai, X., Yang, X., Tu, X., Ding, N., & Zhang, G. (2021). Effects of online social support and perceived social support on the relationship between perceived stress and problematic smartphone usage among Chinese undergraduates. *Psychology Research and Behavior Management, 14*, 529–539. Available at: <https://doi.org/10.2147/prbm.s302551>.
- Zimet, G. D., Dahlem, N. W., Zimet, S. G., & Farley, G. K. (1988). The multidimensional scale of perceived social support. *Journal of Personality Assessment, 52*(1), 30–41. Available at: [https://doi.org/10.1207/s15327752jpa5201\\_2](https://doi.org/10.1207/s15327752jpa5201_2).