

# Correlation Between Adolescents Temperament and Internet Addiction Levels in Junior High School in Surabaya, Indonesia

*by Destasari Tri Hartanti*

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## ORIGINAL RESEARCH

# CORRELATION BETWEEN ADOLESCENTS' TEMPERAMENT AND INTERNET ADDICTION LEVELS IN JUNIOR HIGH SCHOOL IN SURABAYA, INDONESIA

*Hubungan antara Temperamen dan Derajat Kecanduan Internet Remaja di Sekolah Menengah Pertama di Surabaya, Indonesia*

Destasari Tri Hartanti<sup>1</sup>, Yunias Setiawati<sup>2</sup>, Dominicus Husada<sup>3</sup>, Irwanto Irwanto<sup>3</sup>

<sup>1</sup> Faculty of Medicine, Universitas Airlangga, [destasari.tri.hartanti-2017@fk.unair.ac.id](mailto:destasari.tri.hartanti-2017@fk.unair.ac.id)

<sup>2</sup> Department of Psychiatric, Faculty of Medicine Universitas Airlangga, Dr. Soetomo General Hospital, [yunias.setiawati@gmail.com](mailto:yunias.setiawati@gmail.com)

<sup>3</sup> Department of Pediatric, Faculty of Medicine Universitas Airlangga, Dr. Soetomo General Hospital

Correspondence Author: Yunias Setiawati, [yunias.setiawati@gmail.com](mailto:yunias.setiawati@gmail.com), Departement of Psychiatric, Faculty of Medicine, Universitas Airlangga/Dr. Soetomo General Hospital, Jalan Prof. Dr. Moestopo 6-8, Surabaya City, East Java, 60286, Indonesia

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## ABSTRACT

**Background:** Internet addiction has become a serious problem in the world, especially for adolescents. Temperament plays an important role in influencing internet addiction in adolescents. **Purpose:** The aim of this study was to analyze the relationship between students' characteristics and temperament with their internet addiction levels in one of the junior high schools in Surabaya, Indonesia. **Methods:** This was a cross-sectional study, which used primary data that was obtained from students who filled out a questionnaire. The study sample included 114 students in one of the junior high schools in Surabaya. The dependent variable was the internet addiction level; the dependent variables were gender, age, student grade, and temperament. An Internet Addiction Test (IAT) and an Early Adolescents Temperament Questionnaire-Revised (EATQ-R) were the tools used for data collection. Data was collected in November 2019. The sample selection was done through the stratified random sampling technique. The data was subsequently analyzed using the Fisher's exact and Spearman correlation tests. **Results:** There was a significant positive correlation between age ( $p < 0.01$ ), student grade ( $p < 0.05$ ), negative affectivity ( $p < 0.01$ ), and surgency ( $p < 0.05$ ) toward internet addiction levels. There was a significant negative correlation observed between effortful control ( $p < 0.05$ ) and internet addiction levels. **Conclusion:** There was a significant relationship between age, student grade, negative affectivity, surgency, and effortful control and adolescents' internet addiction levels.

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#### ABSTRAK

**Latar Belakang:** Kecanduan internet menjadi masalah serius di dunia, untuk remaja. Temperamen memiliki peranan penting dalam menimbulkan kecanduan internet pada remaja. **Tujuan:** Penelitian ini bertujuan untuk menganalisis hubungan antara karakteristik dan temperamen terhadap derajat kecanduan internet pada remaja salah satu sekolah menengah pertama di Surabaya, Indonesia. **Metode:** Penelitian ini merupakan penelitian cross-sectional yang menggunakan data primer dari siswa dengan cara pengisian kuesioner. Sampel penelitian ini terdiri dari 114 siswa pada salah satu sekolah menengah pertama di Surabaya, Indonesia. Variabel dependen pada penelitian ini adalah derajat kecanduan internet dan variabel independen penelitian ini adalah jenis kelamin, usia, kelas, dan temperamen. Kuesioner yang digunakan untuk pengambilan data yakni Internet Addiction Test dan Early Adolescent Temperament-Revised Questionnaire (EAT-QR). Pengambilan data dilakukan pada bulan November tahun 2019 dengan pemilihan sampel melalui stratified random sampling dan data dianalisis menggunakan uji korelasi Fisher Exact's dan Spearman. **Hasil:** Penelitian ini menunjukkan bahwa terdapat hubungan bermakna secara positif antara usia ( $p < 0.01$ ), kelas ( $p = <0.05$ ), dimensi temperamen remaja yakni negative affectivity ( $p < 0.01$ ), dan surgency ( $p < 0.05$ ) terhadap derajat kecanduan internet. Terdapat hubungan bermakna secara negatif antara dimensi temperamen effortful control ( $p < 0.05$ ) dan adiksi internet. **Kesimpulan:** Terdapat hubungan bermakna antara usia, kelas, negative affectivity, surgency, dan effortful control terhadap derajat kecanduan internet pada remaja.

15

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#### INTRODUCTION

In this day and age, internet cannot be separated from the lives of many people. Internet has changed the pattern of human behavior in many aspects: social, economic, education, and lifestyle. Internet is a technology that enables people to easily access various types of information (Castellacci & Tveito, 2018). Internet has a positive impact; however, excessive use of the internet can also have a negative impact on health. It can also impact children's and adolescents' social and academic status (Abdullah, 2017). Adolescents tend to use the internet to fulfill their daily needs (completing school tasks, for recreation and entertainment, social media usage, etc.). Some studies have highlighted the dangers of adolescents using the internet for an excessively long time. Given their poor self-control, the ease with which they can access the internet, and plenty of time available at their disposal, the population made up of adolescents is

41

considered vulnerable (Li, Newman, Li, & Zhang, 2016). Adolescents' internet addiction is a major problem in the world. Data pertaining to the prevalence rate of internet addiction in each country is still unavailable. Nevertheless, a study conducted by Cheng & Li (2014) among 31 nations revealed that the global prevalence rate of internet addiction is about 6%. Previous studies have indicated that the rate of internet addiction among adolescents in Padang (Indonesia) was mainly at a moderate level, with the percentage of prevalence being 50% (Sari, Ilyas, & Ifdil, 2017). Internet addiction in Asian adolescents is more common compared to the US and Europe due to the cultural different and difficulties in self-expression, which can easily cause these youngsters to fall prey to the cyber-world (Kurniasanti, Assandi, Ismail, Nasrun, & Wiguna, 2019). Internet addiction is associated with other psychiatric disorders and a series of social, emotional, and physical complications (Santos et al., 2017). This addiction also negatively impacts

the quality of life (Cheng & Li, 2014). Identifying the risk factors and the protective factors of internet addiction is important to understand how children develop into adolescents. Researchers are trying to identify the risk factors and the protective factors that influence internet addiction in adolescents (Pace et al., 2014). These factors include intrapersonal attributes (e.g., temperament) (Li, Newman, Li, & Zhang, 2016).

Temperament is defined as individual differences that are biologically based on reactivity and self-regulation (Rothbart & Bates, 2006). Temperament plays an important role in the development of problematic behavior, such as depression, juvenile delinquency, drug abuse, and gambling (Li, Newman, Li, & Zhang, 2016). A study by Putnam, Ellis, & Rothbart (2001) measured the scale of temperament in adolescents and classified it into four dimensions based on reactivity and self-regulation: effortful control, surgency, negative affectivity, and affiliative behavior) (Ramadhianti & Alfiasari, 2017). A research carried out by Li, Newman, Li, & Zhang (2016) revealed that there was a relationship between the dimensions of temperament (i.e., effortful control, sensation seeking, anger or frustration, and shyness) and internet addiction. Negative temperament has a devastating effect on the emotions and behavioral problems of adolescents. These patterns of behavior can continue into adulthood (Setiawati et al., 2020). Adolescents in junior high schools are included in the vulnerable category and are at risk of internet addiction (given their lack of self-control) (Li, Newman, Li, & Zhang, 2016). The aforementioned studies looked to identify at least one of the risk factors that could help prevent internet addiction among adolescents. Additionally, there have been only a few studies that have looked at the correlation between temperament and internet addiction levels among adolescents in Surabaya. This research aimed to describe the internet addiction levels in adolescents, describe adolescents' temperament levels, and analyze the correlation between temperament and the internet addiction levels of students in one of the junior high schools in Surabaya, Indonesia.

## METHODS

This was a cross-sectional study. The population in this study was the 7<sup>th</sup>, 8<sup>th</sup>, and 9<sup>th</sup> grade students in one of the junior high schools in Surabaya (class of 2019). A total of 1,026 students were included in this study. The sample size in

every grade was measured using the stratified random sampling formula. The sample size was determined by Slovin's formula (Ramadhana, 2015). Based on a sample size of 91 respondents, calculations were done using a confidence level of 90%. The results indicated that a minimum sample size of 37 respondents in the 7<sup>th</sup> grade, and 27 respondents in the 8<sup>th</sup> and 9<sup>th</sup> grades was required. The respondents were selected randomly by selecting one class in each grade that met the condition of minimum number of respondents required. The inclusion criteria was students aged 12–15 years living with both parents. Moreover, these students needed to have access to the internet. They should not have had any psychiatry history or have undergone any psychiatric therapy, including receiving any psychopharmacological drugs. Data collection was done on November 18, 2019. The primary data was collected by distributing the self-report questionnaires. There were 120 questionnaires distributed; however, after data processing, six questionnaires were excluded because it is not fill completely.

The dependent variable in this study was internet addiction level, which was measured through the Internet Addiction Test (IAT) and designed by Young (1999). This test was adapted and tested for its validity and reliability by Ramadhana (2015). Based on the four symptoms of internet addiction—preoccupation, low self-control, neglect of work, and rejection in social life—there were 20 questions that assessed the level of internet addiction by employing a scale between 0 and 5. The independent variable in this study was characteristics of adolescents (gender, age, student grade) and temperament, as measured with the Early Adolescent Temperament-Revised Questionnaire (EAT-QR) by Putnam, Ellis, & Rothbart (2001). This tool was modified and tested for its validity and reliability by Ramadhianti & Alfiasari (2017).

There were 48 statements that assessed the four dimensions of temperament: effortful control, surgency, negative affectivity, and affiliative behavior. This assessment was done using the five-point Likert scale (Ramadhianti & Alfiasari, 2017). Internet addiction levels were classified under four categories: If the total score was less than 30, the respondents were grouped under the none category (or not experiencing internet addiction); if the total score was between 31 and 49, the respondents were grouped under the mild internet addiction category; if the total score was between 50 and 79, the respondents were categorized under the moderate internet addiction

category; and if the total score was between 80 and 100, the respondents were grouped under the severe internet addiction category. Temperament measurement was performed by calculating the average of the subscales in each dimension. A respondent having a difficult temperament (dominating personality) was the one who received the largest average value.

Data analysis was done using univariate and bivariate analysis. A univariate analysis was conducted on the frequency distribution of socio-demographic characteristics, details of respondents' internet addiction levels, and the temperament of the respondents. A bivariate analysis, using a Fisher's exact test, was performed to determine the correlation between gender and internet addiction levels. A Spearman correlation test was conducted to determine the correlation between the dimensions of age, student grade, and temperament (effortful control, negative affectivity, surgency, and affiliative behavior) and internet addiction levels. This study was ethically approved by the Health Research Ethics Committee at the Faculty of Medicine in Universitas Airlangga. The study bears the certificate number No.306/EC/KEPK/FKUA/2019.

## RESULTS

### Description of Characteristics, Internet Addiction Levels, and Temperament of Adolescents

Most of the respondents were females between 12 and 15 years of age. The highest age of a respondent was 14 years. The results revealed that the number of respondents experiencing internet addiction was greater than those who did not experience any addiction. Most of the respondents experienced mild internet addiction levels, while a few experienced severe internet addiction levels (See table 1). The data presented in Table 1 indicates that most of the respondents had a dominant affiliative behavior temperament, while a few had the surgency trait.

### Analysis of Correlation between the Adolescents' Characteristics and Temperament with Internet Addiction Levels

The statistical results using Fisher's exact test indicated there was no significant relationship between gender and internet addiction levels ( $p>0.05$ ) (See Table 2). There was a positive significant correlation between the age of the respondents ( $p<0.01$ , correlation coefficient=0.31) and internet addiction levels. A strong significant

positive relationship between negative affectivity ( $p\leq 0.01$ , correlation coefficient=0.56) and internet addiction levels was observed. There was also a significant positive relationship observed between student grade ( $p<0.05$ , correlation coefficient=0.21) and surgency ( $p<0.05$ , correlation coefficient=0.18) with internet addiction levels; however, the strength of this correlation was very low. This study also found a significant low negative relationship between effortful control ( $p<0.05$ , correlation coefficient=-0.22) and internet addiction levels (See Table 3). There was no significant correlation between affiliative behavior ( $p>0.05$ , correlation coefficient=0.08) and internet addiction levels (See Table 3).

## DISCUSSION

### Description of Internet Addiction Levels in Adolescents

The results of this study indicated a high prevalence rate of internet addiction among adolescents. This study produced results that were higher than other studies (which also used the IAT questionnaire) that were carried out with adolescents in China in the age group of 14–24 (10.40%) (Wu et al., 2016) and with adolescents in Croatia in the age group of 15–20: 3.40% and 35.40% higher levels of addiction, respectively (Černja, Vejmelka, & Rajter, 2019). We can notice an upward trend in internet addiction, which is becoming even higher as time passes by. The study was conducted during different time intervals. This, along with the limited number of samples considered in this study, may lead to a big difference in value when comparing the prevalence rates.

Respondents in this study were from 12 to 15 years of age. They were categorized as early adolescents. Early adolescence is a critical period, in which potential negative behavior may develop (e.g., internet addiction) (Ningrum & Soeharto, 2015). A study conducted by Ballarotto, Volpi, Marzilli, & Tambelli (2018) suggested that early adolescents had the highest rate of internet addiction compared to middle and late adolescents. This was because of immature self-regulation in early adolescents. Shek & Yu (2016) found out that there was a gradual decline in the number of people who were addicted to the internet (from early to late adolescence); however, this number was not a significant one. This reduction in internet consumption occurred due to an improvement in cognitive development and

involvement in meaningful activities during adolescence, which prevented adolescents from experiencing internet addiction. This study was conducted in an urban area that had a sound internet infrastructure and high-speed fiber-optic internet connectivity. All of the students in this study had access to the internet. Previous studies have suggested that the phenomenon of internet addiction had a linear relationship with the ease of access (Kurniasanti, Assandi, Ismail, Nasrun, & Wiguna, 2019).

In this study, most of the adolescents experienced a mild internet addiction, while a few experienced moderate levels of addiction. These findings were in line with a cross-sectional study conducted by Ramadhana (2015), who studied internet addiction and anxiety levels among the medical faculty students at the Syiah Kuala University. Most of the students experienced a mild internet addiction (71.10%), and a small number of students experienced a moderate level of internet addiction (1.10%). This study was also conducted by using the IAT questionnaire. Mild internet addiction can be felt by someone who regularly goes online and has minor problems but can overcome them. Moderate internet addiction can be experienced by someone who regularly experiences problems due to their pattern of internet usage. A severe internet addiction is felt by someone who goes through major problems because of a compulsion to use the internet. Problems most commonly experienced by adolescents addicted to the internet are interpersonal relationship disorders (anger, aggression, and irritability), mental health disorders (anxiety, depression, and loneliness), physical disorders, and family and academic problems (Mohammadkhani, Alkasir, Pourshahbaz, Dehkordi, & Sefat, 2017).

#### Description of Temperament in Adolescents

The results of this study revealed that most of the students had a dominant affiliative behavior temperament, which was followed by effortful control temperament. These results are in agreement with another cross-sectional study conducted by Ramadhianti & Alfiasari (2017), who also studied temperament and interactions between teenagers and their mothers in Bogor (Indonesia). The results revealed that the most dominant temperament experienced by students was affiliative behavior (57%), which was followed by effortful control (29%). The study also used the EATQ-R questionnaire. These findings suggested that most of the students had a

dominant affiliative behavior temperament. Adolescents with this temperament possess the ability to build closeness, warmth, cooperation and are sympathetic to others. The results of this study indicated that less than half of the respondents had a dominant effortful control temperament. Adolescents with this temperament have a high level of self-control, which is the ability to inhibit a dominant response to perform a subdominant response (Rothbart & Bates, 2006). The least dominant of the temperaments that was experienced by respondents was surgency.

Thus, it can be said that there were only a few students with cheerful, energetic, positive, sociable, and responsive characteristics. Surgency is closely related to the concept of extraversion, but surgency is more commonly used in the developmental psychology literature (Fields, Cole, & Maggi, 2018). Additionally, there were only a few respondents who had negative affectivity as their dominant temperament. The difference in responses from the subjects in the four dimensions of temperament was quite high.

#### Correlation between Adolescents' Characteristics and Temperament with Internet Addiction Levels

This study revealed a positive significant correlation between age and student grade with adolescents' internet addiction levels. These findings are in line with the study carried out by Karacic & Oreskovic (2017), who noticed a low positive correlation between internet addiction levels and age. A study conducted by Okwaraji, Aguwa, Onyebueke, Arinze-Onyia, & Shiweobi-Eze (2015) revealed that adolescents in senior classes exhibited significant internet addiction levels. A study by Karacic & Oreskovic (2017) suggested that the highest levels of internet addiction was experienced by the 15–16 years age group, while the lowest was experienced by the 11–12 years age group (This study also employed the IAT questionnaire). The reason for this addiction could be because adolescents in the age group of 15–16 years achieved greater amounts of independence, and their free time and activities were less inhibited by their parents compared to the other age group. Internet addiction levels in senior classes were found to be higher (due to their academic work) compared to junior classes. The higher their involvement, the easier it became for them to get addicted to the internet (Okwaraji, Aguwa, Onyebueke, Arinze-Onyia, & Shiweobi-Eze, 2015).

42

**Table 1**

Frequency Distribution of the Respondents

Variable	n	%
<b>Sociodemographic Characteristics of the Respondents</b>		
<b>Sex</b>		
Male	44	38.60
Female	70	61.40
<b>Age (years)</b>		
12	22	19.30
13	35	30.70
14	42	36.80
15	15	35.20
<b>Grade</b>		
7	39	34.20
8	40	35.10
9	35	30.70
<b>Internet Addiction Level</b>		
None	26	22.80
Mild	60	52.60
Moderate	27	23.70
Severe	1	0.90
<b>Temperament</b>		
Effortful control	30	26.30
Negative affectivity	11	9.60
Surgency	9	7.90
Affiliative Behavior	64	56.10
Total	114	100.00

**Table 2**

Correlation between Gender and Internet Addiction Levels in Adolescents

Variable	Internet Addiction Level								Total	<i>p-value</i>	
	None		Mild		Moderate		Severe				
	n	%	n	%	n	%	n	%			
<b>Gender</b>											
Female	21	30.00	35	50.00	14	20.00	0	0.00	70	100.00	>0.05
Male	5	11.40	25	56.80	13	29.50	1	2.30	44	100.00	
Total	26	22.80	60	52.60	27	23.70	1	0.90	114	100.00	

31

This research revealed that there was no significant correlation between gender and adolescents' internet addiction levels. These findings are in line with a study carried out by Khan, Shabbir, & Rajput (2017) and Gervasi et al (2017), who observed a statistically insignificant difference between gender and internet addiction. These findings are not in accordance with a study by Okwaraji, Aguwa, Onyebueke, Arinze-Onyia, & Shiweobi-Eze (2015), which was conducted with Nigerian adolescents. The results revealed a difference between gender and internet addiction. With regard to establishing a relationship between gender and internet addiction levels, previous studies have indicated inconsistent results. A study conducted among adolescents in Croatia, Finland,

and Poland by Karacic & Oreskovic (2017) found that male adolescents were mostly addicted to the internet. A study carried out with adolescents in Taiwan by Yang, Lin, Huang, & Chang (2018) suggested that female adolescents were significantly addicted to smartphones compared to males. These inconsistent results could be due to multiple factors, such as cultural differences, personal habits, institutional policies, and access to the internet (Khan, Shabbir, & Rajput, 2017).

The results of this study suggested that there was a low significant negative correlation between effortful control and internet addiction levels. These findings are not in agreement with a study conducted by Pace et al (2014), who indicated that the dimensions of lack of control temperament had

a significant positive effect on internet addiction. Previous studies have suggested that those who have naturally low self-regulation abilities or fail to develop emotional regulation were at risk of developing psychological disorders. It is possible that adolescents who experience a low effortful control temperament have flexibility in terms of time, ease of access, and other supportive activities. This can place them more at risk of experiencing addiction (e.g., internet addiction) (L. Wang, Tao, Fan, Gao, & Wei, 2017). Adolescents with high self-control are better at suppressing their impulsive behavior. They recognize the complexity of a situation when making a decision on how to behave. These adolescents are aware of the negative effects that could arise from problematic behavior and are in better control of their impulses, which may discourage them from engaging in bad behavior (Zhang, Li, & Li, 2015).

**Table 3**  
Correlation between Age, Student Grade, and Temperament and Adolescents' Internet Addiction Levels

Variable	Results
<b>Age</b>	
<i>Correlation coefficient</i>	0.31**
<i>Sig.(2-tailed)</i>	<0.01
<b>Student Grade</b>	
<i>Correlation coefficient</i>	0.21*
<i>Sig.(2-tailed)</i>	<0.05
<b>Effortful control</b>	
<i>Correlation coefficient</i>	-0.22*
<i>Sig. (2-tailed)</i>	<0.05
<b>Negative affectivity</b>	
<i>Correlation coefficient</i>	0.56**
<i>Sig. (2-tailed)</i>	<0.01
<b>Surgency</b>	
<i>Correlation coefficient</i>	0.18*
<i>Sig. (2-tailed)</i>	<0.05
<b>Affiliative Behavior</b>	
<i>Correlation coefficient</i>	0.08
<i>Sig. (2-tailed)</i>	>0.05

\*\*correlation is significant at the 0.01 level (2-tailed)

\*correlation is significant at the 0.05 level (2-tailed)

This study revealed that the negative affectivity temperament had a strong positive correlation with internet addiction levels. Similar findings were obtained in a study conducted by Pace et al (2014), who observed that the negative affectivity temperament had a positive correlation with internet addiction. Adolescents with a dominant negative affectivity temperament tend to experience sadness, anxiety, fear, and irritation.

These adolescents cannot manage their emotions effectively (Zhang et al., 2015), so they become vulnerable to stress. Stressful events can compel adolescents to use the internet as a positive coping strategy to control and relieve their emotions (W. Wang et al., 2018).

This study revealed that the surgency temperament had a significant positive correlation with internet addiction levels; however, the strength of this correlation was very low. These findings are not in accordance with the results obtained in a study conducted by Pace et al (2014), who found that the dimensions of extraversion temperament were negatively correlated with internet addiction; the strength of this correlation was not significant, though. The difference in results between these studies could be because of the instability of the temperament dimension itself. Surgency or extraversion is the most unique temperament dimension. Apart from genetic factors, there are other components, such as environmental factors (usually considered as family), that can influence how dominant a temperament is in children. Temperament of positive emotionality or extraversion is the only factor that is unstable in the age group of 3–18 years (Fields, Cole, & Maggi, 2018). The ages of the respondents in this study include the above age category (12–15 years).

This study suggested that there was no significant correlation between affiliative behavior temperament and internet addiction levels. These findings are supported by a study carried out by Pace et al (2014), who indicated that sensitivity had no correlation with internet addiction. The sensitivity temperament was related to the affiliative behavior temperament in this study.

Temperament in adolescents can also be affected by the environment in which the adolescent is growing up (e.g., good parenting or parental support). One's environment can provide protection against the potential harmful effects of an adolescent's own characteristics (Hirvonen, Väänänen, Aunola, Ahonen, & Kiuru, 2018).

### Research Limitations

This study was conducted through a questionnaire that was filled out directly by the respondents. Interviews were not conducted. It is possible that the respondents did not examine the questions carefully before answering. The age of the respondents was early adolescence. There could have been some difficulties faced in understanding the questions. To help the respondents, the researcher explained the process



of filling out the questionnaire and encouraged the students to ask questions if they had any difficulties in understanding any of the content presented in the questionnaire. This was a cross-sectional study, as the methods examined the time dimension. Future research needs to be carried out with a greater number of samples to obtain a better and more comprehensive insight on the correlation between temperament and adolescents' internet addiction levels.

## CONCLUSION

The internet addiction level that was experienced by most adolescents was a mild one. Most of the adolescents had a dominant affiliative behavior temperament. This research revealed that there was a significant positive correlation between the dimensions of age, student grade, negative affectivity, and surgency temperaments and adolescents' internet addiction levels. There was a significant negative correlation between effortful control and adolescents' internet addiction levels. Adolescents with a higher negative temperament need more guidance and supervision from their parents to avoid the risk of internet addiction.

19

## CONFLICT OF INTEREST

The authors declare that there is no conflict of interest.

## AUTHORS' CONTRIBUTION

All authors actively participated in this study, contributed to the write-up of this article, and were partly responsible for content writing. YS worked on the conceptualization and methodology of this research. DTH worked on data curation and writing the first draft. DH and I were responsible for reviewing and editing the original draft.

12

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