



## Relationship Between Self-Control and Continuous Partial Attention: Case of Prospective Teachers

Mehmet Fırat<sup>1</sup>, Ulaş İlic<sup>2</sup>

<sup>1</sup>Anadolu University, Turkey, <sup>2</sup>Pamukkale University, Turkey

### ARTICLE INFO

#### Article History:

Received 12.12.2019

Received in revised form

29.03.2020

Accepted 09.05.2020

Available online

12.09.2020

### ABSTRACT

Related literature review evidence that self-control and attention have strong relationship. Despite a rich body of literature on self-control and attention, few studies have analyzed the relationship between self-control and CPA as a new phenomenon emerging with the intensive use of technology. Relationship between CPA and self-controls has been analyzed in this study. This correlation study conducted with 55 prospective teachers, CPA Survey and BSCS have been used. Pearson correlation coefficient, t-test and descriptive statistics used in data analysis. To the results, it was determined that the self-control abilities of prospective teachers were high whereas CPA levels were low. It was found that the CPA levels of the prospective teachers decreased, and self-control abilities increased as technology use increased. Contrary to common belief, no significant relationship was found between CPA and self-control as a result of Pearson correlation.

© 2020 IJPES. All rights reserved

Keywords:

Continuous partial attention, self-control, prospective teachers

### 1. Introduction

The entire connection providing the communication of computers on the same network with computers on different networks is called Internet. Internet, which first appeared to be used in defense industry, has been used for different fields such as education, commerce and communication in the course of time. Internet has a significant role to establish social communication and it has extended beyond the limited uses such as sharing information, sending e-mail and shopping online (Güçdemir, 2003; Lavanco, Catania, Milio, & Romano, 2008). The progress and wide use of Internet technologies are parallel to the use in educational environments. With the increase of the number of online educational environments and of the institutions with this tendency, the use of e-learning concept has become widespread (Çallı, Torkul, & Taşbaş, 2003; Al-Fraihat, Joy & Sinclair, 2020). With the opportunity to be in different environments at the same time, providing rich environments for learners in terms of learning and studying possibilities and enabling fast connections, Internet has an active role in the development of social lives of students attending in higher education (Yang & Tsai, 2008; Feng, Wong, Wong, & Hossain, 2019). Perceptions of students for Internet have a substantial influence on interest, motivation and success towards education provided (Peng, Tsai, & Wu, 2006).

The changes in online learning environments affect the relationship between instructor and learner. Investigating effectiveness of current studies in terms of interaction requires further studies to have strong implementation suggestions (Limperos, Buckner, Kaufmann, & Frisby, 2014). Achieving educational targets in Internet environments today which enables to reach information easily and provides fast access can be possible by designing effective learning environments. Having the most common influence and being easy to

<sup>2</sup> Corresponding author's address: Ulaş İlic, Pamukkale University Faculty of Education Department of Computer Education and Instructional Technologies, Denizli, Turkey

Telephone: + (090) 258 296 12 29

e-mail: [uilic@pau.edu.tr](mailto:uilic@pau.edu.tr)

<http://dx.doi.org/10.17220/ijpes.2020.03.004>

access without being limited with time or location makes it more possible to use Internet as an educational tool. Especially in Covid-19 Pandemic, most of formal education in all educational levels start to get support from the internet. Almost 4.57 billion people were active internet users as of April 2020, encompassing 59 percent of the global population (Clement, 2020).

The efforts of young individuals to create their own identities and to be accepted by a group make positive aspects of Internet more appealing for these individuals (Ođacı & Kalkan, 2010). Excessive use of Internet may be problematic for individuals; it may affect social life of individual and may cause physiological problems such as sleep problems (Flisher, 2010; Arısoy, 2009; Park et al., 2013; Shadzi, Salehi & Vardanjani, 2020). In this context, today, where Internet has become a part of our life, individuals need to be aware of negative impacts of problematic Internet use (Atwal, Klaus, & Daily, 2012). To define problematic Internet use, many terms such as Internet addiction, Internet addiction syndrome and pathological Internet use etc. have been provided in the literature (Siciliano et al., 2015). Correspondingly, many definitions for problematic Internet use are also seen in the literature. Young (1998) defined the problematic Internet use as a disorder where signs such as insomnia and short temper arise when individual cannot get online or spend more time online. Similar to this definition highlighting it as a disorder, it was stated in another definition that problematic Internet use is a multi-dimensional syndrome which has cognitive and behavioral signs and affects academic and professional life (Can, 2002). Problems arising out of problematic Internet use may have negative outcomes on business, school and personal lives of individual (Beard & Wolf, 2001; Davis, 2001; Widyanto & Griffiths, 2009). It is seen that the Internet users who neglect their daily lives are at a significant level in problematic Internet use (Siciliano et al., 2015). These individuals spare less time for actual people in their daily lives and they spend most of their times by being on the computer (Young, 1996). In their research with 60 students Mathew and Raman (2020) identified a strong negative association between problematic internet use and self-esteem. Additionally, a strong association between problematic internet use and average duration of access of internet found in this research.

There are many studies in the literature investigating the problematic Internet use of university students and prospective teachers (Erođlu, Pamuk, & Pamuk, 2013; Ođacı, 2011; Ođacı & ıkırıkcı, 2014; Ođacı & elik, 2013; Kelley & Gruber, 2010; Spada, Langston, Nikevi, & Moneta, 2008; Mathew & Raman, 2020). The number of the studies increases to provide a healthy use of Internet by adults (Siciliano et al., 2015). In this context, the university prospective teachers were chosen as participants in this study.

### 1.1. Continuous Partial Attention

Continuous Partial Attention which is a concept quite new and open to research occupies cognitive psychology, communication and education agenda intensely today (Firat, 2013a). CPA as hyper attention is recent term that seek to characterize our attentional response to multiple and updating demands on our attentional resources in our negotiations with attention needy technologies (Hayles 2007). This concept which was suggested in 1998 by Linda Stone, who is a former Apple and Microsoft executive, is seen as one of the significant impacts created by today's information technologies on individuals. Stone explains this concept as the state of being unable to focus anything while trying to engage with and to follow everything. In other words, Continuous Partial Attention is a concept referring the state of being unable to focus literally while communicating and interacting with everything.

Despite the descriptive studies are quite rich in literature, we didn't find direct research on CPA or relation between CPA and self-control. Motivation, emotion, and attention are determined psychological mediators in the relationship between cognitive and physical self-control (Stocker, Seiler, Schmid, & Englert, 2019). As a related research on self-control and sustained attention, Harwood (2019) conducted 3 studies in his doctoral dissertation. The effect of trait self-control and self-control depletion on two types of sustained attention tasks investigated. The results of these studies showed that the effects of self-control on sustained attention task performance are inconsistent.

According to Friedman (2001), continuous partial attention can be explained as the state where you reply emails when your phone rings; also you talk to the children and be in a conversation. In this case, since individual is under overloaded interaction, it is only possible to focus each of these interactions partially. According to Small and Vorgan (2008), continuous partial attention creates high level of stress in human brain; therefore, the individual with Internet addiction has no sufficient time to react, think over or make

sophisticated decisions. Instead, individual lives in a constant crisis state, and acquires an expectation for new friends and news with an artificial sincerity. Nowadays we use multiple tabs and windows on two or more screens. To Dewan, (2019) if our attention is diverted for a moment, it is often difficult to find our place again in all our open windows, tabs, and applications. The state of being partially focused on each duty when under overloaded interaction is considered to be affected by the self-control insufficiency of CPA. Therefore, it is considered that self-control and Self-Determination Theory have great importance for CPA.

## **1.2. Self-Control**

Self-control is a subject which is frequently studied in the related literature. Gottfredson and Hirschi (1990) defined self-control as the capacity to control emotions, behaviors and cognition. Muraven and Baumeister (2000) stated that this capacity is used to achieve targets. Duckworth (2011) described self-control as the inhibition of thoughts and desires in achieving targets. In another definition, self-control was expressed as ensuring attention control and the ability of self-adaptation in problem solving and planning (Wills, Sandy, & Yaeger, 2001; Wills, Windle, & Cleary, 1998).

While the self-control level of each individual is considered same, some individuals have difficulty in adjusting their self-control level (Baumeister & Heatherton, 1996). On the other hand, it is stated that some individuals have high levels of self-control while others have low levels of self-control (Baumeister, Gailliot, DeWall, & Oaten, 2006; Tangney, Baumeister, & Boone, 2004). Firat (2017) investigated the relationship between self-control and Facebook usage of CEIT students. CEIT students had high self-control rate in general. Students who had changed their Facebook accounts at least once were found to have used Facebook longer statistically with less self-control. The analyses indicated a statistically significant relationship between Facebook use and self-control. In this sense, it would be useful to analyze the impact of different self-control levels on problematic behaviors.

There are various studies showing that the individuals with low self-control levels exhibit problematic behaviors (Baumeister et al., 2006; Piquero & Bouffard, 2007; Sinha, 2009; Tittle, Ward & Grasmick, 2003). Also, individuals have difficulty in establishing self-control when using Internet, and psychological, academic and social problems may occur accordingly (Davis, 2001). Related with this case, problematic Internet use may be seen in individuals who lost their self-control (Kim, Namkoong, Ku, & Kim, 2008; Li, Li, Wang, Zhao, Bao, & Wen, 2013; Li, Dang, Zhang, Zhang, & Guo, 2014). In individuals with high level of self-control, it is seen that such individuals are far from negative behaviors and better in academic performance and personal relationships (Baumeister et al., 2006; Kim et al., 2008; Özdemir, Kuzucu, & Ak, 2014; Tangney et al., 2004). Individuals with high level of self-control can reach their targets by controlling their attention, behaviors and emotions (Duckworth, 2011).

There are many studies in the literature which investigate the impact of self-control on problematic Internet use and other undesired behaviors (Kim et al., 2008; Lee & Shin, 2004; Li et al., 2013; 2014; Özdemir et al., 2014). In their study, Li et al. (2013) found that self-control is effective on social relationships which affect problematic Internet use. Similarly, Lee and Shin (2004) showed that self-control is associated with addiction behaviors such as Internet addiction. In another study, the relationship between depression, loneliness, low self-control and Internet addiction was investigated based on the cognitive behavior model of problematic Internet use. Study results showed that Internet addiction with self-control is associated with loneliness (Özdemir et al., 2014). Li et al. (2014) investigated the impact of self-control and parental behaviors on Internet addiction. In the study, it was seen that men are more addicted to Internet than women. The researchers revealed that the individuals with low levels of self-control have high level of Internet addiction. Kim et al. (2008) investigated the relationship between self-control, narcissistic personality disorders, online gaming addiction and aggression. The study results showed that the individuals with high levels of self-control have low levels of addiction for especially games containing violence.

There are many studies investigating the influence of self-control levels of individuals with problematic behaviors in their daily lives on the genders (Burton, Cullen, Evans, Alarid, & Dunaway, 1998; LaGrange & Silverman, 1999; Mason & Windle, 2002; Vazsonyi, Pickering, Junger, & Hessing, 2001; Vazsonyi, Wittekind, Belliston, & Van Loh, 2004; Vazsonyi & Crosswhite, 2004). In some of these studies, it has been shown that self-control has an impact only on men (Burton et al., 1998) while there are other studies showing that self-control has an impact only on women (LaGrange & Silverman, 1999). In general, it is shown that self-control has similar effects on gender (Mason & Windle, 2002; Vazsonyi & Crosswhite, 2004).

Self-control is based on Self-Determination Theory essentially. Self-Determination Theory created by Deci and Ryan (1985) describes the needs, motivation and target-oriented behaviors of individuals. Self-Determination Theory is interested in how individuals reach the state of self-motivation based on their perceptions towards their surroundings. By Self-Determination, individuals tend towards the actions they are interested (Deci & Ryan, 1985; 2000; 2008). This makes it possible to implement self-determination theory to the activities in different fields of life such as business and entertainment (Thaggard, 2010).

According to self-determination theory, individuals have three basic psychological needs: autonomy, competence and relatedness (Deci & Ryan, 2008). With autonomy, individual makes decisions by himself/herself instead of the oppression of others. Competence is the state of competency that individual feels in order to cope with others. Relatedness with others is the requirement to feel capable for social relationships. When these three needs are met, individual feels in a well-being state and exhibits more positive behaviors (Deci & Ryan, 2000; 2008; Ryan & Deci, 2000).

According to self-determination theory, individuals have two types of motivation which are extrinsic and intrinsic motivations (Lee, Cheung, & Chen, 2005). Extrinsic motivation is the condition where individual tries to achieve something (Ryan & Deci, 2000). In the intrinsic motivation, instead of money or power to gain, individual enjoys doing something which are personally enjoyable and precious (Norman, 2008). Individuals who lose their intrinsic motivation are either motivated to their school life as an extrinsic motivation, thus become result-oriented or they lose their motivational state (Ryan & Deci, 2000). To ensure the self-determination, self-control strategies can be used (Mahon, 1994). Therefore, it would be useful to analyze self-control concept and the relationship of various undesired behaviors (i.e. problematic Internet use) with self-control.

### 1.3. Problem of Research

It is asserted that when individual heavily overloaded with information/interaction in every fields of daily life, CPA as the partial focus on each information/interaction is affected by the insufficiency of self-control. In this research, it is aimed to determine if there is any significant relationship between CPA and self-control levels of CEIT (Computer Education and Instructional Technology) prospective teachers, and to identify the degree of this relationship, if any. In this context, the questions sought for an answer in the study are: For CEIT prospective teachers:

1. How are the CPA and self-control of CEIT prospective teachers?
2. Do CPA conditions of CEIT prospective teachers exhibit any significant difference according to their genders and technology use levels?
3. Do self-controls of CEIT prospective teachers exhibit any significant difference according to their genders and technology use levels?
4. Is there any significant relationship between CPA and self-controls? If any, how strong is this relationship at what level?

## 2. Methodology of Research

The participants, data collection tools and information regarding to the data analysis of this study designed as a correlation study are provided under this title.

### 2.1. Participants

Purposeful sampling method used in this research. Purposeful sampling is widely used for the identification and selection of information-rich cases related to the phenomenon of interest (Palinkas et al., 2015). The participants of this study consist of 55 CEIT prospective teachers attending Operating Systems and Applications lesson during 2014-2015 fall semester at Department of Computer and Instruction Technology Education, Faculty of Education, Anadolu University. Data of participants regarding to their genders and the levels of technology use are provided in the Table 1 below.

**Table 1.** Demographics of participants

| Demographics          | f  | %    |
|-----------------------|----|------|
| <b>Gender</b>         |    |      |
| Female                | 22 | 40.0 |
| Male                  | 33 | 60.0 |
| <b>Technology Use</b> |    |      |
| Normal                | 36 | 65.5 |
| Advance               | 19 | 34.5 |

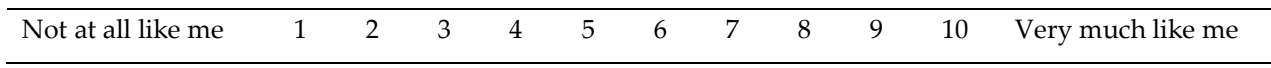
Considering the characteristics of research participants, it is seen that they are mostly male. It was also seen that the prospective teachers who participated in the study showed their levels of technology use as at normal level. It is determined that CEIT prospective teachers who are interested in technology continuously due to their study fields are sufficient in technology use.

**2.2. Data Collection Tools**

In this study, Continuous Partial Attention Survey and Brief Self-Control Scale have been used as data collection tools. The information about data collection tools was provided under two titles.

**2.2.1. Brief self-control scale.** In the study, Brief Self-Control Scale developed by Tangney et al. (2004) and translated into Turkish by Nebioglu, Konuk, Akbaba and Eroglu (2012) was used to identify self-control abilities of the participants. In the study carried out by Nebioglu et al. (2012), it was aimed to adapt Brief Self-Control Scale into Turkish. Validity and reliability studies of the scale were carried out with 523 participants. The relationship between Turkish and English versions of the scale was analyzed with Pearson correlation and it was found as  $r=0.72$  for impulsivity sub-dimension,  $r=0.76$  for self-discipline and as  $r=0.73$  for the entire scale. Principal components method and Varimax rotation was used to determine the factors, and a structure with two factors which are impulsivity and self-discipline was obtained, and it was seen that the structure was verified with confirmatory factor analysis. The Brief Self-Control Scale (Tangney et al., 2004) includes 13 items endorsed on a 5-point scale where 1= not like me at all and 5= very much like me (e.g. "I do certain things that are bad for me, if they are fun").

**2.2.2. Continious partial attention survey.** In this study, Continuous Partial Attention Survey was used as a data collection tool for CPA. The survey has two sections and five questions. There are two questions with multiple choices for demographics in the first section and three questions in 10 likert answer structure about "continuous partial attention" in the second section. The structure for 10 responses is provided in the Fig. 1.



**Fig. 1.** 10 likert answer structure

When preparing survey items, the studies in the literature and expert opinions were referred. First, by using related literature, an item pool including seven items was created. From the item pool, in accordance with the opinions and suggestions of two doctorate academicians who are expert on Educational Technologies, three items were chosen. These three items were restructured as including other items in the item pool. The survey form, where items for demographics were also added, was submitted to the opinions of field experts for appearance and content validity. In accordance with the opinions and suggestions of five doctorate academicians, three experts from educational technologies and two experts from distance education, two items of the survey were modified. The pilot version of the survey form which was reached with expert opinions was applied to five CEIT prospective teachers from the Faculty of Education, Anadolu University. It was seen that it took about six minutes to complete the survey. As a result of the pilot application, final version of Continuous Partial Attention Survey was reached.

### 2.3. Data Analysis

In the analysis of quantitative data obtained from the study, percentage (%), frequency (f), standard deviation (Sd) and mean ( $\bar{X}$ ) descriptive statistics were used as well as independent two-sample t-test and Pearson correlation coefficient as the parametric tests. In order to compare CPA and self-control levels of CEIT prospective teachers in terms of gender and technology use capabilities, independent two-sample t-test among parametric tests was used. Pearson correlation coefficient was used to determine if there is any significant relationship between CPA and self-control abilities of CEIT prospective teachers. Correlation coefficient is considered as the coefficient indicating the direction and size of the relationship among independent variables. This coefficient has a value between (-1) and (+1).

### 3. Results

Under this title, the results of the study were provided. The results obtained were provided under related titles as responding to the research questions.

#### 3.1. CPA and Self-Control Descriptive

For identifying CPA levels and self-control states of CEIT prospective teachers in the first question of the study, descriptive results obtained from data collection tools were analyzed. The results obtained from Continuous Partial Attention Survey and Brief Self-Control Scale for both variables are provided in the Table 2 below.

**Table 2.** CPA and self-control levels of the prospective teachers

|                    | N  | Mean    | Std. Deviation |
|--------------------|----|---------|----------------|
| Self-control score | 55 | 44.6000 | 7.45753        |
| CPA score          | 55 | 18.5636 | 5.13436        |

When the results provided in the table were evaluated, it was seen that CPA scores of CEIT prospective teachers who participated in the study were  $\bar{X}$ =18.56 over 30. This score which is very close to the mean value shows that CEIT prospective teachers in the study are affected from CPA at a medium level. The reason may be that CEIT prospective teachers are experienced for using technology due to their fields. Considering the self-control of the participants, their score was  $\bar{X}$ =44.6 over 65. This score above the average shows that self-control levels of CEIT prospective teachers are high.

#### 3.2. CPA, Genders and Technology Use

In this second question of the study, it was tried to determine whether CPA conditions of CEIT prospective teachers exhibit any significant difference according to their genders and technology use levels or not. For this purpose, independent two-sample t-test was used. The results of independent two-sample t-test are provided in Table 3.

**Table 3.** Results of Two-Sample T-Test for CPA status

| Variable  | Groups         | N  | Mean    | t     | df | Sig. (2-tailed) |
|-----------|----------------|----|---------|-------|----|-----------------|
| CPA score | Female         | 22 | 18.9091 | .404  | 53 | .688            |
|           | Male           | 33 | 18.3333 |       |    |                 |
|           | Medium Level   | 36 | 19.8889 | 2.796 | 53 | .007*           |
|           | Advanced Level | 19 | 16.0526 |       |    |                 |

\*All regression coefficients are statistically significant when  $\alpha = 0,05$

As a result of the independent two-sample t-test, CPA levels of CEIT prospective teachers showed no significant difference in terms of their genders [ $t_{(53)}=.404$ ,  $p=.688>.05$ ]. On the other hand, CPA levels of CEIT prospective teachers showed significant difference in terms of their levels of technology use [ $t_{(53)}=2.796$ ,

$p=.007<.05$ ]. According to this result, those who consider themselves at medium level for technology use ( $\bar{X}=19.88$ ) expose more CPA significantly than those who consider themselves at advanced level for technology use ( $\bar{X}=16.05$ ). This result shows that CPA level decreases as the level of technology use increases.

### 3.3. Self-Control, Genders and Technology Use

To answer the third question of the study, it was tested whether self-control levels of CEIT prospective teachers exhibit a significant difference in terms of their genders and technology use capabilities or not. For that purpose, independent two-sample t-test was used. The results of independent two-sample t-test are provided in Table 4.

**Table 4.** Results of Two-Sample T-Test for Self-control

| Variable           | Groups         | N  | Mean    | t      | df | Sig. (2-tailed) |
|--------------------|----------------|----|---------|--------|----|-----------------|
| Self-control score | Medium Level   | 36 | 43.3056 | -1.809 | 53 | .076            |
|                    | Advanced Level | 19 | 47.0526 |        |    |                 |
|                    | Female         | 22 | 46.0455 | 1.178  | 53 | .224            |
|                    | Male           | 33 | 43.6364 |        |    |                 |

*All regression coefficients are statistically significant when  $\alpha = 0,05$*

As seen in Table 4, as a result of the independent two-sample t-test, self-control levels of CEIT prospective teachers determined by Brief Self-Control Scale exhibited no significant difference according to their genders [ $t_{(53)}=1.178, p=.224>.05$ ] and technology use levels [ $t_{(53)}=-1.809, p=.07>.05$ ]. This result seems parallel to the literature which asserts that self-control has similar effects on gender (Mason & Windle, 2002; Vazsonyi & Crosswhite, 2004). On the other hand, it was seen that the self-control levels of prospective teachers with advanced level of technology use were higher than those with medium level of technology use ( $\bar{X}_{\text{advance}}=47.05>\bar{X}_{\text{Average}}=43.30$ ). Also, self-control levels of female prospective teachers were higher than the self-control levels of male prospective teachers ( $\bar{X}_{\text{female}}=46.04>\bar{X}_{\text{male}}=43.63$ ). The reason for these differences not being statistically significant may be the relatively low numbers of participants.

### 3.4. Relationship Between CPA and Self-Control

The basic question of this study is to find out if there is a relationship between CPA and self-control. In this regard, Pearson correlation coefficient was used to determine if there is any significant relationship between CPA levels of CEIT prospective teachers determined by Continuous Partial Attention survey and self-control levels determined by Brief Self-Control Scale. As a result of the analysis, it was found that there was statistically no significant relationship between CPA levels and self-control of CEIT prospective teachers (Pearson's  $r = -.087, p=.526>.05$ ). It was found that there was a reverse relationship between variables; however, it was not significant.

## 4. Discussion

CPA levels and self-control states of CEIT prospective teachers identified in accordance with the first question of the study. The findings of the research show that CEIT prospective teachers are affected from CPA at a medium level and have high self-control levels. This finding support the finding of Firat (2017) that CEIT students have high self-control level above average.

For the second question of the research, CPA levels of CEIT prospective teachers showed no significant difference in terms of their genders. But, CPA levels of CEIT prospective teachers showed significant difference in terms of their levels of technology use. CPA level decreases as the level of technology use increases. The reason may be that CEIT prospective teachers who use technology at an advanced level professionally are more controlled for using technology.

The main purpose of this research was to to find out if there is a relationship between CPA and self-control. The results show that, contrary to common belief, no significant relationship was found between CPA and self-control as a result of Pearson correlation. Interestingly this result support the findings of Harwood (2019)

that the effects of self-control on sustained attention task performance are inconsistent. Future studies may extend the number of participant in similar research.

In our findings, there was a reverse relationship between variables; not significant. The reason may be that the number of participants is not at a sufficient level. Reverse relationship between variables shows that CPA levels of prospective teachers decrease while their self-control levels are high. On the contrary, prospective teachers with low self-control levels are exposed CPA more. This result obtained support the studies showing that the individuals with low self-control levels exhibit problematic behaviors (Baumeister et al., 2006; Piquero & Bouffard, 2007; Sinha, 2009; Tittle et al., 2003). Similarly, according to Li, Dang, Zhang, Zhang and Guo (2014), problematic Internet use may be seen in those who lose their control.

## 5. Conclusion and Suggestions

The trend of information and communication technologies started with computer and Internet technologies and moved on with mobile technologies has made these technologies to be a part of daily lives. These technologies being used in all fields intensely were also used widely in education and training fields. CPA, which is referred as the state of being unable to focus anything while trying to engage with and to follow everything, seems to be one of the significant problems encountered by today's learners. It is asserted that when individual heavily overloaded with information/interaction in every fields of daily life, CPA as the partial focus on each information/interaction is affected by the insufficiency of self-control. In this regard, the relationship between CPA and self-controls of participant CEIT prospective teachers has been analyzed in this study.

The study was conducted with 55 CEIT prospective teachers attending Operating Systems and Applications lesson during 2014-2015 fall semester at Faculty of Education, Anadolu University. As data collection tools, Continuous Partial Attention Survey and Brief Self-Control Scale have been used. In the analysis of the data, percentage, frequency, standard deviation and mean descriptive statistics were used as well as independent two-sample t-test and Pearson correlation coefficient as the parametric tests. As a result of the analyses carried out, it was seen that CEIT prospective teachers participated in the study were affected at a medium level by CPA. It can be said that the reason for CEIT prospective teachers not being affected from CPA much may be their experienced levels of technology use. Considering the self-control of the participants, it was seen that their scores were higher than the average values. This result shows that CEIT prospective teachers have high levels of self-control.

In the demographic analyses of CEIT prospective teachers who participated in the study, it was found that there was no significant difference between CPA levels of CEIT prospective teachers in terms of their genders. On the other hand, it was observed that their CPA levels decreased as their levels of technology use increased. The reason may be that CEIT prospective teachers who use technology at an advanced level professionally are more controlled for using technology. It was found that self-control levels of CEIT prospective teachers exhibited no significant difference according to their genders and technology use levels. On the other hand, it was seen that the self-control levels of prospective teachers who have advanced levels of technology use were higher. This finding supports the result that self-controls of CEIT prospective teachers who participated in this study are beyond the average generally.

The basic question of this study is to find out if there is a significant relationship between self-control and CPA. To answer this question, Pearson correlation coefficient was used. As a result of Pearson correlation analysis, it was found that there was statistically no significant relationship between CPA levels and self-control of CEIT prospective teachers who participated in this study. On the other hand, a reverse relationship was observed between the variables. This reverse relationship shows that CPA levels of prospective teachers with high self-control decreases and CPA levels of prospective teachers with low self-control increases. Based on the results of this study, it is determined that the self-control levels of CEIT prospective teachers should be increased for being affected from CPA less. Digital natives should enhance their multitasking experiences instead of continuous partial attention regarding technology use by developing their self-control (Firat, 2013b). To that end, self-control strategies can be engaged actively in the classes of CEIT prospective teachers.

With higher number of participants in the further studies, the relationship between CPA and self-control can be questioned in groups with different demographics. As a broader study, a structural equation modeling can



be carried out to assert factors affecting CPA state. Qualitative studies can also be conducted by using interview technique in order to assess the relationship between self-control and CPA in the eyes of participants and to support the findings obtained statistically by qualitative data. Finally, causal studies, which question the reasons of significant difference between self-control levels of CEIT prospective teachers according to the level of technology use, can be conducted.

## References

- Al-Fraihat, D., Joy, M., & Sinclair, J. (2020). Evaluating E-learning systems success: An empirical study. *Computers in Human Behavior*, 102, 67-86.
- Arisoy, Ö. (2009). Internet addiction and its treatment. *Psikiyatride Guncel Yaklasimlar-Current Approaches in Psychiatry*, 1(1), 55-67.
- Atwal, J., Klaus, N., & Daily, R. (2012). Problematic internet use in adolescents: An overview for primary care providers. *Kansas Journal of Medicine*, 5(3), 108-113. Retrieved from <https://pdfs.semanticscholar.org/3fe7/7890b4d85ebae6196829084034a6a20aef55.pdf>
- Beard, K. W., & Wolf, E. M. (2001). Modification in the proposed diagnostic criteria for internet addiction. *CyberPsychology & Behavior*, 4(3), 377-383. doi:10.1089/109493101300210286
- Baumeister, R. F., Gailliot, M., DeWall, C. N., & Oaten, M. (2006). Self-regulation and personality: How interventions increase regulatory success, and how depletion moderates the effects of traits on behavior. *Journal of Personality*, 74(6), 1773-1802. doi:10.1111/j.1467-6494.2006.00428.x
- Baumeister, R. F., & Heatherton, T. F. (1996). Self-regulation failure: An overview. *Psychological Inquiry*, 7(1), 1-15. doi:10.1207/s15327965pli0701\_1
- Burton, V. S., Cullen, F. T., Evans, T. D., Alarid, L. F., & Dunaway, R. G. (1998). Gender, self-control, and crime. *Journal of Research in Crime and Delinquency*, 35(2), 123-147. doi:10.1177/0022427898035002001
- Can, S. (2002). Validity and reliability of the scale called aggression questionnaire in Turkish population. *Unpublished MA Dissertation, GATA Haydarpaşa Training Hospital, İstanbul.*
- Çallı, İ., Torkul, O., Taşbaş, N. (2003). "İnternet Destekli Öğretimde Kullanılmak Üzere Web Erişimli Veri Tabanı Yönetim Sistemleri İle Ölçme ve Değerlendirme Sistemi Tasarımı." Third International Education Technologies Symposium (28-30 May 2003), Turkish Republic of Northern Cyprus: vol: I, pp. 563-569.
- Davis, R. A. (2001). A cognitive-behavioral model of pathological internet use. *Computers in Human Behavior*, 17(2), 187-195. doi:10.1016/S0747-5632(00)00041-8
- Deci, E. L., & Ryan, R. M. (1985). *Intrinsic motivation and self-determination in human behavior*. Springer Science & Business Media.
- Deci, E. L., & Ryan, R. M. (2000). The " what" and " why" of goal pursuits: Human needs and the self-determination of behavior. *Psychological Inquiry*, 11(4), 227-268. doi:10.1207/S15327965PLI1104\_01
- Deci, E. L., & Ryan, R. M. (2008). Facilitating optimal motivation and psychological well-being across life's domains. *Canadian Psychology/Psychologie canadienne*, 49(1), 14. doi:10.1037/0708-5591.49.1.14
- Dewan, P. (2019). Reading in the age of continuous partial attention: Retail-inspired ideas for academic libraries. *Reference & User Services Quarterly*, 58(3), 177-187. doi:10.5860/rusq.58.3.7045
- Duckworth, A. L. (2011). The significance of self-control. *Proceedings of the National Academy of Sciences*, 108(7), 2639-2640.
- Eroğlu, M., Pamuk, M., & Pamuk, K. (2013). Investigation of problematic internet usage of university students with psychosocial levels at different levels. *Procedia-Social and Behavioral Sciences*, 103, 551-557.
- Feng, S., Wong, Y. K., Wong, L. Y., & Hossain, L. (2019). The Internet and Facebook usage on academic distraction of college students. *Computers & Education*, 134, 41-49.
- Flisher, C. (2010). Getting plugged in: an overview of internet addiction. *Journal of Paediatrics and Child Health*, 46(10), 557-559. doi:10.1111/j.1440-1754.2010.01879.x
- Fırat, M. (2013a). Continuous partial attention as a problematic technology use: A case of educators. *Journal of Educators Online*, 10(2).
- Fırat, M. (2013b). Multitasking or continuous partial attention: A critical bottleneck for digital natives. *Turkish Online Journal of Distance Education*, 14(1), 266-272.
- Fırat, M. (2017). Relationship between Self-Control and Facebook Use: Case of CEIT Students. *Educational Sciences: Theory and Practice*, 17(4), 1179-1201. doi:10.12738/estp.2017.4.0194

- Friedman, T.L. (2001). Cyber-Serfdom, *The New York Times*, January 30.
- Gottfredson, M. R., & Hirschi, T. (1990). *A general theory of crime*. Stanford, CA: Stanford University Press.
- Güçdemir, Y. (2003). Bilgisayar ağları, internetin gelişimi ve bilgi kirlenmesi. *İstanbul Üniversitesi İletişim Fakültesi Hakemli Dergisi*, 17, 371-378.
- Harwood, A. (2019). Individual Differences in Self-Control and Cognitive Resource Depletion during Sustained Attention. Doctoral dissertation, *George Mason University*.
- Hayles, N.K. (2007). Hyper and deep attention: The generational divide in cognitive modes. *Profession*, 13, 187-199. doi:10.1632/prof.2007.2007.1.187
- Kelley, K. J., & Gruber, E. M. (2010). Psychometric properties of the Problematic Internet Use Questionnaire. *Computers in Human Behavior*, 26(6), 1838-1845. doi:10.1016/j.chb.2010.07.018
- Kim, E. J., Namkoong, K., Ku, T., & Kim, S. J. (2008). The relationship between online game addiction and aggression, self-control and narcissistic personality traits. *European Psychiatry*, 23(3), 212-218. doi:10.1016/j.eurpsy.2007.10.010
- LaGrange, T. C., & Silverman, R. A. (1999). Low self-control and opportunity: Testing the general theory of crime as an explanation for gender differences in delinquency. *Criminology*, 37(1), 41-72. doi:10.1111/j.1745-9125.1999.tb00479.x
- Lavanco, G., Catania, V., Milio, A., Romano, F. (2008). Learning and relationships in the cyberspace. *Proceedings of World Academy of Science: Engineering & Technology*, 28, 473-477.
- Lee, M. K., Cheung, C. M., & Chen, Z. (2005). Acceptance of internet-based learning medium: The role of extrinsic and intrinsic motivation. *Information & Management*, 42(8), 1095-1104. doi:10.1016/j.im.2003.10.007
- Lee, O., & Shin, M. (2004). Addictive consumption of avatars in cyberspace. *CyberPsychology & Behavior*, 7(4), 417-420. doi:10.1089/cpb.2004.7.417
- Li, C., Dang, J., Zhang, X., Zhang, Q., & Guo, J. (2014). Internet addiction among Chinese adolescents: The effect of parental behavior and self-control. *Computers in Human Behavior*, 41, 1-7. doi:10.1016/j.chb.2014.09.001
- Li, D., Li, X., Wang, Y., Zhao, L., Bao, Z., & Wen, F. (2013). School connectedness and problematic internet use in adolescents: A moderated mediation model of deviant peer affiliation and self-control. *Journal of Abnormal Child Psychology*, 41(8), 1231-1242. doi:10.1007/s10802-013-9761-9
- Limperos, A.M., Buckner, M.M., Kaufman, R., & Frisby, B.N. (2014). Online teaching and technological affordances: An experimental investigation into the impact of modality and clarity on perceived and actual learning. *Computers & Education*, 83, 1-9. doi:10.1016/j.compedu.2014.12.015
- Mahon, M. J. (1994). The use of self-control techniques to facilitate self-determination skills during leisure in adolescents and young adults with mild and moderate mental retardation. *Therapeutic Recreation Journal*, 28(2), 58-72.
- Mason, W. A., & Windle, M. (2002). Gender, self-control, and informal social control in adolescence a test of three models of the continuity of delinquent behavior. *Youth & Society*, 33(4), 479-514. doi:10.1177/0044118X02033004001
- Mathew, P., & Raman, K. (2020). Impact of problematic internet use on the self-esteem of adolescents in the selected school, Kerala, India. *Archives of Psychiatric Nursing*.
- Muraven, M., & Baumeister, R. F. (2000). Self-regulation and depletion of limited resources: Does self-control resemble a muscle?. *Psychological Bulletin*, 126(2), 247. doi:10.1037/0033-2909.126.2.247
- Nebioglu, M., Konuk, N., Akbaba, S., and Eroglu, Y. (2012). The investigation of validity and reliability of the Turkish version of the Brief Self-Control Scale. *Bulletin of Clinical Psychopharmacology*, 22(4), 340-351. doi:10.5455/bcp.20120911042732
- Norman, K. L. (2008). *Cyberpsychology: An introduction to human-computer interaction* (Vol. 1). New York, NY: Cambridge university press.
- Odaci, H. (2011). Academic self-efficacy and academic procrastination as predictors of problematic internet use in university students. *Computers & Education*, 57(1), 1109-1113. doi:10.1016/j.compedu.2011.01.005
- Odacı, H., & Çıkrıkçı, Ö. (2014). Problematic internet use in terms of gender, attachment styles and subjective well-being in university students. *Computers in Human Behavior*, 32, 61-66. doi:10.1016/j.chb.2013.11.019

- Odacı, H., & Çelik, Ç. B. (2013). Who are problematic internet users? An investigation of the correlations between problematic internet use and shyness, loneliness, narcissism, aggression and self-perception. *Computers in Human Behavior*, 29(6), 2382-2387. doi:10.1016/j.chb.2013.05.026
- Odacı, H., & Kalkan, M. (2010). Problematic internet use, loneliness and dating anxiety among young adult university students. *Computers & Education*, 55(3), 1091-1097. doi:10.1016/j.compedu.2010.05.006
- Özdemir, Y., Kuzucu, Y., & Ak, Ş. (2014). Depression, loneliness and Internet addiction: How important is low self-control?. *Computers in Human Behavior*, 34, 284-290. doi:10.1016/j.chb.2014.02.009
- Palinkas, L. A., Horwitz, S. M., Green, C. A., Wisdom, J. P., Duan, N., & Hoagwood, K. (2015). Purposeful sampling for qualitative data collection and analysis in mixed method implementation research. *Administration and policy in mental health and mental health services research*, 42(5), 533-544. doi:10.1080/07418820701200935
- Park, S. M., Park, Y. A., Lee, H. W., Jung, H. Y., Lee, J. Y., & Choi, J. S. (2013). The effects of behavioral inhibition/approach system as predictors of internet addiction in adolescents. *Personality and Individual Differences*, 54(1), 7-11. doi:10.1016/j.paid.2012.07.033
- Peng, H., Tsai, C.C., & Wu, Y.T. (2006). University students' self-efficacy and their attitudes toward the Internet: the role of students' perceptions of the internet. *Educational Studies*, 32, 73-86. doi:10.1080/03055690500416025
- Piquero, A. R., & Bouffard, J. A. (2007). Something old, something new: A preliminary investigation of Hirschi's redefined self-control. *Justice Quarterly*, 24(1), 1-27.
- Ryan, R. M., & Deci, E. L. (2000). Self-determination theory and the facilitation of intrinsic motivation, social development, and well-being. *American Psychologist*, 55(1), 68.
- Shadzi, M. R., Salehi, A., & Vardanjani, H. M. (2020). Problematic internet use, mental health, and sleep quality among medical students: A path-analytic model. *Indian Journal of Psychological Medicine*, 42(2), 128-135.
- Siciliano, V., Bastiani, L., Mezzasalma, L., Thanki, D., Curzio, O., & Molinaro, S. (2015). Validation of a new Short Problematic Internet Use Test in a nationally representative sample of adolescents. *Computers in Human Behavior*, 45, 177-184. doi:10.1016/j.chb.2014.11.097
- Sinha, R. (2009). Modeling stress and drug craving in the laboratory: Implications for addiction treatment development. *Addiction Biology*, 14(1), 84-98. doi:10.1111/j.1369-1600.2008.00134.x
- Small, G. & Vorgan, G. (2008). Meet Your iBrain. *Scientific American Mind*, Vol. 19, Issue 5.
- Spada, M. M., Langston, B., Nikčević, A. V., & Moneta, G. B. (2008). The role of metacognitions in problematic internet use. *Computers in Human Behavior*, 24(5), 2325-2335. doi:10.1016/j.chb.2007.12.002
- Stocker, E., Seiler, R., Schmid, J., & Englert, C. (2019). Hold your strength! Motivation, attention, and emotion as potential psychological mediators between cognitive and physical self-control. *Sport, exercise, and performance psychology*. 9(2), 167-182. doi:10.1037/spy0000173
- Tangney, J. P., Baumeister, R. F., & Boone, A. L. (2004). High self-control predicts good adjustment, less pathology, better grades, and interpersonal success. *Journal of Personality*, 72(2), 271-324. doi:10.1111/j.0022-3506.2004.00263.x
- Thagard, P. (2010). *The brain and the meaning of life*. Princeton University Press.
- Tittle, C. R., Ward, D. A., & Grasmick, H. G. (2003). Gender, age, and crime/deviance: A challenge to self-control theory. *Journal of Research in Crime and Delinquency*, 40(4), 426-453. doi:10.1177/0022427803256074
- Vazsonyi, A. T., & Crosswhite, J. M. (2004). A test of Gottfredson and Hirschi's general theory of crime in African American adolescents. *Journal of Research in Crime and Delinquency*, 41(4), 407-432. doi:10.1177/0022427803262060
- Vazsonyi, A. T., Pickering, L. E., Junger, M., & Hessing, D. (2001). An empirical test of a general theory of crime: A four-nation comparative study of self-control and the prediction of deviance. *Journal of Research in Crime and Delinquency*, 38(2), 91-131. doi:10.1177/0022427801038002001
- Vazsonyi, A. T., Wittekind, J. E. C., Belliston, L. M., & Van Loh, T. D. (2004). Extending the general theory of crime to "the East:" Low self-control in Japanese late adolescents. *Journal of Quantitative Criminology*, 20(3), 189-216. doi:10.1023/B:JOQC.0000037731.28786.e3
- Yang, F.Y., & Tsai, C.C. (2008). Investigating university student preferences and beliefs about learning in the web-based context. *Computers & Education*, 50, 1284-1303. doi:10.1016/j.compedu.2006.12.009

- Young, K. S. (1996). Psychology of computer use: XL. Addictive use of the internet: A case that breaks the stereotype. *Psychological Reports*, 79(3), 899-902. doi:10.2466/pr0.1996.79.3.899
- Young, K. S. (1998). Internet addiction: The emergence of a new clinical disorder. *CyberPsychology & Behavior*, 1(3), 237-244. doi:10.1089/cpb.1998.1.237
- Widyanto, L., & Griffiths, M. D. (2009). Unravelling the web: adolescents and internet addiction. *Adolescent online social communication and behavior: Relationship formation on the Internet*, 29-49.
- Wills, T. A., Sandy, J. M., & Yaeger, A. M. (2001). Time perspective and early-onset substance use: A model based on stress-coping theory. *Psychology of Addictive Behaviors*, 15(2), 118.
- Wills, T. A., Windle, M., & Cleary, S. D. (1998). Temperament and novelty seeking in adolescent substance use: convergence of dimensions of temperament with constructs from Cloninger's theory. *Journal of Personality and Social Psychology*, 74(2), 387.