



# Investigation of the Relationship Between Pre-Service Teachers' Cognitive Absorption, Academic Motivation and Chorotypes Using Structural Equation Model

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## Abstract

In recent years sleep rhythm or chronotype have become one of the most studied subjects especially in psychology and educational environments. Chronotype is an important variable in interpersonal differences and it is related to psychological and physiological differences among people. There are three main chronotypes or eveningness, morningness preferences: morning, evening and composite. While a limited number of studies focused on the relationship between academic motivation and chronotype, no studies were found regarding the individuals in cognitive absorption with the internet and chronotype. In this study, the relationships among cognitive absorption, academic motivation, and chronotype were investigated and a study was conducted on a model regarding the intermediary role of chronotype. Positive relationship was found between morningness chronotype and academic motivation regarding the variables such as using information, self-transcendence and discovery. Positive relationship was determined between morningness chronotype and wonder and also the focus of attention variables of cognitive absorption; however, a negative relationship was determined between composite morningness chronotype and the factors of time and pleasure. It was determined that the chronotype the individual owns has an intermediary role between cognitive absorption and academic motivation.

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**Keywords:** Academic motivation, chronotypes, cognitive absorption, psychological differences

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## 1. Introduction

The rhythms with more than one cycle for each day are called ultradian, the rhythms of about one year are called circannual, the rhythms lasting more than a day, for example rhythms that take weeks or months are called infradian, and circadian rhythms take almost a day (Latin: *circa* = approx., *dies* = day) (Ozbayer, & Degirmenci, 2011). In this study, circadian rhythm was expressed as chronotype.

There are three main chronotypes or eveningness and morningness preferences: morning, evening and composite. Morning type individuals prefer going to bed early and they also prefer morning hours for intellectual and physical activities. On the other hand, evening type individuals prefer going to bed late, they feel better in the afternoon or in the evening, and they only perform well during these hours. Composite type indicates the characteristics of both morning and evening chronotypes (Onder, Besoluk, and Horzum, 2013). In a meta-analysis study, Randler et al. (2016), discussed the issue of chronotype regarding gender and determined that women indicated more morningness characteristics compared to men. Circadian preference has practical effects in different areas, for example; school start time (Escribano, Diaz- Morales, Delgado & Collado, 2012), exam schedules (Besoluk, 2011; Besoluk, Onder & Deveci, 2011), planning of sports activities (Drust, Waterhouse, Atkinson, Edwards, & Reilly, 2005) determining working hours and working times (Pisarski et al., 2006).

Sleeping well enables individuals to make a good start for the day and education, creating an increase in their intellectual performance (Beebe 2011; Meijer & van den Wittenboer 2004). Studies indicate that sleeping quality has a positive effect on an individual's cognitive, physical and affective performance (Beebe 2011; Lima et al. 2010). While some studies indicate an increase in the success rate together with the increasing of average sleep length (Dewald et al. 2010), some others indicate that there is no such relationship between them (Eliasson et al. 2002). In addition, the results related to motivation are consistent with the literature, and a linear relationship was found between motivation scores and individuals' academic success scores (Anderman 2013). In these studies, the relationship between chronotype and academic success was examined and it was concluded that morning types indicated higher performance. In their study, Azizoglu and Okur (2020) found that those with daytime daily rhythms and reading strategies were more successful.

In the study conducted with Turkish students by Masal et al. (2015) it was found that the chronotype changed depending on age, gender, and the region people settled. Demirhan et al. (2018) found positive relationships between having a morningness chronotype and positive personality traits and intellectual giftedness. It is possible to find studies regarding the relationship of the chronotype owned with nutrition (Besoluk, 2018), personality traits (Kırcaburun & Tosuntas 2018), emotional intelligence (Titrek, 2007), and making conscious decisions (Vlădescu, 2011). It was understood that

individuals, who were morning types, had better sleeping quality than evening types. These people can start their social / school life earlier, and since they sleep earlier and rest enough their motivation may be higher compared to evening type individuals. On the other hand, evening type individuals are adversely affected by this situation and this reflects their sleeping quality and motivation. In addition, motivation and average sleep length can be considered as a positive indicator of sleeping quality (Masal et al. 2016).

The imbalance between biological and social time caused by school or work is called social jetlag. In addition, because of the obligation to go to work or school during the weekdays, individuals spend most of their weekends or holidays sleeping in order to compensate for the lack of sleep they suffer on weekdays. By the way this situation causes social jet. In evening types, an increase occurs in social jetlag and it is indicated that it is negatively related to school success (Masal et al. 2015). It was found that there was a decrease in sleeping quality scores due to an increase in social jetlag values (Roenneberg et al. 2012).

Tekeli (20029) indicated that students experience anxiety at medium level, and their sleeping quality change negatively between pre-exam preparation and exam preparation period. The results of the study suggested that young people need guidance and programs to be prepared in this context in order to reduce exam anxiety and prevent sleeping problems.

Regardless of their grade one of the most important factors that affect students' studies in education terms, is the time they spend on the internet. In recent years one of the most studied topics related to this issue is the studies related to Cognitive absorption theory. According to Agarwal and Karahanna (2000), Cognitive absorption, which is defined as the state of deep involvement experienced in technology related idioms, is aimed to understand the experiences of the individual in the interaction with technology (Kocak Usluel & Kurt Vural, 2009). Agarwal and Karahanna (2000) explained the state of deep involvement in five dimensions: time dimension; the individual is not aware of how time passes while using technology; the dimension of wonder; the individual is curious about the interaction with technology; the dimension of focus of attention; the interest is directed towards the work done in the individual's interaction with technology; pleasure dimension; the pleasure taken from technology interaction; the dimension of control; the feeling of the individual that s/he has complete control in this type of interaction (Agarwal & Karahanna, 2000). At this point other concepts need to be explained are interest and pleasure. While the psychological phenomenon that shapes the attention, effort, interaction, pleasure state, and the desire to succeed in the individual's action can be explained as interest (Hidi, 2000; Renninger, 2000), pleasure can be defined as the feeling of delight that comes from reaching or thinking of a liked object or thing (Turkish Dictionary, 1998).

It is assumed that cognitive absorption is a variable associated with internal motivation and is a key factor in explaining beliefs about information technologies. In researches related to involvement, it was determined that individuals with low involvement level are skeptical about technology (Tellegen, 1982); on the other hand individuals with a high level of involvement tend to adopt what they experience. The concept of Cognitive absorption was studied in educational environments where individual presents most. Especially in distance education process it was determined that Cognitive absorption is an important factor and has a positive influence with its level of learning style (Kocak Usluel & Kurt Vural, 2009; Webster & Ho, 1997).

It is known that cognitive absorption is required for the initiation and continuance of the willingness of the individual about mental experience and there is an inseparable relationship among motivation and mental processes, reactions, and thoughts (Shunk 1989; Stoney and Oliver 1999). On the other hand, when it comes to time spent on the internet, it would be right to consider the results of Randler's, et al. (2016) study. The results of this study revealed a linear relationship between being addicted to a smart phone and eveningness chronotype.

Motivation is another variable that affects academic success and consists of biological, physiological, social and cognitive powers (Fulmer & Frijter 2009), also it is an internal state that encourages, maintains and directs behavior (Woolfolk 1998). Motivation is one of the preconditions for learning (Akbaba 2006; Jurisevic et al. 2008), while it affects the academic and social life of the individual (Wentzel 1999; Oliver and Simpson 1988), it also positively contributes to the learning process and success (İflazoğlu & Tümkaya 2008). Forcing students to get up early in the morning may cause some students to sleep insufficiently, skip their breakfast, and therefore their motivation for academic activities may be affected negatively. Thus, it is essential to determine the levels of motivation in order to evaluate the effects of various factors on academic success reliably.

It is known that students who are motivated internally can participate in learning activities, if activities are organized considering their needs (Akbaba, 2006). Ryan and Deci (2009) define four features for internally motivating activities:

1. Challenging activities; activities in which targets are partially more difficult and success is not guaranteed.
2. Control or autonomy; activities in which the individuals partially feel dominant and influential on their learning.
3. Wonder and innovation; surprising experiences that differ from the individual's ideas.
4. Aesthetic value; experiences that partially stimulate emotional reactions about beauty.

Considering the fact that having a morningness or eveningness type, sleeping quality and sleeping variables affect individuals' physical, intellectual and emotional characteristics, it is necessary to conduct more studies on these issues. Therefore, this study primarily aims to examine whether the pre-service teachers' sleeping patterns can be predicted by their Cognitive absorption and academic motivation or not.

The aim of this study is to reveal the effect of cognitive entrapment and the possessed chronotype as affective factors affecting academic motivation. In other words, it is the examination of the relationships among the variables and the explanation of the concept of academic motivation in a different dimension with a model that includes these factors. In the literature, studies on the existence of chronotype among many variables that affect academic motivation have been found. However, no study has been found on the relationship between cognitive entrapment level and chronotype, and thus it may guide academic motivation, and the study was planned to test this hypothesis. It has been hypothesized that individuals who are curious and exploring on the Internet and who keep their focus high are mostly morningish types and that these individuals will also have high academic motivation. In other words, a model in which the chronotype mediates cognitive entrapment and academic motivation has been proposed.

## **1. Method**

### *1.1. Research model*

In this study, in which relational screening model was used, it was aimed to describe the change and the level of change between two or more variables (Karasar, 2005). In this study, the relationship among pre-service teachers' sleeping patterns and cognitive absorption and academic motivations were described. Path analysis with latent variables was preferred. (Kline, 2019)

### *1.2. Participants and procedure*

Participants consist of 824 pre-service teachers studying at different departments of the Faculty of Education in the city of Bursa, where researchers are located, and a sampling method was used, which was convenient and easy to access (Büyüköztürk, Kılıç, Akgün, Karadeniz, and Demirel, 2009). 210 of the preservice teachers were male (25.49%) and 614 of them were female (74.51%). The research team conducted self-report scales after obtaining all the necessary information and taking informed consent form from all participants. All students participated in the study voluntarily and anonymously.

### 1.3. Instruments

Students' daily sleeping characteristics were determined by Composite Scale of Morningness (CSM) which was developed by Smith, Reilly and Midkiff (1989); and adapted to Turkish by Onder, Besoluk and Horzum (2013). The scale aims to determine what time of the day individuals are more active. The internal consistency coefficient of the scale was calculated as 0.87. There are 13 multiple choice items in the scale and the lowest score that can be obtained from the scale is 13 and the highest score is 55. High scores obtained from the scale indicate that the individual is more active during the day and low scores indicate that the individual is more active at night. For this study, Cronbach's Alpha value was calculated as .52 for the general of the scale.

Within the research, in order to determine the academic motivation levels of the adolescence students "Academic Motivation Scale (AMS)" was used, which was formerly used by Bozanoglu (2004) for validity and reliability study. This assessment instrument is 5 Likert scale and it consists of options such as "definitely not appropriate", "not appropriate", "indecisive", "appropriate", and "definitely appropriate" and also it is scored from 1 to 5. Only the 4th item is scored verse. The highest score that can be taken from the scale is 100 and the lowest score is 20. The high scores taken from the Academic Motivation Scale mean that academic motivation is positive.

757 high school students in adolescence were reached for the validity and reliability study of the scale developed by Bozanoglu (2004). Adolescence is defined between the ages of 12-21 (Dolgin, 2014). The average age of pre-service teacher candidates participating in the study is 20.3. Before the scale was applied, a pilot study was conducted with a group of 30 pre-service teachers and a qualitative opinion was obtained about the reading speed of 20 items and the comprehensibility of the test items, and after it was understood that there was no problem, the whole group was tested. In the development of the scale, the test-retest method with 101 students was used to determine its reliability, and the correlation between the two applications was found to be .87. The internal consistency coefficients (Cronbah alfa) calculated as proof of reliability in Bozanoglu's study vary from .77 to .85 in the same group at different times and from .77 to .86 in different groups. In the development of AMS its validity features were limited with content validity, and while determining this, not only the expert opinion but also whether the scale was sensitive to the difference between the two groups that were previously known to be different from each other in terms of the measured feature was examined. As a result of the Cronbach Alpha test, which was carried out in order to determine the reliability coefficients, it can be stated that the reliability coefficient of the Academic Motivation Scale is reliable at a good level with ".86" value. For this study Cronbach Alpha values of the sub-dimensions were .74 for self-transcendence, .64 for using information, and .66 for discovery. As a result, for the reasons explained above, the validity and reliability of the scale was decided to be used in this study.

"Cognitive Absorption Scale (CAS)", which was developed by Agarwal and Karahanna (2000) and adapted to Turkish by Kocak Usluel and Kurt Vural (2009), was used as a data collection tool in the research. It is a 4-factor and 10-point Likert scale with 17 items. The scale's overall Cronbach Alpha internal consistency coefficient was ( $\alpha$ ) .92 and the scale consists of factors such as "time" [ $(\alpha)$  .88], "wonder" [ $(\alpha)$  .90], "pleasure" [ $(\alpha)$  .90] and "focus of attention" [ $(\alpha)$  .82]. It is possible to get points between 17 and 170 from the scale (Kocak Usluel & Kurt Vural, 2009). While time subscale consists of 5 items, others consist of 4 items. For this study Cronbach Alpha values of the sub-dimensions are .87, .64, .82, and .88 respectively. The personal information form was used to collect demographic information about the students, who constituted the sample of the research.

#### *1.4. Data of Analysis*

Although normality could not be determined as a result of the Kolmogorov-Smirnov test, considering the fact that mean, median, mode values were close to each other; Skewness, Kurtosis values were between +1 and -1; p-p, q-q, box plot, line graph, with frequency distribution and stem and leaf plot indicated a normal distribution, it can be stated that the data distributed normally (Tabachnick & Fidell, 2015). In addition, level and direction of three scales with one another was determined by multiple linear correlation based on the sub-dimensions, and the level of cognitive absorption predicting academic motivation over CSM was determined by conducting a structural equation model in which CSM was determined as a mediator variable. Analyzes were carried out utilizing SPSS and LISREL programs.

## **2. Results**

The findings obtained from the research are presented as follows.

Firstly, descriptive statistics and correlation coefficients among these variables are reported. In addition, within the scope of the relevant hypothetical models, mediation role of chronotypes between academic motivation of the participants and their cognitive absorption level are attempted to be determined.

**Table 1.** Multiple linear correlation results among cognitive absorption, academic motivation and morningness eveningness.

Scales	1.1.	1.2.	1.3.	1.4	2.1.	2.2.	2.3.	3.
1. Cognitive Absorption Scale								
1.1. Time		.49**	.19**	.55**	-.14**	-.07*	-.17**	.12**
1.2. Wonder			.33**	.68**	-.02	.07*	.02	.13**
1.3. Focus of Attention				.30**	-.01	.03	.03	.09*
1.4. Pleasure					-.09*	.07*	-.06	.20**
2. Academic Motivation Scale								
2.1. Self-Transcendence						.51**	.58**	-.08*
2.2. Using Information							.57**	-.02
2.3. Discovery								-.12**
3. Composite Scale of Morningness								
<i>M</i>	6.90	6.61	5.53	7.25	3.53	4.27	3.37	3.72
Std. deviation	2.37	2.23	2.05	2.21	.58	.40	.54	.43
Skewness	.387	-.452	.160	-.510	.020	-.205	-.095	-.021
Kurtosis	-.453	-.517	-.239	-.506	-.306	-.544	-.165	-.364
Cronbach's $\alpha$	.87	.64	.82	.88	.74	.64	.66	.52

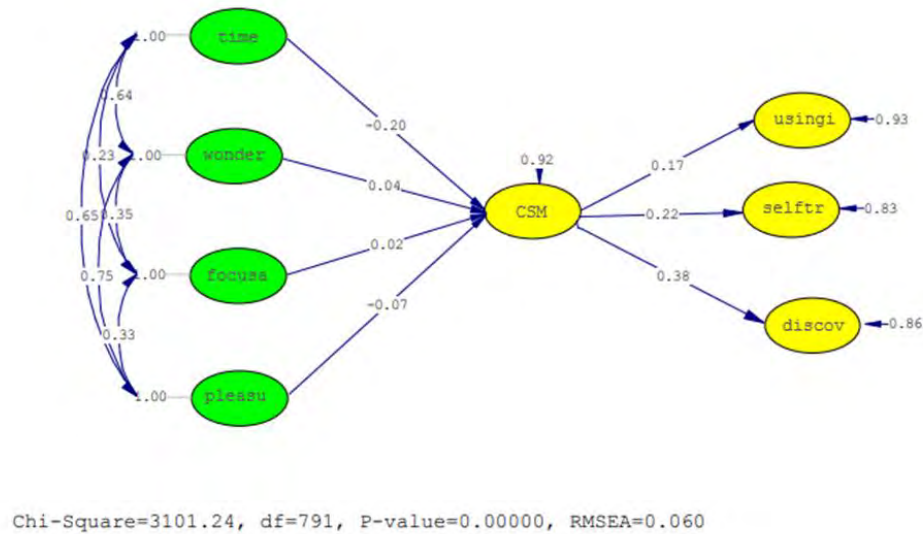
When Table 1 is analyzed, it is seen that preservice teachers mostly have morningness characteristics in the Composite Scale of Morningness (CSM) with an average score of 3.72. As a result of the multiple linear correlation analysis, negative relationship was found between time, self-transcendence ( $r = -.14$ ,  $p < .01$ ), and discovery ( $r = -.17$ ,  $p < .01$ ); as morningness increased, there was a low level of positive relationships between time ( $r = .12$ ,  $p < .01$ ), wonder ( $r = .13$ ,  $p < .01$ ), and pleasure ( $r = .20$ ,  $p < .01$ ). In addition, a negative relationship was found at low level between CSM and discovery ( $r = -.12$ ,  $p < .01$ ). Negative relationship was found among using information and time ( $r = -.07$ ,  $p < .01$ ), self-transcendence and pleasure ( $r = -.09$ ,  $p < .01$ ) and CSM ( $r = -.08$ ,  $p < .01$ ); a significant positive negligible relationship was determined among focus of attention and CSM ( $r = .09$ ,  $p < .01$ ), between using information and wonder ( $r = .07$ ,  $p < .01$ ) and pleasure ( $r = .07$ ,  $p < .01$ ). No significant relationships were determined among transcendence and focus of attention and wonder, between using information and focus of attention, between discovery and wonder, focus of attention and pleasure, and between CSM and using information.



**Table 2.** Model Cohesion Criteria

Cohesion Criterion	Value	Cohesion
$X^2/ sd=791$	3.92	Good Fit
RMSEA	.060	Good Fit
Standardized RMR	.093	Weak Fit
NFI	.89	Acceptable Fit
NNFI	.91	Good Fit
CFI	.91	Good Fit
GFI	.85	Acceptable Fit
AGFI	.83	Acceptable Fit

Model cohesion criteria are presented in Table 2. The chi-square ( $X^2$ ) value of the model was calculated that it was not significant above “.05” as “3101.24” as desired, but the ratio of the degree of freedom (sd) to the ( $X^2$ ) value is an important value for the model fit (Cokluk, Sekercioglu, Buyukozturk, 2012 , p.267-268). It can be stated that the model has a good fit considering the fact that this ratio ( $X^2 / sd = 3.92$ ) being less than 5, the approximate square root of the model's errors (RMSA) being “.060”, and the Non-Normed Fit Index (NNFI) and the Comparative Fit Index (CFI) being above “.90”. It can be stated that the model points out an acceptable fit since the Normed Fit Index (NFI), Goodness Fit Index (GFI) was above “0.80”, and Adjusted Goodness Fit Index (AGFI) was above “0.80” (Cokluk, Sekercioglu, Buyukozturk, 2012, p.400). However, as a result of the evaluation considering all these values and the values are close to the values that indicate good fit, it can be stated that the model is at an acceptable level.



**Figure 1.** Structural regression path diagram

In Figure 1, the intermediary effect of the chronotype, which is owned in the relationship between Cognitive absorption and academic motivation, is presented. A positive and statistically significant relationship was found between CSM and academic motivation variables of using information, self-transcendence and discovery. Therefore, it can be stated that 1 Point increase in CSM caused an increase of .17 in using information variable, .22 in transcendence variable, and .38 in discovery variable. Positive relationships were determined among cognitive absorption, the factors of wonder, focus of attention and CSM; negative relationships were determined among the factors of time and pleasure and CSM. Accordingly, 1point increase in time causes a decrease of .20 points in CSM and 1point increase in pleasure causes a decrease of .07 in CSM. Also 1point increase in wonder leads to .04 increase in CSM and 1point increase in focus of attention leads to .02 increase in CSM.

**Table 3.** Structural Relationships and Equations among External Latent Variables

<b>Structural Equations</b>	<b>R<sup>2</sup></b>
KSO = - .20*Time+ .04*Wonder +.02*Focus of Attention-.07*Pleasure	.05
Using Information = .02* KSO	.03
Self-Transcendence = 0.22*KSO	.05
Discovery = 0.38*KSO	.14
<b>Reduced Equations</b>	<b>R<sup>2</sup></b>
KSO = - .20*Time+ .04*Wonder +.02*Focus of Attention-.07*Pleasure	.05
Using Information = -.03*Time+.007*Wonder+.003*Focus of Attention	.001
Self-Transcendence = -.04*Time+.009*Wonder+.004*Focus of Attention	.003
Discovery = - .07*Time + .02*Wonder + .007* Focus of Attention - .03*Pleasure	.007

In Table 3, structural relationships and equations between external latent variables are presented. As a result of the regression analysis, the influence level of time, wonder, the focus of attention, and pleasure sub-dimensions that measure the Cognitive absorption of the students on CSM, were; -.20 for time, -.07 for pleasure, .04 for wonder, .02 for focus of attention; in the order of importance regarding the influence. The influence level of predictive variables mentioned according to the order of importance regarding CSM on the latent variable of using information, -.03 for time, -.01 for pleasure, .007 for wonder, .003 for focus of attention; levels of influencing the self-transcendence latent variable were; -.04 for time, -.02 for pleasure, .009 for wonder, .004 for focus of attention. When the findings were analyzed, it was determined that CSM of the students were explained by time latent variable most, and the cognitive absorption over CSM was predicted by time variable most, and also it predicted discovery latent variable most considering all Cognitive absorption variables. Time, wonder, focus of attention and pleasure latent variables predict CSM 5%; these variables predict the use of information, self-transcendence and discovery latent variables via CSM at a negligible

level. This situation indicates that these variables do not significantly affect academic motivation over CSM. However, CSM predicts using information 3%, self-transcendence 5% and discovery 14%.

### **3. Discussion**

In this study, the relationship between academic motivation and cognitive absorption levels of pre-service teachers was investigated. It was found that pre-service teachers, who had morningness chronotype, scored high in wonder and pleasure sub-dimensions of cognitive absorption variable. In other words, morningness types are curious and enjoyable in most of the time they spend on the internet. In addition, there was a significant positive relationship between having morningness chronotype and focus of attention on the internet. In the study conducted by Kandeger (2016) on the biological rhythms of university students, the results that morningness types are more calm and focused, and more prone to humor, match with the findings of this study. Likewise, it is possible to find similar study findings regarding the relationship among having morningness type and attention, focus, academic success and motivation (Masal et al., 2016; Bebee 2011; Lima et al. 2010).

Positive relationships were also found between pre-service teachers' desire to use information in their daily lives and being a researcher and enjoying the internet. In other words, pre-service teachers use the internet to access information. Contrary to popular belief, this shows that these young people are not individuals who surf the internet and wander around in a meaningless way. In their study, Ata and Yildirim (2016) found that prospective teachers have the competence to use digital technologies in daily and professional life in accordance with their purpose and to critically evaluate them. The preservice teachers stated that they have an awareness of their competence to contribute to digital culture, but their competencies are limited. Many similar types of studies, which indicate that pre-service teachers use the internet positively, were found (Dewi, 2019; Batane and Ngwako, 2017; Karaman, 2010;). This finding coincides with Kabaran, Altintas and Kabaran, (2016)'s study in which it was revealed that pre-service teachers use TV mostly for "watching news" and "News and news programs" were the first programs they prefer watching on TV and that they use internet for the purpose of "accessing information" and "informing". It is very valuable for preservice teachers to use the internet for wonder and discovery in order to support their development of teacher competencies.

In the study, it was found that as the time they spend on the internet increases, the academic motivation of pre-service teacher's decreases. These decreases are evident in the dimensions of self-transcendence and exploration. In other words, as the pre-service teachers stay longer than their needs in the internet environment, they experience a decrease in their academic pursuits and their behaviors to reach useful information. It is

possible to come across many studies on internet use becoming addictive. It seems that there are more and more studies showing that pre-service teachers also use the internet to a considerable extent (Cuhadar, 2012; Demirer, Bozoglan, & Sahin, 2013; Gezgin et al., 2017; Kvintová, Cakirpaloglu, & Hájková, 2020). It is possible to say that this result, which is consistent with the literature, will have negative consequences in terms of education if pre-service teachers stay out of academic purposes on the internet.

In this study, a model was searched for the intermediary role of the chronotype in the relationship between Cognitive absorption and academic motivation. It was concluded that the academic motivation variable of the chronotype owned predicted variables of using information, self-transcendence and discovery. Therefore, the increase in CSM (i.e., morningness type) causes an increase in variables of using information, self-transcendence and discovery. In addition, cognitive absorption is positive between the factors of wonder, focus of attention and CSM; negative relationships were found between time and pleasure factors and CSM. In other words, pre-service teachers spend their time on the internet for wonder and what they are interested in and these individuals are mostly suitable for the morningness type. On academic motivation the impact of the chronotype owned is totally 22%. Given that the chronotype is an individual difference that affects the psychological and emotional states of individuals (Gau et al. 2007), it would be appropriate to consider these results as well. Perhaps, while planning studies on developmental periods; more regulation can be made regarding morningness types in longitudinal studies.

While evaluating the academic motivation, which is one of the important topics of education, it is clear that, individuals' sleeping hours and sleeping quality should be taken into consideration. In parallel with the findings of this study, it is possible to come across many studies on chronotypes of adolescents who spend most of their time online (Li et al. 2018; Maleno et al., 2016), social jetlags (Feliciano et al., 2019; Roenneberg et al. 2012) and academic motivation relationships. However, in terms of the model that is tried to be put forward in this study, the fact that the general sleep preference of individuals is related to their way of staying on the internet and their motivation, although indirectly, it plays an important role in academic results is a new and almost never studied subject. Although it is known that academic motivation is a complex and difficult subject that cannot be explained simply by a limited number of variables (Masal et al., 2016), the necessity of repeatedly addressing the variables related to chronotype and internet use has been shown in this study.

When the findings of the research are considered as a whole, it is clearly seen that the academic motivation of the pre-service teachers who keep their curiosity and focus of interest high in the internet environment and who have morning chronotype is higher. People with these characteristics are expected to be individuals who are more successfully coping with digital danger today. In this case, it can be said that there is a

decrease in the academic motivation of individuals who spend a lot of time on the internet for the quality of the time spent on the internet and who are just for pleasure. In conclusion, it can be said that the research findings are beneficial in our understanding of ways to protect prospective teachers from digital danger and stay focused on education. This study can be a guide in terms of both representing the adolescent group and explaining their roles in addiction. Because when working with students they will be in contact with, they can help them focus only on the beneficial results of the internet. Focusing on the relationship between the chronotype of young people and teachers in educational settings with academic achievement and motivation will ease the burden of future studies. The data of this study will be helpful in raising the awareness of pre-service teachers and determining the content of psychoeducation in the fight against digital danger and internet addiction. It is recommended that future studies will investigate this research topic in a multivariate, using experimental and mixed designs in addition to relational scanning.

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