Problematic Smartphone Use in Adolescents: Are Parents' Digital Competence, Parents' Negative Attitudes, and Perceived Parental Efficacy Important?

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Abstract

The present study aims to investigate whether parents' digital competence, parents' negative attitudes toward smartphones, and perceived parental efficacy of smartphones predict problematic smartphone use in adolescents. An online survey provided quantitative data from 102 participants. They were 63 mothers and 39 fathers were involved in the study. Problematic smartphone use in adolescents was perceived by parents, using the Problematic Media Use Measure. Parents' digital competence was measured using Digital Competence Instrument. Parents' negative attitudes towards smartphones and perceived parental efficacy were measured using the Parental Perceptions of Technology Scale. All measurements were validated in the Indonesian version. Multiple linear regression analysis was used to analyze the data. The findings showed that only perceived parental efficacy negatively predicted problematic smartphone use in adolescents ($B = -0.06$, $SE = 0.03$, $\beta = -0.24$, $p < 0.05$). The findings suggest that when attempting to implement parenting strategies to regulate children's technology use, perceived parental efficacy may assist parents in better managing their children to minimize problematic smartphone use compared to having a negative attitude towards smartphones.

Keywords: *Adolescents, digital competence, parents' negative attitudes, perceived parental efficacy, problematic smartphone use.*

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Introduction

In this digital era, smartphones penetrate almost all daily activities. Smartphones are used and needed in most, if not all aspects of life, such as for communication between family members or colleagues, learning tools for teachers and students, work media for parents, and entertainment for all people, including adolescents. Based on findings from the Pew Research Center, 95% of adolescents in America have a smartphone. According to the survey, 90% of adolescents use smartphones only to kill time and 54% of adolescents use smartphones to avoid interacting with

other people directly (Anderson & Jiang, 2018). It was also reported that 54% of adolescents worry about themselves because they spend too much time using smartphones (Anderson & Jiang, 2018), suggesting that adolescents are aware of the possible negative consequences of smartphones. In Indonesia, data from the Central Bureau of Statistics in 2021 showed that 74.64% of the population in the age range of 15-24 years old were smartphone users. This data suggests that Indonesian adolescents and young adults are familiar with smartphones.

Smartphones have many advantageous features, such as keeping users connected with those closest to them, providing necessary information and entertainment such as games, music, videos, and as social interactions (Demirci et al., 2015; Fischer-Grote et al., 2019). Especially during the Covid-19 pandemic, where all activities are shifted online, smartphones are handy for adolescents—mainly students—to manage and organize their learning activities through applications such as Zoom Meeting and Google Classroom. In addition, the digital environment through smartphones is very significant in providing various experiences to fulfill the developmental tasks of adolescents (Subrahmanyam & Smahel, 2011), such as identity exploration (Gerwin et al., 2018), maintaining feelings of connectedness (Lin & Utz, 2015), and building positive self-esteem (Burrow & Rainone, 2017).

The pleasures and benefits of smartphones experienced by adolescents could lead to excessive use. Excessive use of smartphone has been extensively researched, and various terminology has been used, including problematic smartphone use (Lepp et al., 2016; C. Shin & Dey, 2013), problematic mobile phone use (De-Sola et al., 2017), smartphone addiction (Sun et al., 2019), nomophobia (no mobile-phone phobia) (Tams et al., 2018), and has many similarities to problematic Internet use (Camerini et al., 2021; Kwon et al., 2013). These terms are frequently used interchangeably. In this study, the term problematic smartphone use (PSU) is used. It is defined as a compulsive pattern of smartphone usage that can result in negative consequences and impair the daily functioning of the users (Busch & McCarthy, 2021). Furthermore, several studies revealed the impact of PSU can affect psychological, physical, and social interactions such as decreased hand strength and grip (Radwan et al., 2020), family conflict (Kwon et al., 2013; Turel et al., 2011), depression (Harwood et al., 2014), and anxiety (Hartanto & Yang, 2016). One feature of PSU is the time component (i.e.,

excessive use). Other characteristics include failed attempts to reduce smartphone use (relapse), withdrawal symptoms, constant thinking about the smartphone and its activities, an increasing desire to use (tolerance), conflict with family members or friends, and mood changes as a result of excessive smartphone use (Kwon et al., 2013).

Several studies have investigated the influencing factors of PSU in adolescents and found that family, particularly parents play important roles (Cheng et al., 2021; Çiçek et al., 2021; Domoff et al., 2021). Specifically, Guo et al. (2019) found that family interaction can trigger PSU. It was reported that insufficient numbers and low quality of parent-adolescent communication correlate with PSU (Liu et al., 2019). In addition, Fischer-Grote et al. (2019) revealed that parental punishments and restrictive types of parenting seem to increase the risks of PSU. The role of the family, especially parents, in adolescents' PSU is understandable since parents are a source of care, emotional support, security, and safety for adolescents in a period full of physical and emotional changes (Joseph & Kotian, 2022).

Previous studies have found that PSU is linked to various parental factors such as parenting styles (Nur et al., 2021) and parental phubbing (Geng et al., 2021). There are basic things that are also important for parents to prevent the risk of PSU in their adolescents: parents' knowledge of smartphones and how they perceive smartphones. Parents' knowledge about smartphones refers to digital competence, and parents' perception of smartphones is known as parental perception.

According to Soldatovaa and Rasskazova (2014), digital competence is the ability and personal readiness to make confident, effective, critical, and safe choices and the application of information and communication technology in various domains (information, communication, consumption, and techno-sphere environments) based on continuous learning competencies (knowledge, skills, motivation, and responsibility). A previous study showed that when parents have little experience with digital media, it is more difficult for them to support their children with the latest technology (Nikken, 2017). Nikken (2017) also found that the extent to which parents understand and use media affects children's capacity to understand how media functions, in addition to the child's own media experience. In addition, Paramitha and Purwanti (2020) revealed that the knowledge and

ability of parents to use technology, or in other terms digital competence, can affect the mediation strategy used. For example, digital competence is needed as discussion material in implementing an active mediation strategy (Bartau-Rojas et al., 2018). Based on those studies, digital competence is considered to play a role in minimizing the impact of PSU by understanding the functions of media and smartphones.

Previous studies have revealed that parental perception is considered important because parents' perceptions affect the use of smartphones by their children (Johnson & Hertlein, 2019). Sanders et al. (2016) reported that parental perception can be influential in determining the use of media at home as well as supporting parenting practices related to technology. According to Sanders et al. (2016), parental perception is formed by two components: parents' negative attitudes towards smartphones and perceived parental efficacy. Parents' attitudes about media devices can influence both the quantity and quality of screen time of their children, parents who showed negative attitude towards smartphones reported less screen time compared to parents that had positive attitude (Sanders et al., 2016). A positive attitude towards smartphone or in this study referred as a parental efficacy is a positive behavior towards smartphones through technology-related parenting. Parents with high efficacy can foster an adaptive parenting environment and reduce their children's risk of developing problem behaviors (Chou et al., 2022; Glatz & Buchanan, 2015) such as PSU.

Parents' digital competence, parents' negative attitude, and perceived parental efficacy are important factors for PSU (Bartau-Rojas et al., 2018; Johnson & Hertlein, 2019). However, up to the knowledge of the authors, there are relatively few studies have examined the relationships between these three parental factors and PSU. This study aims to bridge this research gap by investigating whether parents' digital competence, parents' negative attitudes towards smartphones, and perceived parental efficacy of smartphones predict problematic smartphone use in adolescents. Based on the above-mentioned explanations, it is hypothesized that parents' digital competence, parents' negative attitude, and perceived parental efficacy toward smartphones are negative predictors for PSU in adolescents.

Method

Participants

The target population of this study were: (1) mothers or fathers with children aged 10-18 years, (2) have University educational backgrounds, considering the items of Digital Competence required the digital understanding and skills that are most likely understood by high-education parents. The convenience sampling method was used to collect samples. The collection of data was carried out for 20 days in September 2022. Research information was distributed through social media platforms WhatsApp and Instagram. We also reached out to various parent communities and parents' WhatsApp groups. Furthermore we contacted some teachers in Indonesian high schools to share research information to parent committees in their school.

Procedures

Google Forms, an online survey platform, was used to gather data and took between 25 to 40 minutes to be completed. Parents were asked to fill out three questionnaires related to PSU in adolescents, parents' digital competence, parents' negative attitudes, and perceived parental efficacy towards smartphone as well-as a questionnaire related demographic information. The questionnaire link can be accessed after filling out the informed consent. The Research Ethics Commission of the University of Padjadjaran (Number 951/UN6.KEP/EC/2022) has given ethical approval for the entire procedure of this research.

Instruments

Age, gender, marital status, occupation, educational background, and financial condition were among the demographic data collected in this study. The translation and validation of the measurements into the Indonesian version were conducted using International Test Commission guidance (2017).

To measure PSU in adolescents, the Problematic Media Use Measure (PMUM) (Domoff et al., 2019) was used. There are nine dimensions in this scale, namely, (a) preoccupation (3 items; e.g., "Smartphone is all that my child seems to think about"), (b) withdrawal (3 items; e.g., "My child becomes frustrated when he/she cannot using smartphone"), (c) tolerance (3 items; e.g., "The

amount of time my child wants to use smartphone keeps increasing"), (d) unsuccessful attempts by parent to control use (3 items; e.g., "It is hard for my child to stop using smartphone"), (e) loss of interest in previous hobbies and entertainment (3 items; e.g., "Smartphone is the only thing that seems to motivate my child"), (f) deceived others about use (3 items; e.g., "My child lies in order to use smartphone"), (g) use to escape or relieve a negative (3 items; e.g., "My child uses smartphone to feel better"), (h) lost a relationship or had compromised functioning in school due to use (3 items; e.g., "My child's smartphone use negatively affects his/her friendships"), and (i) continued use despite psychosocial problems (3 items; e.g., "My child's smartphone use interferes with family activities"). The reliability of the Indonesian scale is $\alpha = 0.96$ and the validity analysis of the scale was done using the Content Validity (I-CVI = 1.00). Participants answered items about the frequency of their child's behavior in the past one month using a Likert scale of 1-5, ranging from 1 (never) to 5 (always). The higher the score of mean, the higher the level of PSU in adolescents.

Parents' digital competence was measured using Digital Competence Instrument (Pons-Salvador et al., 2022). It includes eight items related to activities that parents might be able to do, with items (1) blocking messages from someone you do not want to contact, (2) finding information on how to use the Internet safely, (3) putting a page on a bookmark, (4) changing privacy profile settings on a social media, (5) comparing different websites to contrast information, (6) deleting the history of pages visited, (7) blocking unwanted advertisements or "spam," and (8) change filter preferences in an online shop. The response to each item was dichotomous, with a score of 2 given if they could perform the activity and a score of 1 given if they could not perform the activity. The higher the score, the more digitally competent the parents are. The score values ranged from 8 to 16. The reliability of the Indonesian scale is $\alpha = 0.71$ and the content validity is satisfactory (I-CVI = 0.97).

Parental Perceptions of Technology Scale (PPTS) (Sanders et al., 2016), which was a multidimensional measurement tool consists of two dimensions used to measure the parents' negative attitudes and perceived parental efficacy. Parents' negative attitude dimension (4 items; e.g., "Smartphones make people lazy") used a Likert scale ranging from 1 (strongly disagree) to 5 (strongly agree). Then, the item scores on these dimensions were summed, the higher the score,

the higher the level of parents' negative attitude towards smartphones. The reliability of parents' negative attitude scale is α = 0.78. The dimension of perceived parental efficacy (6 items; e.g., "Smartphones are too difficult to use") used a Likert scale ranging from 1=strongly disagree to 5=strongly agree. To calculate the dimension of perceived parental efficacy score, items with negative content were coded reversely. The results of the reliability test in this study indicate that there are two items that are not reliable, therefore, these items were excluded for further analysis. The rest 4 items that were used in this study showed a Cronbach's alpha of 0.63.

Data Analysis

Data were analyzed using IBM-SPSS software version 23.0 (IBM Corp., 2015). Demographic data were analyzed using descriptive analysis, such as frequency and percentage. Descriptive analysis for the research variables PSU in adolescents, parents' digital competence, parents' negative attitude towards smartphone, and perceived parental efficacy was carried out by calculating the mean and standard deviation. Furthermore, correlational analyses were conducted using Pearson Correlation Analysis. To test the hypothesis, multiple linear regression analysis was used. The normality, linearity, and multicollinearity have been examined and meet the assumption of multiple linear regression analysis.

Result

Participants comprised 102 parents (63 mothers, 39 fathers) aged 32-58 years (M = 45, SD = 5.89). Table 1 presents the characteristics of participants. Most participants are full-time workers (73.50%) and married (93.10%). The majority of participants (56.90%) received their most recent education at the Bachelor's level. In terms of financial condition, the majority of participants (59.80%) can meet their daily needs and save.

Table 1

Demographic Characteristics of Participants

Variable	Participants (N = 102)
Marriage status	
Married	95 (93.10%)
Single parent	7 (6.90%)
Occupation	
Full-time job	75 (73.50%)
Part-time job	14 (13.70%)
Unemployed	13 (12.70%)
Educational level	
Academy	1 (1.00%)
Diploma	16 (15.70%)
Bachelor	58 (56.90%)
Master	19 (18.60%)
Doctor	8 (7.80%)
Financial status	
Unable to meet daily needs	1 (1.00%)
Hardly meet daily needs	6 (5.90%)
Able to meet daily needs but not enough for savings	34 (33.30%)
Able to meet daily needs and enough for savings	61 (59.80%)

Table 2 presents the descriptive statistics that provides an overview of the trend's responses to research variables, namely PSU in adolescents, parents' digital competence, parents' negative attitude toward smartphone, and perceived parental efficacy toward smartphone. The variable of PSU has a mean score of 2.86. The digital competence variable has a mean score of 1.79, the negative attitudes variable has a mean score of 3.23, and the variable of perceived parental efficacy has a mean score of 3.50.

Table 2

Descriptive Statistics of Study Variables

Variable	Minimum	Maximum	Mean	Std. Deviation
Problematic Smartphone Use	1	5	2.86	0.86
Preoccupation	1	5	3.89	1.06
Unsuccessful parents' control	1	5	3.41	1.22
Loss of interest	1	5	3.10	1.13
Withdrawal	1	5	2.62	1.23
Tolerance	1	5	3.20	1.12
Deception	1	5	1.81	0.88
Escape/relieve	1	5	2.92	1.12
Lost a relationship	1	5	2.50	0.98
Psychosocial problems	1	5	2.33	1.01
Digital Competence	1	2	1.79	0.22
Negative Attitude	1	5	3.23	0.99
Perceived Parental Efficacy	1	5	3.50	0.84

Table 3 presents the correlations between the variables investigated. It shows that there is no correlation between digital competence and PSU ($r = -0.03$, $p = 0.79 > .05$). While negative attitude towards smartphones shows a positive correlation with PSU ($r = 0.37$, $p < .05$), perceived parental efficacy has a negative correlation with PSU ($r = -0.37$, $p < .05$).

Table 3

Correlations of Study Variables

Variable	1	2	3	4
1. Problematic Smartphone Use	-			
2. Digital Competence	-0.03	-		
3. Negative Attitude	0.37**	-0.11	-	
4. Perceived Parental Efficacy	-0.37**	0.20*	-0.61**	-

Note: **. Correlation is significant at the 0.01 level (2-tailed)
*. Correlation is significant at the 0.05 level (2-tailed)

Before performing the multiple linear regression test, assumption test was performed, normality test was carried out using residual normality and found that the data were normally distributed ($p = 0.2 > 0.05$). Furthermore, linearity and multicollinearity tests were carried out, Table 4 showed that the

data is linear ($p > 0.05$) and there is no multicollinearity (Tolerance > 0.10, VIF < 10).

Table 4
Assumption Tests of Study Variables

Variable	Deviation from Linearity	Collinearity	
		Tolerance	VIF
1. Problematic Smartphone Use	-	-	-
2. Digital Competence	0.31	0.96	1.04
3. Negative Attitude	0.77	0.63	1.58
4. Perceived Parental Efficacy	0.46	0.61	1.62

a. Dependent Variable: Problematic Smartphone Use in Adolescents

After confirming all assumptions (i.e., normality, linearity, and multicollinearity), a multiple regression was performed with PSU as the dependent variable and digital competence, parents' negative attitude towards smartphones, and perceived parental efficacy as predictors. Table 5 showed that the model was significant ($p < .05$) with a predictor contribution of 14%. However, if we look at them one by one, only the perceived parental efficacy model significantly predicts PSU ($B = -0.06$, $SE = 0.03$, $\beta = -0.24$, $p < 0.05$).

Table 5
Multiple Regression Analysis with Digital Competence, Parents' Negative Attitude towards Smartphones*, and Perceived Parental Efficacy as Predictors and Problematic Smartphone Use in Adolescents as Dependent Variable*

Variable	Unstandardized Coefficients		Standardized Coefficients	t	sig.	F	Adjusted R Square
	B	Std. Error	Beta				
(Constant)	2.78	0.87		3.19	.002	6.65	0.14
Digital Competence	0.02	0.04	0.04	0.47	0.64		
Negative Attitude	0.05	0.02	0.22	1.94	0.06		
Perceived Parental Efficacy	-0.06	0.03	-0.24	-2.04	0.04		

a. Dependent Variable: Problematic Smartphone Use in Adolescents

Discussion

The purpose of the present study is to investigate whether parents' digital competence, parents' negative attitudes towards smartphones, and perceived parental efficacy of smartphones predict problematic smartphone use (PSU) in adolescents. The finding showed that only perceived parental efficacy predicts PSU, while the effects of digital competence and parents' negative attitudes towards smartphones seem negligible.

It is hypothesized parent digital competence, parent's negative attitude, and parental efficacy are significant predictor for PSU. The results of multiple regression could partially confirm this hypothesis, with significant finding was only true for perceived parental efficacy. The regression coefficient for parental efficacy is negative in value, suggesting that a high parental efficacy is linked to a low PSU in adolescents. As mentioned by a previous study, parents who have a positive attitude towards smartphones viewed smartphones important for their children's academic and work success in the future (Sanders et al., 2016). Therefore, parents who have a positive attitude will encourage their children to use smartphones, since the use of technology cannot be ignored and education should be adapted to technology, a positive parental attitude towards smartphone may have several benefits for children, such as use technology to complete school assignments, learn to be independent learners, and technology can facilitate deep exploration and integration of information (Sivalingam & Subbaiyan, 2018). Fitton et al. (2013) revealed some other potential advantages of technology use include improved cognitive development, increased academic achievement, and reduced barriers to social interaction. With immediate access to global information, children and adolescents are expanding their worldviews and learning styles, as well as extending social networks across distance and culture. Another result found that some parents consider the educational value of applications to be important during the selection of content and applications appropriate to their children (Pons-Salvador et al., 2022). Thus, it allows parents to further encourage their children to use smartphones for useful purposes.

Since studies which linking the perceived parental efficacy of smartphone and PSU is scarce, the most similar study is Sanders et al. (2016), which investigate the association between perceived

parental efficacy and screen time. Sanders et al. (2016) stated that parental efficacy associated with parental involvement and parental monitoring. It is therefore assumed that parents with high parental efficacy would encourage, support, and monitor their children to use smartphones for useful purposes and minimize the PSU. Parents who perceive themselves to have a high level of efficacy in using media technology are more likely to actively intervene in their children's media use, even if the changing media environment presents unprecedented challenges for parents (W. Shin, 2018). The belief that someone can positively influence their own children leads parents to become more actively involved in their children's upbringing and education (Glatz & Buchanan, 2015). Parents with high efficacy can foster an adaptive parenting environment and reduce their children's risk of developing problem behaviors (Chou et al., 2022; Glatz & Buchanan, 2015). Parents' efficacy is known to predict the use of restrictive mediation strategies and co-use, these strategies include watching together (for example, parents and children watching together for fun), explaining and discussing media-related content with children, and establishing rules for viewing content and limiting the amount of time their children spend using the media (Gomez, 2019).

The results for digital competence and negative attitude as predictor of adolescents' PSU did not yield a significant finding. A possible explanation for this might be that parents did not assist their children during their digital activities and therefore fail to both monitor and transfer their digital competence to their children. Previous studies have revealed that parental assistance has been shown to be negatively correlated with PSU (Chandrima et al., 2020; Chang et al., 2015). To support that assistance and monitoring, digital competence can be a supporting component, as Paramitha and Purwanti (2020) revealed that digital competence can affect the parenting strategy used. Therefore, when parents have practiced assistance and monitoring, good digital competence in parents can be an aspect that supports assistance and monitoring so that they can help their children to use smartphones responsibly (Symons et al., 2017). A possible explanation for parents' negative attitudes which was not significantly predict PSU might be parents who perceive smartphones as having a negative influence are more likely to have parenting rules and strategies to limit their child's access to smartphones (Sanders et al., 2016). However, adolescents' ownership of their smartphone increases with age (Lauricella & Cingel, 2020), hindering parents from controlling and monitoring device use outside home.

Based on the findings in this study, parental perceived efficacy was more able to reduce PSU in adolescents than if parents had a negative attitude towards smartphones. The current study suggests that when attempting to implement parenting strategies to regulate their children's technology use, perceived parental efficacy should be considered: improving perceived parental efficacy through smartphone may assist parents in better managing their children to minimize PSU compared to having a negative attitude towards smartphones.

The limitation of this study is that the sample only reached participants who have a university background and an upper-middle economic status. Thus, the results of this study can only be generalized to members of the population who have the same characteristics. To reach a wider range of participants and collect more representative data, future research may consider reaching samples with more diverse economic and educational status.

Conclusion

This study aimed to investigate whether parents' digital competence, parents' negative attitudes towards smartphones, and perceived parental efficacy of smartphones could predict problematic smartphone use in adolescents. This study has shown that perceived parental efficacy of smartphones negatively predicts PSU in adolescents. Due to this significant finding, it seems important that parents develop a positive attitude towards smartphone, which is associated with high support, encouragement, and monitoring of smartphone use by adolescents. Further research needs to include parents with diverse educational backgrounds and social economic status. Furthermore, it is also important to examine PSU in adolescents from the point of view of adolescents themselves.

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